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**WORLD ECONOMIC OUTLOOK**  
**October 2008**

Financial Stress, Downturns, and Recoveries



International Monetary Fund

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# ASSUMPTIONS AND CONVENTIONS

A number of assumptions have been adopted for the projections presented in the *World Economic Outlook*. It has been assumed that real effective exchange rates will remain constant at their average levels during August 18–September 15, 2008, except for the currencies participating in the European exchange rate mechanism II (ERM II), which are assumed to remain constant in nominal terms relative to the euro; that established policies of national authorities will be maintained (for specific assumptions about fiscal and monetary policies in industrial countries, see Box A1); that the average price of oil will be \$107.25 a barrel in 2008 and \$100.50 a barrel in 2009, and remain unchanged in real terms over the medium term; that the six-month London interbank offered rate (LIBOR) on U.S. dollar deposits will average 3.2 percent in 2008 and 3.1 percent in 2009; that the three-month euro deposits rate will average 4.8 percent in 2008 and 4.2 percent in 2009; and that the six-month Japanese yen deposit rate will yield an average of 1.0 percent in 2008 and 1.2 percent in 2009. These are, of course, working hypotheses rather than forecasts, and the uncertainties surrounding them add to the margin of error that would in any event be involved in the projections. The estimates and projections are based on statistical information available through early October 2008.

The following conventions have been used throughout the *World Economic Outlook*:

- ... to indicate that data are not available or not applicable;
- to indicate that the figure is zero or negligible;
- between years or months (for example, 2006–07 or January–June) to indicate the years or months covered, including the beginning and ending years or months;
- / between years or months (for example, 2006/07) to indicate a fiscal or financial year.

“Billion” means a thousand million; “trillion” means a thousand billion.

“Basis points” refer to hundredths of 1 percentage point (for example, 25 basis points are equivalent to  $\frac{1}{4}$  of 1 percent point).

In figures and tables, shaded areas indicate IMF staff projections.

Minor discrepancies between sums of constituent figures and totals shown are due to rounding.

As used in this report, the term “country” does not in all cases refer to a territorial entity that is a state as understood by international law and practice. As used here, the term also covers some territorial entities that are not states but for which statistical data are maintained on a separate and independent basis.

## FURTHER INFORMATION AND DATA

This report on the *World Economic Outlook* is available in full on the IMF's website, [www.imf.org](http://www.imf.org). Accompanying it on the website is a larger compilation of data from the WEO database than in the report itself, consisting of files containing the series most frequently requested by readers. These files may be downloaded for use in a variety of software packages.

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# PREFACE

The analysis and projections contained in the *World Economic Outlook* are integral elements of the IMF's surveillance of economic developments and policies in its member countries, of developments in international financial markets, and of the global economic system. The survey of prospects and policies is the product of a comprehensive interdepartmental review of world economic developments, which draws primarily on information the IMF staff gathers through its consultations with member countries. These consultations are carried out in particular by the IMF's area departments together with the Strategy, Policy, and Review Department (formerly Policy Development and Review Department), the Monetary and Capital Markets Department, and the Fiscal Affairs Department.

The analysis in this report has been coordinated in the Research Department under the general direction of Olivier Blanchard, Economic Counsellor and Director of Research. The project has been directed by Charles Collyns, Deputy Director of the Research Department, and Jörg Decressin, Division Chief, Research Department. The analysis has benefited from input during the early stages by Simon Johnson, the former Economic Counsellor and Director of Research.

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The analysis has benefited from comments and suggestions by staff from other IMF departments, as well as by Executive Directors following their discussions of the report on September 17 and 19, 2008. However, both projections and policy considerations are those of the IMF staff and should not be attributed to Executive Directors or to their national authorities.

# FOREWORD

Having just joined the IMF, I can take very little credit for this edition of the *World Economic Outlook*. I regret it: Like its predecessors, this is a remarkable document which gives the reader a clear sense of what is happening in the world economy. I thank Simon Johnson, Charles Collyns, Jörg Decressin, and their team for their work.

Chapters 1 and 2 assess the state and the evolution of the world economy, an exercise that has rarely been so difficult. The world economy is decelerating quickly—buffeted by an extraordinary financial shock and by still-high energy and commodity prices—and many advanced economies are close to or moving into recession.

Developments in financial markets have dominated the news in recent weeks. The subprime crisis that unfolded in 2007 has now morphed into a credit crisis that has caused major disruption to financial institutions in the United States and Europe. Intensifying solvency concerns about a number of the largest U.S.-based and European financial institutions have pushed the global financial system to the brink of systemic meltdown. The effects on the real economy have been limited so far. In part, this may be because tax rebates in the United States supported consumption, while strong nonfinancial corporate balance sheets and profitability have allowed firms to use their own funds rather than borrow. But neither of these factors can be expected to last for very long. Credit conditions have become significantly tighter in recent weeks, threatening the ability of nonfinancial firms and a number of emerging economies to raise capital. The U.S. and European authorities have taken extraordinary measures, including massive liquidity provision, intervention to restore weak institutions, extension of guarantees, and recent U.S. legislation to use public funds to buy troubled assets from banks. But it is not yet clear that these measures will be sufficient to stabilize

markets and bolster confidence, and the situation remains highly uncertain.

This is not the only shock buffeting the world economy. Prices of oil and basic commodities have reached historically high levels in recent months. In advanced economies, a combination of real wage flexibility, well-anchored inflation expectations, and prospects of sharply reduced activity have helped to limit rises in core inflation. But in emerging and developing economies, the impact has been much more damaging. Real wages have fallen substantially. Oil exporters have found it difficult to dampen overheating economies.

Looking to the future, it is necessary to assess how these shocks will likely work their way through the world economy. Our forecasts are based on three major assumptions. The first is that commodity and oil prices are likely to stabilize, relieving pressure on inflation and giving more room, if needed, for expansionary policies. The second is that U.S. housing prices and activity will hit bottom within the next year, leading to a recovery of residential investment. The third is that, although credit will remain tight, the elements of a systemic solution to the financial crisis are now being put in place and will prevent a further worsening of financial intermediation. It is this combination that leads us to forecast that world growth will begin to recover at the end of 2009, albeit at a very slow pace. There is, however, more than the usual amount of uncertainty, and the downside risks are far from negligible.

As usual, this *World Economic Outlook* also tackles a number of topically important issues in greater depth. Chapter 3 examines the threat that the recent boom in commodity prices could unwind the past two decades' progress against inflation. To be sure, the fall in some prices—notably for oil—since mid-July has eased some of the pressure, but it is too early to relax. Com-

modity prices are likely to remain much higher in real terms than in recent decades, and this shift in relative prices will need to be absorbed without triggering second-round effects on price and wage formation. This task is likely to be easier in the advanced economies, where widening output gaps are helping to restrain inflation pressures. Moreover, these economies are much less commodity-intensive than they were in the 1970s and have more flexible labor markets and well-established monetary policy frameworks that have largely succeeded in anchoring inflation expectations. However, emerging and developing economies are more vulnerable to inflation spillovers—because of their greater resource intensity, less-well-established policy frameworks, and more rapid rates of growth. In many of these economies, second-round effects are already increasingly visible, and although slowing global growth and softening commodity prices should help rein inflation back in, risks remain that continued inflationary excesses will degrade hard-earned inflation-fighting credentials, requiring even tougher action in the future to put the cork back in the bottle.

Chapter 4 addresses what is clearly a central concern for the global economy: What will be the impact of the current financial crisis on economic activity? It is now all too clear that we are seeing the deepest shock to the global financial system since the Great Depression, at least for the United States. Are we then doomed to a slump in output as occurred in the 1930s? As Chapter 4 shows, the historical record is mixed. Periods of financial stress have not always been followed by recessions or even by economic slowdowns. However, the analysis also shows that when the financial stress does major damage to the banking system—as in the current episode—the likelihood increases of a severe and protracted downturn in activity. This is clearly demonstrated by the experiences of many economies that have struggled with virulent financial crises over the past decades, for example, the Nordic countries and Japan. Moreover, economies with more-arm's length or market-based financial systems seem to be particularly vul-

nerable to sharp contractions in activity in the face of financial stress. This is because leverage tends to be more procyclical in these economies—the risks of a credit crunch are greater. Does this mean that the United States—with a market-based financial system par excellence—is heading for a deep recession? Not necessarily, because, as the chapter shows, other factors also matter. Two sources of support for the U.S. economy are the quick and strong reaction of the Federal Reserve to lower policy rates and the robust state of the U.S. nonfinancial corporate sector. Low indebtedness and high profits have helped U.S. businesses ride the financial storm. However, the longer the financial crisis continues, the less likely it is that nonfinancial firms will be able to support strong growth.

Chapter 5 takes a fresh look at an old debate—about the value of fiscal policy as a countercyclical tool—which has taken on new relevance as the global economy slows and as turbulence in financial markets has raised questions about the effectiveness of monetary policy. The findings are not very encouraging for proponents of fiscal activism: fiscal multipliers—the impact of discretionary fiscal stimulus on output—are generally found to be quite low, and sometimes even to operate in the wrong direction, especially in economies with high debt levels where a turn to expansionary fiscal policy may raise doubts about long-term debt sustainability. This does not necessarily mean that policymakers should abandon fiscal policy as a countercyclical tool, but it does underline that fiscal initiatives, when needed, must be well targeted to have the maximum short-run impact without undermining long-run fiscal rectitude.

It is also worthwhile to consider whether the role of fiscal policy as a macroeconomic stabilizer could be enhanced by strengthening the broader fiscal framework. Two options are worth considering. First, there is the possibility that automatic stabilizers could be boosted by making regular tax and transfer programs more cyclically responsive. For example, the generosity of unemployment insurance systems could be automatically increased when the economy is in

a downturn and jobs are harder to find. Second, steps could be taken to strengthen the overall governance structure for fiscal policy—thereby reducing the risk of “debt bias” by ensuring that fiscal easing during a downturn is balanced by tightening during expansions. Improved governance could bolster the credibility and thus the effectiveness of fiscal stimulus. Recognizing the pros and cons of these approaches, I do feel they are worthy of consideration.

Finally, Chapter 6 tries to solve an important puzzle: Why have the current account balances of emerging economies been so divergent in recent years, with some economies in emerging Asia registering large surpluses and others, particularly in emerging Europe, sustaining very large and long-lasting deficits? There is no single

answer, but the chapter suggests that important contributors have been emerging Europe’s rapid financial liberalization and capital account opening, particularly in those economies integrating rapidly into the European Union, and the focus in emerging Asia on building large stocks of international reserves as self-insurance in the wake of the Asian crisis of 1997–98. This leaves open the question of whether the recent patterns will be sustained. Certainly the turbulent global environment is putting a strain on economies with large current account deficits and commensurately large external financing requirements.

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# EXECUTIVE SUMMARY

*The world economy is entering a major downturn in the face of the most dangerous financial shock in mature financial markets since the 1930s. Global growth is projected to slow substantially in 2008, and a modest recovery would only begin later in 2009. Inflation is high, driven by a surge in commodity prices, but is expected to moderate. The situation is exceptionally uncertain and subject to considerable downside risks. The immediate policy challenge is to stabilize financial conditions, while nursing economies through a period of slow activity and keeping inflation under control.*

## Global Economy under Stress

After years of strong growth, the world economy is decelerating quickly (Chapters 1 and 2). Global activity is being buffeted by an extraordinary financial shock and by still-high energy and other commodity prices. Many advanced economies are close to or moving into recession, while growth in emerging economies is also weakening.

The financial crisis that first erupted with the U.S. subprime mortgage collapse in August 2007 has deepened further in the past six months and entered a tumultuous new phase in September. The impact has been felt across the global financial system, including in emerging markets to an increasing extent. Intensifying solvency concerns have led to emergency resolutions of major U.S. and European financial institutions and have badly shaken confidence. In response, the U.S. and European authorities have taken extraordinary measures aimed at stabilizing markets, including massive liquidity provision, prompt intervention to resolve weak institutions, extension of deposit insurance, and recent U.S. legislation to use public funds to purchase troubled assets from banks. However, the situation remains highly uncertain as this report goes to press.

At the same time, the combination of the surge in food and fuel prices under way since 2004 and tightening capacity constraints has propelled inflation to rates not seen in a decade. As analyzed in Chapter 3, consumer price rises have been particularly strong in emerging and developing economies. This acceleration reflects the high weight of food in consumption baskets, still-quite-rapid growth, and less-well-anchored inflation expectations. Notably, countries that have adopted inflation-targeting regimes have generally fared better. In the advanced economies, oil price increases have pushed up headline inflation, but underlying inflation pressures seem contained.

The recent deterioration of global economic performance follows sustained expansion built on the increasing integration of emerging and developing economies into the global economy. In hindsight, however, lax macroeconomic and regulatory policies may have allowed the global economy to exceed its “speed limit” and may have contributed to a buildup in imbalances across financial, housing, and commodity markets. At the same time, market flaws, together with policy shortcomings, have prevented equilibrating mechanisms from operating effectively and allowed market stresses to build.

## Recovery Not Yet in Sight and Likely to Be Gradual When It Comes

Looking ahead, financial conditions are likely to remain very difficult, restraining global growth prospects. The baseline projections assume that actions by the U.S. and European authorities will succeed in stabilizing financial conditions and avoiding further systemic events. Nonetheless, even with successful implementation of the U.S. plan to remove troubled assets from bank balance sheets, counterparty risk is likely to remain at exceptionally high levels for

some time, slowing down the return to more liquid conditions in key financial markets. Furthermore, additional credit losses are very likely as the global economy decelerates. In this setting, financial institutions' ability to raise new capital will remain very challenged. Accordingly, as discussed in the October 2008 *Global Financial Stability Report*, the required deleveraging will continue to be a protracted process, implying that limits on the pace of credit creation—and on activity—will be present at least through 2009.

Nonetheless, several factors are expected to lay the groundwork for a gradual recovery to emerge later in 2009:

- Commodity prices are projected to stabilize, albeit at 20-year highs. The adverse terms-of-trade effects of the more than 50 percent increase in oil prices during 2008 should begin to unwind in 2009, boosting consumption in oil-importing countries.
- The U.S. housing sector is expected to finally reach bottom in the coming year, ending the intense drag on growth that has been present since 2006. The eventual stabilization of house prices should help restrain the financial sector's mortgage-related losses, and the recent intervention in the two government-sponsored enterprises, Fannie Mae and Freddie Mac, should help support the availability of credit to the housing sector. Although the housing cycle and related adjustment might lag in other advanced economies, the overall impact of the financial crisis will be severely felt.
- Notwithstanding cooling of their momentum, emerging economies are still expected to provide a source of resilience, benefiting from strong productivity growth and improved policy frameworks. Of course, the longer the financial crisis lasts, the more they are likely to be affected.

Against this backdrop, the baseline growth projections have been marked down significantly relative to the July 2008 *World Economic Outlook Update*. On an average annual basis, global growth is expected to moderate from 5.0 percent in 2007 to 3.9 percent in 2008 and

3.0 percent in 2009, its slowest pace since 2002. The advanced economies would be in or close to recession in the second half of 2008 and early 2009, and the anticipated recovery later in 2009 will be exceptionally gradual by past standards. Growth in most emerging and developing economies would decelerate below trend. On the inflation front, the combination of rising slack and stabilizing commodity prices is expected to contain the pace of price increases, bringing inflation back below 2 percent in 2009 in advanced economies. In emerging and developing economies, inflation would ebb more gradually, as recent commodity price increases continue to feed through to consumers.

There are substantial downside risks to this baseline forecast. The principal risk revolves around two related financial concerns: that financial stress could remain very high and that credit constraints from deleveraging could be deeper and more protracted than envisaged in the baseline. In addition, the U.S. housing market deterioration could be deeper and more prolonged than forecast, while European housing markets could weaken more broadly. Inflation risks to growth are now more balanced because commodity prices have retreated as the global economy slows. At the same time, potential disruptions to capital flows and the risks of rising protectionism represent additional risks to the recovery.

The connections between financial stress and economic downturns are explored in Chapter 4, which compares recent experience to earlier episodes. The analysis indicates that financial stress that is rooted in the banking sector typically has more adverse economic effects than stress in stock markets or exchange rates and that the shift toward more-arm's-length financial intermediation may have increased the impact. Initial conditions appear to affect the outcomes. Thus, the relatively healthy nonfinancial corporate balance sheets in the United States and western Europe at the beginning of the current downturn provide a source of resilience, but would be at risk from a sustained period of financial stress.

Chapter 6 raises concerns about countries with sustained large current account deficits. These concerns may be particularly relevant as global deleveraging reduces the availability of external financing for emerging economies. The analysis seeks to explain large divergences in current account behavior across the emerging world and relates the large deficits in emerging Europe to capital account liberalization, financial reform, and opportunities created by European economic convergence. However, sustained large deficits can end abruptly, and rigid exchange regimes heighten such risks. In fact, many economies with large current account deficits have already experienced a much greater impact from the financial market turmoil than those with small current account deficits or surpluses.

### Policymakers between a Rock and a Hard Place

Policymakers around the world today face the daunting task of stabilizing financial conditions while simultaneously nursing their economies through a period of slower growth and containing inflation. Multilateral efforts take on particular importance in current circumstances, including policy initiatives to remedy the financial turmoil, alleviate the tightness in commodity markets, and support low-income economies burdened by high food import bills.

Country authorities are actively pursuing policies intended to stabilize financial conditions. Achieving this daunting task will require comprehensive responses that address the systemic problems—dealing with troubled assets, fostering the rebuilding of bank capital, and restoring liquid conditions in funding markets—while being mindful of taxpayer interests and moral hazard considerations. Approaches at the national level should be internationally coordinated to deal with joint problems and to avoid creating adverse, cross-border incentives.

The U.S. initiative to purchase real-estate-related assets should help over time to reduce

the pressure on banks from distressed assets, and thus support a return of stable funding sources and confidence. However, public funds are also likely to be needed to help banks rebuild their capital bases. In western Europe, restoring confidence now requires a decisive commitment to concerted and coordinated action to facilitate timely recognition of troubled assets and bank recapitalization. A key task will be to develop cooperative agreements, adapted to a broad range of circumstances, including for resolving stress in large cross-border institutions and ensuring consistency in approaches to expanding deposit insurance.

Macroeconomic policies in the advanced economies should aim at supporting activity, thus helping to break the negative feedback loop between real and financial conditions, while not losing sight of inflation risks.

- Rapidly slowing activity and rising output gaps should help contain inflation. Moderating inflation pressure and the deteriorating economic outlook already provide scope for monetary easing in some cases, notably in the euro area and the United Kingdom, where short-term interest rates are quite high.
- Regarding fiscal policy, automatic stabilizers play a useful role in buffering shocks to activity and should be left to operate freely, provided that adjustment paths are consistent with long-term sustainability. Discretionary fiscal stimulus can provide support to growth in the event that downside risks materialize, provided the stimulus is delivered in a timely manner, is well targeted, and does not undermine fiscal sustainability. In the current circumstances, available fiscal room should be focused on supporting stabilization of the financial and housing sectors as needed, rather than for more broad-brush stimulus. In due course, offsetting adjustments to fiscal policies will be needed to safeguard medium-term consolidation objectives.

Macroeconomic policy priorities vary considerably across emerging and developing economies, as policymakers balance growth and inflation risks.

- In an increasing number of economies, the balance of risks has now shifted toward concern about slowing activity as external conditions deteriorate and headline inflation starts to moderate. This shift would justify a halt to the monetary policy tightening cycle, particularly where second-round effects on inflation from commodity prices have been limited, and a turn to easing would be called for if the outlook continues to deteriorate. In the face of sharp capital outflows, countries will need to respond quickly to ensure adequate liquidity, while using the exchange rate to absorb some of the pressure. Furthermore, they should step up efforts to improve capabilities to prevent, manage, and resolve financial stress, including through contingency planning.
- However, in a number of other countries, inflation pressures are still a concern because of sharp food price increases, continued strong growth, tightening supply constraints, and accelerating wages, notably in the public sector. Although the recent moderation in international commodity prices may ease some of the pressure, the gains in reducing inflation in recent years are being jeopardized; once credibility is eroded, rebuilding it will be a costly and lengthy process. In these countries, additional monetary policy tightening may still be called for.
- Countries with heavily managed exchange rate regimes are facing significant challenges. More flexible exchange rates would help contain inflation pressures by providing greater scope for monetary adjustment and provide more room for maneuver in the face of capital outflows. Of course, other considerations feed into choices of exchange rate regimes, including, for example, the degree of financial development and the diversity of the export base.
- Fiscal policy can play a supportive role in macroeconomic management. Greater restraint in public spending would help ease inflation pressures in a number of countries still facing overheating concerns. This is particularly important for current account deficit

countries with pegged exchange rates. In the oil-exporting economies with currencies pegged to the U.S. dollar, spending can be focused on relieving supply bottlenecks. While emerging economies have greater scope than in the past to use countercyclical fiscal policy should their economic outlook deteriorate, the analysis in Chapter 5 cautions that this is unlikely to be effective unless confidence in sustainability has been firmly established and measures are timely and well targeted. More broadly, general food and fuel subsidies have become increasingly costly and are inherently inefficient. Targeted programs that help poor families meet rising living expenses are a preferred option.

## Policy Frameworks in Need of Reform

The deteriorating performance of the global economy has raised concerns about the choice of macroeconomic policy frameworks and the appropriateness of policies affecting financial and commodity markets.

### Operationalizing “Leaning against the Wind”

The current exceptional environment has heightened interest in developing policies that would be better geared toward avoiding asset price booms and busts, including through stronger policy responses in boom times. A promising approach would be to introduce a macroprudential element into the regulatory framework to weigh against the inherent procyclicality of credit creation. Consideration could also be given to extending monetary policy frameworks to provide for “leaning against the wind” of asset price movements, especially when these are rapid or seem to be moving prices seriously out of line with fundamentals, although this raises complex issues.

Moreover, interest has increased in making fiscal policy frameworks more credible and thus making fiscal policy more effective as a countercyclical tool. The Achilles heel of an active fiscal policy remains political economy settings that

foster short-term decision-making. As a result, many countries fail during good times to build room for effective discretionary stimulus during downturns, or are struggling with addressing long-term fiscal sustainability challenges. Chapter 5 suggests that the shift toward more rules-based policy frameworks—analogous to constrained discretion in monetary policy—and the stronger fiscal governance mechanisms that can be observed in a growing number of countries could boost the effectiveness of fiscal policy in combating downturns.

### **Plugging Gaps in Regulatory and Supervisory Infrastructures**

As well as dealing with the immediate systemic threats, determined efforts are being marshaled to address the manifold weaknesses revealed by the current financial turbulence. As laid out in the October 2008 *Global Financial Stability Report*, a central objective is to ensure more effective and resilient risk management by individual institutions, including by setting more robust regulatory capital requirements and insisting on stronger liquidity management practices and improved disclosure of on- and off-balance-sheet risk. Another important task is to strengthen crisis resolution frameworks.

Moreover, the financial turmoil has revealed that national financial stability frameworks have failed to keep up with financial market innovation and globalization, at the price of deleterious cross-border spillovers. Greater cross-border coordination and collaboration among national prudential authorities are needed, particularly for the purposes of preventing, managing, and resolving financial stress both in markets and in major financial institutions.

### **Fostering Energy Conservation and Greater Oil and Food Supply**

The recent decline in commodity prices should not detract from efforts to relieve strains in commodity markets. There is little concrete evidence that rising investor interest in com-

modities as an alternative asset—or outright speculation—had a systematic or lasting impact on prices. However, the combination of unusual swings in market sentiment and greater financial market liquidity may have contributed to short-term price dynamics in some circumstances. Accordingly, the focus should be on policies to encourage better balance between supply and demand in the longer term and to avoid measures that could exacerbate market tightness in the short term. This could include greater pass-through of international price changes to domestic markets and greater energy conservation. Lower biofuel subsidies in the advanced economies could also relieve short-term pressures on food prices. In general, priority should be given to strengthening the supply response to higher prices. For now, greater donor support for the poorest economies will be crucial to address the humanitarian challenges raised by the surge in food prices.

### **Unwinding Global Imbalances**

The surge in commodity prices has led to a further widening in global imbalances, with wider current account surpluses in oil exporters and larger deficits in oil importers. Of course, exporters' intent to save some of the additional revenues is sensible: to date, the associated recycling of funding from surplus to deficit countries is working well. At the same time, the U.S. non-oil deficit has fallen substantially, in part reflecting the depreciation of the U.S. currency back toward a real effective rate that is broadly consistent with medium-term equilibrium. However, U.S. dollar depreciation has occurred mainly against the euro and some other flexibly managed currencies.

The multilateral strategy endorsed by the International Monetary and Financial Committee in 2005 and elaborated by the Multilateral Consultation on Global Imbalances in 2006 and 2007 remains relevant but needs to be applied flexibly. U.S. fiscal consolidation remains a key medium-term objective, but recent countercyclical fiscal stimulus and public support to stabi-

## EXECUTIVE SUMMARY

lize financial institutions have been warranted. Further effective appreciation of the renminbi would contribute to China's broader strategy to shift the sources of growth toward internal demand and to increase the effectiveness of monetary policy. A slowdown in spending growth in Middle Eastern oil exporters would help reduce overheating in their economies, as would a heightened focus on relieving supply bottlenecks. At the same time, product and labor market reforms in the euro area and Japan would raise potential growth.

Finally, rising protectionist pressures on both trade and capital flows reflect a worrisome risk to the prospective recovery. Breaking the current Doha Round deadlock would

help strengthen the open multilateral trading system, an important underpinning of strong global growth in recent years. At the same time, sovereign wealth funds (SWFs) continue to grow as investment vehicles for surplus countries. The set of principles and practices recently agreed by SWFs for their governance, investment, and risk management (the "Santiago Principles") will contribute to reducing concerns about these types of funds that could lead to counterproductive restrictions on such inflows. Moreover, guidelines for recipient countries, which are under development at the Organization for Economic Cooperation and Development, would help reassure the SWFs of fair, transparent, and open access to markets.

# GLOBAL PROSPECTS AND POLICIES

*The world economy is now entering a major downturn in the face of the most dangerous shock in mature financial markets since the 1930s. Against an exceptionally uncertain background, global growth projections for 2009 have been marked down to 3 percent, the slowest pace since 2002, and the outlook is subject to considerable downside risks. The major advanced economies are already in or close to recession, and, although a recovery is projected to take hold progressively in 2009, the pickup is likely to be unusually gradual, held back by continued financial market deleveraging. In this context, elevated rates of headline inflation should recede quickly, provided oil prices stay at or below current levels. The emerging and developing economies are also slowing, in many cases to rates well below trend, although some still face significant inflation pressure even with more stable commodity prices. The immediate policy challenge is to stabilize global financial markets, while nursing economies through a global downturn and keeping inflation under control. Over a longer horizon, policymakers will be looking to rebuild firm underpinnings for financial intermediation and will be considering how to reduce procyclical tendencies in the global economy and strengthen supply-demand responses in commodity markets.*

This chapter opens with an overview of a global economy under stress. It then examines the expanding financial crisis and its macroeconomic implications in more detail, as well as the imbalances in housing and commodity markets. This analysis sets the stage for the discussion of the outlook and risks. The final part of the chapter discusses the policy challenges. Chapter 2 looks in more detail at developments and policy issues in each of the world's main regions.

## Global Economy under Stress

For four years through the summer of 2007, the global economy boomed. Global GDP rose

at an average of about 5 percent a year, its highest sustained rate since the early 1970s. About three-fourths of this growth (measured on a purchasing-power-parity basis) was attributable to a broad-based surge in the emerging and developing economies (Table 1.1 and Figure 1.1). Inflation remained generally contained, albeit with some upward drift.

Over the past year, the global economy has been buffeted by the deepening crisis in financial markets, by major corrections in housing markets in a number of advanced economies, and by surges in commodity prices. Indeed, the financial crisis that erupted in August 2007 after the collapse of the U.S. subprime mortgage market entered a tumultuous new phase in September 2008 that has badly shaken confidence in global financial institutions and markets. Most dramatically, intensifying solvency concerns have triggered a cascading series of bankruptcies, forced mergers, and public interventions in the United States and western Europe, which has resulted in a drastic reshaping of the financial landscape. Moreover, interbank markets have virtually locked up as trust in counterparties has evaporated. Responding rapidly, the U.S. and European authorities have announced far-reaching measures aimed at supporting key institutions, stabilizing markets, and bolstering confidence, but markets remains highly unsettled and volatile as this report goes to press.

Faced by increasingly difficult conditions, the global economy has slowed markedly. The advanced economies grew at a collective annualized rate of only 1 percent during the period from the fourth quarter of 2007 through the second quarter of 2008, down from 2½ percent during the first three quarters of 2007. The U.S. economy has suffered most from the direct effects of the financial crisis that originated in its own subprime mortgage market, which has tightened credit conditions and amplified the

**Table 1.1. Overview of the World Economic Outlook Projections**  
*(Percent change, unless otherwise noted)*

|  | Year over Year |            |             |            |  |             |            |            |            |
|--|----------------|------------|-------------|------------|--|-------------|------------|------------|------------|
|  |                |            | Projections |            | Difference from July<br>2008 WEO Projections |             | Q4 over Q4 |            |            |
|  | 2006           | 2007       | 2008        | 2009       | 2008   | 2009        | 2007       | 2008       | 2009       |
| <b>World output<sup>1</sup></b>                            | <b>5.1</b>     | <b>5.0</b> | <b>3.9</b>  | <b>3.0</b> | <b>-0.2</b>                                  | <b>-0.9</b> | <b>4.8</b> | <b>2.8</b> | <b>3.2</b> |
| Advanced economies   | 3.0            | 2.6        | 1.5         | 0.5        | -0.2   | -0.9        | 2.6        | 0.7        | 1.0        |
| United States  | 2.8            | 2.0        | 1.6         | 0.1        | 0.3  | -0.7        | 2.3        | 0.8        | 0.4        |
| Euro area  | 2.8            | 2.6        | 1.3         | 0.2        | -0.4   | -1.0        | 2.1        | 0.4        | 0.6        |
| Germany  | 3.0            | 2.5        | 1.8         | —          | -0.2   | -1.0        | 1.7        | 0.7        | 0.6        |
| France   | 2.2            | 2.2        | 0.8         | 0.2        | -0.8   | -1.2        | 2.2        | -0.1       | 0.8        |
| Italy  | 1.8            | 1.5        | -0.1        | -0.2       | -0.6   | -0.7        | 0.1        | -0.1       | 0.2        |
| Spain  | 3.9            | 3.7        | 1.4         | -0.2       | -0.4   | -1.4        | 3.2        | 0.1        | 0.1        |
| Japan  | 2.4            | 2.1        | 0.7         | 0.5        | -0.8   | -1.0        | 1.4        | 0.2        | 0.9        |
| United Kingdom   | 2.8            | 3.0        | 1.0         | -0.1       | -0.8   | -1.8        | 2.9        | -0.3       | 0.7        |
| Canada   | 3.1            | 2.7        | 0.7         | 1.2        | -0.3   | -0.7        | 2.8        | 0.3        | 1.7        |
| Other advanced economies                                   | 4.5            | 4.7        | 3.1         | 2.5        | -0.2   | -0.8        | 5.0        | 2.0        | 3.7        |
| Newly industrialized Asian economies                       | 5.6            | 5.6        | 4.0         | 3.2        | -0.2   | -1.1        | 6.1        | 2.6        | 5.4        |
| Emerging and developing economies <sup>2</sup>             | 7.9            | 8.0        | 6.9         | 6.1        | —  | -0.6        | 8.5        | 6.1        | 6.5        |
| Africa   | 6.1            | 6.3        | 5.9         | 6.0        | -0.5   | -0.4        | ...        | ...        | ...        |
| Sub-Saharan  | 6.6            | 6.9        | 6.1         | 6.3        | -0.5   | -0.5        | ...        | ...        | ...        |
| Central and eastern Europe                                 | 6.7            | 5.7        | 4.5         | 3.4        | -0.1   | -1.1        | ...        | ...        | ...        |
| Commonwealth of Independent States                         | 8.2            | 8.6        | 7.2         | 5.7        | -0.6   | -1.5        | ...        | ...        | ...        |
| Russia   | 7.4            | 8.1        | 7.0         | 5.5        | -0.7   | -1.8        | 9.5        | 5.9        | 5.8        |
| Excluding Russia   | 10.2           | 9.8        | 7.6         | 6.2        | -0.2   | -0.8        | ...        | ...        | ...        |
| Developing Asia  | 9.9            | 10.0       | 8.4         | 7.7        | —  | -0.7        | ...        | ...        | ...        |
| China  | 11.6           | 11.9       | 9.7         | 9.3        | —  | -0.5        | 11.3       | 9.2        | 9.4        |
| India  | 9.8            | 9.3        | 7.9         | 6.9        | -0.1   | -1.1        | 8.9        | 7.2        | 6.9        |
| ASEAN-5  | 5.7            | 6.3        | 5.5         | 4.9        | -0.1   | -1.0        | 6.6        | 4.7        | 5.7        |
| Middle East  | 5.7            | 5.9        | 6.4         | 5.9        | 0.2  | -0.1        | ...        | ...        | ...        |
| Western Hemisphere   | 5.5            | 5.6        | 4.6         | 3.2        | 0.1  | -0.4        | ...        | ...        | ...        |
| Brazil   | 3.8            | 5.4        | 5.2         | 3.5        | 0.3  | -0.5        | 6.2        | 3.9        | 3.7        |
| Mexico   | 4.9            | 3.2        | 2.1         | 1.8        | -0.3   | -0.6        | 4.2        | 0.9        | 2.4        |
| <b>Memorandum</b>  |                |            |             |            |  |             |            |            |            |
| European Union   | 3.3            | 3.1        | 1.7         | 0.6        | -0.4   | -1.1        | ...        | ...        | ...        |
| World growth based on market exchange rates                | 3.9            | 3.7        | 2.7         | 1.9        | -0.2   | -0.8        | ...        | ...        | ...        |
| <b>World trade volume (goods and services)</b>             | <b>9.3</b>     | <b>7.2</b> | <b>4.9</b>  | <b>4.1</b> | <b>-1.2</b>                                  | <b>-1.9</b> | ...        | ...        | ...        |
| Imports  |                |            |             |            |  |             |            |            |            |
| Advanced economies   | 7.5            | 4.5        | 1.9         | 1.1        | -1.6   | -2.3        | ...        | ...        | ...        |
| Emerging and developing economies                          | 14.7           | 14.2       | 11.7        | 10.5       | -0.7   | -1.1        | ...        | ...        | ...        |
| Exports  |                |            |             |            |  |             |            |            |            |
| Advanced economies   | 8.4            | 5.9        | 4.3         | 2.5        | -0.7   | -1.8        | ...        | ...        | ...        |
| Emerging and developing economies                          | 11.0           | 9.5        | 6.3         | 7.4        | -2.0   | -1.7        | ...        | ...        | ...        |
| <b>Commodity prices (U.S. dollars)</b>                     |                |            |             |            |  |             |            |            |            |
| Oil <sup>3</sup>   | 20.5           | 10.7       | 50.8        | -6.3       | -13.0  | -13.6       | ...        | ...        | ...        |
| Nonfuel (average based on world commodity export weights)  | 23.2           | 14.1       | 13.3        | -6.2       | -1.3   | -1.0        | ...        | ...        | ...        |
| <b>Consumer prices</b>                                     |                |            |             |            |  |             |            |            |            |
| Advanced economies   | 2.4            | 2.2        | 3.6         | 2.0        | 0.2  | -0.3        | 3.0        | 3.3        | 1.7        |
| Emerging and developing economies <sup>2</sup>             | 5.4            | 6.4        | 9.4         | 7.8        | 0.3  | 0.4         | 6.7        | 7.9        | 6.2        |
| <b>London interbank offered rate (percent)<sup>4</sup></b> |                |            |             |            |  |             |            |            |            |
| On U.S. dollar deposits                                    | 5.3            | 5.3        | 3.2         | 3.1        | 0.4  | -0.5        | ...        | ...        | ...        |
| On euro deposits   | 3.1            | 4.3        | 4.8         | 4.2        | -0.2   | -1.1        | ...        | ...        | ...        |
| On Japanese yen deposits                                   | 0.4            | 0.9        | 1.0         | 1.2        | -0.1   | -0.3        | ...        | ...        | ...        |

Note: Real effective exchange rates are assumed to remain constant at the levels prevailing during August 18–September 15, 2008.

<sup>1</sup>The quarterly estimates and projections account for 90 percent of the world purchasing-power-parity weights.

<sup>2</sup>The quarterly estimates and projections account for approximately 76 percent of the emerging and developing economies.

<sup>3</sup>Simple average of prices of U.K. Brent, Dubai, and West Texas Intermediate crude oil. The average price of oil in U.S. dollars a barrel was \$71.13 in 2007; the assumed price based on future markets is \$107.25 in 2008 and \$100.50 in 2009.

<sup>4</sup>Six-month rate for the United States and Japan. Three-month rate for the euro area.

housing correction that has been under way since 2006. Aggressive policy easing by the Federal Reserve, a timely fiscal stimulus package, and strong export performance on the back of a weakening U.S. dollar have helped cushion these blows, but the economy has still managed to grow by only 1½ percent on average since the fourth quarter of 2007. Activity in western Europe has also slowed appreciably, damped by high oil prices, tightening credit conditions, housing downturns in several economies, the U.S. slowdown, and the appreciating euro. Japan's economy initially showed more resilience but has recently been affected by slowing exports and the impact of deteriorating terms of trade on domestic demand.

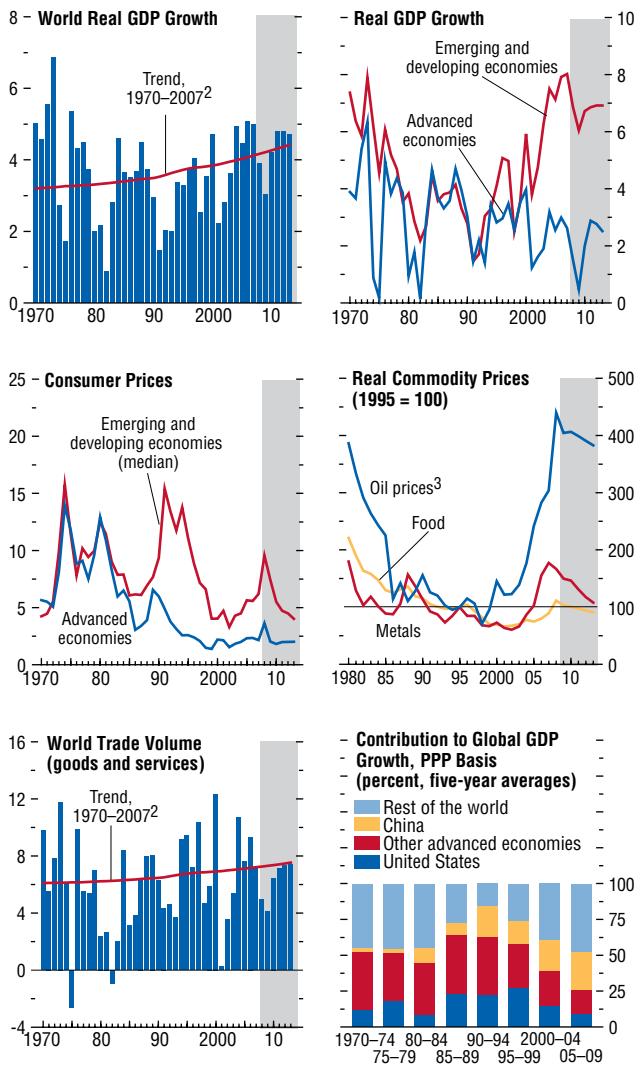
Available data for the third quarter and forward-looking indicators suggest that the downturn in the advanced economies is continuing to deepen (Figure 1.2). Indeed, business and consumer confidence indicators for the United States and the euro area are now close to lows experienced during the 2001–02 recession.

The emerging and developing economies have not decoupled from this downturn. Growth in these countries eased from 8 percent in the first three quarters of 2007 to 7½ percent in the subsequent three quarters, as domestic demand (particularly business investment) and net exports have moderated. Moreover, recent trade and business activity indicators are signaling continuing deceleration. Growth has been most resilient in commodity-exporting countries, which are benefiting from still-high export prices. By contrast, countries with the strongest trade links with the United States and Europe are slowing markedly, while some countries that relied on bank-related or portfolio inflows to finance large current account deficits have been hit hard by an abrupt tightening of external financing. Nevertheless, as a group, emerging economies have so far sustained market access better than in earlier episodes of financial turbulence, reflecting improvements in policy frameworks and stronger public sector balance sheets.

Despite the deceleration of global growth, headline inflation has risen around the world

**Figure 1.1. Global Indicators<sup>1</sup>**  
(Annual percent change unless otherwise noted)

After four years of strong growth, the global economy is heading into a major downturn, led by the advanced economies. At the same time, inflation has risen to its highest rates in a decade, pushed up by a surge in commodity prices.



Source: IMF staff estimates.

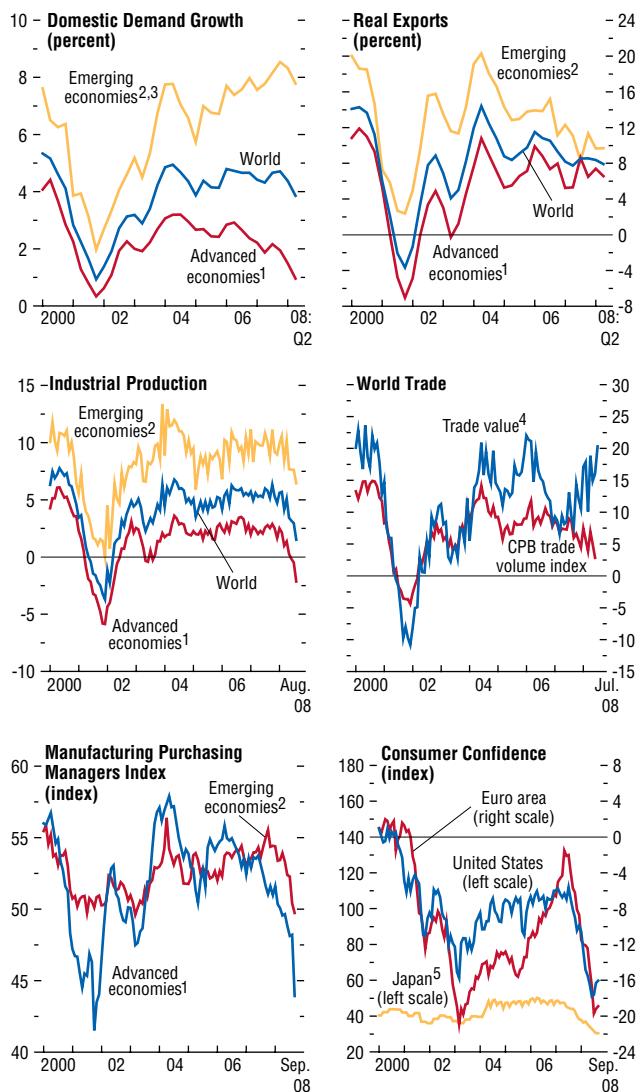
<sup>1</sup>Shaded areas indicate IMF staff projections. Aggregates are computed on the basis of purchasing-power-parity (PPP) weights unless otherwise noted.

<sup>2</sup>Average growth rates for individual countries, aggregated using PPP weights; the aggregates shift over time in favor of faster-growing economies, giving the line an upward trend.

<sup>3</sup>Simple average of spot prices of U.K. Brent, Dubai Fateh, and West Texas Intermediate crude oil.

**Figure 1.2. Current and Forward-Looking Indicators**  
(Percent change from a year earlier unless otherwise noted)

Domestic demand has slowed considerably in the advanced economies, and indicators of business sentiment and consumer confidence suggest that the deceleration is likely to intensify. Emerging economies have not decoupled, as slowing world trade has dampened manufacturing activity.



Sources: CPB Netherlands Bureau for Economic Policy Analysis for CPB trade volume index; for all others, NTC Economics and Haver Analytics.

<sup>1</sup>Australia, Canada, Denmark, euro area, Japan, New Zealand, Norway, Sweden, Switzerland, United Kingdom, and United States.

<sup>2</sup>Argentina, Brazil, Bulgaria, Chile, China, Colombia, Czech Republic, Estonia, Hong Kong SAR, Hungary, India, Indonesia, Israel, Korea, Latvia, Lithuania, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Romania, Russia, Singapore, Slovak Republic, South Africa, Taiwan Province of China, Thailand, Turkey, Ukraine, and Rep. Bolivariana de Venezuela.

<sup>3</sup>Data for China and Pakistan are interpolated.

<sup>4</sup>Percent change from a year earlier in SDR terms.

<sup>5</sup>Japan's consumer confidence data are based on a diffusion index, where values greater than 50 indicate improving confidence.

to the highest rates since the late 1990s, pushed up by the surge in fuel and food prices. In the advanced economies, 12-month headline inflation registered 4½ percent in August 2008, down modestly from a peak in July in the wake of some commodity price easing (Figure 1.3). Measures of underlying inflation—price indices excluding food and fuel prices, inflation expectations, and labor costs—have been broadly contained, although there has been upward drift in some measures. Reflecting heightened inflation concerns, the Federal Reserve has held the federal funds rate at 2 percent since April, after six months of steep cuts, and the European Central Bank increased its policy rate one notch to 4¼ percent in early July.

The resurgence in inflation has been more marked in the emerging and developing economies, with headline inflation reaching 8½ percent in the aggregate in August and with a wide swath of countries now experiencing double-digit inflation. To some extent, the difference reflects the considerably greater weight of food prices in consumption baskets in these economies—typically in the range of 30–45 percent as opposed to 10–15 percent in the advanced economies. However, inflation excluding food and fuel has also accelerated markedly, and there are signs of rising inflation expectations and wage increases, although such data are not as systematically available as in the advanced economies. Chapter 3 looks at the relationship between commodity prices and inflation and finds that emerging economies have been more vulnerable to second-round effects. This is because the greater weight of food prices has put more pressure on real wages, because inflation expectations are less well anchored by central bank credibility, and because fast growth has eroded margins of spare capacity.

Policymakers in emerging and developing economies have responded to rising inflation with an eclectic mix of measures. Many central banks have raised interest rates, but others have relied more on increasing reserve requirements and tightening credit, particularly where interest rate policy has been constrained by inflex-

ible exchange rate management. However, as discussed below, some of these steps have been reversed recently in the face of intense liquidity strains related to recent financial turmoil. Some countries have also tightened fiscal policies to help restrain the growth of aggregate demand. Going beyond macroeconomic policies, a number of countries have sought to limit the impact of rising international commodity prices on domestic prices by delaying or limiting the pass-through of oil prices—with a potentially heavy fiscal cost—by lowering tariffs on imported food, and in some cases by prohibiting or imposing taxes on food exports.

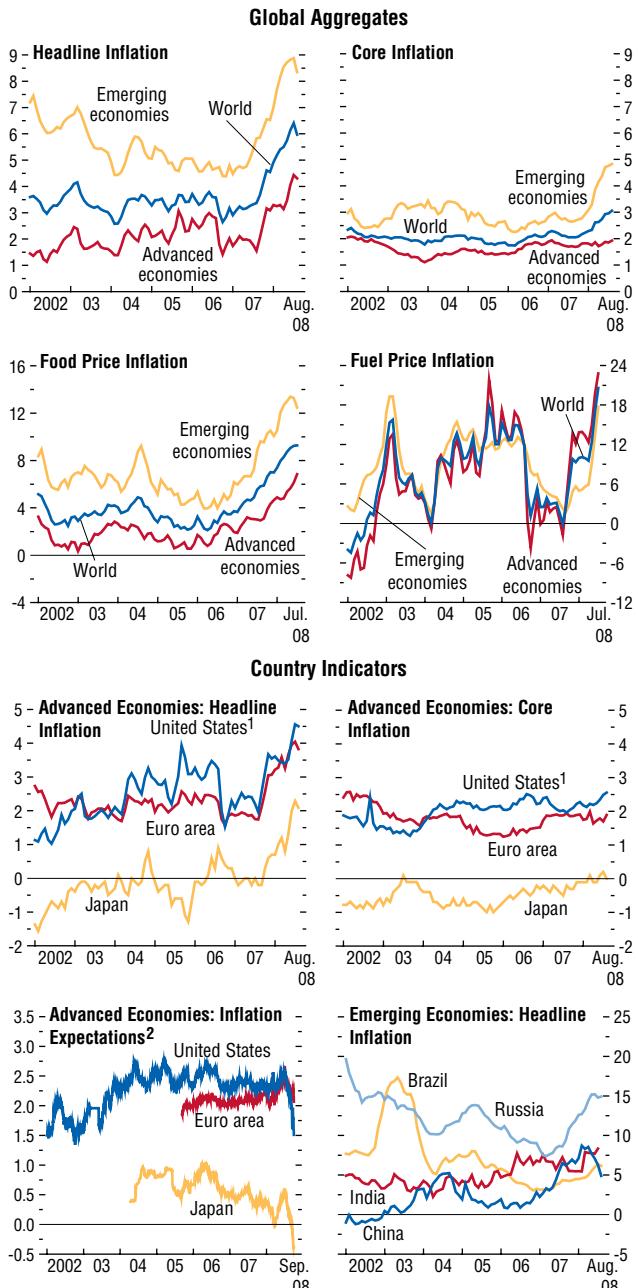
The weakening of U.S. growth relative to its trading partners and the sustained depreciation of the U.S. dollar since 2002 helped lower the U.S. current account deficit to 5 percent of GDP in the first half of 2008, from 6½ percent in late 2005 (Figure 1.4). The decrease is even larger if net oil imports are excluded. Despite some strengthening since early 2008, the real effective exchange rate of the U.S. dollar is at its lowest level in decades, and the dollar is now assessed to be broadly in line with medium-term fundamentals. The adjustment in the dollar in recent years has largely come against other advanced economy currencies, notably the euro (which is now judged to be on the strong side of fundamentals) and the yen (which is still assessed to be undervalued relative to fundamentals), as well as other floating rate currencies.

Among emerging economies, China's exchange rate has continued to appreciate at a moderate pace, with a somewhat faster rise in real effective terms owing to the pickup in inflation (Figure 1.5). Nevertheless, China's current account surplus has remained above 10 percent of GDP, and with strong capital inflows despite a tightening of controls, reserves have continued to mount. In the IMF staff's view, the renminbi remains substantially undervalued relative to medium-term fundamentals. Many oil exporters in the Middle East have continued to peg against the U.S. dollar. As a result, their nominal effective exchange rates have tended to depreciate, although exchange rates have appreciated

### Figure 1.3. Global Inflation

(Twelve-month change in the consumer price index unless otherwise noted)

Headline inflation has surged, particularly in emerging and developing economies, reflecting both a jump in food and fuel prices and a more general tightening of capacity constraints. The advanced economies have also experienced a marked acceleration of headline inflation, driven mainly by the pass-through of high international oil prices, but indicators of underlying inflation have risen only modestly.



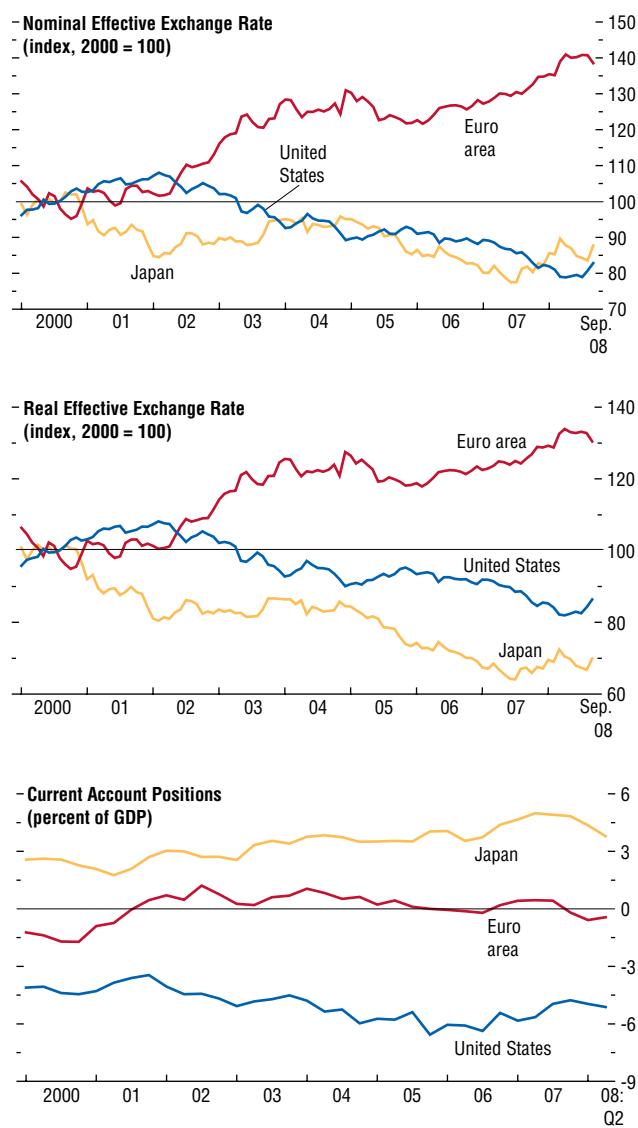
Sources: Bloomberg Financial Markets; Haver Analytics; and IMF staff calculations.

<sup>1</sup>Personal consumption expenditure deflator.

<sup>2</sup>Ten-year breakeven rates.

**Figure 1.4. External Developments in Selected Advanced Economies**

Depreciation of the real effective value of the U.S. dollar combined with slowing domestic demand have contributed to some moderation in the U.S. current account deficit. The current account positions of the euro area and Japan have weakened over the past year, reflecting exchange rate appreciation and higher oil prices.



Sources: Haver Analytics; and IMF staff calculations.

moderately in real terms because of rising inflation. Elsewhere, experiences are quite diverse. Currencies in emerging Europe and Latin America have generally appreciated, as monetary policy has been tightened and commodity exporters have benefited from terms-of-trade gains, although some currencies have come under pressure recently as commodity prices softened and risk aversion increased. A number of currencies in Africa and south and east Asia (for example, India, Korea, Pakistan, and South Africa) have depreciated over a longer period, in part owing to rising costs of commodity imports and widening current account deficits.

### Financial System in Crisis<sup>1</sup>

The April 2008 *World Economic Outlook* was finalized just after the Federal Reserve engineered the emergency sale of a major U.S. investment bank (Bear Stearns) and increased broker-dealer access to emergency liquidity. Banks also made progress in recognizing their losses on subprime-mortgage-related exposures, rebuilding their capital, and reducing their leverage.<sup>2</sup>

Despite these efforts, financial market strains intensified again over the summer as solvency concerns resurfaced and as it became clear that the process of balance-sheet repair would be protracted. Bank funding came under particular stress (Figure 1.6). One source of pressure was the increasing concern that credit losses were mounting in the grip of a negative feedback loop between the economy and the financial system. At the same time, bank adjustment was hampered by high funding costs, reduced revenue streams from fee-based securitization

<sup>1</sup>Financial sector developments are discussed in detail in the October 2008 *Global Financial Stability Report* (IMF, 2008b).

<sup>2</sup>As of September 2008, banks reported \$518 billion in losses on U.S. subprime mortgages and related exposure, the lion's share by U.S. and European banks. Banks also raised \$364 billion in new capital. These amounts compare to losses on U.S.-based loans and related securities now estimated at \$1.4 trillion, of which \$640 billion-\$735 billion would correspond to banks (IMF, 2008b).

business, and forced accumulation of assets from off-balance-sheet entities and prior loan commitments. Falling equity prices made raising new capital increasingly expensive, often prohibitively so, while at the same time, markets as well as regulators were looking for a significant increase in capital-to-asset ratios to levels well above those prevailing before the crisis.

Once more, the greatest strains have been experienced by institutions heavily exposed to the still-weakening U.S. housing market. Starting in August, Fannie Mae and Freddie Mac, the two giant government-sponsored enterprises (GSEs),<sup>3</sup> came under heavy pressure over concerns about the adequacy of their capital bases in the face of rising losses, which were not relieved by assurances from the U.S. authorities that these two institutions would have access to federal funding to meet their liquidity and capital needs. In light of the crucial current role of these agencies in the U.S. housing market and the global financial system, the two institutions were placed under the conservatorship of the U.S. Federal Housing Finance Agency, with the U.S. government pledging additional financial support as needed to maintain adequate capital and funding.

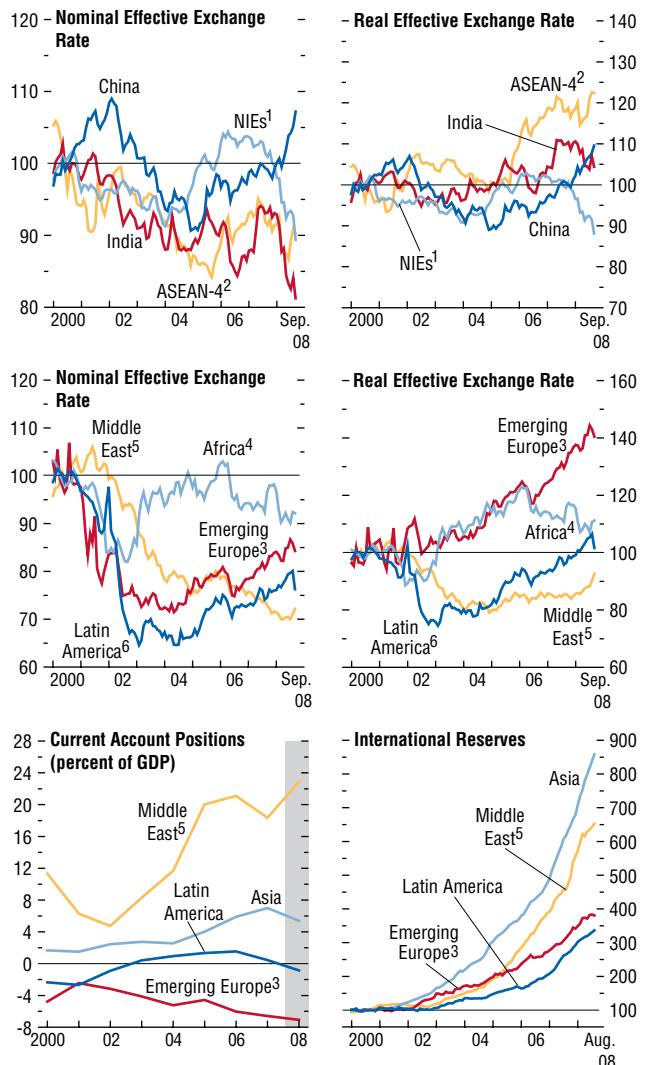
Notwithstanding these efforts, global financial markets were plunged into turmoil in mid-September following the bankruptcy of a second major U.S. investment bank (Lehman Brothers), involving significant losses to creditors and counterparties. In the next few days, market pressure drove the merger of another (Merrill Lynch & Co.) with a large commercial bank and the effective acquisition by the Federal Reserve of the world's largest insurance company (American International Group, A.I.G.) to avoid a disorderly bankruptcy. All of these institutions

<sup>3</sup>Formally, the Federal National Mortgage Association and Federal Home Loan Mortgage Corporation, respectively. The GSEs hold or guarantee about 50 percent of U.S. mortgages and have supported 80 percent of new mortgage lending in recent months. Moreover, their securities are held widely across the global financial system and have provided a major conduit for external financing of the U.S. current account deficit.

### Figure 1.5. External Developments in Emerging and Developing Economies

(Index, 2000 = 100, unless otherwise noted)

Exchange rate movements have recently been quite diverse across emerging and developing economies. A number of oil-importing countries in Asia, especially those with close trade ties to the United States, have experienced currency depreciation, while China's currency has continued to appreciate. Currencies in Latin America and emerging Europe have also generally remained buoyant, although weakening recently.



Sources: IMF, *International Financial Statistics*; and IMF staff calculations.

<sup>1</sup>Newly industrialized Asian economies (NIEs) comprise Hong Kong SAR, Korea, Singapore, and Taiwan Province of China.

<sup>2</sup>Indonesia, Malaysia, Philippines, and Thailand.

<sup>3</sup>Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Turkey.

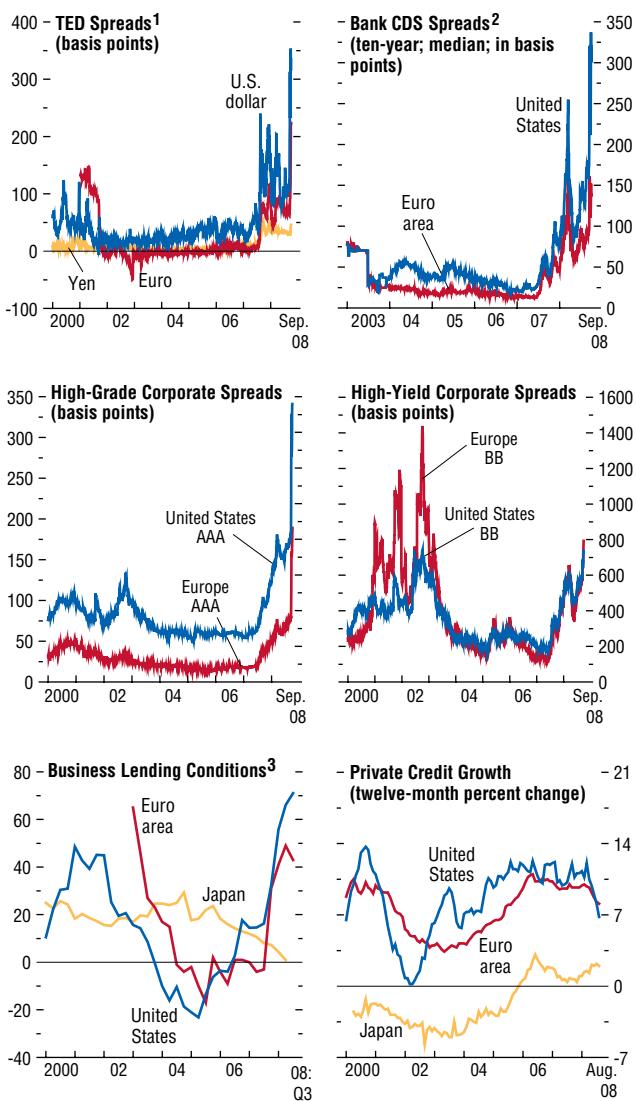
<sup>4</sup>Botswana, Burkina Faso, Cameroon, Chad, Republic of Congo, Côte d'Ivoire, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Kenya, Madagascar, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Sudan, Tanzania, Uganda, and Zambia.

<sup>5</sup>Bahrain, Egypt, I.R. of Iran, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, and Republic of Yemen.

<sup>6</sup>Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Rep. Bolivariana de Venezuela.

**Figure 1.6. Developments in Mature Credit Markets**

Credit market stresses intensified again in September, reflected in soaring spreads in the interbank market. Risk spreads have widened sharply across a broad range of financial assets. At the same time, bank lending standards have been tightened sharply in the United States and euro area, and credit growth is now starting to moderate.



Sources: Bank of Japan; Bloomberg Financial Markets; Board of Governors of the Federal Reserve System; European Central Bank; Merrill Lynch; and IMF staff calculations.

<sup>1</sup>Three-month London interbank offered rate minus three-month government bill rate.  
<sup>2</sup>CDS = credit default swap.

<sup>3</sup>Percent of respondents describing lending standards as tightening "considerably" or "somewhat" minus those indicating standards as easing "considerably" or "somewhat" over the previous three months. Survey of changes to credit standards for loans or lines of credit to enterprises for the euro area; average of surveys on changes in credit standards for commercial/industrial and commercial real estate lending for the United States; average of changes in credit standards for small, medium-size, and large firms for Japan.

were heavily exposed to mortgage-related losses. As confidence in counterparties all but vanished, interbank markets effectively seized up, despite coordinated injections of massive liquidity by major central banks and agreement on foreign exchange swaps of unprecedented magnitude. Subsequently, a number of other U.S. and European banks needed to be resolved through closure, nationalization, or merger with public support.

The authorities in the United States and Europe responded to this firestorm with a series of new initiatives. Notably, in early October, legislation was passed in the United States to set up a \$700 billion fund to purchase troubled mortgage-related securities from banks in order to contain risks of further losses from this source, encourage the development of more transparent pricing of these assets, and reduce illiquidity on bank balance sheets. At the same time, deposit-guarantee schemes were extended in the United States and a number of European countries, including a temporary guarantee for U.S. money market funds and a guarantee for creditors as well as depositors in Ireland. Restrictions also were imposed on short-selling of financial stocks to alleviate speculative pressure.

As this report goes to press, financial conditions continue to be under extraordinary stress. Interbank markets remain highly disrupted beyond overnight maturities, equity prices have fallen sharply, and market volatility continues to be at a high pitch (Figure 1.7). Moreover, market sectors that had been less affected by the turmoil have come under substantial increased pressure, including the nonfinancial corporate sector and emerging markets, as outlined in Box 1.1. Amid this turbulence, government securities have been viewed as a safe haven; U.S. Treasury bill yields were driven to close to zero.

Intensifying financial strains are beginning to take an increasingly heavy toll on economic activity. One of the main channels for such macrofinancial linkage is through tightening bank lending standards in both the United States and western Europe (see Figure 1.6). This has occurred in response to banks' efforts to

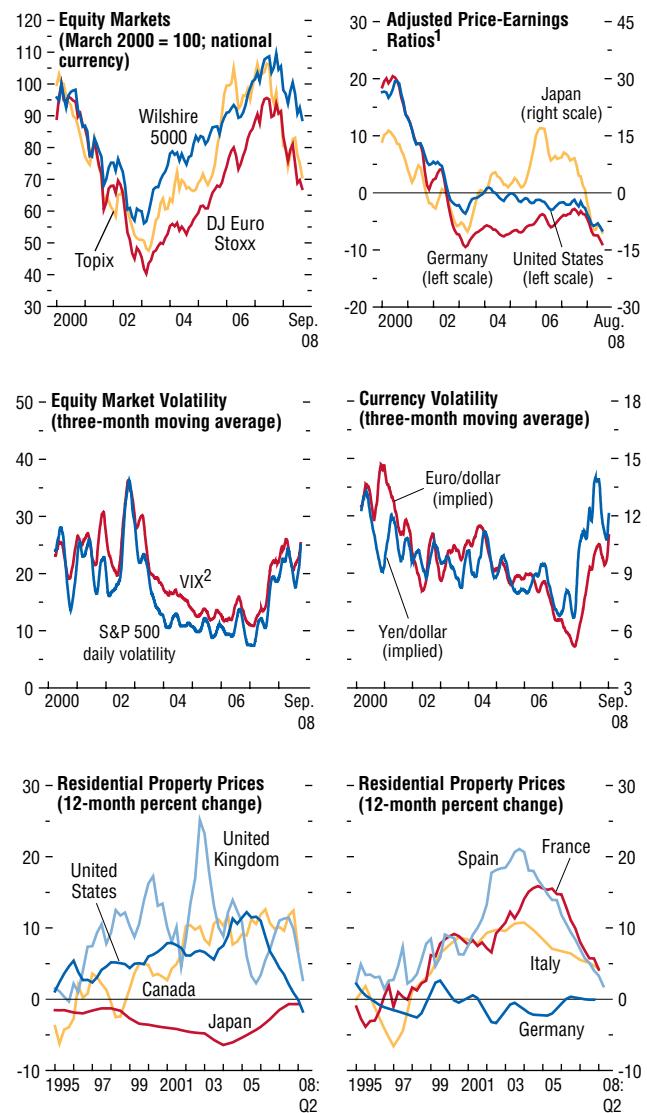
decrease their leverage in the face of reduced market tolerance for balance-sheet risk, increasingly expensive bank capital, and reduced access to wholesale funding. Actual credit growth was sustained for a while by the reintermediation of off-balance-sheet exposure and prior lending commitments, but credit growth is now slowing visibly both to the nonfinancial corporate sector as well as to households, and this winding back of credit is likely to continue until bank capitalization is raised substantially. It is also clear that financing through securities markets is likely to remain highly constrained for higher-risk borrowers as spreads have widened and securitization has fallen dramatically.

The financial crisis is increasingly affecting emerging markets too, reflecting rising risk aversion among investors, the reduced availability of funding for leveraged investors like hedge funds, and a weakening of growth prospects in emerging economies. Local money markets have experienced particular pressures, prompting central banks in a number of countries to ease reserve requirements and to take other actions to reduce strains on liquidity. Moreover, equity prices have fallen sharply, and spreads on both sovereign and corporate paper have widened markedly (Figure 1.8). Countries with large external financing needs and commodity exporters facing the prospect of lower prices have faced particular pressure from the reversal of capital flows. Nevertheless, looking back over the past year, overall capital flows to emerging economies have been quite resilient, certainly by past standards. Against this background, private credit growth has continued to be rapid in many of these economies, and domestic interest rates have declined in real terms as rising inflation has outstripped increases in policy rates.

The concerns expressed in the April 2008 *World Economic Outlook* about the impact of sustained tight credit conditions on economic activity remain highly relevant. These concerns have been reinforced by the analysis in Chapter 4, which outlines how past episodes of financial stress involving shocks to the banking sector have typically been followed by deeper-

**Figure 1.7. Mature Financial and Housing Market Indicators**

Financial strains are being reflected in a sharp correction in equity prices and sustained high volatility in equity and currency markets. Property price dynamics have continued to weaken, most notably in the United States, but also in France, Italy, Spain, and the United Kingdom.



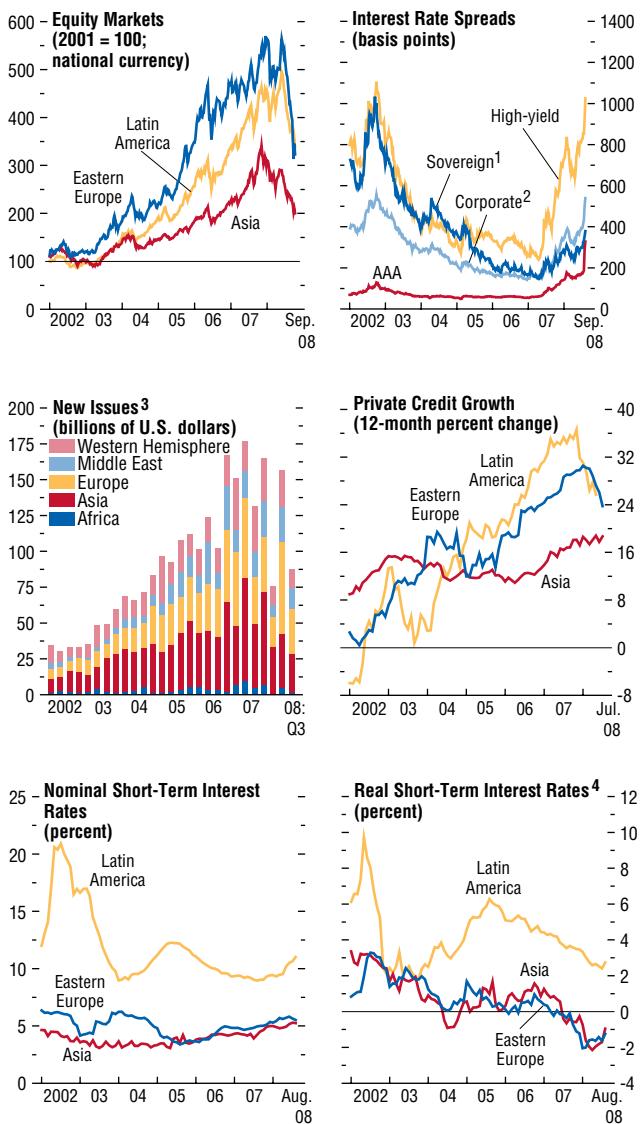
Sources: Bloomberg Financial Markets; Datastream; CEIC Data Company Limited; Haver Analytics; IMF, *International Financial Statistics*; OECD, *Economic Outlook*; and IMF staff calculations.

<sup>1</sup>Adjusted price-earnings ratio is the ratio of stock prices to the moving average of the previous 10 years' earnings, adjusted for nominal trend growth. Adjusted price-earnings ratios are measured as the three-month moving average of deviations from the 1990–2008 (August) average.

<sup>2</sup>VIX is the Chicago Board Options Exchange volatility index. This index is calculated by taking a weighted average of implied volatility for the eight S&P 500 calls and puts.

### Figure 1.8. Emerging Market Conditions

Emerging market conditions have been affected increasingly by financial strains in mature markets. Equity prices have dropped sharply in recent months, spreads have widened, and new issues have moderated from last year's highs. At the same time, domestic interest rates have been increased in response to rising inflation, but real rates have declined. Although private credit growth has moderated some, it remains high.



Sources: Bloomberg Financial Markets; Capital Data; IMF, *International Financial Statistics*; and IMF staff calculations.

<sup>1</sup>JPMorgan EMBI Global Index spread.

<sup>2</sup>JPMorgan CEMBI Broad Index spread.

<sup>3</sup>Total of equity, syndicated loans, and international bond issuances.

<sup>4</sup>Relative to headline inflation.

than-usual business-cycle downturns and more protracted recoveries. The main transmission channel from financial sector shocks to downturns in activity seems to be a contraction in net lending to the business and household sectors. Chapter 4 points out that the growing role of securities markets and of arm's-length financing has not in fact reduced the vulnerability of the economy in the face of banking stress and presents evidence suggesting that the impact could be even larger because of procyclical swings in leverage.

One important lesson from Chapter 4 is that the extent of damage to the economy depends on the initial strength of corporate and household financial positions and housing price developments. The U.S. economy seems particularly vulnerable because household balance sheets are stretched and the housing sector is undergoing a major correction. The relatively strong initial position of the U.S. corporate sector and the rapid shift toward monetary easing are identified as mitigating factors. Western European economies should gain some protection from the strong position of households, but would nevertheless also be at considerable risk from a sustained period of financial stress.

### Deepening Housing Corrections

Financial factors have interacted in important ways with housing cycles to amplify the extent of housing booms and busts and procyclical swings in leverage. The historic housing booms experienced in the United States and many western European economies since the early years of this decade had their origin in falling real interest rates, strong growth, and in some cases rapid immigration. However, the expansion was also fueled by new financing techniques based on securitization and weakening lending standards, particularly in the United States.<sup>4</sup> By 2006, more than 40 percent

<sup>4</sup>Dell'Arickia, Igan, and Laeven (2008) document how the weakening of lending standards contributed to the deterioration of credit quality in the U.S. subprime sector.

### Box 1.1. The Latest Bout of Financial Distress: How Does It Change the Global Outlook?

Since the beginning of the financial crisis in mid-2007, the *World Economic Outlook* baseline forecast has envisaged that financial strains would be protracted and would take a significant toll on economic activity. However, the resilience of the nonfinancial corporate sector in advanced economies and the momentum of growth in emerging economies were expected to cushion the impact on global growth. Data through mid-September 2008 were broadly consistent with this assessment. With the financial crisis entering a new, more severe stage in September 2008, the question arises as to whether the likely course of the global economy has changed. This box specifically explores how the nonfinancial corporate sector in advanced economies and emerging markets have been affected by the latest financial events, highlighting mounting risks to these segments of the global economy.

The latest stage of the financial crisis started in September 2008, when several systemically important U.S. financial institutions abruptly exited the market. Lehman Brothers' decision to file for bankruptcy, in particular, reverberated across global financial markets, exacerbating the severe contraction in market liquidity and heightening concerns about counterparty risks. The cost of U.S. dollar funding surged globally, and other money markets also came under severe strain. As investors' appetite for risk declined, pressures extended to emerging markets, particularly to Russia, which faced a confluence of shocks. The global financial turmoil has been met with a far-reaching public response. However, financial markets remain under strain, and confidence is still fragile. Major structural shifts in the U.S. financial sector, which took place during this latest stage of the crisis, have intensified and broadened the deleveraging process, laying the groundwork for a further downsizing of the financial sector.<sup>1</sup>

Note: The authors of this box are Andreas Jobst and Natalia Tamirisa.

A worrying aspect of this latest bout of turbulence is that there are now increasing signs that market strains are starting to fall more heavily on the nonfinancial corporate sector and on emerging markets. If sustained, such strains could well foreshadow a more severe macroeconomic impact of the financial crisis than previously anticipated.

The nonfinancial sector in advanced economies is now more broadly affected than during the earlier stages of the crisis. Spreads on high-grade nonfinancial corporate bonds, which have risen gradually since the beginning of the crisis, rose further during the latest round of turbulence (first figure). They now stand at almost double the 2002 peaks and indicate a default risk comparable to that of emerging market sovereign debt. Low-grade corporate spreads also surged, but they remain below the historical highs of 2002. Access to short-term financing has tightened and equity prices have declined (upper panel of second figure), although equity prices still remain above previous troughs.

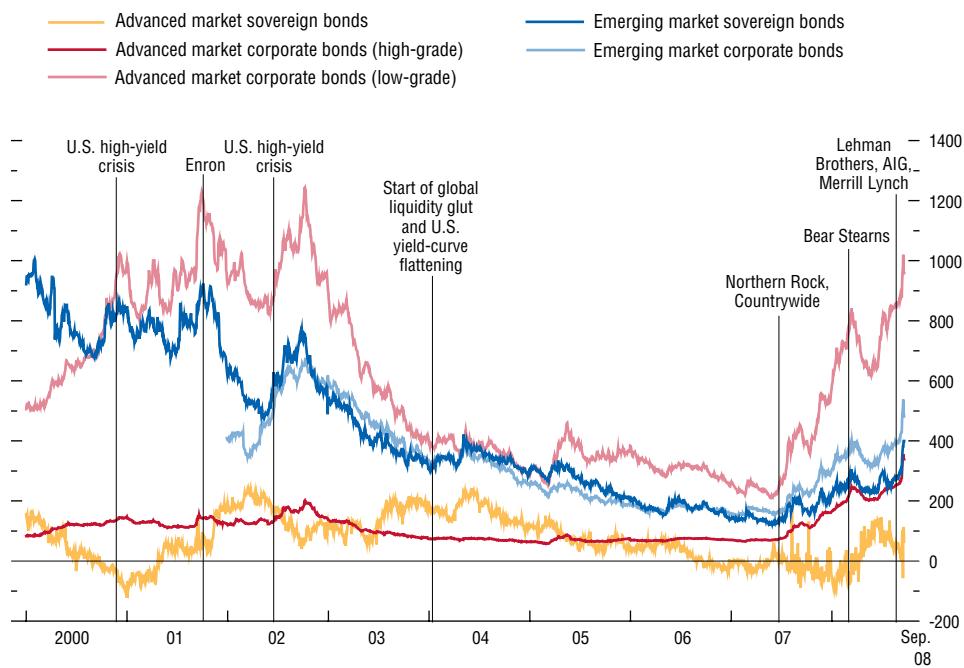
The recent surge in borrowing costs for nonfinancial firms has taken place against the backdrop of a gradual worsening of their risk profiles over the course of the financial crisis. The market-based measures of default risk and leverage ratios<sup>2</sup> have risen across the credit spectrum in both the United States and Europe—not only for low-grade bonds, as would be expected during a slowdown,<sup>3</sup> but for high-grade bonds too (middle panel of second figure). For high-grade corporate bonds in the

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<sup>1</sup>For more details, see the main text of Chapter 1 and Box 1.1 of the October 2008 *Global Financial Stability Report* (IMF, 2008b).

<sup>2</sup>The default probabilities are calculated for individual companies from market data using the modified Black-Scholes-Merton option pricing formula and balance-sheet data over a one-year risk horizon before they are aggregated to the country and regional levels. The market value, based on equity prices, approximates the company's asset value. Market leverage is defined as the ratio of debt to equity, valued at market prices.

<sup>3</sup>See Box 1.1 in the April 2008 *World Economic Outlook*.

**Box 1.1 (continued)****Advanced and Emerging Markets: Sovereign and Corporate Bond Spreads, 2000–08<sup>1</sup>**  
*(In basis points)*

Sources: Bloomberg Financial Markets; Datastream; JP Morgan; Moody's KMV; Thomson Reuters; and IMF staff calculations.

<sup>1</sup>The corporate bond spreads are derived as the difference between the asset swap spread and the commensurate London interbank offered rate. The sovereign bond spread series for advanced markets is a composite of the five-year U.S. Treasury rate over the effective federal funds rate and the five-year German Bund over the EONIA rate (i.e., the effective European Central Bank policy rate).

United States, for example, the probability of default has doubled since June 2007, although it remains below the levels experienced in 2004,<sup>4</sup> in part owing to strong corporate balance sheets, particularly, ample internal funds.

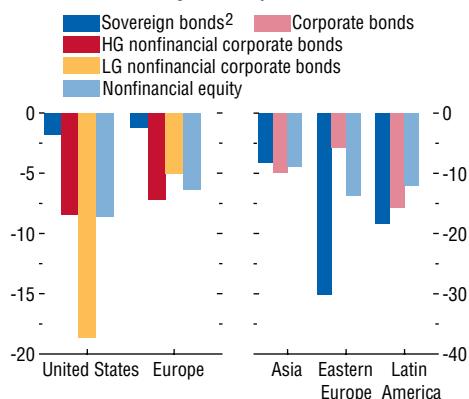
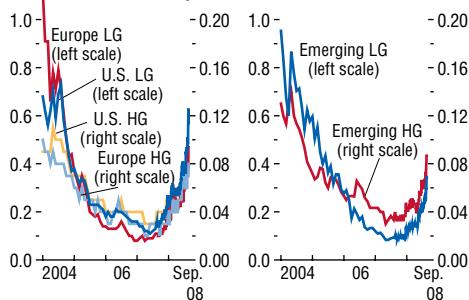
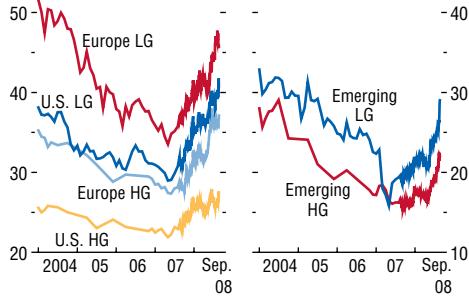
Why are high-grade nonfinancial firms being affected more severely during the current crisis than during the previous major decline in financial markets in 2000–02, following the collapse of the dot-com bubble? A possible general explanation relates to differences between the shocks that triggered the respective downturns.

<sup>4</sup>Earlier data are not available.

The current downturn has its roots in the financial sector, where the originate-to-distribute model largely ceased to function. The financial shock is being transmitted to the nonfinancial sector via tighter financing conditions and, more recently, a drying up of market liquidity. The ubiquity of these channels leaves little room for differentiation across the credit spectrum. In contrast, the dot-com bubble originated in the nonfinancial sector, notably high-yield corporate credit, and was transmitted mainly through the solvency channel, affecting low-grade nonfinancial corporate bonds to an appreciably larger extent than high-grade ones. A more specific reason for increased pressures on high-grade

**Selected Financial Indicators<sup>1</sup>**

(Percent)

**Returns, August 31–September 22, 2008****Median Market-Based Default Probability of Nonfinancial Corporates, 2004–08****Median Market Leverage of Nonfinancial Corporates, 2004–08**

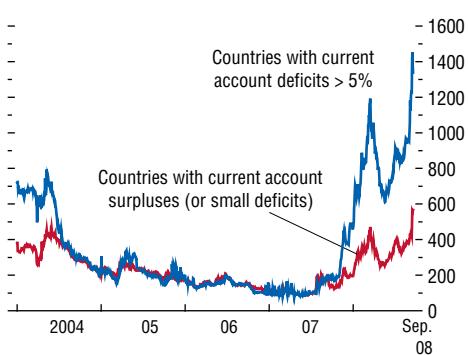
Sources: Bloomberg Financial Markets; Datastream; Moody's KMV; Thomson Reuters; and IMF staff calculations.

<sup>1</sup>LG = low-grade; HG = high-grade.

<sup>2</sup>The change in returns of sovereign bonds in the United States and Europe is based on prices of the one-month futures contract on the effective Fed Funds rate and the total return index on German Bunds, respectively.

**Emerging Economies: Credit Default Swap Spreads, 2004–08<sup>1</sup>**

(In basis points)



Sources: Bloomberg Financial Markets; and IMF staff calculations.

<sup>1</sup>Equally weighted composites of five-year sovereign credit default swap contracts.

nonfinancial firms relates to a growing concern about their rollover risk during the current crisis, because refinancing plans have led to a bunching of maturing bond obligations over the coming years, while bank financing has tightened. Moreover, declines in equity prices have increased the cost of raising capital.

The cost of borrowing for emerging markets has also increased further in recent weeks, although it remains below the peaks during 2001–02 and the Asian crisis of 1997–98. There has been a sharp and broad-based retrenchment from emerging market assets as a result of investors' reduced appetite for risk and their need to sell assets to raise cash in response to margin calls. Idiosyncratic risks are rising. Emerging Europe and Latin America are experiencing the largest declines in sovereign and corporate bond returns, while the effect on emerging Asian assets has been more muted (see upper panel of second figure). The increased differentiation in credit markets according to countries' financing needs points to a heightened risk of sudden stops in capital

**Box 1.1 (*concluded*)**

flows and currency crises in vulnerable emerging economies (third figure).

Since the beginning of the crisis, corporate spreads for emerging economies have risen above sovereign spreads (see first figure), suggesting that investors consider the emerging market nonfinancial sector to be more vulnerable than the public sector, possibly owing to their more limited domestic finance opportunities, higher leverage, and greater rollover risks compared with sovereigns. The latter are perceived to be more protected, including by high official international reserves and improved public sector balance sheets.

As in advanced economies, the recent increase in emerging market corporate spreads comes on the heels of an earlier weakening in the risk profiles of nonfinancial firms, in part owing to slower growth (see lower panels of second figure). Market-based default probabilities have nearly tripled since the beginning of the crisis for both high- and low-grade bonds, although they remain below recent peaks. High-grade nonfinancial corporates from emerging Asia currently have the highest default probabilities, reflecting the fact that they have the highest market-based leverage ratios in the respective subgroup. This is partly due to increased external corporate borrowing on the back of appreciating currencies in the past two years. In the low-grade segment, Latin American corporate bonds have the highest leverage ratios.

Nonetheless, corporate spreads and emerging sovereign spreads remain well below the levels experienced after the Asian crisis, the Argentine default, and the dot-com collapse (see first figure). One reason is that emerging economies have become more resilient to external financing shocks because of larger international reserves, higher revenues from commodities, and more robust domestic demand. Another reason is that emerging economies are facing a less-direct shock: the collapse of the dot-com bubble revolved around a technological innovation that was shared more broadly across the world than the originate-to-distribute banking model, and the Asian crisis originated in emerging economies.

In sum, the latest stage of the financial crisis has seen a further steady weakening in corporate and emerging economies' positions. Whether this deterioration will be sustained is unclear at the moment. Markets remain exceptionally volatile, and it is difficult to predict how long this volatility will persist. The longer the turmoil lasts, the more entrenched the feedback loop between the financial and real sectors will become and the more broadly real sectors across the world will suffer. This, together with intensified and broadened deleveraging, would delay the recovery and increase the likelihood of a global recession. Accordingly, recent developments suggest that the outlook for global growth has weakened considerably as a result of recent events and that the downside risks to the baseline forecast have increased.

of new U.S. mortgages were nonprime mortgages, often with very high loan-to-value ratios and minimal documentation. In European countries, there is less evidence of declining lending standards, but, as in the United States, in several countries the availability of housing finance was sustained through the increased availability of wholesale financing, involving serious liquidity mismatches in some cases.

The subsequent downswing in the U.S. housing market has been the largest of the

postwar period, as housing activity and prices have both fallen steeply. The downswing has been exacerbated by the virtual disappearance of the subprime market, a general tightening of lending standards, increasing spreads on conventional mortgages despite monetary easing (due to the deteriorating financial situation of the GSEs), and sharply rising foreclosures. In western Europe, housing cycles have also turned down recently, in some cases because lending standards have been tightened and

credit has become more expensive. The most severe downswings have been concentrated in a few national markets—Ireland, Spain, and the United Kingdom—which had experienced the most rapid house price appreciation or the greatest building booms, but house prices are slowing more broadly (see Figure 1.7, lower panels). IMF staff analysis of house price valuations provided in Box 1.2 suggests that, after allowing for the impact of key fundamentals, houses continue to appear overvalued across a broad range of advanced economies, although prices in the United States are now moving closer in line with past relationships.

As discussed in Box 1.2, housing downturns can have a strong negative impact on growth through a range of channels. Most directly, the contraction of residential investment has subtracted  $\frac{3}{4}$  percentage point a year from U.S. growth over the past two years, and similar retrenchments are having an even larger impact in Ireland and Spain. In addition, the heavy and continuing losses from mortgage-related assets—both direct losses through rising loan delinquencies and indirect losses on mortgage-backed assets being marked to market—have been a central driver of the financial crisis and the related tightening of credit conditions. Finally, there is the negative impact of declining house prices on opportunities for borrowing using housing collateral, as well as possible wealth effects. While consumption has been quite resilient in the United States, in part because of tax rebates, it is now slowing fast.

## Overstretched Commodity Markets

Commodity prices remain at much higher levels in real terms than at any time in the past 20 years, despite some correction since mid-July amid the slowdown of the global economy (see Figure 1.1). Chapter 3 lays out evidence that the driving force behind the sustained run-up in commodity prices has been the tightness of demand-supply balances for many key products and realization that markets are likely to remain tight for the foreseeable future, after many years

of ample spare capacity. Commodity demand growth has essentially been driven by the continuing integration of large pools of low-income labor, especially in Asia, into the global economy—groups with low per capita consumption but high income elasticity of demand. Moreover, the supply response to rising relative prices has been sluggish, in part because of geological and technological constraints, particularly in the oil sector, in part because of lingering concerns that oil prices may yet revert to the much lower levels observed in the second half of the 1980s and the 1990s, and in part because of policy shortcomings that have discouraged investment in new supply, for both energy and food. With inventories low and spare capacity limited, and with very low short-term supply-and-demand price elasticities, commodity prices have become highly sensitive to news about possible supply disruptions or changing perceptions of cyclical prospects. Thus, the recent softening in prices seems to have been driven largely by perceptions that global growth is slowing and emerging evidence of a demand response to high prices (notably in the United States), as well as by some favorable supply developments.

Some observers have suggested that recent large commodity price swings are related to speculation or increasing investment in commodities as assets, rather than to shifts in fundamentals affecting supply and demand. IMF staff has found some evidence that the depreciation of the U.S. dollar and declining U.S. interest rates have had an effect on prices through their impact on supply and demand. However, as discussed in Box 3.1, while limitations on data availability make it hard to reach definitive judgments, there is little concrete evidence that rising speculation or increased investor interest in commodities as alternative assets has had a systematic or lasting impact on prices, although swings in market sentiment may well have contributed to short-term price dynamics in some circumstances.

The most immediate and direct macroeconomic impact of the boom in commodity prices has been on inflation. As already mentioned and

### Box 1.2. House Prices: Corrections and Consequences

Housing prices have begun falling this year in several advanced economies, a sharp contrast from the increase in prices seen during 2007 in almost all countries except the United States, where a housing correction has been under way since 2006. In real terms, and on a seasonally adjusted basis, house prices fell in the first half of 2008 at an annual rate of 5 percent to 12 percent in Canada, Denmark, Spain, New Zealand, and the United Kingdom (first figure).<sup>1</sup> How much more are house prices likely to come down? And what are the consequences of the declines in house prices for the macroeconomy?

**Corrections in house prices.** As a basis for assessing the potential for house price declines, a first step is to try to account for the increase in house prices that has taken place over the past decade in terms of important driving forces. To this end, real house price growth is modeled as a function of the following variables: growth in per capita disposable income, working-age population, credit and equity prices, and the level of short-term and long-term interest rates. The dynamic effects of these variables are captured through the inclusion of lagged real house price growth and an affordability ratio (the lagged ratio of house prices to disposable incomes). This model is estimated for each country using quarterly data for the time period 1970 to 2007.<sup>2</sup>

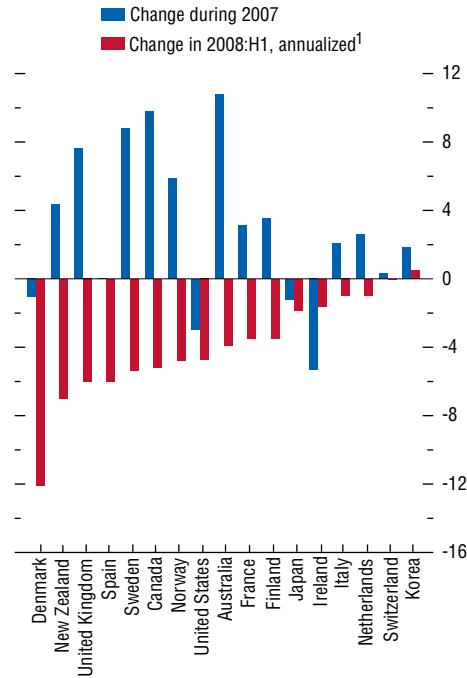
The increase in house prices not explained by these fundamental factors—referred to as

The main author of this box is Prakash Loungani. Ercument Tulun and Jair Rodriguez provided research assistance. This box updates analysis presented in the October 2007 and April 2008 issues of the *World Economic Outlook*.

<sup>1</sup>These data are provided by the Organization for Economic Cooperation and Development (OECD) and are based on commonly used national sources, as shown here: [www.oecd.org/olis/2006doc.nsf/linkto/ECO-WKP\(2006\)3](http://www.oecd.org/olis/2006doc.nsf/linkto/ECO-WKP(2006)3) (p. 34). The data are seasonally adjusted by the OECD if the national authority does not provide a seasonally adjusted series. The use of seasonally adjusted data leads to some difficulty in comparability with headline figures on house prices but may be a better indication of developments in house prices over the coming months.

<sup>2</sup>The data start in 1971 for Spain and in 1986 for Korea.

**Changes in Real House Prices  
(Percent)**



Sources: Organization for Economic Cooperation and Development; and IMF staff calculations.

<sup>1</sup>Change in 2008:H1, annualized, for Canada, Denmark, France, Ireland, Italy, Japan, New Zealand, and United States.

the house price gap—is taken as an estimate of the potential for correction in house prices. Of course, the gap estimates could partly reflect omitted fundamental factors, such as changes in supply-side factors in the housing market.<sup>3</sup> Nevertheless, the estimates provide an indication of how large those omitted factors would have

<sup>3</sup>The models estimated here focus on explaining short- to medium-run changes in house prices rather than the long-run level of house prices, which could differ considerably across countries, reflecting national supply constraints and long-term institutional factors, such as the extent of taxation of housing (Poterba, 1984). A study of European housing markets by Hilbers and others (2008) provides a good exposition of the role such factors can play in house price movements.

to be for the rise in house prices over the past years to be considered an equilibrium outcome.

The second figure shows the house price gaps—the percent increase in house prices during the period 1997 to end-2007 that is not accounted for by fundamentals. Also shown, as an indicator of the robustness of these results, is the range of gap estimates generated by small perturbations of the estimated models. These changes include using the average value of housing prices over 1994 to 1997, instead of the 1997 value, as the starting point for computing the gap estimates; estimating a parsimonious version of the model with only incomes and interest rates as the driving forces; and changing the dynamic specification by estimating a vector autoregressive model for house prices instead of a single-equation model.

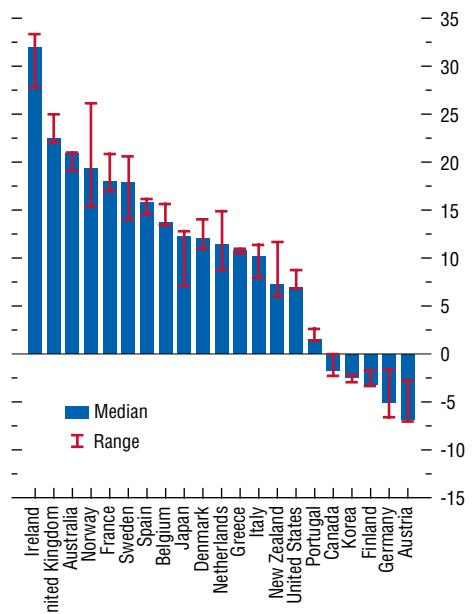
The countries that have experienced the largest unexplained increases in house prices over the past decade are Australia, Ireland, and the United Kingdom;<sup>4</sup> house prices in these countries were 20 percent to 30 percent higher in 2007 than can be attributed to fundamentals. A group of other countries—including France, Italy, the Netherlands, and Spain<sup>5</sup>—have house price gaps of between 10 percent and 20 percent.<sup>6</sup> The gap estimate for the United States—

<sup>4</sup>As noted in the 2008 IMF staff report for Australia, if some country-specific factors, particularly the impact of long-term migration on housing demand, are taken into account, the results do not produce evidence of a significant overvaluation of house prices.

<sup>5</sup>The 2008 IMF Article IV staff report for the Netherlands notes that the estimated house price gap—estimated here as ranging from 9 to 15 percent—is likely to be much smaller if the rise in single-person households, which is very important in boosting housing demand in the Netherlands, is taken into account along with institutional factors (for example, strict zoning regulations and generous mortgage interest deductibility).

<sup>6</sup>Hilbers and others (2008) group European countries into “fast,” “average,” or “slow movers,” depending on the extent to which their house prices in recent years have risen above long-term averages. The gap estimates presented here turn out to be consonant with this classification: the average estimated gap for the three groups is 19 percent, 11 percent, and –3 per-

**House Price Gaps  
(Percent)**



Source: IMF staff calculations.

about 7 percent—is smaller than for most other countries and has been narrowing compared with earlier estimates, partly reflecting the decline in U.S. house prices over the past 18 months.<sup>7</sup> The range of estimates for each coun-

cent, respectively. Recent IMF Article IV staff reports that point to either a cooling of housing markets or the onset of a correction include reports for Canada, Korea, New Zealand, Norway, Spain, and the United Kingdom. For Germany, some studies have found higher undervaluation than the estimate of 5 percent reported here, perhaps reflecting supply-side impacts from social housing in post-reunification Germany.

<sup>7</sup>Klyuev (2008) estimates that single-family homes in the United States “remained 8 to 20 percent overvalued as of the first quarter of 2008.” The U.S. house price gap was estimated at about 12 percent in 2007 (Box 3.1 in April 2008 *World Economic Outlook*) and about 20 percent in 2006 (Box 2.1 in October 2007 *World Economic Outlook*).

**Box 1.2 (continued)**

try is about 3½ percent on average, though for the Netherlands, Norway, and Sweden the range is considerably higher.

To put these gap estimates in perspective, it is useful to compare them with house price cycles in the advanced economies over the past several decades (OECD, 2006). Between 1970 and 2005, the average house price cycle lasted about 10 years, with an expansion phase of 6 years during which real house prices increased by about 45 percent. During the subsequent four-year contraction phase, real house prices declined about 25 percent, with the range of declines across countries varying from about 10 percent in the United States to more than 30 percent in Japan and several European countries.

Thus, if house price corrections were to occur in line with the gaps shown in the second figure, they would be well within the range of previous experience. Moreover, the evidence indicates that corrections typically occur over several years. Evidence from countries with regional (that is, subnational) data suggests that for some regions, price-level corrections could be much more pronounced and last longer than the national cycle (Calomiris, Longhofer, and Miles, 2008; Estevão and Loungani, forthcoming).

**Macroeconomic consequences.** Experience during past housing market cycles can also be a guide to the macroeconomic consequences of these price corrections (Claessens, Kose, and Terrones, forthcoming; *World Economic Outlook*, April 2008 and April 2004). The evidence suggests, not surprisingly, that the consequences are more adverse if they occur in the context of a weakening economy and tight credit conditions, which is likely to be the situation facing many countries at present. Over the period 1960 to the present, recessions in advanced economies that are associated with house price busts and credit crunches are slightly longer and deeper than other recessions. The duration of a recession is more than one quarter longer in the case of a housing bust, total output loss during the recession is somewhat higher, and the unemployment rate increases notably more and for longer in recessions with housing busts

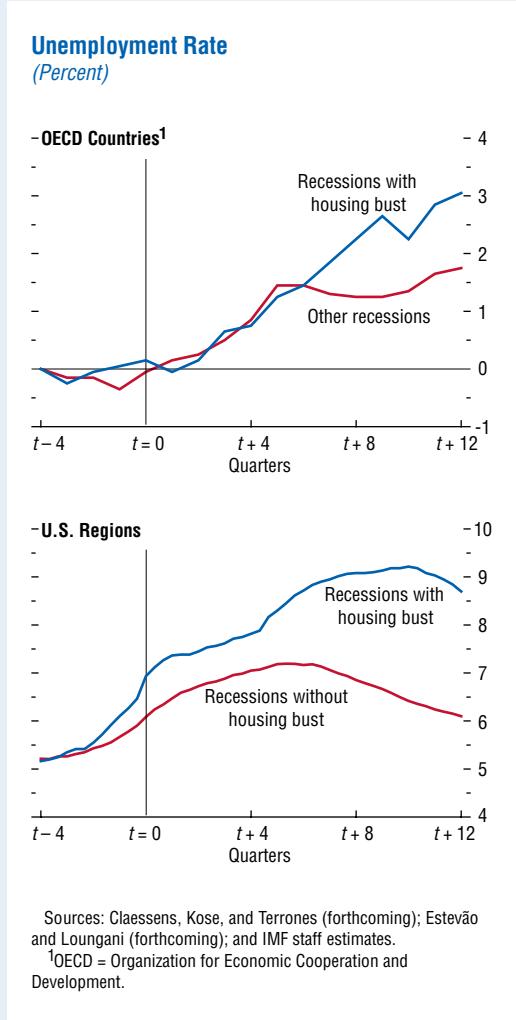
(third figure, top panel). Over the 12 quarters following the onset of a recession, the unemployment rate has increased on average by 1.5 percentage points. But in recessions associated with house price busts, the increase in unemployment is 3 percentage points.

There is some evidence that this pattern holds up at both the national and regional levels. As shown in the lower panel of the third figure, during regional recessions in the United States that are associated with a house price bust the peak impact on unemployment is an increase of 4 percentage points, compared with an increase of 2 percentage points for all regional recessions (Estevão and Loungani, forthcoming).

What about the impact of house price declines on the components of output? There is a growing literature on the possible impact of changes in housing wealth on consumption. Buiter (2008) demonstrates that changes in house prices are redistributions of wealth and hence do not have much impact on net wealth in the aggregate; however, they can affect individual consumption by relaxing collateral constraints. Consistent with this point, Muellbauer (2008) finds that with careful modeling of the effect of credit market development and deregulation, which raises access to housing collateral, changes in house prices have a medium-run liquidity effect on U.S. and U.K. consumption.

The impact on investment is more readily apparent. Claessens, Kose, and Terrones (forthcoming) find that investment—residential investment in particular—tends to fall more sharply in recessions associated with housing busts and with credit crunches than in other recessions.<sup>8</sup> There are also significant cross-

<sup>8</sup>Benito (2007) finds, using household-level data for the United Kingdom, that it is much more common for withdrawal from home equity to flow into residential investment than consumer spending, which suggests that the collateral channel stressed by Buiter (2008) and Muellbauer (2008) could be stronger for investment than consumption.



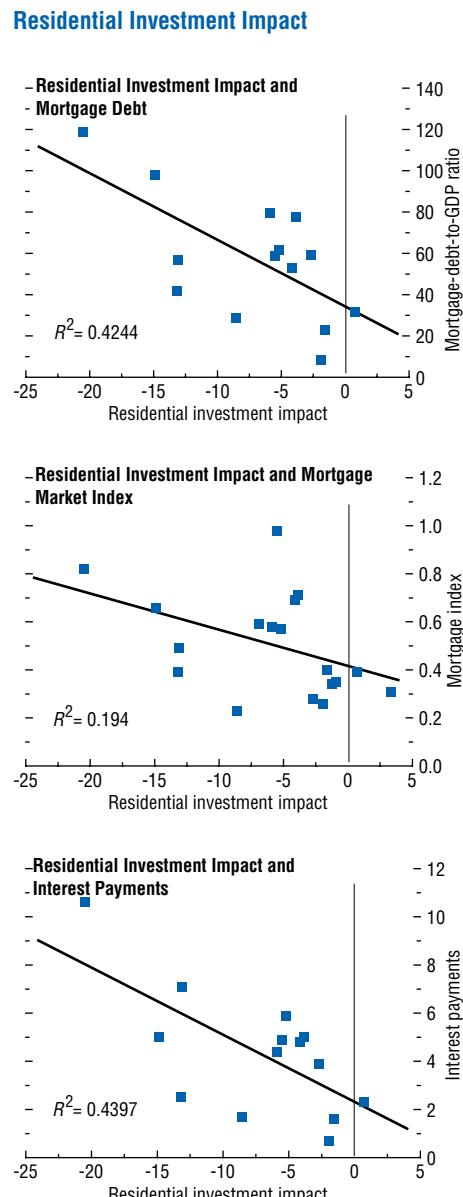
country differences in the extent of the residential investment declines, which in principle can depend on a wide range of characteristics of national financial and legal systems. One important dimension is the ease with which households can access mortgage credit. This can be measured either by the depth of mortgage markets or by an index that summarizes the institutional features of mortgage markets. The mortgage market index incorporates features such as the typical ratio of mortgage loans to property values, the standard length of mortgage loans, the capacity to borrow against

accumulated home equity, and the degree of development of secondary markets for mortgage loans. As shown in the top two panels of the fourth figure, declines in residential investment have tended to be higher in countries where households have had more access to mortgage credit.<sup>9</sup>

Other factors can play a role in explaining the amplitude of the economic cycle following house price corrections. In addition to the characteristics of mortgage markets already discussed, a key feature at the current juncture is the prevalence of mortgages with variable (as opposed to fixed) interest rates. There are differences within Europe in this respect, where Finland, Ireland, and Spain have mostly variable rate mortgages. Higher interest payments (relative to household disposable income) have also been historically associated with bigger declines in residential investment during housing busts—see the bottom panel in the fourth figure.<sup>10</sup> Countries also differ in terms of legal provisions, such as those that govern

<sup>9</sup>Data on the depth of mortgage markets—the ratio of outstanding mortgage debt to income—are reported in Warnock and Warnock (2007) and OECD (2006). The mortgage market index is described in Chapter 3 of the April 2008 *World Economic Outlook*. The debt measure used here is the ratio of mortgage debt to household disposable income for the 1990s (from OECD, 2006), but the use of other measures of debt—for other years or expressed as a ratio to GDP—gives similar results. Controlling for the magnitude of the house price corrections makes the correlation between residential investment declines and the mortgage-debt-to-GDP ratio stronger. Cardarelli and others (forthcoming) take this analysis a step further by using sign restrictions to identify housing demand shocks and tracing the impact of these shocks on house prices, residential investment, and output. They conclude that housing finance innovation has amplified the spillovers from housing to the rest of the economy by strengthening the role of housing as collateral.

<sup>10</sup>See Tsatsaronis and Zhu (2004). Warnock and Warnock (2007) add Greece, Portugal, Sweden, and the United Kingdom to the list of European countries with mostly variable rate mortgages; outside of Europe, Canada, Japan, and the United States are classified as countries with mostly fixed rate mortgages.

**Box 1.2 (concluded)**

residential mortgage lenders' recourse regarding defaulted residential mortgages, which can

influence foreclosure rates.<sup>11</sup> In many of the countries that are the focus of study in this box—France, Germany, Ireland, the Netherlands, Spain, and the United Kingdom—debtors are personally liable for the full amount of mortgaged debt, thus reducing incentives for foreclosure. In the United States, mortgage foreclosure is regulated at the state level. In six states, lenders have recourse only to the mortgaged property, which they may repossess and sell. In the other states, debtors are also personally liable for the full amount of the debt, but there are differences in the extent to which lenders can recover the difference between the mortgage debt and the foreclosure sale price. In practice, lenders may choose not to seek deficiency judgments mainly because of the time and cost involved.

Another factor that can play a role in explaining the amplitude of the economic cycle following house price corrections is banking sector exposure to the housing sector, which varies across countries as well as across lending institutions within countries. The value of mortgage loans held by banks, expressed as a multiple of their overall market capitalization, gives an indication of their ability to withstand the deterioration of their real estate loan portfolios. This indicator varies from about 4 in Denmark and Germany, less than 3 in Spain, about 1.5 in Canada, Japan, and the United Kingdom, and less than 1 in the United States.<sup>12</sup> Cross-country declines in residential investment during housing cycles have been higher in countries with greater banking sector exposure to mortgage lending, but the effect has not been as strong as that shown earlier with the mortgage-debt-to-

<sup>11</sup>See Klyuev (2008) and Deutsche Bank (2008) for a discussion of the impact of foreclosure rates on house prices.

<sup>12</sup>Estimates for countries other than the United States are from Ahearn and others (2005) and are based on bank-level data on mortgage loans and market capitalization from Bloomberg L.P. and Worldscope; the U.S. estimate is based on total real estate loans by the banking sector and total banking sector market capitalization.

GDP ratio. Nevertheless, at the current juncture, with bank balance sheets under renewed stress and bank equity prices low, the potential for an adverse impact on the real economy from banking system exposure to mortgage lending is perhaps greater than in the past.

**Conclusions.** Many advanced economies experienced a house price run-up in recent years that is difficult to account for fully in terms of fundamental driving forces such as income growth and interest rates. The correction in house prices appears to have now begun in most of these economies. If past is prologue, these cor-

rections could average about 25 percent and be spread out over a period of two to four years. Past evidence also suggests that cross-country differences in the impact of these corrections on the macroeconomy are likely to depend on the characteristics of the housing finance systems, particularly the ease with which households have been able to access mortgage credit in recent years. This feature is likely to be correlated with the extent of investment declines that occur during the house price corrections and could also have a dampening impact on consumption.

as examined in detail in Chapter 3, rising food prices have been a key factor behind surging inflation in emerging economies. By contrast, oil price increases have played the lead role in spurring inflation in the advanced economies.

How far will these direct contributions feed into second-round effects? Three structural trends should mitigate such risks: (1) increasing real wage flexibility, in contrast to the real wage resistance seen particularly in western Europe during the 1970s; (2) more secure anchoring of inflation expectations by vigilant central bankers; and (3) declining energy intensity.<sup>5</sup> Slowing economic activity is also mitigating inflation risks, particularly in the advanced economies. However, there remain concerns in some emerging economies, particularly those where capacity constraints are still tightening, where public wages have been increased rapidly, and where inflexible exchange rates may constrain the monetary response.

Rising commodity prices also have important potential effects on the terms of trade and purchasing power and hence on growth. At the global level, the key factor is oil, not food, because the production of food is more evenly distributed around the globe: on average, oil

imports are two-and-a-half times greater than food imports.

Overall, rising oil prices have had a net dampening impact on global demand, because oil exporters save a high proportion of additional oil revenues, particularly since their economies are already running into absorptive capacity limits. The size of the redistributive effect also depends on the source of the commodity price shock; there is a greater effect when the price surge reflects a pure supply shock instead of a combination of supply and demand factors, as seems to be the case in the current episode. The redistributive effects are sizable, although substantially smaller than in the 1970s, when the intensity of oil output was about twice its current level in advanced economies and 25 percent higher in emerging markets (see Figure 3.9). At the country level, low-income countries are particularly vulnerable to strains from rising food and fuel importation costs. Some countries in sub-Saharan Africa have experienced terms-of-trade losses of more than 5 percent of GDP (IMF, 2008a).

## Have Macroeconomic Policies Been Too Loose?

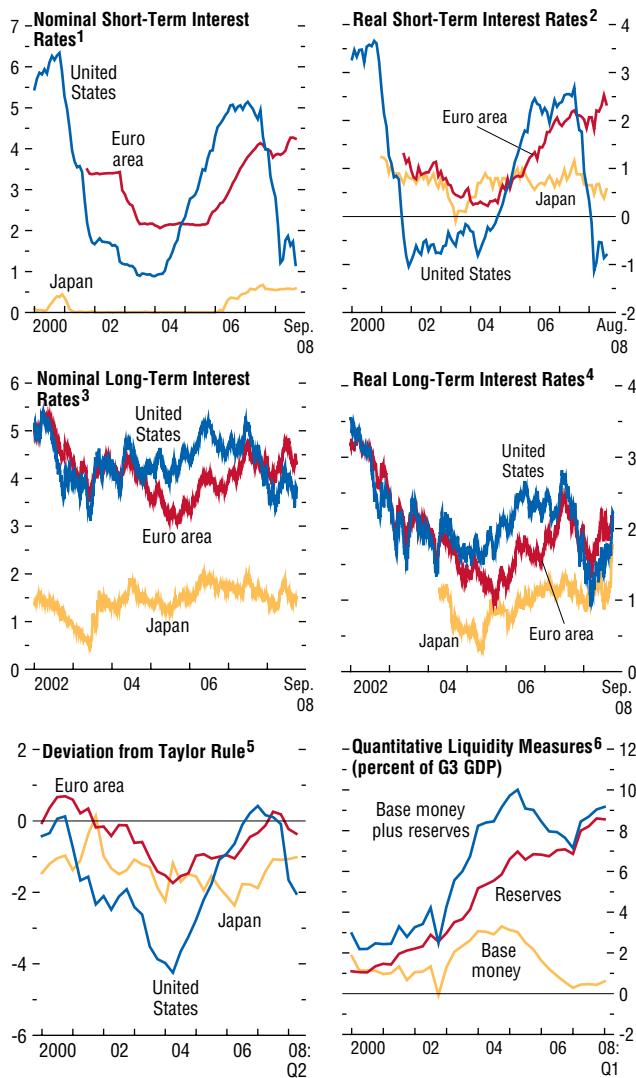
The recent deterioration of performance in the global economy comes on the heels of four

<sup>5</sup>Blanchard and Gali (2007) provide a careful analysis of why the macroeconomic impact of the recent oil price boom is likely to be smaller than in the 1970s.

### Figure 1.9. Measures of Monetary Policy and Liquidity in Selected Advanced Economies

(Interest rates in percent unless otherwise noted)

Following a period of easy monetary conditions during 2001–05, monetary policy was tightened across the advanced economies. Since the onset of financial stress in August 2007, the Federal Reserve has eased its policy stance aggressively. By contrast, monetary policy settings in the euro area and Japan have been kept broadly unchanged.



Sources: Bloomberg Financial Markets; Eurostat; Haver Analytics; Merrill Lynch; OECD *Economic Outlook*; and IMF staff calculations.

<sup>1</sup>Three-month treasury bills.

<sup>2</sup>Relative to core inflation.

<sup>3</sup>Ten-year government bonds.

<sup>4</sup>Ten-year inflation-linked government bonds.

<sup>5</sup>The Taylor rate depends on (1) the neutral real rate of interest, which in turn is a function of potential output growth, (2) the deviation of expected consumer price inflation from the inflation target, and (3) the output gap. Expected inflation is derived from break-even rates of inflation-indexed bonds.

<sup>6</sup>Change over three years for euro area, Japan, and United States (G3), denominated in U.S. dollars.

years of exceptionally strong expansion, during which healthy gains from the increasing integration of emerging and developing economies into the world economy contributed to the strongest period of global growth since the early 1970s. With the benefit of hindsight, however, it is clear that major imbalances built up across crucial financial, housing, and commodity markets, reflecting serious flaws in the operations of these markets and inadequate regulatory responses, with an inevitable payback.

Some observers argue that these imbalances in financial, housing, and commodity markets were exacerbated by excessively loose macroeconomic policy settings during the strong expansion over 2003–07. In particular, the pronounced success in bringing down inflation during the 1990s and the global productivity gains from the integration of China and other labor-intensive economies into the world trading system allowed for excessively easy monetary policy in the advanced economies, which generated a series of market bubbles. Following the collapse of the hi-tech dot-com bubble early this decade, monetary policy settings were kept very loose to counter deflation concerns. Indeed, in the United States and to a lesser extent in the euro area and Japan, policy rates were set well below what would be implied by the Taylor rule (Figure 1.9). Moreover, even though monetary policy was tightened starting in 2003, it has been suggested that the tightening did not do enough to “lean against the wind” as credit flowed into the housing sector and house prices rose to levels that were far out of line with underlying fundamentals.

In addition, inflexible exchange rate regimes have recently limited the capacity of some key emerging economies to carry out independent monetary policies, a constraint that became increasingly relevant after August 2007 as the U.S. dollar depreciated and the Federal Reserve aggressively cut interest rates. Thus, these economies effectively imported an increasingly easy monetary stance from the United States, just as inflation pressures were

rising.<sup>6</sup> At the same time, the sustained surge in commodity prices was accentuated by strong growth in emerging economies, a weakening U.S. dollar, lower U.S. interest rates, and—in the view of some observers although not IMF staff—financial flows into commodity futures markets. Central banking orthodoxy is to accommodate a temporary rise in inflation from a relative price shock, provided underlying inflation remains consistent with forward-looking objectives. However, repeated shocks in the same direction have increased the risks of second-round effects from the sustained shift in relative prices.

Measures of global liquidity shown in Figure 1.9 provide only inconclusive support for these concerns. The monetary base of the largest advanced economies certainly grew rapidly through 2005, and although the rate of base expansion has moderated since then, the emerging economies' continued strong buildup of international reserves implies rapid monetary growth in these economies. However, the relationship between monetary aggregates and prices is tenuous at best in advanced economies and is not well understood in emerging economies. Long-term interest rates have been low by historical standards throughout this decade, although such rates are arguably determined more by fundamental forces affecting the supply of and demand for savings—including the high rates of saving in emerging economies, increased public saving in advanced economies, and low rates of investment globally (outside China)—than by monetary policy settings.

Measures of the output gap provide more direct evidence of excess demand at the global level. To be sure, such measures are imprecise and need to be interpreted cautiously, as highlighted in Box 1.3, which discusses the approach used in the *World Economic Outlook* for assessing potential growth and output gaps. That said, on balance the data suggest that the global economy has been operating well above a cycli-

cally neutral level—comparable to the late 1990s (Figure 1.10).<sup>7</sup> The advanced economies seem to be operating at somewhat below a cyclically neutral level—and their output gaps are likely to widen, given that current rates of growth are well below estimated potential. By contrast, the emerging economies seem to have been growing faster than trend until recently, and pressures on capacity are still high. Even though estimates of output gaps are particularly subject to error for this group of countries, these assessments are broadly consistent with the observed recent acceleration in inflation.

Thus, while there is indeed some evidence that monetary policy may have been too easy at the global level and that the global economy may have exceeded its collective speed limit, excessive demand pressures seem to be concentrated in emerging economies and do not appear egregious at the global level by the standards of other recent cycles. It is hard to explain the intensity of the recent stress in financial, housing, and commodity markets purely through these macroeconomic factors, although they have played some role.

## Prospects for a Turnaround

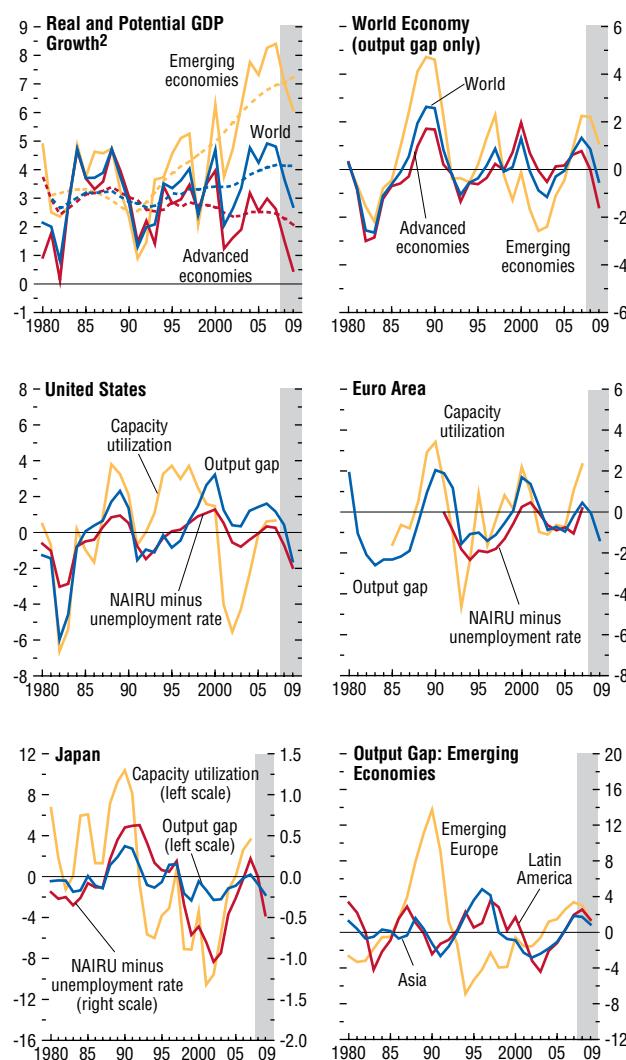
Prospects for the global economy are exceptionally uncertain as this report goes to press. A key assumption underlying the baseline projections is that comprehensive actions by the U.S. and European governments succeed in stabilizing financial market conditions and avoiding further systemic events. Nonetheless, markets are likely to remain under heavy strain throughout 2008 and 2009. Even with successful implementation of the plan to remove troubled assets from U.S. bank balance sheets, it will take time to rebuild confidence in asset valuations and alleviate counterparty concerns. Moreover, banks are going to remain under pressure from the need for more capital combined with growing

<sup>6</sup>Such concerns are illustrated in model simulations provided in Box 3.3.

<sup>7</sup>It is worth noting, however, that estimates of potential output are frequently marked down after a cyclical downturn.

**Figure 1.10. Measures of the Output Gap and Capacity Pressures<sup>1</sup>**

After a period of above-trend growth, global activity is now slowing well below potential. In the advanced economies, output gaps are expected to widen to the range of 1–2 percent of GDP in 2009. In the emerging economies, output would remain somewhat above cyclically-neutral levels, although capacity pressures would ease some. The methodology used to estimate potential GDP growth and output gaps is explained in Box 1.3.



Sources: OECD, *Economic Outlook*; and IMF staff estimates.

<sup>1</sup>Estimates of the nonaccelerating inflation rate of unemployment (NAIRU) come from the OECD. Estimates of the output gap, in percent of potential GDP, are based on IMF staff calculations. Capacity utilization measured as deviations from 1980–2007 averages for the United States (percent of total capacity) and Japan (operation rate index for manufacturing sector), and deviations during 1985–2007 for the euro area (percent of industry capacity).

<sup>2</sup>GDP growth rates of actual (solid line) versus potential (dashed line) for advanced economies. For emerging economies, a Hodrick-Prescott filter is applied for potential GDP.

credit losses coming from the broader economy. Detailed projections laid out in the October 2008 *Global Financial Stability Report* (IMF, 2008b) indicate that sustained deleveraging will reduce credit growth to very low levels in the advanced economies during 2009 and even beyond, while spreads on riskier asset classes will remain wide. Emerging and developing economies will continue to face difficult external financing conditions, and those with large current account deficits or other vulnerabilities will remain under the most pressure.

In commodity markets, in the absence of further supply shocks or a major downgrading of growth prospects, prices are projected to stay around current high levels, in line with pricing in forward markets. Thus, the price of petroleum would average about \$100 a barrel in 2009. But markets are likely to remain volatile, responding quickly to shifting perceptions of demand and supply trends.

Against this backdrop, the baseline projections show the global economy undergoing a major downturn, with growth falling to its slowest pace since the 2001–02 recession. A gradual recovery is projected to get under way later in 2009, but global growth is not expected to return to trend until 2010. Important supports for the eventual recovery will be the unwinding of adverse terms-of-trade effects as commodity prices stabilize, a turnaround in the U.S. housing market, and rising confidence that the liquidity and solvency problems in core financial institutions are being resolved. On an annual basis, global growth is expected to moderate from 5.0 percent in 2007 to 3.9 percent in 2008 and 3.0 percent in 2009 (see Table 1.1 and Figure 1.11). These projections are well below those provided in the July 2008 *World Economic Outlook Update*, reflecting increasing evidence in recent months of slowing activity, the further burgeoning of the financial crisis, and a heightened appreciation of the degree to which financial deleveraging is likely to be an extended constraint on growth.

The advanced economies are expected to be particularly weak for the remainder of 2008 and

the first half of 2009. The U.S. economy faces flat to negative growth during this period, as support from the fiscal stimulus ebbs, export momentum moderates, and tight financial conditions take an increasing toll. An eventual turnaround in the housing sector and more stable oil prices should help lay the basis for incipient recovery in the second half of 2009, but the revival is expected to be much more gradual than in previous business cycles, as tight credit conditions continue to weigh heavily on domestic demand.<sup>8</sup> Most other advanced economies are also expected to go through a period of extremely sluggish growth or contraction in 2008 and the first half of 2009, and to experience only a modest upturn in the latter part of the year. In fact, all the G7 countries but Canada are now projected to grow by less than 1 percent on a fourth-quarter-over-fourth-quarter basis during both 2008 and 2009.

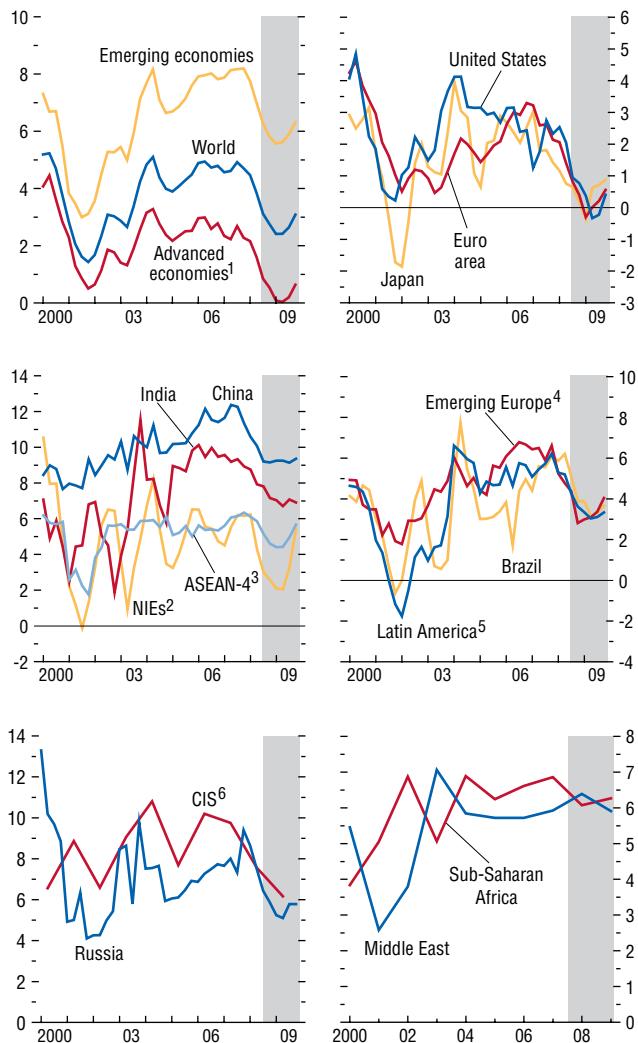
Growth in emerging and developing economies is also projected to continue to decelerate, falling somewhat below trend during the second half of 2008 and early 2009 before picking up during the course of the year. Over this period, overall growth is projected to remain well above rates experienced in the 2001–02 global downturn. Export growth will continue to slow and domestic demand will also moderate, although demand will continue to be supported by the strong productivity gains made in recent years. Commodity-exporting countries—particularly oil exporters—are expected to maintain their momentum, but growth in countries dependent on food and fuel imports or external financing will slow quite sharply. Net external capital inflows are projected to fall by half in the aggregate, and some countries could face substantial pressure on reserve positions.

On the inflation front, the combination of rising slack and stabilizing commodity prices is

<sup>8</sup>By itself, however, slow credit growth need not prevent a recovery. Evidence from past business cycles shows that activity typically recovers in advance of a turnaround in the credit cycle (Claessens, Kose, and Terrones, forthcoming).

**Figure 1.11. Global Outlook**  
(Real GDP; percent change from a year earlier)

The global economy is projected to slow further in the second half of 2008 and early 2009, and then to start a gradual recovery. The advanced economies will be most affected by the downturn and will be in or close to recession. Growth will also moderate in the emerging economies, particularly those in Asia, emerging Europe, and Latin America with close trade links.



Sources: Haver Analytics; and IMF staff estimates.

<sup>1</sup>Australia, Canada, Denmark, euro area, Japan, New Zealand, Norway, Sweden, Switzerland, United Kingdom, and United States.

<sup>2</sup>Newly industrialized Asian economies (NIEs) comprise Hong Kong SAR, Korea, Singapore, and Taiwan Province of China.

<sup>3</sup>Indonesia, Malaysia, Philippines, and Thailand.

<sup>4</sup>Czech Republic, Estonia, Hungary, Latvia, Lithuania, and Poland.

<sup>5</sup>Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Rep. Bolivariana de Venezuela.

<sup>6</sup>Commonwealth of Independent States.

### Box 1.3. Measuring Output Gaps

Rising inflation concerns have brought increasing attention to the issue of whether economies are overheating and how to measure an economy's productive capacity. All else being equal, an economy operating beyond its capacity—with a positive gap between actual and potential output—is likely to face rising inflation pressures, whereas an economy well within its capacity—with a negative output gap—will tend to experience declining inflation. Measurements of capacity are also important for other purposes, including assessment of the fiscal stance over the cycle, as discussed in Chapter 5. Overall, understanding the current and future cyclical position of the economy is crucial to making sound monetary and fiscal policy decisions.

Measuring output gaps is, however, a highly inexact science, because productive capacity for a whole economy is not directly observable (although some measures of capacity are typically available for some sectors, such as the industrial sector). Accordingly, a mix of approaches has been used, with varying degrees of sophistication, adjusting to data limitations. This box reviews methods used in estimates of output gaps in the *World Economic Outlook* (WEO) projections and discusses a new model-based approach that is now being developed.

**Measurement of output gaps.** For most advanced economies, estimates of output gaps used in the WEO are derived from an assessment of potential GDP based on a production function approach. Under such an approach, a production function is estimated for the economy, relating output to measured inputs of labor and capital. The residual is a measure of total factor productivity (TFP) in the economy, which can then be related to explanatory variables such as competition, structural reforms, and import penetration.<sup>1</sup> Considerable attention has been paid in the literature to devising increas-

The main authors of this box are Charles Collyns, Douglas Laxton, and Natalia Tamirisa, with input from Gianni de Nicolò and assistance from Ercument Tulun.

<sup>1</sup>Box 3.1 of the September 2006 *World Economic Outlook* provides an example of this approach.

ingly careful measures of inputs—for example, by adjusting labor inputs for the impact of education and training on the quality of labor and by introducing a measure of the flow of capital services—and trying to explain the TFP residual.

This approach has the advantage that once the basic relationship is estimated, an assessment can be made of the impact of shifting factors that affect potential growth—for example, the impact of demographics on the growth of labor services and the impact of investment rates on capital services.

Turning to the emerging economies, data on labor and capital inputs are typically inadequate for the production function approach. Moreover, the possibility of rapid change following major reforms reduces continuity and would make the approach more difficult to apply. Estimates of output gaps in the economies presented in this issue of the WEO therefore rely on time-series techniques to estimate trend GDP based on observed and projected GDP series. Specifically, the output data presented used standard Hodrick-Prescott (HP) filters, which disentangle a time series into a trend component and a cyclical component (Hodrick and Prescott, 1997), using a  $\lambda$  coefficient of 100 on annual data.<sup>2</sup>

Despite their simplicity and widespread use, one difficulty with the HP filters (and time-series techniques more generally) is the sensitivity of the estimates to the choice of end point. As a rough-and-ready approximation, the HP filter is applied to data (in log form) over the period 1980–2008 (which can essentially be considered historical data) and again to data and projections over the period 1980–2013. Using the latter estimates takes advantage of the IMF desk economists' best judgment on medium-term growth prospects. Potential output and output gaps were then derived as the average of these two estimates.

<sup>2</sup>Filtering results depend heavily on the value for the smoothing parameter  $\lambda$ . The value of 100 captures the properties of the U.S. business cycle well, but it has been less useful for other countries.

Applying this technique to 1980–2008 data suggests a significant acceleration in potential growth over the past decade across emerging economies (first figure, left-hand column). The extent of acceleration is estimated to be even larger using data that include medium-term projections. Using either series, emerging economies are seen as operating significantly above capacity, especially in emerging Europe and Latin America, with the excess approaching 4 percent of GDP in each region in 2008 using the more conservative potential growth estimates.<sup>3</sup>

**Quantifying the impact of oil-price shocks on potential output.** One issue of current relevance is how much the recent increase in oil prices, if sustained, could affect the level and the rate of growth potential output. Oil is a key input for the production of many goods and services, in part because it is used in transportation. If the relative price of oil rises, other inputs into production (capital and labor), which are available in limited supply and with limited substitution possibilities in the short run will need to be used more intensively, implying a fall in productive potential. The impact of the growth rate of potential output would depend on how quickly output converges to its long-run level.<sup>4</sup>

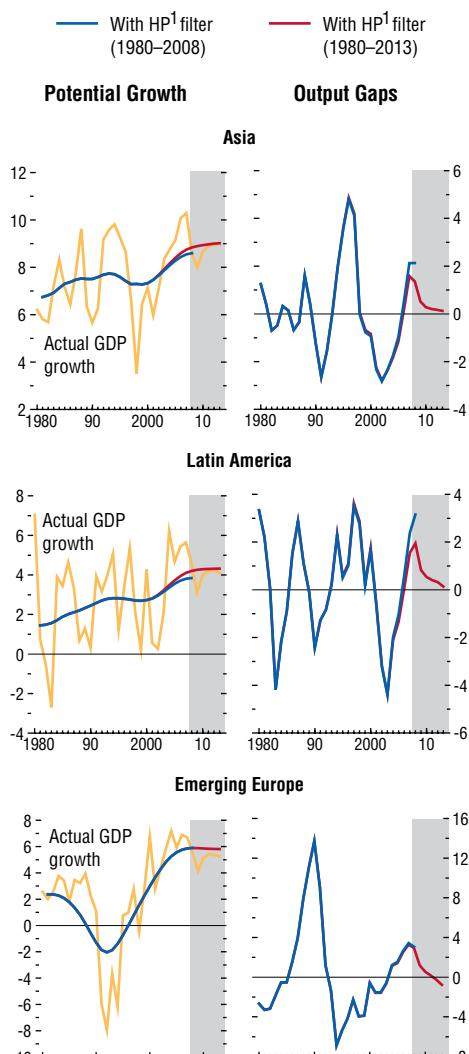
Using a production function approach, Organization for Economic Cooperation and Development (OECD) estimates suggest that an increase in oil price by 240 percent from its 20-year average in the United States and by 170 percent above that in the euro area (to \$120 a barrel) would reduce potential output by 4 percent in the United States and 2 percent in the euro area (OECD, 2008). The impact on

<sup>3</sup>Vamvakidis (2008) compares estimates of potential growth across emerging Europe using an HP filter, a production function approach, and a growth equation similar to a specification used by Barro and Sala-i-Martin (2004). The production function approach provides the highest estimates for potential growth, assuming continued strong TFP growth.

<sup>4</sup>For example, press reports suggest that the automotive industry in the United States is moving quickly to retool car manufacturing plants to produce smaller, more energy efficient vehicles.

### Potential Growth and Output Gaps in Emerging Economies

Although potential growth probably rose in emerging economies over the past decade, time-series techniques suggest that recent growth has been above potential, implying the opening of significant output gaps in the past year or so. The estimated size of the gap is sensitive to the choice of end point and to the IMF staff's judgment of the extent to which potential growth has risen.



Source: IMF staff estimates.

<sup>1</sup>HP = Hodrick-Prescott.

**Box 1.3 (concluded)**

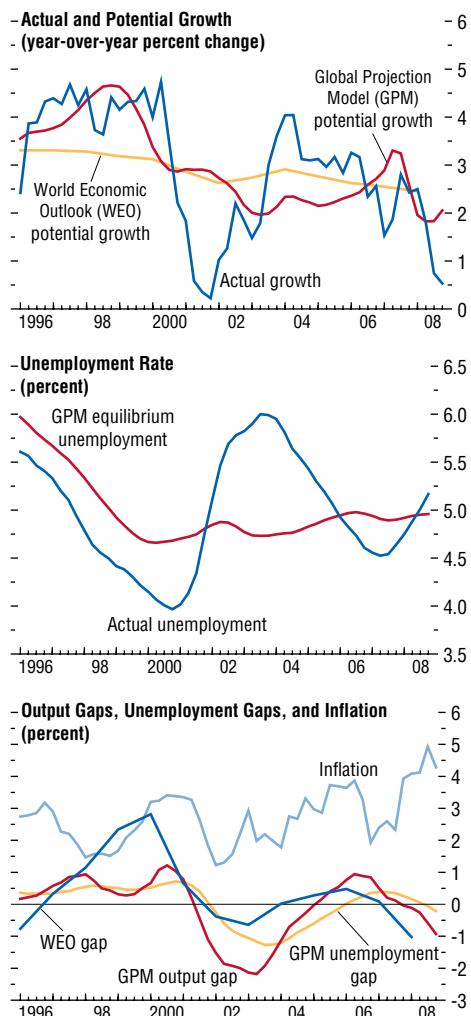
U.S. potential output is higher because of a larger share of oil in production and the declining value of the dollar. Potential growth is estimated to decline by 0.2 percentage point a year in the United States and 0.1 percentage point in the euro area in the first year of adjustment, based on the average rate at which existing capital is typically scrapped and replaced. However, the adjustment could well occur more rapidly in the face of a large relative price shock because the renewal rate is likely to accelerate—although energy-intensive capital tends to have an above-average service life.

**Model-based estimates of output gaps.** Recent work for the Global Projection Model (GPM) has developed model-consistent measures of potential output—and thus of the output gap—that exploit information on observable variables, such as GDP, unemployment, and inflation. Like any macroeconomic model, the GPM contains a system of equations, an array of key observable variables, and a few unobservable but crucial variables, notably potential output. Estimates for the latent variables may be based on predictive power. Using this criterion, of all the economically plausible paths that potential output might take, the procedure selects the one that best predicts the observable variables in the model. In other words, the procedure “backs out” values of the latent variables implied by the structure of the model and the behavior of the observable variables.

The model contains two critical equations in this regard. The first links inflation to the output gap. The second is a dynamic Okun’s law, which links unemployment gaps (actual minus equilibrium levels) to past movements in the output gap.

The model-based technique is less mechanical, with much more economic content, than the HP and other univariate filters. It offers a potentially substantial improvement, especially in gauging the current level of potential output in real time, although it requires more advanced modeling than simple filters like the HP filter.

The second figure provides some illustrative GPM estimates for the United States and con-

**Alternative Measures of U.S. Potential Growth**

Source: IMF staff calculations.

trasts them with WEO estimates based on the production function approach.<sup>5</sup> The top panel

<sup>5</sup>In current versions of the GPM, the observable variables for the U.S. economy include oil prices, headline CPI inflation, real GDP, unemployment, exchange rates, the federal funds rate, and a measure of bank lending tightness. The last variable is calculated from the Federal Reserve Board’s Senior Loan Officer Opinion Survey on Bank Lending Practices.

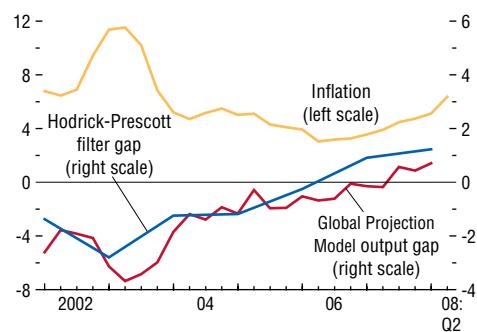
compares the estimates of potential growth from the GPM and from the WEO. The GPM estimates display considerably more variation than the WEO estimates. This is to be expected, given that the former vary in line with the outcomes for inflation and unemployment.

The figure shows a marked discrepancy between the two estimates in the second half of the 1990s, a period with strongly increasing output and declining unemployment, yet stable inflation. The model interprets these facts to be consistent with a more marked increase in the growth of potential output during this period (and hence a permanent increase in the trend level of output) and a decline in the equilibrium (or natural) unemployment rate (middle panel). By the end of the decade, inflation pressure, as gauged by the output gap, or by the deviation of unemployment from equilibrium, was present under either estimate, but much less under the model estimate. By the same token, the GPM estimate of the negative output gap in the 2001–02 recession is significantly larger than that in the WEO estimate.

A widening discrepancy is again evident in 2008, with potential growth in GPM dropping from 3 percent to 2 percent, whereas the WEO measure continues on a smoother path. A major factor at play is the sharp increase in the price of energy, which causes productivity growth in the GPM to drop for a while below its long-run rate. This implies a smaller negative output gap in the GPM for 2008, and hence less downward pressure on the core inflation rate, than in the WEO.

The third figure provides estimates of the output gap based on applying the GPM approach

### Output Gap in Selected Latin American Countries<sup>1</sup> (Percent)



Source: IMF staff calculations.

<sup>1</sup>For the aggregate of Brazil, Chile, Colombia, Mexico, and Peru.

to a group of five Latin American countries. The output gap series tracks quite closely estimates derived from the HP filter approach, providing some support for using the HP filter as a credible first attempt at estimating the output gap across groups of countries.

All in all, it is unlikely that a methodological silver bullet for measuring potential output and output gaps will be found anytime soon. In the meantime, policymakers will need to continue to rely on an eclectic approach, drawing on various measures of slack in the economy (output gaps and unemployment gaps) as well as survey-based measures of capacity utilization and high-frequency indicators, while continually testing available estimates against reality.

expected to contain the pace of price increases in the advanced economies and bring inflation back below 2 percent by the end of 2009. In emerging and developing economies, inflation is projected to remain at about 8 percent at end-2008 as recent commodity price increases continue to feed through the pipeline. Inflation is expected to ease to 6½ percent during 2009

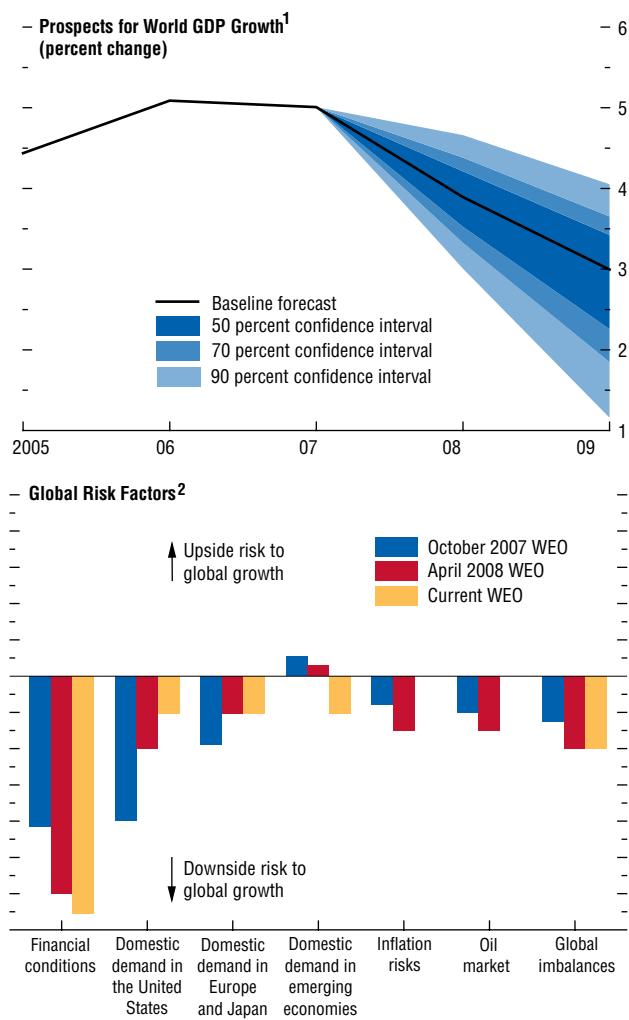
but to remain well above central bank objectives in a number of countries.

There are substantial downside risks to the baseline forecast, as illustrated in the global growth fan chart (Figure 1.12).<sup>9</sup> The princi-

<sup>9</sup>Appendix 1.1 reviews these and other approaches used here to assess and communicate risk, including the

**Figure 1.12. Risks to the Global Outlook**

There are substantial downside risks to the growth outlook. The greatest concern relates to the risk that financial strains will be more intense and more protracted than already envisaged in the baseline projections. Negative risks also relate to concerns about domestic demand and global imbalances, while risks related to inflation and the oil market are now seen as balanced.



Source: IMF staff estimates.

<sup>1</sup>The fan chart shows the uncertainty around the *World Economic Outlook* (WEO) central forecast with 50, 70, and 90 percent probability intervals. As shown, the 70 percent confidence interval includes the 50 percent interval, and the 90 percent confidence interval includes the 50 and 70 percent intervals. See Box 1.3 in the April 2006 WEO for details.

<sup>2</sup>The chart shows the contributions of each risk factor to the overall balance of risks to global growth, as reflected by the extent of asymmetry in the probability density for global GDP growth shown in the fan chart. The balance of risks is tilted to the downside if the expected probability of outcomes below the central or modal forecast (the total "downside probability") exceeds 50 percent (Box 1.3 in the April 2006 WEO). The extent of asymmetry in the probability density in the fan chart depends on the various sources of risk and their potential impact as well as the standard deviation of past forecast errors—which, among other factors, varies with the length of the forecasting horizon. To make the risk factors comparable across forecast vintages, their contributions are rescaled to correct for differences in the standard deviations.

pal downside risk revolves around two related financial concerns: that financial stress could continue at very high levels and that credit constraints from deleveraging could be deeper and more protracted than envisaged in the baseline. In addition, the U.S. housing market could deteriorate for longer than envisaged, and European housing markets could weaken more broadly. Inflation risks to growth are now more balanced, in light of the retreat in commodity prices and the slower trajectory of the global economy. Global imbalances remain an issue, but with some shift in focus away from the potential problems of financing the U.S. current account deficit toward risks created by the need to recycle large surpluses from oil exporters and toward risks of protectionism now that the Doha Round has again stalled.

### Financial Market Risks

Financial market risks remain acute, even more of a concern than at the time of the April 2008 *World Economic Outlook*. Despite unprecedented actions by financial authorities to prevent systemic events and a major new initiative to help banks in the United States deal with illiquid assets, markets remain under heavy stress, and the threat of disorderly deleveraging remains a serious risk to the outlook.

After the events of recent weeks, concerns remain high about the solvency of financial institutions in mature markets faced with rising losses, tight funding conditions, and dwindling capital bases. Successful implementation of the U.S. government's plan to purchase troubled assets would over time reduce such risks by limiting the downside to U.S. real estate exposure in U.S.-based institutions, but low bank capital could remain a serious issue, especially because asset sales could imply greater loss recognition and because weakening activity is likely to push up losses on a broad range of assets in the

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methodology used to develop the growth fan chart and associated risk factors, and discusses work now under way to enhance such assessments.

United States and Europe. Moreover, funding pressures are likely to remain intense until counterparty confidence is restored.

A related concern is that the process of deleveraging and balance-sheet repair could be deeper and more extended than projected, implying that credit constraints on growth could be greater than built into the baseline. At this point it is hard to gauge how much bank capital levels will need to rise to be considered adequate by markets and by regulators. Indeed, the events of recent weeks seem likely to increase pressure on banks to accelerate deleveraging efforts and to be extremely cautious in extending new credit as long as financial conditions remain highly volatile. Moreover, prospects for raising capital are highly uncertain, particularly in light of the large losses suffered by equity holders in recent resolutions and continuing uncertainty over valuation. In the baseline, credit continues to grow moderately in the advanced economies, in line with projections presented in the October 2008 *Global Financial Stability Report* (IMF, 2008b), but credit supply would contract under a “stress scenario” that factors in more aggressive deleveraging efforts.

Recent events have underlined the vulnerability of emerging economies to turbulence in advanced financial markets. Intensified or extended deleveraging in U.S. or European banks or growing risk aversion among investors could prompt a further scaling back of bank and portfolio flows to emerging economies, putting particular pressure on those economies considered vulnerable, including those with large current account deficits, such as in emerging Europe, or countries that have experienced rapid credit growth based on heavy capital inflows, such as in Russia and other countries in the Commonwealth of Independent States. Further cutbacks in financing flows would put increasing pressure on domestic credit conditions at a time when activity is slowing, leading to rising stress on financial intermediaries and borrowers.

The global repercussions of an intensification of financial strains are illustrated in Figure 1.13, based on simulations of a global general equilib-

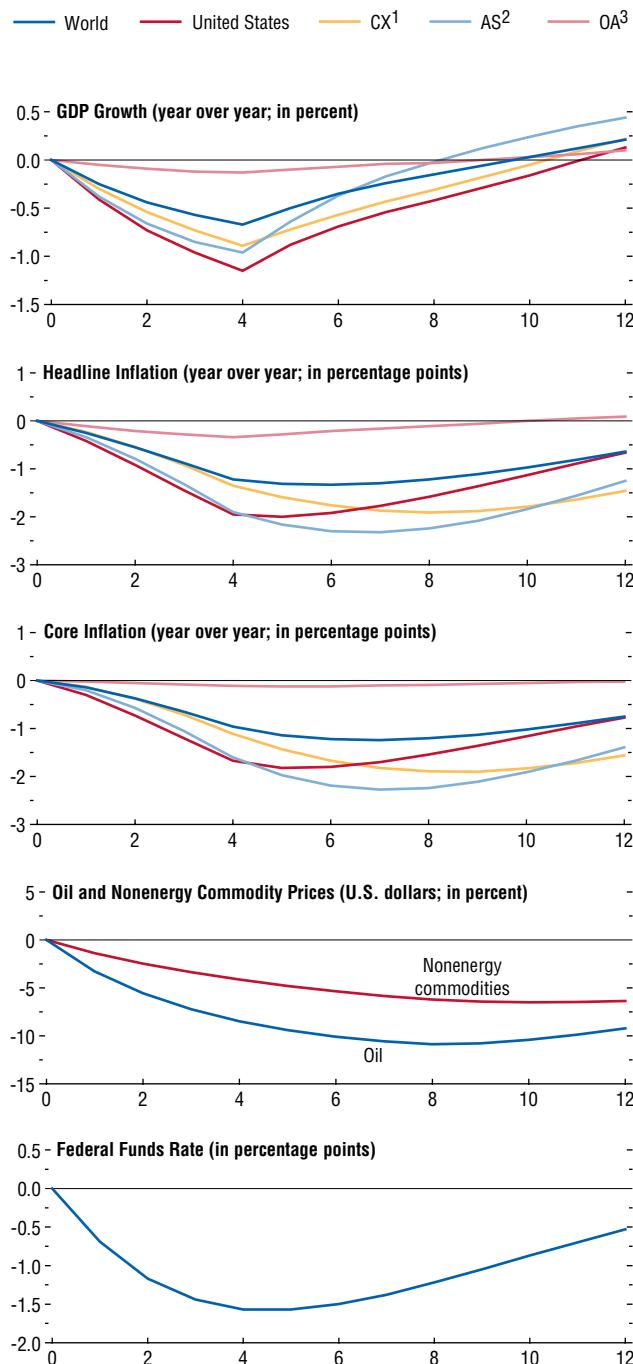
rium model (BoC-GEM).<sup>10</sup> The shock is modeled as an additional 100-basis-point widening of credit spreads in the United States and lesser increases elsewhere, combined with a loss of confidence that knocks equity prices down by a further 10 percent. As a result, U.S. domestic demand would slow relative to baseline, lowering real GDP growth by a further 1 percentage point over the next year, with lingering negative effects over a three-year period. The implication would be a considerably deeper U.S. recession and only a gradual recovery thereafter, with similar if less-intense effects elsewhere. Slower global growth would tend to depress commodity prices and raise output gaps, moderating pressure on inflation and providing greater room to ease policy interest rates.

### Risks to Domestic Demand in Advanced Economies

Downside risks to domestic demand in advanced economies remain clearly evident. Related to the financial risks just discussed is the threat of deeper and more prolonged housing corrections than built into the forecast. The intervention in the GSEs and the troubled-asset purchase plan should alleviate risks in the U.S. market to some degree by providing assurances of the availability of housing finance and reducing risks of fire sales of distressed real estate in a declining market. Moreover, U.S. housing valuations are moving closer in line with fundamentals; residential construction is already near a 40-year low; and inventories are falling. However, the real possibility remains that U.S. housing prices and activity will not find the projected bottom in 2009, and instead will overshoot, in the context of still-depressed sentiment. In western Europe, housing market prospects are uncertain, and dynamics could be affected by financial deleveraging that restricts the supply of

<sup>10</sup>BoC-GEM is a version of the IMF's global economy model (GEM), developed jointly with the Bank of Canada, which includes explicit modeling of oil and other commodity sectors.

**Figure 1.13. Impact of Financial Shock on the Global Economy**  
*(Deviation from control; quarters on x-axis)*



Source: IMF staff calculations, based on BoC-GEM simulations.

<sup>1</sup>CX = commodity exporters.

<sup>2</sup>AS = emerging Asia.

<sup>3</sup>OA = other advanced economies.

mortgage financing. Thus, existing downturns could intensify, and a broader range of countries could experience house price declines, a sharp reduction in residential investment, and greater strains on household balance sheets.

The possibility of greater-than-projected resilience of domestic demand in the face of credit strains provides some upside to the forecast. Nonfinancial corporate balance sheets are generally sound—much improved since the early years of this decade—and profitability is high, although corporate bond spreads have widened sharply in recent weeks. In the euro area, consumption could be stronger than projected, as oil prices stabilize, particularly because unemployment rates remain exceptionally low and household balance sheets are stronger than in the United States.

### Risks to Domestic Demand in Emerging Economies

Risks to domestic demand in the emerging economies are now distinctly to the downside. The principal concerns for these economies are external—exposure to slower global trade, tighter external financing conditions, and adverse terms-of-trade shocks—but domestic demand also could be adversely affected by deteriorating conditions in financial markets and by corrections in housing markets. Countries that have allowed easy access to external financing and buoyant commodity-related revenues to drive rapid growth in domestic credit and strong growth in government spending are at particular risk of a “sudden stop” in capital inflows that could have a damaging impact on domestic financial conditions and apply a sharp knock to domestic demand. Conversely, there remains potential for domestic demand to surprise on the upside, for example in China, where the government has moved quickly to introduce measures to support growth.

### Inflation Risks

Inflation risks have receded relative to the April 2008 *World Economic Outlook*, as commod-

ity prices have retreated and slowing growth has reduced pressure on capacity. In the advanced economies, headline inflation could drop even faster than projected, back into line with central bank objectives, which would provide more scope to ease monetary policy in response to slowing activity. The concern remains, however, that wages could accelerate in response to the loss in purchasing power from higher food and fuel prices if activity does not slow as projected, particularly in western Europe, where unemployment remains low by recent standards.

Inflation risks are still manifest in a number of emerging and developing economies, amid signs that higher commodity prices and increasing pressure on local supply conditions are already spilling into wage demands and inflation expectations. The moderation in commodity prices since July is helping to relieve some of the upward momentum, but pressures from this source are likely to remain for some time because past price increases have only partially passed through the supply chain, particularly for oil, given that many countries have held prices well below international levels. The concern is that once inflation expectations become unanchored, central banks may be forced to tighten abruptly to generate a “hard landing”—a period of subtrend growth—in order to bring inflation back in line. As discussed in Chapter 3, the output costs of regaining control over inflation could be sizable, particularly in economies where initial policy credibility is low and the monetary response is delayed (see Figures 3.15 and 3.16). To be sure, as emphasized in Box 1.3, “speed limits” are hard to estimate for economies that have been able to achieve rapid rates of growth through trade and financial integration. Although continued pools of underutilized labor may suggest a capacity for sustained strong growth, bottlenecks in the infrastructure and availability of skilled labor may start to bind.

### Risks from Oil Prices

Given the likely continued volatility, oil prices are an important source of two-way risks to the

projections. Option market data suggest that market participants are operating with an unusually wide band of uncertainty about the future price, with outcomes from \$60 a barrel to \$165 a barrel falling within the 90 percent confidence band over the period through end-2008 (see Appendix 3.1). On the upside, oil prices could continue to decline, providing some stabilizing benefit to the global economy, although such an occurrence would most likely be associated with weakening global demand rather than a positive supply shock, with a correspondingly lower multiplier (see discussion in Box 1.1 of the April 2007 *World Economic Outlook*). Against this, further supply shocks could again push oil prices up, in the context of continued limited spare capacity, keeping pressure on consumer purchasing power, particularly in oil-importing countries, and limiting the relief to headline inflation from stabilizing oil prices built into the baseline.

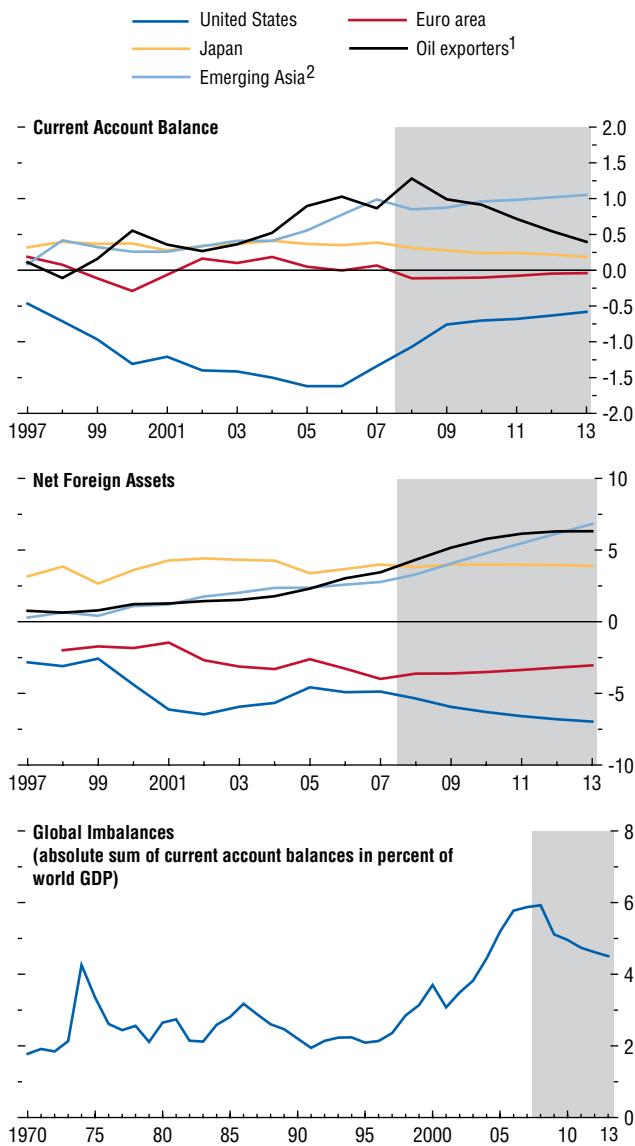
### Risks from Global Imbalances

Global imbalances remain an issue, even as the sources of risk are shifting. In the past, the central concern was the possibility of a disorderly unwinding of the imbalances driven by a discontinuous shift in foreign investors’ willingness to continue financing the large U.S. current account deficit and add to the share of U.S. assets in their wealth portfolios. Such risks have moderated somewhat as the U.S. dollar’s depreciation has brought it closer in line with medium-term fundamentals and the U.S. current account deficit has moved onto a more sustainable trajectory (Figure 1.14, top panel). Still, rising oil prices have slowed the adjustment process as the U.S. oil deficit has jumped, and U.S. net foreign liabilities are still projected as a rising share of global GDP (Figure 1.14, middle panel).<sup>11</sup> Moreover, reduced confidence in the liquidity

<sup>11</sup>Projections are constructed assuming unchanged exchange rates and asset prices. In fact, U.S. dollar depreciation and the relative decline of U.S. equity prices have generated net valuation gains in recent years that have served to offset the flow accumulation of new liabilities. See Box 1.2 in the April 2008 *World Economic Outlook*.

**Figure 1.14. Current Account Balances and Net Foreign Assets  
(Percent of global GDP)**

The U.S. current account deficit has moderated in recent years and is projected to continue to narrow over the medium term, although net foreign liabilities would continue to build. Oil exporters' surpluses have been boosted by rising international oil prices, and although these surpluses are expected to come down, oil exporters are projected to accumulate rising net foreign assets. Emerging Asia would sustain large current account surpluses and continue to build net holdings of foreign assets.



Sources: Lane and Milesi-Ferretti (2006); and IMF staff estimates.

<sup>1</sup>Algeria, Angola, Azerbaijan, Bahrain, Republic of Congo, Ecuador, Equatorial Guinea, Gabon, I.R. of Iran, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Syrian Arab Republic, Turkmenistan, United Arab Emirates, Rep. Bolivariana de Venezuela, and Republic of Yemen.

<sup>2</sup>China, Hong Kong SAR, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan Province of China, and Thailand.

and risk-return characteristics of U.S. assets in the wake of the financial crisis mean that the risk of disorderly unwinding cannot be discounted. The recent difficulties of the GSEs—whose securities have been purchased heavily by foreign investors, thereby providing a significant share of the financing for the U.S. current account deficit in recent years—are a reminder of continuing vulnerabilities on this front.

At the same time, three other types of concern have become salient. The first is that the adjustment of the dollar has been concentrated in a number of flexibly managed currencies while certain major currencies continue to be tightly managed or pegged to the dollar. This situation could create new imbalances over time, for example in the euro area, whose currency is now somewhat overvalued.

Second, the sustained rise in international oil prices has increased the need to ensure the stable recycling of exporters' large surpluses. Allowing current account surpluses to increase is a reasonable response by oil exporters, reflecting their desire to save some of the additional revenues. The annual aggregate surplus of oil-exporting countries projected over 2008–09 has jumped to 1½ percent of global GDP, notwithstanding the rapid increase in domestic demand in these countries. At the same time, emerging Asia continues to run surpluses of about 1 percent of global GDP. To date, the recycling of these funds has been relatively smooth, and indeed investment by sovereign wealth funds (SWFs) has played a valuable stabilizing role in providing capital to banks during the financial crisis. However, there is a concern that continued investment of large surpluses could lead to protectionist resistance to rising foreign ownership. A related concern is that large investment flows into other emerging economies, akin to the recycling of petrodollars in the 1970s, could contribute to excessive growth of liquidity and increase the vulnerability of these economies.<sup>12</sup>

<sup>12</sup>See Box 2.2 in the April 2008 *World Economic Outlook* on the recycling of commodity surpluses and Box 6.1 in this *World Economic Outlook* on the role of SWFs.

The third concern is that continuing large trade deficits combined with weakening employment prospects in some advanced economies could prompt rising trade protectionism. Such concerns are heightened by the recent deadlock in the Doha Round of multilateral trade negotiations.

## Policy Challenges for the Global Economy

Policymakers around the world today face the imperative of stabilizing global financial markets, while nursing their economies through a global downturn and tight credit and ensuring that the recent rise in inflation is reversed. While these are the immediate priorities, work must also progress on tackling the market and regulatory flaws that have contributed to recent stresses. Financial markets and institutions must be placed on a healthier footing and supply-demand responses in commodity markets strengthened. Continued commitment to trade and financial integration of the global economy remains essential to underpin longer-term growth prospects.

### Stabilizing Global Financial Markets

Policymakers face the enormous challenge of dealing with the immediate threat to financial stability, while also paving the way for rebuilding a firm underpinning for financial intermediation. Achieving this daunting task will require comprehensive solutions that address the systemic problems—the proliferation of illiquid, problem assets; the shortage of capital; and the collapse of counterparty confidence—while dealing rapidly and effectively with emerging problems in individual institutions. Approaches at the national level must be internationally coordinated in order to address joint problems and avoid creating adverse cross-border incentives. At the same time, while recognizing the urgent need to restore stability to the system, it is important to protect taxpayers' interests, to ensure that government intervention is tempo-

rary, and to avoid exacerbating moral hazard as much as possible.

The plan by the U.S. government to purchase troubled real estate assets from banks is a bold initiative aimed at restoring liquidity to balance sheets, achieving more transparent pricing of problem assets, and reducing fears about further losses from fire-sale liquidations. Although the implementation details of this plan are uncertain as this report goes to press, the principal challenge will be to balance the need for quick and effective implementation against the longer-term objective of containing the overall fiscal costs, including by creating mechanisms to ensure that the government will share in any gains as banks return to health. It will also be critical to ensure that bank capital is rebuilt quickly, especially because sales of problem assets may spur recognition of additional losses. Public money may be needed to help sound and viable institutions meet their capital needs.

Comprehensive solutions will be important in western Europe too, where cross-border issues are particularly relevant. Appropriate policy actions would be mutually reinforcing with those taken in the United States. Cooperative approaches within Europe should aim at rebuilding confidence through timely bank recapitalization, dealing with problem assets, and protecting depositors in a consistent manner. As recent events have shown, cooperative agreements are essential for resolution of large cross-border institutions, requiring that weaknesses in the cross-border crisis management framework be remedied, including through much greater sharing of supervisory data. It will also be important to ensure consistency of approaches when providing temporary extensions of deposit insurance coverage.

Beyond these immediate tasks, determined efforts will be required to address the manifold underlying weaknesses in financial markets revealed by the current period of financial turbulence. As laid out in the October 2008 *Global Financial Stability Report* (IMF, 2008b), a central objective is to ensure more effective and resilient risk management by individual institutions,

including by setting more robust regulatory capital requirements, insisting on stronger liquidity management practices, and improving disclosure of risk, on and off balance sheets. Another important task will be to strengthen approaches to crisis resolution frameworks, including by clarifying the roles of various official agencies, bolstering deposit insurance systems, and ensuring adequate intervention instruments.

The emergency actions taken to deal with the collapse of major nonbank financial intermediaries (NBFIs) over the past six months have underlined the need for more effective regulation and more secure capitalization of systemically important intermediaries outside the traditional banking system. A clear and permanent solution will be needed for the GSEs that addresses the long-known systemic vulnerabilities resulting from their size, the nature of their risks, and their hybrid public-private governance structure, while dealing with their current shortage of capital. There is also a need to rethink the regulatory structure for and capital adequacy of other NBFIs that play a systemic role in securities and derivatives markets.

Emerging economies should also learn lessons from recent strains. While less directly exposed to the problems created by the proliferation of structured credits, financial systems in a number of emerging economies have been seriously disrupted by shifts in capital flows in the wake of the financial crisis. Basic lessons concerning the importance of strong risk management, transparency, contingency planning, and effective crisis management are thus highly relevant to these countries as well.

Recent events have demonstrated that greater coordination of approaches across national boundaries will be crucial in many of these areas, given the growing international integration of institutions and markets. First, differences in national legal and regulatory frameworks open up room for regulatory arbitrage. Although some differences can foster healthy competition and innovation, this process has gone too far. Second, regulatory and supervisory failures, particularly in major financial centers, have

large cross-border spillover effects. And third, cooperative approaches to resolving difficulties in the financial sector are likely to be more effective than individual approaches because of the interconnectedness of financial institutions and markets. In general, policymakers have found it challenging to stay abreast of a financial system that, on the one hand, is globalizing but, on the other hand, is governed by a multitude of national legal and regulatory frameworks. Although international bodies such as the Financial Stability Forum and the Bank for International Settlements, as well as the IMF, are playing a crucial role in alleviating the tensions between global and national forces, more political will to drive collaboration forward is essential. The latest steps in this direction, including proposals for colleges of supervisors for the world's largest financial institutions, are welcome in this regard.

### Nursing Economies through a Global Downturn

Macroeconomic policymakers are seeking to find a balance between supporting activity in the face of a global downturn and extremely difficult financial conditions and ensuring that the sustained shift in relative prices implied by the surge in commodity prices does not drive a ratcheting up of inflation, as occurred in the 1970s. The appropriate policy stance will vary across countries. A turn to more supportive stances is justified in some economies now facing recession as a result of financial strains, housing downturns, and terms-of-trade losses. Nevertheless, policy tightening is still called for in a number of countries that are still growing well above their speed limits.

Turning first to the major advanced economies, although macroeconomic policies alone can have a limited impact as long as financial markets are under extreme degrees of stress, steps to provide support to economies in or near recession should supplement efforts to stabilize financial conditions, thus helping to break the negative feedback loops between real and financial conditions.

- In the *United States*, monetary policy settings are already highly accommodative, providing

needed support to the economy in the face of extreme financial stress and the continuing housing correction. Underlying price pressures should be contained as economic slack rises, providing room for further policy easing if the downturn seems likely to deepen, even though its effectiveness may be limited if financial strains persist. On the fiscal front, the stimulus package provided well-timed support to the economy, and recent initiatives to stabilize the housing market and the financial system are justified by the need to avert a systemic crisis. Given the potential costs of these measures and the need for medium-term consolidation, however, adjustment measures will be required elsewhere in the fiscal accounts as conditions normalize, to offset the additional spending over time.

- In the *euro area*, monetary conditions are now quite tight, especially after considering the widening in risk spreads. Rapidly slowing activity, rising output gaps, and the recent softening in commodity prices should contribute to lowering inflation to below 2 percent by end-2009, providing scope to ease monetary policy. Fiscal policy is already providing support to the euro area economy through automatic stabilizers and discretionary measures in some countries. The limited further scope for fiscal easing available under the revised Stability and Growth Pact should be used to focus public resources on stabilizing financial conditions, as needed.
- In *Japan*, the monetary policy stance remains accommodative and should remain so, given that the economy is weakening and that underlying price pressures are well contained, with inflation excluding food and fuel still close to zero. The priority for fiscal policy continues to be medium-term consolidation, which suggests that the currently planned fiscal package should be limited in size.

Macroeconomic policy priorities vary considerably across emerging and developing economies. In an increasing number of these countries, the balance of risks has now shifted toward concerns with slowing activity as

external conditions deteriorate and headline inflation starts to moderate. This shift would justify a halt to the monetary policy tightening cycle, particularly in countries where second-round effects on inflation from commodity prices have been limited, and a turn to easing would be called for if the outlook continues to deteriorate. Moreover, in the face of sharp capital outflows, countries will need to respond quickly to ensure adequate liquidity and deal with emerging problems in weaker institutions. The exchange rate should be allowed to absorb some of the pressure, but stockpiles of reserves provide room for intervention to avoid disorderly market conditions.

However, in some other countries, notably but not exclusively in the Middle East and Commonwealth of Independent States, inflation pressures are still a concern in the context of sharp increases in food prices, continued strong growth, and tightening supply constraints. Although the recent moderation in international commodity prices may ease some of the pressure, the gains made over the past years on the inflation front are already being jeopardized, and once credibility is eroded, rebuilding it will be a costly and lengthy process. Thus, policymakers in a number of countries may still need to tighten policy settings further.

In most cases, monetary policy should play the lead role in macroeconomic policy management, but it should be supported by prudent fiscal policy and, in some cases, by flexible exchange rate management. Inflation-targeting regimes have generally served well as a framework that has encouraged early responses to rising inflation pressures, while also providing scope to respond to deteriorating external conditions. However, countries with tightly managed exchange rate regimes have faced greater difficulties. Efforts to tighten the monetary stance in the face of rising inflation are undermined by capital inflows attracted by the increase in interest rate differential, boosting money and credit growth, and many of these countries, particularly in emerging Asia and the Middle East, have faced sharp increases in

inflation. In China, the authorities have used administrative and prudential measures in an effort to limit credit growth, but allowing greater exchange rate flexibility would increase the room for a more independent monetary policy and support efforts to rebalance from external to domestic sources of growth.

Fiscal policy should play a supportive role in macroeconomic management. Fiscal deficits have generally been reduced in recent years across emerging and developing economies as rapid growth has boosted revenues, but government spending has increased rapidly in many countries, adding to demand pressures. Greater restraint on spending growth, including public sector wage increases, would complement tighter monetary policy, in the face of rising inflation, which is particularly important in economies with inflexible exchange regimes. Within a given spending envelope, giving greater priority to infrastructure spending may help relieve supply bottlenecks, a particular concern in Middle Eastern oil-exporting countries, which have clearly been overheating and whose dollar pegs leave little scope for monetary tightening. Some countries with limited exchange rate flexibility have also been more exposed to sharply deteriorating capital inflows, and here again fiscal tightening may be required to help stabilize conditions.

In the face of deteriorating economic prospects, a number of emerging economies have greater scope than in the past to use fiscal policy as a countercyclical tool, in particular by letting automatic stabilizers operate. However, the results of Chapter 5 caution that fiscal stimulus packages are unlikely to be effective—and could be counterproductive—unless confidence in medium-term fiscal sustainability has been firmly established and measures are timely and well targeted.

### Strengthening Macroeconomic Policy Frameworks

Beyond such immediate cyclical considerations, a more difficult global environment has raised questions about monetary and fiscal

policy frameworks more broadly. Are modifications to these frameworks warranted to improve their stabilization properties?

The inflation-targeting approach has been challenged by the need to deal with a series of large and one-sided commodity price shocks. Clearly, there would be risks in focusing single-mindedly on measures of inflation excluding food and fuel prices because such an approach could accommodate years of high headline inflation that could eventually spill over into expectations and wage formation. At the same time, however, allowing some deviation of headline inflation from inflation targets does seem justified to help accommodate a relative price shift without undue output volatility, although sustained large deviations could undermine policy credibility, as discussed in Chapter 3. This underlines the need for clear communications and a forward-looking approach, prepared to tolerate temporary deviations from inflation targets, provided that expectations are sufficiently well anchored.

Is there now a global inflation bias inherent to the way monetary policy is set, implying a need for more coordinated approaches to policy setting? Policymakers tend to treat international commodity prices as exogenously determined and thus do not account for the impact of the country's demand on global commodity markets, exacerbating the global supply constraint. However, the size of the externality seems likely to be of second-order magnitude even for major oil consumers, and it is not clear how such an externality could be effectively internalized. Practically, it seems sensible for monetary policymakers to continue to focus on minimizing volatility in domestic inflation and output while relying on more direct action to relieve commodity market pressures, as discussed below. If they do so successfully, they will also contribute to minimizing volatility in global markets, including those for commodities.

A second concern is that countries that manage their currencies tightly against another country's currency find themselves importing the other country's monetary conditions, which

may not be appropriate to their circumstances. The tension is particularly great where countries face large shocks of opposite sign. Thus, the United States has been easing at a time when many countries with dollar pegs are running current account surpluses and operating at or beyond capacity. These latter countries would benefit from tighter monetary conditions and exchange rate appreciation. However, absent a formal currency union arrangement, it is not reasonable to expect the central bank with the reserve currency to adjust its policy to reflect monetary conditions in other countries that choose to peg against that reserve currency. Moreover, such tightening would be likely to contribute to dollar appreciation and thus not be helpful in terms of the desired rebalancing of current accounts. Although there are many considerations that feed into the choice of an exchange rate regime, there would be stabilization benefits for countries with adequately developed financial institutions to move over time to more flexible rate regimes that provide for greater control over domestic monetary conditions. This issue is explored further in Box 3.3.

Recent events in housing and financial markets have again brought attention to the extent to which monetary policy should respond to asset price movements. Inflation-targeting central banks do take asset price movements into account to the extent that they have an impact on short-term output and price prospects and risks. There is a concern, however, that this may lead to asymmetrical responses, because sharp declines in asset prices may lead to quick policy easing, whereas a longer period of asset price buildup may not generate much resistance, provided near-term prospects remain fair. This has led to proposals for leaning against the wind of asset price movements, especially when these are rapid or seem to be moving prices seriously out of line with fundamentals (Chapter 3 of the April 2008 *World Economic Outlook* and BIS, 2008). The usual counterarguments are that such a policy would be hard to calibrate and that it is not clear how successful monetary policy by itself can be in dampening asset price

cycles. However, recent research has emphasized that short-term interest-rate settings have played an increasingly important role in the monetary transmission mechanism as the shift toward market-based financing has increased the procyclicality of leverage (Adrian and Shin, 2008).

A complementary approach would be to introduce a systemwide element to the regulatory framework to weigh against the inherent procyclicality of credit creation. Such a “macro-prudential” approach could involve increasing regulatory attention to the way financial incentives and constraints affect risk-taking behavior throughout the credit cycle (Bernanke, 2008). Moreover, capital and provisioning requirements could be tightened during the upswing of the economic cycle to reduce the risk of destabilizing credit booms and could be aligned with reforms to strengthen risk management within individual institutions. Such reforms would need to be developed in the broader context of an overhaul of regulatory approaches discussed further below.

Increasing attention is also being paid to fiscal policy frameworks. As discussed in Chapter 5, fiscal policy can play a useful countercyclical role, provided its support is timely, does not undermine medium-term sustainability, and is well structured to maximize impact. Automatic stabilizers provide support that generally satisfies at least the first two of these criteria, and reforms could be considered, for example to safety net programs, that would increase their countercyclical impact without distorting the basic purpose of government tax or spending policies. Discretionary policy can also play a countercyclical role, but timeliness and, especially, reversibility can be more problematic. A “deficit bias” can contribute to undermining policy credibility and therefore effectiveness, as shown in Chapter 5, by the limited impact of fiscal stimulus in high-debt countries. To remedy this, a rules-based countercyclical policy response could be considered, supported by stronger fiscal governance mechanisms to give greater emphasis to ensuring consistency with long-term fiscal sustainability. Such an approach could reinforce the overall stabilization proper-

ties of macroeconomic policies and reduce some of the burden on monetary policy.

### Strengthening Supply and Demand Responses in Commodity Markets

The recent decline in commodity prices in the face of a global slowdown should not be allowed to undercut policy efforts to relieve strains in commodity markets. The focus should be on policies to improve supply and demand responsiveness, while avoiding measures that could exacerbate market tightness in the short term. It will be important to pass through changes in international prices to domestic markets, while developing well-targeted safety nets to cushion the impact on low-income groups. Policies that discourage exports in favor of domestic markets should continue to be rolled back. Advanced economies generally allow commodity price changes to feed through but should take steps to moderate their use of energy and food—far higher per capita than in the emerging and developing economies—by encouraging greater energy conservation (for example, through fuel-efficiency standards as well as price-based measures) and reducing biofuel subsidies.

Priority should also be given to policies that strengthen the supply response to higher prices. Agricultural production in emerging markets could be fostered by steps to build up the infrastructure for irrigation and transportation and to ensure more effective transfer of new technologies to improve yields in developing economies so they are more in line with those in advanced economies. In energy markets, improved provision of information about resources, inventories, and investment plans, and clear and stable investment frameworks, would provide a better basis for the needed long-term buildup of investment in this sector. Finally, liberalization of access for agricultural products to advanced economy markets, through a successful conclusion of the Doha Round, would play an important part in establishing a stronger long-term framework for agricultural development.

### Managing Global Imbalances

As emphasized above, the issue of global imbalances has multiple dimensions. Some progress has been made toward unwinding the large U.S. current account deficit, and more adjustment is in train, even though rising oil prices have slowed the process and financial vulnerabilities have added to concerns. The multilateral strategy endorsed by the International Monetary and Financial Committee in 2005 and elaborated by the Multilateral Consultation on Global Imbalances in 2006–07 remains broadly relevant, but needs to be applied flexibly (Box 1.3 in the April 2008 *World Economic Outlook* provides a comprehensive overview of progress since the Multilateral Consultation). U.S. fiscal consolidation remains a key medium-term objective, but recent countercyclical fiscal stimulus and public support for the housing and financial sectors have been justified to alleviate the current slowdown and to stabilize markets. Progress needs to continue toward appreciation of the renminbi as part of China's broader strategy to shift the sources of growth toward internal demand and to increase the effectiveness of monetary policy. Middle Eastern oil exporters will need to adjust plans to build up spending out of oil revenues in order to reduce overheating in their economies, including less-ambitious spending increases and a tighter focus on relieving supply bottlenecks. For their part, the euro area and Japan should press ahead with product and labor market reforms to raise potential growth in their economies.

Even with implementation of such a strategy, global current account imbalances are likely to be sustained at high levels for a considerable period, particularly given the impact of rising oil prices and increasingly binding capacity constraints on oil exporters' current account surpluses. It will be important to ensure that such imbalances do not undermine continued commitment to open trade and capital flows, which has underpinned global growth over the past decades. One challenge is to ensure the investment of these resources in a secure fashion that

does not lead to the buildup of vulnerabilities in capital-importing countries. Recently, a number of emerging economies—notably in emerging Europe but elsewhere too—have had large current account deficits for sustained periods that stand out by historical standards on both dimensions. As discussed in Chapter 6, to some degree this experience can be understood in terms of the opportunities created by financial development, capital account liberalization, and European integration. However, the experience of the Latin American debt crisis in the early 1980s after years of strong oil-related inflows provides a salutary lesson that such episodes can end with a painful bump. Countries receiving capital inflows must therefore be careful to ensure that the flows do not lead to a buildup of vulnerabilities or balance-sheet mismatches, including by strengthening financial supervision and domestic financial institutions and ensuring an overall macroeconomic context conducive to sustainable growth.

Finally, it will be important to ensure that large imbalances in trade flows do not lead to a buildup in protectionist measures on either the current or capital account. Breaking the current deadlock on the Doha Round would help strengthen the open multilateral trading system. On the capital account side, the growing role of SWFs as an investment vehicle is an important development. The set of principles and practices recently agreed by SWFs (the Santiago Principles) to guide their governance, investment, and risk management will help make such flows more transparent and thus should help reduce concerns about governance of such funds that could lead to counterproductive restrictions on such inflows (see Box 6.1).<sup>13</sup> Moreover, the new guidelines that are under development at the Organization for Economic Cooperation and Development for recipient countries will help reassure SWFs of fair, transparent, and open access to markets.

<sup>13</sup>The *Generally Agreed Principles and Practices of Sovereign Wealth Funds* (forthcoming, October 2008).

## Appendix 1.1. Assessing and Communicating Risks to the Global Outlook

*The main authors of this appendix are Kevin Clinton, Thomas Helbling, Douglas Laxton, and Natalia Tamirisa, with assistance from Juigang Chen, Ioan Carabenciov, and Ondra Kamenik.*

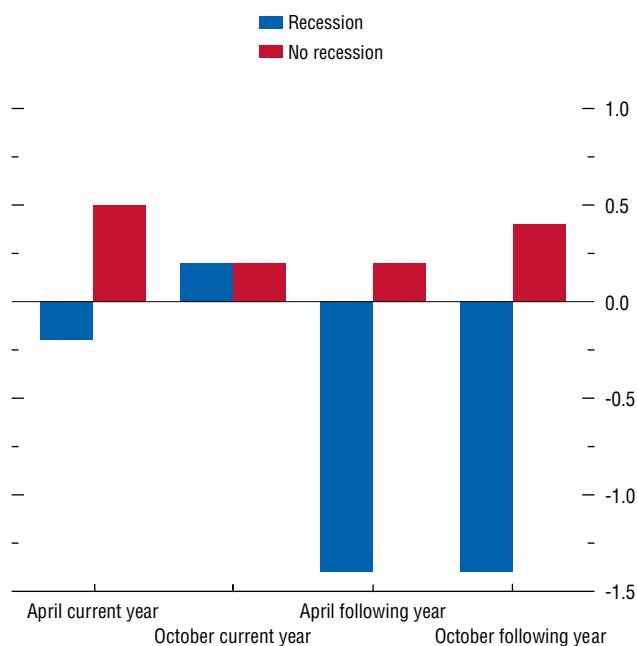
Like all forecasts, the *World Economic Outlook* (WEO) central, or baseline, projections are subject to considerable uncertainty. This appendix discusses approaches that have been used in the WEO to assess and communicate risks to the WEO forecasts and reports on ongoing work to strengthen macroeconomic risk analysis.

As background, it is important to understand how the global projections are prepared by IMF staff. The process underlying the preparation of the WEO forecast is not based on a single formal model. It is driven by the judgment of specialists who prepare individual country projections combined, through a multistage interactive process based on a consistent set of basic assumptions, with assessments from the teams covering global economic and financial developments. This process is supported by a suite of country-specific, regional, and multicountry macroeconomic models. It also draws on discussions with country authorities in the course of bilateral surveillance as well as with market participants and academics during multilateral surveillance missions.

### The Fan Chart

In recent years, following the recommendations of Timmermann (2006), the IMF staff has presented risks to the WEO projections using a fan chart (see, for example, Figure 1.12). The chart shows the estimated confidence intervals around the baseline world growth forecast, which widen as the forecast horizon stretches into the future. The methodology for constructing the fan chart is similar to that originally developed by the Bank of England

**Figure 1.15. Median Forecast Errors during Global Recessions and at Other Times, 1991–2007<sup>1</sup>**



Sources: World Economic Outlook (WEO) database; and IMF staff estimates.

<sup>1</sup>Forecast errors are defined as the difference between actual world growth and the WEO forecast of world growth. The errors are calculated for the current-year and following-year forecasts in the April and October issues of the WEO for the period 1991–2007. A negative (positive) forecast error indicates that the actual value is below (above) the forecast, that is, the forecast is biased upward (downward).

(see Britton, Fisher, and Whitley, 1998). Outcomes for world growth are assumed to follow a “two-piece-normal” distribution. The central forecast is represented as the mode, or the most likely outcome, and the width of the fan is determined by the distribution of past forecast errors. The skewness of the distribution, or the relative size of the two pieces of the normal distribution, represents the balance of risks to the central forecast.

The preparation of the fan chart incorporates an array of empirical judgments about the most likely sources of risk and about the way they may affect macroeconomic developments. The contributions of each risk factor to the overall balance of risks to global growth are shown in the risk factor chart, which complements the fan chart. The impact of individual risk factors is quantified using the IMF’s suite of macroeconomic models and the IMF staff’s judgment.

The assessed risks are usually not symmetric—but weighted more to one side. The sum of the risk factors provides a measure of the balance of risks, or the skew of the probability distribution around the mode, defined as the distance between the mean (the average outcome) and the mode (the most likely outcome). When the risks are symmetric, the average of all possibilities is the most likely outcome. However, when the risks are unbalanced, for example to the downside, the left-hand tail of the distribution is longer, the mean forecast is below the mode, and the skew is negative. The median (or the point that splits the forecast distribution in half, with 50 percent probability on either side) falls between the mode and the mean.

Skewed distributions reflect the IMF staff’s views on the risks to the forecasts. The staff might see a higher risk of deviation from the forecast in one direction than the other for a number of reasons. First, asymmetric risk assessment may result from an acknowledgment of *nonlinearities* in the global economy. For example, capacity constraints in the goods market and labor market would limit the room for upside potential when the economy is operating close to full capacity. The zero bound

on nominal interest rates, financial accelerator mechanisms that amplify shocks throughout the system, and herd behavior in financial markets could all generate complex and asymmetric feedback effects.

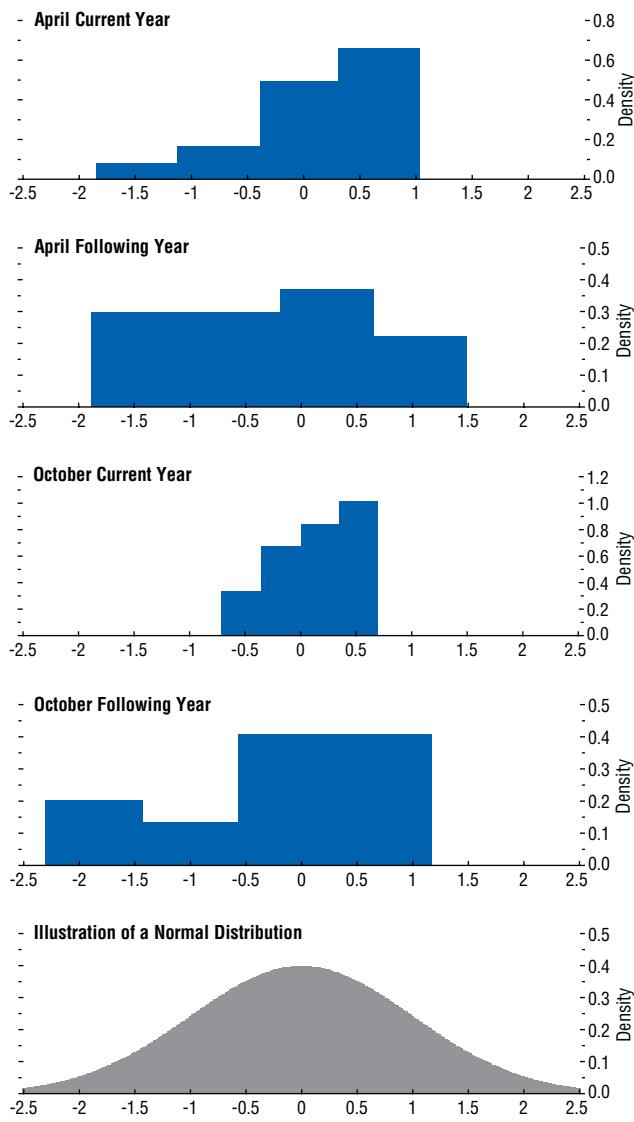
The second reason for asymmetries is to reflect incoming *new information*, after the forecast is “frozen.” For example, oil prices could move substantially out of line with the assumed path, or there could be rapid financial developments whose impact is hard to assess but that clearly could have a significant and asymmetric impact, as was the case last year.

The third reason for asymmetry stems from possible *internal inconsistency of the WEO forecasts*. These are not based on an internally consistent macroeconomic model and assume interest rates and oil prices broadly consistent with market expectations and constant real exchange rates, which may be at odds with the IMF staff’s assessment of the outlook.

The fourth reason relates to the possibility of a *systematic behavioral bias in the WEO baseline forecasts*. An analysis of past forecast errors suggests that during 1991–2007 the *World Economic Outlook* had a general tendency to underpredict world growth somewhat while overpredicting it substantially in the years immediately preceding global recessions—defined as annual world growth (based on purchasing-power-parity weights) falling below 3 percent (see Figures 1.15 and 1.16). This may reflect the well-known difficulty of predicting “tail events” (defined as adverse outcomes that have up to a 10 percent probability of occurring), for example, systemic financial events or hard-landing outcomes.

Even though the fan chart provides a useful illustrative device for communicating risks underlying the WEO baseline forecasts, and the heuristic approach underlying its construction is sufficiently flexible to incorporate a wide range of complex considerations, the methodology has some drawbacks. The sources of uncertainty are somewhat ad hoc, because they are not derived from a formal model of the economy, and the actual distribution of likelihood of different outcomes may not be normal. In addition, the

**Figure 1.16. Histograms of Forecast Errors, 1991–2007<sup>1</sup>**

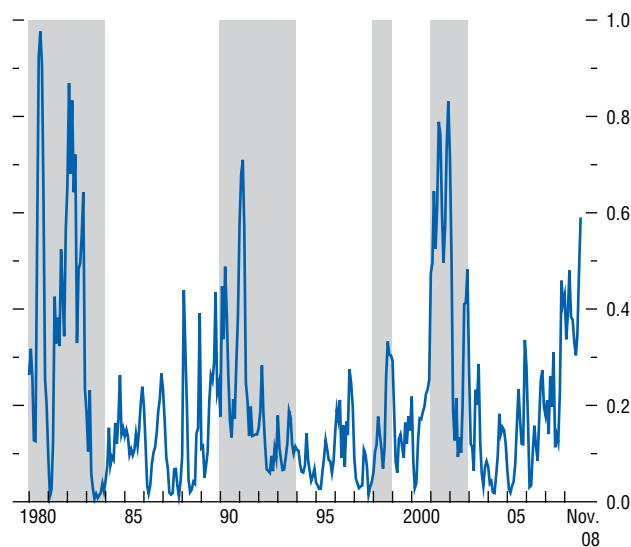


Source: IMF staff calculations.

<sup>1</sup>Forecast errors are defined as the difference between actual world growth and the WEO forecast of world growth. The errors are calculated for the current-year and following-year forecasts in the April and October issues of the WEO for the period 1991–2007. A negative (positive) forecast error indicates that the actual value is below (above) the forecast, that is, the forecast is biased upward (downward).

standard deviation of the distribution used to construct the fan chart is fixed and does not vary with the state of the world. The risk factors used to determine the extent of asymmetry in the distribution are typically ad hoc and, in reality, jointly distributed rather than independent. Thus, inflation risks are greater in the presence of an oil price spike, whereas risks to domestic demand depend on the evolution of financial conditions. As discussed above, a fan chart based on a two-piece-normal distribution may underestimate the risks of tail events such as global recessions.

**Figure 1.17. Probability of Global Recessions<sup>1</sup>**



Source: IMF staff estimates.

<sup>1</sup>Shaded area represents periods of global recession.

### Leading Indicator Approach

One way to complement the fan chart approach is to gauge the risk of a global recession using a leading indicator approach.

Leading indicators are variables that help predict the probability of global downturns (recessions) some three to nine months ahead.<sup>14</sup> A suitable indicator has a turning point that precedes a change in global activity in a systematic and consistent manner. Leading indicators have long been used in business cycle analysis (for example, Zarnowitz, 1992), although finding reliable indicators remains surprisingly difficult.<sup>15</sup>

IMF staff analysis suggests that an index constructed as a combination of U.S. financial and real variables and cyclical commodity prices has promising leading indicator properties. The financial variables include the slope of the term structure (proxied by the spread between 10-year and three-month Treasury rates) and stock returns (S&P 500). The other variables are U.S. industrial production and the IMF's metals price index. Based on September 2008 data, this indicator points to a probability of global recession within the next three months of approaching 60 percent, up from almost 50 percent late last

<sup>14</sup>The dating of the cycle in global activity is based on a monthly series of global industrial production.

<sup>15</sup>Another difficulty is the lack of sufficiently long time series for many relevant high-frequency indicators.

year.<sup>16</sup> As Figure 1.17 shows, together these variables have predicted past global recessions with a probability of more than 50 percent without providing false signals during 1980–2007.<sup>17</sup>

This approach should also be used cautiously. The strength and timing of the signal varied across recessions, which is consistent with the general experience with leading indicators (for example, Stock and Watson, 1989, 2003). Moreover, the leading indicator approach is essentially statistical and does not provide much insight into the processes generating adverse outcomes or how they might change over time. Thus, a leading indicator approach at the global level, although simple and intuitive, is not a panacea when it comes to assessing risks to global growth.

### Scenario Analysis

An alternative way to address the above issues is to complement the judgment-based risk assessment, as embodied in fan charts, with analyses using a fully articulated model to assess the impact of shocks to key variables. Thus, Figure 1.15 in the April 2008 *World Economic Outlook* illustrated the impact of a deeper financial sector shock, and Box 1.1 in the April 2007 *World Economic Outlook* illustrated the effects of oil-price shocks stemming, respectively, from demand and supply factors. Model simulations are particularly useful for tracing the complex dynamic interactions that occur when a shock moves the economy away from its previously expected path. However the simulated scenarios, in themselves, do not provide a guide to the distribution of risks. This requires inclusion within the model of a probabilistic framework that contains estimates of the distributions of relevant shocks.

<sup>16</sup>For comparison, the fan chart now suggests that the risk of global recession is almost 20 percent.

<sup>17</sup>A false signal would be a prediction of more than 50 percent probability of a global recession at a time the global economy was expanding.

### Macroeconomic Model-Based Confidence Intervals

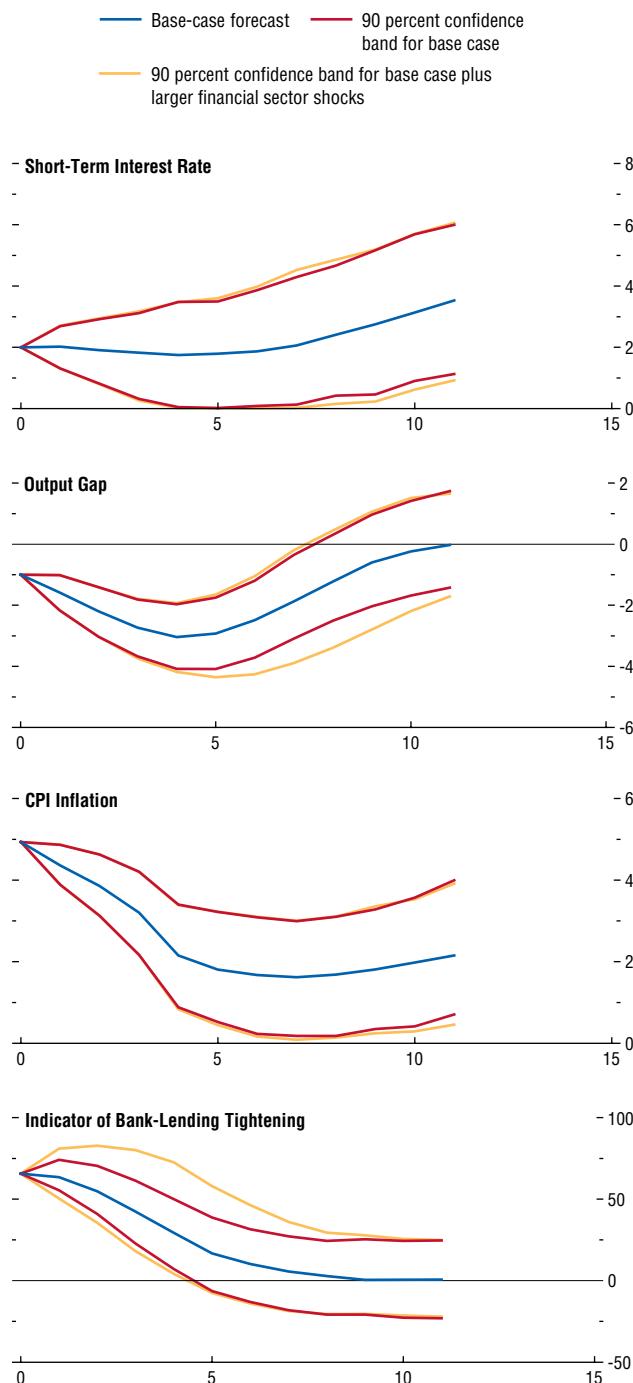
Work is now under way at the IMF on an estimated multicountry model capable of producing baseline forecasts and fan charts, with all numerical assumptions—including distribution of shocks—clearly spelled out.<sup>18</sup> This new Global Projection Model (GPM) builds on the significant progress that has been made, at various central banks, in estimating a complete system of equations that link demand and supply shocks in different markets to macroeconomic variables.<sup>19</sup> Such a model is not capable of producing forecasts with the full country detail provided by the WEO forecasts, but has the advantage of greater consistency and clarity between assumptions and outcomes. It can also be used to produce conditional forecasts to indicate the impact of shocks on one or more variables.

Almost all this research has so far been based on symmetric shock distributions and linear models, which will result in symmetric confidence bands, but the IMF staff has been working to introduce three sources of asymmetry: (1) the zero-interest-rate floor; (2) a nonlinear output-inflation process, in which positive shocks to aggregate demand have larger inflation implications when the economy is already overheating than when there is significant slack in the economy; and (3) a credit-tightness effect on the real economy, whereby an easing of financial conditions may not increase lending much beyond a certain threshold (once there is sufficient collateral to satisfy lenders of

<sup>18</sup>See Carabenciov and others (forthcoming) for a description of a preliminary three-region version of the GPM that includes models for the United States, the euro area, and Japan. In the near term, the GPM will be used to run scenarios and check the macro consistency in the IMF desk economists' baseline forecasts much as the Federal Reserve Board of Governors uses macro models to check the consistency of their own forecasts.

<sup>19</sup>This has been made possible by the development of user-friendly Bayesian-estimation routines, which are now being used extensively in policymaking institutions and academia to estimate macro models—see Laxton, Rose, and Scott (forthcoming).

**Figure 1.18. Illustrative GPM-Based 90 Percent Confidence Intervals<sup>1</sup>**



Source: IMF staff calculations.

<sup>1</sup>GPM = Global Projection Model.

the safety of their loans, a further increase in the value of the collateral may not affect their behavior very much).

Figure 1.18 provides some illustrative confidence intervals from this extended version of the GPM.<sup>20</sup> The central path lines within the fans represent the baseline solutions of the model for the expected path of the economy. Unlike conventional forecasts, this is an unconditional forecast, which assumes that all shocks are set to zero, with none of the judgment-based input that usually proves to be very useful when producing near-term forecasts.<sup>21</sup> The boundaries of the fans represent 90 percent confidence intervals, which are derived from estimated historical distributions of shocks. The wider confidence intervals depicted in the fourth panel are based on building into the GPM an assumption that shocks to credit conditions become larger when credit conditions are exceptionally tight. The wider bands suggest that the increased uncertainty would all be on the downside for the output gap, inflation, and short-term interest rates.

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<sup>20</sup>See Chen, Kamenik, and Laxton (forthcoming) for a description of the model and methodology used to construct the GPM fan charts.

<sup>21</sup>Efficient model-based projections developed in policy-making institutions typically rely very heavily on judgment for setting the first two quarters of the projection. This judgment is based on considerably more information than can be summarized by pure forecasts generated from a macro model—see Laxton, Rose, and Scott (forthcoming).

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*Against the background of the global outlook outlined in Chapter 1, this chapter discusses how the main countries and regions that make up the world economy are coping with intense financial strains, high commodity prices, and the global downturn. It then draws policy lessons, with a view to finding an appropriate balance between responding to deteriorating short-term growth prospects, containing inflation, and fostering longer-term growth potential.<sup>1</sup>*

### **United States and Canada: Prognosis for the Downturn**

The United States has been at the center of the intensifying global financial storm discussed in Chapter 1, and the economy is now slowing fast. The latest data suggest that GDP rose 2.8 percent at an annualized rate in the second quarter as surging net exports and tax rebate checks buoyed consumption and outweighed the drag from financial turmoil, a continuing housing correction, and high commodity prices. However, taking the most recent three quarters together, the pace of growth averaged only 1¼ percent, well below potential. More important, available data for the third quarter suggest a further slowdown and forward-looking indicators—such as consumer and business confidence and accumulating evidence of the negative impact on credit of recent financial market disruptions—suggest that the economy is likely to contract in the current quarter and into early 2009.

Since the summer of 2007, declining residential investment has been a major drag on output (subtracting about ¾ percentage point off growth), inventories have been compressed, and consumption has slowed. By contrast, there have been two sources of resilience. First, net exports have continued to boom—adding 1½ percent-

age points to growth over the period—although surging oil prices kept the current account deficit at about 5 percent of GDP. Second, despite the slowing economy and tighter credit conditions, U.S. firms have remained healthy, benefiting from relatively low leverage, high profits, and strong export demand, which explain why cuts in business spending and employment were moderate until recently.

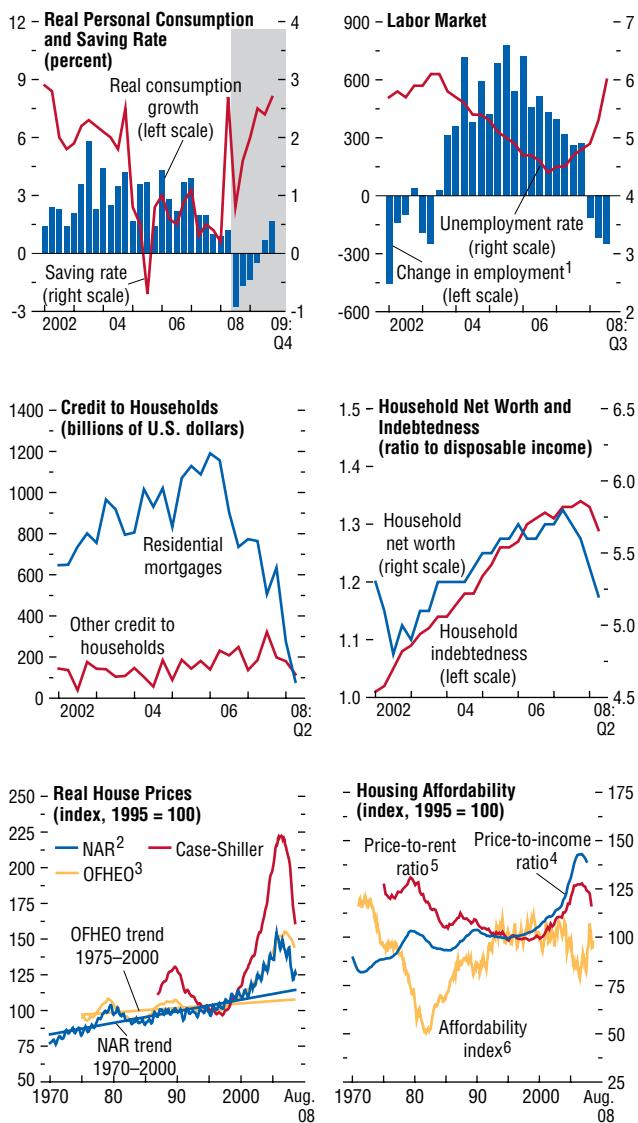
With a recession now looking increasingly likely, the key questions are, how deep will the downturn be, when will a recovery get under way, and how strong will it be? The key determinants of the short-term outlook will be the effectiveness of recent government initiatives to stabilize financial market conditions, as well as the behavior of U.S. households in the face of rising stress, the depth of the housing cycle, and the extent to which inflation concerns constrain monetary policy.

Faced by a rapidly expanding and increasingly dangerous financial crisis, the authorities have acted to deal with immediate threats to systemic stability and have passed a major initiative to purchase illiquid assets from banks—although it will take time to organize these operations. Once fully in place, these measures should help to stabilize market conditions, but even so the process of balance-sheet repair will be long and arduous. It will take considerable time before losses are fully recognized, banks are recapitalized, leverage is reduced, and market confidence is regained. Tight bank lending conditions are now having a visible impact on the growth of new loans, and credit availability is likely to remain tight throughout 2009. The impact is likely to be greatest on households, given their deteriorating balance sheets, but under current dislocated financial market conditions, firms are also likely to be affected adversely, notwithstanding stronger balance sheets and still-healthy profit margins.

<sup>1</sup>Further analysis of regional and country developments is provided in the IMF *Regional Economic Outlooks*.

**Figure 2.1. United States: Strains on Households**

U.S. households are coming under increasing strain. So far they have maintained moderate spending growth, but current drags on growth include falling employment, tightening credit, and declining net worth, as well as rising fuel and food prices. However, housing affordability has improved and there are signs that housing valuations are moving closer in line with historical trends.



Sources: Davis, Lehnert, and Martin (2007); Haver Analytics; and IMF staff estimates.

<sup>1</sup>Quarterly change in total nonfarm payrolls, thousands.  
<sup>2</sup>National Association of Realtors; three-month moving average of 12-month percent change.

<sup>3</sup>Office of Federal Housing Enterprise Oversight (OFHEO).  
<sup>4</sup>Ratio of OFHEO house price index to personal disposable income per capita.  
<sup>5</sup>Inverse of the rent-price ratio for the aggregate stock of owner-occupied housing.  
<sup>6</sup>Index equal to 100; median family income qualifies for an 80 percent mortgage on a median-priced existing single-family home, reindexed to 1995 = 100.

While consumption has continued to increase in recent quarters, U.S. households face rising cash-flow and balance-sheet strains. Income growth has slowed as employment has dropped since January, the average workweek has shrunk, unemployment has risen by a full percentage point, wages have stagnated, and gas prices remain high (Figure 2.1). Falling house prices and the weakening equity market have contributed to a 10 percent drop in household net wealth relative to GDP. Moreover, access to credit has tightened markedly, most notably for mortgages but also for other sources of consumer finance.

A key element of the baseline forecast is that consumption will now show more obvious signs of weakness. In the projections, consumption declines in the second half of 2008, as the stimulus from the tax rebate checks wears off, and in the early part of 2009. It would then recover gradually during the remainder of the year, held back by cash-flow strains and the need to rebuild savings.

Strains on households are in part a reflection of the massive continuing downturn in the housing market. The drop in house prices—in the range of 5 to 17 percent over the past year, depending on the index used—is unprecedented since the Great Depression. As a result, more than 10 million households owe more on their mortgages than the market value of their homes. Housing-related activity has also plummeted—housing starts have fallen 60 percent from their peak. This was a needed correction after a period of excess, and there are now some tentative signs of stabilization, for example in recent home sales data, although up to one-third of sales now involve foreclosure, an indicator of weakness rather than strength.

The baseline projections anticipate that the housing cycle will eventually find a floor in 2009 after four years of correction. The projections build in a further 10 percent decline in house prices by the end of the year, in line with market expectations (although these forward markets are very thin), which will bring prices closer in line with fundamentals. Moreover, residential

investment relative to GDP is around a 40-year low, and the drop in housing starts is bringing down inventories of unsold new homes. Support should also be provided by recent legislation to facilitate the refinancing of “underwater” mortgages with federal guarantees and to provide assurances that Fannie Mae and Freddie Mac—the government-sponsored enterprises (GSEs) that are behind about 80 percent of new mortgage lending in recent quarters—will continue to provide housing finance.

On the inflation front, still-high energy prices boosted headline personal consumption expenditure (PCE) inflation to 4.6 percent (12-month rate) in August 2008, while core PCE inflation ticked up to 2.6 percent. Given the recent retreat in international oil prices, headline figures are likely to start coming down, and the widening output gap, moderate wage increases, and a pickup in productivity should all help contain underlying inflation.

Putting together the pieces of the puzzle, activity is projected to decline in the final quarter of 2008 and the first quarter of 2009, stabilize in the second quarter, and then embark on a gradual recovery. On a year-over-year basis, growth moderates from 2.0 percent in 2007 to 1.6 percent in 2008 and 0.1 percent in 2009 (Table 2.1). The economy only returns to potential growth in 2010. Risks around this forecast are to the downside. Particular concerns are that the credit crunch could impose an ever-greater constraint on activity, that the house price correction could extend into 2010, and that inflation pressures may prove more persistent, limiting the Federal Reserve’s room for maneuver. The principal upside potential is that U.S. firms may be able to maintain their spending patterns better than expected, despite financial strains, which would provide greater-than-anticipated support for household incomes.

While the immediate task is to stabilize financial conditions, policymakers must ensure appropriately supportive macroeconomic policy settings, including efforts to contain negative macrofinancial feedback loops. The present highly accommodative monetary policy stance

could be eased still further if the downturn seems likely to deepen, even though its effectiveness may be limited if financial strains persist, and the Federal Reserve will continue to be watchful on the inflation front. Eventually, policy will need to move toward a more neutral stance as an economic recovery gathers steam and financial conditions improve. On the fiscal front, the stimulus package provided well-timed support, but the fiscal deficit is rising sharply and is now projected at 4½ percent of GDP in 2009, the highest among the G7 countries, without allowing for the potentially sizable impact of recent measures to stabilize the financial and housing sectors. The need for fiscal consolidation in the face of medium-term spending pressures and long-term challenges posed by demographics and rising medical costs point to the need for adjustment measures elsewhere once the situation has stabilized in order to offset the costs of financial system support.

In Canada, economic activity has slowed sharply since mid-2007, and growth is projected to come down from 2.7 percent in 2007 to 0.7 percent in 2008 before picking up to 1.2 percent in 2009. Although the resource-intensive sectors have benefited from high commodity prices, the lagged effect of past real appreciation of the Canadian dollar, together with the U.S. slowdown, has hit manufacturing hard. The Bank of Canada eased interest rates by 150 basis points between December 2007 and April 2008 and has held rates steady since then. Despite its recent acceleration to 3½ percent, inflation has generally remained well anchored, in part owing to the rising currency. Banks have generally weathered the financial strains well so far, reflecting conservative regulation and low exposure to structured products, but risks remain given the strong economic and financial linkages with the United States.

## Western Europe: Struggling with Multiple Shocks

Western Europe is being hit by major shocks that are weakening economic activity, notably

**Table 2.1 Advanced Economies: Real GDP, Consumer Prices, and Unemployment**  
*(Annual percent change and percent of labor force)*

|                                      | Real GDP   |            |            |            | Consumer Prices |            |            |            | Unemployment |            |            |            |
|--------------------------------------|------------|------------|------------|------------|-----------------|------------|------------|------------|--------------|------------|------------|------------|
|                                      | 2006       | 2007       | 2008       | 2009       | 2006            | 2007       | 2008       | 2009       | 2006         | 2007       | 2008       | 2009       |
| <b>Advanced economies</b>            | <b>3.0</b> | <b>2.6</b> | <b>1.5</b> | <b>0.5</b> | <b>2.4</b>      | <b>2.2</b> | <b>3.6</b> | <b>2.0</b> | <b>5.7</b>   | <b>5.4</b> | <b>5.7</b> | <b>6.5</b> |
| United States                        | 2.8        | 2.0        | 1.6        | 0.1        | 3.2             | 2.9        | 4.2        | 1.8        | 4.6          | 4.6        | 5.6        | 6.9        |
| Euro area <sup>1</sup>               | 2.8        | 2.6        | 1.3        | 0.2        | 2.2             | 2.1        | 3.5        | 1.9        | 8.7          | 7.4        | 7.6        | 8.3        |
| Germany                              | 3.0        | 2.5        | 1.8        | —          | 1.8             | 2.3        | 2.9        | 1.4        | 9.8          | 8.4        | 7.4        | 8.0        |
| France                               | 2.2        | 2.2        | 0.8        | 0.2        | 1.9             | 1.6        | 3.4        | 1.6        | 9.2          | 8.3        | 7.7        | 8.3        |
| Italy                                | 1.8        | 1.5        | -0.1       | -0.2       | 2.2             | 2.0        | 3.4        | 1.9        | 6.8          | 6.2        | 6.7        | 6.6        |
| Spain                                | 3.9        | 3.7        | 1.4        | -0.2       | 3.6             | 2.8        | 4.5        | 2.6        | 8.5          | 8.3        | 11.2       | 14.7       |
| Netherlands                          | 3.4        | 3.5        | 2.3        | 1.0        | 1.7             | 1.6        | 2.9        | 2.6        | 3.9          | 3.2        | 2.8        | 2.9        |
| Belgium                              | 2.9        | 2.8        | 1.4        | 0.2        | 2.3             | 1.8        | 4.6        | 2.8        | 8.3          | 7.5        | 7.1        | 8.6        |
| Austria                              | 3.4        | 3.1        | 2.0        | 0.8        | 1.7             | 2.2        | 3.5        | 2.3        | 4.8          | 4.4        | 4.2        | 4.4        |
| Finland                              | 4.9        | 4.5        | 2.5        | 1.6        | 1.3             | 1.6        | 3.9        | 2.5        | 7.7          | 6.8        | 6.2        | 6.2        |
| Greece                               | 4.2        | 4.0        | 3.2        | 2.0        | 3.3             | 3.0        | 4.4        | 3.1        | 8.9          | 8.3        | 7.7        | 8.3        |
| Portugal                             | 1.4        | 1.9        | 0.6        | 0.1        | 3.0             | 2.4        | 3.2        | 2.0        | 7.7          | 8.0        | 7.6        | 7.8        |
| Ireland                              | 5.7        | 6.0        | -1.8       | -0.6       | 2.7             | 2.9        | 3.5        | 2.4        | 4.4          | 4.5        | 5.7        | 7.0        |
| Luxembourg                           | 6.1        | 4.5        | 2.3        | 1.8        | 2.7             | 2.3        | 3.7        | 1.8        | 4.4          | 4.4        | 4.4        | 4.8        |
| Slovenia                             | 5.7        | 6.1        | 4.3        | 3.7        | 2.5             | 3.6        | 5.9        | 3.3        | 5.9          | 4.8        | 4.8        | 5.0        |
| Cyprus                               | 4.0        | 4.4        | 3.4        | 2.8        | 2.2             | 2.2        | 4.6        | 3.5        | 4.6          | 3.9        | 3.9        | 3.9        |
| Malta                                | 3.1        | 3.7        | 2.8        | 2.3        | 2.6             | 0.7        | 3.7        | 2.2        | 7.3          | 6.4        | 6.5        | 7.0        |
| Japan                                | 2.4        | 2.1        | 0.7        | 0.5        | 0.3             | —          | 1.6        | 0.9        | 4.1          | 3.8        | 4.1        | 4.5        |
| United Kingdom <sup>1</sup>          | 2.8        | 3.0        | 1.0        | -0.1       | 2.3             | 2.3        | 3.8        | 2.9        | 5.4          | 5.4        | 5.4        | 6.0        |
| Canada                               | 3.1        | 2.7        | 0.7        | 1.2        | 2.0             | 2.1        | 2.5        | 2.1        | 6.3          | 6.0        | 6.2        | 6.3        |
| Korea                                | 5.1        | 5.0        | 4.1        | 3.5        | 2.2             | 2.5        | 4.8        | 4.0        | 3.5          | 3.3        | 3.1        | 3.0        |
| Australia                            | 2.7        | 4.2        | 2.5        | 2.2        | 3.5             | 2.3        | 4.6        | 3.6        | 4.8          | 4.4        | 4.3        | 4.8        |
| Taiwan Province of China             | 4.9        | 5.7        | 3.8        | 2.5        | 0.6             | 1.8        | 4.2        | 2.5        | 3.9          | 3.9        | 3.9        | 4.1        |
| Sweden                               | 4.1        | 2.7        | 1.2        | 1.4        | 1.5             | 1.7        | 3.4        | 2.8        | 7.0          | 6.1        | 6.6        | 7.1        |
| Switzerland                          | 3.4        | 3.3        | 1.7        | 0.7        | 1.0             | 0.7        | 2.6        | 1.5        | 3.0          | 2.5        | 2.6        | 2.8        |
| Hong Kong SAR                        | 7.0        | 6.4        | 4.1        | 3.5        | 2.0             | 2.0        | 4.8        | 4.3        | 4.8          | 4.1        | 3.5        | 3.6        |
| Denmark                              | 3.9        | 1.7        | 1.0        | 0.5        | 1.9             | 1.7        | 3.4        | 2.8        | 3.9          | 2.8        | 1.8        | 2.6        |
| Norway                               | 2.5        | 3.7        | 2.5        | 1.2        | 2.3             | 0.8        | 3.2        | 2.7        | 3.4          | 2.5        | 2.5        | 3.0        |
| Israel                               | 5.2        | 5.4        | 4.3        | 2.8        | 2.1             | 0.5        | 4.8        | 3.3        | 8.4          | 7.3        | 6.0        | 6.2        |
| Singapore                            | 8.2        | 7.7        | 3.6        | 3.5        | 1.0             | 2.1        | 6.5        | 3.3        | 2.7          | 2.1        | 2.1        | 2.2        |
| New Zealand <sup>2</sup>             | 1.9        | 3.2        | 0.7        | 1.5        | 3.4             | 2.4        | 4.2        | 3.8        | 3.8          | 3.6        | 4.0        | 4.3        |
| Iceland                              | 4.4        | 4.9        | 0.3        | -3.1       | 6.8             | 5.0        | 12.1       | 11.2       | 1.3          | 1.0        | 2.2        | 3.9        |
| <i>Memorandum</i>                    |            |            |            |            |                 |            |            |            |              |            |            |            |
| Major advanced economies             | 2.7        | 2.2        | 1.2        | 0.1        | 2.4             | 2.2        | 3.5        | 1.7        | 5.8          | 5.5        | 5.8        | 6.6        |
| Newly industrialized Asian economies | 5.6        | 5.6        | 4.0        | 3.2        | 1.6             | 2.2        | 4.8        | 3.5        | 3.7          | 3.4        | 3.3        | 3.3        |

<sup>1</sup>Based on Eurostat's harmonized index of consumer prices.

<sup>2</sup>Consumer prices excluding interest rate components.

extraordinary financial stress. Real GDP growth has stalled in the euro, following a first-quarter rebound. Growth was already noticeably weaker elsewhere during the first quarter, including in the United Kingdom and most Nordic countries, and conjunctural indicators now suggest that many countries are moving close to or into recession. At the same time, high oil and food prices are still keeping inflation at elevated levels.

Economic growth is being slowed by a number of factors, initially mainly by rising oil prices but now increasingly by tightening financial

conditions.<sup>2</sup> Relative to 2007, oil prices are some 40 percent higher in euro terms and, together with surging food prices, have squeezed already-sluggish consumption growth. All other things equal, standard rules of thumb would imply output losses from such a shock in a broad range up to about ½ percent of GDP for the

<sup>2</sup>See also the forthcoming *Regional Economic Outlook: Europe*, where the implications for Europe of commodity price shocks and ongoing financial turmoil are discussed in more detail.

euro area—less for oil producers such as the United Kingdom and Norway. Although oil prices increased sevenfold over 1999–2008, the response of wages has remained generally subdued, unlike during the 1970s, reflecting structural reforms and improved policy frameworks. Together with rapidly cooling activity and rising unemployment fears, these factors should help contain wages over the coming year (Figure 2.2). Thus, while headline inflation has recently been running in the 3–4 percent range in many countries, core inflation (excluding all food and energy) has generally been below 2 percent in the euro area and the United Kingdom.<sup>3</sup> Inflation expectations have generally remained well anchored, although somewhat less so in the United Kingdom than in the euro area.

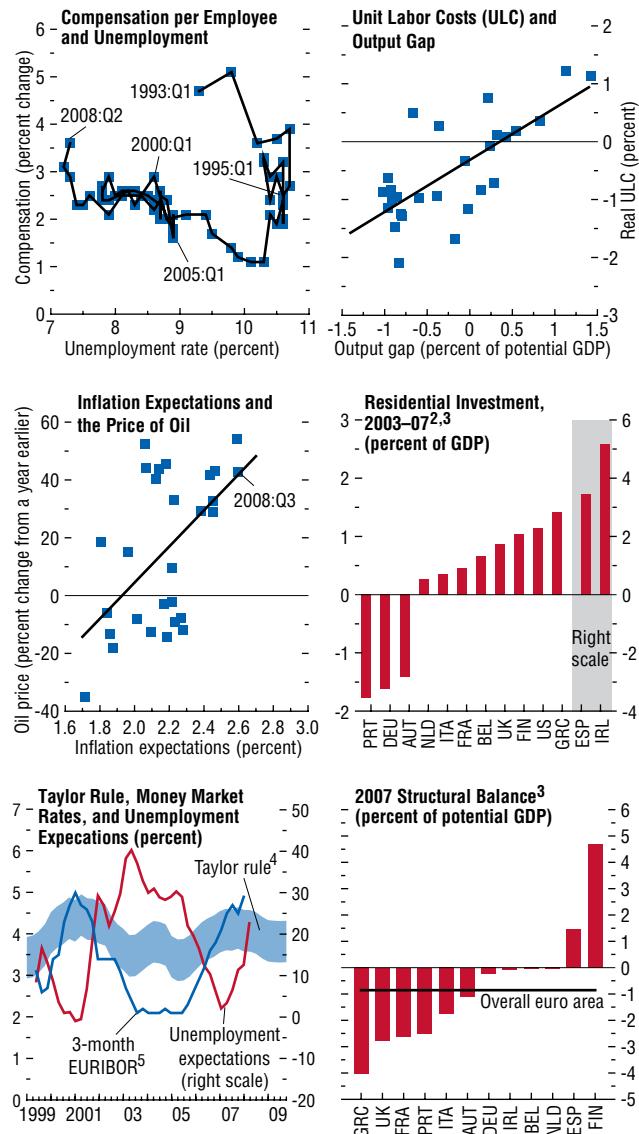
While oil and food price hikes are undercutting real disposable incomes, financial conditions are tightening quickly. European banks are struggling with a confluence of adverse shocks. They have been exposed to losses on their holdings of U.S.-mortgage-related assets and deteriorating overall credit quality since 2007. Concerns that initially focused on liquidity are also affecting solvency. Confidence in the sector has weakened and highly leveraged banks are struggling to maintain funding in the face of rising creditor concerns about balance-sheet risk. Equity-to-asset ratios will need to be boosted, which, to a large extent, will have to be achieved by cutting back on lending because bank stock prices have declined. The process of deleveraging, including market exit by some institutions, will likely be long and arduous and banks have already tightened lending standards to far above pre-turmoil levels.

Households and firms operating in real estate are struggling under growing debt burdens,

<sup>3</sup>Consumer price index (CPI) food price inflation in the euro area increased from about 2 percent in mid-2007 to 6.2 percent in August 2008, contributing 0.8 percentage point to the 3.8 percent August headline CPI inflation rate. Energy contributed 1.1 percentage points. Higher food prices mainly redistribute income within western Europe and thus have much smaller direct effects on economic growth than high oil prices (see Chapter 3).

**Figure 2.2. Western Europe: Slowing Demand and High Inflation<sup>1</sup>**

Although headline inflation is high, wages have generally remained subdued, and slowing activity and rising unemployment fears should restrain demand for pay hikes. In the euro area, monetary conditions are on the tight side by the standards of recent history, and countries have little room for discretionary fiscal stimulus, lest they breach the Maastricht limit of 3 percent of GDP deficit.



Sources: European Central Bank; European Commission; Eurostat; Haver Analytics; Thomson Datastream; and IMF staff estimates.

<sup>1</sup>Data refer to the euro area unless otherwise noted.

<sup>2</sup>Deviation from 1993–2002 average.

<sup>3</sup>AUT: Austria; BEL: Belgium; FIN: Finland; FRA: France; DEU: Germany; GRC: Greece; IRL: Ireland; ITA: Italy; NLD: Netherlands; PRT: Portugal; ESP: Spain; UK: United Kingdom; US: United States.

<sup>4</sup>The formula gives equal weight (0.5) to the deviation of breakeven inflation from the inflation target and to the output gap; the lower band is based on a natural rate equal to 3.5 percent; the upper band is based on a natural rate equal to 4.5 percent.

<sup>5</sup>Euro interbank offered rate.

particularly in countries such as Ireland, Spain, and the United Kingdom, where floating-rate mortgages indexed to short-term interest rates are common. In real terms, residential property prices are falling in these and some other countries, while slowing quickly elsewhere (see Box 1.2). While there is a risk of an outright housing-related credit crunch, some factors would mitigate pernicious feedback loops between the financial and real sectors (Chapter 4). Although residential real estate generally accounts for a larger share of activity in western Europe than the United States, the recent expansion of residential investment was generally less pronounced, except in Finland, Greece, Ireland, Spain, and the United Kingdom. Furthermore, these countries are less likely to suffer from the financial vulnerabilities exposed in the United States: household savings are generally higher and debt lower, non-prime lending is much less widespread, loan-to-value ratios are more conservative, and opportunities for equity withdrawal are much more limited. However, even in the absence of an outright credit crunch, the downturn in residential real estate will have an appreciable short-run impact in some countries (for example, Ireland, Spain, and the United Kingdom) and, with the exception of a few countries (for example, Austria, Germany, and Switzerland), produce noticeable medium-term headwinds.

Turning to nonfinancial firms, balance sheets are stronger than at the onset of the 2001–02 cyclical downturn, and this should limit the effect of financial sector strains on investment. On the other hand, the longer the financial stresses last, the more corporate profits, balance sheets, and investment will suffer.

The euro area's external current account was close to balance in 2007 (Table 2.2). Exports are expected to slow in line with world demand, however, and the current account is expected to deteriorate, mainly on account of worsened terms of trade. Also, the real effective exchange rate is on the strong side of medium-term fundamentals, despite some recent weakening. By contrast, the United Kingdom's current account is in notice-

**Table 2.2. Advanced Economies: Current Account Positions**

(Percent of GDP)

|                                      | 2006        | 2007        | 2008        | 2009        |
|--------------------------------------|-------------|-------------|-------------|-------------|
| <b>Advanced economies</b>            | <b>-1.3</b> | <b>-0.9</b> | <b>-1.0</b> | <b>-0.6</b> |
| United States                        | -6.0        | -5.3        | -4.6        | -3.3        |
| Euro area <sup>1</sup>               | 0.3         | 0.2         | -0.5        | -0.4        |
| Germany                              | 6.1         | 7.6         | 7.3         | 6.8         |
| France                               | -0.7        | -1.2        | -2.8        | -2.7        |
| Italy                                | -2.6        | -2.5        | -2.8        | -2.4        |
| Spain                                | -8.9        | -10.1       | -10.1       | -7.7        |
| Netherlands                          | 8.2         | 6.8         | 5.6         | 5.1         |
| Belgium                              | 2.7         | 2.1         | —           | -1.1        |
| Austria                              | 2.4         | 3.2         | 2.8         | 2.4         |
| Finland                              | 4.6         | 4.6         | 3.4         | 2.9         |
| Greece                               | -11.1       | -14.1       | -14.0       | -14.1       |
| Portugal                             | -10.1       | -9.8        | -12.0       | -12.7       |
| Ireland                              | -3.6        | -5.4        | -5.0        | -4.4        |
| Luxembourg                           | 10.5        | 9.9         | 8.6         | 8.2         |
| Slovenia                             | -2.8        | -4.9        | -4.7        | -4.7        |
| Cyprus                               | -5.9        | -9.7        | -9.7        | -7.8        |
| Malta                                | -8.2        | -5.4        | -7.7        | -6.4        |
| Japan                                | 3.9         | 4.8         | 4.0         | 3.7         |
| United Kingdom                       | -3.4        | -3.8        | -3.6        | -3.4        |
| Canada                               | 1.4         | 0.9         | 0.9         | —           |
| Korea                                | 0.6         | 0.6         | -1.3        | -0.7        |
| Australia                            | -5.3        | -6.2        | -4.9        | -4.3        |
| Taiwan Province of China             | 7.2         | 8.6         | 7.8         | 6.5         |
| Sweden                               | 8.5         | 8.5         | 6.4         | 5.8         |
| Switzerland                          | 14.7        | 16.6        | 9.3         | 8.7         |
| Hong Kong SAR                        | 12.1        | 13.5        | 11.7        | 10.3        |
| Denmark                              | 2.9         | 1.1         | 1.3         | 1.8         |
| Norway                               | 17.3        | 15.4        | 19.1        | 18.0        |
| Israel                               | 5.9         | 3.2         | 0.4         | 0.5         |
| Singapore                            | 21.8        | 24.3        | 19.2        | 17.0        |
| New Zealand                          | -8.7        | -8.2        | -9.3        | -8.1        |
| Iceland                              | -25.4       | -14.6       | -18.2       | -13.7       |
| <i>Memorandum</i>                    |             |             |             |             |
| Major advanced economies             | -2.0        | -1.5        | -1.3        | -0.9        |
| Euro area <sup>2</sup>               | —           | 0.3         | -0.5        | -0.5        |
| Newly industrialized Asian economies | 5.3         | 6.2         | 4.7         | 4.3         |

<sup>1</sup>Calculated as the sum of the balances of individual euro area countries.

<sup>2</sup>Corrected for reporting discrepancies in intra-area transactions.

able deficit, and the pound sterling has depreciated by more than 10 percent in real effective terms since the onset of the market turmoil.

In this challenging environment, central banks have tried to ease liquidity pressures, including through provision of U.S. dollar liquidity, and a number of governments (for example, Belgium, France, Germany, Luxembourg, the Netherlands, and the United Kingdom) have stepped in to provide solvency support for resolutions of a number of major

financial institutions (including Dexia and Fortis) or by raising deposit guarantee limits and extending guarantees to creditors (for example, Ireland), or by providing explicit assurances to depositors (for example, Germany and the United Kingdom). However, even if a comprehensive approach to address the growing concerns is put in place rapidly, it will take time to return perceptions of counterparty risk to more normal levels. Accordingly, banks' deleveraging will weigh noticeably on economic growth over the coming quarters.

The baseline projections thus envisage a significant slowdown in activity across western Europe followed by a very gradual recovery beginning in the second half of 2009. Euro area growth is expected to moderate from 2.6 percent in 2007 to 1.3 percent and 0.2 percent, respectively, in 2008–09, before returning to 1.4 percent in 2010. In the United Kingdom, real GDP growth would fall from 3.0 percent in 2007 to 1.0 percent in 2008; activity would contract by 0.1 percent in 2009 and then accelerate to 2.2 percent in 2010. The risks around these growth projections are to the downside. They include accelerated deleveraging in the financial sector set off by broader asset price deflation and a global credit crunch, an abrupt unwinding of global imbalances, and sharp appreciation of the euro. On the upside, risks relate to still-buoyant employment and therefore higher-than-projected consumption, but these are small. Volatile energy and food prices are a source of two-way risk.

The fiscal positions of western European countries differ widely, but many have made significant progress toward consolidation since the previous downturn. Even with some widening in 2008–09 related to both cyclical factors and policy support, the general government deficit for euro area countries would still average about 1½ percent of GDP, 1¼ percentage points less than in 2003–04. However, fiscal deficits of some countries (France, Greece, Ireland, Italy, and Portugal) are still far from their medium-term objectives and, in some cases, are likely to exceed the Maastricht deficit limit of 3 percent of GDP in the near term. The United Kingdom's

fiscal position—a deficit of 3½ percent of GDP is projected for 2008—is considerably weaker than before the previous downturn.

The rules of the revised Stability and Growth Pact provide room for fiscal objectives to be adjusted in response to changing economic conditions. With the effectiveness of discretionary easing diminished in the context of a loss of confidence in financial markets, discretionary use of fiscal resources should be primarily focused on measures to stabilize the financial sector, as needed. More generally, given the challenges associated with an aging population, fiscal policy should be consistent with achieving medium-term objectives. Automatic stabilizers can be allowed to operate freely around the adjustment path in response to weakening activity, except when this might breach fiscal rules. Similarly, the United Kingdom should set policy consistent with meeting its medium-term fiscal rules. For 2009 and 2010, the agreed medium-term expenditure plans should remain in place, with automatic stabilizers allowed to operate fully around the adjustment path.

Over the past six months, changes in policy interest rates have been limited, and central banks have focused on providing liquidity to stressed markets. The European Central Bank increased policy rates by 25 basis points to 4¼ percent in July 2008, the first move since June 2007, whereas the Bank of England has kept rates unchanged at 5 percent since April 2008. The projections see headline inflation falling below 2 percent in the euro area and the United Kingdom by end-2009. The immediate priority for central banks is to maintain calm in financial markets by continuing to provide liquidity as needed. However, the deteriorating outlook, moderating inflation pressure, and tightening financial conditions provide scope for monetary easing in both the euro area and the United Kingdom.

The continuing financial turmoil presents important policy challenges on various fronts, including because of complex cross-border financial linkages and spillovers. The latter is a particular concern for EU countries, given their quest to build a single market in financial ser-

vices. The specific challenges are already evident as actions taken in specific countries to alleviate financial strains are having adverse effects on financial institutions in other countries. Addressing the concerns raised by spillovers will require movement toward more joint responsibility and accountability for financial stability, notably for crisis prevention, management, and resolution, in line with the commitments of the ECOFIN Council of Finance Ministers in May 2008.<sup>4</sup> Restoring confidence now requires a decisive commitment to concerted and coordinated action to alleviate financial stresses and avoid the serious risk of backtracking on European financial integration.

The emphasis on policies to limit the damage from the financial turmoil should, however, not distract from structural policy challenges. Ten years following the introduction of the euro, the main medium-term policy challenge facing euro area member countries is to make economic union as successful as monetary union (Box 2.1). In this regard, productivity growth has lagged that in other advanced economies, and large and persistent intra-euro-area current account divergences are raising concerns about adjustment mechanisms in the monetary union. Accordingly, the structural reform momentum needs to be kept up and reoriented in a coordinated manner to improve adjustment in response to intra-area disparities. The ongoing reforms are bearing fruit, contributing to the marked growth in employment and to improved productivity in liberalized sectors. However, large parts of the services sector remain unaffected, forfeiting important income, resilience, and inflation benefits. Thus, the specific reform recommendations under the Lisbon Agenda that concern the euro area as a whole appropriately emphasize accelerating services market reform and financial integration. Enhanced

<sup>4</sup>For further details see May 15, 2008, “ECOFIN Council of Finance Ministers adopt conclusions on financial supervision and provision of financial stability in the EU,” available at [www.eu2008.si/en/News\\_and\\_Documents/Press\\_Releases/May/0514MF\\_Svet\\_ECOFIN.html](http://www.eu2008.si/en/News_and_Documents/Press_Releases/May/0514MF_Svet_ECOFIN.html).

policy coordination is needed to ensure greater consistency of national reform programs with these euro area recommendations.

## Advanced Asia: Responding to External Shocks

Although growth in Japan held up well through the first quarter, rising commodity prices and weakening external demand have started to weigh on economic activity. In the second quarter of 2008, the economy contracted at a 3 percent quarter-over-quarter annualized rate, and growth over the past four quarters was below 1 percent. The recent decline was led by private consumption and fixed investment, while the contribution from net exports fell to zero (Figure 2.3).

Recent indicators point to growing weakness ahead. Slowing external demand from the United States and western Europe, rising input costs, and diminishing profit expectations are weighing on corporate sentiment and companies' investment plans. At the same time, high food and fuel prices and weakening wage prospects have pushed consumer confidence to low levels. Although financial conditions have tightened to a lesser extent than in other major economies, in part owing to Japanese banks' lower exposure to securitized products, the stock market has fallen sharply, driven by concerns about the weaker growth outlook. Bank credit default swap (CDS) spreads have risen on concerns about global financial strains and the weaker outlook.<sup>5</sup> Following the collapse of Lehman Brothers, concerns about Japanese banks' exposures to the failed institution rose, contributing to a sharp widening of CDS spreads for some entities and a broad-based fall

<sup>5</sup>Although liquidity pressures have been less acute in Japan than in other G3 economies, the Bank of Japan's significant liquidity provision also contributed to stabilizing money markets. See the *Selected Issues* paper accompanying the 2008 report on Article IV consultations with Japan (available at [www.imf.org](http://www.imf.org)) for more details on the impact of the global financial turmoil on the Japanese economy (IMF, 2008c).

in equity prices. Strains in the financial system are expected to persist, even if to a lesser extent than in the United States or western Europe.

Headline inflation has risen well above the 2007 level, to above 2 percent, on the back of higher food and fuel prices, but core inflation, excluding food and fuel, remains around zero.<sup>6</sup> Firms have started to pass through cost increases to consumers, but they are also granting smaller wage increases as activity is slowing and unit labor costs continue to fall on a year-over-year basis. Measures of inflation expectations suggest that short-term expectations have edged up, while long-term expectations remain contained.

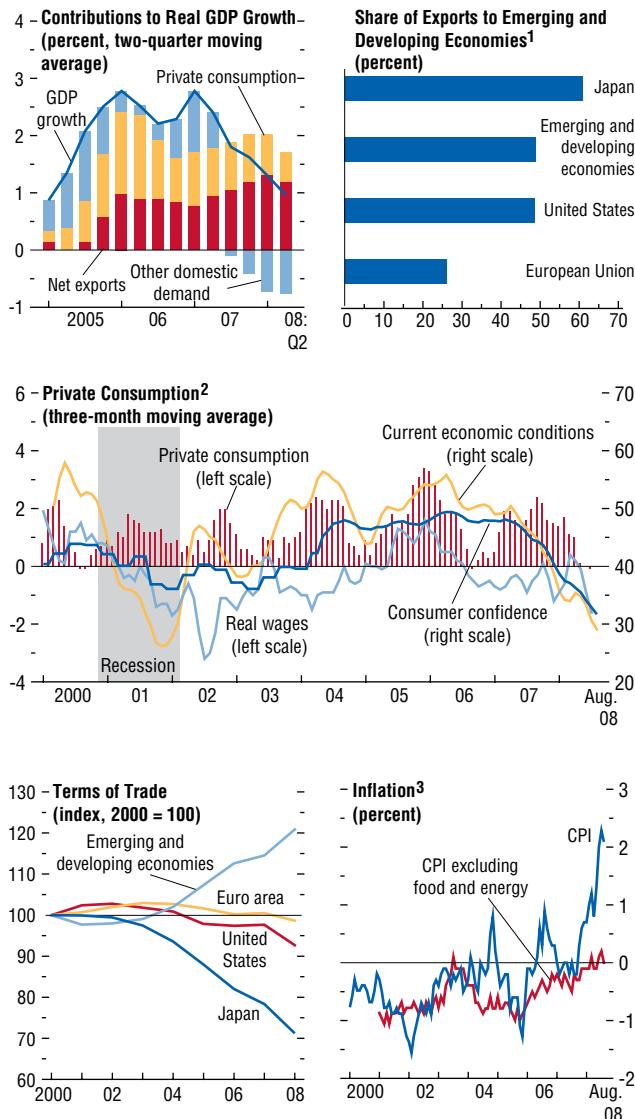
Although the trade surplus deteriorated because of a higher bill for commodity imports, rising investment income helped keep the current account balance near historical highs. Through March 2008, the yen appreciated against other major currencies, particularly the U.S. dollar, reflecting an unwinding of carry trades in volatile foreign exchange markets (see Figure 2.3). Then the currency started to weaken again, as expectations of monetary tightening dissipated amid slowing growth, before resuming an appreciating trend in September owing to declining commodity prices and increased risk aversion on the part of investors. Given the medium-term prospects for continued large external surpluses, the yen is still assessed to be undervalued relative to medium-term fundamentals.

As shown in Figure 2.3, Japan has experienced a much larger decline in its terms of trade in past years than other major advanced economies. Several factors have so far mitigated the impact on activity. First, robust exports to emerging and developing economies, many of which are exporters of commodities, have partly offset the effect of the deterioration in Japan's terms of trade. Second, although Japan is dependent on imported oil for almost all its

<sup>6</sup>Core inflation on the authorities' definition (excluding only fresh food) has been running at about 2 percent, reflecting recent increases in fuel and other commodity prices.

**Figure 2.3. Japan: How Well Would the Economy Weather a Terms-of-Trade Shock?**

The Japanese economy has been particularly exposed to deterioration in the terms of trade. Robust exports to emerging and developing economies should provide support for growth, but the outlook for consumption is weakening.



Sources: Haver Analytics; IMF, *Direction of Trade Statistics*; and IMF staff calculations.

<sup>1</sup>Percent of total exports, 2006–08 averages.

<sup>2</sup>Year-over-year percent changes of real private consumption and real earnings; current economic conditions, Econ Watch Survey diffusion index; and consumer confidence, all households diffusion index.

<sup>3</sup>CPI = consumer price index.

### Box 2.1. EMU: 10 Years On

Ten years ago, EU heads of state gave the go-ahead for the third stage of European Economic and Monetary Union (EMU), approving the introduction of the euro in 11 EU member countries on January 1, 1999. Since then, four more EU members have adopted the euro, and the Slovak Republic is set to follow at the beginning of 2009. Monetary union is a distinct success, and the euro area is a zone of stability in the international economy. Thanks to the high credibility of the European Central Bank, inflation has declined over the past decade, and inflation expectations are now less variable in the euro area than in other advanced economies (Beechey, Johannsen, and Levin, 2008).<sup>1</sup> The key remaining challenge on the monetary front is the integration into the euro area of all EU members that are committed to adopting the euro (which does not include Denmark or the United Kingdom).<sup>2</sup> Economic union, however, remains a challenge even among the current euro area members, and there are concerns about the area's growth performance and large intra-area current account divergences.

**The record on growth.** The widespread perception among observers that EMU has delivered economic stability but not growth is not well founded. The EMU record with respect to employment has been strong, which helps explain why in per capita terms euro area real GDP growth has not lagged behind U.S. growth during EMU (first table). The euro area's employment performance is in part related to EMU, which likely has contributed to greater monetary policy credibility, as well as labor market reforms, including well ahead of the introduction of the single currency in 1999. Employment rates remain lower than in the United States, and per capita income is still about 30 percent below U.S. levels. However, full convergence is not likely:

<sup>1</sup>The main authors of this box are Jörg Decressin and Emil Stavrev, based on the findings in Decressin and Stavrev (forthcoming).

<sup>2</sup>Adoption of the euro depends on certain economic convergence criteria. For further details, go to [http://ec.europa.eu/economy\\_finance/the\\_euro/joining\\_euro9413\\_en.htm](http://ec.europa.eu/economy_finance/the_euro/joining_euro9413_en.htm).

### Euro Area and United States: Key Macroeconomic Variables

(Seven-year trailing average, in percent)

|  |                  | 1992    | 1999      | 2007 |
|--|------------------|---------|-----------|------|
| Per capita real GDP growth                 | Euro area        | 2.5     | 1.7       | 1.3  |
|  | United States    | 1.7     | 2.6       | 1.3  |
| Real GDP growth                            | Euro area        | 2.9     | 2.0       | 1.8  |
|  | United States    | 2.8     | 3.7       | 2.4  |
| Employment growth                          | Euro area        | 0.5     | 0.7       | 0.9  |
|  | United States    | 1.8     | 1.8       | 1.4  |
| Employment-population ratio, end of period | Euro area        | 40.8    | 41.7      | 44.4 |
|  | United States    | 45.3    | 47.4      | 47.8 |
| General government fiscal balance          | Euro area        | -5.0    | -3.7      | -2.1 |
|  | United States    | -4.5    | -1.7      | -3.1 |
| Current account                            | Euro area        | -0.7    | 0.3       | 0.3  |
|  | United States    | -1.7    | -2.0      | -5.1 |
| Inflation                                  | Euro area        | 3.4     | 2.1       | 2.2  |
|  | United States    | 3.9     | 2.5       | 2.7  |
| Per capita GDP <sup>1</sup>                | Euro area        | 75.1    | 70.8      | 70.9 |
| Memorandum item                            | TFP <sup>2</sup> | 1980–95 | 1995–2004 |      |
|  | Euro area        | 0.8     | 0.2       |      |
|  | United States    | 0.7     | 1.6       |      |

Sources: Eurostat; IMF *International Financial Statistics*; and IMF staff calculations.

<sup>1</sup>Percent of U.S. per capita GDP, at purchasing power parity.

<sup>2</sup>TFP = total factor productivity.

Europeans have used the growth in productivity since World War II to increase leisure more than in the United States (Blanchard, 2004), and insofar as this greater leisure is sustainable, this development is not undesirable.

The euro area's poor productivity performance under EMU has attracted much attention (for example, Pisani-Ferry and others, 2008), but, as in the case of economic growth, the reality may well be more complex than the raw numbers suggest. Labor productivity growth, for example, has averaged about 1 percent a year in the past 15 years, down considerably compared with previous years. Total factor productivity (TFP) growth has almost ground to a halt during the current decade. However, the low productivity growth may well be related to the boom in employment, as argued by Dew-Becker and Gordon (2008). In fact, there is

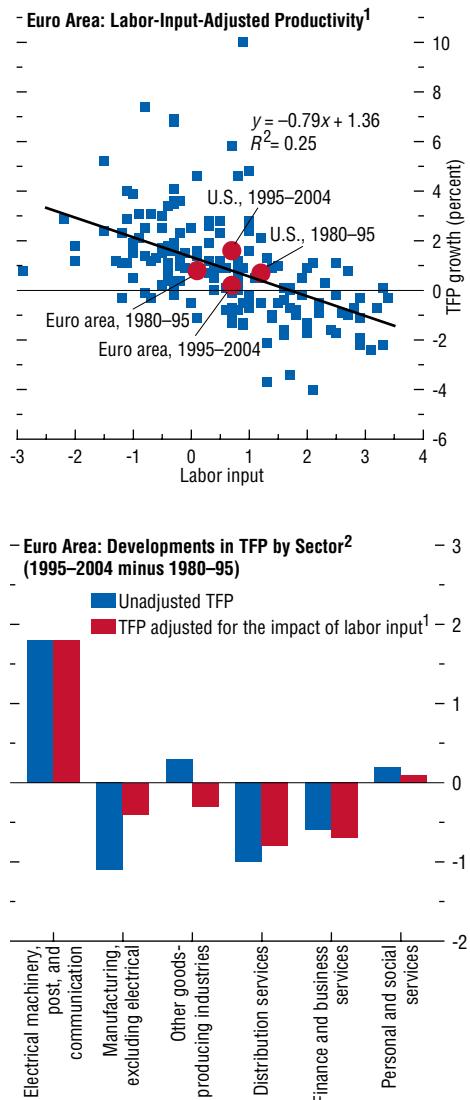
strong evidence for a negative relationship between TFP growth and labor input in a cross section of EU KLEMS data (van Ark, O'Mahony, and Ypma, 2007) for 12 advanced economies and six sectors for each country (see first figure). There could be many reasons for such a trade-off. One obvious reason is capital-labor substitution in response to reforms that raised labor supply and, possibly, demand (via cuts in payroll taxes). Accordingly, as the labor market completes its adjustment to reforms and demographic changes, TFP growth may well revert to the higher levels recorded in the 1980s.

There is still concern, however, that even with adjustment for differences in labor input, TFP growth on average has been lower in the euro area than in the United States, particularly in the service sectors. This points to a need to open up the more sheltered service sectors to competition, that is, to make services tradable.

The dispersion of real GDP growth rates has also raised concern; however, business cycles among EMU members have in fact become more synchronized as the importance of common shocks has increased over time. These shocks now explain some 60 percent of output developments, as opposed to 30 percent before the introduction of the euro (Stavrev, 2007). Furthermore, country-specific developments in output reflect, to a considerable extent, per capita income convergence to higher levels. Overall, the dispersion of growth rates in the euro area is now similar to that among U.S. states, although it is more persistent. The slow speed of adjustment means that prolonged periods of strong growth may be followed by prolonged periods of sluggish activity, as experienced recently, for example, by Portugal (Blanchard, 2007).

**The record on the current account.** The external position of the euro area as a whole has remained in balance since EMU inception and thus has not raised concern. This external balance has been preserved despite the significant appreciation of the real effective exchange rate of the euro over the past several years (see Chapter 1). In addition, the euro has firmly established itself as the world's number two international currency, accounting for more than one-quarter of international reserves and more than one-half of trade invoicing.

### Productivity Performance (Percentage points unless otherwise noted)



Sources: EU KLEMS database; and IMF staff calculations.

<sup>1</sup>Based on a cross-country, cross-sector pooled regression of total factor productivity (TFP) on labor input.

<sup>2</sup>For average TFP growth rates. Negative numbers indicate a deterioration of TFP performance.

The European Commission and others have raised concerns about large intra-area current

**Box 2.1 (concluded)****Current Account Dispersions and Implications for Net Foreign Asset (NFA) Position**

|             | Current Account Balance <sup>1</sup><br>(2007, in percent of GDP) | Estimated Equilibrium Current Account<br>(2007, in percent of GDP) | NFA Position | NFA Position When the Current Account Balance Reaches Estimated Equilibrium <sup>2</sup> |
|-------------|---|--|--------------|--|
|             |   |  |              | When the Current Account Balance Reaches Estimated Equilibrium <sup>2</sup>              |
| Austria     | 2.7   | 1.1  | -22          | -10  |
| Belgium     | 3.2   | 2.5  | 34           | 40   |
| Finland     | 4.6   | -0.3   | -28          | 10   |
| France      | -1.3  | 0.6  | 5            | -9   |
| Germany     | 5.6   | 2.5  | 28           | 52   |
| Greece      | -13.9   | -4.4   | -100         | -174   |
| Ireland     | -4.5  | 1.1  | -1           | -45  |
| Italy       | -2.2  | -0.1   | -6           | -22  |
| Netherlands | 6.6   | 2.2  | 0            | 35   |
| Portugal    | -9.4  | -5.8   | -80          | -107   |
| Spain       | -10.1   | -5.7   | -74          | -109   |

Sources: IMF *International Financial Statistics*; and IMF staff estimates.

<sup>1</sup>Data are based on the April 2008 *World Economic Outlook* estimates. Please see Table A11 in the Statistical Appendix for the latest figures.

<sup>2</sup>The estimated speed of convergence implies that 70 percent of the deviation of the current account from the steady state is closed in about 10 years.

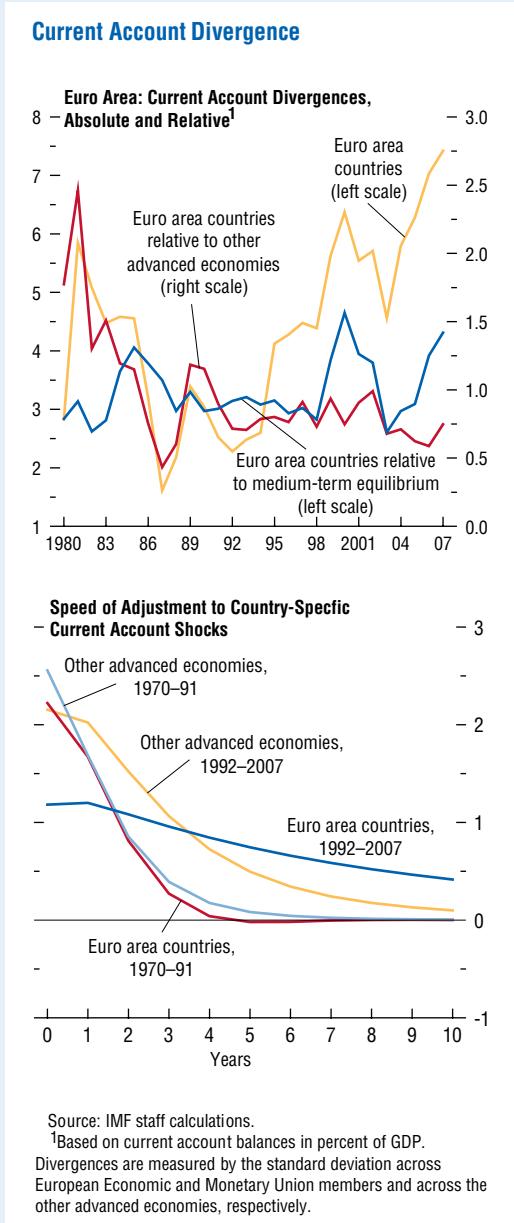
account and competitiveness imbalances (see, for example, European Commission, 2008). Current account divergence among euro area members appears large, ranging from deficits close to or exceeding 10 percent of GDP (for example, in Greece, Portugal, and Spain) to surpluses greater than 5 percent of GDP (for example, in Germany and the Netherlands—second table). In fact, this divergence—measured by the standard deviation across countries in each year—has risen substantially over the past two decades (second figure). But is it unusually large for today's world? As Chapter 6 shows, greater divergence of current account behavior is a widespread phenomenon. A simple approach to determining whether the divergence is unusually large is to divide the standard deviation of current accounts for euro area countries by the same measure for the current accounts of a group of 13 other advanced economies.<sup>3</sup> The results show that this ratio has not

grown systematically. This is because the divergence among the other 13 advanced economies has also been on the rise.

A related question is whether current account imbalances are a reflection of equilibrium or disequilibrium forces and how these have evolved over time. To answer this question, a model of equilibrium current account balances, based closely on the IMF CGER methodology (Lee and others, 2008), is used to compute the developments in deviations from equilibrium over time. Specifically, the equilibrium current account for each euro area country is obtained as a function of real GDP growth, relative per capita income, population growth, the net foreign-assets-to-GDP ratio, the fiscal balance in percent of GDP, the old-age dependency ratio, and the oil balance in percent of GDP. The next step is to compute for each year the sum across countries of the absolute values of the deviation from equilibrium current accounts. This shows that divergence from equilibrium has not increased over time.

Although the size of divergence might not be of major concern, slow adjustment to equilibrium current account balances might be. Sustained deficits add to countries' external debt and, unlike in a currency union, such as the United States, people cannot expect help from a federal author-

<sup>3</sup>Specifically, the two samples include 11 EMU members (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain) and 13 other advanced economies (Australia, Canada, Denmark, Iceland, Israel, Japan, Korea, New Zealand, Norway, Sweden, Switzerland, United Kingdom, and United States). Data are from the April 2008 *World Economic Outlook*.



ity or easily move to better-off areas to improve their repayment capacity. Moreover, in a currency union of countries, adverse economic developments in parts of the union are more likely to affect the strength of the union as a whole. The persistence of the current account

imbalances in the EMU over time can be gauged with a pooled univariate regression of the current account balances on their own lags, allowing for country-specific steady-state current account balances (fixed effects). The results suggest that since 1992 it takes roughly 10 years to close about 70 percent of a gap between actual and steady-state current accounts within the euro area (see second figure). This speed of adjustment is significantly lower than during the pre-1992 period, when exchange rates were more flexible, but has not slowed significantly further during EMU. Moreover, it is significantly lower than in the group of 13 other advanced economies. However, the typical country-specific current account shock in the euro area is only about half as large as in the other countries during 1992–2007, which is a mitigating factor. In addition, it is only about half as large as in 1970–91 within the euro area, which again underscores the growing integration of EMU members.

These results can gauge the implications of today's current account divergence for the net foreign asset positions of euro area countries (see second table). Clearly, some countries will be footing considerably higher external debt servicing bills that will limit consumption and slow growth. Because there is a risk that during periods of austerity the performance of EMU might be questioned, it is imperative for policymakers to ensure that goods and factor markets are flexible enough to deliver rapid adjustment: boosting productivity is one way to foster internal adjustment as are measures to foster more wage flexibility (Blanchard, 2007). At the same time, social safety nets need to provide sufficiently generous but temporary help to those who suffer from the dislocations that accompany adjustment. Moreover, internal adjustment processes (via their effects on the union) concern all countries, and so addressing this challenge is a matter of common interest. The European Union's Lisbon Agenda offers the right vehicle for the design and implementation of the required structural reforms in a manner that leverages reform spillovers and complementarities.

domestic needs, the efficiency with which oil is used in the economy is much higher than in the United States. Last, with underlying price pressures subdued, monetary conditions are likely to remain accommodative.

The outlook envisages that growth in 2008–09 will be well below 1 percent, significantly below potential. Although weakness in the United States and western Europe will weigh appreciably on activity, growth in emerging economies is expected to remain more resilient and should continue to support exports. Private consumption is expected to remain moderate because of weakening prospects for wage increases and high food and fuel prices, while the weakening demand and profit outlook will slow private investment.

The outlook is subject to considerable uncertainty surrounding the external environment, with the overall risks tilted to the downside. External risks relate mainly to a larger-than-expected slowdown in emerging and developing economies and a renewed bout of global financial instability. On the domestic front, high commodity prices could weigh further on firms' profits and households' incomes.

Given the outlook for further weakening of domestic demand and subdued inflation pressures, the Bank of Japan (BoJ) is appropriately retaining an accommodative monetary policy stance and keeping interest rates at the current low levels until uncertainties over the outlook are resolved. Japan has been battling deflation for nearly a decade, and although an end to this problem appears in sight, it is not yet ensured. While core inflation on the authorities' definition is close to the 2 percent upper bound of the "understanding" of price stability by the BoJ policy board members, wage growth is slowing, and inflation expectations have been contained. There are few indications of excessive risk taking in asset markets (the second perspective of the BoJ's monetary policy framework) or of bubbles in the financial or real estate markets.<sup>7</sup>

<sup>7</sup>The BoJ's monetary policy framework encompasses two perspectives: the short-term outlook for economic

A sharper-than-expected slowdown of the economy may justify a further reduction of the policy interest rate, although with the current rate already at 50 basis points, room for easing is limited. In this context, the BoJ's move to greater transparency, by expanding the discussion of the policy board members' views on the outlook and the risks to it and by placing a greater emphasis on the 1 percent median of the "understanding of price stability" in its communications, should help guide expectations.

Looking beyond the near term, the Japanese economy continues to face a rapidly aging population and rising public debt. The pace of fiscal consolidation has understandably slowed in the environment of diminishing global growth, with the general government primary deficit excluding social security expected to widen in 2008 and 2009 and discussions on raising the consumption tax rate postponed. In late August, the Japanese government put forward an economic stimulus package aimed at supporting faltering growth. However, the scope for fiscal stimulus is limited, and building fiscal space for projected increases in expenditures owing to demographic pressures remains a top priority for the medium term.<sup>8</sup> The authorities' current plans, which target a primary balance by fiscal year 2011, need to be strengthened further to prevent net public debt from trending up.

Australia and New Zealand are slowing down noticeably, after prolonged economic expansions driven by commodity and housing booms. The expansions have stretched productive capacity, pushing inflation to historical highs. The authorities have responded by tightening monetary policies, and domestic demand pressures have eased. Real GDP growth in Australia is projected to fall below potential, to about 2½ percent in 2008–09 from 4¼ percent in 2007.

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activity and prices and a longer-term outlook for risks to the outlook, including from asset price bubbles.

<sup>8</sup>The government's proposal includes spending of around \$17 billion (0.4 percent of GDP) and government guarantees for business loans. The government has also committed to an income tax cut by the end of fiscal year 2008.

The recent moderation in domestic demand and the tightening of credit conditions have prompted the Reserve Bank of Australia (RBA) to cautiously ease monetary policy. The Reserve Bank of New Zealand has also moved to ease monetary policy. In both countries, sound fiscal positions provide scope for allowing automatic stabilizers to operate in full and for judicious use of discretionary stimulus if the outlook deteriorates further.

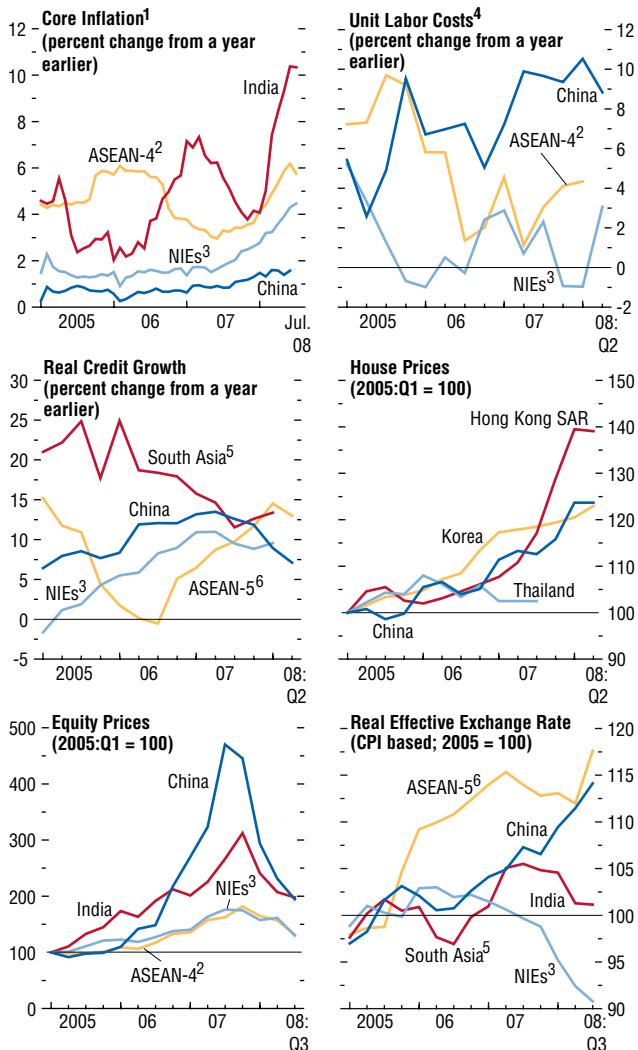
## Emerging Asia: Balancing Risks to Growth and Price Stability

The economic cycle in emerging Asia started to turn in early 2008, and more weakness is expected ahead in response to slowing demand from advanced economies and growing strains in regional financial markets. Growth in China eased to 10½ percent (year over year) in the first half of 2008, from 12 percent in 2007, partly because of slowing exports. Activity continued to be supported by steady investment growth and accelerating consumption. In India, growth in the second quarter came down to about 8 percent, on the back of weakening investment, while private consumption and export growth have held up well. In the newly industrialized Asian economies (NIEs) and the Association of Southeast Asian Nations (ASEAN) economies, activity has also been decelerating. Domestic demand has softened, as rising food and fuel prices have started to weigh on consumption, while declining profit margins and weakening demand have prompted firms to scale back their investment plans. Vietnam is undergoing a sharp correction as the demand boom caused by large capital inflows unwinds.

Financial markets have weakened in recent months, driven by increasing concerns about the global outlook and declining investor risk appetite, particularly in the context of the September market turbulence. Equity markets that experienced the largest run-up in prices in recent years—during 2005–07, prices more than quadrupled in China and tripled in India—have declined the most (Figure 2.4). In some coun-

**Figure 2.4. Emerging Asia: Remaining Inflation Concerns**

Underlying inflation pressures rose across emerging Asia in recent quarters. Wage increases, despite productivity improvements, have contributed to a buildup in inflation in some cases. In part owing to a rapid expansion of bank loans, house prices have continued to trend upward. In contrast, an extended run-up in equity prices ended with a sharp correction in early 2008, triggered by global financial turmoil. Exchange rates have failed to provide much respite for inflation, because currencies have either appreciated too little or weakened.



Sources: Haver Analytics; IMF, *International Financial Statistics*; and IMF staff calculations.

<sup>1</sup>The definition of core inflation varies across countries, though it generally excludes food and energy prices from overall consumer price index (CPI).

<sup>2</sup>Indonesia, Malaysia, Philippines, and Thailand.

<sup>3</sup>Newly industrialized Asian economies (NIEs) comprise Hong Kong SAR, Korea, Singapore, and Taiwan Province of China.

<sup>4</sup>Calculated as overall compensation divided by GDP, except for China, where wages are used instead of compensation, and Indonesia and Malaysia, where calculations cover only the manufacturing sector. Data for China need to be treated with caution because of their partial coverage, biased toward large state-owned manufacturing enterprises.

<sup>5</sup>Bangladesh, India, Maldives, Nepal, Pakistan, and Sri Lanka.

<sup>6</sup>ASEAN-4 and Vietnam.

tries, borrowing spreads have risen markedly for banks relying on wholesale funding.

Current account balances have generally come under pressure from rising import bills for commodities and slowing export growth, while capital account and exchange rate developments have varied. Capital inflows to China have remained strong, as evidenced by a continuing surge of foreign reserves in excess of the trade surplus; capital flows to some other countries have become more volatile, particularly to those running sizable external deficits. Their currencies have come under pressure, prompting central banks to intervene in support (India, Pakistan, and Vietnam). The Korean won has also weakened, partly owing to a turnaround in the current account balance to a small deficit, on the back of worsening terms of trade. Differing nominal exchange rate developments, in turn, have driven divergent trends in real effective exchange rates, with the Chinese renminbi and the ASEAN currencies continuing to appreciate, and the South Asian and NIEs' currencies weakening (see Figure 2.4).

Growth in the region is projected to moderate to 7½ percent in 2008 and 7 percent in 2009 from 9¼ percent in 2007 (Table 2.3). Weakening external demand is likely to weigh on exports, but, in some cases, the impact may be mitigated by still-loose macroeconomic policies and currency depreciation. Investment will also moderate, mainly because of deteriorating export prospects. Consumption will ease because of still-high fuel and food prices, although subsidies, which are common in the region, may cushion the impact on purchasing power. The risks to the outlook are firmly to the downside. The main concern is that a buildup of stress in the global financial system and a sharper-than-anticipated global slowdown could further weigh on activity. On the upside, domestic demand may prove more resilient, with falling commodity prices providing a boost to real incomes.

Headline CPI inflation has soared in a number of countries on the back of increases in food prices and administered fuel prices in the first half of the year. Indicators of underlying infla-

tion pressure have risen to a lesser extent, but some countries still face risks of further second-round effects. In China, headline CPI inflation has steadily declined since its 8½ percent peak in April, as food supply conditions have normalized. Core inflation has been rising gradually, but remains contained. In India, CPI inflation jumped to 9 percent in August. Underlying inflation pressures have increased, as high resource utilization and robust credit growth have created fertile ground for second-round effects (see Figure 2.4). Insufficient policy tightening has also contributed.

Although increases in food and fuel prices may continue to subside in the coming months and growth will moderate, inflation is expected to remain at elevated rates over the near term. Headline inflation is projected to rise to about 7¾ percent (year over year) in 2008 for the region as a whole from 5 percent in 2007, before declining to near 6 percent in 2009. Underlying inflation pressures are also likely to remain high in the environment of tight resource utilization and still-loose macroeconomic policies.

Responses to rising inflation have varied across the region. Some economies tightened monetary policy—by hiking interest rates (India, Indonesia, Korea, Philippines, Thailand, Taiwan Province of China, and Vietnam), tightening reserve requirements (Cambodia, India, Vietnam), and creating more scope for appreciation in the exchange rate band (Singapore). More recently, the People's Bank of China lowered the benchmark lending rates and reduced the reserve requirement ratio, on concerns about slowing growth. India and Korea intervened in the foreign exchange market to support their currencies. Countries that have continued to accumulate foreign reserves have partially sterilized them through the issuance of bonds and increases in reserve requirements to contain the buildup of liquidity. Offsetting the effects of monetary tightening, the fiscal policy stance has been eased in many countries, however, reflecting significant increases in fuel subsidies. Although several countries have raised administered fuel prices (for example, Bangladesh,

**Table 2.3. Selected Asian Economies: Real GDP, Consumer Prices, and Current Account Balance**  
*(Annual percent change unless noted otherwise)*

|   | Real GDP   |            |            |            | Consumer Prices <sup>1</sup> |            |            |            | Current Account Balance <sup>2</sup> |             |             |             |
|---|------------|------------|------------|------------|------------------------------|------------|------------|------------|--------------------------------------|-------------|-------------|-------------|
|   | 2006       | 2007       | 2008       | 2009       | 2006                         | 2007       | 2008       | 2009       | 2006                                 | 2007        | 2008        | 2009        |
| <b>Emerging Asia<sup>3</sup></b>            | <b>9.2</b> | <b>9.3</b> | <b>7.7</b> | <b>7.1</b> | <b>3.8</b>                   | <b>4.9</b> | <b>7.3</b> | <b>5.8</b> | <b>5.8</b>                           | <b>6.8</b>  | <b>5.2</b>  | <b>5.0</b>  |
| China                                       | 11.6       | 11.9       | 9.7        | 9.3        | 1.5                          | 4.8        | 6.4        | 4.3        | 9.4                                  | 11.3        | 9.5         | 9.2         |
| <b>South Asia<sup>4</sup></b>               | <b>9.2</b> | <b>8.7</b> | <b>7.6</b> | <b>6.4</b> | <b>6.5</b>                   | <b>6.9</b> | <b>8.8</b> | <b>8.8</b> | <b>-1.4</b>                          | <b>-1.7</b> | <b>-3.3</b> | <b>-3.3</b> |
| India                                       | 9.8        | 9.3        | 7.9        | 6.9        | 6.2                          | 6.4        | 7.9        | 6.7        | -1.1                                 | -1.4        | -2.8        | -3.1        |
| Pakistan                                    | 6.9        | 6.4        | 5.8        | 3.5        | 7.9                          | 7.8        | 12.0       | 23.0       | -3.9                                 | -4.8        | -8.7        | -6.4        |
| Bangladesh                                  | 6.5        | 6.3        | 7.0        | 5.6        | 7.1                          | 9.1        | 10.1       | 10.0       | 1.2                                  | 1.1         | 1.0         | 0.9         |
| <b>ASEAN-5</b>                              | <b>5.7</b> | <b>6.3</b> | <b>5.5</b> | <b>4.9</b> | <b>8.1</b>                   | <b>4.4</b> | <b>9.6</b> | <b>7.2</b> | <b>4.8</b>                           | <b>5.1</b>  | <b>2.7</b>  | <b>2.1</b>  |
| Indonesia                                   | 5.5        | 6.3        | 6.1        | 5.5        | 13.1                         | 6.2        | 9.8        | 8.8        | 3.0                                  | 2.5         | 0.1         | -0.1        |
| Thailand                                    | 5.1        | 4.8        | 4.7        | 4.5        | 4.6                          | 2.2        | 5.7        | 3.2        | 1.1                                  | 6.4         | 3.1         | 2.0         |
| Philippines                                 | 5.4        | 7.2        | 4.4        | 3.8        | 6.2                          | 2.8        | 10.1       | 7.0        | 4.5                                  | 4.4         | 2.4         | 2.2         |
| Malaysia                                    | 5.8        | 6.3        | 5.7        | 4.8        | 3.6                          | 2.0        | 6.0        | 4.7        | 16.1                                 | 15.6        | 14.8        | 13.2        |
| Vietnam                                     | 8.2        | 8.5        | 6.3        | 5.5        | 7.5                          | 8.3        | 24.0       | 15.0       | -0.3                                 | -9.9        | -11.7       | -10.4       |
| <b>Newly industrialized Asian economies</b> | <b>5.6</b> | <b>5.6</b> | <b>4.0</b> | <b>3.2</b> | <b>1.6</b>                   | <b>2.2</b> | <b>4.8</b> | <b>3.5</b> | <b>5.3</b>                           | <b>6.2</b>  | <b>4.7</b>  | <b>4.3</b>  |
| Korea                                       | 5.1        | 5.0        | 4.1        | 3.5        | 2.2                          | 2.5        | 4.8        | 4.0        | 0.6                                  | 0.6         | -1.3        | -0.7        |
| Taiwan Province of China                    | 4.9        | 5.7        | 3.8        | 2.5        | 0.6                          | 1.8        | 4.2        | 2.5        | 7.2                                  | 8.6         | 7.8         | 6.5         |
| Hong Kong SAR                               | 7.0        | 6.4        | 4.1        | 3.5        | 2.0                          | 2.0        | 4.8        | 4.3        | 12.1                                 | 13.5        | 11.7        | 10.3        |
| Singapore                                   | 8.2        | 7.7        | 3.6        | 3.5        | 1.0                          | 2.1        | 6.5        | 3.3        | 21.8                                 | 24.3        | 19.1        | 17.0        |

<sup>1</sup>Movements in consumer prices are shown as annual averages. December/December changes can be found in Table A7 in the Statistical Appendix.

<sup>2</sup>Percent of GDP.

<sup>3</sup>Consists of developing Asia, the newly industrialized Asian economies, and Mongolia.

<sup>4</sup>Includes Maldives, Nepal, and Sri Lanka.

China, India, Malaysia, and Vietnam), the increase was small (except in Vietnam) compared with the increase in world fuel prices, and in some cases resources raised have been used to increase other expenditures, for example, food subsidies. Several major rice exporters in the region (Cambodia, China, India, and Vietnam) introduced export bans, quotas, or taxes to raise domestic food supplies and lower domestic prices, adding to pressure on world prices.

Against this background, a major policy dilemma for the region is how to respond to the weakening growth outlook and global financial turbulence, without losing sight of inflation risks. Although there is considerable divergence in country circumstances, downside risks to growth in emerging Asia have risen in recent months, while inflation risks have moderated as food and oil prices came down from the peaks observed earlier in the year. Policy priorities have shifted accordingly, although there remain notable differences in country circumstances.

- In most countries domestic demand is weakening rapidly and some policy tightening has already taken place. Although authorities need to remain alert to inflation risks, policy easing could be justified if downside risks to growth are significant. In countries with strong fiscal positions, automatic stabilizers can be allowed to operate in full. However, the use of discretionary fiscal policy needs to be approached with caution, as past experience suggests that such actions are difficult to time well and have not been very effective (see Chapter 5). But it could be justified in the face of deteriorating growth prospects in countries with strong underlying fiscal positions.
- By contrast, in a few countries where growth is expected to remain relatively strong, where risks for further second-round inflation effects are higher, and where monetary policy credibility has not yet been firmly established—macroeconomic policies still need to lean toward tightening (for example,

in Indonesia and Vietnam). Monetary policy tightening should be the first line of defense against rising inflation but may need to be complemented in some cases by greater exchange rate flexibility or fiscal action. Fiscal restraint could help reduce inflation pressures, especially in countries where rising food and fuel subsidies, as well as public wage increases, have weakened fiscal positions and contributed to price pressures.

## Latin America and the Caribbean: Navigating a More Perilous Environment

As in other parts of the world, Latin American economies are facing an awkward combination of slowing activity, more difficult external conditions, and still-high inflation. After four years of strong output growth, the pace eased in most economies of the region during the first half of 2008, largely because of moderating exports. Domestic demand has remained quite robust so far this year, sustained by terms-of-trade gains for commodity exporters, but is expected to be damped as the global economy slows and by the shift toward monetary policy tightening to contain inflation. Countries in the region have also been facing more difficult external conditions in recent months. Latin America has been increasingly affected by turbulent conditions in mature financial markets, with equity prices falling sharply, spreads widening markedly, access to dollar funding tightening appreciably, and exchange rates coming under pressure, especially in commodity-exporting countries facing lower export prices.

Overall, GDP growth is projected to come down from 5½ percent in 2007 to 4½ percent in 2008 and 3¼ percent in 2009 (Table 2.4). The somewhat sharper deceleration in 2009 than envisaged in the July 2008 *World Economic Outlook Update* reflects the weaker global outlook, softer commodity prices, and more difficult external financial conditions. Growth in Brazil would come down below trend, and activity would remain sluggish in Mexico as exports and remittances are damped by the

U.S. slowdown. Growth in Central America and the Caribbean is also expected to ease, reflecting the impact of slow U.S. growth on remittances, trade, and tourism, as well as high fuel costs.

Headline inflation for the region as a whole rose to 8 percent in August, the highest rate in five years, although it is expected to moderate in the latter part of 2008 and 2009, helped by softening international commodity prices, tighter monetary policies, and slowing demand growth. Still, inflation will remain at double-digit levels in a number of countries in the region, including Bolivia, Paraguay, the República Bolivariana de Venezuela, and several Central American countries, and analysts believe that actual inflation in Argentina is considerably higher than the official rate of 9.0 percent in August (Figure 2.5).<sup>9</sup> Although nominal wage growth has remained under control in most countries, high inflation expectations are feeding into wage negotiations in countries such as Argentina and the República Bolivariana de Venezuela, where capacity constraints are tight. In countries with inflation-targeting central banks—Brazil, Chile, Colombia, Mexico, and Peru—inflation has also risen, in some cases above target ranges, but increases have generally been more contained than elsewhere in the region, and there are signs of stabilizing or even declining inflation expectations for some countries.

In response, central banks have raised policy interest rates, most actively in the inflation-targeting countries, where exchange rate appreciation has also helped contain inflation pressures. In Brazil, monetary policy tightening has been supported by an increase in the primary fiscal surplus target for 2008 by ½ percentage point of GDP. However, fiscal policy has not in general been restrictive across the region, in part because of the budgetary impact of delayed pass-through

<sup>9</sup>Data for CPI inflation for several provincial capitals for August 2008 are generally well above this rate, although it should be noted that provincial data do not reflect price changes on the same basket of goods.

**Table 2.4. Selected Western Hemisphere Economies: Real GDP, Consumer Prices, and Current Account Balance**

(Annual percent change unless noted otherwise)

|   | Real GDP   |            |            |            | Consumer Prices <sup>1</sup> |            |             |             | Current Account Balance <sup>2</sup> |             |             |             |
|---|------------|------------|------------|------------|------------------------------|------------|-------------|-------------|--------------------------------------|-------------|-------------|-------------|
|   | 2006       | 2007       | 2008       | 2009       | 2006                         | 2007       | 2008        | 2009        | 2006                                 | 2007        | 2008        | 2009        |
| <b>Western Hemisphere</b>                   | <b>5.5</b> | <b>5.6</b> | <b>4.6</b> | <b>3.2</b> | <b>5.3</b>                   | <b>5.4</b> | <b>7.9</b>  | <b>7.3</b>  | <b>1.5</b>                           | <b>0.4</b>  | <b>-0.8</b> | <b>-1.6</b> |
| <b>South America and Mexico<sup>3</sup></b> | <b>5.4</b> | <b>5.6</b> | <b>4.6</b> | <b>3.1</b> | <b>5.2</b>                   | <b>5.3</b> | <b>7.6</b>  | <b>7.1</b>  | <b>1.8</b>                           | <b>0.8</b>  | <b>-0.5</b> | <b>-1.3</b> |
| Argentina                                   | 8.5        | 8.7        | 6.5        | 3.6        | 10.9                         | 8.8        | 9.1         | 9.1         | 2.6                                  | 1.7         | 0.8         | -0.6        |
| Brazil                                      | 3.8        | 5.4        | 5.2        | 3.5        | 4.2                          | 3.6        | 5.7         | 5.1         | 1.3                                  | 0.1         | -1.8        | -2.0        |
| Chile                                       | 4.3        | 5.1        | 4.5        | 3.8        | 3.4                          | 4.4        | 8.9         | 6.5         | 4.7                                  | 4.4         | -1.1        | -0.9        |
| Colombia                                    | 6.8        | 7.7        | 4.0        | 3.5        | 4.3                          | 5.5        | 7.3         | 5.5         | -1.8                                 | -2.9        | -2.2        | -1.9        |
| Ecuador                                     | 3.9        | 2.5        | 3.0        | 3.0        | 3.3                          | 2.3        | 8.5         | 5.1         | 3.9                                  | 2.3         | 5.6         | 1.5         |
| Mexico                                      | 4.9        | 3.2        | 2.1        | 1.8        | 3.6                          | 4.0        | 4.9         | 4.2         | -0.2                                 | -0.6        | -1.4        | -2.2        |
| Peru  | 7.7        | 8.9        | 9.2        | 7.0        | 2.0                          | 1.8        | 5.6         | 4.4         | 3.0                                  | 1.4         | -2.0        | -1.8        |
| Uruguay                                     | 7.0        | 7.4        | 6.5        | 5.5        | 6.4                          | 8.1        | 6.8         | 6.2         | -2.4                                 | -0.8        | -2.6        | -1.9        |
| Venezuela, Rep. Boliv. de                   | 10.3       | 8.4        | 6.0        | 2.0        | 13.7                         | 18.7       | 27.2        | 33.5        | 14.7                                 | 8.8         | 8.5         | 3.4         |
| <b>Central America<sup>4</sup></b>          | <b>6.2</b> | <b>6.6</b> | <b>4.6</b> | <b>4.2</b> | <b>6.5</b>                   | <b>6.7</b> | <b>10.9</b> | <b>8.5</b>  | <b>-4.8</b>                          | <b>-6.9</b> | <b>-9.1</b> | <b>-8.7</b> |
| <b>The Caribbean<sup>4</sup></b>            | <b>7.8</b> | <b>5.6</b> | <b>3.7</b> | <b>2.9</b> | <b>7.8</b>                   | <b>6.7</b> | <b>12.1</b> | <b>10.1</b> | <b>-0.7</b>                          | <b>-1.7</b> | <b>-5.3</b> | <b>-4.4</b> |

<sup>1</sup>Movements in consumer prices are shown as annual averages. December/December changes can be found in Table A7 in the Statistical Appendix.

<sup>2</sup>Percent of GDP.

<sup>3</sup>Includes Bolivia and Paraguay.

<sup>4</sup>The country composition of these regional groups is set out in Table F in the Statistical Appendix.

of international oil price increases and increased explicit subsidies. Although inflation should now gradually recede, monetary tightening is still warranted in some countries where real interest rates have become significantly negative and there is a sense that policy credibility is being eroded. Central banks with inflation-targeting regimes have earned some limited scope to tolerate temporary deviations of headline inflation from objectives, but, depending on evolving risks to activity, some may still need to raise rates further. At the same time, tighter control over the growth of government spending would help restrain domestic demand growth and reduce exposure to adverse shifts in market sentiment.

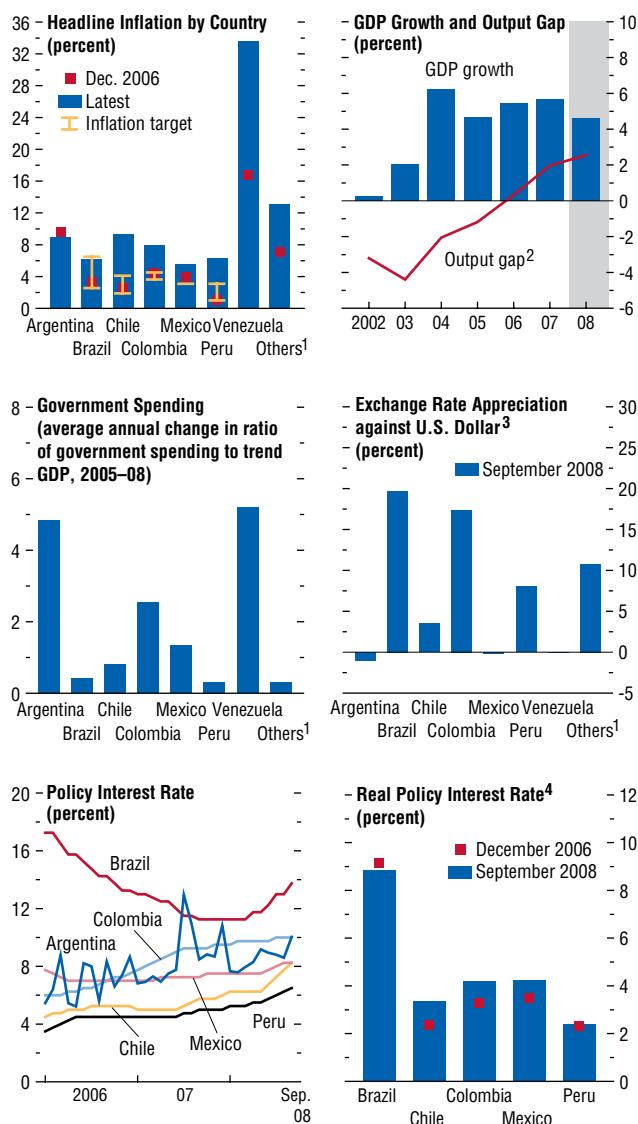
External positions are generally robust, although the turbulence in the global economy may erode the cushions that have been built up over the past few years. The region's current account balance is expected to move to deficit in 2008 and 2009, after being in surplus since 2003, but the deficit will remain quite low. Moreover, reserve levels are high, and flexible exchange rates provide room to maneuver in a number of countries. Overall, public sector

balance sheet vulnerabilities have been reduced and credit ratings raised—Brazil and Peru both achieved “investment grade” ratings in recent months. However, conditions for U.S. dollar funding have tightened in several countries over the past month, which—together with a sustained drop in commodity prices—could stretch macroeconomic policy frameworks.

Risks to this outlook are to the downside, largely related to external developments. A deeper downturn in global growth could trigger a sharp drop in commodity prices, while external financing conditions facing Latin America could continue to tighten. Such a scenario would slow growth in the region even more, and although inflation would moderate considerably, external positions could come under serious stress. In this event, policymakers would need to stand ready to adapt policies as needed to preserve macroeconomic stability and the prospects for long-term growth. Those few countries with very strong fiscal positions may have some scope for a countercyclical fiscal response. Flexible exchange rate management would provide resilience in the face of potentially volatile foreign exchange flows.

**Figure 2.5. Latin America: Inflation Returns**

Inflation has risen across the region, driven by rising food prices and tightening capacity constraints. Inflation-targeting central banks have generally been more active in raising interest rates, supported by more flexible exchange rate management.



Sources: Haver Analytics; Inter-American Development Bank; and IMF staff estimates.

<sup>1</sup>Bolivia, Costa Rica, Guatemala, Honduras, Paraguay, and Uruguay.

<sup>2</sup>Estimates of the output gap, expressed as ratio to potential GDP, are based on IMF staff calculations.

<sup>3</sup>Since December 2006.

<sup>4</sup>Relative to one-year inflation expectations.

## Emerging Europe: Prospects for a Soft Landing

Following a prolonged economic expansion, activity in emerging Europe has started to moderate and a significant slowdown appears in the offing. Weaker external demand, especially owing to the cooling of demand in western Europe, and tighter external financing conditions are weighing on investment and exports, while private consumption has slowed in the face of soaring food and energy prices. Nonetheless, ongoing expansion of productive capacity and rapid lending to the private sector by mostly foreign banks (particularly in Bulgaria and Romania) have continued to support domestic demand, although prospects for continued strong capital inflows have weakened noticeably. The Baltics, notably Estonia and Latvia, are already undergoing sharp corrections as large domestic and external imbalances that had accumulated during drawn-out consumption-and-investment booms are starting to unwind (Figure 2.6). With real incomes eroded by high debt service and inflation and with foreign banks pulling back loan expansion on increasing concerns about a buildup of imbalances, private consumption and, to a lesser extent, investment have plummeted and current account deficits have started to decline.

Amid still-buoyant domestic demand and still-tight labor markets, inflation has been further boosted by increases in food and energy prices. By June 2008, headline inflation in most countries was double what it was a year earlier, reaching double digits in the Baltics (especially Latvia), Bulgaria, and Turkey. Underlying inflation has also climbed because of rising wages (for example, in Poland and the Slovak Republic) and strong demand pressures (particularly in Bulgaria, Romania, and Turkey). There is also evidence of second-round effects from surging food and energy prices, and inflation expectations have edged up in many countries. With inflation targets exceeded by wide margins, monetary policy has been tightened in central and eastern Europe (CEE), Romania, and

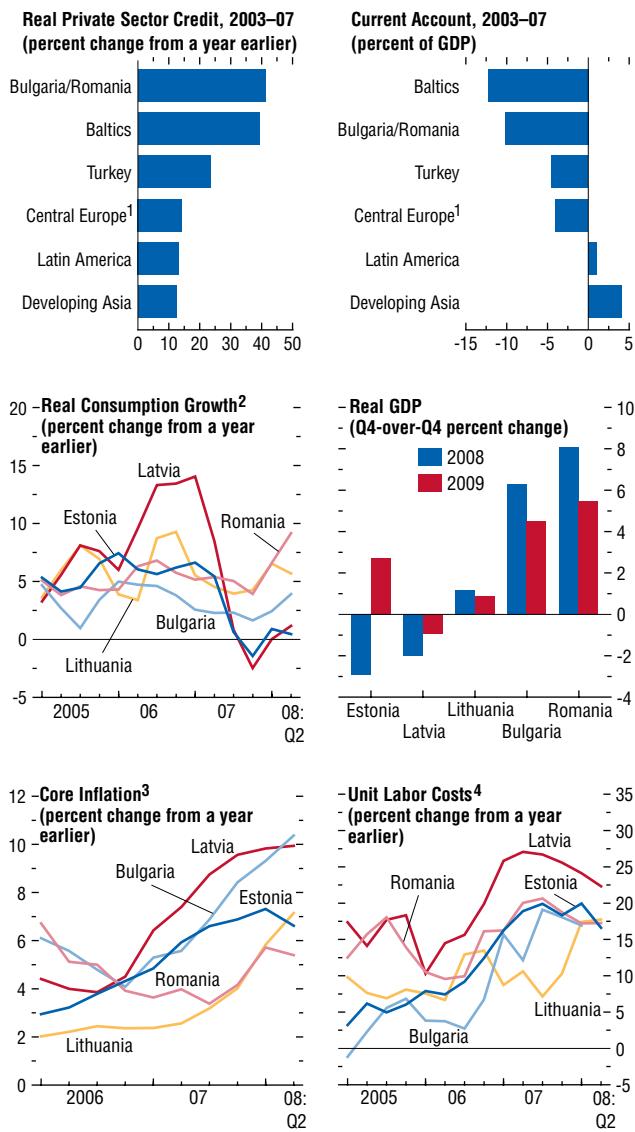
Turkey in the context of floating exchange rate regimes. In the CEE economies, strengthening currencies and good harvests have helped combat inflation pressures. However, countries with fixed exchange rates (the Baltics and Bulgaria) have had less room to tighten the monetary stance; in Romania and Turkey, currency depreciation contributed to inflation despite interest rate increases. Nonetheless, in Estonia, Hungary, and Latvia, inflation pressures have started to ebb in the course of economic corrections (see Figure 2.6).

Growth is expected to continue to decelerate markedly, including on account of diminishing capital inflows and tighter financial constraints. In the CEE economies, growth is projected to ease from about 6 percent in 2007 to near 4½ percent in 2008 and 3½ percent in 2009 (Table 2.5). Weakening demand from western Europe will slow exports and investment, and high inflation will take a toll on real incomes and consumption. Growth in southern and southeastern Europe (SEE) and Turkey will also weaken, as a worsening external outlook and still-high commodity prices weigh on consumption and investment. Corrections in the Baltics are expected to continue, with growth projected to drop from an average of near 9 percent in 2007 to 1¼ percent in 2008 and to –¼ percent in 2009. The economies are projected to start to recover gradually during the second half of 2009. Inflation pressures are expected to ease in 2009 as increases in commodity prices and domestic cost and demand pressures subside.

The risks to the outlook are tilted to the downside. They relate to deterioration in external financing conditions, larger than expected weakening of external demand, and renewed increases in commodity prices. Countries with large current account deficits financed in part by non-foreign-direct-investment capital inflows are particularly vulnerable to a sharp reversal of capital inflows. In some countries in emerging Europe, large nonresident holdings of local currency bonds, extensive domestic borrowing in foreign currencies, and dependence of some financial institutions on wholesale fund-

## Figure 2.6. Emerging Europe: Are Credit Booms Cooling Off?

Credit to the private sector has expanded at a much faster rate in the Baltics, Bulgaria, and Romania than in other countries in the region. Credit booms have been accompanied by a buildup of significant external imbalances. Estonia and Latvia are now undergoing a sharp correction, while consumption and GDP continue to grow briskly in Bulgaria and Romania and, to a lesser extent, in Lithuania. Core inflation and growth of unit labor costs have started to stabilize in Estonia and Latvia, while in Bulgaria, Lithuania, and Romania inflation pressures remain strong.



Sources: Haver Analytics; IMF, *International Financial Statistics*; and IMF staff estimates.

<sup>1</sup>Includes Czech Republic, Hungary, Poland, and Slovak Republic.

<sup>2</sup>Two-quarter moving average.

<sup>3</sup>Overall consumer price index (CPI) excluding energy, food, alcohol, and tobacco.

<sup>4</sup>Calculated as overall compensation divided by GDP, except for Romania, where wages are used instead of compensation.

**Table 2.5. Selected Emerging European Economies: Real GDP, Consumer Prices, and Current Account Balance**

(Annual percent change unless noted otherwise)

|  | Real GDP   |            |            |             | Consumer Prices <sup>1</sup> |            |             |            | Current Account Balance <sup>2</sup> |              |              |              |
|--|------------|------------|------------|-------------|------------------------------|------------|-------------|------------|--------------------------------------|--------------|--------------|--------------|
|  | 2006       | 2007       | 2008       | 2009        | 2006                         | 2007       | 2008        | 2009       | 2006                                 | 2007         | 2008         | 2009         |
| <b>Emerging Europe</b>                   | <b>6.7</b> | <b>5.7</b> | <b>4.5</b> | <b>3.4</b>  | <b>5.4</b>                   | <b>5.7</b> | <b>7.8</b>  | <b>5.8</b> | <b>-6.0</b>                          | <b>-6.6</b>  | <b>-7.1</b>  | <b>-7.2</b>  |
| Turkey                                   | 6.9        | 4.6        | 3.5        | 3.0         | 9.6                          | 8.8        | 10.5        | 8.4        | -6.0                                 | -5.7         | -6.5         | -6.7         |
| Excluding Turkey                         | 6.6        | 6.3        | 5.0        | 3.5         | 3.2                          | 4.1        | 6.4         | 4.5        | -6.0                                 | -7.1         | -7.4         | -7.4         |
| <b>Baltics</b>                           | <b>9.8</b> | <b>8.8</b> | <b>1.2</b> | <b>-0.3</b> | <b>4.8</b>                   | <b>7.3</b> | <b>12.5</b> | <b>7.3</b> | <b>-15.8</b>                         | <b>-18.1</b> | <b>-14.0</b> | <b>-8.6</b>  |
| Estonia                                  | 10.4       | 6.3        | -1.5       | 0.5         | 4.4                          | 6.6        | 10.2        | 5.1        | -16.7                                | -18.1        | -10.8        | -8.7         |
| Latvia                                   | 12.2       | 10.3       | -0.9       | -2.2        | 6.5                          | 10.1       | 15.9        | 10.6       | -22.7                                | -22.9        | -15.1        | -8.3         |
| Lithuania                                | 7.9        | 8.9        | 3.9        | 0.7         | 3.8                          | 5.8        | 11.3        | 6.2        | -10.7                                | -14.6        | -14.9        | -8.7         |
| <b>Central Europe</b>                    | <b>6.2</b> | <b>6.1</b> | <b>4.6</b> | <b>3.6</b>  | <b>2.1</b>                   | <b>3.4</b> | <b>4.9</b>  | <b>3.5</b> | <b>-3.6</b>                          | <b>-3.7</b>  | <b>-4.4</b>  | <b>-5.0</b>  |
| Czech Republic                           | 6.8        | 6.6        | 4.0        | 3.4         | 2.5                          | 2.8        | 6.7         | 3.4        | -2.6                                 | -1.8         | -2.2         | -2.5         |
| Hungary                                  | 3.9        | 1.3        | 1.9        | 2.3         | 3.9                          | 7.9        | 6.3         | 4.1        | -6.1                                 | -5.0         | -5.5         | -6.1         |
| Poland                                   | 6.2        | 6.6        | 5.2        | 3.8         | 1.0                          | 2.5        | 4.0         | 3.3        | -2.7                                 | -3.8         | -4.7         | -5.7         |
| Slovak Republic                          | 8.5        | 10.4       | 7.4        | 5.6         | 4.3                          | 1.9        | 3.9         | 3.6        | -7.1                                 | -5.4         | -5.1         | -4.7         |
| <b>Southern and south-eastern Europe</b> | <b>7.0</b> | <b>6.0</b> | <b>7.3</b> | <b>4.5</b>  | <b>6.2</b>                   | <b>5.1</b> | <b>8.8</b>  | <b>6.4</b> | <b>-10.7</b>                         | <b>-14.1</b> | <b>-14.8</b> | <b>-14.0</b> |
| Bulgaria                                 | 6.3        | 6.2        | 6.3        | 4.2         | 7.4                          | 7.6        | 12.2        | 7.0        | -15.6                                | -21.4        | -24.4        | -21.5        |
| Croatia                                  | 4.8        | 5.6        | 3.8        | 3.7         | 3.2                          | 2.9        | 7.0         | 4.9        | -7.9                                 | -8.6         | -10.1        | -10.2        |
| Romania                                  | 7.9        | 6.0        | 8.6        | 4.8         | 6.6                          | 4.8        | 8.2         | 6.6        | -10.4                                | -14.0        | -13.8        | -13.3        |

<sup>1</sup>Movements in consumer prices are shown as annual averages. December/December changes can be found in Table A7 in the Statistical Appendix.

<sup>2</sup>Percent of GDP.

ing from abroad accentuate vulnerabilities to further changes in market sentiment. Beyond these risks, there is considerable uncertainty about the pace of adjustment in the Baltics. An even-sharper-than-projected slowdown cannot be ruled out, should external or domestic confidence plummet. The downturn may also be more prolonged than expected, if the labor markets, which must adjust to restore competitiveness, proves to be less flexible than expected.

Financial risks have risen appreciably with the onset of the turbulence in advanced financial markets. Although banks operating in emerging Europe have little if any direct exposure to the U.S. subprime market, they (and their foreign parents) have been affected by the widening turmoil in western Europe. A decline in global risk appetite has raised liquidity risks by increasing banks' external funding costs and shortening maturities. Credit risks have also risen: the credit boom was accompanied by lengthening maturities, rising loan-to-value ratios, and more exposure to riskier products (for example, yen-denominated loans in Hungary and Swiss-

franc-denominated loans in Poland, including at variable rates). A recent deceleration in real estate prices, at least in some countries, makes banks more vulnerable to credit risk. Foreign currency lending is widespread, in both fixed-exchange-rate countries (for example, most lending is done in euros in the Baltics) and in floating-exchange-rate countries (for example, in Hungary and Romania, foreign currency loans accounted for about 60 percent of total household loans in 2007). Lower equity prices and rising bond spreads have raised funding costs.

The policy challenge is how to engineer a soft landing, while continuing to lay the groundwork for sustainable convergence to western European living standards.

- In the CEE economies, the risks to inflation and growth appear balanced, justifying keeping monetary policy on hold for the moment, although the balance of risks hinges on unpredictable capital flows and exchange rate developments. Fiscal positions have recently been strengthened by buoyant revenues and

spending restraint, but there is little room for automatic stabilizers to operate in full. Continued fiscal consolidation would help widen these margins and unburden monetary policy. Public finances need to be put on a sustainable long-term path to meet the challenges posed by population aging and to support continued convergence with the euro area, particularly in the Slovak Republic, which is scheduled to adopt the euro in January 2009. Addressing remaining rigidities in the labor market would facilitate long-term fiscal adjustment while easing labor market constraints and wage pressures.

- In the Baltics, macroeconomic adjustment needs to run its course. Although domestic demand pressures are subsiding, especially in Estonia and Latvia, external imbalances still loom large, inflation is at double-digit levels, and confidence is weakening. It is important to resist the temptation to significantly ease fiscal policy in the downturn, considering that these economies' high degree of openness would limit its impact on demand. It will be important to claw back unsustainable expenditure increases from the recent past and target structural balance over the medium term. There is also a need for heightened supervisory vigilance and contingency plans for financial institutions to deal with potentially significant loan losses from the economic downturn. This will require close collaboration between domestic and foreign prudential authorities, given the large share of foreign-owned banks.
- In the SEE economies, action is needed to rein in rising external and internal imbalances, mindful of the more volatile external financing conditions. Like the Baltics several years ago, these countries are still enjoying “good times,” and fiscal and income policies need to avoid adding procyclical impulses to the already overheating private sector. Specifically, growth in public expenditures needs to be contained by keeping public wage increases in line with productivity growth and reducing the size of government,

in conjunction with reforms to raise the efficiency of the public sector. With credit to the private sector growing at double-digit rates, maintaining high prudential standards—and rigorously applying them—is critical in order to prevent weakening credit standards. Again, close cross-border collaboration will be important, for the same reasons as in the Baltics.

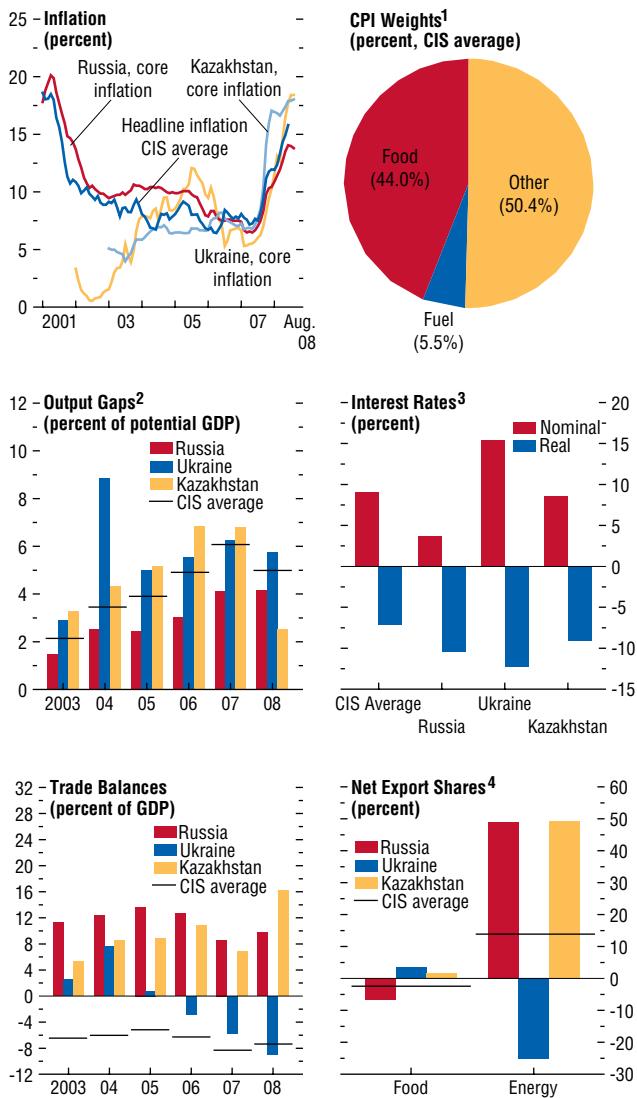
## Commonwealth of Independent States: Managing the Commodity Price Boom

Real GDP growth has been strong in most countries of the Commonwealth of Independent States (CIS), underpinned by buoyant domestic demand that has been boosted by terms-of-trade gains in most countries in the region and expansionary macroeconomic policies. However, growth prospects are deteriorating as the region has been affected by the global financial turmoil, notably Kazakhstan and, more recently, Russia, which have been confronted by loss of confidence and a sharp turn in capital flows. Weakening demand from partner countries would add to the effects on growth of unsettled financial markets.

High world prices for food and fuel have contributed significantly to inflation pressures across the region. Partly as a result of the high weight of food in household consumption, headline inflation accelerated sharply during the first half of 2008, reaching nearly 15 percent by the summer (Figure 2.7). Moreover, core inflation has picked up around the region, reflecting the combination of strains from rising commodity prices and domestic demand pressures. Thus, there are concerns about overheating, with output consistently above potential and labor markets remaining tight. The policy stance generally continues to be expansionary across the region; interest rates have turned negative in real terms, while government spending continues to expand rapidly. High international commodity prices have continued to boost trade balances in net commodity exporters, while net commodity importers have

**Figure 2.7. Commonwealth of Independent States (CIS): Managing the Commodity Price Boom**

Soaring food and fuel prices are causing divergence in external positions and contributing to rising inflation across the region, while expansionary policies continue to stimulate demand.



Sources: IMF, *International Financial Statistics*; and IMF staff calculations.

<sup>1</sup>CPI = consumer price index.

<sup>2</sup>Output gaps are estimated using a Hodrick-Prescott filtered potential GDP. See Box 1.3 for more detail on the methodology and the estimation issues involved.

<sup>3</sup>Deposit rates. Real rates are computed using headline inflation.

<sup>4</sup>Shares in total exports minus shares in total imports.

seen a marked weakening in their external positions. Azerbaijan, Kazakhstan, Russia, Turkmenistan, and Uzbekistan have benefited most from terms-of-trade gains, whereas terms of trade in Armenia, Moldova, and Tajikistan have worsened. In net food importers, food balances have deteriorated significantly, with deficits reaching precarious levels in some countries. Linked to the rising cost of food imports, the Kyrgyz Republic received an augmented disbursement from the IMF in May to help meet a larger than expected balance of payments shortfall.

In response to slowing external demand and emerging financial market pressure, real GDP growth is projected to slow from  $7\frac{1}{4}$  percent this year to about  $5\frac{3}{4}$  percent in 2009 (Table 2.6). Notwithstanding recent oil price declines, output is expected to grow at a solid pace in net energy exporters, where terms-of-trade gains should continue to boost demand, whereas net energy importers will likely see their growth momentum weaken noticeably. In Russia, the growth forecast for 2008 reflects a stronger-than-expected performance early in the year, rising terms-of-trade gains, and a larger-than-expected fiscal stimulus package. But growth is set to weaken appreciably, reflecting slowing world demand and tightening financial conditions. In Kazakhstan, growth is expected to remain relatively subdued as the excesses of the earlier credit boom unwind, although the still-buoyant oil sector should continue to partially offset the effects of the credit crunch. In Ukraine, the growth forecast for 2008 reflects strong performance during the first half of the year, terms-of-trade gains, and indications of a bumper harvest. Going forward, growth is projected to decelerate markedly, reflecting weaker export market growth, slowing real wage increases, moderating terms-of-trade gains, and higher financing costs.

Risks to the outlook have moved to the downside. Financial market uncertainties are a source of concern, notably for countries with rapidly expanding current account deficits, such as Ukraine, and for other countries that are already heavily reliant on capital inflows.

**Table 2.6. Commonwealth of Independent States (CIS): Real GDP, Consumer Prices, and Current Account Balance**

(Annual percent change unless noted otherwise)

|   | Real GDP    |             |             |             | Consumer Prices <sup>1</sup> |             |             |             | Current Account Balance <sup>2</sup> |             |             |             |
|---|-------------|-------------|-------------|-------------|------------------------------|-------------|-------------|-------------|--------------------------------------|-------------|-------------|-------------|
|   | 2006        | 2007        | 2008        | 2009        | 2006                         | 2007        | 2008        | 2009        | 2006                                 | 2007        | 2008        | 2009        |
| <b>Commonwealth of Independent States</b> | <b>8.2</b>  | <b>8.6</b>  | <b>7.2</b>  | <b>5.7</b>  | <b>9.5</b>                   | <b>9.7</b>  | <b>15.6</b> | <b>12.6</b> | <b>7.5</b>                           | <b>4.4</b>  | <b>5.5</b>  | <b>3.0</b>  |
| Russia                                    | 7.4         | 8.1         | 7.0         | 5.5         | 9.7                          | 9.0         | 14.0        | 12.0        | 9.5                                  | 5.9         | 6.5         | 3.4         |
| Ukraine                                   | 7.3         | 7.6         | 6.4         | 2.5         | 9.1                          | 12.8        | 25.3        | 18.8        | -1.5                                 | -3.7        | -7.2        | -9.2        |
| Kazakhstan                                | 10.7        | 8.9         | 4.5         | 5.3         | 8.6                          | 10.8        | 17.6        | 9.8         | -2.4                                 | -6.9        | 4.3         | 3.3         |
| Belarus                                   | 10.0        | 8.2         | 9.2         | 8.0         | 7.0                          | 8.4         | 15.3        | 9.6         | -3.9                                 | -6.8        | -5.9        | -8.0        |
| Turkmenistan                              | 11.4        | 11.6        | 10.8        | 10.3        | 8.2                          | 6.3         | 13.0        | 12.0        | 15.7                                 | 15.4        | 26.5        | 33.0        |
| <b>Low-income CIS countries</b>           | <b>14.7</b> | <b>14.5</b> | <b>10.5</b> | <b>10.5</b> | <b>10.1</b>                  | <b>12.7</b> | <b>16.3</b> | <b>13.7</b> | <b>7.7</b>                           | <b>11.2</b> | <b>15.7</b> | <b>16.2</b> |
| Armenia                                   | 13.3        | 13.8        | 10.0        | 8.0         | 2.9                          | 4.4         | 9.4         | 5.0         | -1.8                                 | -6.4        | -9.7        | -10.8       |
| Azerbaijan                                | 30.5        | 23.4        | 16.0        | 16.4        | 8.4                          | 16.6        | 22.4        | 20.0        | 17.7                                 | 28.9        | 38.3        | 38.6        |
| Georgia                                   | 9.4         | 12.4        | 3.5         | 4.0         | 9.2                          | 9.2         | 10.0        | 7.6         | -15.9                                | -20.0       | -20.8       | -18.7       |
| Kyrgyz Republic                           | 3.1         | 8.2         | 7.5         | 6.7         | 5.6                          | 10.2        | 24.5        | 12.2        | -3.1                                 | -0.2        | -4.2        | -5.4        |
| Moldova                                   | 4.8         | 4.0         | 6.5         | 6.5         | 12.7                         | 12.4        | 13.7        | 9.7         | -11.8                                | -17.0       | -19.9       | -19.1       |
| Tajikistan                                | 7.0         | 7.8         | 6.0         | 7.0         | 10.0                         | 13.2        | 21.6        | 15.5        | -2.8                                 | -11.2       | -8.5        | -8.1        |
| Uzbekistan                                | 7.3         | 9.5         | 8.0         | 7.5         | 14.2                         | 12.3        | 11.1        | 10.6        | 17.2                                 | 19.1        | 16.8        | 12.8        |
| <i>Memorandum</i>                         |             |             |             |             |                              |             |             |             |                                      |             |             |             |
| Net energy exporters <sup>3</sup>         | 8.2         | 8.7         | 7.2         | 6.0         | 9.7                          | 9.4         | 14.5        | 12.1        | 9.1                                  | 5.9         | 7.5         | 4.8         |
| Net energy importers <sup>4</sup>         | 8.0         | 8.1         | 7.0         | 4.2         | 8.5                          | 11.4        | 21.5        | 15.4        | -3.0                                 | -5.6        | -7.9        | -9.6        |

<sup>1</sup>Movements in consumer prices are shown as annual averages. December/December changes can be found in Table A7 in the Statistical Appendix.

<sup>2</sup>Percent of GDP.

<sup>3</sup>Includes Azerbaijan, Kazakhstan, Russia, Turkmenistan, and Uzbekistan.

<sup>4</sup>Includes Armenia, Belarus, Georgia, Kyrgyz Republic, Moldova, Tajikistan, and Ukraine.

Although further monetary and fiscal tightening is expected in the second half of 2008, the near-term effects on activity and inflation will likely be limited. Accordingly, inflation risks are still on the upside for net commodity importers and exporters alike.

Inflation is now expected to be higher than projected in the April 2008 *World Economic Outlook*, 15½ percent this year and 12½ percent next year, reflecting intensifying price pressures amid persistently high commodity prices and little spare capacity. Against this backdrop, monetary policy effectiveness generally remains constrained by inflexible exchange rate regimes, although in Ukraine the exchange rate was recently revalued within a widened trading band. To compensate, governments in CIS countries have resorted to a variety of fiscal and trade measures in order to contain inflation pressures and alleviate the social impact of rising food prices. These measures include reducing or eliminating import taxes and tariffs on key

food items, cutting back domestic consumption taxes or stepping up subsidies for food and fuel, introducing direct price caps on key food items, and imposing export taxes and quotas. Some countries have introduced short-term supply-oriented measures, mainly subsidies and other supports to agriculture. However, the fiscal costs of these measures have reached disconcerting proportions in a number of economies, raising concerns about fiscal sustainability.

For as long as inflation pressure is not projected to diminish markedly from presently elevated levels, stronger policy action is needed in many countries across the region in order to ensure that long-term inflation expectations remain firmly anchored. A comprehensive policy response would require a combination of monetary tightening and greater exchange rate flexibility, combined with a prudent fiscal stance. In particular, universal subsidies, which reinforce domestic demand pressures and burden public resources, could usefully be

replaced with temporary and targeted measures to alleviate the social effects of soaring food and energy prices on vulnerable segments of the population. In this regard, export restrictions and other policy interventions that prevent the needed supply adjustment are likely to prove counterproductive.

Over the longer term, the region continues to face the challenge of reducing its sensitivity to commodity price shocks through diversification of the economy away from primary commodities. Further efforts to improve the business climate; increase competition, including in the food and energy sectors; strengthen domestic financial systems; and continue to build market institutions more broadly would foster stronger performance and reduce vulnerabilities associated with terms-of-trade shifts.

### Sub-Saharan Africa: A Test of Policy Frameworks

Economic growth in sub-Saharan Africa (SSA) is expected to moderate in the face of the financial turmoil and high energy and food prices, even though many SSA countries are benefiting from terms-of-trade gains resulting from the surge in other commodity prices. Overall, growth is projected to decline from near 7 percent in 2007 to just over 6 percent in 2008–09. However, there are important cross-country variations (Figure 2.8 and Table 2.7). Despite a weakening external environment, economic expansion in oil-exporting countries is expected to soften only moderately in 2008–09, with growth declining to about 7½ percent from near 8 percent in 2007, owing to a near 75 percent improvement in the terms of trade in 2008. For oil importers, the terms of trade would remain broadly stable in 2008, with higher oil prices offset by higher export prices for metals, coffee, cocoa, and cotton.<sup>10</sup> However,

the countries hit hardest (Benin, The Gambia, Kenya, Madagascar, Rwanda, and Sierra Leone) are projected to experience a 15–20 percent deterioration in the terms of trade. In South Africa, SSA's largest economy, electricity shortages early in 2008 and the need for a 500-basis-point rise in policy interest rates since mid-2006 to contain inflation are expected to slow growth from 5 percent in 2007 to about 3½ percent in 2008–09. The risks to the regional growth outlook are tilted to the downside and relate mainly to slower-than-expected growth in global demand and slowing capital inflows.

Recent sharp increases in food and fuel prices pose significant challenges for price stability across SSA. Inflation is expected to rise from about 7 percent in 2007 to near 12 percent in 2008, before easing to 9½ percent in 2009, although the average masks significant variation across countries. Food price rises tend to have a large impact on inflation in SSA, reflecting a high share of food in consumer baskets (see Chapter 3). Domestic demand pressures, which have emerged in some SSA countries during the past several years of robust growth, may also be amplifying the initial impact of food and fuel price shocks through second-round effects on inflation.

Against the backdrop of rising inflation, the impact of higher food prices on poverty is a major concern as it risks undermining past progress in this area and putting social cohesion at risk. SSA countries' strong dependence on imports of food and fuel as well as a high incidence of poverty make them most vulnerable to increases in prices of these commodities. Populations in these countries have few options to hedge against rising food prices, and the urban poor tend to suffer most. The IMF staff estimates that rising prices for imported food would have the largest impact on poverty in The Gambia, Ghana, Mauritania, and Swaziland owing to their high dependence on

<sup>10</sup>Oil importers stand to benefit from higher prices for metals (Botswana, Ghana, Guinea, Kenya, Mozambique, Senegal, South Africa, Togo, Uganda, and Zambia), coffee, cocoa, and cotton (Burundi, Côte d'Ivoire, Ethiopia,

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Kenya, Rwanda, Uganda, and Zambia, among others). For more details on the effects of the recent commodity price shock, see Chapter 3 and IMF (2008a).

imports and low incomes (IMF, 2008a). Some countries have responded to rising inflation pressures by tightening monetary policy, but many have reduced import tariffs and the value-added tax on food or have imposed export taxes and other restrictions.

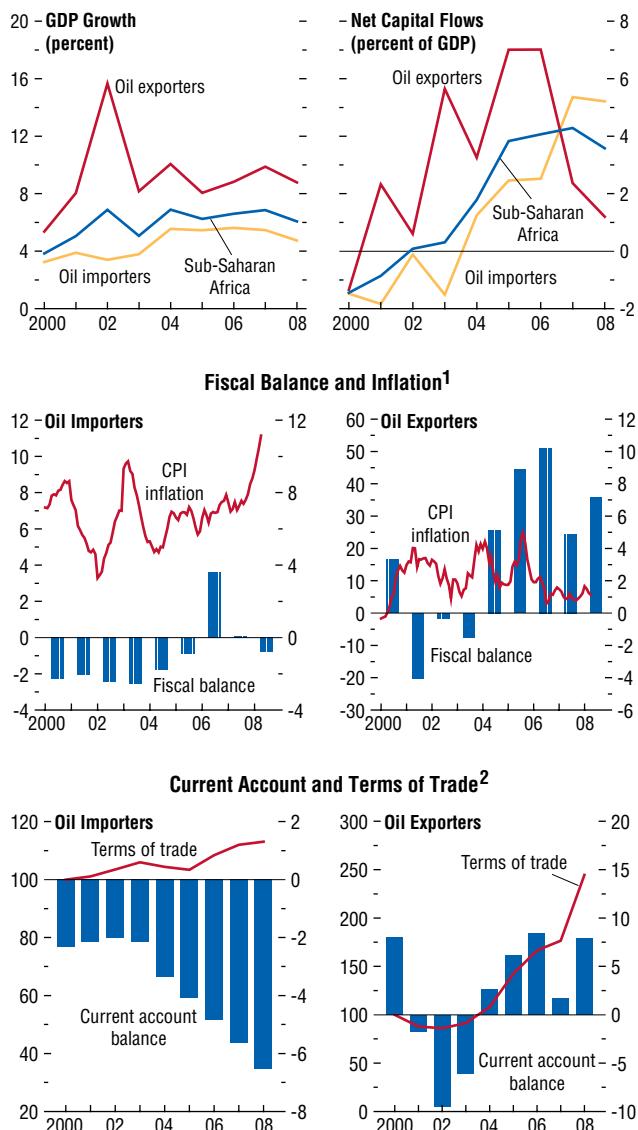
The external positions of oil-importing countries are also coming under pressure because of surging prices of imported food and fuel. Current account deficits in oil-importing countries are projected to deteriorate on average from about 5 percent of GDP in 2007 to about 5½ percent of GDP in 2008 and 6¼ percent in 2009. In South Africa, a widening current account deficit, which stood at 7¼ percent of GDP in the second quarter of 2008, is of particular concern. The deficit is financed largely through volatile portfolio flows, although low external debt and a flexible exchange rate should provide some resilience if capital flows were to reverse. By contrast, current account balances in oil-exporting countries are in surplus and are projected to strengthen further, from 8 percent in 2007 to 13½ percent in 2008 and about 8 percent in 2009.

The main challenge for the region is how to respond to the large commodity price shock and the threat of slowing capital inflows. Oil-importing countries, where the negative terms-of-trade shock has weakened fiscal and external positions, need to adjust their monetary, fiscal, and income policies. Delaying the adjustment would put at risk not only macroeconomic stability but also recent achievements in improving policy and institutional frameworks, which have been largely responsible for SSA's impressive growth performance in recent years.

- Countries with managed or fixed exchange rates need to tighten monetary policies through interest rate increases or administrative measures to prevent inflation expectations from becoming ingrained and to strengthen the balance of payments and fiscal positions. A reduction in public sector borrowing and greater exchange rate flexibility would support monetary tightening and ease pressure on the balance of payments.

**Figure 2.8. Sub-Saharan Africa: The Mixed Blessing of High Commodity Prices**

At the aggregate level, growth in Africa is expected to show some resilience to the global slowdown, as many countries benefit from improvement in the terms of trade owing to a surge in fuel and nonfuel commodity prices, and net capital inflows to the region remain broadly steady. Nonetheless, there are dramatic differences in the economic performance of oil importers and exporters, with the former experiencing a significant deterioration in their current account and fiscal positions, as well as a sharp rise in inflation.



Sources: Haver Analytics; IMF, *Direction of Trade Statistics*; and IMF staff calculations.

<sup>1</sup>Consumer price index (CPI) inflation measured as percent change from a year earlier, left scale; fiscal balances measured as percent of GDP, right scale.

<sup>2</sup>Current account balances measured as percent of GDP, right scale; terms of trade measured as index, 2000 = 100, left scale.

**Table 2.7. Selected African Economies: Real GDP, Consumer Prices, and Current Account Balance**  
*(Annual percent change unless noted otherwise)*

|  | Real GDP    |             |             |            | Consumer Prices <sup>1</sup> |             |             |             | Current Account Balance <sup>2</sup> |              |             |             |
|--|-------------|-------------|-------------|------------|------------------------------|-------------|-------------|-------------|--------------------------------------|--------------|-------------|-------------|
|  | 2006        | 2007        | 2008        | 2009       | 2006                         | 2007        | 2008        | 2009        | 2006                                 | 2007         | 2008        | 2009        |
| <b>Africa</b>                              | <b>6.1</b>  | <b>6.3</b>  | <b>5.9</b>  | <b>6.0</b> | <b>6.3</b>                   | <b>6.2</b>  | <b>10.2</b> | <b>8.3</b>  | <b>2.9</b>                           | <b>0.4</b>   | <b>3.0</b>  | <b>0.2</b>  |
| <b>Maghreb</b>                             | <b>4.3</b>  | <b>4.3</b>  | <b>5.5</b>  | <b>4.9</b> | <b>3.1</b>                   | <b>3.0</b>  | <b>4.3</b>  | <b>4.0</b>  | <b>13.9</b>                          | <b>12.1</b>  | <b>15.5</b> | <b>10.3</b> |
| Algeria                                    | 2.0         | 4.6         | 4.9         | 4.5        | 2.5                          | 3.6         | 4.3         | 4.0         | 24.8                                 | 22.8         | 28.1        | 19.8        |
| Morocco                                    | 7.8         | 2.7         | 6.5         | 5.5        | 3.3                          | 2.0         | 3.9         | 3.5         | 2.2                                  | -0.1         | 0.4         | -0.3        |
| Tunisia                                    | 5.5         | 6.3         | 5.5         | 5.0        | 4.5                          | 3.1         | 5.1         | 4.5         | -2.0                                 | -2.6         | -3.4        | -3.5        |
| <b>Sub-Saharan Africa<sup>3</sup></b>      | <b>6.6</b>  | <b>6.9</b>  | <b>6.1</b>  | <b>6.3</b> | <b>7.3</b>                   | <b>7.1</b>  | <b>11.9</b> | <b>9.5</b>  | <b>-0.3</b>                          | <b>-3.0</b>  | <b>-0.7</b> | <b>-2.4</b> |
| <b>Horn of Africa<sup>3</sup></b>          | <b>11.3</b> | <b>10.6</b> | <b>8.4</b>  | <b>7.2</b> | <b>9.1</b>                   | <b>11.0</b> | <b>19.5</b> | <b>20.9</b> | <b>-13.4</b>                         | <b>-10.4</b> | <b>-6.3</b> | <b>-6.5</b> |
| Ethiopia                                   | 11.6        | 11.4        | 8.4         | 6.5        | 12.3                         | 15.8        | 25.3        | 40.8        | -9.1                                 | -4.5         | -5.0        | -5.2        |
| Sudan                                      | 11.3        | 10.2        | 8.5         | 7.7        | 7.2                          | 8.0         | 16.0        | 10.0        | -15.2                                | -12.6        | -6.3        | -6.7        |
| <b>Great Lakes<sup>3</sup></b>             | <b>7.1</b>  | <b>7.0</b>  | <b>6.5</b>  | <b>7.6</b> | <b>10.4</b>                  | <b>9.2</b>  | <b>15.7</b> | <b>7.9</b>  | <b>-4.3</b>                          | <b>-4.5</b>  | <b>-6.2</b> | <b>-7.8</b> |
| Congo, Dem. Rep. of                        | 5.6         | 6.3         | 10.0        | 10.3       | 13.2                         | 16.7        | 17.5        | 15.1        | -2.4                                 | -1.8         | -1.9        | -12.6       |
| Kenya                                      | 6.4         | 7.0         | 3.3         | 6.4        | 14.5                         | 9.8         | 25.0        | 6.5         | -2.3                                 | -3.1         | -6.1        | -4.5        |
| Tanzania                                   | 6.7         | 7.1         | 7.5         | 8.0        | 7.3                          | 7.0         | 9.2         | 6.5         | -7.7                                 | -9.0         | -9.8        | -10.0       |
| Uganda                                     | 10.8        | 7.9         | 9.8         | 8.1        | 6.6                          | 6.8         | 7.3         | 7.8         | -3.5                                 | -2.8         | -3.4        | -5.8        |
| <b>Southern Africa<sup>3</sup></b>         | <b>11.0</b> | <b>12.9</b> | <b>10.6</b> | <b>9.4</b> | <b>11.5</b>                  | <b>10.0</b> | <b>11.3</b> | <b>9.4</b>  | <b>12.8</b>                          | <b>6.7</b>   | <b>9.6</b>  | <b>8.3</b>  |
| Angola                                     | 18.6        | 21.1        | 16.0        | 12.8       | 13.3                         | 12.2        | 12.1        | 9.3         | 23.3                                 | 11.3         | 18.0        | 15.9        |
| Zimbabwe <sup>4</sup>                      | -5.4        | -6.1        | ...         | ...        | 1,016.7                      | 10,452.6    | ...         | ...         | -7.0                                 | -3.5         | ...         | ...         |
| <b>West and Central Africa<sup>3</sup></b> | <b>4.9</b>  | <b>5.1</b>  | <b>5.4</b>  | <b>6.8</b> | <b>6.8</b>                   | <b>4.6</b>  | <b>9.3</b>  | <b>8.3</b>  | <b>4.5</b>                           | <b>-0.8</b>  | <b>3.1</b>  | <b>-0.4</b> |
| Ghana                                      | 6.4         | 6.3         | 6.5         | 5.8        | 10.2                         | 10.7        | 16.8        | 13.3        | -9.0                                 | -10.9        | -13.1       | -13.2       |
| Nigeria                                    | 6.2         | 5.9         | 6.2         | 8.1        | 8.3                          | 5.5         | 11.0        | 11.1        | 9.5                                  | 2.1          | 6.2         | 0.6         |
| <b>CFA franc zone<sup>3</sup></b>          | <b>2.8</b>  | <b>4.2</b>  | <b>4.3</b>  | <b>5.6</b> | <b>3.2</b>                   | <b>1.4</b>  | <b>5.6</b>  | <b>4.1</b>  | <b>0.1</b>                           | <b>-2.4</b>  | <b>2.5</b>  | <b>0.7</b>  |
| Cameroon                                   | 3.2         | 3.5         | 3.8         | 4.6        | 5.1                          | 0.9         | 4.1         | 2.1         | 0.6                                  | -1.9         | 1.3         | -1.1        |
| Côte d'Ivoire                              | 0.7         | 1.6         | 2.9         | 4.7        | 2.5                          | 1.9         | 5.6         | 5.7         | 2.8                                  | -0.7         | 3.8         | -0.6        |
| <b>South Africa</b>                        | <b>5.4</b>  | <b>5.1</b>  | <b>3.8</b>  | <b>3.3</b> | <b>4.7</b>                   | <b>7.1</b>  | <b>11.8</b> | <b>8.0</b>  | <b>-6.5</b>                          | <b>-7.3</b>  | <b>-8.0</b> | <b>-8.1</b> |
| <i>Memorandum</i>                          |             |             |             |            |                              |             |             |             |                                      |              |             |             |
| Oil importers                              | 5.9         | 5.3         | 5.0         | 5.0        | 6.3                          | 6.6         | 10.9        | 8.5         | -3.8                                 | -4.9         | -5.7        | -6.3        |
| Oil exporters <sup>5</sup>                 | 6.5         | 7.9         | 7.4         | 7.6        | 6.4                          | 5.5         | 9.2         | 8.0         | 13.1                                 | 7.9          | 13.5        | 8.1         |

<sup>1</sup>Movements in consumer prices are shown as annual averages. December/December changes can be found in Table A7 in the Statistical Appendix.

<sup>2</sup>Percent of GDP.

<sup>3</sup>The country composition of these regional groups is set out in Table F in the Statistical Appendix.

<sup>4</sup>No projections for 2008 and beyond are shown. The inflation figure for 2007 represents an estimate.

<sup>5</sup>Includes Chad and Mauritania in this table.

- At the same time, targeted fiscal measures, including subsidies, are needed to help protect the poor. These measures would need to be complemented by steps to safeguard the long-term budget position, including a gradual yet full pass-through of international oil prices to consumer prices as better-targeted measures are put in place for the poor. Price controls on food items are likely to be ineffective, leading to shortages and budgetary costs rather than reduced inflation.
- Additional donor assistance is needed to cushion the impact of adjustment on vulnerable countries that have high poverty levels, limited access to foreign financing,

low reserve cushions, and high external or public debt levels. Such funding would allow these countries to meet higher import bills and provide targeted budget assistance to the poorest segments of the population while the necessary adjustments are phased in. Over the longer term, donor assistance could seek to promote the development of domestic agriculture and sustainable social safety nets. Oil-exporting countries face the challenge of managing the windfall gains from high commodity prices more successfully than during similar past episodes, which failed to produce permanent improvements in living standards. Rising current account surpluses and inflation

pressures call for close coordination between monetary and fiscal policies. Saving a portion of oil revenues would help mitigate emerging inflation pressures while laying a solid financial basis for addressing vital infrastructure, health, and social needs. Monetary tightening could help stabilize inflation and guard against the development of a generalized inflation process. Allowing nominal exchange rates to appreciate would also help keep inflation under control.

### Middle East: Overheating Still a Concern

Activity continues to grow at a robust pace in much of the Middle East, while inflation pressures either remain high or keep rising, particularly in a number of oil exporters. Real GDP growth in Middle Eastern countries is projected to weaken only modestly during 2008–09, from 6½ percent to just below 6 percent, with oil exporters and non-oil economies growing at a similar pace (Table 2.8). The effects of falling demand in advanced partner economies and increasing supply-side constraints in oil sectors are projected to be partly offset by robust domestic demand and activity in non-oil sectors. Rising oil and food prices are posing important budgetary challenges for many non-oil economies. By contrast, the global financial turmoil has had relatively little effect on the region thus far, beyond pressing stock markets to surrender earlier gains.

Economic growth is being sustained mainly by non-oil sectors, as capacity constraints are slowing oil output growth (Figure 2.9). Growth in oil exporters is being driven by private construction, retail trade, transportation, and financial services. Aside from the indirect effect of high oil revenues, the strength reflects an improved business environment that is fostering private investment and a buildup in public projects to alleviate infrastructure and housing bottlenecks that have accumulated with rapid population growth. Notwithstanding record oil prices, recent activity in the oil sector has been noticeably less buoyant than in the non-oil sector. Despite heavy investment, production and

distribution capacity are rising slowly, owing to soaring investment costs, technological and geological constraints, and the depletion of existing fields. Still, oil and natural gas production capacity and, to a lesser extent, output are projected to expand moderately in 2008–09, with significant new capacity in Qatar and Saudi Arabia. Real GDP growth in the non-oil economies is benefiting from past efforts to improve their business environments. Sizable FDI inflows are boosting activity in Egypt and Jordan, while Lebanon is continuing to recover from the conflict in 2006.

Signs of overheating are multiplying. Inflation has reached double-digit rates even in some countries with traditionally low rates, such as Saudi Arabia, and exceeds 20 percent in Egypt and the Islamic Republic of Iran. The surge in inflation has occurred despite limited pass-through of high fuel and, to a lesser extent, food prices to domestic markets.<sup>11</sup> Not surprisingly, although inflation is still driven mainly by foreign-determined prices (including the depreciation of the U.S. dollar against third currencies), pressures are increasingly spilling over into domestically determined prices of nontraded goods. This is particularly true in oil-exporting countries, where expanding and wealthier populations and an influx of foreign workers are putting pressure on services prices, notably for housing, and where governments are granting large wage hikes. However, other countries are beginning to see broader pressures too. Accordingly, despite the technical assumptions of no further real effective exchange rate depreciation and broadly unchanged prices for fuel and food, inflation is expected to retreat only moderately in 2009.

At the same time, robust domestic demand is driving an acceleration of imports across the region. Current account developments differ widely between oil exporters and non-oil economies. Oil exporters are recording large and

<sup>11</sup>These items typically have a combined weight of between one-quarter and one-third in consumption baskets, with the bulk accounted for by food.

**Table 2.8. Selected Middle Eastern Economies: Real GDP, Consumer Prices, and Current Account Balance**

(Annual percent change unless noted otherwise)

|                                  | Real GDP   |            |            |            | Consumer Prices <sup>1</sup> |             |             |             | Current Account Balance <sup>2</sup> |             |             |             |
|----------------------------------|------------|------------|------------|------------|------------------------------|-------------|-------------|-------------|--------------------------------------|-------------|-------------|-------------|
|                                  | 2006       | 2007       | 2008       | 2009       | 2006                         | 2007        | 2008        | 2009        | 2006                                 | 2007        | 2008        | 2009        |
| <b>Middle East</b>               | <b>5.7</b> | <b>5.9</b> | <b>6.4</b> | <b>5.9</b> | <b>7.0</b>                   | <b>10.6</b> | <b>15.8</b> | <b>14.4</b> | <b>21.1</b>                          | <b>18.4</b> | <b>22.9</b> | <b>17.1</b> |
| <b>Oil exporters<sup>3</sup></b> | <b>5.6</b> | <b>5.7</b> | <b>6.2</b> | <b>5.9</b> | <b>7.6</b>                   | <b>10.7</b> | <b>16.8</b> | <b>14.3</b> | <b>24.2</b>                          | <b>21.2</b> | <b>26.0</b> | <b>19.9</b> |
| Iran, I.R. of                    | 5.8        | 6.4        | 5.5        | 5.0        | 11.9                         | 18.4        | 26.0        | 22.0        | 9.2                                  | 10.1        | 11.2        | 6.7         |
| Saudi Arabia                     | 3.0        | 3.5        | 5.9        | 4.3        | 2.3                          | 4.1         | 11.5        | 10.0        | 27.9                                 | 25.1        | 32.5        | 23.8        |
| United Arab Emirates             | 9.4        | 7.4        | 7.0        | 6.0        | 9.3                          | 11.1        | 12.9        | 10.8        | 22.6                                 | 20.5        | 22.6        | 18.8        |
| Kuwait                           | 6.3        | 4.6        | 5.9        | 5.8        | 3.1                          | 5.5         | 9.0         | 7.5         | 52.2                                 | 43.1        | 44.6        | 39.3        |
| <b>Mashreq</b>                   | <b>5.9</b> | <b>6.3</b> | <b>6.6</b> | <b>5.8</b> | <b>5.4</b>                   | <b>9.2</b>  | <b>11.3</b> | <b>13.5</b> | <b>-1.7</b>                          | <b>-2.2</b> | <b>-3.1</b> | <b>-3.6</b> |
| Egypt                            | 6.8        | 7.1        | 7.2        | 6.0        | 4.2                          | 11.0        | 11.7        | 16.1        | 0.8                                  | 1.5         | 0.6         | -0.9        |
| Syrian Arab Republic             | 4.4        | 3.9        | 4.2        | 5.2        | 10.4                         | 4.7         | 8.0         | 7.0         | -2.9                                 | -1.4        | -2.7        | -2.9        |
| Jordan                           | 6.3        | 6.0        | 5.5        | 5.3        | 6.3                          | 5.4         | 15.8        | 7.6         | -11.3                                | -17.5       | -18.5       | -16.3       |
| Lebanon                          | —          | 4.0        | 6.0        | 5.0        | 5.6                          | 4.1         | 11.0        | 6.2         | -5.6                                 | -12.7       | -14.0       | -13.7       |
| <i>Memorandum</i>                |            |            |            |            |                              |             |             |             |                                      |             |             |             |
| Israel                           | 5.2        | 5.4        | 4.3        | 2.8        | 2.1                          | 0.5         | 4.8         | 3.3         | 5.9                                  | 3.2         | 0.4         | 0.5         |

<sup>1</sup>Movements in consumer prices are shown as annual averages. December/December changes can be found in Table A7 in the Statistical Appendix.

<sup>2</sup>Percent of GDP.

<sup>3</sup>Includes Bahrain, Islamic Republic of Iran, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, and Republic of Yemen.

growing surpluses, generally projected to reach 10–45 percent of GDP in 2008–09. In the other countries, deficits have widened in response to rising import costs—to double-digit levels in Jordan and Lebanon, but to still-low levels in Egypt.

The risks to the growth outlook remain broadly balanced. External risks are mostly to the downside and relate to weaker demand in advanced economies and potentially lower oil prices. Capital inflows to deficit countries could take a hit if global financial conditions were to worsen suddenly, and access to funding by major nonfinancial corporations could also become more difficult. Upside risks relate to still-robust domestic demand and foreign investors' continued strong interest from within (notably the Gulf Cooperation Council—GCC—countries) and outside the region. However, if upside risks materialize and exacerbate inflation pressure, this would further complicate macroeconomic policies.

In this setting, warding off mounting inflation pressures requires addressing growing imbalances. Countries that are not pegging exchange rates to foreign currencies (for example, Egypt and the Islamic Republic of Iran) can further

tighten monetary policy while enhancing its effectiveness through greater exchange rate flexibility. In countries with pegged exchange rates, monetary policy is imported from abroad, mainly from the United States. In many oil exporters, currencies are undervalued, although by varying degrees, and higher inflation is contributing to an appreciation of real effective exchange rates. The main driver of the undervaluation is the peg to the U.S. dollar, which has been depreciating while terms of trade have been improving. Once domestic prices have completely adjusted to the higher levels that are consistent with an appreciated real effective exchange rate, inflation pressures should subside, provided the peg and fiscal policy effectively anchor expectations.

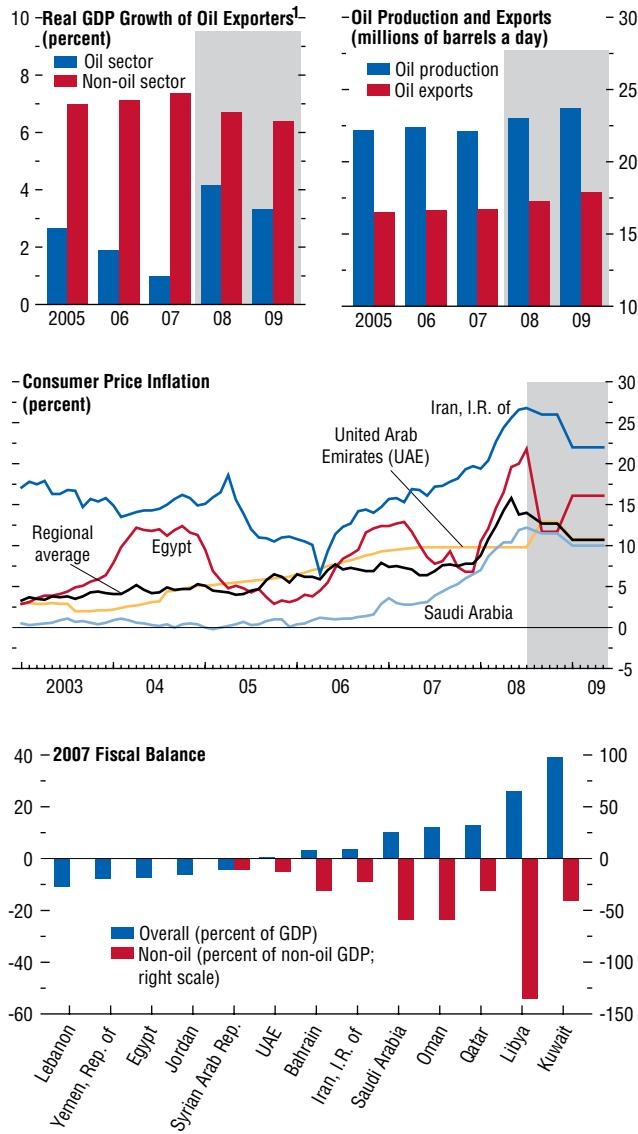
The move to a new equilibrium could also be achieved through a revaluation of currencies, but this would be complex, particularly in the GCC countries, which plan to move to monetary union in 2010. First, revaluations would introduce uncertainty as to how policy would respond to external shocks in the future, undermining the value of the peg as a nominal anchor. Second, many pegging countries still need to

develop both their capacity to conduct an independent monetary policy and the underlying financial market infrastructure. Third, volatility in oil markets could lead to volatile exchange rates under a floating regime, which might hamper some countries' efforts to diversify their export bases. Some of these issues would be addressed by a switch from a peg to the U.S. dollar to a peg to a basket of currencies that better reflects the composition of trade and services exchange with the rest of the world. However, had such a peg been in place recently, it would not have made a major difference with respect to excess demand pressures, as is evidenced by Kuwait's experience. In the long run, however, if inflation persists, a switch to a basket peg is an option worth exploring. Overall, the extent of the role of the exchange rate in managing demand pressure has to depend on country-specific circumstances, including the potential for adjustments in fiscal policy and GCC countries' commitment to peg their currencies to the U.S. dollar in the period leading up to monetary union.

Fiscal policy will be central in restraining demand pressures in Middle Eastern economies. Many non-oil economies have significantly reduced debt levels over the past decade. Nonetheless, domestic debt levels remain high by international standards, and thus both conjunctural and medium-term requirements point toward fiscal tightening. In oil exporters, the rise in oil prices has provided fiscal room for a buildup in government spending but has added to pressures on domestic resources. As a result of rapidly rising expenditures on wages and subsidies, for example, the oil price at which countries' budgets balance over the medium term has been on the rise. The specific fiscal policy requirements vary, but generally would need to emphasize cutbacks in current spending while continuing to support critical infrastructure projects that alleviate internal supply-side bottlenecks. Furthermore, fiscal policy can also help address the social challenges posed by high energy and food prices. The development of more-targeted transfer programs would

**Figure 2.9. Middle East: Managing Inflation Pressures**

Real GDP growth is forecast to remain buoyant, mainly on account of activity in non-oil sectors. Inflation pressure is rising, and tighter fiscal policies are needed to keep inflation expectations well anchored, particularly in non-oil economies, which are also experiencing widening current account deficits.



Sources: IMF, *International Financial Statistics*; and IMF staff calculations.

<sup>1</sup>Oil exporters include Bahrain, Islamic Republic of Iran, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, and Republic of Yemen.

help tackle poverty and, in oil exporters, share the gains from higher oil prices. As progress is made, high outlays on general oil and food subsidies—reaching about 10 percent of GDP in Egypt and Saudi Arabia, for example—need to be rolled back.

Over the medium term, stronger macroeconomic policy frameworks and continued structural reforms are important for strengthening the resilience of Middle Eastern economies to shocks and to providing for a young and rapidly expanding population. Fiscal policies could usefully be imparted with a longer-term orientation—for example, with the help of medium-term budgetary frameworks—because of the need to lower debt in non-oil economies and in preparation for lower oil revenues in some oil exporters. The capacity to conduct independent monetary policy and to support financial markets needs to be enhanced. As domestic financial systems become more complex, rising regulatory and supervisory challenges will need to be addressed. Moreover, many countries stand to benefit from further improvements in their business environments, including by increasing investment in education and strengthening the social safety net.

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# IS INFLATION BACK? COMMODITY PRICES AND INFLATION

*This chapter examines the current commodity price boom and evaluates the risks that the associated relative price adjustment could ratchet up inflation, as during the 1970s. Despite some recent easing in commodity prices, many of the forces underlying the boom are still in place, and prices will likely remain at high levels by historical standards. Continuing inflation risks arise from the large increases in commodity prices that have not fed fully through the supply chain. Most vulnerable to risks of a ratcheting up in inflation are those economies with a high likelihood of second-round effects—where commodities account for a large share of final expenditure and where monetary policy has only limited credibility, where there are price pressures from other sources such as overheating, and where the macroeconomic policy response to rising inflation has been inadequate.*

**C**ould the large commodity price surge of the past year and a half signal an end to a decade or so of price stability and herald a return to the type of high inflation seen during the 1970s? This question continues to be widely debated, even as commodity prices have begun to ease since mid-July. In many economies, headline inflation rates remain at levels last seen 10 to 15 years ago, and core inflation is still rising, particularly in emerging and developing economies.

Although there is broad agreement that inflation risks have increased across the globe, the causes for concern differ among various analysts and policymakers. For some, the main concern is that the commodity price increases have been so broad-based, large, and rapid that perceptions of rising inflation could spill over into expectations for further price increases,

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demands for higher wages, and thereby an increase in underlying inflation (second-round effects). Others focus on the fact that, in a number of emerging and developing economies, the pressures from surging commodity prices come on top of price pressures from economic overheating. This combination exacerbates the risks of second-round effects. The problem is particularly acute in commodity exporters for which the commodity price surge has been expansionary.

A third cause for concern is that the commodity price surge might not, in fact, be a pure supply shock but may instead be the consequence of global excess demand resulting from overly expansionary macroeconomic policies. As during the 1970s, soaring commodity prices may be an early indication that capacity is being overestimated in some countries. By mistakenly reading the price surges as entirely the result of sector-specific constraints, policymakers may amplify inflation pressures.

The chapter analyzes the commodity price boom and the implications for inflation prospects and risks. Specifically, it seeks to answer the following questions.

- Why are commodity prices so high, and will they stay high?
- What has been the impact of rising commodity prices on headline and core inflation across the globe? Which countries have been most affected? What are the risks of significant second-round effects, and what factors affect these risks?
- What should be the appropriate monetary policy response to rising commodity prices? Under what circumstances can inappropriate monetary policies in individual countries carry significant global implications?

The chapter concludes that the current commodity price boom has, broadly speaking, reflected the interaction of strong demand, low

inventory and spare capacity levels, slow supply expansion in key sectors, and adverse supply shocks. Prospects for a slowing of global growth in 2008–09—partly in response to high commodity prices—and the resolution of weather-related supply constraints for key food crops have recently caused commodity prices to ease. However, some of the underlying forces behind the commodity price boom are still in place, notably strong growth in large emerging economies, low inventories, and supply constraints in key sectors. Barring an intense global downturn, these factors will likely limit the extent of further easing from recent price peaks and provide for continued price volatility.

Inflation risks will likely remain elevated for some time, even if commodity prices exert less direct inflation pressure than during the past year and a half, because the adjustment to the large increase in relative commodity prices is still in train. There have already been second-round effects in some economies, and some others remain at risk. Emerging and developing economies are generally more vulnerable to the main risk factors, including having a large share of commodities in final expenditure and having less-credible monetary management. Moreover, higher international prices, in particular for fuels, have not yet been fully passed through to domestic prices in many economies.

Notwithstanding the recent easing in commodity prices, a determined monetary policy response remains important in economies where inflation pressures were already elevated before the commodity price surge and where risks of second-round effects are high. Delaying the monetary policy response could lower the credibility of policymakers and thereby significantly worsen the inflation-output trade-off. Other macroeconomic policies should be supportive, particularly if exchange-rate-related constraints limit the scope for monetary tightening.

The chapter is organized as follows. The next section examines the origins of and prospects for high commodity prices. The following sec-

tion looks at the relationship between commodity price shocks and inflation at the country level, examining whether sustained increases in food and energy prices could reverse the recent “great moderation” in inflation across the globe. The analysis then focuses on the monetary policy implications of the commodity price shocks and the implications for global inflation dynamics. The summary and conclusions section also draws some policy implications.

## Surging Commodity Prices: Origins and Prospects

Commodity prices surged during the past year and a half (Figure 3.1, top and middle panels). The oil price more than doubled between December 2006 and mid-July 2008, although some of these gains have been reversed since, and food prices rose by more than 50 percent during this period. These surges came on top of large price increases during 2003–06. Overall, cumulative commodity price increases since 2003 are broadly similar in magnitude to those recorded during the commodity price boom of the early 1970s (1971–74), the last major boom. More recent periods of sustained global growth—during the 1980s and the 1990s—were not accompanied by broad-based commodity price booms involving fuel and food commodities. This section compares the current commodity price boom to the early 1970s boom and then discusses current oil and food price developments and prospects.<sup>1</sup>

### The Current Commodity Price Boom Compared with the 1970s

Three common factors seem to underlie both booms. First, the origins can be traced to strong global growth (Figure 3.1, bottom panel).<sup>2</sup> Prices for many commodities respond strongly

<sup>1</sup>Appendix 3.1 provides a more detailed overview of recent commodity market developments and prospects.

<sup>2</sup>Among others, Radetski (2006) noted that the beginning of each significant, broad commodity price boom during the postwar period (1950–52, 1972–74, and 2003

to changes in global growth or industrial activity. This reflects the role of commodities in global industrial activity—especially intermediate inputs in manufacturing such as metals and agricultural raw materials, but also oil—and, for other commodities such as food, the role of income as a determinant of demand.

The growth acceleration in emerging and developing economies during the past few years—driven by industrialization takeoff and strong per capita income increases from a low base—has likely altered the relationship between global activity and commodity prices during the current boom. The rotation in global growth toward these economies has catalyzed commodity demand because their growth has been relatively more commodity-intensive (Figure 3.2, top panel). The slowdown in the advanced economies has so far had less of an impact on commodity prices than during earlier downturns in these economies. That said, turning points in price cycles have historically been broadly synchronized with those in global economic activity.<sup>3</sup>

A second factor common to the 1970s boom and the current boom is that both started with lower-than-usual inventory and spare capacity levels (Figure 3.2, middle and bottom panels). In both booms, this lack of buffers amplified the price impetus from the pickup in commodity demand resulting from strong global growth.<sup>4</sup> The reasons for low inventory and spare capacity levels in the current boom vary across commodity sectors, but in general, there was underinvestment and slow supply growth during the late

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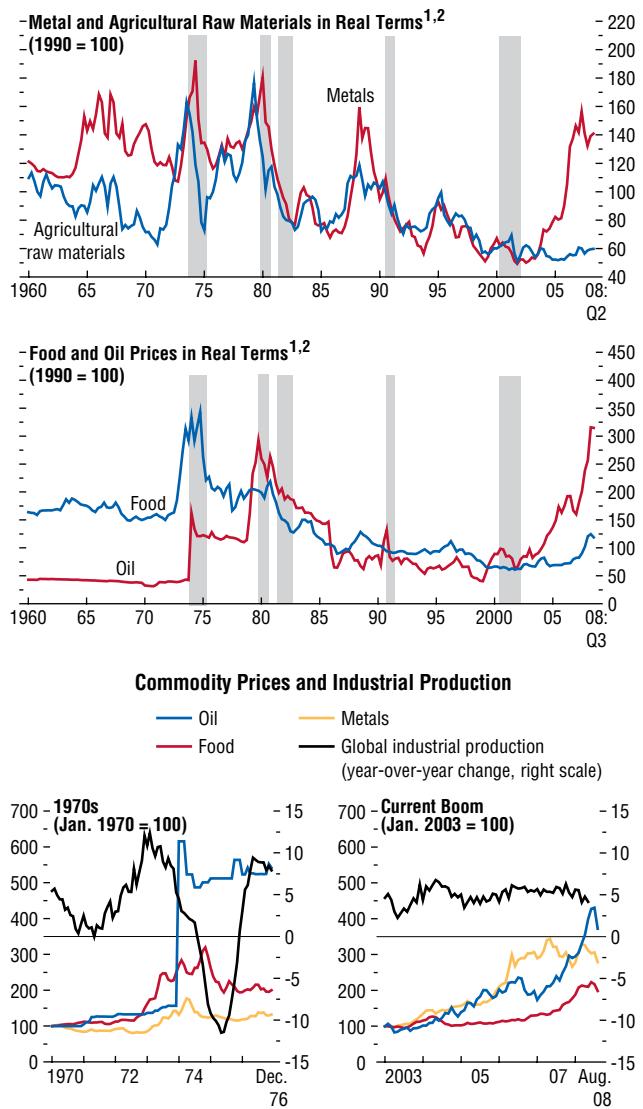
until now) coincided with an acceleration in economic growth and industrial production.

<sup>3</sup>See Box 5.2 in the April 2008 *World Economic Outlook*.

<sup>4</sup>The presence of such interaction between strong demand and low initial buffer levels is likely one of the factors that turn a cyclical price upswing into a price boom, because differences in global growth between expansions are too small to plausibly explain the large differences in commodity prices observed during global upswings. See, among others, Deaton and Laroque (1992) and Radetski (2006) on the mechanics of commodity price cycles.

**Figure 3.1. Commodity Prices in Historical Context**

The current commodity price boom shares many common features with the most recent major commodity price boom, during the early 1970s, including sharp increases in oil and food prices and an environment of strong global growth.



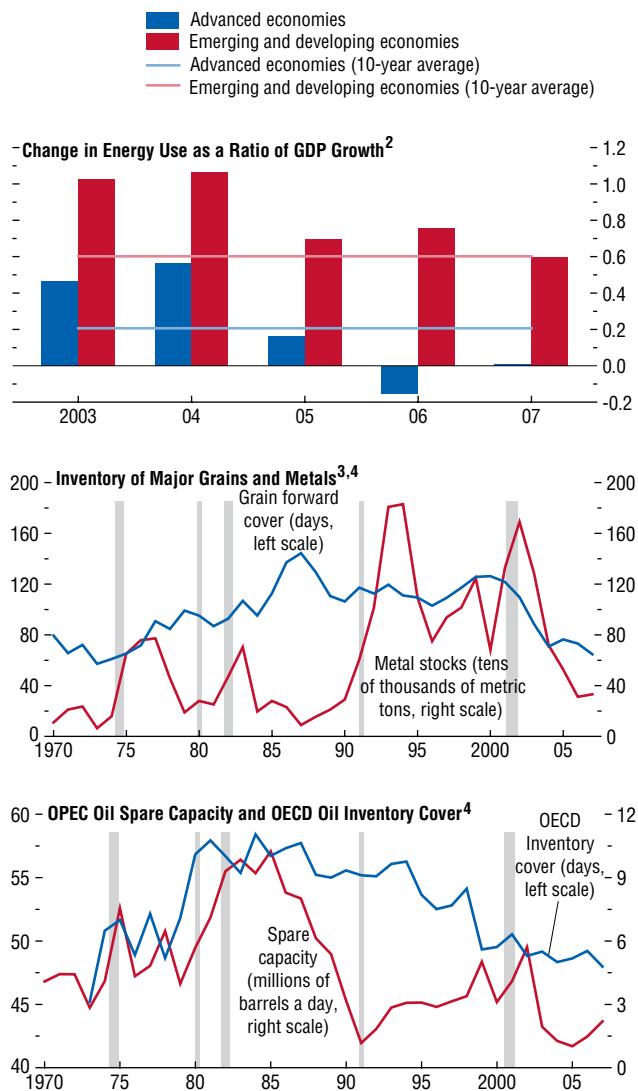
Source: IMF staff calculations.

<sup>1</sup>Deflated by U.S. consumer price index (CPI).

<sup>2</sup>Shading denotes periods of global recession (identified by a monthly index of global industrial production).

**Figure 3.2. Marginal Change in Energy Intensity, Commodity Inventories, and OPEC Oil Spare Capacity<sup>1</sup>**

Strong commodity-intensive growth in emerging and developing economies was a major factor behind declining inventory levels and low OPEC oil spare capacity.



Sources: British Petroleum Statistical Review of World Energy (2008); International Energy Agency; U.S. Department of Agriculture; U.S. Department of Energy; and IMF staff calculations.

<sup>1</sup>OPEC is the Organization of Petroleum Exporting Countries.

<sup>2</sup>Primary energy in millions of barrels of oil equivalent per GDP (expressed in billions of 2005 U.S. dollars).

<sup>3</sup>Grains include corn, rice, and wheat; metals include copper, lead, and zinc.

<sup>4</sup>Shading denotes periods of global recession (identified by a monthly index of global industrial production).

1990s, following two decades of low commodity prices.

A third factor common to both booms has been that supply constraints put upward pressure on prices. The abrupt rise in oil prices in December 1973, together with the temporary reduction in oil production during the embargo by the Organization of Petroleum Exporting Countries (OPEC), has become the textbook case of a commodity supply shock. In the current boom, weather-related crop failures, for wheat in particular, have boosted food prices. Such shortfalls also propelled food prices during the earlier boom (Figure 3.3).

In the current boom, the supply-side constraints in commodity sectors other than agriculture were not the result of sharp, temporary supply reductions, but instead reflected protracted, inelastic supply responses in the face of higher demand and rising prices. In the oil market and, to a lesser extent, in some metals markets, “time-to-build” lags appear to have increased during the current cycle, as discussed below. In the face of rapidly growing demand, this slow capacity expansion has led to a perpetuation of low inventory and spare capacity levels, which have sustained the pressure on prices. This feature of the current boom has given rise to the notion of a “supercycle” in commodity prices—a period with secular trend increases in commodity prices because of the need for a substantial buildup in capacity.<sup>5</sup>

Speculation—the purchase of commodities intended for resale at a higher price rather than for commercial use—has been widely seen as a factor driving up commodity prices during both booms.<sup>6</sup> In the 1970s, speculative inventory holdings appear to have risen for some

<sup>5</sup>See Cuddington and Jerrett (2008) for a recent analysis. More generally, lags in the response of supply (as well as demand) to unexpected price changes can lead to price cycles (see, for example, Krautkraemer, 1998), with the length and amplitude of a cycle depending on differences between long- and short-term price elasticities and the lag structure as well as the magnitude of the initial unexpected change.

<sup>6</sup>See Harrison and Kreps (1978) or Feiger (1976) on definitions of speculation.

commodities, notably metals (see, for example, Cooper and others, 1975). In the current boom, however, inventory holdings of key commodities have generally remained low or have even declined, suggesting that prices have not been driven up by a speculative shift toward holdings of real assets, as in the earlier boom. Despite recent financial innovation in commodity markets, such as indexing, which has allowed investors to benefit from rising commodity prices without having to maintain physical inventory holdings, there is little discernible evidence that the buildup of related financial positions has systematically driven either prices for individual commodities or price formation more broadly (Box 3.1).

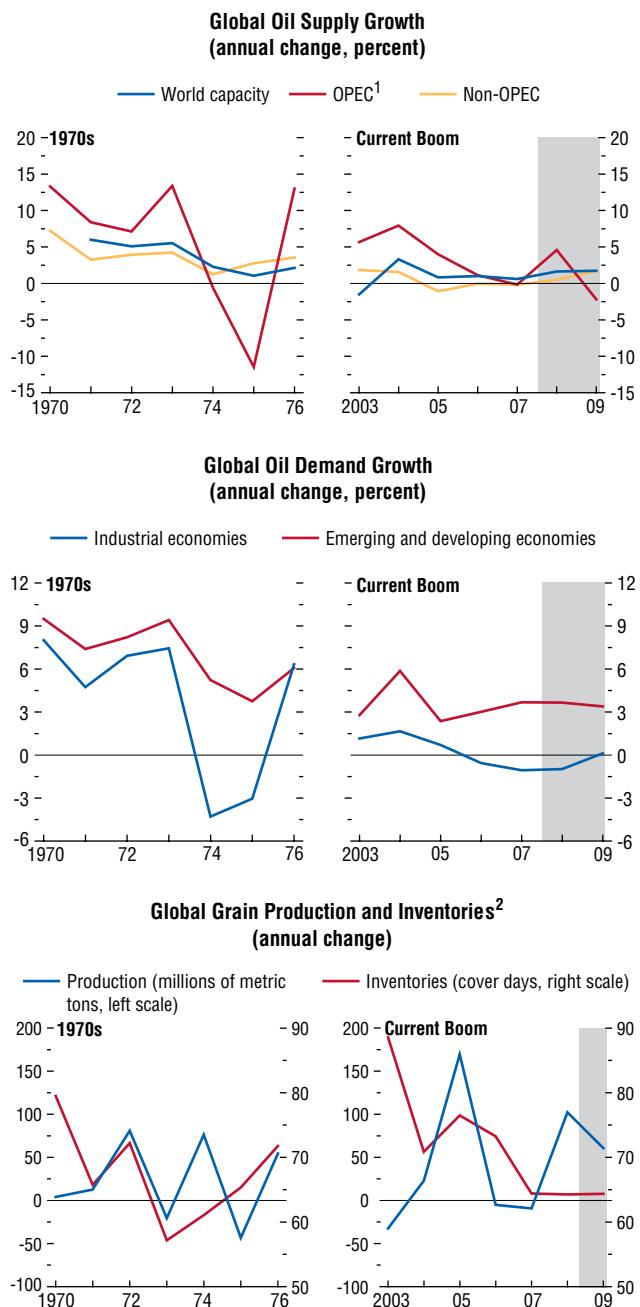
Nevertheless, financial factors and sentiment do play a role in commodity price formation. Financial variables such as interest rates affect commodity prices through their effects on physical demand and supply. Indeed, the recent decline in U.S. policy interest rates likely spurred commodity demand temporarily, as discussed below. Many commodity prices have traditionally been more flexible than either wages or prices for other goods, and therefore they tend to respond faster to such monetary policy impulses, with some scope for short-term price overshooting.<sup>7</sup> Moreover, because most commodities are storable, they are real assets, and their prices are thus affected not only by current market conditions but also by future expectations. In the short term, such expectations can be influenced by sentiment and investor behavior, which can amplify short-term price fluctuations, as in other asset markets.

Whether the current commodity price boom will continue depends on the extent to which the current alignment prevails: strong demand, low inventory and spare capacity levels, and supply constraints. There are indications that some elements of this constellation have started

<sup>7</sup>See Bordo (1980) on the commodity price response to monetary policy impulses, and Frankel (1986, 2006) and Akram (2008) on the effects of real interest rate changes on commodity prices.

**Figure 3.3. Grain and Oil Demand, Production, and Inventories in Comparison**

Strong demand and slow capacity expansion in key sectors, as well as supply disruptions for major crops, are aspects of both the current and the 1970s commodity price booms.



Sources: *British Petroleum Statistical Review of World Energy* (2008); U.S. Department of Agriculture; U.S. Department of Energy; and IMF staff estimates.

<sup>1</sup>Organization of Petroleum Exporting Countries.

<sup>2</sup>Grains include corn, rice, and wheat.

### Box 3.1. Does Financial Investment Affect Commodity Price Behavior?

Commodities have become an alternative asset class in recent years, with rapid growth in both open positions at futures exchanges and investments in commodity-indexed assets.<sup>1</sup> This financialization of commodity markets is often thought to have affected commodity price behavior, although views about the extent of influence vary widely among analysts. One perspective is that financialization of commodities is largely beneficial and improves market efficiency and price discovery. Another view is that recent commodity price surges are largely driven by speculators and herd behavior among investors looking for alternative asset classes. This box analyzes the potential impact of investment flows on commodity price behavior. Specifically, it considers whether the evidence supports the notion that speculation in commodity-related financial assets has driven the recent commodity price booms. To shed further light, it also considers how other aspects of price formation, such as price volatility and comovements, have been affected by increased financial flows.

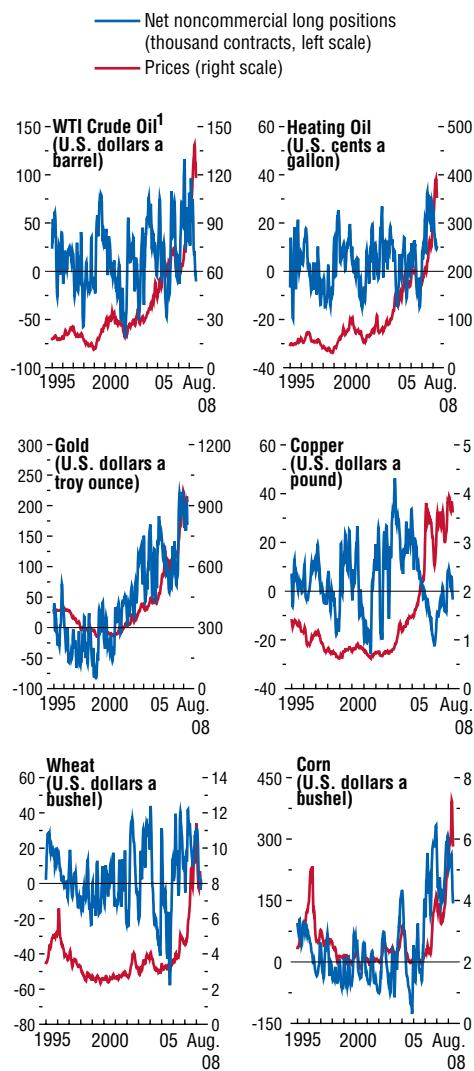
How do financial factors affect price formation? Financial markets can affect commodity prices through two channels. First, certain financial variables—such as exchange rates and interest rates—can directly affect commodity supply and demand. For example, a weakening U.S. dollar and lower interest rates could raise demand and reduce production of commodities, thereby exerting price pressures.<sup>2</sup> Second, transactions by financial investors, including speculators, might influence price behavior. A prominent controversy in this area relates to

The main author of this box is Kevin Cheng.

<sup>1</sup>For example, the open interest of crude oil futures traded in the New York Mercantile Exchange (NYMEX) has increased by 155 percent during 2003–08, with corresponding figures increasing by 63 percent for gold. Investment in commodity-related assets has increased from below \$10 billion in 1997 to about \$230 billion in the second quarter of 2008 (Barclays Capital, 2008).

<sup>2</sup>See, for example, Box 1.4 of the April 2008 *World Economic Outlook*.

#### Net Noncommercial Futures Positions and Prices (Four-week moving averages)



Sources: Bloomberg Financial Markets; U.S. Commodities Futures Trading Commission; and IMF staff calculations.

<sup>1</sup>WTI is West Texas Intermediate crude oil.

whether the recent commodity price boom has been underpinned by the rapid rise in investment in commodity-indexed assets by investors seeking to diversify their portfolios.

Because the fair value of commodities is difficult to determine, the issue of whether such behavior has driven prices away from fundamentals has been addressed through indirect approaches. One approach is to examine whether changes in commodity financial positions lead to commodity price changes using time-series analysis (“Granger causality tests”). Many recent studies in this vein, including in the October 2008 *Global Financial Stability Report* (IMF, 2008d), have not found evidence of systematic causality between positions and prices in either direction.<sup>3</sup> Indeed, the direction of financial flows is often inconsistent with the direction of price movements. For example, while crude oil prices rose sharply in May and June 2008, net speculative positions declined (first figure).

A second approach is to examine whether recent inventory behavior is consistent with the hypothesis that the recent price trends have been mostly driven by speculation. The basic intuition is as follows: For speculation to have a persistent effect on commodity prices, it must be accompanied by increasing physical hoarding of the commodities to keep spot markets in balance because consumption would decline at the higher prices (see Krugman, 2008). Available data, however, suggest that, although inventories for some commodities increased somewhat in recent years, inventories for other commodities that had significant price appreciation declined or remained broadly stable (second figure, upper panel). In particular, although crude oil prices almost doubled during 2007–08, crude oil inventories among Organization for Economic Cooperation and Development (OECD) member countries remained flat during 2008. Overall, therefore, there is little evidence of a systematic inventory hoarding of commodities, although a caveat is that data on commodity inventories are poor and lack global coverage.

<sup>3</sup>See also Box 5.1 of the September 2006 *World Economic Outlook* or the *Interim Report on Crude Oil* by the Interagency Task Force on Commodity Markets (ITC, 2008).

A third approach to assessing the impact of financial investment is to gauge the cross-sectional relationship between price formation and investor activities before and after the financialization of commodities. To shed further light, this box examines the relationship between financialization and price levels across markets. It also extends the analysis to two other aspects of price formation:

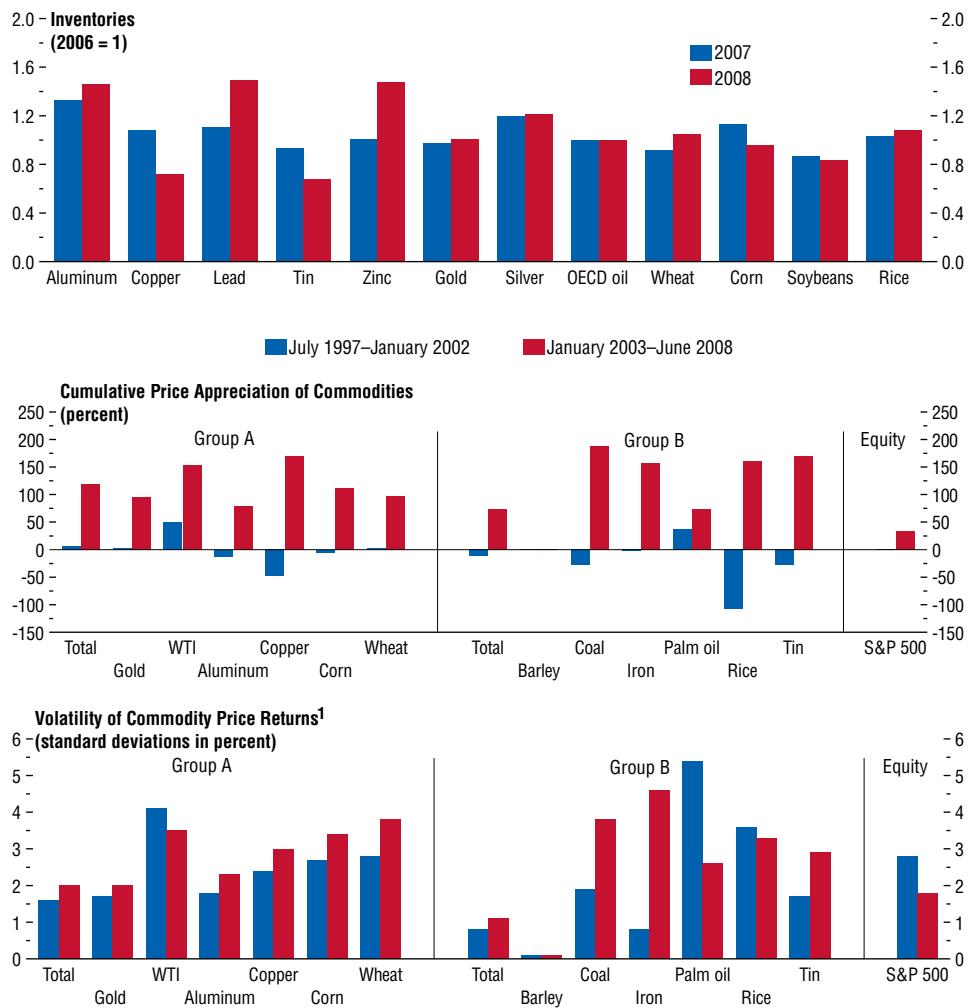
- *Volatility:* The impact of speculators on price volatility has long been a source of controversy among economists. Some noteworthy economists—including Adam Smith, John Stuart Mill, and Milton Friedman—have argued that speculators provide liquidity, facilitate price discovery, and improve intertemporal allocation of resources by buying low and selling high, thereby stabilizing prices. Others contend that market participants can often be “irrational,” trading based on emotion, heuristics, and herd mentality, thereby increasing market volatility.

- *Price comovement:* Another hypothesis is that enhanced financialization of commodities can raise the degree to which commodity prices move together. The reason is that increased financial flows can amplify exposure of commodities to some common financial shocks, such as exchange rate and interest rate movements. Moreover, investors may lack familiarity with individual commodities, thereby leading them to allocate funds to commodities as a whole (the habitat/category theory). For example, investors can invest in commodities by buying a commodity index, which allocates funds across various commodities according to some specified weights, rather than by investing in specific commodities about which they may lack knowledge. Moreover, financialization of commodities can increase the correlation—either positive or negative—between commodity prices and other asset prices, such as equity prices, purely on account of overall financial market conditions.

To examine the possibility of a price impact, properties of weekly commodity price returns (weekly changes of price in logarithms) of

**Box 3.1 (continued)**

**Inventories, Price Changes, and Volatility**



Sources: Bloomberg Financial Markets; International Energy Agency; London Metal Exchange; U.S. Department of Agriculture; and IMF staff calculations.

<sup>1</sup>An F-test at the 5 percent significance level indicates that the standard deviations of the two periods are statistically different, except for rice.

50 commodities are examined before and after the takeoff in commodity investment. Because the recent commodity price and investment booms began roughly in 2003, the focus period is January 2003–June 2008, with the control period being July 1997–December 2002. To

distinguish the extent of financialization, commodities are divided into two groups:

- *Group A*: These are commodities heavily traded in the financial markets. Specifically, a commodity is included in Group A if it is included in one of the four major commodity

indices.<sup>4</sup> A total Group A price index is computed based on the average weights of the underlying four commodity indices. Also, six individual commodities within the group are examined in greater detail: gold, WTI crude oil, aluminum, copper, corn, and wheat.

- *Group B:* This includes all the commodities in the IMF commodity index that are not included in Group A.<sup>5</sup> In addition to the total Group B price index calculation based on the IMF commodity weights, six of these are examined in greater detail: barley, coal, iron ore, palm oil, rice, and tin.

#### **Price Level**

Prices of Group A commodities rose by less than 6 percent between 1997 and 2002, but they increased by about 120 percent during 2003–08. Group B prices fell by about 12 percent during the first period, but rose by almost 75 percent during the second period (first figure, middle panel). Indeed, many commodities without significant futures markets—such as iron ore and rice—have experienced more price appreciation than those with sizable futures markets, such as gold and crude oil. Furthermore, a simple cross-sectional regression indicates an almost flat and slightly negative relationship between price changes and changes in the speculative net long positions<sup>6</sup> during 2003 (third figure, upper panel).

<sup>4</sup>The four commodity indices examined are the S&P Goldman Sachs Commodity Index, Deutsche Bank Commodity Index, Dow Jones–AIG Commodity Index, and UBS Bloomberg Constant Maturity Commodity Index. Commodities included in Group A are Brent crude, natural gas, West Texas Intermediate (WTI) crude, gas oil, unleaded gasoline, heating oil, aluminum, copper, gold, lead, nickel, silver, zinc, cocoa, coffee, corn, cotton, lean hogs, beef, orange juice, soybean oil, soybeans, soybean meal, sugar, and wheat.

<sup>5</sup>These include bananas, barley, coal, fish, fish meal, groundnuts, hard logs, hard sawed wood, hides, iron ore, lamb, olive oil, palm oil, poultry, rapeseed oil, rice, rubber, shrimp, soft logs, soft sawed wood, sunflower oil, tea, tin, uranium, and wool.

<sup>6</sup>Following the classification of futures positions by type of trader by the U.S. Commodity Futures Trading

#### **Price Volatility**

To gauge if greater financial investment has destabilized markets by increasing price volatility, measures of price volatility (standard deviations) were computed for each commodity group before and after 2003 (second figure, lower panel). The results are mixed. First, price volatilities for most commodities in Group A were higher after 2003, with the notable exception of crude oil, which has significantly declined despite being heavily traded. Second, volatilities for most commodities in Group B have also risen, despite the fact that they are not heavily financially traded, which suggests that the volatility increases in Group A may reflect factors other than the financialization of commodities. Furthermore, a simple cross-sectional equation is estimated by regressing return volatilities on changes in open interests of commodity futures during 2003–08.<sup>7</sup> The results indicate a positive but weak relationship between return volatilities and the extent of financialization, suggesting that price volatility may be better linked to other variables, such as market tightness, stock levels, or geopolitical risks<sup>8</sup> (third figure, lower panel).

#### **Price Comovement**

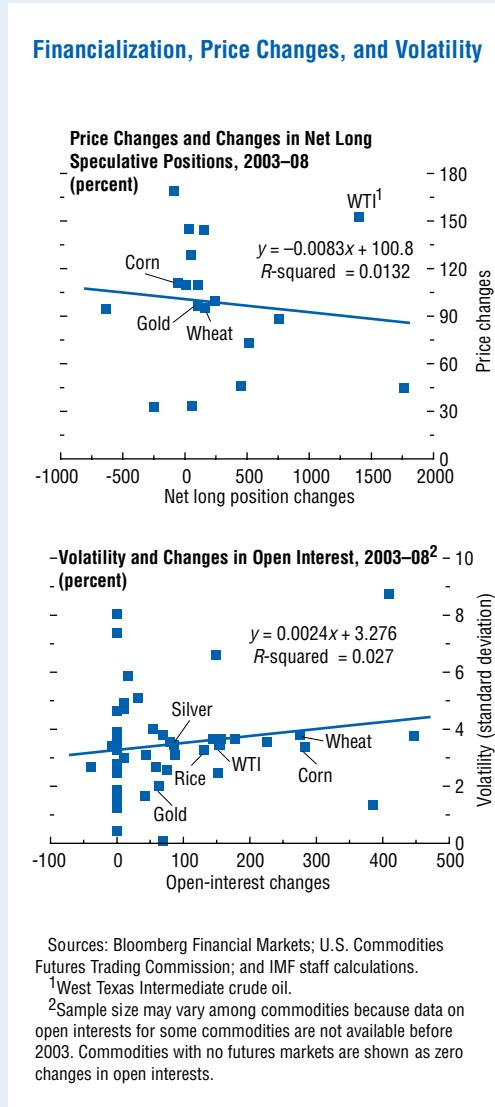
To gauge if there has been an increase in comovement of commodity prices and stock prices, weekly returns of selected commodities were regressed on a constant and an “explanatory” variable—including a return of another commodity within the same group,

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Commission (CFTC), net noncommercial futures positions are used as a measure of speculative positions in commodity futures markets. These positions are defined as the net of long and short positions of noncommercial traders.

<sup>7</sup>An open interest—defined as the total number of options and/or futures contracts that are not closed or delivered on a particular day—is used as a proxy for the degree of financialization.

<sup>8</sup>Haigh, Hranaiova, and Overdahl (2007) also find no evidence that increased commodity hedge fund trading has raised price volatility.

**Box 3.1 (concluded)**

the return of the total group index (excluding the individual commodity under investigation), or the return of the S&P 500 stock market index. The extent of comovement is measured by the coefficient of determination or  $R^2$ . Intuitively, if comovements were primarily driven by commodity investment, especially indexing, the  $R^2$  for Group A commodities should be higher than for Group B and

should increase after 2003, as financialization accelerated.<sup>9</sup>

The results do suggest increasing price comovements among some of the more financialized commodities (table). Overall, Group A commodities demonstrate a higher comovement than those in Group B both before and after 2003. Moreover, on average, comovement among Group A commodities has increased to a greater extent than among Group B commodities. Most notably, the explanatory power of gold returns for other Group A returns has increased significantly, rising from about 2 percent during 1997–2002 to over 20 percent during 2003–08, suggesting that gold increasingly comoves with other commodities in Group A. However, the explanatory power of crude oil for other Group A commodities has declined significantly since 2003.<sup>10</sup> Finally, commodity returns in both groups do not seem closely related to stock returns in either period.<sup>11</sup>

In summary, although financialization may have led to increases in comovement between some commodities, particularly with respect to gold, no apparent systematic connection is found to either price volatility or price changes. These findings are consistent with recent studies in the area by the CFTC and others. Thus, there is little evidence to suggest that trading in futures markets has driven the price run-up or has destabilized the commodity markets during the first half of 2008.

<sup>9</sup>As a caveat, given the interlinkages among commodities (such as production-consumption substitution), it is possible that financialization could affect Group B indirectly through Group A, even though Group B commodities are not heavily traded. See, for example, Adrangi and Chatrath (2006) for more details.

<sup>10</sup>Using monthly data, however, WTI crude oil has a high explanatory power—over 30 percent—for other commodity returns in Group A, reflecting energy cost pass-through over a longer horizon.

<sup>11</sup>Büyüksahin, Haigh, and Robe (2008) also find that the relation between the returns on investable commodity and U.S. equity indices has not changed significantly in the past 15 years.

### Comovement among Returns (*R*-squares in percent)<sup>1</sup>

|                                | Group A                        |          |          |        |      |                               |  |            |          |          |        |      |         |
|--------------------------------|--------------------------------|----------|----------|--------|------|-------------------------------|--|------------|----------|----------|--------|------|---------|
|                                | July 4, 1997–December 27, 2002 |          |          |        |      |                               | January 3, 2003–June 27, 2008 <sup>3</sup> |            |          |          |        |      |         |
|                                | Gold                           | WTI      | Aluminum | Copper | Corn | Wheat                         | Group A                                    | Gold       | WTI      | Aluminum | Copper | Corn | Wheat   |
| WTI crude                      | 0.9                            |          |          |        |      |                               |  |            |          | 6.6*     |        |      |         |
| Aluminum                       | 0.8                            | 2.1      |          |        |      |                               |  |            |          | 23.4*    | 4.8    |      |         |
| Copper                         | 2.9                            | 1.6      | 43.4     |        |      |                               |  |            |          | 19.5*    | 3.5    | 34.6 |         |
| Corn                           | 1.1                            | 0.1      | 0.2      | 0.0    |      |                               |  |            |          | 3.4      | 0.1    | 1.6* | 1.2     |
| Wheat                          | 0.5                            | 0.5      | 0.3      | 0.5    | 40.6 |                               |  |            |          | 4.7      | 0.5    | 1.0  | 1.9     |
| Group A <sup>2</sup>           | 2.3                            | 7.2      | 0.5      | 40.1   | 2.5  | 36.5                          |  |            |          | 21.0*    | 0.9*   | 2.5* | 28.1*   |
| S&P 500                        | 0.0                            | 0.6      | 0.2      | 0.2    | 0.0  | 0.3                           | 0.5  |            |          | 0.1      | 0.1    | 0.6  | 0.0*    |
| <b>Average</b>                 | <b>6.7</b>                     |          |          |        |      |                               |  | <b>7.2</b> |          |          |        |      | 17.6    |
| Group B                        |                                |          |          |        |      |                               |  |            |          |          |        |      |         |
| July 4, 1997–December 27, 2002 |                                |          |          |        |      | January 3, 2003–June 27, 2008 |  |            |          |          |        |      |         |
| Barley                         | Coal                           | Iron ore | Palm oil | Rice   | Tin  | Group B                       | Barley                                     | Coal       | Iron ore | Palm oil | Rice   | Tin  | Group B |
| Coal                           | 0.0                            |          |          |        |      |                               |  | 0.0        |          |          |        |      |         |
| Iron ore                       | 0.4                            | 0.0      |          |        |      |                               |  | 1.3        | 0.8      |          |        |      |         |
| Palm oil                       | 2.0                            | 0.2      | 0.1      |        |      |                               |  | 0.2        | 0.0      | 0.2      |        |      |         |
| Rice                           | 0.0                            | 0.1      | 0.0      | 0.0    |      |                               |  | 0.0        | 0.2      | 0.1      | 0.4    |      |         |
| Tin                            | 0.1                            | 0.2      | 0.1      | 0.1    | 0.4  |                               |  | 0.5        | 0.4      | 0.3      | 0.0    | 0.2  |         |
| Group B <sup>2</sup>           | 0.4                            | 56.3     | 0.0      | 17.4   | 0.1  | 0.4                           |  | 0.6        | 73.1*    | 0.1      | 0.0*   | 1.1  | 0.2     |
| S&P 500                        | 0.9                            | 1.0      | 0.3      | 0.1    | 0.4  | 0.0                           | 1.4  | 0.7        | 2.7      | 0.0      | 0.4    | 0.1  | 0.8     |
| <b>Average</b>                 | <b>2.9</b>                     |          |          |        |      |                               |  | <b>3.1</b> |          |          |        |      | 2.3     |

Sources: Bloomberg Financial Markets; and IMF staff calculations.

<sup>1</sup>A higher *R*-square indicates higher comovement. In bivariate regressions, *R*-squares are invariant to the choice of left- and right-hand-side variables. For example, regressing gold on WTI yields the same *R*-square as regressing WTI on gold.

<sup>2</sup>Excluding the commodity of the column under investigation.

<sup>3</sup>An asterisk indicates that there is a structural break between the two periods according to the Chow test at the 5 percent significance level.

to unwind. Prospects for slowing global growth in 2008–09, the resolution of weather-related supply constraints for key food crops, and increased oil supply have led to some easing of commodity prices since mid-July. However, inventories and spare capacity both remain low, growth momentum in the large emerging economies remains strong, and some supply constraints still exist, which, barring a more severe global downturn, will likely limit the extent of further easing and provide for continued price volatility.

Within this general outlook, prospects vary for individual commodities. Fundamentally, these cross-commodity variations reflect different characteristics (such as a commodity's storability or its relative position in the stages of

production) and the fact that supply problems and inventory conditions tend to be commodity-specific. The role of common factors in short-term commodity price fluctuations is generally limited even during booms, as reflected in the wide differences in the magnitude and timing of price increases (Table 3.1). Against this backdrop, the chapter now turns to developments and prospects for the two commodity groups that are most relevant for the global inflation outlook: oil and food.

### Will Slowing Growth Ease Oil Prices?

By mid-July 2008, oil prices had risen well above previous highs, to some 30 percent above the previous December 1979 record in

**Table 3.1. Contributions of Common Factors to Commodity Price Fluctuations<sup>1</sup>**  
*(In percent)*

|                                  | Booms               |         |                   |   |  |
|----------------------------------|---------------------|---------|-------------------|---|--|
|                                  | 1970–2008<br>(June) | 1972–74 | 2003–08<br>(June) | “Great Moderation Period”<br>1984–2008 (June) | “Period with No Oil Shocks” <sup>2</sup><br>1992–2002 (June) |
| Crude oil                        | 1.6                 | 1.9     | 3.6               | 2.6   | 3.2  |
| Metals                           | 37.9                | 29.6    | 34.5              | 27.7  | 63.7   |
| Agricultural raw materials       | 23.9                | 1.3     | 21.8              | 13.0  | 12.5   |
| Food                             | 16.7                | 1.2     | 23.9              | 24.7  | 15.2   |
| Meat                             | 8.3                 | 0.5     | 26.7              | 9.7   | 6.8  |
| Cereals                          | 18.9                | 1.7     | 11.9              | 22.8  | 12.4   |
| Vegetable oils and protein meals | 24.3                | 0.7     | 28.5              | 42.6  | 25.9   |
| Other foods                      | 7.8                 | 3.0     | 24.5              | 6.9   | 5.2  |
| Beverages                        | 11.2                | 2.2     | 28.0              | 7.5   | 2.4  |

Sources: IMF, Primary Commodities database; and IMF staff calculations.

<sup>1</sup>Contributions are based on the first principal component of logarithmic changes of prices of 38 primary commodities in team terms (corrected for serial correlation and standardized).

<sup>2</sup>See Kilian (2008).

real terms, but have fallen since then. The rise in oil prices since early 2007 mirrored a noticeable tightening in market balances in a context of low buffer levels (low inventories, little spare capacity). OPEC production through most of 2007 was below 2006 levels, and non-OPEC production declined in the second half of 2007, while global oil demand continued to expand at a broadly unchanged pace. When oil market capacity is so tightly stretched, relatively small unexpected shifts in global supply (or demand) can have large price effects, given the generally very low short-term price responsiveness of oil demand.<sup>8</sup> During

<sup>8</sup>Short-term price elasticities of oil demand are generally believed to be low. The U.S. Department of Energy (Costello, 2006) considers them to be in the range of 0.01 to 0.04 (absolute values)—whereas income elasticities are much higher. Similarly, Hamilton (2008) reports elasticities of 0.03 to 0.07 (absolute values), and values ranging from 0.03 to 0.08 were reported in the September 2005 *World Economic Outlook*. As a result, income effects have dominated price effects in oil demand. In a simple demand model with exogenous supply that ignores nonlinearities from low inventories and intertemporal considerations, such price elasticities imply that a reduction in oil production of 0.5 million barrels a day—roughly the amount of the reduction in non-OPEC supply during the second half of 2007—should lead to prices that are 10–60 percent higher (the calculations are based on 2007 production data). If longer-term price elasticities are higher than short-term ones, prices will overshoot their long-term increase in response to a supply reduction.

the past year and a half, the price impact of shifts in global demand has been reinforced by the decreased pass-through to domestic prices in emerging and developing economies, which further reduced the already low short-term price elasticity of global oil demand.<sup>9</sup> Other contributing factors include rising risks of supply disruptions in some major producers and geopolitical concerns.

Growing expectations that medium-term oil-market conditions will remain tight were likely an important factor in price increases during the past year. The pace of capacity expansion has been slow and has consistently fallen short of expectations in recent years, particularly outside OPEC (Figure 3.4, top panel).<sup>10</sup> A broad consensus has emerged that the buildup of production capacity needed to accommodate the anticipated robust expansion of emerging and developing economies will remain sluggish because of cyclical, technological and geological, and policy

<sup>9</sup>Oil consumers in many countries have been increasingly sheltered from rising world market prices. In a sample of 43 emerging and developing economies, fewer than half allowed full pass-through during 2007 (compared to three-quarters in 2006). See IMF (2008b).

<sup>10</sup>Capacity constraints in the downstream oil sectors, notably in refining, have also contributed to rising oil prices. However, the longer-term supply issues discussed here primarily relate to upstream investment, which is where the long-term constraints are most severe.

constraints.<sup>11</sup> In effect, the time-to-build lags noted above have lengthened, although the scope to eventually achieve such a buildup remains in place—as reflected in the broadly constant ratio of proven oil reserves to current production, a measure of the long-term scarcity of oil (Figure 3.4, middle panel). Even so, future capacity will be built at a much higher cost than in the past, because of the sharply rising extraction costs in marginal fields, which have a substantial permanent component (Figure 3.4, bottom panel).

Even relatively small downward revisions in the expected path of future supply expansion caused by increased pessimism can imply large increases in expected future prices, given the relatively low price elasticity of oil demand noted above.<sup>12</sup> Such expectations of higher prices must be reflected in higher spot prices today. Otherwise, producers would have incentives to leave oil reserves in the ground, and traders would have incentives to accumulate inventories, which could be sold later at higher prices. It is for this reason that some observers have referred to recent oil price increases as an “expected supply shock,” that is, a response to tighter medium-term market conditions (see, for example, Clarida, 2007).

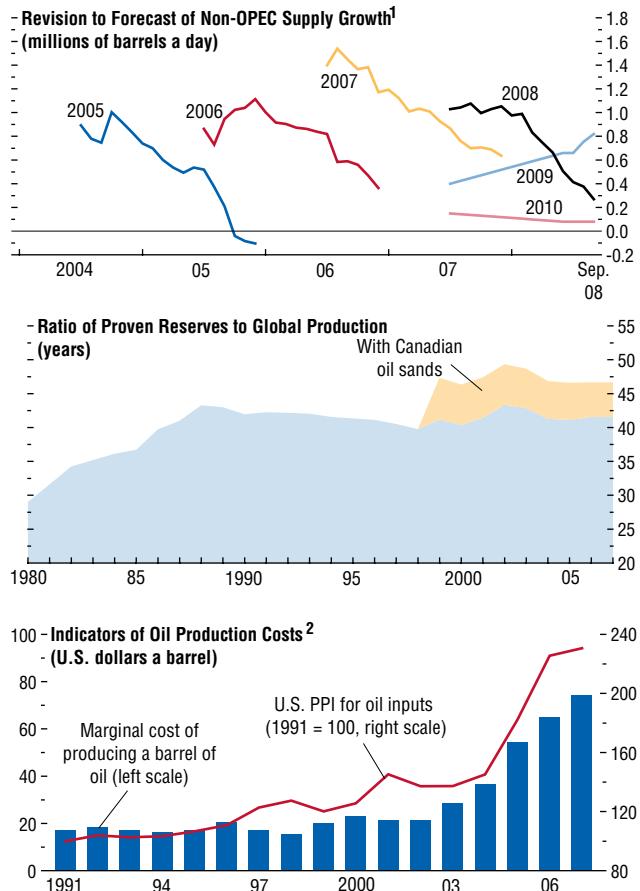
What about the role of financial factors? Speculation and commodity financial investment are frequently mentioned as factors in recent oil price increases. However, there is little clear evidence that these factors have any systematic price impact. Both investment inflows into energy and oil funds and the net futures market positions of noncommercial investors, for example, peaked in late 2007 and have since declined. Nevertheless, shifts in sentiment may well have some impact on short-term price dynamics, particularly given the lack of timely information about global market conditions. In addition, recent financial

<sup>11</sup>See Box 1.5 in the April 2008 *World Economic Outlook*.

<sup>12</sup>A more inelastic medium-term supply response because of longer time-to-build lags also implies that upward revisions to the expected path of global demand should have a larger impact on current spot prices.

### Figure 3.4. Oil Supply Developments

Oil production, which has consistently fallen short of expectations over the past four years amid high production costs, has fostered concerns that tight market conditions will last for some time, despite adequate reserve levels.



Sources: Bloomberg Financial Markets; *British Petroleum Statistical Review of World Energy* (2008); Goldman Sachs Global, Inc. Equity Group; International Energy Agency; U.S. Bureau of Labor Statistics; U.S. Department of Energy; and IMF staff calculations.

<sup>1</sup>The forecast refers to a simple average from the Organization of Petroleum Exporting Countries (OPEC), the International Energy Agency, and the U.S. Energy Information Administration at the time of the forecast.

<sup>2</sup>Marginal cost is defined as the average of the highest-cost (or bottom quartile) producers, based on a survey of listed oil companies. The producer price index (PPI) for oil inputs refers to the unweighted average of drilling oil and gas wells, oil and gas operation support activities, and oil field machinery and equipment.

conditions likely exerted some upward pressure. Both U.S. dollar depreciation and the decline in real policy interest rates tend to push oil prices upward. The effects are primarily short-term, with scope for overshooting, but longer-term effects are possible through the effects on physical oil demand and supply.<sup>13</sup>

Oil prices have eased recently on (1) increased OPEC production (primarily in Saudi Arabia); (2) data signaling a continued decline in U.S. oil demand that seems to reflect a growing demand response to high prices and not just slowing income; (3) prospects for lower growth in other major advanced economies; and (4) less-supportive financial conditions, given the U.S. dollar rebound. Looking ahead, oil demand growth is likely to moderate with the slower global growth envisaged for the second half of 2008 and for 2009. If recent production increases are sustained, near-term market conditions will thus be less tight and will support a decrease in prices below recent peaks, with some scope for further downward adjustment if the global downturn intensifies or the demand response to high prices further strengthens in advanced economies. Nevertheless, supply constraints and continued strong growth in emerging economies are likely to keep prices both well above pre-boom levels and subject to continued volatility.

### High Food Prices Reflect a Combination of Permanent and Temporary Factors

The food price boom that began around mid-2006 intensified during the first four months of 2008, driven largely by increases in the prices of six key food commodities: corn, wheat, rice,

<sup>13</sup>Effective U.S. dollar depreciation can exert upward pressure on commodity prices through a number of channels. The empirical analysis in Box 1.4 in the April 2008 *World Economic Outlook* suggests that a 1 percentage point depreciation raises oil prices (in U.S. dollars) by more than 1 percentage point. Lower short-term real interest rates reduce inventory holding costs and could induce shifts from money market instruments to commodities and other higher-yielding assets. See Bordo (1980), Frankel (1986, 2006), and Akram (2008).

soybeans and related products, rapeseed oil, and palm oil. Together, these commodities account for over 80 percent of the rise in the IMF's food price index since early 2006, despite having a weight of only 40 percent.

The decline in global inventory levels for these food commodities over the past few years was important in setting the stage for the price surges. On the supply side, there was a decline in yield growth rates after the mid-1980s, attributable in part to declining relative prices and low investment rates (Figure 3.5, top panel). The high levels of protection in agriculture in advanced economies and the bias in public expenditures in developing economies toward subsidies (instead of investment in agricultural infrastructure and research) contributed to this trend.<sup>14</sup> On the demand side, there was a strong pickup in consumption, driven by rapid income growth in emerging and developing economies (Figure 3.5, middle panel).<sup>15</sup>

This analysis seeks to estimate the relative roles of a number of supply and demand factors in explaining the price increases of these six food commodities during 2006–08 (Figure 3.5, bottom panel). As a caveat, the exercise is based on simple partial equilibrium analysis and does not incorporate the price-driving effects of low inventories. Moreover, the uncertainty involved is considerable, given complex interactions across markets and time.<sup>16</sup>

- *Weather Shocks:* A series of weather-related supply shocks in 2006 and 2007, which occur less frequently than once a decade on average, severely reduced average wheat and rapeseed yields for two years. These include drought

<sup>14</sup>In the OECD countries, progress has been slow in reducing overall support during the past 20 years, with the average transfer to agricultural producers as a share of farm-gate prices falling from 37 percent to 30 percent in 2005. See World Bank (2007).

<sup>15</sup>The composition of demand has also changed toward protein-rich foods, feeds, and oils in line with consumption trends in developing economies.

<sup>16</sup>The methodology is described in more detail in Appendix 3.2. Unless otherwise stated, references are to crop years (with the 2007 crop year running from mid-2007 to mid-2008).

damage, particularly to wheat crops in Australia, eastern Europe, and northern Africa, which accounted for about 20 percent of the increase in wheat prices since 2006.<sup>17</sup> The impact of weather shocks is generally temporary; indeed, the wheat area planted for the 2008 crop year has risen sharply in response to high prices in the United States (Trostle, 2008).

- **Biofuel Production:** Soaring demand from biofuel producers for corn and some vegetable oils was a second factor boosting food prices. Biofuel production expanded rapidly in response to rising fuel prices, as well as to ambitious biofuel mandates, government subsidies, and tariff protection in major advanced economies.

In particular, corn-based ethanol production soared in the United States. Almost 30 percent of the U.S. corn crop was diverted toward the production of biofuels during 2006–07, and this share is projected to rise to 36 percent in 2008. Despite a strong production response, the additional demand pressure is estimated to account for some 25–45 percent of the rise in international corn prices during this period, given a range of plausible values for the price elasticity of demand. Looking ahead, demand pressures from ethanol will likely continue to exert a rising effect on food prices unless policies are changed.

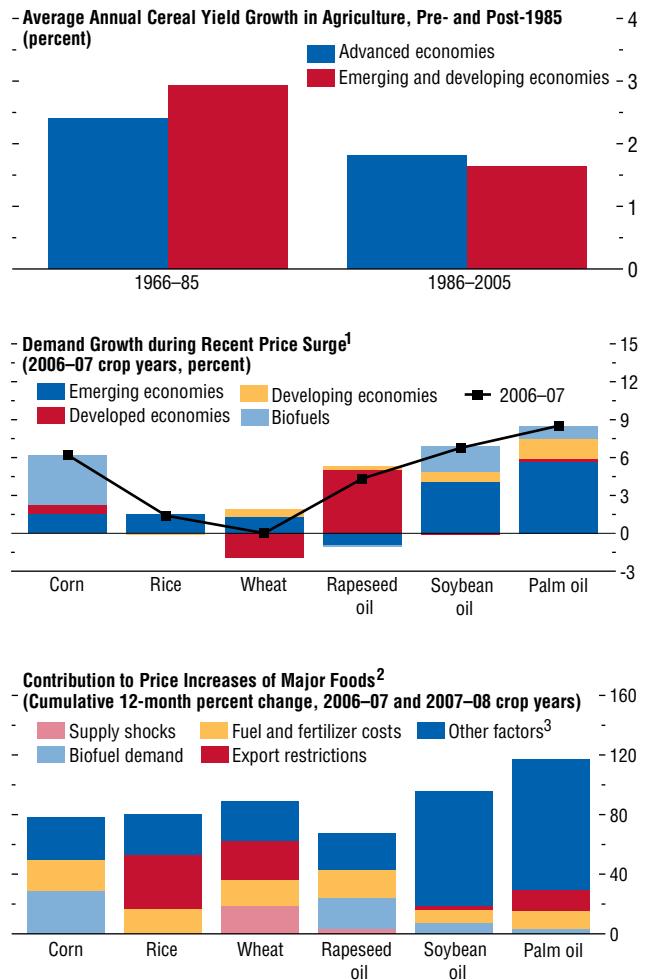
The price effect of biofuel production on rapeseed oil—the main biodiesel feedstock in Europe—has become less important over time. A reduction of EU subsidies amid a reexamination of biofuel policies and soaring vegetable oil prices rendered many biodiesel plants unprofitable, and demand for rapeseed oil for biodiesel use declined during 2007.<sup>18</sup> Moreover, rapeseed oil repre-

<sup>17</sup>Indeed, without the bumper crops in soybeans, wheat, and corn in 2005, the price surge might well have occurred earlier.

<sup>18</sup>About 20 percent of global rapeseed oil demand is currently diverted toward biodiesel production. Use of soybean oil and palm oil for biodiesel production also

**Figure 3.5. Price Trends of Major Foods**

The recent price surge followed a period of declining yield growth in grains amid sluggish investment in agriculture. Recent demand growth, mostly from emerging economies, has shifted toward soybean oil and palm oil. In addition to biofuel growth, the price surge reflects a confluence of factors.



Sources: Food and Agriculture Organization; U.S. Department of Agriculture; World Bank (2007); and IMF staff calculations.

<sup>1</sup>Demand growth from biofuels is excluded from the calculation for country groups.

<sup>2</sup>See Appendix 3.2 for details on the calculations.

<sup>3</sup>Including spillovers and substitution effects.

grew in during this period but remained a very small fraction of total global use (an estimated 9 percent and 3 percent in 2006 and 2008, respectively).

**Table 3.2. Selected Indicators of Spillovers across Major Food Commodity Prices**

|   | Corn  | Rice | Wheat | Soybean Oil | Rapeseed Oil | Palm Oil |
|---|-------|------|-------|-------------|--------------|----------|
| Estimated percent price change resulting from a 1 percent increase in the price of foods used for biofuels <sup>1</sup> |       |      |       |             |              |          |
| Corn  | 1.00  | 0.23 | 0.19  | 0.78        | —            | —        |
| Rapeseed oil  | —     | —    | 0.62  | 1.19        | 1.00         | —        |
| Concordance statistic of cyclical comovement <sup>2</sup>   |       |      |       |             |              |          |
| With corn (Jan. 1957–May 2008)  | 100** | 82** | 61*   | 71**        | 74**         | 66**     |
| With rapeseed oil (Jan. 1980–May 2008)  | 74**  | 76** | 46    | 82**        | 100**        | 78**     |
| Memorandum items (2007 crop year)   |       |      |       |             |              |          |
| Share of global production exported   | 13    | 6    | 18    | 29          | 10           | 72       |
| Share of fuel and fertilizers in total production costs <sup>3</sup>  | 32    | 30   | 25    | 12          | 30           | 14       |

Sources: USDA (2008); Food and Agriculture Organization's online database, FAOSTAT; Fedepalma (2008); North Carolina Solar Center (2006); and IMF staff calculations (see Appendix 3.2 for details).

<sup>1</sup>Derived from composite estimate of elasticities of substitution.

<sup>2</sup>The concordance statistic measures the proportion of time that prices of two commodities are in the same phase, with a range between 0 and 100. A high value implies that their cycles are more synchronized, suggesting the two commodities are highly substitutable (Cashin, McDermott, and Scott, 1999). \* = significance at the 10 percent level. \*\* = significance at the 5 percent level.

<sup>3</sup>Production costs for soybean oil and rapeseed oil refer to corresponding plant crop. Share of fuels used for transport not included.

sents only a small and declining share of the market for edible oils.

- *Pass-Through of Higher Energy Costs:* A third factor pertains to the pass-through of higher energy costs directly to food prices, estimated to have accounted for about 20 percent of the rise in the prices of the six commodities. Agricultural production costs have been pushed higher by an almost tripling of fertilizer prices and a doubling of fuel prices since mid-2006. This is particularly true for corn, rapeseed, and rice, which are particularly energy-intensive crops.
- *Trade Policy:* More-restrictive trade policies have been a fourth factor pushing up food prices. Growing concerns about the domestic impact of rising food prices led a number of major food-exporting countries to impose export restrictions starting in mid-2007. The restrictions had a particularly strong effect on rice prices—accounting for about half of the overall price increase according to IMF staff estimates—but they also affected the prices of wheat and, to a lesser extent, palm oil and soybean oil. These policies also led to some short-term price overshooting, as they reportedly triggered panic buying

and inventory hoarding.<sup>19</sup> Many of these restrictions were subsequently removed, and some countries have released stocks. The removal of restrictions is likely to continue with more favorable harvests for rice and wheat.

Overall, the most important direct factor driving up food prices since 2006 has been rising energy costs, with trade restrictions following as a close second. However, the direct effects of these factors do not account for all of the observed increases in the prices of the affected crops. Mutually reinforcing indirect effects, which operate mainly through supply and demand substitution channels, have also contributed. Table 3.2 illustrates the spillover effects from the price increases for corn and rapeseed oil (which are inputs for biofuels), using demand and supply cross-price elasticities. The results suggest that these effects are particularly important in explaining price increases for soybeans and related products: a

<sup>19</sup>Such effects are common when international markets are segmented and the share of trade in total production is small, as it is the case for rice, but they are not considered in the estimates. See FAO (2008).

1 percent increase in corn prices, all else equal, raises soybean prices by about three-quarters of a percent, as farmers substitute acreage from soybeans to corn and consumers switch from corn to soybean meal.<sup>20</sup> If it were assumed that the increase in corn prices was unrelated to price rises for the other major foods, the indirect effects of higher corn prices would account for some 60 percent of the increase in soybean prices and about 20 percent of the increases in rice and wheat prices.

The resolution of weather-related supply disruptions in the current crop year and removal of export restrictions have already led to some easing of food prices. However, the pressure on food prices from high oil prices and further increases in biofuel production will likely remain, limiting the extent of the easing, and low inventories will continue to contribute to price volatility. Indeed, because of these more permanent factors, the duration of the present boom has already exceeded the length of the average food price boom by 12 months (Figure 3.6).

### Commodity Price Shocks and Inflation

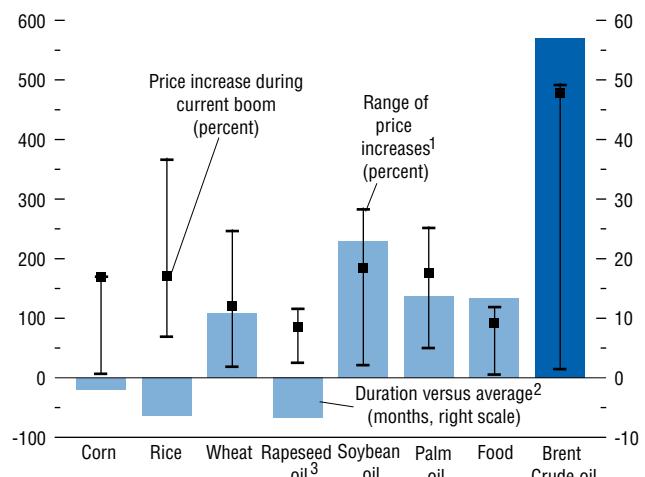
Can the large relative price adjustments implied by the recent commodity price surges be accommodated without ratcheting up underlying inflation? The main concern is that a lengthy period of high headline inflation following the commodity price surges may unhinge inflation expectations.<sup>21</sup> The broad context for such concern is the contrast in commodity price behavior during two key episodes in recent history. During the “great mod-

<sup>20</sup>Consumers in this case would be mostly meat and poultry producers, who use cornmeal and soymeal as animal feed.

<sup>21</sup>While relative price shifts do not generally lead to sustained changes in the overall price level, large and persistent temporary shocks, especially to the prices of essential commodities, may unhinge inflation expectations and spill over into underlying inflation. For a more formal discussion of the relationship between relative price changes and overall inflation, see Ball and Mankiw (1995) and Sims (2003).

**Figure 3.6. Duration and Amplitude of Food and Crude Oil Price Cycles**

The current boom is already longer than average for most foods and for crude oil. However, with the exception of crude oil and corn, the price increases are not exceptionally high.



Source: IMF staff calculations.

<sup>1</sup>Range of price increases during past trough-to-peak phases between January 1957 and June 2008.

<sup>2</sup>Months price is rising within the cycle compared with the average of past cycles.

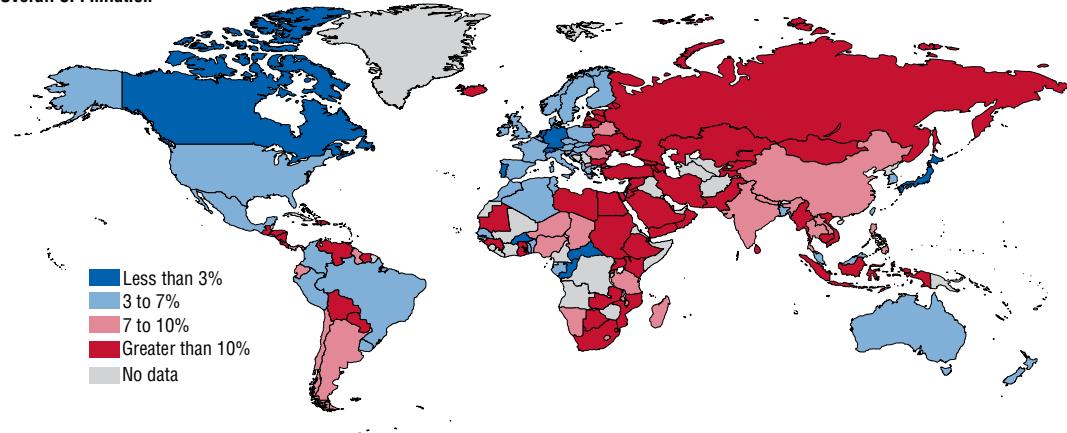
<sup>3</sup>Rapeseed oil price series starts in January 1980.

**Figure 3.7. Inflation around the World<sup>1</sup>**

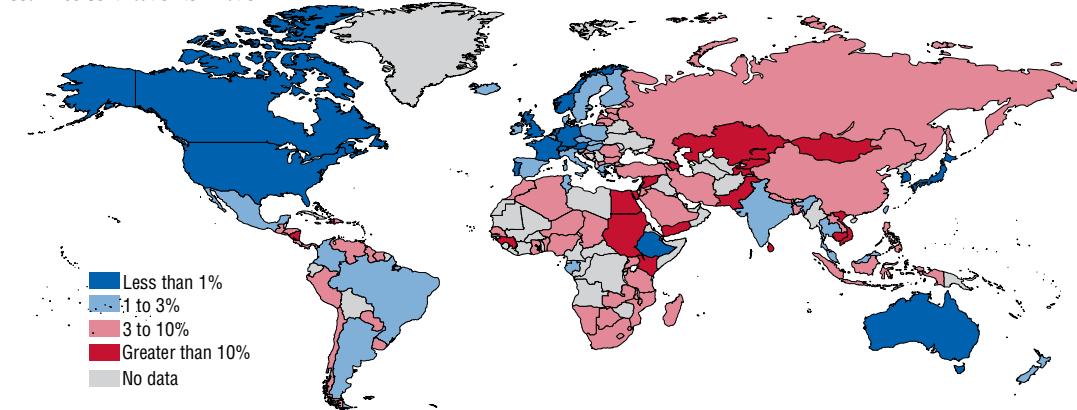
(2008:Q2-over-2007:Q2 percent change)

Headline inflation has risen, especially in emerging and developing economies, where the role of food prices is particularly significant. The contribution of energy prices is smaller in comparison, with stronger effects in advanced economies.

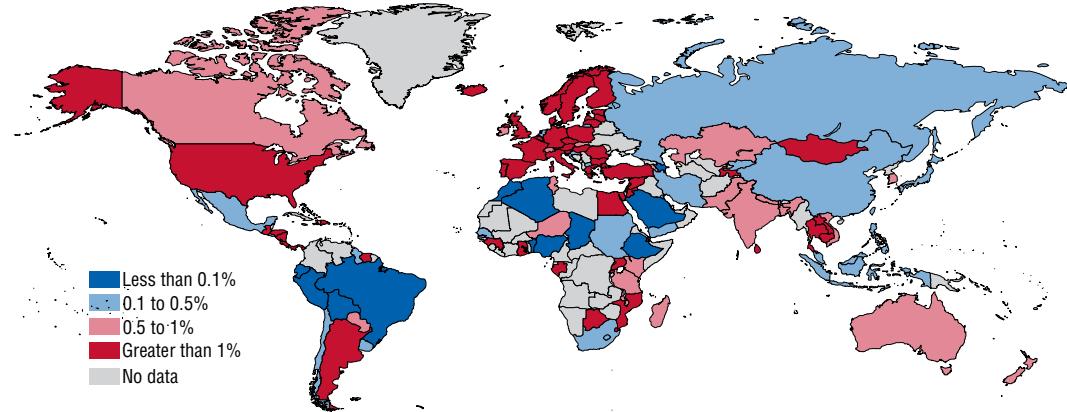
Overall CPI Inflation



Food Price Contribution to Inflation



Fuel Price Contribution to Inflation



Source: IMF staff calculations.

<sup>1</sup>Food and fuel price contributions are calculated as, respectively, food and fuel inflation multiplied by the corresponding weight in the consumer price index (CPI).

eration”—the long period of low and falling inflation rates from the 1990s until recently—changes in commodity prices were relatively modest and temporary, whereas during the “great inflation”—the 1970s—these shocks were large and persistent, as they have been in the present period.<sup>22</sup>

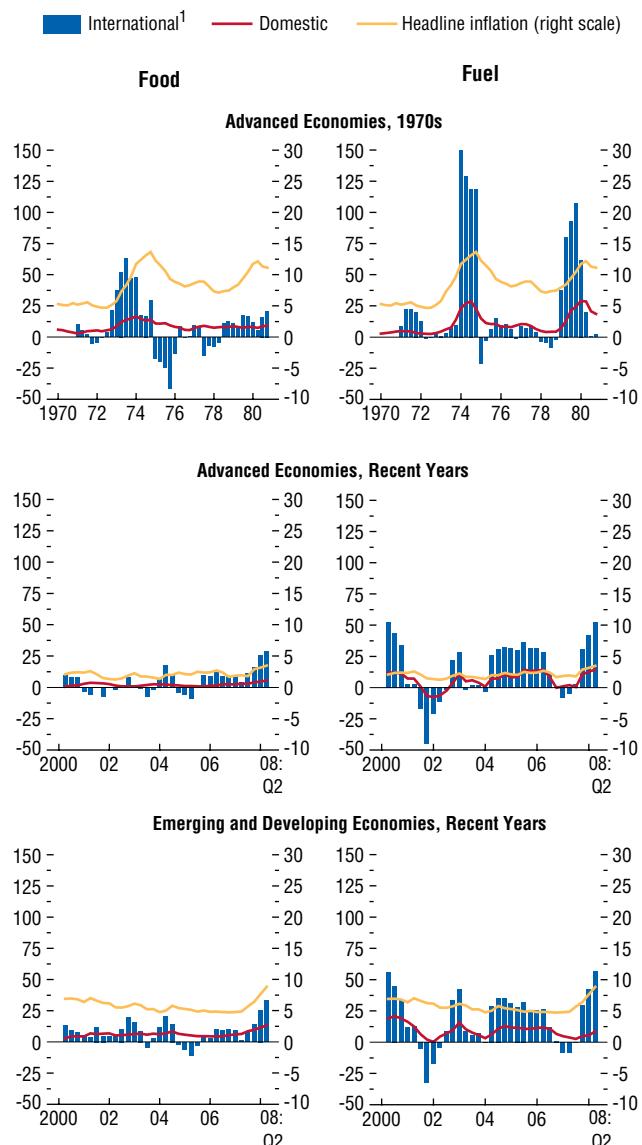
Concerns about second-round effects remain relevant despite the recent easing of international commodity prices, because domestic price pressures will likely persist for some time as a result of the continuing feed-through of past commodity price increases and lingering overheating pressures in many emerging economies. This section examines the links between commodity prices and inflation over time and across a broad sample of economies. It highlights how the risks to the inflation outlook are linked to the credibility of monetary policy—its ability to effectively anchor expectations—to the magnitude and persistence of the commodity price shocks, and to structural factors.

Turning first to current events, the dramatic rise in headline inflation in recent months owes much to commodity price increases over the past year and a half, with food prices playing a particularly important role in emerging and developing economies (Figure 3.7). In comparison, the contribution of energy prices has been moderate, with stronger effects in advanced economies. Indeed, domestic food prices have accelerated primarily in emerging and developing economies, while energy

<sup>22</sup>There is a growing literature on the sources of the “great moderation.” For example, Gerlach and others (forthcoming) attribute the “great moderation” primarily to improved monetary policies. The role of globalization is less clear. Falling manufactured goods prices, driven by rapid productivity gains from integration of large underutilized labor forces in emerging and developing economies, helped to make the process of reducing inflation less costly than it would otherwise have been. However, recently strong growth in demand for commodities has added to price pressures. The observed flattening of the Phillips curve (documented in Chapter 3 of the April 2006 *World Economic Outlook*) may be related to global competition but may also reflect better monetary management.

**Figure 3.8. Changes in International and Domestic Commodity Prices and Headline Inflation**  
(Year-over-year changes, in percent)

Large changes in commodity prices characterized the 1970s, when inflation reigned in advanced economies. In comparison, recent price fluctuations have been modest, although in recent months domestic food prices have accelerated in emerging and developing economies, and domestic energy prices have surged in advanced economies, while inflation has picked up around the world.



Sources: IMF Primary Commodity Prices database; and IMF staff calculations.

<sup>1</sup>International food and fuel prices are converted into local currencies. Food and fuel price indices in the 1970s include a narrower set of commodities for data availability reasons.

prices surged mainly in advanced economies (Figure 3.8).<sup>23</sup> To date, however, underlying or core inflation has remained broadly stable in advanced economies, although it has risen significantly in the rest of the world, as discussed in Chapter 1 (see Figure 1.3).<sup>24</sup> Inflation expectations have also begun to mount, especially in emerging economies, where wages have been on the rise amid generally tight labor markets.

What factors might affect the extent of transmission, or pass-through, from international commodity prices into domestic food and fuel retail prices? First, because domestic prices are denominated in local currencies, whereas world prices are typically denominated in dollars, exchange rate movements can amplify or mitigate the domestic impact of changes in world prices.<sup>25</sup> Second, many economies levy taxes or grant subsidies on certain commodities, especially fuels, which, again, may amplify or

mitigate the transmission (Box 3.2).<sup>26</sup> Third, the extent to which the domestic economy is integrated with international commodity markets is important, because in more isolated markets, domestic supply conditions may dominate the role of world price changes (for example, for certain crops). Fourth, the cost structure of domestic production plays a very important role in the extent and timing of the pass-through to retail prices, because labor, transportation, and retailing costs account for a large part of the final price of many food items, especially in advanced economies, and the costs associated with the commodities themselves may be moderate in comparison.<sup>27</sup>

Changes in domestic prices of food and fuel may influence overall inflation both directly and indirectly. The direct (first-round) effects on headline inflation are determined by the weights of these commodities in the consumption basket. Although these effects are large in many—especially poor—economies, they eventually dwindle once international price changes are passed through, unless underlying, or core, inflation is affected.<sup>28</sup> Such indirect (second-round) effects on core inflation depend on the

<sup>23</sup>There are substantial differences across countries in the way food and fuel prices are treated in consumer price indices, especially across emerging and developing economies. The food baskets used to measure food inflation vary from country to country, with some countries including beverages and tobacco alongside food items, and other countries using narrower definitions including fresh but not processed foods. The measurement issues are even more acute in the case of fuel prices: definitions of the fuel component of the consumer price index (CPI) range from gasoline prices to prices for household utilities.

<sup>24</sup>Measuring core inflation is difficult. In theory, core inflation is defined as the underlying, or persistent, part of inflation that provides an indication of future inflation, although precise definitions vary (see, for example, Eckstein, 1981; and Bryan and Cecchetti, 1994). In practice, core inflation is commonly measured using the CPI that excludes food and energy prices, or their most volatile components, but these measures differ across countries. The variation in measurements of core inflation tends to be especially significant among emerging and developing economies, for which inferences about the underlying inflation need to be made with caution.

<sup>25</sup>De Gregorio, Landerretche, and Neilson (2007) argue that past oil shocks were often accompanied by depreciations that may have amplified their pass-through into domestic prices, whereas depreciations have been less common in the past few years, and many economies have, in fact, experienced appreciations that may have softened the pass-through.

<sup>26</sup>A number of emerging and developing economies rely on energy subsidies to limit the domestic consequences of international energy price shocks. However, the associated fiscal costs may be large, especially at times of significant pressures from international prices (see IMF, 2008b). Indeed, escalating fiscal costs have recently forced a number of countries to roll back some of these subsidies. Furthermore, the associated fiscal expansion and financing requirements for ensuing government deficits may themselves lead to inflation (Sargent and Wallace, 1985).

<sup>27</sup>Movements in domestic labor and transportation costs may vary and may either offset or reinforce pressures from commodity price changes. For example, labor costs in advanced economies followed a declining trend during the past couple of decades, in part due to increased access to the global pool of labor (see Jaumotte and Tytell, 2007). This may have helped offset higher energy and material costs in recent years.

<sup>28</sup>In fact, these effects are rarely immediate, because commodity price shocks may take considerable time to propagate through to final retail prices. For example, Rigobon (2008) estimates that oil price shocks typically take 9 to 12 months to pass through, and food price shocks can take up to 30 months.

### Box 3.2. Fiscal Responses to Recent Commodity Price Increases: An Assessment

The boom in prices for food and energy has led to a wide range of fiscal responses across the globe aimed at mitigating the domestic impact. This box summarizes these responses and discusses their effectiveness in alleviating the impact of commodity price increases on the poor and their macroeconomic implications more broadly.

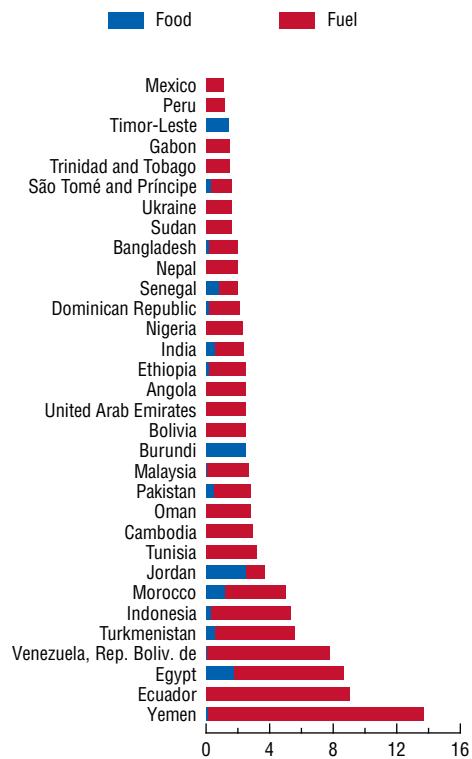
A recent IMF survey collected information on the fiscal responses of 161 countries to international price increases (IMF, 2008b). Among the survey's findings were these:

- Expenditure measures are more prominent in the case of fuels, whereas revenue measures dominate for food. More than one-quarter of the surveyed countries increased fuel subsidies, and about one-fifth reduced fuel taxes. Fuel subsidies reached high levels in many countries this year, exceeding 5 percent of GDP in Ecuador, Egypt, Turkmenistan, República Bolivariana de Venezuela, and Republic of Yemen. The picture is almost the opposite for food, with more than half the countries reducing food taxes and less than one-fifth increasing food subsidies.
- Exporting countries have used both tax and regulatory measures to contain increases in domestic food prices. These measures have included increases in export taxes, the introduction of export quotas, and even the imposition of an outright ban on certain exports. Notably, export bans and export taxes were imposed by key exporters of major cereals, including Argentina, China, India, Kazakhstan, Ukraine, and Vietnam. However, more recently a few major exporters have started to relax some export restrictions. Vietnam and Kazakhstan recently allowed export bans to expire on rice and wheat, respectively, and Ukraine has increased quotas on wheat exports.
- About a quarter of the surveyed countries recently increased financing for more targeted transfer programs, and 15 countries

The main author of this box is David Coady.

#### Universal Subsidies, 2008<sup>1</sup>

(Percent of GDP)



Source: IMF Fiscal Survey.

<sup>1</sup>For countries where only the food or the fuel subsidy is displayed, data for the other type of subsidy are not available.

increased public sector wages and pensions partly in response to the price increases.

The total fiscal cost of these measures has been substantial; the median annualized increase in fiscal cost across the surveyed countries during 2007–08 was 0.7 percent of GDP. For about a quarter of the countries, the fiscal costs exceeded 1 percent of GDP, with higher food and fuel universal subsidies accounting for the bulk of this increase. By 2008, the combined fiscal cost of these universal subsidies had become a major fiscal burden in many countries, particularly for fuel subsidies. For example, these subsidies now account for

**Box 3.2 (*concluded*)**

at least 5 percent of GDP in 7 countries and at least 2 percent in another 17 countries (figure).

These measures are adopted, in part, because increases in the prices of food and fuel are seen to be particularly damaging to the poor. In general, the burden of food price increases tends to be highly regressive, but the burden of fuel price increases depends on the type of fuel. Indeed, recent IMF studies<sup>1</sup> found that a doubling of rice prices results in a 12 percent decrease in real incomes for the poorest income quintile, compared with a 5 percent decrease for the richest quintile. In contrast, whereas a doubling of all fuel prices results in approximately a 10 percent decrease in income for all income groups, the impact of increases in gasoline prices is roughly proportional, but the impact of increases in kerosene prices is highly regressive.

Universal price subsidies are a fiscally costly approach to protecting the welfare of poor households. This is because a high proportion of the benefits from low food and fuel prices accrue to higher-income groups, reflecting the higher shares of these groups in total consumption. For example, IMF studies found that about 64 percent of a subsidy for rice went to the top three income quintiles (IMF, 2008b); the

<sup>1</sup>IMF (2008a) analyzes the case of Senegal, and Coady and others (2006) provide evidence for Bolivia, Ghana, Jordan, Mali, and Sri Lanka.

corresponding shares for kerosene and gasoline subsidies were 55 percent and 92 percent, respectively (Coady and others, 2006). Switching to better-targeted mitigation measures can substantially reduce the associated costs while more effectively assisting the most affected segments of the population.

Furthermore, incomplete pass-through of international to domestic commodity prices distorts incentives for domestic consumers and producers and ultimately reinforces global price pressures. More specifically, reduced taxes and increased subsidies dilute the impact of higher international commodity prices on demand, and the imposition of export taxes and quotas reduces the gains to exporters from higher prices and therefore obstructs the supply response that would, in time, help bring prices down. The financing requirements implied by the high fiscal costs of subsidies will eventually either cause their reversal or lead to higher taxes—and therefore higher prices—for other goods and services. They could also feed into more general inflation pressures if the ensuing deficits are monetized or if they cause an excessive accumulation of government debt. For these reasons, the broad-brush fiscal intervention ongoing in a wide range of countries is not a viable substitute for an appropriate monetary policy response to help maintain macroeconomic stability in the face of commodity price fluctuations.

extent to which expectations of future inflation get unhinged and higher wage demands are set in motion.<sup>29</sup> This is partly linked to the relative

<sup>29</sup>In the past, the risk of a wage-price spiral was exacerbated in many countries by wage indexation, with wages indexed to past inflation, which introduced an additional source of inflation persistence. However, indexation systems have been redesigned over the past decades, weakening the inflation effects. This said, the role of indexation is difficult to quantify given differences in wage-setting practices across countries. In some countries—especially where labor markets are already tight—transfer revenue indexation can indirectly affect wage negotiations and increase inflation risks. In addi-

magnitudes of demand and supply effects associated with commodity price shifts. On the one hand, higher food and energy prices raise costs and may lower productivity—a negative supply effect that puts upward pressure on inflation. On the other hand, they may cause expenditure switching from other goods and services—a negative demand effect that pushes inflation down. Although the supply effect tends to

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tion, in a number of countries, public sector wages are adjusted in response to increases in food and energy prices, which may contribute to a wage-price spiral.

dominate, the balance between the two effects is subject to some uncertainty, especially in net commodity importers. In net commodity exporters, a commodity price boom typically raises aggregate demand and intensifies inflation pressures, although exchange rate adjustments could mitigate this effect.

What factors influence the vulnerability of economies to inflation risks associated with commodity price shifts? Broadly, these could be grouped into structural and policy-related factors. A key structural factor is the intensity of use. Indeed, energy intensity—measured as energy consumption per unit of real GDP—has fallen by about 40 percent in advanced economies since the 1970s. In comparison, emerging and especially developing economies are considerably more energy-intensive (Figure 3.9).<sup>30</sup> The difference between these two groups is even more dramatic when it comes to food consumption. Food represents over one-third of household consumption in emerging and developing economies, with the share ranging from just over 10 percent to almost 80 percent in some developing economies. In contrast, in advanced economies food amounts to only one-tenth of household consumption (half of what it was in the 1970s), and the share of raw material costs in total costs is considerably lower.

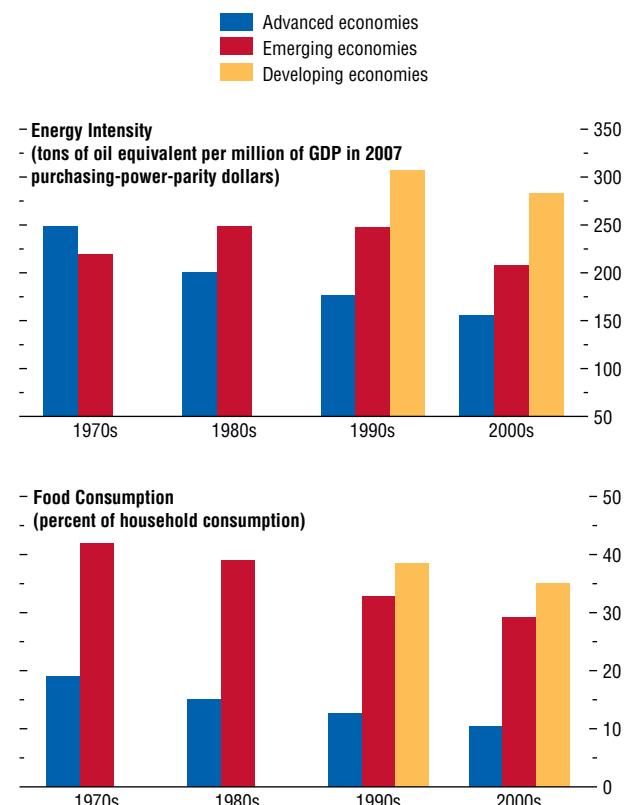
Among the policy-related factors that affect economies' vulnerability to the inflationary impact of a commodity price shock, the credibility of monetary policy stands out. The quality of monetary management—approximated by an index of central bank autonomy<sup>31</sup>—has improved around the world, but it remains lower in emerging and especially developing economies than in advanced economies (Figure 3.10). More than 80 percent of emerging and developing economies maintain heavily managed exchange rate regimes, in sharp con-

<sup>30</sup>Energy intensity in emerging and developing economies is even higher when GDP is evaluated at market exchange rates.

<sup>31</sup>This index captures the ability of a central bank to pursue independent monetary policy and is based on Arnone and others (2007).

**Figure 3.9. The Relative Importance of Food and Energy**

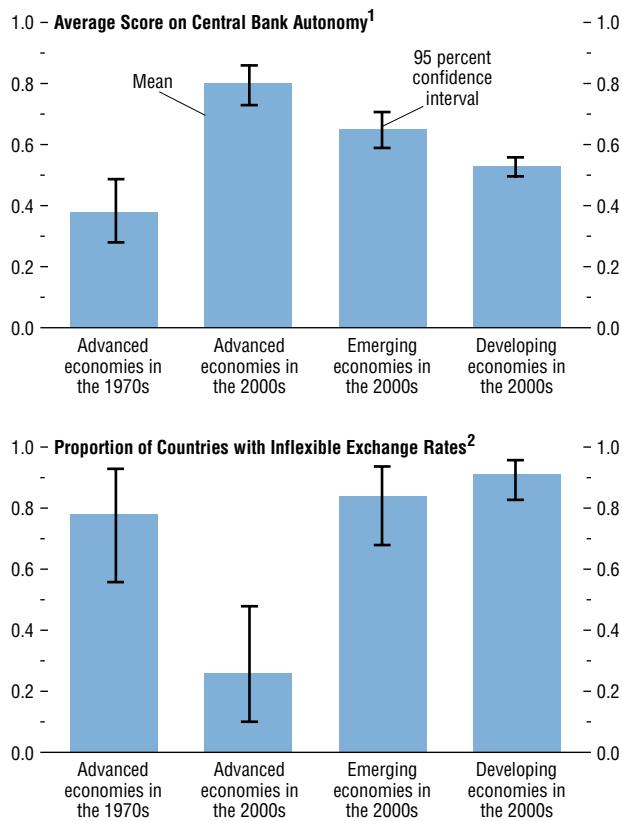
Although the relative economic importance of energy and food consumption has broadly followed a declining trend, emerging and developing economies are both more energy-intensive and more dependent on food consumption than advanced economies.



Sources: *British Petroleum Statistical Review of World Energy* (2008); UN National Accounts; U.S. Department of Agriculture; and IMF staff calculations.

**Figure 3.10. Monetary and Exchange Rate Policies**

Although the quality of monetary management has improved around the world, advanced economies score better in this area than emerging and developing economies, the majority of which continue to maintain inflexible exchange rate regimes.



Sources: Arnone and others (2007); Reinhart and Rogoff (2004, updated); and IMF staff calculations.

<sup>1</sup>The score for the 1970s is constructed using the methodology of Arnone and others (2007) for a somewhat narrower set of indicators.

<sup>2</sup>Inflexible exchange rate regimes include all de jure and de facto exchange rate pegs and bands and exclude currency unions.

trust to advanced economies, where exchange rates are now overwhelmingly floating.<sup>32</sup>

Although pegged exchange rates have helped many emerging and developing economies anchor inflation expectations in the past, they do constrain monetary policy responses, particularly when advanced and nonadvanced economies face very different cyclical conditions. The dissonance between the buoyant activity levels and easy policy stances that now characterize a range of emerging and developing economies is striking and reminiscent of the situation faced by advanced economies during the great inflation of the 1970s.

To assess the potential for second-round effects from changes in food and fuel prices and to relate them to the structural and policy characteristics of different economies, two related econometric exercises were conducted. The first one links core inflation to changes in prices of food and fuel, controlling for changes in the output gap (the Phillips curve).<sup>33</sup> It is based on country-by-country estimations over a relatively extended time period and allows a comparison between current developments and those at the time of the great inflation in the 1970s. The second exercise directly links changes in expected inflation to changes in actual headline inflation and disaggregates the latter into core inflation and changes in domestic inflation rates for food and fuel.<sup>34</sup> This exercise is based on a

<sup>32</sup>This comparison is based on an updated classification of exchange rate regimes of Reinhart and Rogoff (2004). Inflexible exchange rate regimes include all de jure and de facto exchange rate pegs and bands and exclude currency unions. See also Ilzetzki, Reinhart, and Rogoff (forthcoming).

<sup>33</sup>See Blanchard and Galí (2007) for an analysis of oil price pass-through across industrialized economies. De Gregorio, Landerretche, and Neilson (2007) undertake a similar study for a sample of industrial and some emerging and developing economies. Both studies find that the pass-through from oil price changes to overall inflation has declined over time.

<sup>34</sup>Inflation expectations are typically measured in one of two ways. The first is based on surveys of consumers or professional forecasters, and the second is based on the difference in yields between conventional and inflation-linked bonds (see Soderlind and Svensson, 1997; Fung, Mitnick, and Remolona, 1999; and Shen and Corning, 2001).

panel of advanced and emerging economies and allows a comparison of performance depending on structural and policy characteristics of these economies over recent years.

The first set of estimations shows that the pass-through from international to domestic food prices and from domestic food prices into core inflation in emerging economies is comparable to that seen in advanced economies in the 1970s and much higher than the pass-through observed in advanced economies more recently (Figure 3.11).<sup>35</sup> In emerging economies, about one-half of the shock to domestic food prices ultimately makes its way through to core inflation, whereas in advanced economies, less than one-quarter passes through. These findings are in line with the high share of food in consumption and the relative importance of material costs in production across emerging economies and underscore these economies' sensitivity to food price developments.

Turning to fuel prices, the pass-through from international to domestic prices is substantially lower in emerging than in advanced economies. The pass-through from domestic prices to core inflation has recently been markedly lower than

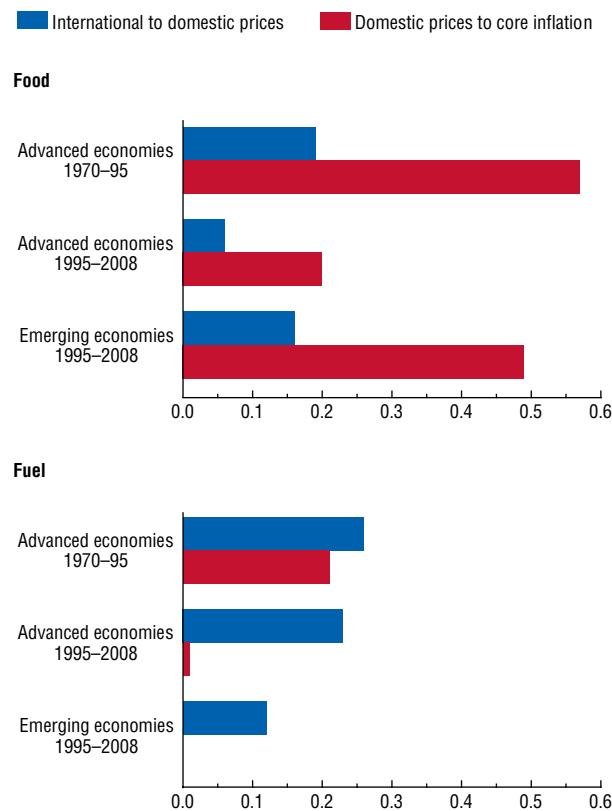
Both of these measures have shortcomings: survey-based measures may reflect subjective and sometimes unfounded perceptions about inflation, while bond-based measures may reflect liquidity and inflation volatility premiums, as well as institutional features of specific bond markets. In this study, expected inflation is measured using inflation forecasts published by Consensus Economics, because bond-based measures are not available for a sufficiently broad set of countries. See Goretti and Laxton (2005) and Levin, Natalucci, and Piger (2004) for similar analyses.

<sup>35</sup>The sample consists of 25 emerging and 21 advanced economies (9 for the 1970–95 period). In order to limit contamination of the estimates by endogenous factors, the pass-through from domestic commodity prices to core inflation is estimated using only the variation in domestic prices that is due to changes in international prices as well as lagged effects of domestic price developments. It must be mentioned that the estimates vary considerably across countries, reflecting in part differences in data quality, measurement of inflation, and sample periods, especially across emerging economies. The estimated pass-through captures the full long-term pass-through and does not reflect any differences in the time path of the inflation responses. Appendix 3.3 provides a detailed description of this exercise.

**Figure 3.11. Commodity Price Pass-Through<sup>1</sup>**

(Full long-term response to a 1 percentage point change in commodity price inflation, in percentage points)

The recent food price pass-through in emerging economies resembles that seen in advanced economies in the 1970s, whereas the fuel price pass-through has been markedly lower. The recent pass-through to core inflation has been moderate for both food and fuel prices in advanced economies.



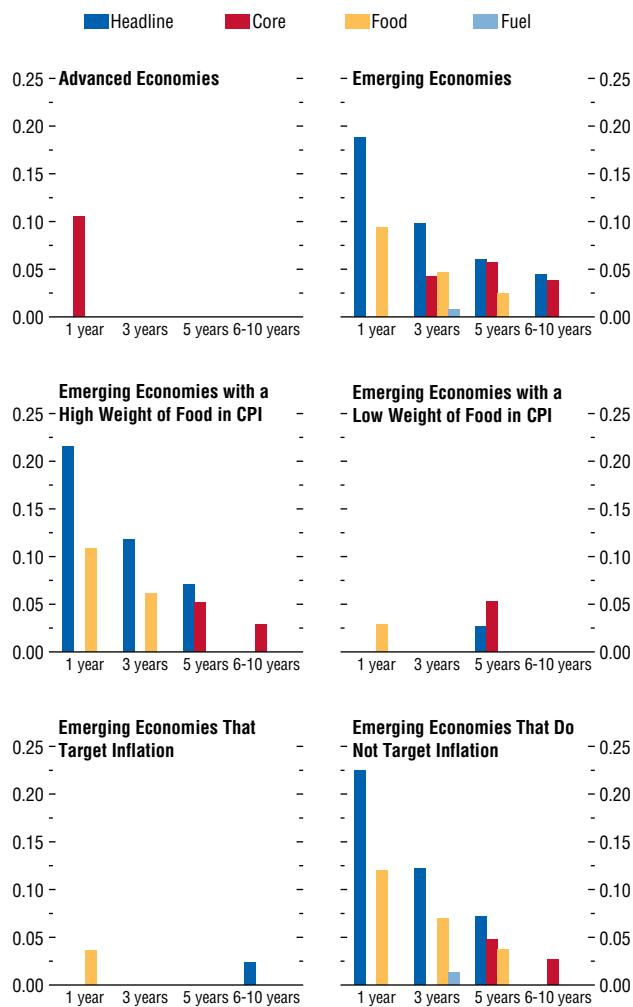
Source: IMF staff calculations.

<sup>1</sup>Weighted averages of country-by-country estimates using quarterly data. The pass-through from international to domestic prices is estimated using bivariate regressions. The pass-through from domestic commodity prices to core inflation is estimated using Phillips curve equations with domestic prices net of any influences other than international prices and their own lags. In both estimations, the full long-term pass-through is calculated as the sum of coefficients on the current value and the four lags of the independent variable divided by 1 minus the sum of coefficients on the four lags of the dependent variable.

**Figure 3.12. Changes in Expected Inflation in Response to Changes in Actual Inflation<sup>1</sup>**

(Expected inflation 1, 3, 5, and 6–10 years ahead; percentage point responses to a 1 percentage point change in actual inflation)

Inflation expectations appear significantly better anchored in advanced economies than in emerging economies, especially those with a high share of food in the CPI. In emerging economies, inflation targeting seems to have recently been more effective than alternative monetary policy frameworks in anchoring expectations.



Sources: Consensus Forecasts; and IMF staff calculations.

<sup>1</sup>Based on statistically significant coefficients from panel regressions with fixed effects, using semiannual data since 2003. The measure of core inflation is net of food and fuel inflation.

during the 1970s, when over 20 percent of the price shock reached core inflation. The low pass-through coefficients may reflect a combination of factors, including declining energy intensity, widespread fuel subsidies and controls in emerging economies, and high fuel taxes in many advanced economies.<sup>36</sup>

The econometric analysis of the relationship between changes in expected and actual inflation suggests that differences in structural and policy vulnerabilities shape expectations across economies (Figure 3.12).<sup>37</sup> In advanced economies, expectations appear to be well anchored: long-term inflation forecasts do not react to actual inflation. Expectations are generally less well anchored in emerging economies, where expected inflation continues to be influenced by actual inflation even at long forecast horizons. Thus, when headline inflation increases by 1 percentage point, inflation expected in the following year rises by nearly 0.2 percentage point on average. Even as far as six to ten years into the future, inflation is still expected to rise by about 0.05 percentage point. In these economies, expectations also respond strongly to changes in domestic food price inflation, whereas energy price inflation does not appear to exert significant effects, likely reflecting the relative shares of food and energy in consumption. In economies where food accounts for a large share of household consumption, there is a particularly sizable increase in expected inflation in response to changes in actual headline and food price inflation.

<sup>36</sup>In addition, comovement between food and energy prices could make the two effects hard to disentangle. Indeed, energy price changes contribute significantly to the dynamics of food prices, as pointed out in the preceding section. Furthermore, measurement issues in domestic food and especially fuel prices noted above could attenuate the estimated pass-through coefficients.

<sup>37</sup>The estimations are based on a panel of semiannual observations beginning in 2003. The sample includes 14 advanced and 21 emerging economies. In order to disentangle the effects of core inflation from those of changes in commodity prices, only the variation in core inflation that is not due to changes in food and fuel prices is used in the analysis. More information on this exercise is provided in Appendix 3.3.

The transmission of commodity price shocks into expected inflation appears to depend crucially on the conduct of monetary policy. Specifically, inflation targeting appears to have been quite effective in anchoring inflation expectations: beyond the one-year horizon, expectations respond very little to changes in actual inflation. In contrast, non-inflation-targeting countries—many of which formally or informally target nominal exchange rates—seem less successful in anchoring expectations. This said, the apparent benefits of inflation targeting may reflect in part the general quality of domestic monetary management in these countries and their levels of development more broadly (but even so, achieving the targets has recently become more difficult).<sup>38</sup> In addition, other country-specific factors—such as the extent of labor market flexibility and the conduct of fiscal policy—may also influence the response of expectations to actual inflation.

Will the recent food and energy price surges lead to a sustained increase in inflation rates across the globe? The findings of this analysis may give reason to be optimistic, particularly for the advanced economies and emerging economies that have adopted inflation targeting. At the current juncture, inflation risks are also diminished by the economic slowdown, especially in advanced economies, although overheating pressures linger in many emerging and developing economies. That said, empirical relationships based on past data may not provide reliable guidance for the future, even if one assumes that monetary policy credibility will continue to improve and that global integration and competition will continue to rise. Recent commodity-market-related shocks have been larger and more persistent than they were over the sample period used for the estima-

<sup>38</sup>Inflation targeting in emerging economies is discussed in Chapter 4 of the September 2005 *World Economic Outlook*. In a more recent study, Mishkin and Schmidt-Hebbel (2007) suggest that inflation targeting helps countries to lower inflation, to strengthen monetary policy and, in particular, to reduce inflationary effects of oil price shocks.

tions, and for this reason, actual future pass-through may surprise on the upside, unless the global slowdown intensifies.<sup>39</sup> The risks of such surprises are intimately linked to expectations of future inflation and the ability of monetary policies to anchor them effectively, as discussed in the following section.

## Monetary Policy Responses to Commodity Price Shocks

Monetary policy mistakes can have serious consequences in the presence of permanent commodity price shocks, as demonstrated by the great inflation of the 1970s in the advanced economies. Given already increasing inflation and easy monetary conditions, the appropriate response at that time to the oil price shock—an adverse supply shock—would have been to tighten. Instead, the inflation surge was exacerbated by a continued easing of the monetary policy stance, which further increased inflation expectations and eroded policy credibility. Since that experience, central banks have been very aware that monetary policy should not accommodate second-round effects of adverse supply shocks.<sup>40</sup>

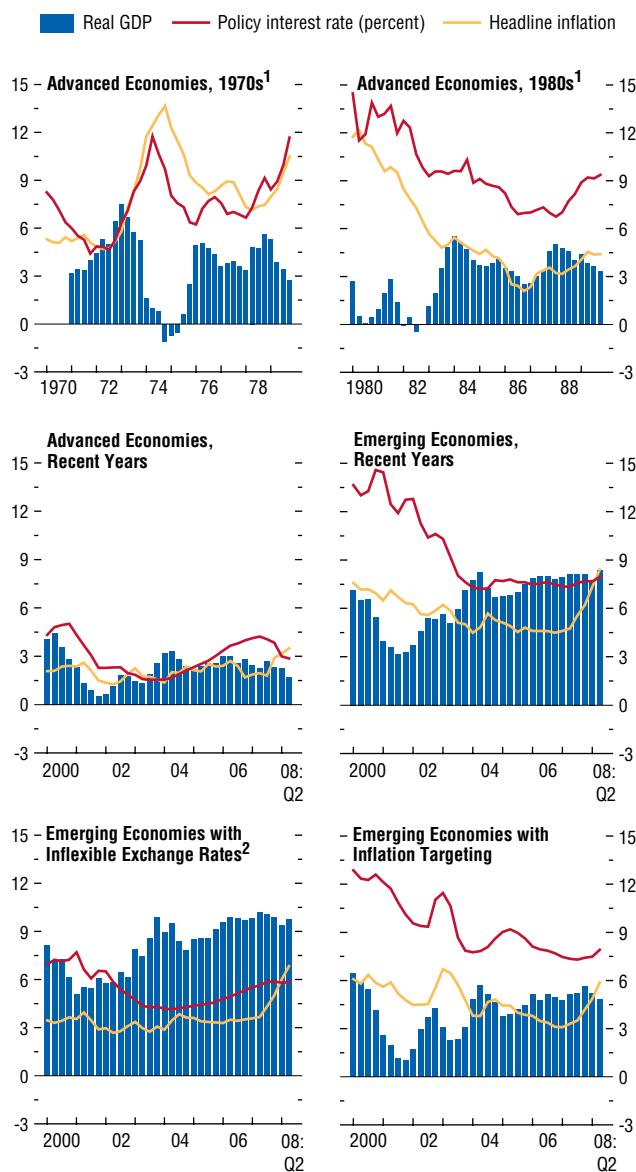
It is well established that the appropriate response of monetary policy to supply shocks depends on the cyclical position of an economy and the degree of policy credibility. For example, with a high degree of capacity utilization and low policy credibility, dangers of pass-through into core inflation are relatively high. This has implications for the appropri-

<sup>39</sup>In addition, although the flexibility of domestic labor markets will in all probability continue to improve, the anti-inflationary role of the global labor market may eventually weaken, as labor markets in emerging and developing countries mature and their wages catch up to advanced economy levels.

<sup>40</sup>Many economists have noted the substantial decline in the volatility of important macroeconomic variables since the 1980s, including, for example, Bernanke (2004) and King (2005). Kumhof and Laxton (2007) estimate that about one-half of the higher output variability in the 1970s and early 1980s relative to 1995–2007 can be attributed to inefficient monetary policy and one-half to larger supply and demand shocks.

**Figure 3.13. Activity, Interest Rates, and Inflation**  
(Percent change from one year earlier unless otherwise noted)

Low or negative real interest rates were a feature of the inflationary period in the 1970s in advanced economies, in contrast to the period of stabilization that followed in the 1980s. Recently, real interest rates have turned negative in emerging economies—especially those with inflexible exchange rates—alongside substantially more buoyant activity than in advanced economies.



Source: IMF staff calculations.

<sup>1</sup>For data availability reasons, money market rates are used in place of policy rates for a number of countries.

<sup>2</sup>Inflexible exchange rate regimes include all de jure and de facto exchange rate pegs, bands, and crawling pegs or bands that are narrower than ±2 percent. See Reinhart and Rogoff (2004) and Ilzetzki, Reinhart, and Rogoff (forthcoming).

ate monetary policy responses to the recent surges in food and energy prices. As discussed in Chapter 1, many emerging economies have been showing signs of overheating, along with easing monetary conditions. Short-term nominal interest rates are below nominal income growth—partly because expansionary U.S. monetary conditions have been imported along with exchange rate constraints on monetary policy, as noted above (Figure 3.13). At the same time, monetary policy credibility in these countries is more fragile. To bring inflation under control and avoid a boom-bust cycle, monetary conditions will have to tighten in affected countries. As outlined in Box 3.3, this would also have some moderating influence on commodity demand at the global level and on international commodity prices.

### Monetary Policy Credibility and Inflation Dynamics

Simulations based on models with endogenous credibility and capacity constraints can provide useful guidance for using monetary policy to respond to adverse supply shocks in the face of different degrees of policy credibility, different cyclical positions, and different levels of initial inflation. The analysis is based on a small open economy macroeconomic model in which inflation behavior and inflation expectations depend on the credibility of monetary policy. Credibility is determined endogenously and depends on the evolving track record of inflation relative to the long-run target.<sup>41</sup> This, in turn, affects the extent of second-round effects of supply shocks in the model, because the extent to which inflation shocks feed into expectations depends on current and past inflation. With full credibility, inflation expectations are entirely forward-looking, implying that a permanent increase in commodity prices has little effect on expectations. If credibility is low, however, expectations depend mostly on cur-

<sup>41</sup>See Aliche and others (forthcoming) for a description of the model and its properties.

rent and past inflation, and they are affected by shocks to current inflation.

The model determines the optimal monetary policy response—through changes in the short-term interest rate—given the central bank’s policy objectives. These relate to deviations from the inflation target, output gaps, and short-term variability in interest rates.

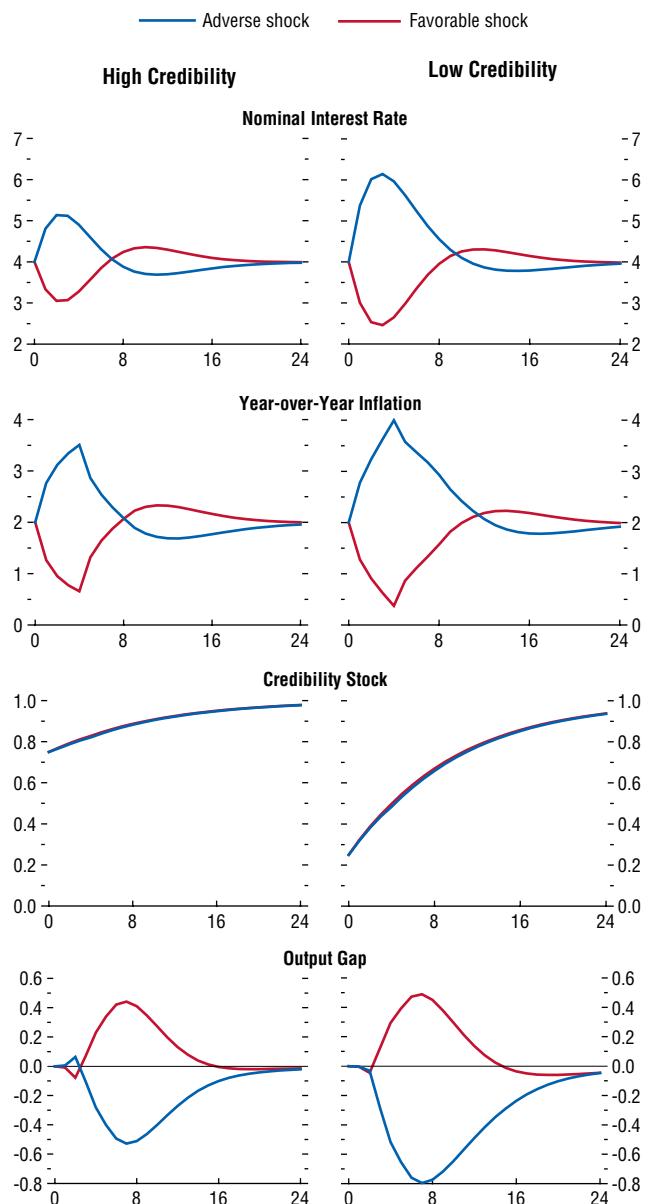
The model postulates that the central bank sets interest rates to minimize variability along all three dimensions. With adverse supply shocks, the difficulties in setting policies arise because inflation and output initially move in opposite directions and because monetary policy tightening reduces both output and inflation in the short term. The central bank’s policy preferences determine how it trades off gains from reducing inflation against the costs of lower output.

### Supply Shocks and Policy Credibility

In a first simulation, the supply shocks hit the model economy when inflation is at the target rate of 2 percent and the initial level of the output gap is zero.<sup>42</sup> With high initial credibility—reflecting conditions prevailing in advanced economies—inflation rises to more than 3 percent following the inflationary supply shock (Figure 3.14, left panels). The optimal policy response brings inflation back to the target within eight quarters—which is in line with conventional estimates of the lags involved in the transmission of monetary policy. The interest rate has to rise temporarily to a peak of about 5 percent—about 1 percentage point above the neutral rate of 4 percent assumed in the model. In the low-credibility case, the general picture is roughly similar, although inflation rises by more, and the interest rate increase required to bring inflation back to target is proportionally higher (Figure 3.14, right panels).

**Figure 3.14. Stylized Advanced Economy with Adverse and Favorable Supply Shocks**  
(Percent; quarters on the x-axis)

Adverse and favorable supply shocks are broadly symmetric in their impact on inflation and output and monetary policy implications if credibility is high.



Source: IMF staff calculations.

<sup>42</sup>The experiments are based on supply shocks that either permanently increase or decrease the price of commodities. The output gap is defined so that a positive value is excess demand and associated with inflation pressures.

### Box 3.3. Monetary Policy Regimes and Commodity Prices

Policymakers around the world have recently shown much concern about heightened inflation pressures, with sharp spikes in oil and food prices starting to feed into headline and even core inflation in a large number of countries. The question is whether monetary policy arrangements, specifically the dollar standard that has many countries pegging their currencies to the U.S. dollar (formally or informally through heavily managed exchange rates) can be held partly accountable for this development. And, if yes, what would be the impact of adopting alternative approaches?

Under current monetary policy arrangements, the United States exports its monetary policy stance to a significant proportion of the global economy, when other countries either peg their exchange rates or intervene in foreign exchange markets. But the world is currently facing highly asymmetric shocks, with the United States and the euro area being slowed by financial strains and terms-of-trade losses and much of the rest of the world continuing to expand at historically high rates. A monetary policy that is appropriate for the United States, namely, relatively low nominal and real interest rates, is therefore highly inappropriate elsewhere.

This box seeks to answer two questions. First, if the most significant exchange rate pegs continue for the time being, is it in the best interests of the United States to take into account the effects of its monetary policy on the world economy? Second, given current circumstances, what difference would it make to the behavior of the world economy and of individual economies if the countries that now peg to the dollar moved to more flexible exchange rate regimes?

#### *Monetary Policy and Core Inflation*

This attempt to answer these questions involves illustrative dynamic simulations that use the Bank of Canada's version of the Global Economy Model (BoC-GEM).<sup>1</sup> This is a five-

The main authors of this box are Michael Kumhof, Douglas Laxton, and Dirk Muir.

<sup>1</sup>See Lalonde and Muir (2007).

region dynamic stochastic general equilibrium model that separately specifies each region's monetary policy regime as either a peg to the U.S. dollar or as an inflation-targeting regime.<sup>2</sup> The latter is characterized by an interest rate reaction function whereby nominal interest rates are raised when inflation accelerates. These characterizations of monetary policies are not intended to be an accurate depiction of policies but rather a useful stylized representation that can help shed light on the issues. A critical feature of BoC-GEM for this investigation is its assumption of significant nominal rigidities in manufacturing and services but no nominal rigidities in the oil and commodity sectors.<sup>3</sup> This implies that if monetary policy is solely concerned with domestic stabilization of price and output volatility, it should not attempt to pursue a strict short-run target that includes oil and commodity inflation, but should instead focus on stabilizing "core inflation" in the remaining sectors, which is therefore our baseline assumption. Finally, given that reduced spare capacity and low supply elasticities appear to have been major factors behind the recent volatility of oil and food prices, the model introduces factor adjustment costs that limit the short-term supply response in these sectors. As a result, following a positive shock that raises global demand, there will first be a spike in prices and only later a significant output response.

The baseline simulation is shown as the black lines in the figure. In the initial period, the United States lowers its interest rate by 2.5 percentage points in response to a contractionary

<sup>2</sup>The regions are United States (21.2% of world GDP using purchasing-power-parity (PPP) weights), emerging Asia (24.8%), commodity exporters (15.2%), Canada (1.8%), and remaining countries (37.0%). The simulations do not address the issue of transitions from one monetary regime to another. They also do not address aspects of monetary policy other than the pure timing of interest rate changes such as questions of portfolio preferences for reserve assets in different currencies or questions of financial system regulation and control of credit expansion.

<sup>3</sup>The commodity sector includes but is not limited to food production.

shock to consumption and investment demand and elevated concern about financial sector stability. This monetary intervention dampens the effects of the demand shock, with output falling up to 1.2 percent below potential in the year following the shock.

At the same time, demand in emerging Asia (EA) and a group of oil-exporting countries (GOEC) continues to grow rapidly.<sup>4</sup> Using exchange rate pegs, these regions' interest rates cannot be raised in a countercyclical fashion, and instead they fall almost one for one with U.S. rates.<sup>5</sup> Together with the highly inflationary effects of the shocks, this leads to sharply lower real interest rates that amplify rather than dampen the output effects of the shocks. GDP in these regions therefore expands sharply, by 4.5 percent for EA and 2.8 percent for GOEC, while inflation, both headline and core, increases by about 4.5 and 2.0 percentage points, respectively. This additional demand originates in regions representing only about 20 percent of world GDP,<sup>6</sup> but because growth is very commodity-intensive in EA and GOEC, this exerts strong upward pressure on international oil and commodity prices, which rise by 14 percent and 5.3 percent, respectively. This in turn accounts for the moderate increase shown in U.S. headline inflation of 0.4 percentage point in the initial period, despite the U.S. slowdown. The reason is that these highly flexible prices immediately pass through into headline inflation. Core inflation does fall with demand, but after about a year, it picks up as some oil and commodity inflation feeds through.

The dynamics of inflation in the baseline are almost entirely due to the underlying demand shocks and their amplification by monetary policy, rather than to the initial large spikes in oil and commodity prices that are due to supply-

<sup>4</sup>The figure only shows simulation results for EA; results for GOEC are very similar.

<sup>5</sup>The small observed difference is due to a foreign exchange risk premium that is increasing each region's net foreign liability position.

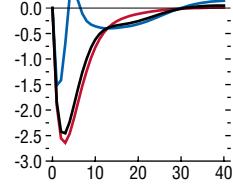
<sup>6</sup>World GDP expands by about 1.4 percent.

### Adjustment Scenarios<sup>1</sup>

— Baseline  
— U.S. targets core and oil price inflation  
— Flexible exchange rates everywhere

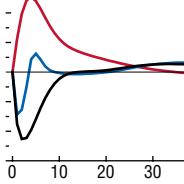
#### United States

#### Nominal Interest Rate

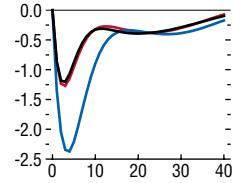


#### Emerging Asia

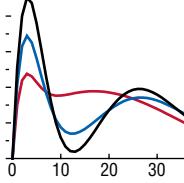
#### Nominal Interest Rate



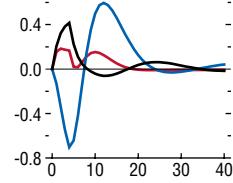
#### Real GDP



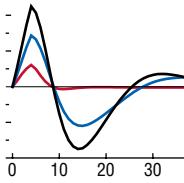
#### Real GDP



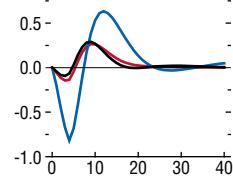
#### Headline Inflation



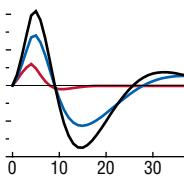
#### Headline Inflation



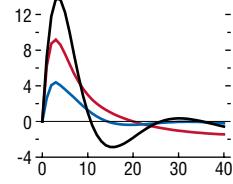
#### Core Inflation



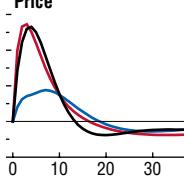
#### Core Inflation



#### U.S. Dollar Oil Price



#### U.S. Dollar Commodity Price



Source: IMF staff calculations.

<sup>1</sup>Plots show deviations from control. Nominal interest rate and inflation are in percentage points. Real GDP and prices are in percent. Quarters on the x-axis.

**Box 3.3 (*concluded*)**

side rigidities.<sup>7</sup> When the underlying shocks are to demand, flexible commodity prices therefore constitute a bellwether for underlying imbalances and overheating, rather than representing a problem in and of themselves. The situation would be very different, of course, if the underlying shocks were shocks to supply, an issue that is not addressed here.

***Should the United States Account for the Global Impact of Its Monetary Policy?***

The U.S. Federal Reserve could in principle take account of the effects of its monetary policy on inflation in the rest of the world. But, because targeting a measure of overall world inflation is not a realistic option for an institution with a mandate for domestic price and output stability, we consider a scenario in which the Fed, in addition to responding to domestic core inflation, also responds to oil price inflation. The corresponding simulations are shown as the blue lines in the figure. Monetary policy now is much less accommodative, with nominal interest rates dropping initially by around 1.5 percentage points instead of 2.5 percentage points. They then quickly rise to 0.3 percentage point above the neutral rate in response to upward pressure on oil prices.

Relative to the baseline, under this policy rule, the U.S. output gap deteriorates by 1.2 percentage points, with a cumulative 10-year difference in output losses of 3 percent. On the other hand, a less-accommodative U.S. monetary policy significantly mitigates the boom-and-bust cycle in EA and GOEC, with a 1 percent reduction in excess

<sup>7</sup>This requires a simulation, not shown here, that eliminates supply-side rigidities in energy and commodities. The only major resulting difference is that the maximum increase in real oil prices is 3.5 percent instead of 14 percent and the maximum increase in commodity prices is 4 percent instead of 5.3 percent.

A positive disinflationary shock has roughly symmetric implications for the inflation rate and for the other key variables. Thus, there is

demand in the first year. The impact on world oil prices is large, with the peak increase reduced from 14 percent to 4 percent. A U.S. focus on oil price inflation is not only contractionary at home, but it also induces much greater volatility in inflation, with the benefit again accruing to EA and GOEC, whose inflation volatility falls by about a third. Adopting a more global measure of inflation, while of significant benefit to EA and GOEC, is therefore highly undesirable for the United States. But these regions have a far more powerful option at their disposal to help themselves without requiring sacrifices from others—the move from fixed to flexible exchange rates.

***What Are the Benefits of Flexible Exchange Rate Regimes?***

The red lines in the figure illustrate a scenario in which EA and GOEC also follow an inflation-targeting regime with flexible exchange rates, which causes them to sharply increase nominal interest rates in response to their demand shocks. This roughly halves the output expansion in these regions, with inflation rates only one-quarter of their baseline values. The effect on U.S. output, through reduced demand for U.S. exports, is less than 0.05 percent in the first year and virtually zero thereafter; the same is true for U.S. core inflation. But initial U.S. headline inflation rises by only half as much as under an exchange rate peg, principally because lower demand outside the United States causes the oil price to rise much less strongly, by 9 percent instead of 14 percent.

This provides the answer to the second of our questions: Under current circumstances, flexible exchange rates would indeed make a large difference for countries now pegging to the dollar, with beneficial effects for output and inflation stabilization, including the stabilization of oil and commodity prices.

a transitory decline in inflation, which allows the central bank to lower the interest rate temporarily.

### Supply Shocks and Existing Inflation Pressures

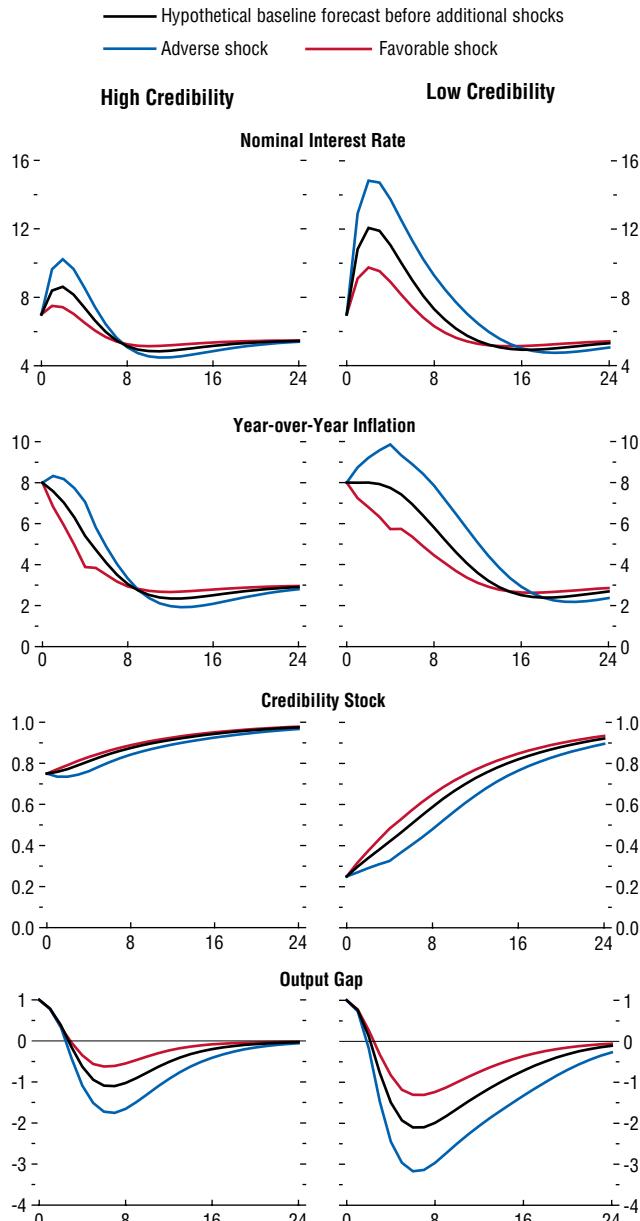
In a second simulation, the same shock hits an economy where there are excess demand pressures and inflation is already significantly above target. Initial inflation is assumed to be at 8 percent, which is above the long-run target of 3 percent—similar to the inflation pressures from overheating faced today by some emerging economies. With initial inflation above target and with low policy credibility, an adverse supply shock will have larger second-round effects on inflation (Figure 3.15, right panels). As expected, an aggressive immediate interest rate response is needed to bring inflation back to target, with rates rising to 14 percent, an increase substantially larger than the increase in inflation. Interest rates also need to remain higher for longer, and the negative output gap is longer-lived. Thus, even if policy responds appropriately, an inflationary supply shock in conjunction with low credibility results in a period of stagflation. By way of comparison, if credibility is higher, inflation can be brought back to target with a less aggressive interest rate response and a lower output cost (Figure 3.15, left panels). In contrast, in the case of a favorable, disinflationary supply shock, it is optimal to reduce inflation over a shorter time period than otherwise, as the more rapid gains from credibility lower the output costs of reducing inflation.

### Supply Shocks with Delayed Monetary Policy Responses

In a final simulation, monetary policy is assumed to fall behind the curve. Specifically, optimal policy is overruled for two quarters by a decision to hold interest rates constant in the face of an inflationary supply shock. In the case of on-target initial inflation and high policy credibility, the picture does not change materially from the path under the optimal responses discussed above (Figure 3.16, left panels). The delay does mean, however, that the interest rate has to rise by more than otherwise. In contrast,

**Figure 3.15. Stylized More-Vulnerable Emerging Market Economy with Adverse and Favorable Supply Shocks**  
(Percent; quarters on the x-axis)

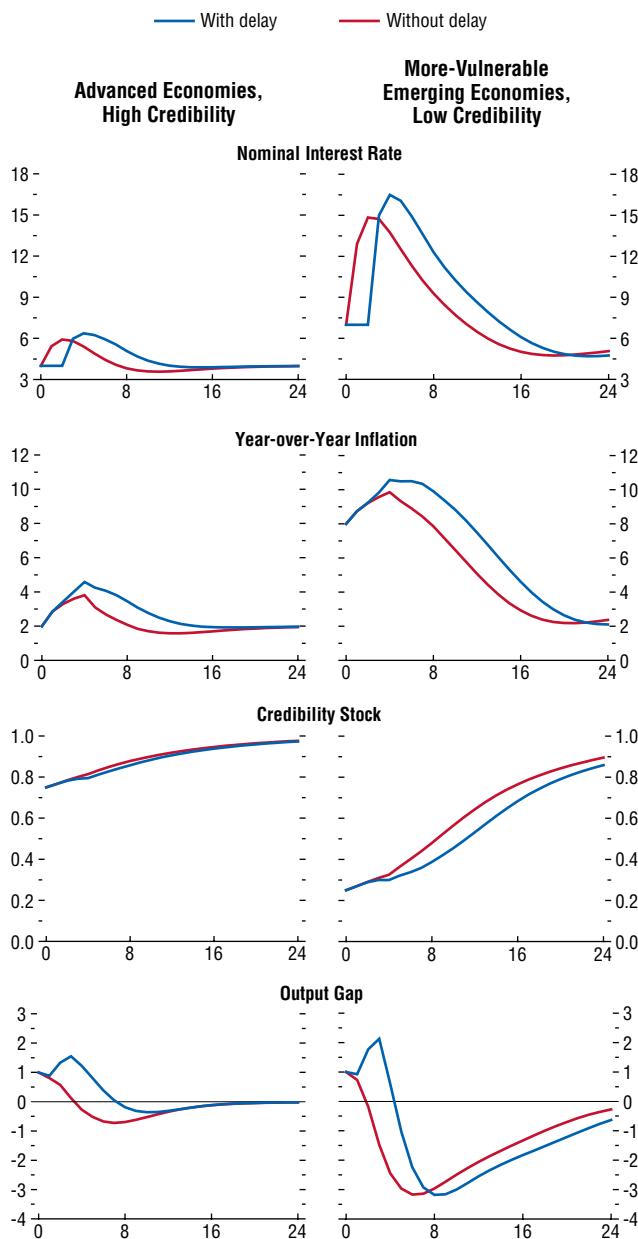
The symmetry between adverse and favorable supply shocks disappears if monetary policy credibility is low and initial inflation is already above target. A more aggressive immediate interest rate response is needed to bring inflation back to target after an adverse supply shock.



Source: IMF staff calculations.

**Figure 3.16. Potential Costs of Delaying Interest Rate Hikes**  
*(Percent; quarters on the x-axis)*

Delaying the monetary policy response to adverse supply shocks implies that interest rates have to rise more in the end to bring inflation back to target, with possible disruptions to credibility building.



Source: IMF staff calculations.

in the case of excessive initial inflation and low credibility, the delay in raising interest rates in response to an adverse supply shock causes inflation to ratchet upward and to remain persistently higher than the long-term target. The damage to credibility means that significantly larger interest rate increases and a more prolonged negative output gap are needed to bring inflation back to target.<sup>43</sup> At the same time, the time horizon for inflation stabilization lengthens, which increases the risks of possible future adverse supply shocks.

If the adverse supply shock resulted in an *upward trend* in commodity prices rather than a *one-time* permanent increase in prices, the monetary policy challenges associated with low credibility and existing inflation pressures would increase further. Simulations (not reported) that consider a more persistent rise in commodity prices show that such shocks would require even more aggressive monetary policy responses. The costs from falling behind the curve would be even greater with such a supply shock.

To sum up, the simulation results underline the overarching importance of monetary policy credibility. When credibility is low, the short-run inflation-output trade-off is worse, which implies that the policy interest rate must increase more vigorously in response to adverse supply shocks with second-round effects. Inappropriate actions or delays can quickly undermine credibility and make achieving price stability more difficult.

## Summary and Conclusions

The world economy has experienced the broadest and most sustained commodity price boom since the early 1970s. The boom has largely been driven by the interaction of strong global growth, a lack of sector-specific spare

<sup>43</sup>Historical experience supports this result. For example, in the United States and Canada in the early 1980s, short-term interest rates rose well above 20 percent, following the adoption of anti-inflation policies by the U.S. Federal Reserve and the Bank of Canada.

capacity and low inventories from the onset of the boom, and slow supply responses. In addition, commodity-specific factors have contributed to the recent surge in food prices, including demand related to biofuel production, supply disruptions for major crops, and trade restrictions. Cross-commodity price linkages have reinforced the price momentum, with rising energy prices spilling into food prices. In contrast, the increasing role of commodities as alternative financial assets has had little, if any, discernible systematic impact on prices, although shifts in market sentiment can affect short-term price dynamics, and financial variables such as interest rates can affect prices through their effects on physical demand and supply.

Recent developments suggest that some of the factors driving the current boom appear to be unwinding. Prospects of slowing global growth in 2008–09—partly in response to high commodity prices—the resolution of weather-related supply constraints for key food crops this year, and increased oil supply have already led to some easing of commodity prices. However, supply constraints and low inventories are likely to remain in place for some time, and the momentum of demand growth in large emerging economies remains robust. The extent of any further easing of prices will depend on the evolving balance between supply factors and global growth, with considerable scope for price volatility.

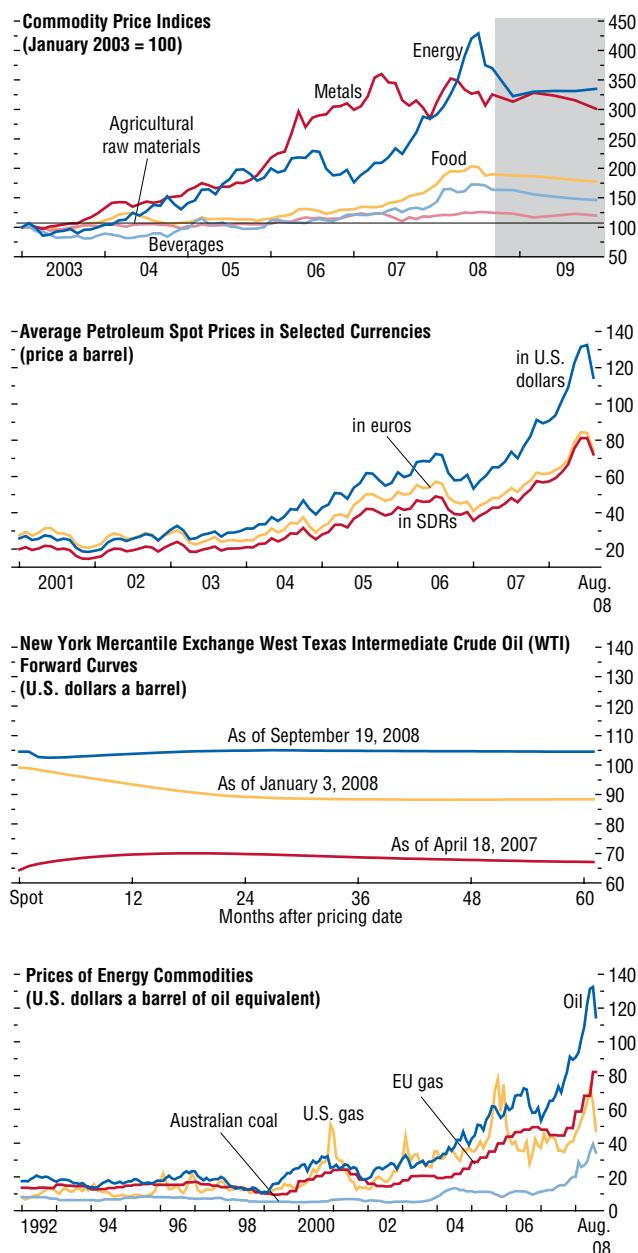
Barring a sharp drop in commodity prices, inflation risks will remain elevated for some time. The adjustment to the earlier commodity price surge is still in train in many economies, and the challenge remains to accommodate these relative price changes without second-round effects, that is, without spillovers into underlying inflation.

The chapter's empirical findings on the pass-through from food and fuel prices to core inflation and inflation expectations suggest that the risks of second-round effects depend importantly on the credibility of monetary policy and its ability to anchor expectations and the weight of commodities—especially food—in final expenditure. Emerging and developing

economies score lower along these dimensions, and a number of them are thus at greater risk, notwithstanding some offset from generally more flexible labor markets. Such risk concerns are corroborated by the recent increases in core as well as headline inflation in some of these economies. Although inflation risks are diminishing in advanced economies owing to the deflationary impact of the financial turmoil, these countries may not be immune to inflation risks. Because the recent commodity price shocks have been larger and more persistent than they were during the period used in the analysis, the actual pass-through may surprise on the upside, unless the global slowdown intensifies.

There are growing signs that monetary policy has not yet responded adequately to the risks of rising inflation in some emerging and developing economies. Real policy interest rates in many of these economies are low, even in the face of strong growth rates, recent increases in core inflation, and relatively higher risks of second-round effects from recent commodity price increases. In some countries, this partly reflects exchange-rate-related constraints on monetary policy, which resulted in some economies having imported the expansionary U.S. monetary policy stance. In turn, monetary policies that are insufficiently tight to contain strong domestic demand may recently have put some additional pressure on international commodity prices.

As the chapter's simulation results highlight, delays in responding to rising inflation can erode monetary policy credibility, particularly if inflation expectations are not well anchored—which the chapter suggests remains the case for many emerging economies. As a result, more aggressive monetary policy responses may ultimately be needed to bring inflation back to target, at a higher cost in terms of output than would have been involved in a timely monetary policy response. Such dynamics are generally reinforced by higher initial inflation levels or inflation pressure from tightening capacity constraints. At the same time, even with a timely response, the time needed to reduce inflation

**Figure 3.17. Commodity and Petroleum Prices**

Sources: Bloomberg Financial Markets; and IMF staff estimates.

is likely to be longer with low policy credibility, making an economy more vulnerable to future adverse supply shocks. This highlights the importance of an adequate monetary policy response to the rising inflation seen in the wake of recent commodity price surges, especially where current inflation is already high ("above" target) for other reasons, notably overheating, and where policy credibility is low.

### Appendix 3.1. Recent Commodity Market Developments

The main author of this appendix is Valerie Mercer-Blackman, with contributions from To-Nhu Dao and Nese Erbil.

Commodity prices rose by 33 percent during the first six months of 2008, led by soaring fuel prices, before softening in the third quarter of the year. Oil prices continued to rise rapidly over most of this period, and they remain at high levels by historical standards, notwithstanding some recent declines. Food prices surged in the first quarter of 2008, led by wheat and rice, but stabilized thereafter, as prices of these two grains started to decline. Prices of agricultural raw materials and beverages increased only moderately overall, whereas base metals prices broadly stabilized (Figure 3.17, top panel).

### Fuel Prices Leading the Surge

Oil prices reached an all-time record high (in both nominal and real terms) of \$143 a barrel on July 11, and then declined to just over \$100 by mid-September.<sup>44</sup> Oil prices in euros also reached record highs, although the rise was 24 percentage points less than in dollar terms during the first six months of 2008 (Figure 3.17, second panel).

Despite rising slightly from their lows in late 2007 in terms of forward cover, OECD stocks

<sup>44</sup>Unless otherwise stated, oil prices refer to the IMF's Average Petroleum Spot Price, which is a simple average of the prices for the West Texas Intermediate, Dated Brent, and Dubai Fateh grades.

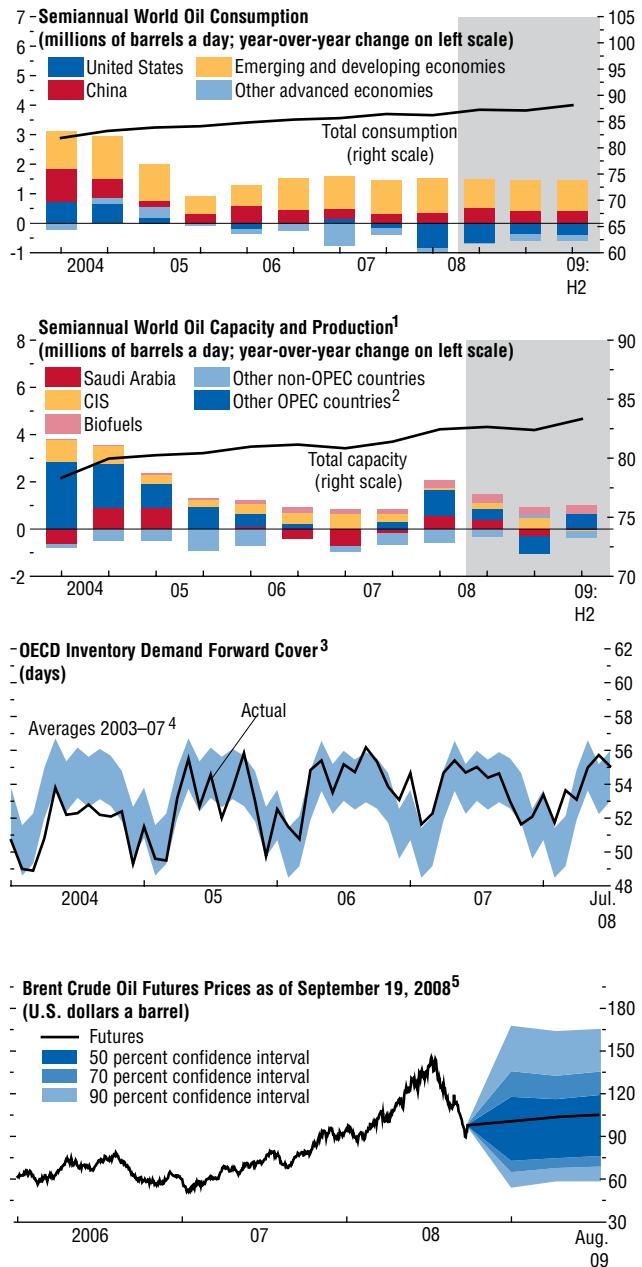
remained at relatively low levels in the first half of 2008. Reflecting this and the recent easing of broad market conditions (see below), the futures price curve moved from backwardation in the first quarter to a very mild contango in recent weeks, a constellation that provides incentives for further near-term inventory buildup (Figure 3.17, third panel). Nevertheless, shifts of the futures curve have dominated movements along the curve in terms of magnitudes, particularly in mid-September, when broad financial market volatility spilled into oil markets.

Diesel prices have risen much faster than gasoline prices, reflecting strong demand growth for this product relative to global refining capacity. Consequently, refining margins for diesel have generally been much higher than for gasoline, although gasoline crack spreads temporarily shot up in mid-September on hurricane-related temporary refining outages. Prices of other fuel products have followed crude oil prices, albeit with a lag (Figure 3.17, bottom panel). Coal prices, in particular, rose by 70 percent during the first six months of 2008, the largest increase among all energy products. This reflected short-term factors (such as supply disruptions early in the year), bottlenecks in major shipping ports, and the gradual substitution from coal in power generation away from more expensive fuel oil.

World oil consumption moderated slightly after seven consecutive years of rising prices, rising by roughly 0.7 million barrels a day (mbd) during the first half of 2008 (year over year), compared with 1 mbd during 2005–07. Consumption in OECD member countries declined by 1.0 mbd during this period, primarily in the United States, but rose by 1.5 mbd in non-OECD countries, led by China, the Middle East, and Latin America (Table 3.3, and Figure 3.18, top panel). Across different products, demand for transportation fuels (gasoline and diesel) has grown the most, driven by increased vehicle ownership in emerging and developing economies amid continued fuel subsidies and price controls.<sup>45</sup> However,

<sup>45</sup>In many economies that have limited the fuel price pass-through, the fiscal burden from fuel subsidies has

**Figure 3.18. World Oil Market Balances and Oil Futures Price**



Sources: Bloomberg Financial Markets; International Energy Agency; U.S. Energy Information Agency; and IMF staff estimates.

<sup>1</sup>CIS is the Commonwealth of Independent States. OPEC is the Organization of Petroleum Exporting Countries.

<sup>2</sup>Includes OPEC natural gas liquids.

<sup>3</sup>OECD is the Organization for Economic Cooperation and Development.

<sup>4</sup>Band is based on averages for each calendar month during 2003–07 and a 40 percent confidence interval based on deviations during this period.

<sup>5</sup>From futures options.

**Table 3.3. Global Oil Demand and Production by Region**  
(Millions of barrels a day)

|   | 2006        | 2007       | 2008<br>Proj. | 2007       |            | 2008<br>H1  | Year-over-Year Percent Change |      |               |      |      |            |
|---|-------------|------------|---------------|------------|------------|-------------|-------------------------------|------|---------------|------|------|------------|
|   |             |            |               | H1         | H2         |             | 2006                          | 2007 | 2008<br>Proj. | 2007 |      | 2008<br>H1 |
|   |             |            |               | H1         | H2         |             |                               |      |               | H1   | H2   |            |
| <b>Demand</b>                           |             |            |               |            |            |             |                               |      |               |      |      |            |
| OECD                                    | 49.6        | 49.2       | 48.4          | 49.0       | 49.3       | 48.1        | -0.5                          | -0.8 | -1.3          | -1.0 | -0.6 | -1.9       |
| North America                           | 25.4        | 25.5       | 24.8          | 25.5       | 25.5       | 24.8        | -0.6                          | 0.5  | -2.6          | 1.1  | -0.2 | -3.4       |
| <i>Of which:</i>                        |             |            |               |            |            |             |                               |      |               |      |      |            |
| United States                           | 21.0        | 21.0       | 20.3          | 21.1       | 22.0       | 20.2        | -0.5                          | 0.0  | -3.5          | 0.8  | 0.8  | 3.9        |
| Europe                                  | 15.7        | 15.3       | 15.2          | 15.1       | 15.5       | 15.0        | 0.1                           | -2.4 | -0.4          | -3.6 | -1.2 | -0.4       |
| Pacific                                 | 8.5         | 8.3        | 8.4           | 8.4        | 8.3        | 8.5         | -1.4                          | -1.6 | 1.1           | -2.4 | -0.8 | 0.9        |
| Non-OECD                                | 35.5        | 36.9       | 38.3          | 36.6       | 37.1       | 38.2        | 4.0                           | 3.8  | 3.8           | 3.7  | 3.9  | 4.0        |
| <i>Of which:</i>                        |             |            |               |            |            |             |                               |      |               |      |      |            |
| China                                   | 7.2         | 7.5        | 8.0           | 7.5        | 7.6        | 7.9         | 7.8                           | 4.6  | 5.6           | 4.8  | 4.3  | 4.9        |
| Other Asia                              | 9.0         | 9.3        | 9.5           | 9.3        | 9.2        | 9.6         | 2.3                           | 2.8  | 2.4           | 2.2  | 3.5  | 3.6        |
| Former Soviet Union                     | 4.1         | 4.1        | 4.2           | 4.0        | 4.2        | 4.1         | 3.4                           | 1.7  | 2.5           | 2.1  | 1.3  | 2.2        |
| Middle East                             | 6.2         | 6.5        | 6.9           | 6.5        | 6.6        | 6.8         | 4.0                           | 4.7  | 5.9           | 5.5  | 4.0  | 6.0        |
| Africa                                  | 3.0         | 3.1        | 3.1           | 3.1        | 3.1        | 3.2         | 0.9                           | 3.9  | 1.7           | 3.0  | 4.7  | 2.2        |
| Latin America                           | 5.3         | 5.6        | 5.9           | 5.5        | 5.7        | 5.8         | 4.6                           | 5.2  | 4.3           | 4.8  | 5.7  | 4.7        |
| World                                   | 85.1        | 86.1       | 86.8          | 85.7       | 86.5       | 86.2        | 1.3                           | 1.1  | 0.8           | 1.0  | 1.3  | 0.7        |
| <b>Production</b>                       |             |            |               |            |            |             |                               |      |               |      |      |            |
| OPEC (Current composition) <sup>1</sup> | 36.3        | 35.9       |               | 35.5       | 36.4       | 37.2        | 0.8                           | -0.9 |               | -2.1 | 0.2  | 4.7        |
| <i>Of which:</i>                        |             |            |               |            |            |             |                               |      |               |      |      |            |
| Saudi Arabia                            | 10.4        | 10.0       |               | 9.9        | 10.1       | 10.4        | -1.5                          | -4.4 |               | -7.0 | -1.8 | 5.6        |
| Nigeria                                 | 2.5         | 2.3        |               | 2.3        | 2.4        | 2.1         | -5.2                          | -4.8 |               | -4.4 | -5.1 | -8.2       |
| Venezuela                               | 2.8         | 2.6        |               | 2.6        | 2.6        | 2.6         | -5.8                          | -7.8 |               | -9.6 | -5.9 | -0.7       |
| Iraq                                    | 1.9         | 2.1        |               | 2.0        | 2.2        | 2.4         | 4.9                           | 9.9  |               | 5.3  | 14.3 | 23.9       |
| Non-OPEC                                | 49.2        | 49.6       | 49.9          | 49.8       | 49.4       | 49.7        | 1.1                           | 0.9  | 0.6           | 1.6  | 0.1  | -0.2       |
| <i>Of which:</i>                        |             |            |               |            |            |             |                               |      |               |      |      |            |
| North America                           | 14.3        | 14.2       | 14.1          | 14.1       | 14.1       | 14.2        | 0.6                           | 0.4  | -1.6          | -0.3 | -0.4 | 1.0        |
| North Sea                               | 4.8         | 4.6        | 4.3           | 4.7        | 4.5        | 4.4         | -7.6                          | -5.0 | -6.6          | -5.6 | -4.4 | -5.5       |
| Russia                                  | 9.8         | 10.1       | 10.0          | 10.1       | 10.1       | 10.0        | 2.2                           | 2.4  | -0.5          | 3.2  | 1.6  | -0.8       |
| Other former Soviet Union               | 2.4         | 2.7        | 2.9           | 2.7        | 2.7        | 2.9         | 11.1                          | 12.0 | 8.4           | 16.9 | 7.5  | 6.5        |
| Other non-OPEC                          | 17.9        | 17.9       | 18.6          | 18.3       | 18.0       | 18.3        | 2.3                           | 0.4  | 3.5           | 2.3  | -0.2 | -0.4       |
| World                                   | 85.5        | 85.6       |               | 85.4       | 85.8       | 86.9        | 1.0                           | 0.1  |               | 0.0  | 0.2  | 1.9        |
| <b>Net Demand<sup>2</sup></b>           | <b>-0.4</b> | <b>0.5</b> |               | <b>0.3</b> | <b>0.7</b> | <b>-0.7</b> |                               |      |               |      |      |            |

Sources: International Energy Agency, *Oil Market Report* (September 2008); and IMF staff calculations.

<sup>1</sup>Includes Angola (subject to quotas since January 2007) and Ecuador (rejoined OPEC in November 2007, after having suspended its membership from December 1992 to October 2007).

<sup>2</sup>Net demand is the difference between demand and production. It includes a statistical difference. A positive value indicates a tightening of market balances.

gasoline consumption in the United States fell by 1.7 percent in the first half of 2008—the first drop in at least 15 years—and has continued to fall to date, according to preliminary data,

been increasing. Indeed, major product importers such as the Islamic Republic of Iran, Malaysia, and Pakistan have increased domestic prices by about 20 percent in response to this rising burden.

reflecting constrained incomes amid weakening economic activity and, increasingly, a demand response to one of the sharpest pickups in gasoline prices in recent U.S. history.

Oil production increased by 1.6 mbd during the first half of 2008, as OPEC production increased by 1.7 mbd (year over year), partly on account of the organization's September 2007 decision to raise output as of November 2007.

Within OPEC, production increases in Saudi Arabia (thereby rising above the September 2007 production quota), a pickup in Iranian exports, and production recovery in Iraq more than offset output losses in Nigeria (from continued attacks on production facilities) and sluggish Venezuelan output. In contrast, non-OPEC crude oil supply fell by 0.1 mbd, reflecting mostly unexpected falls in Russian output and field declines in the North Sea and Mexico. In addition, liquid fuel supply has benefited from important increases in OPEC natural gas liquids (NGLs, not subject to quotas) and bio-fuels, which contributed one-quarter of the net increase in supply during the first half of 2008 (Figure 3.18, second panel).

In the near term, oil market conditions may ease further. On an annual basis, the International Energy Agency (IEA) forecasts global demand growth at 0.8 mbd in 2008 and 0.7 mbd in 2009, down from 1.1 mbd in 2007. Non-OPEC supply is expected to pick up by 1.2 mbd during the second half of 2008 (compared to the same period in the previous year), before decreasing again gradually in 2009. The completion of a host of new projects, particularly in Saudi Arabia, should temporarily lift OPEC spare capacity levels. The easing may not be long-lasting, however. In its recent *Medium-Term Oil Market Report*, the IEA expects OPEC spare capacity (as a share of global consumption) to fall to below 2008 levels by 2012, as OECD demand recovers in the outer years and supply growth trends remain limited (partially because of increased field decline rates).

With the moderate easing of market conditions—at least through end-2009—but with inventories and spare capacity still low, prices are expected to remain high, albeit below recent peaks. Oil futures options prices suggest a much wider range of uncertainty about price prospects than in recent years. As shown in the fan chart (Figure 3.18, bottom panel), the 90 percent confidence interval for end-2008 oil prices ranges from about \$60 a barrel to more than \$165 a barrel, a much wider range than typically observed.

### Rising Food Prices Driven by Prices of Major Crops

Grain and vegetable oil prices picked up sharply during the first half of 2008 amid trade restrictions and tight supplies, leading to a 23 percent increase in the IMF's food price index during the first six months of 2008.

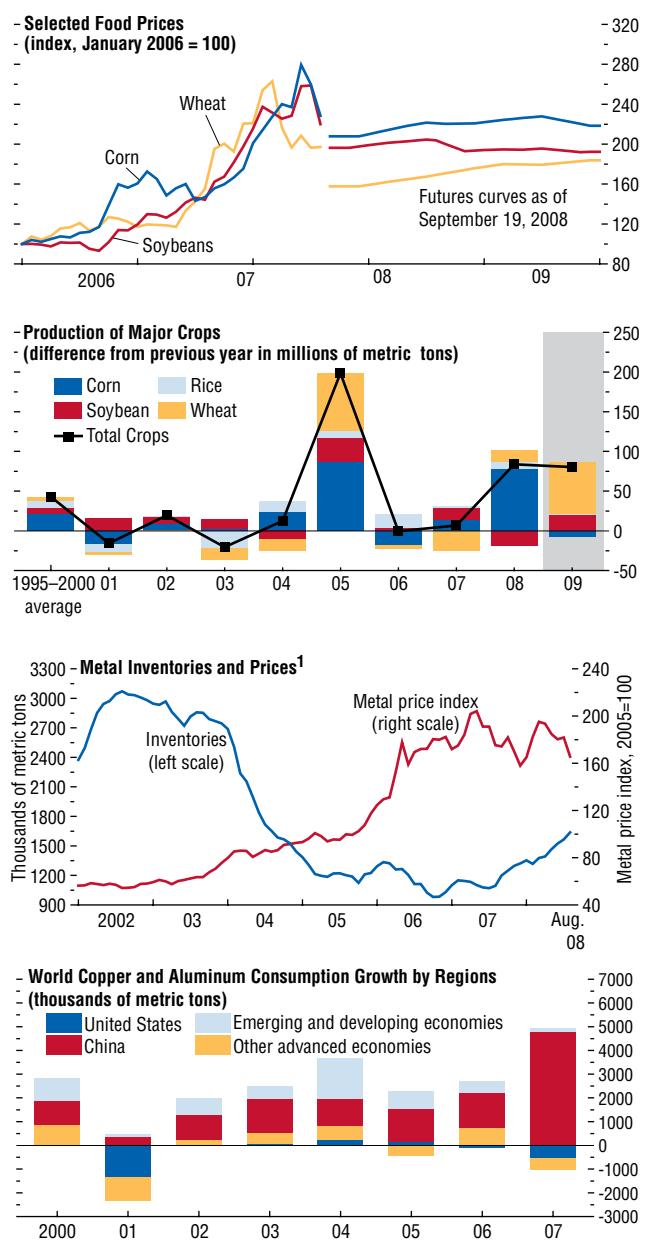
Wheat prices reached record-high nominal levels in early March of this year following poor, drought-related crops in 2006 and 2007 but have declined since, as more favorable weather conditions led to a bumper crop this year. Rice prices began to rise in late 2007, as consumers in developing economies switched from high-priced wheat and corn toward cheaper rice. Price increases accelerated in early 2008, when major exporters started to impose trade bans (Figure 3.19, top panel).<sup>46</sup>

Corn and soybean prices have remained high so far in 2008, with a short-lived spike in June when floods in the U.S. Midwest (the largest producing region in the world) led to fears of crop damage. Other agricultural product prices have also risen, although much more gradually, partly because supplies and inventory levels have so far remained more comfortable. Meat and poultry prices have risen due to higher animal feed costs. Food prices are expected to remain high, given continued demand pressures, particularly for corn-based ethanol. As limited acreage moves from corn to wheat and soybeans on the margin in response to relative price movements, corn production is expected to fall slightly in 2009 from 2008 (Figure 3.19, second panel). Moreover, high oil prices will affect agricultural production costs more broadly in the coming years, in particular through the effect on higher fertilizer prices.

### Metal Prices Stabilized

Divergent trends in fundamentals explain the widely varying performance of base metal

<sup>46</sup>Rice is mostly consumed domestically, and the share of global trade to consumption is very small (with large importers receiving the bulk of rice from only one or two producers).

**Figure 3.19. Developments in Food and Metal Markets**

Sources: Bloomberg Financial Markets; World Bureau of Metal Statistics; and IMF staff calculations.

<sup>1</sup>Inventories refer to the sum of global stocks of copper, aluminum, tin, zinc, nickel, and lead monitored by the London Metal Exchange. Price refers to a composite index of these metals.

markets through 2008 to date. Iron ore<sup>47</sup> prices increased by 66 percent, and copper and aluminum prices rebounded by 17 percent and 21 percent, respectively, but zinc and nickel prices declined sharply. While demand for copper and aluminum, which are more widely traded than the other metals, has weakened, supply in key producers (Chile, China, and South Africa) has been adversely affected by disruptive power shortages. In contrast, zinc and nickel inventory levels at the London Metals Exchange have recovered in the face of declining demand and rising production (Figure 3.19, third panel).

Looking ahead, base metal prices should ease in 2008 and 2009, as demand growth is expected to weaken with slowing global industrial production and the end of the Olympic Games construction run-up in China (Figure 3.19, bottom panel). However, continued supply-side problems will likely provide for tight copper and aluminum market balances for some time.

## Appendix 3.2. Accounting for Food Price Increases, 2006–08

The main author of this appendix is Valerie Mercer-Blackman, with contributions from Stephen Tokarick.

This section describes the methodology used in estimating the impact of the various demand and supply factors on the prices of the six key commodities discussed in the main text (as shown in Figure 3.5, third panel). For tractability, the analysis is based on simple partial equilibrium approaches.

The amount of weather-related supply shortfalls,  $q_i^{sh}$ , was determined by the deviation of global production from trend, based on annual crop data since 1990.<sup>48</sup> The percent change in

<sup>47</sup>Iron ore prices are determined by annual contracts among producers and steel makers. The April 2008 increase largely reflected soaring mining costs over the previous year and strong demand.

<sup>48</sup>Typically, shortfalls (negative deviations) were the result of lower yields, not reductions in planted acreage,

**Table 3.4. Elasticity Estimates Used for Price Calculations**

|                      | Own-Price-Demand Elasticity | Own-Price-Supply Elasticity | Cross-Price Elasticity of Supply with Wheat | Cross-Price Elasticity of Demand with Soybeans <sup>1</sup> |
|----------------------|-----------------------------|-----------------------------|---|---|
| Corn                 | -0.21 to -0.43              | 0.50                        | -0.08 to -0.1                               | 0.36 to 0.54  |
| Rice                 | -0.38                       | 0.32                        | ...   | ...   |
| Wheat                | -0.3                        | 0.48                        | ...   | ...   |
| Soybeans/soybean oil | -0.31 to -0.48              | 0.23                        | -0.03                                       | ...   |
| Rapeseed oil         | -1.2                        | 0.58                        | -0.62 to -0.8                               | 0.57  |
| Palm oil             | -0.47                       | 0.21                        | ...   | ...   |

<sup>1</sup> Soybeans are important substitutes for corn on the supply and demand sides. The cross-supply of corn and soybeans estimates range between -0.27 and -0.3.

the global price of commodity  $i$ , as a result of the supply shortfall  $q_i^{sh}$  was calculated as

$$\% \Delta P_i = \varepsilon_i^m * q_i^{sh} = \sum_c w_c [(\varepsilon_{i,c}^D * (C_{i,c}/M_{i,c}) - \varepsilon_i^S * (Q_{i,c}/M_{i,c})) * q_i^{sh}] \quad (1)$$

where  $\varepsilon_i^m$ , the global import demand elasticity of commodity  $i$ , is a weighted average of the import elasticities of demand of the main importing countries (where  $w_c$  is the import weight of country  $c$ ). This depends on the elasticities of demand ( $\varepsilon_{i,c}^D$ ), and supply ( $\varepsilon_i^S$ ) of country  $c$ , respectively.  $M_{i,c}$  is total imports,  $C_{i,c}$  is total consumption, and  $Q_{i,c}$  is total production of the commodity  $i$  in country  $c$ .

The price impact of higher energy prices was calculated using the contribution of fuel and fertilizers to the production cost of each food commodity, as reported by the U.S. Department of Agriculture (USDA). For the 2007 and 2008 crop years, the costs were estimated based on the IMF commodity price projections, assuming that other costs grow at trend. The corresponding cost shares for palm oil and rapeseed oil are based on Fedepalma (2008) and North Carolina Solar Center (2006) estimates, respectively. The calculations assume full pass-through of higher costs to prices and a similar cost structure in crop production across the globe.

The price impact of increased biofuel demand was calculated for food items for which more than 1 percent of the crop was used as

including for wheat and rapeseed oil, thereby corroborating the approach.

biofuel feedstock (which excluded wheat).<sup>49</sup> The expansion of demand attributed to biofuels is then expressed as the percentage difference between the growth in total demand for the crop ( $d_i$ ) and demand growth excluding biofuels (denoted as  $d_i^b$ ).<sup>50</sup> The price impact (in percent) was then calculated as

$$\% \Delta P_i = (d_i - d_i^b) * (1/\varepsilon_i^D), \quad (2)$$

where  $\varepsilon_i^D$  is the own-price elasticity of demand for the crop. A range of elasticity estimates from various sources were used (Table 3.4). Moreover, because a by-product of corn-based ethanol is distiller's dried grains with solubles (DDGS), which is used for animal feed (about 30 percent of every bushel of corn used in production), this additional supply was deducted from the demand for biofuel use.

To measure the impact of trade restrictions, a slightly modified version of the trade model in Tokarick (2003) was used. Supply and demand are modeled as constant elasticity functions, using elasticities from Gardiner, Roningen, and Liu (1989). Data on commodity trade values were taken from the UN COMTRADE database. Production value data were estimated using

<sup>49</sup>The shares of biofuel feedstocks were calculated using USDA data (adjusting the share of each crop used for industrial purposes) and IEA data on biofuel production.

<sup>50</sup>This definition takes into account two competing aspects. On the one hand, it is demand change, not demand levels, that has the greatest impact on prices. On the other hand, it avoids measuring the change from such a low base (given that biofuels are a small share of total demand), which would exaggerate the impact of demand growth for biofuel use on price.

volume data from the USDA's FAS database and IMF price indices.

These direct effects, which can be considered initial shocks, together explain about half of the total price increase of these foods during the period considered (2006 and 2007 crop years). It would be impossible to account fully for the indirect effects of the shocks. However, it is possible to get a sense of the relative magnitude of the cross-effects due to supply and demand substitution and comovements. Two indicators are considered (see Table 3.2):

- *For substitution across commodities:* Assuming symmetry and no second-order effects, the impact of a price increase in commodity  $j$ ,  $\Delta P_j$  on commodity price  $i$ ,  $\Delta P_i$ , is given by

$$\frac{\Delta P_i}{P_i} = \frac{\varepsilon_{ij}}{\varepsilon_i} * \left( \frac{\Delta P_j}{P_j} \right), \quad (3)$$

where  $\varepsilon_{ij}$  is the cross-price elasticity of supply (demand) between commodities  $i$  and  $j$ , and  $\varepsilon_j$  is the own-price elasticity of supply (demand) of commodity  $j$ , assuming commodities  $i$  and  $j$  are substitutes in production (consumption).

- *Comovement across time:* This was determined using the concordance statistic. The statistic was estimated for all commodity price pairs using monthly data from January 1957 to May 2008 (starting in 1980 for rapeseed oil), using the methodology of Cashin, McDermott, and Scott (1999). The concordance statistic between commodities  $i$  and  $j$ , defined as the proportion of time two commodities are on the same phase of the cycle, is denoted as

$$C_{ij} = T^{-1} \left\{ \sum_{t=1}^T (S_{i,t} * S_{j,t}) + \sum_{t=1}^T (1 - S_{i,t}) (1 - S_{j,t}) \right\}, \quad (4)$$

where  $S_{i,t}$  is a binary random variable taking the value unity when the price of commodity  $i$ ,  $P_i$  is in a boom phase and zero when it is in a slump phase. The same definition applies to  $S_j$ .  $T$  is the sample size and  $C_{ij} \in \{0,1\}$  measures the proportion of time the two series are in the same phase.

The elasticity estimates used in the calculation are weighted, global composites of individual country elasticities taken from Gardiner, Roningen, and Liu (1989). Plausible elasticity ranges for soybean oil and European rapeseed oil were also taken from the FAPRI/GOLD model estimates in Westhoff and Young (2000) and Arnade, Kelch, and Leetmaa (2002). Estimates and ranges used are shown in Table 3.4.

### Appendix 3.3. Estimating Inflationary Effects of Commodity Price Shocks

*The main author of this Appendix is Irina Tytell.*

This section outlines the methodology behind the two econometric exercises discussed in the main text and in Figures 3.11 and 3.12.

#### Commodity Price Pass-Through

The pass-through coefficients shown in Figure 3.11 are obtained using quarterly data for 25 emerging economies and 21 advanced economies (9 for the 1970–95 period). First, the pass-through from international to domestic prices of food and fuel is estimated using country-by-country bivariate regressions of the following form:

$$\pi_t^{domestic} = \alpha + \sum_{i=1}^4 \beta_i \pi_{t-i}^{domestic} + \sum_{i=0}^4 \delta_i \pi_{t-i}^{world} + \varepsilon_t. \quad (1)$$

In these equations  $\pi$  stands for the annualized quarter-over-quarter log difference (in percent) in, respectively, food or fuel prices (the equations also include seasonal dummies). The reported pass-through coefficients reflect the full long-term pass-through from international to domestic prices:

$$price\ pass-through = \frac{\sum_{i=0}^4 \delta_i}{1 - \sum_{i=1}^4 \beta_i}. \quad (2)$$

Second, the pass-through from domestic food and fuel prices to core inflation is estimated

using the following generalized Phillips curve equations for each country:<sup>51</sup>

$$\pi_t = \alpha + \sum_{i=1}^4 \beta_i \pi_{t-i} + \sum_{i=0}^4 \gamma_i (y_{t-i} - y_{t-i}^*) + \sum_{i=0}^4 \phi_i \pi_{t-i}^{food} + \sum_{i=0}^4 \phi_i \pi_{t-i}^{fuel} + \varepsilon_t \quad (3)$$

$$\text{food price pass-through} = \frac{\sum_{i=0}^4 \phi_i}{1 - \sum_{i=1}^4 \beta_i}$$

$$\text{food price pass-through} = \frac{\sum_{i=0}^4 \phi_i}{1 - \sum_{i=1}^4 \beta_i}$$

As above,  $\pi$  stands for the annualized quarter-over-quarter log difference (in percent) in core, food, and fuel prices, while  $y$  and  $y^*$  denote the annualized quarter-over-quarter log difference (in percent) in, respectively, real and potential GDP (the equations also include seasonal dummies).<sup>52</sup> In order to limit contamination of the estimates by endogenous factors, the pass-through from domestic commodity prices to core inflation is estimated using predicted values of domestic food and fuel inflation from the first-stage bivariate regressions. In this way, domestic food and fuel prices reflect only the variation that is due to changes in international prices and lagged effects of domestic price developments, rather than movements in labor, transportation, and retailing costs that may have common origins with overall inflation.

The resulting pass-through coefficients are aggregated across countries using weighted averages, with weights inversely proportional to the standard errors of the corresponding coun-

try-specific coefficients.<sup>53</sup> Given considerable variation across individual—especially emerging—economies that reflects in part differences in data quality, measurement of inflation, and sample periods, this approach is designed to give more weight to more precisely estimated pass-through coefficients.

### Expectations and Actual Inflation

The responses of expectations to actual inflation shown in Figure 3.12 are based on a semiannual panel data set for 14 advanced and 21 emerging economies that covers the period starting in 2003. The exercise links changes in expected inflation to changes in actual headline inflation and disaggregates the latter into core inflation and changes in domestic inflation rates for food and fuel:<sup>54</sup>

$$\begin{aligned} \Delta\pi_{i,t}^{expected} &= \lambda_i + \theta\Delta\pi_{i,t}^{headline} + \varepsilon_{i,t} \\ &= \mu_i + \alpha\Delta\pi_{i,t}^{core} + \beta\Delta\pi_{i,t}^{food} \\ &\quad + \gamma\Delta\pi_{i,t}^{fuel} + \nu_{i,t} . \end{aligned} \quad (4)$$

In these equations,  $\Delta\pi$  denotes first differences in expected inflation at various horizons (1, 3, 5, and 6–10 years ahead) and actual inflation (headline, as well as its core, food, and fuel components) in percentage points. The data on inflation expectations are obtained from Consensus Economics and are based on surveys of professional forecasters published twice yearly in March/April and September/October. To correspond to these frequencies, the data on actual inflation refer to the first and third quarters of each year and are measured in year-over-year terms. To better disentangle the impact of food and fuel from core inflation, a residual from a regression of core on food and fuel inflation (in first differences) is used in place of actual core inflation. The equations also include country-

<sup>51</sup>This approach is similar to the one used by De Gregorio, Landerretche, and Neilson (2007) to estimate pass-through from the world oil price to domestic inflation. See also Blanchard and Galí (2007).

<sup>52</sup>Core inflation is based on the CPI excluding food and energy prices. OECD data on potential GDP are used for OECD countries, and the Hodrick-Prescott filtered trend is employed to estimate potential GDP for non-OECD countries.

<sup>53</sup>In dynamic models, aggregating country-by-country estimates is preferable to aggregating the underlying data or using pooled panel regressions, as shown by Pesaran and Smith (1995).

<sup>54</sup>See Goretti and Laxton (2005) and Levin, Natalucci, and Piger (2004) for similar analyses, although without the disaggregation of headline inflation into core, food, and fuel components.

and year-fixed effects. The reported results include only the coefficients that are statistically significant at the 10 percent level.

The sample of emerging economies is further split by the weight of food in the consumer price index (CPI) and by the type of monetary policy regime.<sup>55</sup> Countries are grouped into those with high (low) food weights if the weight of food in their CPI is above (below) 25 percent. By this definition, Chile, China, Colombia, Hong Kong SAR, India, Indonesia, Peru, Romania, Russia, Taiwan POC, Turkey, and Ukraine have a high weight of food in the CPI; Brazil, Czech Republic, Hungary, Korea, Mexico, Poland, Singapore, Slovak Republic, and Thailand have a low food weight. With respect to the type of monetary policy regime, inflation targeters are defined as countries that introduced this regime prior to the beginning of the sample period and excludes more recent inflation targeters. Therefore, Brazil, Chile, Colombia, Czech Republic, Hungary, Korea, Mexico, Peru, Poland, and Thailand are classified as inflation targeters, whereas China, Hong Kong SAR, India, Indonesia, Romania, Russia, Singapore, Slovak Republic, Taiwan POC, Turkey, and Ukraine are classified as non-inflation-targeters.

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<sup>55</sup>It is worth noting that the two splits overlap: inflation targeters tend to have relatively low food weights.

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*This chapter examines why some episodes of financial stress lead to economic downturns and others have only a limited impact on the overall economy. The analysis indicates that episodes of financial turmoil characterized by banking sector distress are more likely to be associated with severe and protracted downturns than episodes of stress centered mainly in securities or foreign exchange markets. Countries with more arm's-length financial systems seem particularly vulnerable to sharp contractions in economic activity, because of the greater procyclicality of leverage in their banking systems. This chapter draws implications for economic prospects in the United States and the euro area and considers how policy responses could help limit the output consequences of the current and future financial crises.*

The financial turmoil that began in the summer of 2007 has mutated into a full-blown crisis, encompassing broader securities markets and the banking systems of several advanced economies. How will macroeconomic activity be affected, and what can policymakers do both to reduce the economic consequences of this crisis and to forestall such crises in the future? Although past episodes of stress in banking, securities, and/or foreign exchange markets have only sometimes been associated with economic downturns (Figure 4.1, top panel), these downturns have tended to be more severe (Figure 4.1, bottom panel).

An important concept in assessing the impact of financial stress on economic activity is the role of financial cycles, which have been a constant feature of the economic landscape despite the evolution of financial systems through innova-

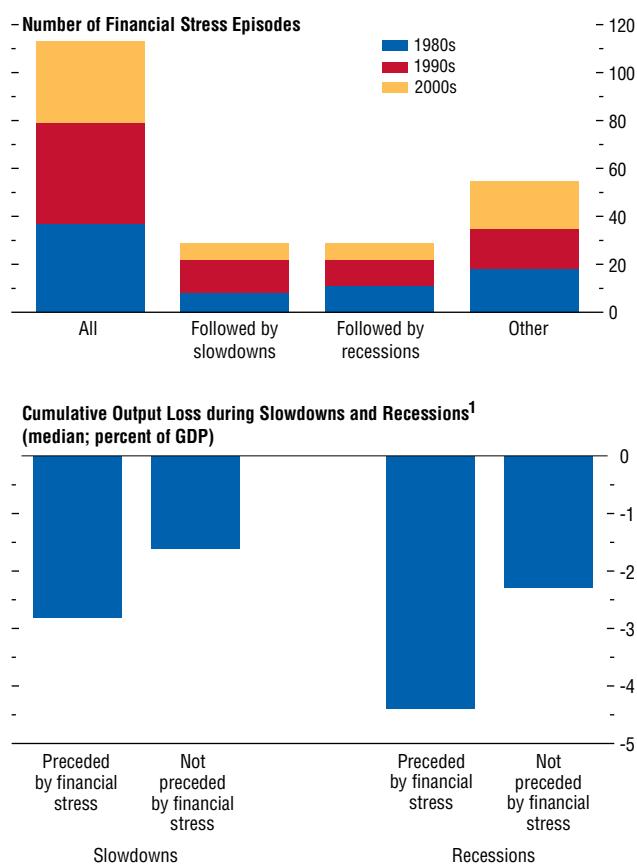
The main authors of this chapter are Subir Lall, Roberto Cardarelli, and Selim Elekdag, with support from Angela Espiritu and Gavin Asdorian. Hyun Song Shin provided consultancy support. Jörg Decressin and Tim Lane were chapter supervisors.

tion and regulatory changes. Financial systems are inherently procyclical, with growth in credit, leverage, and asset prices often reinforcing the underlying economic dynamic—and in some cases leading to a buildup of financial imbalances followed by a sharp correction (see Borio, 2007; Goodhart, 1996; and Minsky, 1992).

The impact of financial cycles on the real economy remains subject to debate in both academic and policy circles. One strand of research emphasizes the role of the financial accelerator in amplifying the effects of financial cycles on the real economy through its effect on the value of collateral and thereby on the willingness of the financial system to provide credit to the economy (Bernanke and Gertler, 1995; Bernanke, Gertler, and Gilchrist, 1999; and Kiyotaki and Moore, 1997). In this view, shocks that affect the creditworthiness of borrowers tend to accentuate swings in output. Another branch of inquiry focuses on lenders' balance sheets and the relationship between bank capital and aggregate credit, the so-called bank capital channel (Bernanke, Lown, and Friedman, 1991; Kashyap and Stein, 1995; Peek and Rosengren, 1995; and Altunbas, Gambacorta, and Marqués, 2007). When bank capital is eroded, banks become more reluctant to lend and may be forced to deleverage, leading to sharper economic downturns. Another area of analysis is the extent to which the role of the financial accelerator in the economy varies with the type of financial system (*World Economic Outlook*, September 2006; and Rajan and Zingales, 2003). The general trend toward greater reliance on arm's-length financing and less reliance on relationship-based lending may have left economies better able to absorb financial stress, as both households and firms can now substitute away from banks to markets (and thus benefit from the so-called twin engines of the financial system).

**Figure 4.1. Financial Stress and Output Loss**

Only about half the episodes of financial stress identified in Chapter 4 for advanced economies over the past three decades were followed by economic downturns. Slowdowns and recessions preceded by financial stress tend to be longer and more severe.



Sources: Haver Analytics; OECD, Analytic Database; OECD, *Economic Outlook* (2008); and IMF staff calculations.

<sup>1</sup>Measured as the cumulative output loss when output was below the Hodrick-Prescott trend for slowdowns and cumulative output loss until recovery for recessions.

Against this background, this chapter addresses the following questions: Why are some periods of financial stress associated with slowdowns, or even recessions, while others appear to have little impact on the real economy? What role is played by the size or location of financial imbalances or the state of households' and firms' balance sheets? Has financial innovation reduced the role of banks in propagating shocks from the financial system to the real economy?

To answer these questions, this chapter analyzes episodes of financial stress and economic cycles in 17 advanced economies during the past three decades.<sup>1</sup> It draws lessons from these episodes by differentiating among them on the basis of the conditions in place at the start of the financial stress episode, including the state of households' and firms' balance sheets and the dynamics of credit and asset prices in the run-up to the stress episode; the type of financial stress involved (that is, whether related to banks, securities markets, or foreign exchange markets); and the policy responses. Taken together, these factors provide a comprehensive window on the channels and mechanisms through which financial stress affects economic cycles.<sup>2</sup> While establishing the causality between financial stress and economic downturns poses an inherently difficult challenge, the analysis in the chapter makes an attempt to address this issue by explicitly accounting for the effects of the most common types of shocks studied in the macroeconomic literature.

The key findings of this chapter are the following:

<sup>1</sup>The countries included in this study are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, and United States.

<sup>2</sup>This broader approach complements recent research on the empirical relationship between asset prices—such as equity and house prices and bond spreads—and the dynamics of output during the course of the business cycle (see Cihák and Koeva Brooks, forthcoming; and Claessens, Kose, and Terrones, 2008) or between bank capital, lending, and output (see Bayoumi and Melander, 2008; and Kashyap, Rajan, and Stein, 2008, in the context of the United States).

- Episodes of financial turmoil characterized by banking distress are more often associated with severe and protracted downturns than episodes of stress centered mainly in securities or foreign exchange markets.
- The likelihood that financial stress will be followed by a downturn appears to be associated with the extent to which house prices and aggregate credit rise in the period before the financial stress. Moreover, greater reliance on external financing by households and nonfinancial firms is associated with sharper downturns in the aftermath of financial stress.
- Countries with more arm's-length financial systems appear to be vulnerable to sharper contractions in economic activity in the wake of banking stress, because leverage in the banking system appears to be more procyclical in countries characterized by greater financial innovation.
- The importance of core financial intermediaries in transmitting financial shocks to the real economy suggests that policies that help restore the capital base of these institutions within a strong framework of financial stability can help alleviate downturns.
- The patterns of asset prices and aggregate credit in the United States during the current episode of financial stress appear similar to those of previous episodes that were followed by recessions. In particular, changes in the pattern of household net borrowing—a measure of reliance on external financing—closely track the trajectory of past recessions. Nonfinancial firms entered the turmoil from a relatively strong position. Combined with the large losses sustained by core banking institutions, these factors suggest that the United States continues to face considerable recession risks, even though real interest rates are low by the standards of financial-stress-driven recessions. In the euro area, households' relatively strong balance sheets offer some protection against a sharp downturn, despite the sizable increases of asset prices and credit ratios preceding the financial turmoil.

The rest of the chapter is structured as follows. The next section elaborates the concept of financial stress that is employed in this chapter, and uses this concept to identify episodes of financial turmoil during the past three decades. The chapter then analyzes the behavior of economic cycles following these financial stress episodes. The section that follows discusses the factors that differentiate episodes that were associated with economic downturns from those that were not. Following the macro-level analysis is a micro analysis, using bank-level data, of the procyclicality of investment banks' and commercial banks' leverage in both arm's-length and relationship-based financial systems. The chapter then focuses on six of the most well-known episodes of banking-related financial stress and places the current financial turmoil in historical context. The concluding section outlines some implications for policy.

## Identifying Episodes of Financial Stress

Financial systems—both financial institutions and the channels of intermediation—have historically been prone to periods of rapid expansion followed by corrections.<sup>3</sup> To better understand the impact of financial cycles on the economy, it is useful to look for previous episodes of financial stress that share common features with the current one.

The current episode began in early 2007 as a generally orderly repricing of risk for assets linked to U.S. subprime mortgages. By the summer, it had rapidly escalated into a severe liquidity squeeze in the banking systems in the United States and western Europe and was causing serious dislocations in the interbank fund-

<sup>3</sup>See Kindleberger and Aliber (2005) for a history of financial crises. A well-known exposition of this procyclical feature of financial systems is Minsky's financial instability hypothesis (Minsky, 1992), which posits that financial markets encourage businesses and individuals to take on too much risk, generating ruinous boom-and-bust cycles.

ing market.<sup>4</sup> The crisis mutated again more recently, as heavy credit losses raised questions about the capital strength of many banks. Moreover, the stress has spread across various market segments in emerging as well as advanced economies, with these segments marked by a loss of liquidity, falling valuations, rising risk aversion, and heightened volatility. Foreign exchange markets have also been affected by heightened uncertainty about the safety and soundness of global financial assets and the impact of financial stress on economic performance. Given these key features of the current financial market turmoil, any characterization of previous financial stress episodes should take into account conditions in the banking sector, the state of nonbank intermediation through equities and bonds, and the behavior of foreign exchange markets.

The academic literature on financial crises has relied largely on historical narratives of well-known systemic banking crises, when bank capital was eroded, lending was disrupted, and there was often the need for significant public intervention (see, for example, Caprio and Klingebiel, 2003). An extension of this approach is to augment the narratives about banking crises with narratives of currency crises, when reserves were depleted and/or there was a significant change in the exchange rate mechanisms (see, for example, Kaminsky and Reinhart, 1999; and Reinhart and Rogoff, 2008). Pure securities market stress episodes have not been examined as comprehensively, especially those involving multiple countries,

<sup>4</sup>For a detailed analysis of the interbank funding market in the context of the current turmoil, see Chapters 1 and 2 of the October 2008 *Global Financial Stability Report* (IMF, 2008). The supply of liquid funds in the interbank market dried up because many banks were in need of such funds, and those with surplus funds refrained from lending, owing to concerns about the creditworthiness of their counterparts. This affected both commercial banks, which rely largely on retail deposits to fund their lending activities, and investment banks and broker-dealers, which rely more on wholesale funding markets. Universal banks, which combine features of both commercial and investment banks, faced similar constraints.

although studies for single countries are instructive (Shiller, 1999).

Although such narrative approaches to identifying financial crises provide a rich database of episodes, they are less well suited to the purposes of this chapter for a number of reasons. First, these are the episodes known to have had large output consequences and/or to have required significant public intervention. Less attention has been given to “near misses”—episodes of financial stress with little macroeconomic impact—which could serve as useful counterfactuals. Second, the episodes identified are typically of considerable length and involve stresses of varying intensity, making it difficult to identify both when the financial stress peaked and whether there was any meaningful causal relationship to an economic downturn. Finally, even the most comprehensive databases focus on banking crises and currency crises and pay little attention to pure securities market stresses or liquidity squeezes, such as the U.S. stock market crash of 1987 and the collapse of U.S. hedge fund Long-Term Capital Management (LTCM) in 1998. With leverage in banking systems linked to securitization, it would seem important to simultaneously analyze the banking and securities channels of intermediation to determine the degree of interaction between the two.

To overcome these limitations, this chapter identifies episodes of financial stress as extreme values of a composite variable—the “Financial Stress Index” (FSI)—which is built using market-based indicators in real time and of high frequency.<sup>5</sup> The FSI for each country is constructed as an average of the following indicators:

- three banking-related variables: the “beta” of banking sector stocks;<sup>6</sup> the spread between

<sup>5</sup>A similar approach is used by Illing and Liu (2006).

<sup>6</sup>The beta of banking stocks is a measure of the correlation between the total returns to the banking sector stock index and the overall stock market index. A beta greater than 1—indicating that banking stocks move more than proportionately against the overall stock market—suggests that the banking sector is relatively risky. The FSI computes the betas as the coefficient on the rolling returns of

interbank rates and the yield on treasury bills—the so-called TED spread, which measures the premium banks charge each other over treasury bill rates; and the slope of the yield curve;

- three securities-market-related variables: corporate bond spreads, stock market returns, and time-varying stock return volatility; and
- one foreign exchange variable: time-varying effective exchange rate volatility.<sup>7</sup>

The advantage of utilizing such an index is the ability to more precisely date by quarter the start, peak, and end of a financial stress episode and thereby to calculate its duration. Moreover, such an index facilitates the identification of four fundamental characteristics of financial stress events: large shifts in asset prices (stock and bond market returns); an abrupt increase in risk/uncertainty (stock and foreign exchange volatility); abrupt shifts in liquidity (TED spreads); and the health of the banking system (the beta of banking sector stocks and the yield curve, which affects the profitability of intermediating short-term liabilities into long-term assets). Looking at these subcomponents can help identify which types of financial stress episodes have been associated with larger output consequences: banking-related, securities-market-related, currency-related, or a combination of these.

This chapter uses financial market (asset-price-based) variables to identify periods when the financial sector is under strain and its ability to intermediate may be impaired. This strategy has three major advantages over using a quantity-based index (an approach that the corporate finance literature might suggest).

each country's banking sector subindex regressed on the returns of the country's overall stock market index. The FSI considers the beta only during periods when returns are negative to focus on adverse shocks to banks. Accordingly, in high-stress episodes, this indicator would reflect an unusually large drop in banking stock prices relative to overall market prices.

<sup>7</sup>All variables are weighted by the inverse of their variance in order to reduce the impact on the overall index of the more volatile variables. See Appendix 4.1 on the construction of the index.

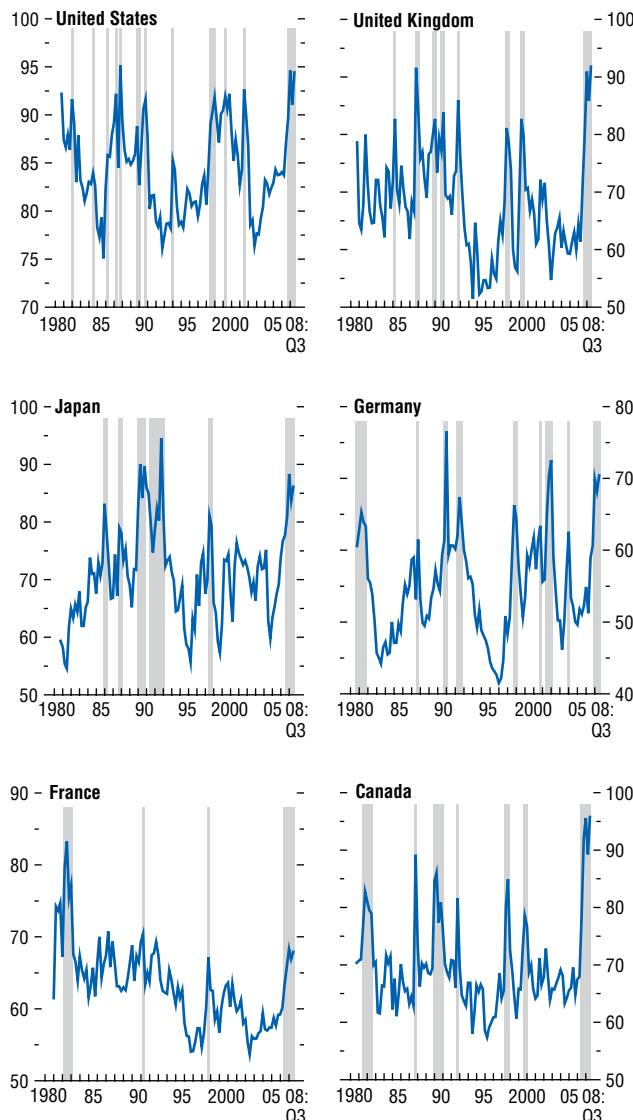
First, asset-price-based variables are easy to monitor and compute on a comparable basis across a large set of countries. Second, movements in broader financial asset prices can be expected to have a greater impact on the ability of financial firms to supply intermediation services than on the ability of specific nonfinancial firms to fund new investment, which is much more closely tied to developments in their particular sector. Third, it is useful to initially consider a broad range of financial stress events using asset prices and then use quantity-based variables to identify which of those financial stress episodes are associated with a significant economic downturn. The underlying hypothesis is that only a subset of the universe of asset-price-based stress episodes reflects true underlying distress in the balance sheets of financial intermediaries that have an impact on overall economic activity by restricting the supply of credit; others merely reflect normal market corrections.

Using the seven variables described above, the FSI is constructed for each of the 17 countries in the sample. Episodes of financial stress are identified as those periods when the index for a country is more than one standard deviation above its trend (identified using the Hodrick-Prescott filter), which signals that one or more of the banking, securities, and/or foreign exchange market variables shifted abruptly.

Overall, 113 financial stress episodes during the past 30 years were identified in the 17 countries considered in this chapter (Table 4.1). Of these, 43 episodes were driven mainly by stress in the banking sector (that is, the banking variables accounted for most of the FSI increase), 50 episodes reflected primarily turmoil in the securities market, and 20 episodes reflected primarily turmoil in the foreign exchange market. In some cases, stresses in one segment of the financial system eventually migrated into the other segments. For example, in 17 of the 70 episodes that reflected stress primarily in the securities or foreign exchange markets, the banking variables accounted for at least one-

**Figure 4.2. Financial Stress Index**  
(Shaded areas denote financial stress episodes)

The financial stress index appears to capture the current episode of financial stress in all countries in the sample.



Source: IMF staff calculations.

**Table 4.1. Descriptive Statistics on Financial Stress Episodes**

|                           | Number of Episodes <sup>1</sup> |       |       |       |         | Duration of Episodes (average; quarters) |
|---------------------------|---------------------------------|-------|-------|-------|---------|--|
|                           | Total                           | 1980s | 1990s | 2000s | Current |  |
| Financial stress          | 113                             | 37    | 42    | 34    | 16      | 2.4                                      |
| <i>Of which:</i>          |                                 |       |       |       |         |  |
| Banking                   | 43                              | 12    | 19    | 12    | 4       | 2.4                                      |
| Securities markets        | 50                              | 19    | 12    | 19    | 11      | 2.4                                      |
| Foreign exchange          | 20                              | 6     | 11    | 3     | 1       | 2.4                                      |
| <i>Memo:</i>              |                                 |       |       |       |         |  |
| Banking related           | 60                              | 16    | 25    | 19    | 10      | 2.6                                      |
| <i>Of which:</i>          |                                 |       |       |       |         |  |
| Above median arm's length | 31                              | 9     | 13    | 9     | 4       | 2.4                                      |
| Below median arm's length | 27                              | 7     | 11    | 9     | 5       | 2.9                                      |

Source: IMF staff calculations.

<sup>1</sup>The countries included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, and United States.

third of the spike in the FSI. This implies that there are actually 60 episodes in the sample with banking-related financial stress—episodes for which banks were either the most or the second most important factor, contributing at least one-third of the FSI spike.

Overall, the FSI appears to accurately capture global financial episodes.<sup>8</sup> The current financial crisis, which began in 2007, has a significant global dimension, affecting virtually all countries in the sample (Figures 4.2 and 4.3). Earlier episodes that simultaneously affected the majority of countries in the sample include the 1987 stock market crash, the Nikkei/junk bond collapse in the late 1980s, the Scandinavian banking crises in 1990, the European exchange rate mechanism crisis of 1992, and the collapse of LTCM, but the current episode seems to have the widest impact.

The FSI also accurately captures the fact that, although the origins of the current episode were in the banking sector, by early 2008 the crisis had broadened significantly to affect

<sup>8</sup>Overall, of the 113 episodes of financial stress identified in the sample, 87 episodes simultaneously affected two or more countries.

the securities and foreign exchange markets as well (Figure 4.4). Moreover, the index indicates that all past episodes of banking-related stress also had significant securities market components.

The country-specific FSIs for the 17 countries considered in this chapter show that the FSI peaks, which correspond to periods of financial stress, generally overlap accurately with well-known financial stress episodes in these countries over the past three decades, including the current episode (see Figure 4.2). Specifically, the FSI captures over 90 percent of the banking crises and over 80 percent of the currency crises identified in the literature.<sup>9</sup>

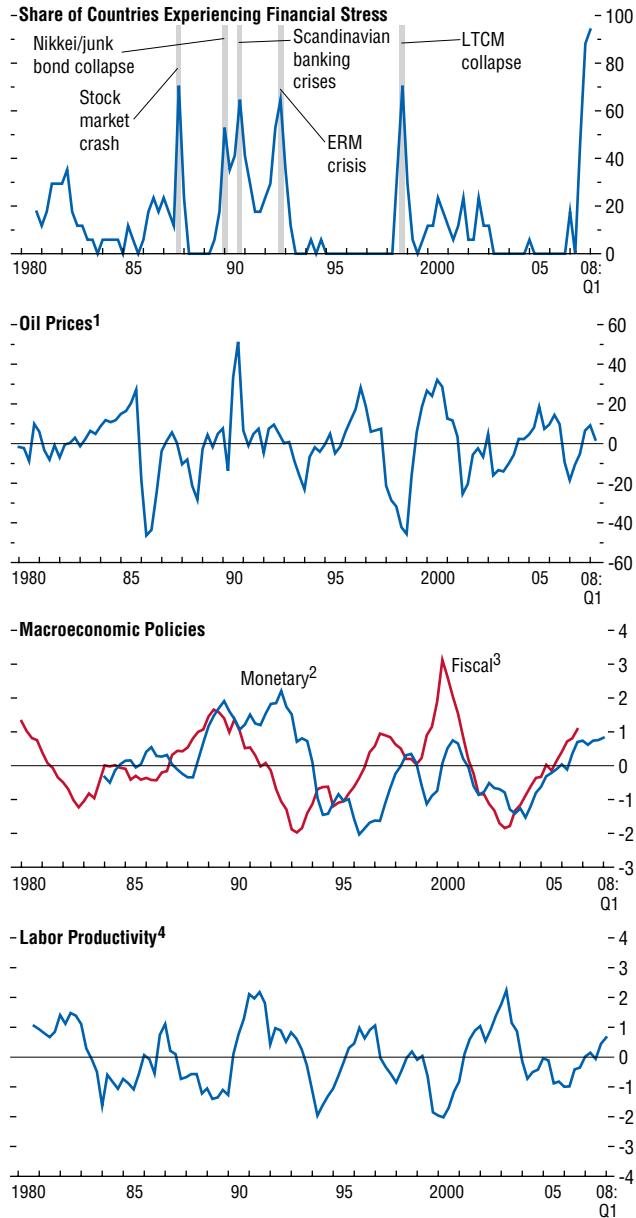
Given that spikes in the FSI are associated with well-known events such as stock/bond market collapses or banking crises, could the index simply mirror changes in other fundamentals that can directly affect the economic cycle? Considering four types of such shocks—to oil prices, labor productivity, fiscal policy, and monetary policy—the evidence indicates that spikes in the FSI are not correlated with oil, labor productivity, or macroeconomic policies (see Figure 4.3, bottom three panels).<sup>10</sup> There does appear to be a greater correlation with monetary policy, but this can be expected, given that monetary policy (as measured by the term spread) is a subcomponent of the FSI itself, where it is included because financial stress appears to be associated

<sup>9</sup>The FSI captures 100 percent of all episodes identified in the literature if the duration of episodes is interpreted more broadly—that is, if the period around the peak of financial stress is expanded by a few quarters.

<sup>10</sup>The definition of these shocks mirrors the definition of financial stress episodes: (1) Shocks to oil prices or labor productivity are defined as instances when changes in these indicators are one standard deviation above trend; (2) fiscal policy shocks, when the ratio of government net lending/borrowing to GDP is one standard deviation above trend; and (3) monetary policy shocks, when the inverse term spread is one standard deviation above trend. In all cases, the deviations from trend are calculated using Hodrick-Prescott filters. Figure 4.3 reports the first principal components of these fiscal, monetary, and labor productivity indicators across the set of countries considered in the chapter.

**Figure 4.3. Financial Stress and Shocks**

Financial stress episodes tend to be synchronized around systemic events, as shown by their clustering in a few peaks. Episodes of financial stress generally correspond to cases of monetary policy shocks, but they don't correlate well with other shocks.



Sources: Haver Analytics; IMF, Commodity Price System database; OECD, Analytic Database; OECD, *Economic Outlook* (2008); and IMF staff calculations.

Note: ERM = exchange rate mechanism; LTCM = Long-Term Capital Management.

<sup>1</sup>Oil prices are scaled by U.S. inflation (CPI) and represent deviations from Hodrick-Prescott (HP) trend.

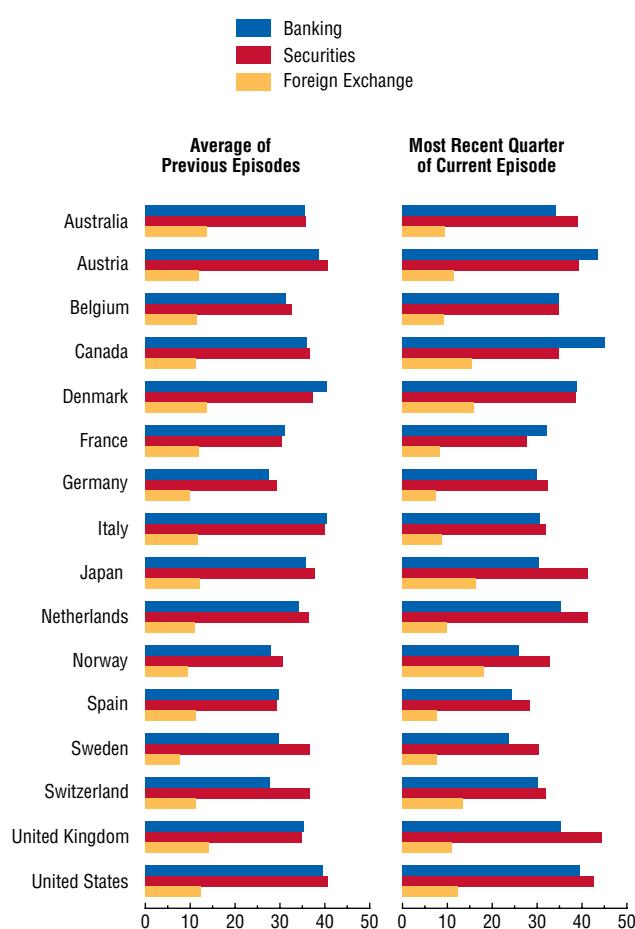
<sup>2</sup>Monetary policy is measured using the inverse term spread's deviations from HP trend.

<sup>3</sup>Fiscal policy is measured using government net lending's deviations from HP trend.

<sup>4</sup>Labor productivity of the total economy is measured as the ratio of real GDP and total employment and represents deviations from HP trend. Data are not available for Austria, Belgium, Denmark, Spain, and Switzerland.

**Figure 4.4. Contribution of Banking, Securities, and Foreign Exchange to Current Financial Stress Episode<sup>1</sup>**

The episode of financial stress that started in 2007 has become more broad-based, with contributions from banking, securities, and foreign exchange markets. Previous episodes also show strong contributions from both banking and securities markets.



Source: IMF staff calculations.

<sup>1</sup>The sum of the components equals the level of the Financial Stress Index in the given period. See Appendix 4.1 for details.

with the monetary policy stance as reflected in the term spread.

Overall, the FSI appears to be a comprehensive indicator that successfully identifies the main episodes of financial stress for the sample of countries under consideration and provides a sound basis for examining the macroeconomic consequences of such stress.

### Financial Stress, Economic Slowdown, and Recession

How many of the financial stress episodes identified using the FSI were followed by an economic slowdown or an outright recession? How did episodes that were followed by economic downturns differ from those that were not?

- An episode of financial stress is followed by an economic “slowdown” if the level of real GDP falls below trend (identified using the Hodrick-Prescott filter) within six quarters of the onset of financial stress.
- An episode of financial stress is followed by a “recession” if a peak-to-trough business cycle, identified using the methodology described in Harding and Pagan (2002) and the April 2003 *World Economic Outlook*, begins within six quarters of the onset of financial stress.<sup>11</sup>

This chapter seeks to identify the main characteristics of financial stress episodes that were eventually followed by economic downturns, not to assess whether financial stress “causes” economic downturns, in recognition of the significant analytical and empirical challenges in establishing causality.<sup>12</sup> Nevertheless, the analysis attempts to control, to some extent, for other shocks—namely, monetary, fiscal, oil price, and

<sup>11</sup>For example, in the United States, the most recent recession was in 2001, whereas the most recent slowdown was when GDP fell below trend during 2007:Q4–2008:Q1.

<sup>12</sup>For example, many shocks affect both the financial system and the economy, and although the financial system may amplify the shocks, it would be hard to disentangle the direct effects of the shocks from the amplification effects.

**Table 4.2. Descriptive Statistics on Financial Stress, Slowdowns, and Recessions**

|   | N   | Duration (average; quarters) |                                       | Output Loss<br>(average; percent of GDP) |         | Lag until<br>Downturn <sup>3</sup><br>(average;<br>quarters) |
|---|-----|------------------------------|---------------------------------------|--|---------|--|
|   |     | Financial<br>stress          | Slowdown or<br>recession <sup>1</sup> | Cumulative <sup>2</sup>                  | Average |  |
| Financial stress  | 113 | 2.4                          |                                       |  |         |  |
| <i>Of which:</i>  |     |                              |                                       |  |         |  |
| Followed by slowdown                                    | 29  | 2.7                          | 7.6                                   | -7.6                                     | -0.7    | 2.4  |
| Banking-related   | 18  | 3.2                          | 8.4                                   | -9.3                                     | -0.8    | 1.8  |
| Followed by recession                                   | 29  | 3.0                          | 6.8                                   | -13.8                                    | -1.2    | 2.3  |
| Banking-related   | 17  | 4.0                          | 7.6                                   | -19.8                                    | -1.5    | 2.0  |
| Others  | 55  | 2.0                          |                                       |  |         |  |
| Slowdown not preceded by financial stress <sup>4</sup>  | 109 |                              | 5.1*                                  | -4.1*                                    | -0.6    |  |
| Recession not preceded by financial stress <sup>4</sup> | 31  |                              | 3.1*                                  | -5.4*                                    | -0.9    |  |

<sup>1</sup>Slowdown duration: number of quarters during which GDP is below trend; recession duration: number of quarters until GDP is at or exceeds peak level.

<sup>2</sup>Slowdown output loss: cumulative output loss below trend; recession output loss: cumulative output loss until recovery.

<sup>3</sup>Number of quarters between start of financial stress and slowdown or recession.

<sup>4</sup>Asterisks indicate difference from slowdowns preceded by financial stress significant at 10 percent or better.

labor productivity shocks—that may affect the relationship between financial stress and economic cycles.

Based on the definitions above, of the 113 financial stress episodes identified here, 29 were followed by slowdowns and 29 by recessions. The remaining 55 episodes were not followed by an economic downturn (Table 4.2).

The average lag between the onset of financial stress and the subsequent downturn was about seven months. However, this average masks substantial variations: about half the downturns occurred within a quarter of the beginning of financial stress, but it took more than a year for a downturn to materialize during one-fourth of the episodes (Figure 4.5).

Most important, the slowdowns and recessions that were preceded by financial stress episodes were longer in duration and, partly as a result, were more severe than those that were not. Median cumulative output losses (relative to trend or until recovery) were about 3 percent of GDP for slowdowns following financial stress and about 4½ percent of GDP for recessions following financial stress, significantly larger than for slowdowns and recessions that were not preceded by financial stress (about 1½ percent and 2¼ percent, respectively) (see Figure 4.1).

The occurrence of financial stress tends to change the patterns of downturns (Figure 4.6), as apparent by examining the dynamics of selected macroeconomic variables at the beginning of the downturn.<sup>13</sup> In particular, when preceded by financial stress, economic slowdowns tend to be characterized by a flattening in consumption growth, by investment that follows a boom-and-bust cycle, by appreciable turnarounds of current account balances, and by falling inflation and real interest rates. The pattern changes are more pronounced for slowdowns and less pronounced for recessions, perhaps suggesting that the latter may be triggered to a greater extent by the interaction of financial stress with other shocks.

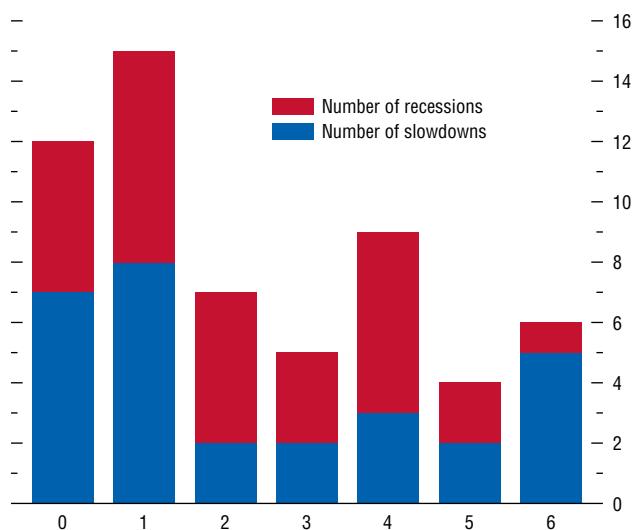
### Why Are Some Financial Stress Episodes Associated with Economic Downturns?

Only about half the episodes of financial stress identified using the FSI were followed by economic slowdowns or recessions. What deter-

<sup>13</sup>The charts use a window of 12 quarters and show only “complete” episodes (episodes spanning at least 12 quarters from start to finish). Therefore, they include only those downturns that started between 1983:Q1 and 2005:Q1.

**Figure 4.5. Lag between Financial Stress and Downturns**  
*(Start of financial stress episode at t = 0; quarters on the x-axis; number of slowdowns or recessions that begin in the given quarter on the y-axis)*

In most cases economic downturns materialize soon (within one quarter) after the start of a financial stress episode, but longer lags have been observed.



Source: IMF staff calculations.

mines whether a financial stress episode will be followed by a downturn? What characterizes the stress episodes that precede the most severe and prolonged downturns? To answer these questions, those financial stress episodes that were followed by downturns are compared against each other along two dimensions: (1) the characteristics of the financial stress episode itself and, in particular, the nature of the financial shock (whether related to the banking system, securities market, or foreign exchange market) and (2) the financial position of financial intermediaries, households, and firms at the beginning of the episode.

### Is Banking-Related Financial Stress Different?

Banking system stress is associated with larger output consequences than stress episodes related purely to the securities or foreign exchange markets, in which the banking system remains largely unaffected (Figure 4.7). About 60 percent of those financial stress episodes that are followed by downturns are banking-related. Moreover, slowdowns and recessions preceded by banking-related stress tend to last longer and be associated with larger average GDP losses than those preceded by other types of financial stress or by no financial stress at all (see Table 4.2).

Bank asset growth slows significantly when banking-related financial stress episodes are followed by recessions or slowdowns, compared with financial stress episodes that are not followed by economic downturns (Figure 4.8, top panel). In general, downturns tend to be associated with a fall in the demand for credit, but during slowdowns or recessions associated with banking-related financial stress, the cost of capital is significantly higher (Figure 4.8, bottom panel).<sup>14</sup> While the issue of reverse

<sup>14</sup>The cost of capital is defined here as a weighted average of the real cost of equity, the real cost of debt, and real lending rates, using as weights the relative shares of equity, bonds, and loans in nonfinancial corporate liabilities. See Appendix 4.1 for details.

causality between recessions and financial stress is difficult to address empirically, suggesting appropriate caution in interpreting these results, these findings are consistent with the view that a reduction in the supply of credit—the classic credit crunch or credit squeeze—is a key factor associating banking-related financial stress episodes with economic downturns.

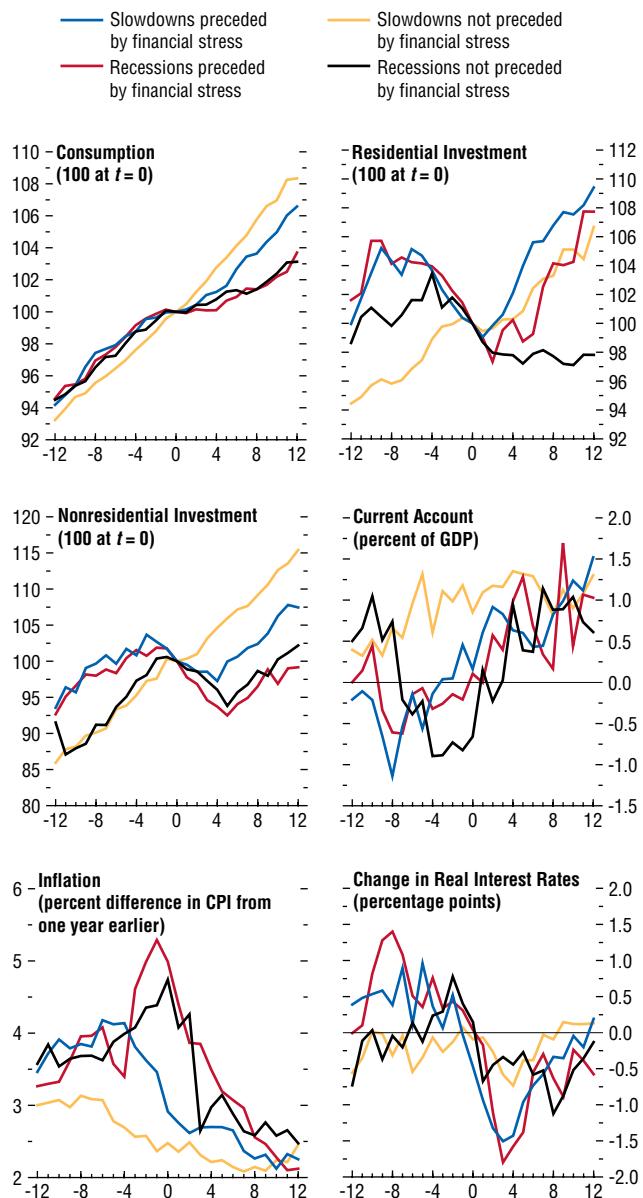
### Do Initial Conditions Matter?

Having examined the nature of the shocks, the analysis now assesses whether the likelihood of a downturn depends on initial conditions. The evidence suggests that the credit and asset price dynamics and the financial position of financial intermediaries, households, and firms preceding the episode are important in determining the economic impact of a financial shock.

- House prices and the credit-to-GDP ratio both tend to rise significantly faster during the upswing of the financial cycle in those stress episodes that are followed by slowdowns or recessions (Figure 4.9). Statistical tests confirm that financial turmoil is more likely to be followed by economic slowdown or outright recession when it is preceded by a more rapid buildup in house prices and credit (Figure 4.10).
- Firms tend to be more heavily dependent on external sources of funding—that is, with higher net borrowing ratios—in the run-up to financial stress episodes that are followed by economic downturns (see Figures 4.9 and 4.10). A higher initial reliance on external funding makes firms more vulnerable during the downswing of the financial cycle, and may force them to adjust their spending plans more drastically in the aftermath of financial stress, setting the stage for a larger impact on the real economy.
- Only financial stress episodes that are followed by recessions (not by slowdowns) seem to be characterized by a “more exposed” household sector in terms of reliance on external financing (see Figure 4.9). Indeed, the median household net borrowing ratio

**Figure 4.6. Selected Macrovariables around Economic Downturns with and without Financial Stress<sup>1</sup>**  
(Median; start of economic contraction at  $t = 0$ ; quarters on the x-axis)

The occurrence of financial stress changes the patterns of economic downturns. In particular, the shape of slowdowns seems to be affected.

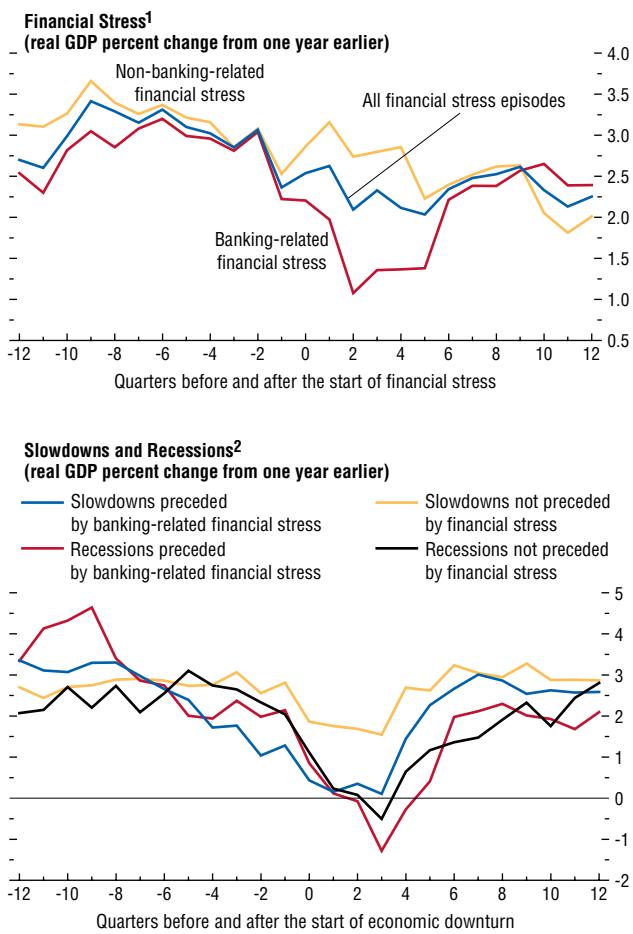


Sources: Haver Analytics; IMF, International Financial Statistics database; OECD, Analytic Database; and IMF staff calculations.

<sup>1</sup>All in real terms. The sample is constant for all quarters.

**Figure 4.7. Banking-Related Financial Stress, Slowdowns, and Recessions**  
(Median; quarters on the x-axis)

The most severe economic downturns are associated with banking-related financial stress.



Sources: Haver Analytics; OECD, Analytic Database; OECD, *Economic Outlook* (2008); and IMF staff calculations.

<sup>1</sup>The difference between banking-related and non-banking-related episodes is significant at a minimum of 10 percent for quarters 0, 1, 2, 3, and 4. The sample is constant for all quarters.

<sup>2</sup>The difference between slowdowns preceded by banking-related financial stress and slowdowns not preceded by financial stress is significant at a minimum of 10 percent for  $t-6$  to  $t+6$ . The sample is constant for all quarters.

(in deviation from trend) is significantly higher at the outset of financial stress episodes that are followed by recessions than during those that are followed by slowdowns or by no decline in economic activity (see Figure 4.10).

The analysis suggests that when the financial cycle turns, as signaled by the onset of stress in financial markets, there is a greater likelihood of a downturn in economic activity the larger the initial financial imbalances—when firms and households are more exposed to a decline in credit and asset prices. In particular, households' exposure seems to be associated with more severe contractions in economic activity.

The degree to which initial financial imbalances and firms' and households' reliance on external funding explain the severity of ensuing economic downturns can be investigated more formally. The cumulative loss of output in the aftermath of financial stress episodes is regressed on (1) the run-up in credit and asset prices before the onset of the financial stress, (2) firms' and households' net borrowing ratios at the start of the episodes, and (3) a proxy for the severity of the financial shock, namely, the duration of the stress episode.

The main results of the regressions are presented in Table 4.3:<sup>15</sup>

- Firms' net borrowing ratio at the onset of the financial stress episode enters significantly in almost all specifications, confirming the importance of the link between firms' initial reliance on external credit and the severity of the decline in economic activity.
- Households' net borrowing ratio at the onset of the financial stress episode is statistically significant when considered alone but loses significance when firms' net borrowing position is added. It continues to affect the severity of the output losses, however, when

<sup>15</sup>Slowdown severity is measured using the cumulative output loss during the period during which output is below trend; see Table 4.1 for further details. Recession severity is measured by losses until recovery.

interacted with the duration of the financial episode, suggesting that households' position matters especially when the economy is hit by a sustained financial shock.

This chapter seeks to identify factors that determine whether or not episodes of financial stress are followed by economic downturns. Therefore, a key challenge is to determine the origins of the shocks that hit the economy and set off the complex interactions between the financial and real sectors. The fact that financial sector stress precedes an economic downturn does not mean that financial stress drives subsequent real sector developments: because financial market participants are forward-looking, financial stress may be merely a manifestation that they anticipate a fundamental deterioration in the real sector. To address this problem, the chapter considers four types of shock that could be considered fundamental, exogenous deteriorations in the real sector environment: oil-price shock, monetary policy shock, fiscal policy shock, and labor productivity shock. As shown in Figure 4.11, when one of these shocks is combined with financial stress, there is a more severe downturn than when there is the shock alone. This suggests that financial stress has a separately identifiable impact.

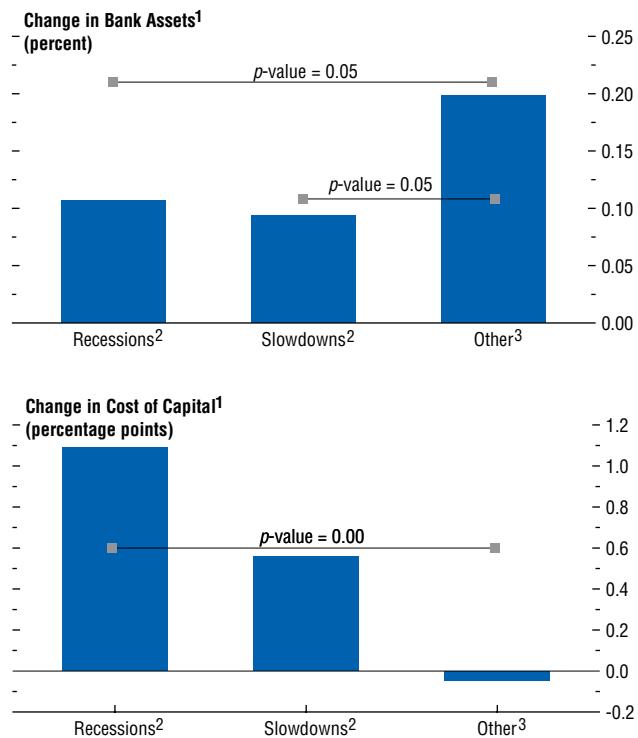
### Has Financial Innovation Affected the Interplay between Financial Stress and Economic Cycles?

Banks continue to be important in explaining why certain financial stress episodes are associated with greater output consequences (see Figure 4.7). Why do banks remain crucial despite financial innovation and the emergence of nonbank sources of funding? Financial innovation would seem able to reduce the pivotal role of banks by providing alternative channels for firms and households to access financing, channels that loosen collateral constraints for borrowers and soften the adverse impact of financial stress on the cost of capital for banks. However, even though the role of

**Figure 4.8. Cost of Capital and Bank Asset Growth around Banking Financial Stress Episodes**

(Average; change from one year before to one year after the start of financial stress)

Banking-related financial stress episodes associated with recessions are characterized by lower bank asset growth and higher cost of capital in the aftermath.



Sources: OECD, Analytic Database; and IMF staff calculations.

<sup>1</sup>p-value reported refers to the two-tailed t-tests on the difference between the two averages.

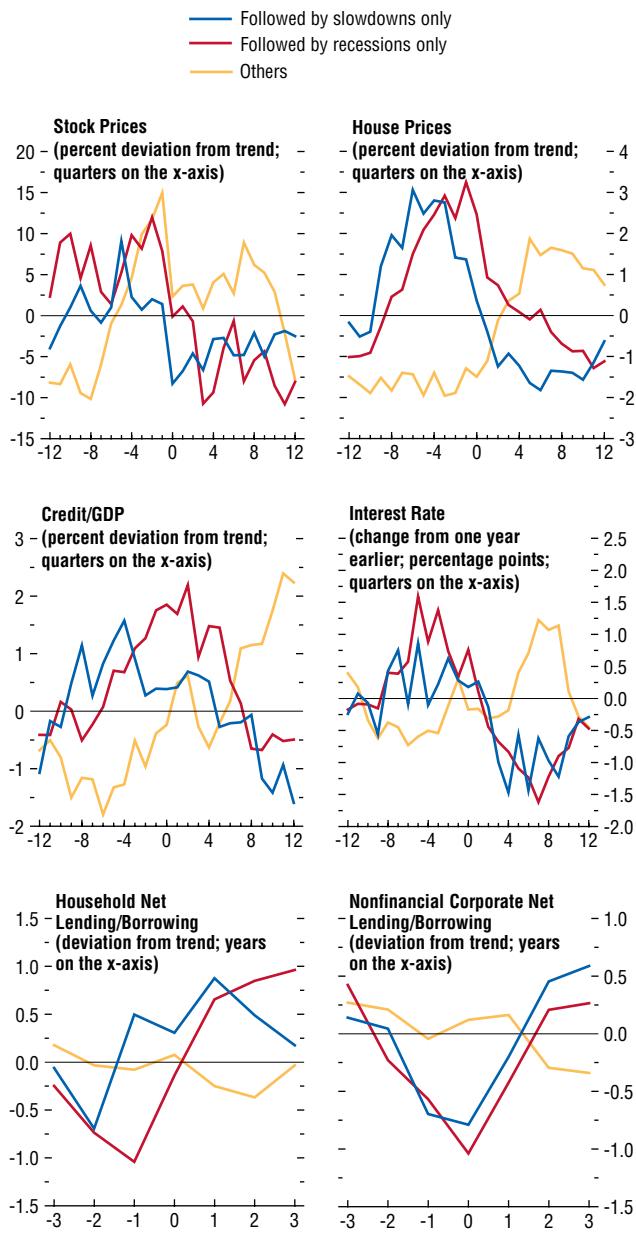
<sup>2</sup>Banking-related financial stress episodes followed by slowdowns or recessions.

<sup>3</sup>Financial stress episodes not followed by slowdowns or recessions.

**Figure 4.9. Selected Macrovariables around Financial Stress Episodes<sup>1</sup>**

(Median; start of financial stress episode at t = 0; x-axis as stated)

Financial stress episodes followed by slowdowns or recessions tend to be preceded by rapid buildups in asset prices and credit ratios and are associated with higher initial net borrowing from nonfinancial firms and (in cases of recession) from households.



Sources: IMF, International Financial Statistics database; OECD, Analytic Database; and IMF staff calculations.

<sup>1</sup>All in real terms, except for household and nonfinancial corporate net lending ratios. The sample is constant for all quarters and years.

banks has evolved over time, their symbiotic relationship with securities markets remains an essential feature of many financial systems, especially those characterized by arm's-length financing (*World Economic Outlook*, September 2006).<sup>16</sup> As a result, episodes of banking distress continue to affect nonbank sources of financing as well.

To explain the continuing importance of banks, it is revealing to explore the procyclical behavior of bank leverage around financial cycles. In particular, how banks manage their leverage during upturns and downturns in the cycle appears fundamental to explaining why banking stress translates into a reduced credit supply, a higher cost of capital, and a softening of economic activity. The hypothesis is as follows: When banks overextend their balance sheets during booms, on the back of higher asset values and lower perceived risk, there is a buildup of financial imbalances and a rapid expansion in activity, which further boosts asset values and reduces perceived risk, thereby fostering another round of lending and economic expansion.<sup>17</sup> Under such conditions, a financial shock that either increases risk or reduces the return on assets could prompt a cycle of severe deleveraging, with banks sharply reducing their lending (or their growth in lending) as bank capital falls, prompting an economic slowdown that feeds back into a further reduction in credit supply.

The procyclicality of leverage is more pronounced when banks are more exposed to fluctuations in the market value of assets—for example, through their holdings of securities and

<sup>16</sup>Banks increasingly depend on market-based funding sources to finance their assets (such as through their certificates of deposit and off-balance-sheet commercial paper programs). Conversely, investment banks and increasingly commercial banks also remain at the center of the originate-to-distribute model of securitized financing, providing credit through repurchase facilities to hedge funds and other leveraged intermediaries to invest in securities markets.

<sup>17</sup>This is in line with Minsky's financial instability hypothesis (Minsky, 1992).

their repurchase facilities.<sup>18</sup> Because this is typical for nondepository financial intermediaries, especially investment banks, there should be evidence of procyclical leverage among them (Shin, 2008). On the other hand, commercial banks should be less prone to procyclically adjusting their balance sheets during asset price or liquidity booms and busts, because they rely less on wholesale funding and more on retail deposits, and also because they are less subject to mark-to-market changes in the value of their assets.

Evidence confirms that investment banks' leverage tends to be procyclical: they expand their leverage when they are expanding their assets (Figure 4.12, upper panel).<sup>19</sup> The evidence is less uniform on the procyclicality of commercial banks, which rely much more on retail deposits and whose main activity is making long-term, illiquid loans (Figure 4.12, lower two panels). However, the evidence does suggest that commercial banks tend to be more procyclical when operating in more-arm's-length financial systems, where a greater share of intermediation occurs through financial markets rather than through traditional relationship-based (and bank-dominated) activities (Figure 4.13). Thus, more-arm's-length financial systems are associated with overall more procyclical bank behavior, and as a result may be more vulnerable to banking stress.<sup>20</sup> Of note, the proportion of banking-related financial stress episodes occurring in more-arm's-length financial systems has remained about equal to the proportion occurring in more-relationship-based systems (see Table 4.1).

Indeed, slowdowns and recessions tend to be deeper in economies with more-arm's-length financial systems, although the duration of such

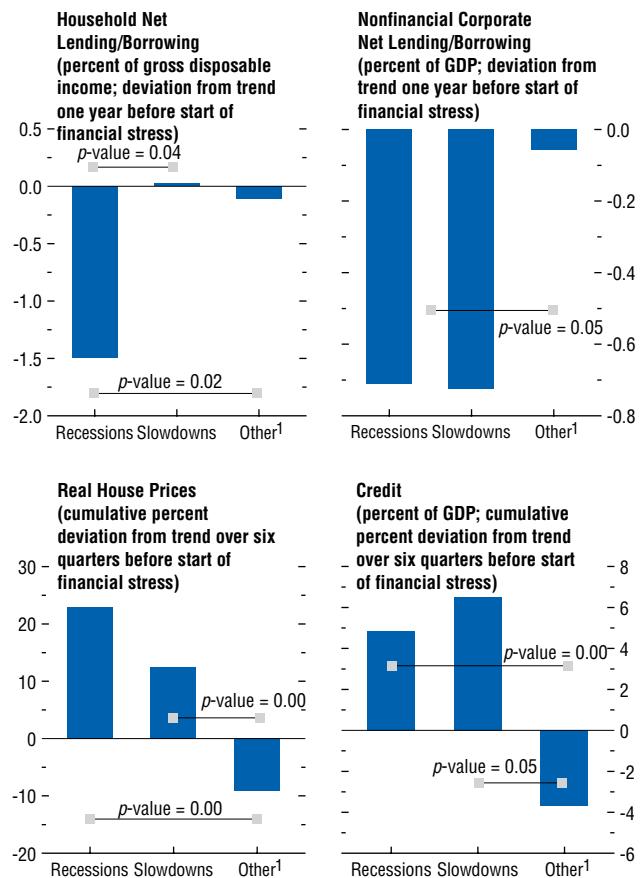
<sup>18</sup>In a systemic crisis, it would be difficult for all banks to adjust their leverage simultaneously, because there would be few buyers for these assets among other banks; the only likely buyers would be cash-rich investors who do not rely on bank leverage to fund their positions.

<sup>19</sup>See also Adrian and Shin (2008a and 2008b).

<sup>20</sup>This is consistent with the findings in Chapter 3 of IMF (2008), showing that fair value accounting tends to lead to more procyclical movements in financial intermediaries' balance sheets.

**Figure 4.10. Initial Conditions of Financial Stress Episodes (Average)**

Faster buildup in the credit ratio and house prices and higher nonfinancial corporate borrowing are statistically significant indicators of the likelihood that financial stress episodes will be followed by slowdowns or recessions. Household net borrowing is significantly associated only with subsequent recessions.



Sources: Haver Analytics; IMF, International Financial Statistics database; OECD, Analytic Database; and IMF staff calculations.

Note: p-value reported refers to the two-tailed t-tests on the difference between the two averages.

<sup>1</sup>Financial stress episodes not followed by slowdowns or recessions.

**Table 4.3. Cross-Section Regressions**

| Dependent Variable: Cumulative Output Loss <sup>1</sup> | [1]              | [2]              | [3]              | [4]              | [5]             | [6]              | [7]              | [8]              | [9]              |
|---|------------------|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|------------------|
| Duration of financial stress                            | 1.324<br>(0.10)  | 1.591<br>(0.10)  | 0.641<br>(0.43)  | 1.023<br>(0.33)  | 0.963<br>(0.30) | 1.377<br>(0.09)  | 1.034<br>(0.20)  | 0.888<br>(0.07)  | 0.711<br>(0.30)  |
| Real interest rate <sup>2</sup>                         | 0.89<br>(0.00)   | 0.808<br>(0.01)  | 0.47<br>(0.12)   | 0.835<br>(0.01)  | 0.877<br>(0.00) | 0.87<br>(0.00)   | 0.841<br>(0.01)  | 0.887<br>(0.00)  | 0.869<br>(0.01)  |
| Nonfinancial corporate net borrowing ratio <sup>3</sup> | 2.0<br>(0.01)    |                  |                  |                  |                 | 1.753<br>(0.02)  | 0.849<br>(0.35)  | 1.986<br>(0.00)  | 1.439<br>(0.07)  |
| Household net borrowing ratio <sup>3</sup>              |                  | 1.05<br>(0.10)   |                  |                  |                 | 0.48<br>(0.44)   | 0.668<br>(0.33)  | -1.086<br>(0.22) | -0.89<br>(0.32)  |
| Real house price <sup>4</sup>                           |                  |                  | 14.304<br>(0.01) |                  |                 |                  |                  |                  |                  |
| Real stock price <sup>4</sup>                           |                  |                  |                  | -0.785<br>(0.72) |                 |                  |                  |                  |                  |
| Credit ratio <sup>4</sup>                               |                  |                  |                  |                  | -1.09<br>(0.90) |                  |                  |                  |                  |
| Household net borrowing ratio x duration                |                  |                  |                  |                  |                 |                  | 0.593<br>(0.04)  | 0.561<br>(0.04)  |                  |
| Nonfinancial corporate net borrowing ratio x duration   |                  |                  |                  |                  |                 | 0.229<br>(0.43)  |                  | 0.136<br>(0.48)  |                  |
| Constant  | -2.014<br>(0.45) | -0.803<br>(0.79) | 2.076<br>(0.39)  | 0.809<br>(0.74)  | 0.482<br>(0.86) | -1.877<br>(0.50) | -0.727<br>(0.78) | -1.161<br>(0.64) | -0.519<br>(0.85) |
| N   | 42               | 40               | 52               | 52               | 52              | 40               | 40               | 40               | 40               |
| Adjusted R-squared                                      | 0.418            | 0.287            | 0.254            | 0.128            | 0.126           | 0.418            | 0.42             | 0.493            | 0.485            |

Note: Robust *p*-values in parentheses.

<sup>1</sup>Dependent variable is cumulative output loss in episodes of financial stress followed by slowdowns or recessions.

<sup>2</sup>Average of real interest rates during six quarters before the financial stress.

<sup>3</sup>Net borrowing ratios one year before the financial stress (deviation from trend).

<sup>4</sup>Cumulative percent deviation from trend over six quarters before the financial stress.

downturns is broadly similar in both types of systems (Figure 4.14), indicating that deleveraging matters and that its impact depends on the degree of procyclicality in the banking system.<sup>21</sup> This implies that more-arm's-length systems are vulnerable to sharper contractions in activity following banking stress. Consistent with this channel, the leverage of banks in more-arm's-length systems also tends to fall more sharply than that of banks in other types of financial systems, albeit from a lower starting level. This casts doubt on the presumption that arm's-length systems can better soften the blow from financial-stress-driven economic downturns because of

the availability of the twin engines for financial intermediation (banks and markets).

Arm's-length financial systems do offer several advantages over relationship-based systems in terms of reallocating resources in response to changing economic opportunities (see *World Economic Outlook*, October 2006). However, as the current crisis underscores, the trend toward greater securitization in more-arm's-length systems, while permitting portfolio diversification to offset the costs of monitoring the idiosyncratic risks that are inherent in traditional relationship-based systems, does not eliminate the need for banks and markets to independently assess the risk of their exposures. Indeed, a lack of information about the value and risk of many securitized products, and about the losses subsequently associated with these products, appears to have played a significant role in amplifying the current crisis.

<sup>21</sup> Diverging experiences with economic cycles by economies characterized by arm's-length versus relationship-based financial systems may also reflect contrasts in other areas, notably in the degree of flexibility in labor and product markets and the types of social welfare systems (see *World Economic Outlook*, October 2006).

## The Current Financial Crisis in Historical Context

This section compares the current episode of financial stress to six well-known episodes of banking-related financial stress that occurred in advanced economies during the 1990s. These episodes affected Finland, Norway, Sweden, the United Kingdom, and the United States in the early 1990s and Japan throughout the 1990s. Given the importance of banking distress in the current financial turmoil, these episodes can serve as a useful benchmark for analyzing the current conjuncture and for gauging its potential macroeconomic impact.<sup>22</sup>

Examining the initial conditions before the onset of these six episodes confirms the main findings of the event analysis, namely, that financial stress episodes are more likely to be followed by severe economic downturns when they occur in the context of a rapid buildup in credit and house prices and a heavier reliance on credit by firms and households. Broadly speaking, the episodes characterized by the largest asset price and credit booms were in the Nordic countries in the early 1990s, where increases in credit ratios, assets prices, and bank assets were abnormally high (see Table 4.4, top panel). At the same time, borrowing by households and firms was initially much larger in Finland and Norway than in the other countries. Japanese firms relied extensively on external financing, but this was balanced at least partially by the saving patterns of households. In contrast, before the crises in the Anglophone countries, asset price imbalances were moderate and balance sheets were not under tremendous strain.

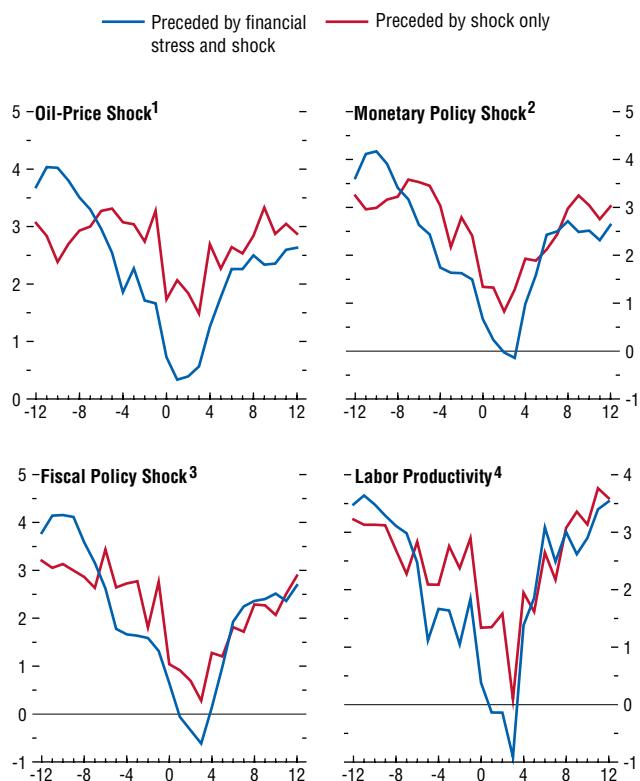
The countries with larger financial imbalances and balance sheet vulnerabilities at the onset of an episode experienced more severe output contractions (see Table 4.4, lower panel). The most dramatic collapses in asset prices, bank asset growth, and credit occurred in the coun-

<sup>22</sup>This approach is in line with other studies, including Reinhart and Rogoff (2008). See also J.P. Morgan Research (2008).

**Figure 4.11. Financial Stress and Economic Downturns: Controlling for Four Main Shocks**

(Median of GDP percent change from one year earlier; start of economic contraction at  $t = 0$ ; quarters on the x-axis)

Economic downturns tend to be more severe when preceded by financial stress episodes.



Sources: Haver Analytics; IMF, Commodity Price System database; OECD, Analytic Database; OECD, *Economic Outlook* (2008); and IMF staff calculations.

<sup>1</sup>Oil prices are scaled by U.S. inflation (CPI). Oil-price shock is identified if oil price is one standard deviation above Hodrick-Prescott (HP) trend.

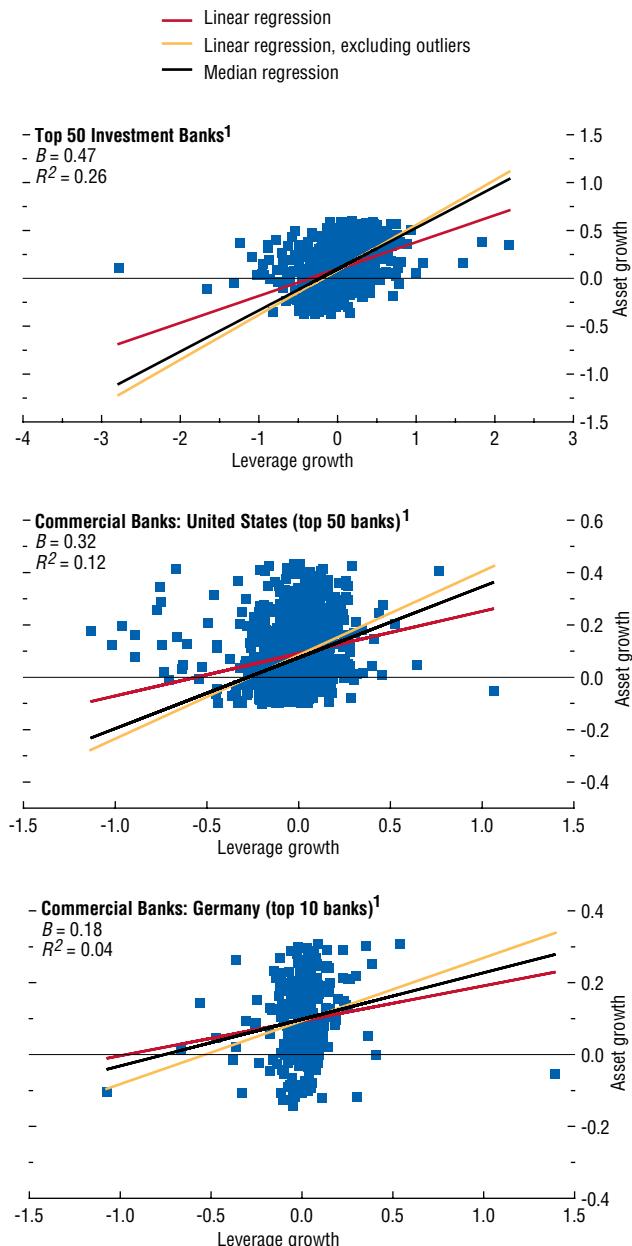
<sup>2</sup>Monetary policy is measured using the inverse term spread. Monetary policy shock is identified if the inverse term spread is one standard deviation above HP trend.

<sup>3</sup>Fiscal policy is measured using government net lending. Fiscal shock is identified if government net lending is one standard deviation above HP trend.

<sup>4</sup>Labor productivity of the total economy is measured as the ratio of real GDP and total employment. Productivity shock is identified if labor productivity is one standard deviation below HP trend. Data are not available for Austria, Belgium, Denmark, Spain, and Switzerland.

**Figure 4.12. The Procyclicality of Leverage in Investment and Commercial Banks**  
(Annual change, percent)

Investment banks' leverage (assets divided by equity) is procyclical; for commercial banks, the evidence is mixed across countries.



Sources: Bankscope; and IMF staff calculations.

<sup>1</sup> $B$  and  $R^2$  refer to the linear regression, excluding outliers, of asset growth over leverage growth.

tries with the largest buildups of financial imbalances. These countries also suffered the deepest and longest recessions.

Moreover, households and firms in these countries also generally experienced a stronger deleveraging process. Deleveraging to reduce the stock of debt through higher savings and consequently lower consumption and investment had direct implications for the dynamics of growth. The degree of corporate deleveraging, in particular, corresponds remarkably well with the length and depth of the recessions—underscored by the contrast between the Nordic and Anglophone country groups.

These historical experiences underline the key role of policy responses to financial stress. Policies appropriate to restore sound financial intermediation are discussed in Box 4.1, based around four main principles. First, there must be a sound framework in place for ensuring financial stability, which encompasses a framework for intervention and appropriate legal, institutional, and procedural mechanisms to deal with distress. Second, policy responses must be rapid and involve the early recognition of losses, a quick assessment of the scale of the problem, and timely measures to ensure that financial institutions are adequately capitalized. Third, the adverse impact of financial stress on the real economy may need to be contained directly, in order to preserve or restore the health of households' and firms' balance sheets. Finally, adequate safeguards must be in place to limit the fiscal cost of support and prevent the creation of inappropriate incentives for the longer term that could lead to excessive reliance on publicly financed bailouts.

### Implications for the Current Crisis in the United States and Euro Area

Figure 4.15 compares data for the current crisis in the United States and euro area against the medians of selected macroeconomic variables around the beginning of the six major financial stress episodes examined above and against the averages for these variables across all

financial stress episodes that were followed by recessions. The current imbalances and adjustments appear generally much smaller than those for the six episodes examined here, except for U.S. residential real estate investment and the U.S. current account.<sup>23</sup> The patterns of credit and asset prices in the United States prior to the current crisis are very similar to those for the typical financial-stress-driven recession.

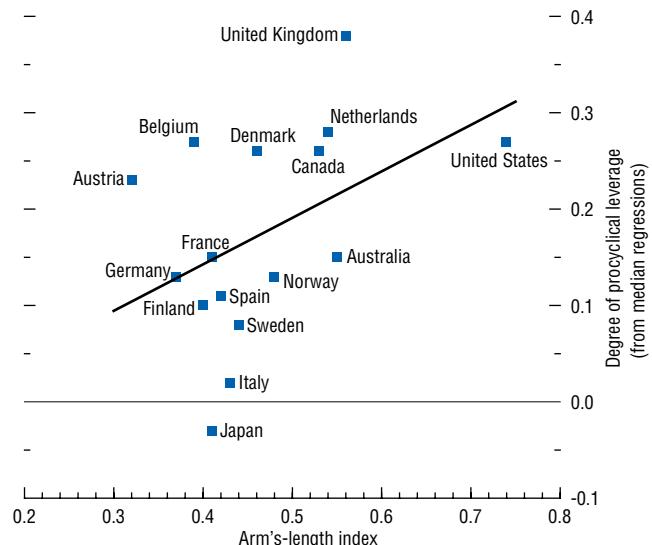
The deleveraging process by households in the United States is proceeding faster than in the typical recession, although deleveraging by firms seems to be proceeding somewhat more slowly and from a stronger initial position. Finally, although bank assets remained robust during the second half of 2007, partly reflecting the reintermediation of off-balance-sheet commitments, the ratio of credit to GDP declined significantly in the first quarter of 2008, suggesting that the pace of deleveraging may have picked up (see also Chapter 1).

The current crisis is different for the United States in important ways from previous episodes. Corporate balance sheets and firms' reliance on external financing were on a more solid footing entering the current crisis, which should provide some resilience. However, the sheer size of the U.S. mortgage market, which is at the heart of the crisis, and the role of residential investment suggest that household saving and consumption behavior may play a much larger role in the current downturn than in the past. On a positive note, the policy stance in the United States has been proactive, as exemplified by the aggressive cuts in policy rates and the measures taken to shore up liquidity in both commercial banks and investment banks. Moreover, banks have raised substantial amounts of capital, although continuing declines in the mark-to-market value of assets suggest that substantially more capital will be needed before the financial system can resume significant discretionary lending.

<sup>23</sup>However, a strong drop in residential real estate investment is a distinguishing feature of almost all U.S. recessions (see Leamer, 2007).

**Figure 4.13. Procyclical Leverage and Arm's-Length Financial Systems**

There is more evidence of procyclical leverage by commercial banks in arm's-length financial systems.

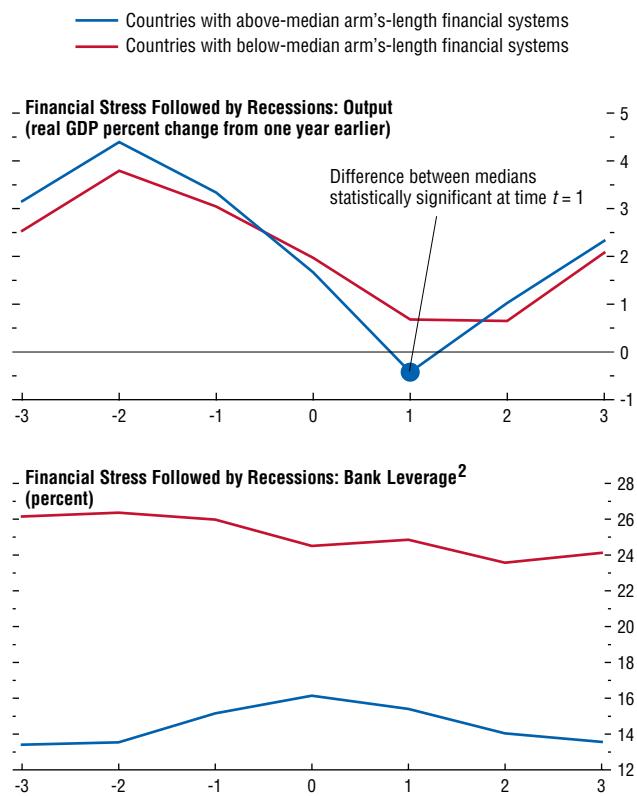


Source: IMF staff calculations.

### Figure 4.14. Arm's-Length Financial Systems, GDP Growth, and Bank Leverage

(Median; start of financial stress episode at  $t = 0$ ; years on the x-axis)<sup>1</sup>

Evidence of more procyclical leverage in arm's-length financial systems may explain differences in spillovers from financial crises to the real economy.



Sources: Haver Analytics; IMF, International Financial Statistics database; OECD, Analytic Database; OECD, *Economic Outlook* (2008); and IMF staff calculations.

<sup>1</sup>The sample is constant for all years.

<sup>2</sup>Difference in medians is statistically significant for all values of  $t$ . Bank leverage is defined as assets divided by equity.

In the euro area, the adjustment of house prices and credit has thus far been milder than in the United States, but there is evidence that the adjustment is gathering momentum. The net borrowing pattern of firms in the euro area is similar to that in the United States: starting from a stronger base than typical for a financial-stress-driven recession but weakening. However, euro area households are in a considerably stronger position, and this is a distinguishing feature of financial stress episodes that are not followed by recessions. The euro area's vulnerability may also be somewhat reduced because the financial systems in many countries tend to be less arm's-length than in the United States.

Within the euro area, there are important intercountry differences. Credit growth is on a more pronounced downward path in Ireland and Spain than in other countries. A number of countries have experienced unusually large run-ups in house prices and residential investment (see Box 1.2 and Chapter 2), and activity in this sector is slowing markedly. Finally, although Germany is experiencing large external surpluses, there are large current account deficits in a number of countries, including Greece, Portugal, Spain, and, to a lesser extent, Ireland (see Box 2.1).

Overall, these results suggest that the economic impact of financial stress may be greater in the United States than in the euro area. The U.S. economic downturn may well become more severe and could evolve into a recession. The evidence for the euro area is more consistent with the pattern for a slowdown than a recession, and the dynamics also appear to be evolving with some lag.

### Conclusions

This chapter uses the Financial Stress Index to analyze episodes of stress in banking, securities, and foreign exchange markets in 17 advanced economies during the past 30 years. The focus is on attempting to identify factors that determine the extent to which financial stress affects economic activity.

**Table 4.4. Six Major Periods of Financial Stress and Economic Contractions**

|                             | Initial Condition                |              |                |   |                          |                         |
|-----------------------------|----------------------------------|--------------|----------------|---|--------------------------|-------------------------|
|                             | Asset price buildup <sup>1</sup> |              |                | Net lending ratio <sup>3</sup>          |                          |                         |
|                             | Equity prices                    | House prices | Credit/GDP     | Bank assets <sup>2</sup>                | Households               | Firms                   |
| Finland, early 1990s        | 80.0                             | 36.1         | 16.6           | 21.0                                    | -6.5                     | -5.1                    |
| Sweden, early 1990s         | 68.5                             | 17.5         | 19.1           | 27.2                                    | ...                      | ...                     |
| Norway, early 1990s         | 73.9                             | 26.5         | 18.8           | 27.6                                    | -6.9                     | -3.6                    |
| Japan, 1990s                | 54.4                             | 12.2         | 7.4            | 22.4                                    | 5.3                      | -5.1                    |
| United Kingdom, early 1990s | 19.9                             | 22.9         | 2.5            | 16.1                                    | -2.3                     | -3.4                    |
| United States, early 1990s  | 14.5                             | 4.9          | 3.1            | 9.5                                     | -0.4                     | -0.3                    |
| Average                     | 51.9                             | 20.0         | 11.3           | 20.6                                    | -2.1                     | -3.5                    |
| <b>Current episode</b>      |                                  |              |                |   |                          |                         |
| United States               | 27.7                             | 5.9          | 3.0            | 9.9                                     | 1.4                      | -0.7                    |
| Euro area                   | 44.0                             | 2.9          | 4.5            | 9.7                                     | -0.5                     | -0.4                    |
| Japan <sup>4</sup>          | 25.1                             | 5.4          | 6.4            | -0.8                                    | 0.1                      | -2.9                    |
| United Kingdom              | 29.4                             | 3.2          | 5.1            | 11.2                                    | -0.8                     | -0.8                    |
| Outcomes                    |                                  |              |                |   |                          |                         |
|                             | Asset price decline              |              |                | Macroeconomic deleveraging <sup>7</sup> |                          |                         |
|                             | Equity prices                    | House prices | Credit/<br>GDP | Bank<br>assets <sup>6</sup>             | Households               | Firms                   |
| Finland, early 1990s        | -85.9                            | -39.8        | -16.8          | -5.1                                    | 16.2                     | 17.0                    |
| Sweden, early 1990s         | -69.5                            | -20.1        | -21.3          | -4.9                                    | ...                      | ...                     |
| Norway, early 1990s         | -76.9                            | -24.6        | -2.7           | -12.5                                   | 16.5                     | 8.5                     |
| Japan, 1990s                | -58.5                            | -11.1        | -6.8           | -8.5                                    | 0.5                      | 15.4                    |
| United Kingdom, early 1990s | -21.4                            | -23.3        | -5.6           | -6.5                                    | 9.6                      | 4.4                     |
| United States, early 1990s  | -21.0                            | -4.8         | -3.8           | -5.4                                    | 0.8                      | 0.6                     |
| Average                     | -55.5                            | -20.6        | -9.5           | -7.2                                    | 8.7                      | 9.2                     |
|                             |                                  |              |                |   | Output loss <sup>8</sup> | Quarters to<br>recovery |

<sup>1</sup>Trough-to-peak changes before the start of the crisis in the detrended Hodrick-Prescott (HP) filter level of the variables.

<sup>2</sup>Maximum percent deviation from detrended (HP filter) levels of bank assets before the start of the crisis.

<sup>3</sup>Deviation from HP trend the year before the crisis.

<sup>4</sup>Data in net lending ratios are for 2006.

<sup>5</sup>Peak-to-trough changes after the start of the crisis in the detrended (HP filter) level of the variables.

<sup>6</sup>Minimum percent deviation from the detrended (HP filter) level of bank assets after the start of the crisis.

<sup>7</sup>Trough-to-peak changes in detrended (HP filter) net lending ratios.

<sup>8</sup>Output loss is measured as the loss from peak to trough in percent of peak level of output.

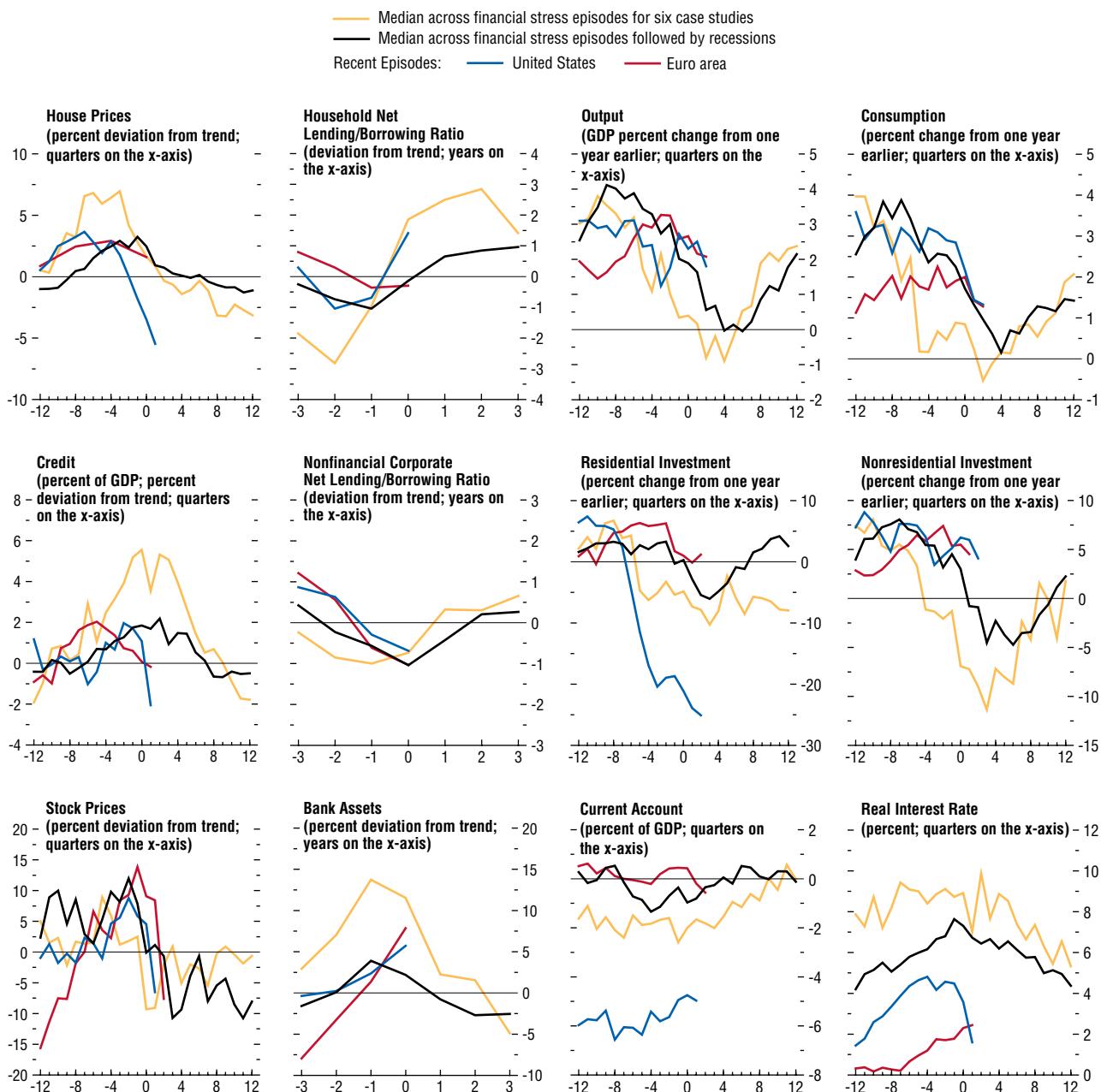
The analysis finds that financial stress is often, but not always, a precursor to economic slowdown or recession. A rapid expansion of credit, a run-up in house prices, and heavy borrowing by households and firms all increase the likelihood that stress in the financial system will lead to a more severe economic downturn. Banking stress, in particular, tends to lead to greater effects on activity, despite financial innovation that has increased the role of securities markets in many countries. This can be explained by the procyclicality of leverage, especially for investment banks but also for commercial banks in many countries. Indeed, economies with financial systems dominated by more-arm's-length transactions,

as opposed to traditional relationship-based intermediation, tend to exhibit higher procyclical leverage, indicating that the amplifying role of financial systems in propagating shocks is more pronounced. As a result, when shocks affect core financial institutions, the subsequent downturns tend to be deeper in more-arm's-length financial systems. Even so, arm's-length systems are not generally more prone to such shocks, and such systems are better able to reallocate resources across various sectors of the economy in response to changing economic opportunities.

Based on a comparison of the current episode of financial stress with previous episodes, there remains a substantial likelihood of a

**Figure 4.15. The Current Financial Stress Episode in the United States and Euro Area in Historical Context<sup>1</sup>**  
*(Start of financial stress episode at t = 0; x-axis as stated)*

Credit ratios and asset prices are mirroring previous episodes, but bank asset growth remains resilient in both the United States and the euro area. Initial corporate financial positions have been stronger than in past episodes, but are deteriorating. A correction in household financial positions is under way in the United States. The slowdown of consumption and investment growth mirrors earlier episodes in the United States, although it has only recently started in the euro area.



Sources: European Central Bank; Haver Analytics; IMF, International Financial Statistics database; OECD, Analytic Database; OECD, *Economic Outlook* (2008); and IMF staff calculations.

<sup>1</sup>All in real terms, except for household and nonfinancial corporate net lending ratios and bank assets.

### Box 4.1. Policies to Resolve Financial System Stress and Restore Sound Financial Intermediation

How can policymakers respond to financial stress, including the current global financial turmoil, in a way that ensures that the financial system is restored to health, while limiting the fallout on the economy and avoiding long-term moral hazard? Well-timed interventions aimed at financial institutions and borrowers can help restore balance sheets and incentives, mitigate the negative shock to the economy of a financial system under stress, and help to restart productive investment. But in undertaking these interventions, governments face the key challenge of restoring financial intermediation while keeping the costs to taxpayers down, avoiding misallocations of capital, and maintaining proper incentives.

#### *General Principles of Intervention*

The experience from past episodes of financial system distress suggests that the effectiveness and cost of policy responses depend on four key elements:<sup>1</sup>

- Having a sound framework for ensuring financial sector stability helps prevent and contain financial stress. Key elements of this framework include (1) pre-crisis sanctions on undercapitalized financial institutions that pose systemic risks; (2) legal and institutional mechanisms to deal swiftly with weak financial institutions, such as bank-specific bankruptcy regimes; (3) well-defined tools and processes for closing and rapidly reopening banks; and (4) an effective deposit insurance system.
- Speed is of the essence to minimize the impact on the real economy. Too often, regulatory forbearance and liquidity support have been used to help insolvent financial institutions recover—only to have it become

The author of this box is Luc Laeven. This box draws heavily on Calomiris, Klingebiel, and Laeven (2005).

<sup>1</sup>For an overview of existing literature on crisis resolution policies, see Hoelscher and Quintyn (2003) and Honohan and Laeven (2005).

clear later that delaying decisive intervention increased the stress on the financial system and the economy. To avoid this, policymakers should force the early recognition of losses and take steps to ensure that financial institutions are adequately capitalized.

- The adverse impact of financial system distress on the real economy may need to be alleviated through measures that directly support firms and households—for example, through targeted debt relief programs to distressed borrowers and corporate restructuring programs.
- Steps should be taken to limit the costs and moral hazard implications of these policy responses. Shareholders must first absorb losses by a write-down of their equity capital. In the case of large losses, creditors also need to contribute by reducing and restructuring their claims. Borrowers must absorb some of the costs, especially if they have been imprudent. Mechanisms that link government support (such as preferred stock purchases) to privately raised capital can also help identify those banks that are truly worth saving and limit future distortions arising from moral hazard.

#### *Specific Policy Responses*

Policymakers can employ a wide range of specific emergency measures (aimed at containing the crisis) and restructuring tools (aimed at restoring the normal functioning of the credit system and rebuilding banks' and borrowers' balance sheets).

Emergency measures include (1) regulatory capital forbearance, (2) emergency liquidity support, (3) government deposit guarantees, and (4) suspension of convertibility of deposits.<sup>2</sup> Each of these actions can have very

<sup>2</sup> Examining a sample of 40 banking crisis episodes, Laeven and Valencia (forthcoming) show that emergency measures have often included emergency liquidity support and government deposit guarantees. Regulatory capital forbearance—suspending pruden-

**Box 4.1 (concluded)**

different consequences on the supply of credit and thus on economic activity. The appropriate policy measure depends on whether the trigger for the crisis is a loss of depositor confidence, the (regulatory) recognition of existing insolvency, or the knock-on effects of asset price volatility, including exchange rate or house price pressures. Even during the emergency phase, however, longer-term implications must be taken into account—the risk being that restoring stability in the heat of the crisis may lead central banks to extend loans to some financial institutions that are almost certain to prove insolvent.

Specific resolution policies include (1) recapitalizing financial institutions, (2) using asset management companies (AMCs) to resolve distressed loans, (3) offering debt forgiveness, and (4) providing incentives for loan loss write-offs.<sup>3</sup> Countries typically apply a combination of resolution strategies—with some directed more toward financial institutions and others geared more toward borrowers—and in the process the government often incurs substantial fiscal costs.<sup>4</sup> Here are some experiences with these types of resolution policies.

*Recapitalization:* Measures aimed at quickly improving the capital bases of financial institutions do not directly improve debtor capacity, but they make it easier for banks to recognize losses and thereby facilitate corporate restructuring. Government-assisted recapitalizations can, however, create moral hazard for shareholders, especially if government intervention

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tial regulations and allowing technically insolvent banks to continue operating—is also a rather common response. By contrast, measures aimed at avoiding bank runs through deposit freezes and bank holidays are rarely used.

<sup>3</sup> Laeven and Valencia (forthcoming) show that bank recapitalization occurred in three-quarters of the crises they considered, with an average fiscal cost of 6 percent of GDP. AMCs were set up in slightly more than half of the episodes in their database.

<sup>4</sup>The average fiscal cost of government intervention in the cases studied by Laeven and Valencia (forthcoming) is about 16 percent of GDP.

is small relative to the negative net worth of recipient institutions. Looking at the recapitalization schemes adopted in the United States (starting in 1933) and Japan (1998 and 1999) helps illustrate some key issues.<sup>5</sup> In the United States, the program mainly involved the purchase of preferred stock to enhance bank capital and included appropriate screening and incentives for participants so that only banks worth saving and those that managed their risk and capital structure more prudently received taxpayer funds. Moreover, banks receiving assistance were monitored to ensure that they made proper use of public aid. In Japan, the first program (launched in 1998) involved only small amounts, was mostly targeted to purchases of subordinated debt and loans, and was broadly spread across the banking system. A more successful recapitalization program was launched in 1999, which involved much larger purchases of preferred stocks, included more rigorous benchmarks, and participation was more narrowly focused.<sup>6</sup>

*Asset management companies (AMCs):* The main objective of government-owned AMCs is to accelerate financial restructuring by taking over nonperforming assets from banks. Two examples of successful AMCs are Securum and Retrieva in Sweden, created in 1992 to manage the problem loans of two major Swedish banks, Nordbanken and Gota Bank. Both companies managed to recover much of their initial investment by selling off their assets. Factors that contributed to their success include an efficient judicial system, which allowed them

<sup>5</sup>The two Japanese programs together involved public purchase of ¥10 trillion (2 percent of GDP) of bank capital.

<sup>6</sup>The specific form of bank recapitalization often depends on the country's insolvency regime for financial institutions. In many countries today such regimes do not allow for a speedy resolution of crises but rather prolong them. Another lesson for successful bank recapitalization is that bank capital regulations must be enforced rigorously, which can involve imposing limitations on the distribution of dividends.

to force insolvent debtors into bankruptcy; the real-estate-related nature of their assets, which made it easier to restructure; and the strong governance mechanisms and skilled management teams in place at the companies. However, other countries have found it harder to realize these advantages, in part owing to weak legal, regulatory, and political institutions—banks' assets often are transferred to the AMC at prices above market value, resulting in backdoor bank recapitalization and creating moral hazard.

*Debt forgiveness:* Key advantages of this measure are its simplicity and speed—debt forgiveness recognizes loan losses up front and thus provides immediate relief to borrowers. At the same time, however, debt forgiveness poses incentive problems because it does not impose losses on borrowers and bank shareholders. It can also undermine trust in monetary institutions and the rule of law, as it can violate monetary standards and interfere in private contracting. Whether it works ultimately depends on the frequency of its use and the specific circumstances of financial

distress.<sup>7</sup> Because of the risks of moral hazard, however, debt forgiveness should be considered only as a last resort.

*Loan loss write-off programs:* Loan loss write-off programs are directed at supporting borrowers. Although they can be implemented quickly, loan loss write-offs may worsen incentives for prudent behavior as they do not impose losses on banks or their borrowers.

Overall, the mix of policy responses will ultimately be crisis-specific and must reflect a variety of factors, including the nature and depth of the financial crisis and the specific country circumstances. The four principles for intervention outlined here have proven to have general applicability and should be followed in every crisis, including the current one.

<sup>7</sup> The U.S. experience in the 1930s, when gold payment clauses in debt contracts were abrogated, shows that debt forgiveness can help solve coordination problems in renegotiating debt. While few individual creditors were willing to voluntarily remove these clauses, when they were forced to do so collectively, the improvement in aggregate economic circumstances left both creditors and debtors better off.

sharp downturn in the United States, given the similarities between the current dynamics of asset prices, credit ratios, and household financial positions and previous episodes that were followed by recession. Mitigating factors are the rapid monetary policy response and a relatively low real interest rate. In the euro area, by contrast, the relatively strong position of households offers some protection against a sharp downturn, despite the appreciable run-up in asset prices and the credit ratio ahead of the current financial turmoil. The euro area's vulnerability to a deeper downturn may also be somewhat reduced because many of its financial systems are less arm's-length, as evidenced most notably by the much smaller role for the originate-to-distribute mortgage banking business model.

One factor that helps predict whether a financial stress episode will lead to a downturn is the buildup in balance sheet vulnerabilities associated with rising asset prices and credit. Policymakers therefore need to be alert to these indicators during the upswing of the financial cycle. Prudential measures and monetary policy should be used to address buildups that may leave the economy vulnerable to greater output losses in the event of a severe shock.

Should significant financial stress affect the core of the banking system, the early recognition of losses and measures to support the speedy restoration of capital can help reduce the output consequences. At the same time, policymakers must seek to avoid longer-term moral hazard implications of any strategy to restore financial stability.

## Appendix 4.1. Data and Methodology

*The main authors of this appendix are Angela Espiritu and Gavin Asdorian.*

**Table 4.5. Data**

| Variable   | Source  | Frequency |
|--|---|-----------|
| GDP  | Haver Analytics, Organization for Economic Cooperation and Development (OECD) Analytical Database | Quarterly |
| Average petroleum spot price   | World Economic Outlook database   | Quarterly |
| CPI inflation  | Haver Analytics, OECD Analytical Database   | Quarterly |
| Real private consumption   | OECD Analytical Database  | Quarterly |
| Money supply   | OECD Analytical Database  | Quarterly |
| Interest rate  | Haver Analytics, International Financial Statistics (IFS) database                                | Quarterly |
| Banking sector equity index  | Thomson Datastream, Haver Analytics   | Monthly   |
| Stock market index   | OECD  | Monthly   |
| 3-month London interbank offered rate (LIBOR) or commercial paper rate | Haver Analytics   | Monthly   |
| Government short-term rate   | Haver Analytics   | Monthly   |
| Government bond yields   | Haver Analytics, Thomson Datastream   | Monthly   |
| Corporate bond yields  | Thomson Datastream, Haver Analytics   | Monthly   |
| Real effective exchange rate   | International Monetary Fund   | Monthly   |
| Residential investment   | OECD Analytical Database  | Quarterly |
| Nonresidential investment  | OECD Analytical Database  | Quarterly |
| Current account  | OECD Analytical Database  | Quarterly |
| Real house prices  | OECD  | Quarterly |
| Credit   | IFS database  | Quarterly |
| Household net lending  | OECD  | Annual    |
| Government net lending   | OECD  | Annual    |
| Nonfinancial corporate net lending                                     | OECD  | Annual    |
| Bank assets  | OECD  | Annual    |
| Bank equity  | OECD  | Annual    |

## The Financial Stress Index

This section of the appendix describes the components and the methodology used to construct the Financial Stress Index (FSI). The FSI is an equal-variance weighted average of seven variables, grouped into three categories.

### Banking Sector

- Banking sector  $\beta$ : rolling 12-month covariance of the year-over-year percent change of a country's banking sector equity index and its overall stock market index, divided by the rolling 12-month variance of the year-over-year percent change of the overall stock market index. Sources: Thomson Datastream, Haver Analytics, and OECD.
- TED spread: three-month LIBOR or commercial paper rate minus the government short-term rate. Source: Haver Analytics.
- Inverted term spread: government short-term rate minus government long-term rate. Sources: Thomson Datastream and Haver Analytics.

### Securities Market

- Corporate spread: corporate bond yield minus long-term government bond yield. Sources: Thomson Datastream and Haver Analytics.
- Stock decline: stock index at  $t - 1$  minus stock index at  $t$ , then divided by stock index at  $t - 1$ . Source: OECD.
- Time-varying stock volatility: GARCH(1,1) volatility of overall stock market index monthly return. Source: OECD.

### Foreign Exchange

- Time-varying real effective exchange rate volatility: GARCH(1,1) volatility of real effective exchange rate monthly percent change. Source: IMF.  
All components are originally in monthly frequency. The index is constructed by taking the average of the components after adjusting

for the sample mean and standardizing by the sample standard deviation. The index is then rebased so that it ranges from 0 to 100. Finally, it is converted into quarterly frequency by taking the average of the monthly data. The FSI is available for 17 advanced economies starting in 1980.<sup>24</sup>

Episodes of financial stress are identified when the index is one standard deviation above its trend. Episodes that are only two quarters apart are considered a single episode. To classify the cause of an episode of financial stress—either banking-related, securities-related, or foreign-exchange-related—we look at the change between the FSI from the quarter prior to the start of the episode and the maximum value of the FSI within the episode. If most of the increase stems from banking sector components, the FSI is classified as “banking.” The same rule applies if the change results mainly from the securities markets components or the foreign exchange component. Moreover, if banking contributes at least one-third of the change in the FSI, the episode is also classified as “banking-related.”

## The Cost of Capital

“Cost of capital” is defined in this chapter as a weighted average of the real cost of bank loans, the real cost of debt, and the real cost of equity, using as weights the relative shares of equity, bonds, and loans in nonfinancial corporate liabilities. The cost of capital is based on the calculation outlined in Box 4 on p. 37 of the European Central Bank’s (ECB’s) March 2005 *Monthly Bulletin*. The real cost of bank loans, real cost of debt, and real cost of equity are derived as follows:

- Real cost of bank loans: bank lending rates minus one-year-forward Consensus inflation forecast. Sources: IFS, ECB, and Consensus Economics.

<sup>24</sup>Data on long-term corporate bond yields for Greece, Ireland, New Zealand, and Portugal were not available and therefore were excluded from the sample.

- Real cost of debt: corporate bond yield minus one-year-forward Consensus inflation forecast. Sources: Thomson Datastream, Haver Analytics, and Consensus Economics.
- Real cost of equity: derived using a model specified in Box 2 on p. 76 of the ECB’s November 2004 *Monthly Bulletin*. Using available data for the other variables, the real cost of equity,  $h_t$ , can be calculated using the following equation:

$$P_t = \frac{D_t[(1+g) + 8(g_t^{IBES} - g)]}{h_t - g},$$

where

- $P_t$  = real stock price,  
 $D_t$  = the current level of real dividends,  
 $g_t^{IBES}$  = I/B/E/S long-term earnings-per-share growth forecast minus Consensus long-term inflation forecast,  
 $g$  = long-term growth rate of real corporate earnings, assumed constant at 2.5 percent.

The overall cost of capital is calculated as a weighted average of these three components with the weights defined, respectively, as loans, debt, and equity as shares of nonfinancial corporate liabilities as reported in the OECD national accounts data.

## Bankscope Data

Two data sets were constructed using bank-level data obtained from the Bankscope database.<sup>25</sup> The first data set included only investment banks as classified by the Bankscope database (“Investment Bank/Securities House”). The second data set, referenced in the chapter as “commercial banks,” included banks with the following Bankscope classifications: Commercial Bank, Savings Bank, Cooperative Bank, Real Estate/Mortgage Bank, and Medium & Long Term Credit Bank.

<sup>25</sup>Bankscope database published by Bureau van Dijk Electronic Publishing (BvDEP): [www.bvdep.com](http://www.bvdep.com).

## Sample of Banks

### *Investment banks*

The sample of banks contained banks that were among the top 50 investment banks globally in terms of total assets in one or more years from 1988 to 2007.

### *Commercial banks*

The sample of banks consisted of banks that were among the top 10 banks<sup>26</sup> in terms of total assets for each country in one or more years from 1988 to 2007. Also included were any banks that were acquired by or that merged with a top-10 bank. (See below for an explanation of accounting for mergers and acquisition.)

The number of commercial banks in each country used in the sample was chosen to provide a representative sample of banking activity within each country. Table 4.6 summarizes the average yearly share of total bank assets (as reported by the OECD) represented by the banks in the sample.

## Consolidated Versus Unconsolidated Balance Sheets

### *Investment banks*

Data from consolidated statements were used for investment banks. If consolidated data were unavailable, data from unconsolidated statements were used.

### *Commercial banks*

In order to isolate as much as possible the domestic activities of commercial banks, unconsolidated bank data were used for commercial banks in the sample. If unconsolidated statements were unavailable, data from consolidated data were used.

Data from multiple statements for the same bank were combined to form a single set of bank-level data if the statement types (consolidated or unconsolidated) were the same. In

<sup>26</sup>Top 30 banks for United Kingdom and Japan; top 50 banks for United States.

**Table 4.6. Average Yearly Share of Total Bank Assets of Banks in Sample**

| Country        | Number of Top Banks a Year in Sample | Percent of Country's Total Bank Assets |
|----------------|--------------------------------------|--|
| Australia      | 10                                   | 78                                     |
| Austria        | 10                                   | 71                                     |
| Belgium        | 10                                   | 94                                     |
| Canada         | 10                                   | 88                                     |
| Denmark        | 10                                   | 92                                     |
| Finland        | 10                                   | 79                                     |
| France         | 10                                   | 73                                     |
| Germany        | 10                                   | 65                                     |
| Italy          | 10                                   | 40                                     |
| Japan          | 30                                   | 74                                     |
| Netherlands    | 10                                   | 90                                     |
| Norway         | 10                                   | 78                                     |
| Spain          | 10                                   | 78                                     |
| Sweden         | 10                                   | 94                                     |
| Switzerland    | 10                                   | 64                                     |
| United Kingdom | 30                                   | 67                                     |
| United States  | 50                                   | 60                                     |

addition, the data were cleaned (by country, in the case of commercial banks) by excluding observations in which the growth rate of total assets was above the 95th percentile or below the 5th percentile.

## Mergers and Acquisitions

For consistency, banks that were acquired by or merged with banks included in the original sample set were also included in the data set. For years prior to a merger or acquisition, the banks involved were treated as separate banks; for years subsequent to a merger or acquisition, the bank resulting from the merger or acquisition was naturally a single bank in the database. In order to calculate level changes or growth rates of a bank *in the year of a merger or acquisition*, a data point was constructed for the year prior to the merger or acquisition by summing the data values of the banks involved in the merger or acquisition.

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*This chapter investigates whether fiscal policy should be used to combat business cycle fluctuations, especially downturns. Can discretionary fiscal policy successfully stimulate output? Or does it do more harm than good? New evidence presented here, from emerging as well as advanced economies, indicates that the effects of fiscal stimulus can be positive, albeit modest. But policymakers must be very careful about how stimulus packages are implemented, ensuring that they are timely and that they are not likely to become entrenched and raise concerns about debt sustainability. The chapter concludes with a discussion of how automatic stabilizers could be made more effective and how governance improvements could reduce “debt bias” concerns related to discretionary actions.*

In recent months, as economies have been buffeted by falling asset prices, rising costs for raw materials and credit, and waning confidence, there have been renewed calls for governments to actively use fiscal policy to support efforts taken by central banks to prevent sharp declines in activity. Once again, there is a lively debate about the appropriate role of fiscal policy in managing the business cycle, especially during a downturn: Are discretionary fiscal actions helpful, or do they sometimes do more harm than good? When is a discretionary package most effective? When is it better simply to let automatic stabilizers do the job?

The debate over the appropriate role of fiscal policy in managing the business cycle has persisted for many years. One school of thought argues that taxes, transfers, and spending can be used judiciously to lean against fluctuations in economic activity, especially to the extent that

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economic fluctuations are mainly due to markets falling out of equilibrium instead of reacting to changes in fundamental factors such as productivity. Others contend that fiscal policy actions are generally either ineffective or make things worse, because the actions are ill timed or they create damaging distortions. This latter point of view has dominated the debate over the past two decades; consequently, fiscal policy has taken a backseat to monetary policy. But there also has been a recognition that there are times when monetary policy needs the support of fiscal stimulus, such as when nominal interest rates approach zero or the channels of monetary policy transmission are in some way impeded.

Against this background, this chapter takes a fresh look at the role of fiscal policy during economic downturns. The main objectives are to (1) analyze how fiscal policy has typically responded during downturns; (2) examine the effects on economic activity of fiscal stimulus during downturns; (3) identify the main factors that affect the outcomes of fiscal policy interventions; and (4) offer policy suggestions, in light of both empirical evidence and insights from theoretical work, on (a) whether and when to use discretionary fiscal policy, (b) the implications of using various fiscal policy instruments, and (c) the appropriate balance between automatic stabilizers and discretionary actions.

This chapter seeks to contribute to the considerable literature on fiscal policy as a counter-cyclical tool in three ways. First, it specifically evaluates whether discretionary fiscal policy responses to downturns have been timely and temporary. Second, whereas most previous studies have focused on the effects of policy in advanced economies, this chapter also looks at evidence for emerging economies. Finally, the chapter complements the empirical analysis with simulation analysis designed to assess how fiscal multipliers depend on the choice of

fiscal instruments and the characteristics of the economy.

The policy record shows that discretionary fiscal policy has been more timely than some critiques suggest. But there are valid concerns about whether fiscal stimulus packages will be temporary and the implications for the path of government debt. Empirical evidence suggests that discretionary fiscal stimulus has a moderately positive effect on output growth in advanced economies. However, the effects appear to be constrained in emerging economies. This might be because of credibility issues, especially debt concerns. Simulation experiments show that fiscal multipliers can vary considerably, depending on the instrument used, the degree of monetary policy accommodation, and the type of economy. Consistent with the empirical evidence, increases in interest rate risk premiums as a result of debt concerns can render fiscal multipliers negative, suggesting that discretionary fiscal stimulus may do more harm than good.

Does this mean there is no role for countercyclical fiscal policy? In practice, the extent of automatic stabilizers has been related to the size of government, but more extensive government is generally associated with lower growth. Given this dichotomy, it is worth investigating further whether countercyclical fiscal rules and the fiscal policy framework can be designed to increase the ability of fiscal policy to smooth fluctuations in output and income over the course of business cycles—without increasing the size of government or placing debt stability at risk.

The chapter is organized as follows. The next section provides a brief review of the empirical and theoretical literature on the role of fiscal policy in stabilizing output. The following two sections present, first, the results of new empirical work that characterizes how fiscal policy has been used in both advanced and emerging economies and then an analysis of its effects. The subsequent section uses formal simulation-based analysis to examine the effectiveness of various stimulus options and the effects of various macroeconomic factors when the policy

is implemented. The concluding section offers some policy suggestions.

## Understanding the Fiscal Policy Debate

Fiscal policy can work in two general ways to stabilize the business cycle. One way is through automatic stabilizers, which arise from parts of the fiscal system that naturally vary with changes in economic activity—for example, as output falls, tax revenues also fall and unemployment payments rise.<sup>1</sup> Discretionary fiscal policy, on the other hand, involves active changes in policies that affect government expenditures, taxes, and transfers and are often undertaken for reasons other than stabilization.

By their nature, automatic stabilizers play an immediate role during downturns. But they are usually by-products of other fiscal policy objectives. As such, the size of automatic stabilizers tends to be associated with the size of government (see, for example, Fatás and Mihov, 2001), suggesting that an increase in the size of government can help dampen output volatility (see Galí, 1994). However, many argue that a larger government acts as a drag on growth over the longer term. Hence, there is a potential conflict between increasing stability and increasing economic efficiency. Moreover, the effectiveness of automatic stabilizers may be more a matter of proper design than size.

Because automatic stabilizers are often limited in scope—Box 5.1 reviews the extent of automatic stabilizers across economies—the active use of discretionary fiscal measures is often promoted as a countercyclical tool. Skeptics, however, question governments' ability to deliver well-timed measures as well as the macroeconomic effects of discretionary fiscal measures and the longer-term implications for fiscal sustainability.

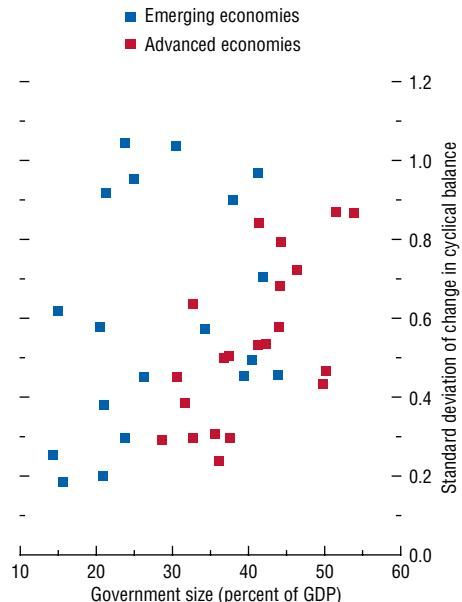
<sup>1</sup>Hence, the strength of automatic stabilizers depends on the size of transfers (such as the scope of unemployment insurance), the progressivity of the tax system, and the effects of taxes and transfers on labor participation and demand for workers and capital.

### Box 5.1. Differences in the Extent of Automatic Stabilizers and Their Relationship with Discretionary Fiscal Policy

How important are automatic stabilizers? This box looks at their quantitative impact on the fiscal balance, especially in comparison with discretionary fiscal policy. First, the impact of automatic stabilizers on the primary balance varies across countries. The volatility in the primary balance is more a result of changes in discretionary policy than of automatic stabilizers. However, for many countries, changes in discretionary policy are not well synchronized with the business cycle, suggesting that automatic stabilizers are often a more important source of systematic countercyclical policy actions.

Automatic stabilizers are measured using the change in the cyclical balances estimated in the event analysis in the main text of this chapter.<sup>1</sup> The impact of automatic stabilizers on fiscal outcomes varies across countries and is positively related to both government size and output volatility. Government size is a good proxy for the size of automatic stabilizers, and provides the horizontal axis in the first figure.<sup>2</sup> Realized volatility in the cyclical balance—measured as the standard deviation of the change in the cyclical balance—is roughly equal to government size times the volatility in the output gap. The first figure shows that even though emerging economies have smaller governments, they tend to experience higher volatility in the cyclical balance than advanced economies. This is largely because emerging economies have more volatile output gaps. However, looking separately at emerging economies and advanced economies (to control for the higher output volatility in emerging economies), there is a positive relationship between government size and cyclical balance volatility—that is, countries with larger

#### Volatility in Cyclical Balance



Source: IMF staff calculations.

automatic stabilizers have more variation in the cyclical balance.<sup>3</sup>

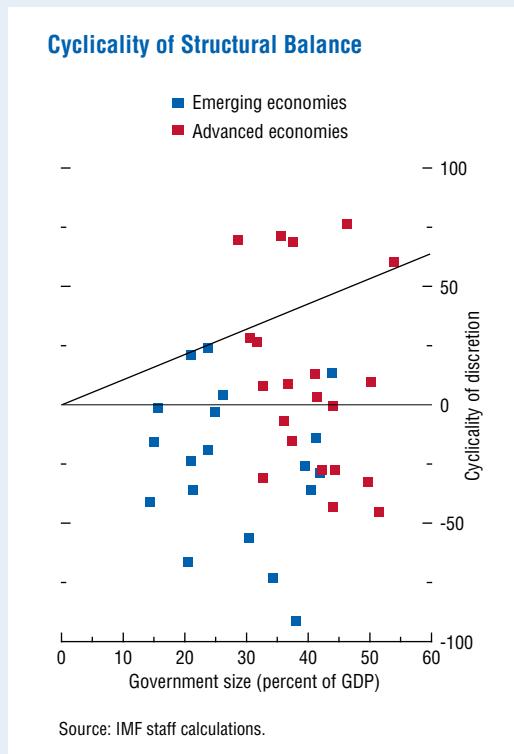
Changes in discretionary fiscal policy, however, account for more of the volatility of primary balances than automatic stabilizers. On average, the volatility of the cyclically adjusted balance is about three times greater than that of the cyclical balance. This is true for advanced economies and for emerging economies. But the extent to which these policy changes play a countercyclical role depends on how well they are synchronized with the business cycle. To examine this empirically, a measure of the cyclicality of fiscal policy discretion is compared with

The main author of this box is Steven Barnett.

<sup>1</sup>The elasticity-based measure is used for the analysis in this box. The sample period is 1992–2007.

<sup>2</sup>Balassone and Kumar (2007), Box 4.2, explains why this holds. This general finding is robust to income elasticity assumptions.

<sup>3</sup>Government size, however, is often found to be negatively correlated with output volatility (for example, Andrés, Doménech, and Fatás, 2008), which would dampen the otherwise mechanical positive relationship between government size and cyclical balance volatility.

**Box 5.1 (concluded)**

the size of automatic stabilizers.<sup>4</sup> The second figure shows that discretionary fiscal policy tends to be more countercyclical in advanced economies (when the countercyclicality of discretion is greater than zero), but is often procyclical in emerging economies (below zero). The units on the two axes are comparable and indicate the percentage point change in the respective balance (after dividing by 100) for a 1 percentage point increase in the output gap. If a country lies above the 45-degree line, it indicates that discretionary policy makes overall fiscal policy more countercyclical than automatic stabilizers

<sup>4</sup>Cyclicality of fiscal policy is measured by a regression, run in first differences, with the cyclically adjusted primary balance as the dependent variable and the output gap as the explanatory one. A positive coefficient indicates a more countercyclical policy. This regression, however, is potentially problematic in that it ignores the relationship (endogeneity) between fiscal policy and the output gap.

do. As can be seen, this happens in only a few cases, including some of the Anglophone countries with smaller governments, as well as some of the Nordic ones with larger governments. However, there is little systematic evidence that countries with smaller governments compensate for weaker automatic stabilizers by using more discretion.

Together, these findings would suggest that (1) automatic stabilizers have, in general, played a more consistently countercyclical role than discretionary fiscal policy, and (2) changes in discretionary fiscal policy are either poorly timed or related to factors other than output stabilization. A caveat, however, is that fiscal policy discretion is measured by the cyclically adjusted balance, which, as discussed in the main text, is an imperfect proxy, because it may also capture factors unrelated to discretionary changes, notably asset price fluctuations.

Asset price movements directly affect financial transaction and capital gains taxes, but they also have broader, indirect revenue implications, notably through a wealth effect on consumption. To the extent that these movements do not fully track the business cycle (for example, amplified fluctuations relative to those of the output gap), the revenue effects will not be captured by conventional tax revenue elasticities and will be part of the cyclically adjusted component of revenue. In an unpublished study, the IMF staff prepared econometric estimates of the short-run sensitivity of cyclically adjusted tax revenue to house and equity price fluctuations in the G7 countries. The cyclically adjusted revenue data are computed using the conventional adjustment methods, ensuring consistency of the results. The estimates suggest that a 1 percent decline in both house and equity prices could reduce total tax revenue by up to almost 1 percent, with the house price decline accounting for most of the drop. The estimates also indicate that Canada, Japan, the United Kingdom, and the United States are more sensitive to house and equity price fluctuations than the continental European G7.

These skeptics argue that discretionary fiscal measures cannot be delivered quickly enough by legislatures, especially compared with the speed with which a central bank can change its policy rate. Hence, there is a risk that fiscal stimulus will arrive just as the economy recovers from a downturn. Moreover, argue the critics, fiscal stimulus measures are not likely to be well targeted, but are likely instead to be directed to wasteful and distortionary public spending and revenue measures more responsive to the pressures of interest groups than the needs of the economy. Furthermore, they are not likely to be withdrawn sufficiently quickly to preserve fiscal sustainability. For instance, there is widespread evidence that fiscal policy in emerging and less developed economies is procyclical rather than countercyclical, in part because of political incentives to run larger deficits in good times, when financing is available (Talvi and Végh, 2000).

Even if fiscal stimulus can be delivered quickly, does that justify the use of discretionary fiscal policy? There is still considerable debate and little theoretical consensus. A textbook Keynesian position is that private consumption and investment are driven by current income, with the implication that output is highly responsive to changes in fiscal policy. But fiscal policy can be much less effective in an open economy, depending on the degree of capital mobility and the exchange rate regime, because fiscal stimulus might simply “leak out.” In addition to the standard crowding-out arguments, many neoclassical theorists emphasize the role of expectations about future income and taxes, arguing that fiscal multipliers are likely to be small because forward-looking households will figure out that temporary fiscal stimulus matters little to their lifetime income; multipliers may even be negative, if increased government expenditures lead to offsetting reductions in private consumption and investment.<sup>2</sup> By con-

<sup>2</sup>For example, the well-known Ricardian equivalence critique of Barro (1974) argues that households and firms understand that deficits accompanied by future tax

trast, recent work using so-called New Keynesian models argues that an increase in government consumption still can have positive consumption and real wage effects, if there are nominal and real rigidities and liquidity constraints (see, for example, Galí, 2006). These models also suggest that not all temporary fiscal measures are ineffective: policies that affect the incentive to switch the timing of consumption—such as changes in consumption taxes—are likely to be most effective when they are understood to be temporary rather than permanent.

In recent years, four factors may have become increasingly relevant:

- *The extent of market rigidities:* Rigidities in goods and labor markets may have decreased over time, as a result of microeconomic reforms, and access to credit may have become more widely available, reducing fiscal multipliers.
- *The monetary policy framework:* The impact of fiscal policy can be expected to increase if it is accommodated by monetary policy, thus alleviating the crowding-out effect.
- *Globalization and openness:* To the extent that economies are more integrated—that is, an increasing share of domestic demand falls on imported goods—discretionary fiscal policy will be less effective today than previously.
- *Financial innovation:* Deregulation of financial markets and increased access to global capital may have eased credit constraints on households and firms, with the implication that consumption and investment are less constrained by current income and less responsive to discretionary fiscal policy measures. However, cross-border financial integration can also reduce the sensitivity of interest rates to government borrowing and ease crowding-out effects.

Unfortunately, empirical work has not settled the theoretical debates. Estimates of fiscal multi-

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rises leave them no better off in net present value terms, and therefore they save rather than spend temporary (lump-sum) tax cuts. Neoclassical models often exhibit negative wealth effects following increases in government spending that are strong enough to reduce private consumption and investment.

### Box 5.2. Why Is It So Hard to Determine the Effects of Fiscal Stimulus?

Perhaps surprisingly, the empirical literature on the effects of fiscal policy does not provide a clear answer to the simple question of whether discretionary fiscal policy can successfully stimulate the economy during downturns. Estimates of the effects of fiscal policy on many key macroeconomic variables can differ not merely in degree but in sign. This box aims to show why demonstrating conclusively what happens as a result of discretionary fiscal policy is, in fact, extremely difficult.

Any empirical work on this issue faces the following problems: (1) Every assessment of the impact of a policy change must take into account the economic circumstances when the policy was implemented. (2) A fiscal stimulus can be achieved by many different combinations of taxes, transfers, and spending, each of which can have different effects. (3) There will sometimes be a difference between the date on which a change in fiscal policy is measured from the data and the date on which the policy was common knowledge to households and firms. (4) Policy measures and economic activity are both endogenous—they depend on each other at the same time—and so it is not immediately clear what determines what just by looking at simple correlations. This last problem is arguably the most difficult to overcome. The researcher must somehow strip out those parts of changes in taxes, transfers, and spending that occur passively (such as from automatic stabilizers) from those that represent the true policy initiative, and use that measure of fiscal impulse to determine the effects on economic activity.

To illustrate, suppose overall fiscal policy,  $g$ , evolves according to

$$g = (\alpha + \beta)y + \eta, \quad (1)$$

where  $y$  is the output gap. For simplicity, one can think of  $g$  as representing only government expenditures, so that a stimulus occurs when  $g$  is positive. There are two reactions of fiscal policy to the state of the economy: an automatic

The main author of this box is Alasdair Scott.

component, represented by  $\alpha$ , and a systematic discretionary component, represented by  $\beta$ . Unexpected discretionary fiscal policy is denoted by  $\eta$ .

Now suppose that the output process is

$$y = \delta g + \varepsilon, \quad (2)$$

where  $\delta$  is the fiscal multiplier and  $\varepsilon$  represents shocks independent of policy. There are two significant problems presented by this system. First, we have a classic simultaneity problem—attempting to assess the effects of fiscal policy on output by estimating (1) will result in biased estimates. The second problem is a measurement problem—the difficulty of distinguishing systematic discretionary policy changes from automatic stabilizers. The elasticity-based fiscal impulse measure can be thought of as using OECD estimates of  $\alpha$  and constructing

$$\tilde{f} = f - \alpha y.$$

Estimating the cyclicity of this measure is equivalent to estimating the parameter  $\beta$ .<sup>1,2</sup>

When examining the effectiveness of fiscal policy in the regression framework, a fiscal impulse measure that mistakenly includes cyclical changes generated by automatic stabilizers will lead to invalid inferences about the effects of discretionary fiscal policy. The second fiscal impulse measure therefore focuses entirely on  $\eta$ , the effects of unexpected fiscal policy shocks.<sup>3</sup>

Other approaches in the literature attempt to address the same issues. Structural vector autoregressions (SVARs) use statistical criteria to estimate shocks to fiscal policy and measure

<sup>1</sup>See also Gali and Perotti (2003) for an application of the same method.

<sup>2</sup>When looking at the reaction of fiscal policy in emerging economies, it is necessary to make the “zero-one” assumption of income elasticities of expenditures and revenues, which is a cruder approach to measuring  $\alpha$  but conceptually the same.

<sup>3</sup>For precise details on how the fiscal impulse measures are constructed, see Appendix 5.1.

### Assessment of Impacts of Discretionary Fiscal Policy Stimulus by Empirical Method

|                   | Output              | Private Consumption | Private Investment in Durables | Private Capital Investment |
|-------------------|---------------------|---------------------|--------------------------------|----------------------------|
| VAR studies       | Neutral to positive | Neutral to positive | Negative to positive           | Negative to positive       |
| Narrative studies | Positive            | Negative            | Negative                       | ...                        |
| Case studies      | Positive            | Positive            | ...                            | ...                        |

Note: Studies placed in the vector autoregression (VAR) category include Fatás and Mihov (2001); Mountford and Uhlig (2002); Blanchard and Perotti (2002); and Gál, López-Salido, and Vallés (2007). Studies placed in the narrative category include Ramey and Shapiro (1998) and Edelberg, Eichenbaum, and Fisher (1999). Case studies include Johnson, Parker, and Souleles (2006).

how well those shocks can explain movements in output that are not accounted for by other economic shocks. Three problems are potentially relevant. As with reduced-form regressions, statistical assumptions need to be made to identify the fiscal shocks. Second, most VARs ignore the importance of debt dynamics in conditioning responses (whether or not a temporary rise in debt causes households and firms to expect future higher taxes is a key distinction between Keynesian and classical views on the effectiveness of discretionary fiscal policy).<sup>4</sup> Finally, as with reduced-form regressions, VARs might not reliably be able to resolve the timing issue.

By contrast, “narrative” approaches estimate policy-driven changes in fiscal stimulus by looking directly at the historical record of legislation and public statements. The advantage of this approach is that careful attention can be directed to picking the timing of the shocks by examining carefully when policy decisions were made and announced. But such studies are very resource intensive, making their application across countries almost impossible. Further, they are subjective, just as VARs and reduced-form analysis rely on identifying assumptions. In practice, analysis has centered around a small number of extraordinary episodes of military buildups, and there are questions as to how much can be learned from such episodes about discretionary fiscal policy during downturns.

A final approach examines specific “natural experiments,” such as the effects of tax rebates.

<sup>4</sup>See Chung and Leeper (2007). Favero and Giavazzi (2007) do include debt stock.

The advantage of this approach is that it can be directed at specific episodes for which it is relatively easy to identify the policy change and its intent. The corresponding disadvantage is that, by examining a specific case, it can be hard to draw broader lessons for policy.

This empirical work provides a mixed picture of the ability of government spending to stimulate private demand.<sup>5</sup> (There is less evidence about revenue-based measures.) Moreover, there appears to be a pattern between the method used and the qualitative results obtained. The table summarizes the results of a selection of prominent papers in the literature in terms of the signs of responses of key variables to discretionary increases in government spending.

In particular, SVAR-based studies in which fiscal interventions are identified by assuming that government spending is predetermined within the quarter (see Blanchard and Perotti, 2002) tend to find relatively strong positive effects, whereas narrative studies that rely on the reactions to episodes of extraordinary spending have tended to find much weaker, and even negative, relationships between episodes of fiscal stimulus and

<sup>5</sup>Results from case studies usually find positive effects, but the effects are generally not as strong as those generated by VAR studies. Studies of the 1975 tax rebates generally conclude that the effects were positive but modest (that is, short-run multipliers of about 0.2–0.5); see Modigliani and Steindel (1977) and Blinder (1981). Studies of the 2001 tax rebates have generated similar results; see Shapiro and Slemrod (2002).

**Box 5.2 (*concluded*)**

consumption.<sup>6</sup> Ramey (2008) suggests that this difference relates to the way that VARs treat timing—if discretionary fiscal policy measures are pre-announced, and households *decrease* their spending right away (as predicted by neoclassical theory), VARs that measure the effect based on actual changes to fiscal balances or components might record a *rise* in the growth rate of consumption on that date. This would support a Keynesian view of fiscal policy, but in fact the growth in consumption is driven

<sup>6</sup>Note, however, that narrative studies of the effects of tax changes find very large multipliers—see Romer and Romer (2007).

by recovery from the previous fall. Narrative approaches, on the other hand, take into account the moment discretionary measures are announced.<sup>7</sup> Compared with these studies, the reduced-form approach employed in this chapter is conceptually closest to the SVAR approach of Blanchard and Perotti (2002); to the extent that the timing criticism applies to this paper and those like it, it also applies to our methodology. However, a comparative narrative study of all 41 economies in this study is beyond the scope of this chapter.

<sup>7</sup>But see also the rebuttal in Perotti (2007).

pliers cover a wide range, from positive through insignificant to negative.<sup>3</sup> One reason is that taking account of all the appropriate conditioning factors can be very difficult. Another reason is methodological. Put simply, separating out changes in discretionary fiscal policy from automatic stabilizers and evaluating their effects is very difficult—in particular, fiscal policy simultaneously both responds to and causes changes in economic activity. This “endogeneity problem” poses a major challenge for estimating the effects of fiscal policy, as discussed in Box 5.2.

### How Has Discretionary Fiscal Policy Typically Responded?

The previous section identified two types of critique of fiscal policy: skepticism that discretionary fiscal policy can be delivered efficiently, owing to political constraints, and doubts that it can be effective, for economic reasons. These critiques frame the empirical analysis in this

section, which examines how fiscal policy has typically responded to downturns.

Defining economic downturns and measuring fiscal stimulus are inevitably somewhat subjective exercises. In the analysis that follows, downturns are defined as periods during which either the growth rate is negative or the output gap is unusually negative, the precise threshold depending on whether quarterly or annual data are used. This definition is arguably more sensible than defining a downturn simply in terms of negative growth, because that would miss periods during which output is significantly below potential but still rising.

The measures of fiscal stimulus used in this chapter all start with the primary fiscal balance, the difference between total general government revenues and expenditure net of interest payments on consolidated general government liabilities. Changes in the primary balance can arise passively, as revenues and expenditures rise and fall with economic activity, or actively, as governments make choices about tax, transfer, and spending policies. What is needed, therefore, is a measure of the *cyclically adjusted* primary balance, the intuition being that changes in the cyclically adjusted primary balance should reflect changes in policy. The first part of this

<sup>3</sup>A typical range of expenditure multipliers would be from 0.5 (for example, Mountford and Uhlig, 2002) to about 1 (for example, Blanchard and Perotti, 2002). But Perotti (2007) has outliers as high as 4 and Krogstrup (2002) as low as -2.

section looks at the responses of fiscal policy to changes in economic activity, identifying automatic stabilizers with changes in the cyclical component of the primary balance and discretionary fiscal policy with changes in the cyclically adjusted primary balance.<sup>4</sup> Constructing this measure requires two slightly different approaches, depending on the information available for the economies being analyzed.

### Evidence on the Responsiveness of Fiscal Policy

The empirical investigation begins with analysis of advanced economies, for which long spans of fiscal data are available on a quarterly basis.<sup>5</sup> Discretionary fiscal actions are those that change the cyclically adjusted budget balance, using estimates of the output gap together with estimates of income elasticities of revenues and expenditures to extract the cyclical component from the budget.<sup>6</sup> Figure 5.1 presents a summary of policy responses in G7 economies over the past four decades. The numbers indicate that discretionary fiscal stimulus has been delivered in downturns, but it has been used much less frequently than automatic stabilizers and monetary policy. Discretionary fiscal stimulus has been used in about 23 percent of all downturn quarters—less than half as frequently as interest-rate easing—whereas automatic stabilizers are observed in well over 95 percent of downturns (upper panel).<sup>7</sup> Discretionary policy

<sup>4</sup>As defined in Box 5.1 and the event analysis, the cyclically adjusted balance is a residual and embodies all changes in the primary balance not removed by cyclical adjustment. This includes many factors not necessarily related to output stabilization, such as the impact of structural reform, one-off items, and other economic events (including asset price changes that are not cyclical in nature and could therefore be identified as “automatic” changes in the fiscal balance—see Jaeger and Schuknecht, 2007).

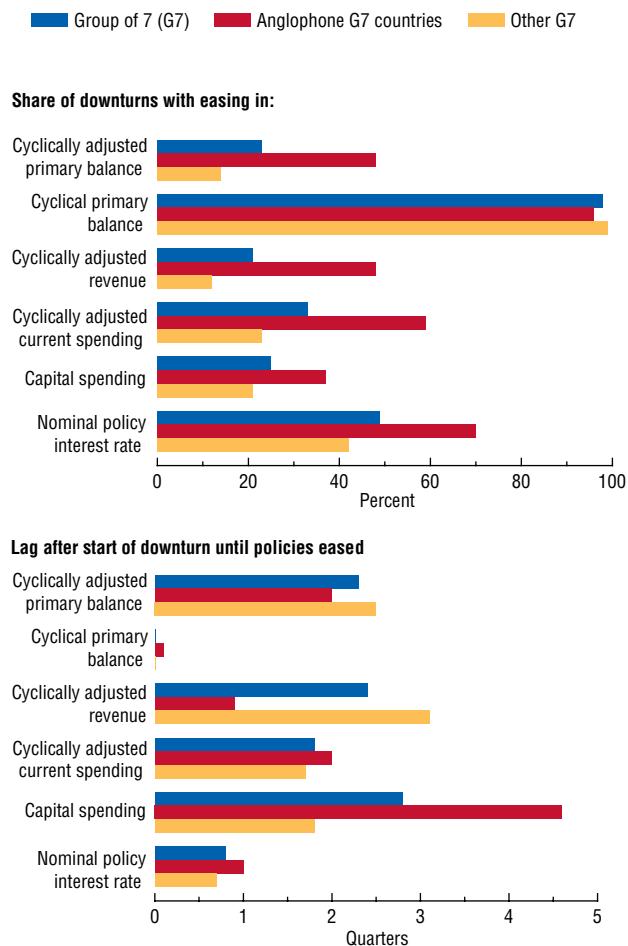
<sup>5</sup>For further details about the following analysis, see Leigh and Stehn (forthcoming).

<sup>6</sup>These elasticities are taken from the OECD *Economic Outlook*; see Appendix 5.1 for details.

<sup>7</sup>Note that automatic stabilizers do not necessarily ease in all downturns, because the applied definition of a downturn does not rule out an increase in growth or

**Figure 5.1. How Often and Quickly Has Fiscal Stimulus Been Used in G7 Economies?<sup>1</sup>**

Discretionary fiscal policy has been used less frequently than monetary policy and automatic stabilizers during downturns, and has taken longer to arrive.



Source: IMF staff calculations.

<sup>1</sup>G7 comprises Canada, France, Germany, Italy, Japan, United Kingdom, and United States.

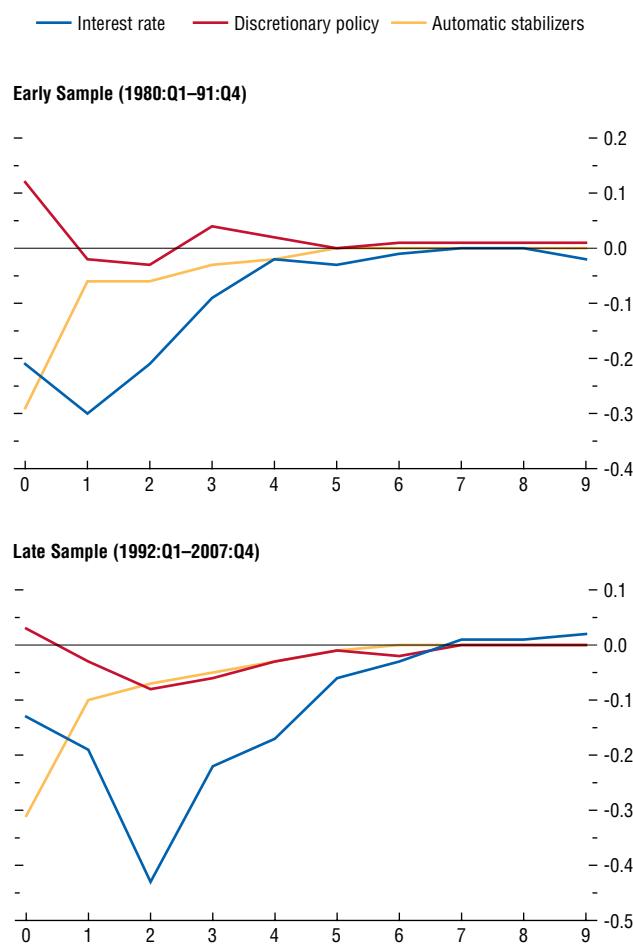
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the output gap (as long as the output gap is unusually negative).

**Figure 5.2. How Strong Was the Fiscal Policy Response in G7 Economies?**

(Percentage point deviation; quarters on x-axis; shock occurs in period zero)

Following an unexpected 1 percentage point fall in growth below potential, interest rates and the automatic component of the fiscal balance ease on impact; discretionary fiscal stimulus takes longer to arrive. In recent years, discretionary fiscal policy has become more countercyclical.



Source: IMF staff calculations.

also arrives later, on average about two and a half quarters after the onset of a downturn, and about one and a half quarters after interest-rate easing (lower panel). Capital spending is particularly slow, with an arrival lag of almost four quarters. By contrast, automatic fiscal easing, proxied by a fall in the cyclical primary balance, occurred in almost all downturns in the quarter of the downturn itself.

The size of discretionary fiscal easing is also much smaller on average than that of automatic stabilizers. Figure 5.2 shows average impulse responses of discretionary fiscal measures, automatic stabilizers, and interest rates for the G7 economies, drawing from vector autoregressions (VARs) estimated for two samples, an “early” sample covering 1980:Q1–1991:Q4 and a “late” sample covering 1992:Q1–2007:Q4.<sup>8</sup> In both samples, the discretionary fiscal easing is much smaller than the automatic stabilizers and is slower to arrive than both changes in interest rates and automatic stabilizers. However, a comparison of the two panels also suggests that the countercyclical response of discretionary fiscal policy has strengthened since the early 1990s.<sup>9</sup> The responses of spending and revenue components in the early sample reflect a combination of mildly procyclical revenue increases, small countercyclical current spending increases, and large procyclical capital spending cuts. The greater degree of fiscal policy countercyclical-ity observed since the early 1990s is the result of cuts in revenues, larger increases in current spending, and smaller procyclical cuts in capital spending. The response of automatic stabil-

<sup>8</sup>See Appendix 5.1 for more details. Note that, unlike much of the VAR literature, the analysis presented here does not evaluate the response of growth to fiscal policy shocks. Rather, the focus is on the response of fiscal policy variables to changes in growth.

<sup>9</sup>In the early sample, discretionary fiscal policy is pro-cyclical on impact and provides a cumulative procyclical contraction of around 0.1 percentage point of potential GDP over four quarters. In the later sample, even though discretionary policy still produces no stimulus on impact, it leads to a cumulative stimulus of 0.2 percentage point over four quarters. This finding is consistent with, for example, Galí and Perotti (2003) and *World Economic Outlook* (September 2003).

ers remained unchanged in the second sample, while that of monetary policy strengthened. Figure 5.3 shows that there are noticeable cross-country differences across advanced economies. Discretionary fiscal policy and monetary policy have been more timely and more countercyclical in the United States, Canada, and the United Kingdom (the G7's three Anglophone countries) than in the rest of the G7. The other Organization for Economic Cooperation and Development (OECD) member countries display even weaker countercyclicality than the United States, Canada, and the United Kingdom in both monetary and discretionary fiscal policy.

### Data Uncertainties and the Risk of Debt Bias

A concern that often arises regarding countercyclical fiscal activism is that policymakers may respond in an asymmetric manner, easing in downturns and not tightening sufficiently in upturns, implying a permanent increase in the public-debt-to-GDP ratio with potentially adverse consequences for long-run growth. To investigate whether fiscal policy in G7 countries has displayed such an asymmetric tendency, the VAR framework is adapted to allow for an asymmetric response to upturns and downturns (see Appendix 5.1). The results suggest that both fiscal policy and monetary policy are subject to an easing bias; that is, more easing during downturns than tightening during upturns (Figure 5.4). In contrast, automatic stabilizers respond in a symmetric way, with the easing observed in downturns almost exactly offset by tightening during upturns.

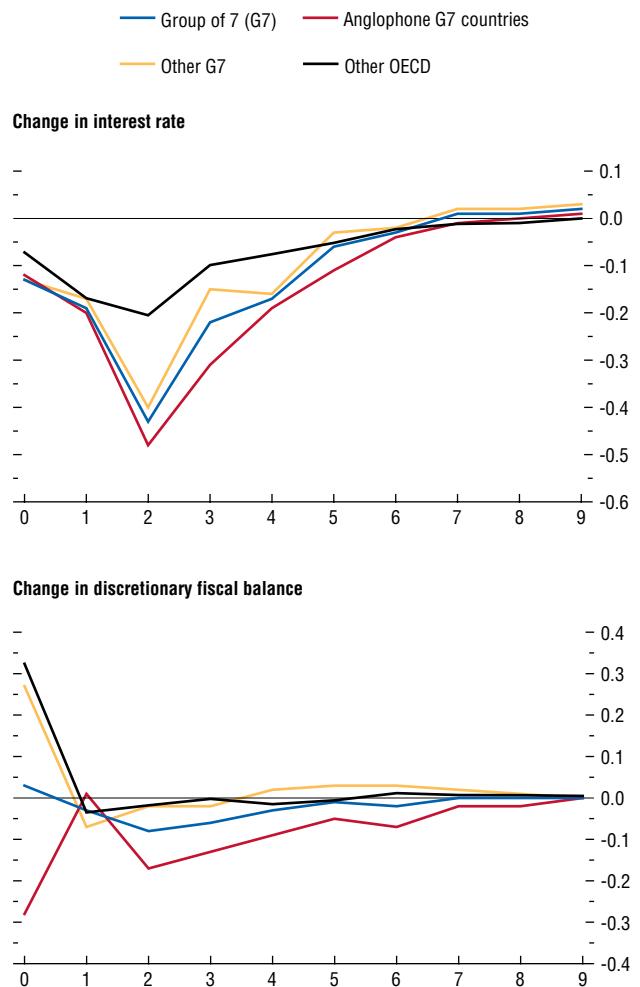
Hence, although discretionary fiscal policy has been actively used, there are valid concerns about debt bias. For illustration, a case study of tax-based stimulus legislation in the United States is provided in Box 5.3. The study finds that, although reasonably timely, 38 percent of cyclically motivated tax cuts were permanent.

An additional concern in the analysis of countercyclical fiscal activism is that policymakers face substantial uncertainties regarding the cyclical position and run the risk of destabilizing

**Figure 5.3. How Have Fiscal Policy Responses Varied across Advanced Economies?**

(Percentage point deviation; quarters on x-axis; shock occurs in period zero)

Following an unexpected 1 percentage point fall in growth below potential, Anglophone countries have provided both monetary and fiscal stimulus; the rest of the Organization for Economic Cooperation and Development (OECD) countries have provided a weaker monetary response and procyclical discretionary fiscal tightening. The figure displays policy responses for the late sample (1992:Q1–2007:Q4).

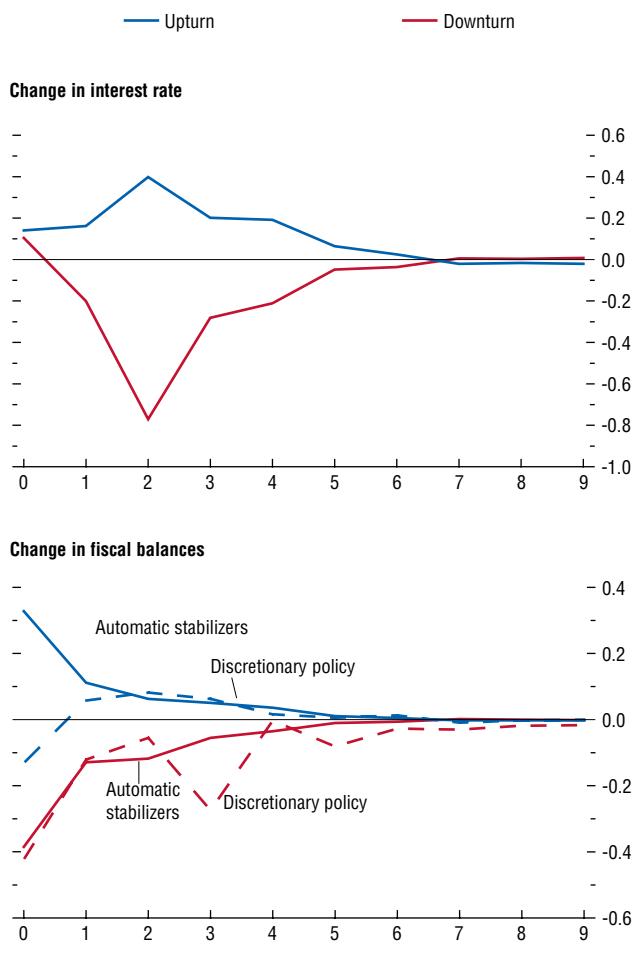


Source: IMF staff calculations.

### Figure 5.4. Is There a Bias toward Easing during Downturns in G7 Economies?

(Percentage point deviation; quarters on x-axis; shock occurs in period zero)

Following a 1 percentage point shock to growth, both discretionary fiscal policy and monetary policy are subject to an easing bias, with more stimulus during downturns than tightening during upturns. In contrast, automatic stabilizers respond symmetrically to upturns and downturns. The figure displays policy responses for the late sample (1992:Q1–2007:Q4).



Source: IMF staff calculations.

the economy by responding to erroneously perceived downturns. This appears to be a serious problem, based on an assessment of the reliability of preliminary GDP estimates produced by national authorities.<sup>10</sup> There is a strong negative relationship between preliminary growth estimates and subsequent revisions. Forty percent of preliminary estimates indicating negative quarter-over-quarter growth were subsequently revised to positive growth.<sup>11</sup> Forecast efficiency tests find strong evidence of a bias toward pessimism in preliminary growth estimates.<sup>12</sup>

To investigate how fiscal policy in G7 countries has been affected by errors in growth estimates, the VAR framework is augmented with growth-estimation errors (see Appendix 5.1). The results reported in Figure 5.5 confirm that both fiscal and interest rate policy have been affected by errors in preliminary growth estimates, with a 1 percentage point fall in perceived growth relative to final revised growth associated with an easing in interest rates and the discretionary fiscal-balance-to-potential GDP ratio by about 0.2 percentage point. This finding suggests that concern over policy errors is well founded, especially as fiscal policy decisions appear to be less easily reversed than monetary policy decisions, and fiscal policy errors bear potentially long-lived consequences for debt.

### Are Fiscal Policy Reactions Different in Emerging and Advanced Economies?

Some of the reservations about the application of discretionary fiscal policy may apply even more strongly in less advanced economies. Unfortunately, although the data in the previous section were available at quarterly frequency, consistent data for a broader set of econo-

<sup>10</sup>See Appendix 5.1. See also Cimadomo (2008) for further analysis of fiscal policy using real-time data.

<sup>11</sup>At the same time, 30 percent of quarters that, according to the final data actually had negative growth, showed positive growth in preliminary estimates.

<sup>12</sup>While remaining statistically significant, this bias appears to have declined in recent years, possibly reflecting the more stable and predictable growth environment.

mies are available only at annual frequency. In what follows, the analysis uses a sample of 21 advanced economies and 20 emerging economies, covering the period from 1970 to 2007.<sup>13</sup> The definition of “downturn” is conceptually the same as used previously with the quarterly data, but “unusually negative” is now defined as below  $-0.5$  standard deviation of the output gap, on account of the use of annual data.<sup>14</sup> For advanced economies, OECD estimates of income elasticities of revenues and expenditures are used to calculate the cyclical balance. However, such estimates are not available for emerging economies, and so it is assumed that revenues move one-for-one with the business cycle, but expenditures do not—that is, the income elasticity of revenues is 1 and the income elasticity of expenditures is zero (see Appendix 5.1 for details). A fiscal expansion is then defined as a negative change in the cyclically adjusted primary balance of more than 0.25 percentage point and a fiscal contraction as a positive change of more than 0.25 percentage point. When the change in the cyclically adjusted primary balance is less than 0.25 percentage point (either positive or negative), fiscal policy is considered neutral. Hence, we have three states for the fiscal stance: stimulus (397 episodes), neutral (155 episodes), and tightening (437 episodes).

In addition to the assumptions necessarily imposed when choosing data sets and definitions, a number of caveats apply to analysis using these measures. In particular, the use of annual data limits the ability to accurately characterize fiscal interventions that begin and end within a year. Second, what is relevant is policymakers’ perceptions of the state of the economy in real time, which might differ substantially from inferences made using revised data, but, in the

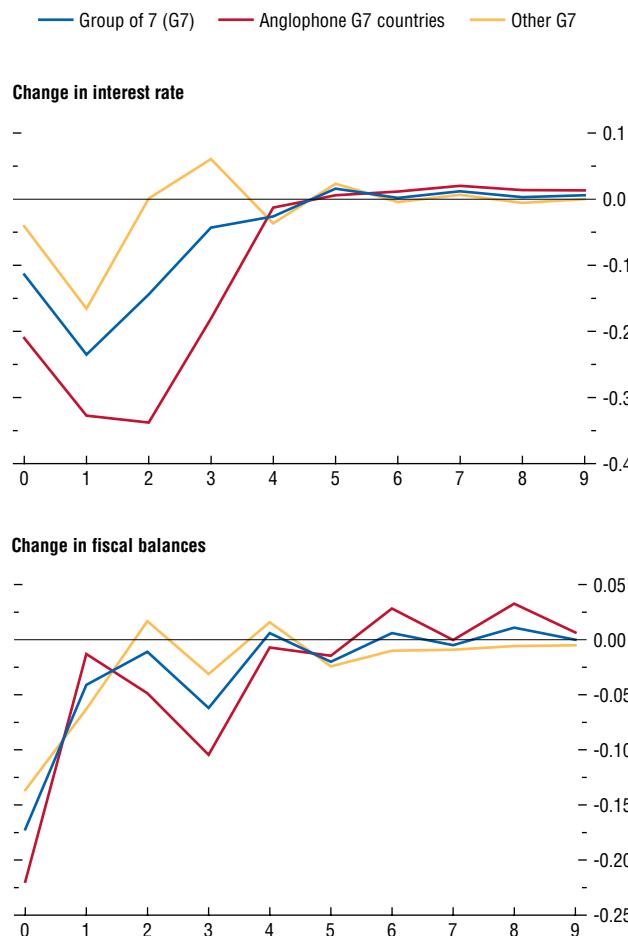
<sup>13</sup>See Appendix 5.1 for a list of economies and episodes of downturns.

<sup>14</sup>Correspondingly, upturns are defined as episodes during which the output gap is above 0.5 standard deviation. Potential output is measured using the Hodrick-Prescott filter, with  $\lambda$  set to 6.25, the value recommended in Ravn and Uhlig (2002).

**Figure 5.5. Did G7 Economies Respond to Erroneously Perceived Downturns?**

(Percentage point deviation; quarters on x-axis; shock occurs in period zero)

Following an erroneously perceived 1 percentage point fall in growth, both discretionary fiscal policy and monetary policy have eased, particularly in Anglophone countries. The figure displays policy responses for the late sample (1992:Q1–2007:Q4).



Source: IMF staff calculations.

### Box 5.3. Have U.S. Tax Cuts Been “TTT”?

This box takes a closer look at whether fiscal interventions in the United States have been timely, temporary, and targeted (TTT). A recent data set compiled by Romer and Romer (2007) of all significant tax changes signed into law since 1945 permits a detailed analysis of this issue. By consulting official documents, Romer and Romer distinguish tax changes that were explicitly motivated by cyclical considerations from those motivated by other factors, including long-run growth support, debt reduction, and the financing of additional expenditures. Of all the 50 significant federal tax actions identified, 7 were assessed as cyclical, and, of these, 5 were tax cuts designed to stimulate short-run growth.

This box focuses on these five tax cuts, implemented between 1970 and 2002, as well as the Economic Stimulus Act, signed into law in February 2008. The box assesses how quickly after the onset of a downturn the tax cuts were

The main authors of this box are Daniel Leigh and Sven Jari Stehn.

legislated and implemented, how temporary they were, and how well targeted they were. In assessing how close to a downturn the tax cuts arrived, the analysis defines a downturn as in the main text. Growth data to assess the 2008: Q2 stimulus are not yet available.

The main results are as follows:

- **Timeliness:** Four out of the five cyclically motivated tax cuts occurred within one quarter of a downturn (see table). In the case of 2002, the stimulus arrived three quarters after the downturn. The average implementation lag of tax cuts; that is, the delay between the signing of the legislation into law and its impact on revenue, was one quarter.
- **Temporariness:** Although only one of the six cyclically motivated tax cuts was permanent, the remainder contained a permanent component (see table). In particular, about 79 percent of the tax cuts were designed to be temporary, with an average planned duration of two quarters. Some of the tax cuts were subsequently extended, so that a smaller proportion—62 percent—actually ended up

### How Timely, Temporary, and Targeted Were the Tax Cuts?

| Date stimulus arrived | Name of act                                   | Size of stimulus (percent of GDP) | Timeliness                            |                                    | Temporariness <sup>1</sup> |        |  |        | Targeting Bang-for-the-buck score <sup>4</sup> |  |
|-----------------------|---|-----------------------------------|---------------------------------------|------------------------------------|----------------------------|--------|--|--------|--|--|
|                       |   |                                   | Date of nearest downturn <sup>2</sup> | Inside lag (quarters) <sup>3</sup> | Proportion temporary       |        | Duration of temporary portion (quarters) |        |  |  |
|                       |   |                                   |                                       |                                    | Planned                    | Actual | Planned                                  | Actual |  |  |
| 1970:Q1               | Tax Reform                                    | 1.2                               | 1970:Q1                               | 1                                  | 0                          | 0      | permanent                                |        | 1.0  |  |
| 1975:Q2               | Tax Reduction                                 | 3.6                               | 1975:Q1                               | 1                                  | 97                         | 78     | 2.3                                      | 1.0    | 2.5  |  |
| 1977:Q3               | Tax Reduction and Simplification              | 1.0                               | 1977:Q4                               | 1                                  | 77                         | 67     | 1.3                                      | 1.0    | 1.9  |  |
| 2001:Q3               | Economic Growth and Tax Relief Reconciliation | 1.7                               | 2001:Q3                               | 1                                  | 100                        | 100    | 1.3                                      | 1.3    | 2.4  |  |
| 2002:Q2               | Job Creation and Worker Assistance            | 1.7                               | 2001:Q3                               | 1                                  | 100                        | 67     | 3.7                                      | 4.0    | 1.3  |  |
| 2008:Q2               | Economic Stimulus                             | 1.1                               | ...                                   | 1                                  | 100                        | ...    | 1.6                                      | ...    | 2.7  |  |
| Mean                  |   | 1.6                               | ...                                   | 1                                  | 79                         | 62     | 2.0                                      | 1.8    | 2.0  |  |

<sup>1</sup>Temporary stimulus is defined as a stimulus that expires. Actual duration may exceed planned duration because of legislated extensions.

<sup>2</sup>Downturn is defined as a quarter with negative or below-trend growth and an output gap more than one standard deviation below zero.

<sup>3</sup>Inside lag denotes the period between the date the stimulus was signed into law and the date it was implemented (quarter in which tax liabilities actually changed).

<sup>4</sup>Bang-for-the-buck score (3 = high, 2 = medium, 1 = low) indicates the degree of cost-effectiveness according to CBO (2008) classification.

**Box 5.3 (concluded)**

being temporary, and 38 percent became permanent.

- *Targeting:* The targeting efficiency of each tax cut package is assessed using the cost-effectiveness classification scheme of the Congressional Budget Office (CBO, 2008), which indicates the likely bang-for-the-buck impact on aggregate demand of a range of possible fiscal stimulus tools. Based on this classification scheme, three out of the six cyclically motivated tax cuts are classified as cost-effective. More than half of the content of these three tax packages consisted of per-

sonal direct transfers and personal lump-sum rebates—two fiscal tools assessed as being the most cost-effective by the CBO. The most recent, 2008, stimulus scored highest on this account, followed by 1975 and 2001. The least cost-effective stimulus measures were the 1970 and 2002 tax reductions, the bulk of which consisted of corporate lump-sum rebates and personal and corporate tax-rate reductions.

Hence, for the most part, fiscal interventions in the United States have been timely, but not always temporary or well targeted.

absence of consistent real-time vintages of data, it is difficult to adjust for this difference.

Bearing these caveats in mind, the analysis identified the following stylized facts:

- Emerging economies respond during downturns with fiscal stimulus only half as frequently as advanced economies: 22 percent versus 41 percent (Figure 5.6, top panel). When emerging economies do implement fiscal stimulus, the response is slightly higher, as measured by changes in the cyclically adjusted primary balance as a percent of potential GDP (Figure 5.6, middle panel, first and third bars). But this is because downturns are larger (Figure 5.6, middle panel, second and fourth bars).
- In just over one-third of episodes, fiscal stimulus involved a mixture of revenue and expenditure changes. Of those that relied mainly on one kind of stimulus, expenditure measures dominate for both advanced and emerging economies (Figure 5.6, bottom panel).
- In emerging economies, changes in the overall primary balance are usually procyclical, despite countercyclical effects from automatic stabilizers (Figure 5.7, top panel).<sup>15</sup> And they are more procyclical in downturns when

advanced economies are simultaneously experiencing downturns, consistent with rises in external financing premiums (Figure 5.7, bottom panel). In advanced economies, changes in the primary fiscal balance are, on average, countercyclical, mostly because of automatic stabilizers, as measured by changes in the cyclical balance.

## The Macroeconomic Effects of Discretionary Fiscal Policy

Having defined downturns and episodes of fiscal stimulus, this section turns to the central question: What are the macroeconomic effects of discretionary fiscal policy, especially during downturns? An event analysis identifies some of the basic patterns, using the same elasticity-based fiscal impulse measure as in the previous section, and then regressions provide a more systematic assessment of cause and effect.

### An Event Analysis of Episodes of Downturns and Fiscal Stimulus

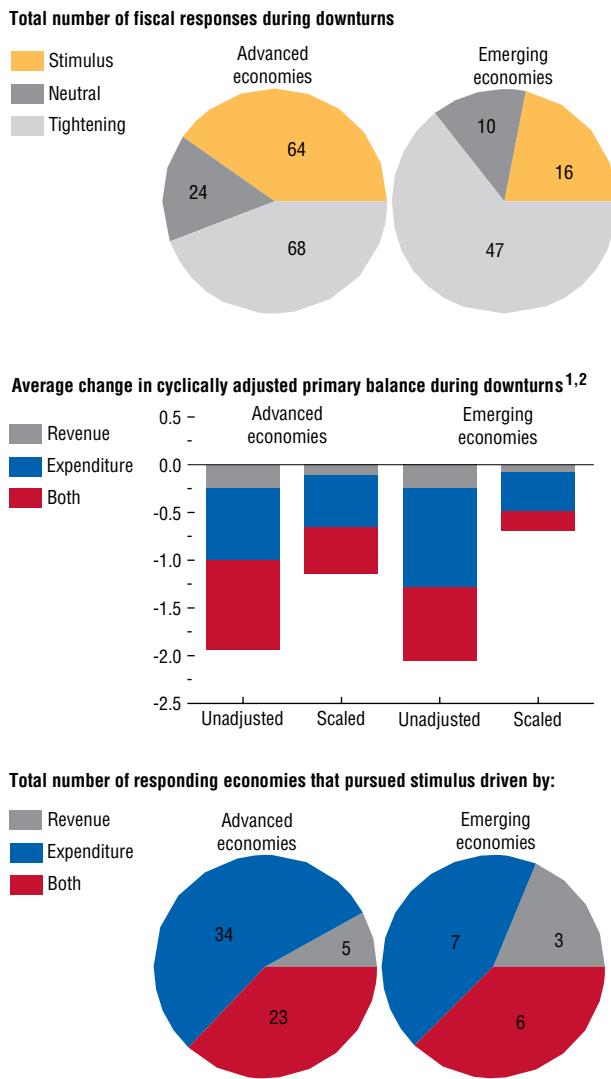
The event analysis shows the dynamics of key macroeconomic variables—real GDP growth, the

<sup>15</sup>This finding is consistent with Kaminsky, Reinhart, and Végh (2004) and a number of other studies. It holds

across both fixed and floating exchange rate regimes at the time of the episode.

### Figure 5.6. Composition of Fiscal Stimulus during Downturns for Advanced and Emerging Economies

The pie charts at the top show the types of fiscal policy response—stimulus, neutral, or tightening—during episodes of downturns for advanced economies and emerging economies. The bar chart indicates the average size of fiscal stimulus. Areas indicate the average proportion of the total sample stimulus from changes in revenues only, changes in expenditures, or both. The pie charts at the bottom indicate the frequency of using revenue only, changes in expenditures, or both for advanced economies and emerging economies.



Source: IMF staff calculations.

<sup>1</sup>Average change in cyclically adjusted primary balance associated with various types of fiscal stimulus weighted by the share of fiscal stimulus cases of a particular type among countries that responded with fiscal stimulus during downturns.

<sup>2</sup>For each group of economies the left-hand column is the change in cyclically adjusted primary balance in percent of GDP. The right-hand column is the change in cyclically adjusted primary balance in percent of GDP scaled by the standard deviations of changes in output gap.

debt-to-GDP ratio, inflation, exchange rates, the current account, and money growth—around episodes of downturns. Table 5.1 and Figure 5.8 show how macroeconomic variables move together with fiscal stimulus before, during, and after downturns. As expected, the debt-to-GDP ratio increases following a fiscal stimulus and improves when it tightens, while current account balances improve in the downturn year when there is tightening and deteriorate when there is stimulus. But for other variables, the results are generally ambiguous. In particular, growth rates are larger in episodes without fiscal stimulus, but the change in growth rates from the downturn year to the first year after the downturn is somewhat larger when there is fiscal stimulus. These observations are common across advanced and emerging economies.

Table 5.2 shows median values of real GDP growth across all economies during episodes of downturns and fiscal stimulus for a number of variables that theory suggests could have important effects: public debt, current account balances, trade openness, and the exchange rate regime.<sup>16</sup> Figure 5.9 shows the difference between growth rates in the year of the downturn and the year following. Looking across these conditioning factors, there is little discernible difference in the impact of fiscal policy from variations in the current account balance, openness to trade, and the exchange rate regime, despite what theory suggests. However, the level of public debt does appear to be associated with consistent differences in growth outcomes—economies that implement fiscal stimulus and have high public debt going into a downturn typically experience lower growth rates before and after the downturn year and

<sup>16</sup>For the first three of these variables, the results are divided into “high” and “low” cases, based on the average for that variable three years before the recession episode. The thresholds for high and low are the median values of the overall sample, except debt, for which the threshold for high debt is 75 percent for advanced economies and 25 percent for emerging economies. Exchange rate regimes are categorized according to whether the exchange rate was fixed or floating in the first year of the downturn.

less of a pickup in growth in the year following fiscal stimulus, whereas high-debt economies that implement fiscal tightening experience stronger gains in growth.

Turning to the ways fiscal policy was implemented, economies that employed a combination of revenue and expenditure stimulus experienced less-severe downturns compared with those that relied on revenue or expenditure measures alone, although revenue-based policies were associated with faster recoveries and higher growth in the years following (Table 5.3).<sup>17</sup> Conversely, expenditure-based fiscal tightening was associated with higher growth in years following the downturn.

In summary, the event analysis indicates that taking into account debt and the composition of fiscal stimulus could be important to understanding the effects of fiscal policy. Conversely, it is difficult to see clear patterns with other variables that theory indicates could be important.

### Regression Analysis

Event analysis records only associations between fiscal stance and the dynamics of the macroeconomic variable in question, but indicates nothing about causation between the variables.<sup>18</sup> Further, by characterizing variables according to simple categories and considering them one by one in isolation from one another might hide important information about the size of and interaction between variables. A regression framework is used to address this.

The conceptual framework for these regressions is an examination of the effects of discretionary fiscal policy on real GDP growth, while controlling for the potential effects from monetary policy and other sources of demand

<sup>17</sup>The small sample size of episodes involving revenue impulse, however, warrants caution in interpreting these results.

<sup>18</sup>Growth associations are a prime example: If there are lower growth rates in downturns when fiscal policy was very aggressive, is the appropriate conclusion that fiscal policy is not effective or that fiscal policy had to be very aggressive because the downturn was very severe?

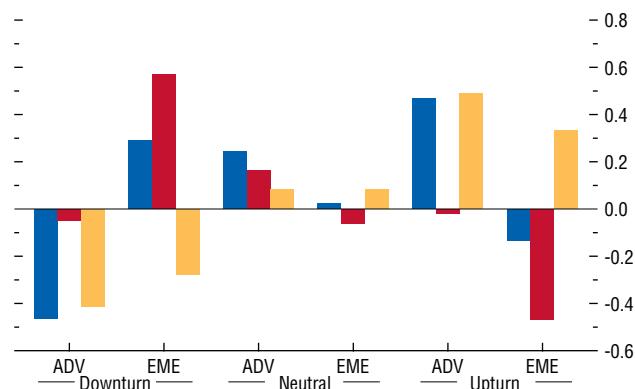
**Figure 5.7. Fiscal Policy Responses in Downturns and Upturns**

(Average change, percent of GDP)

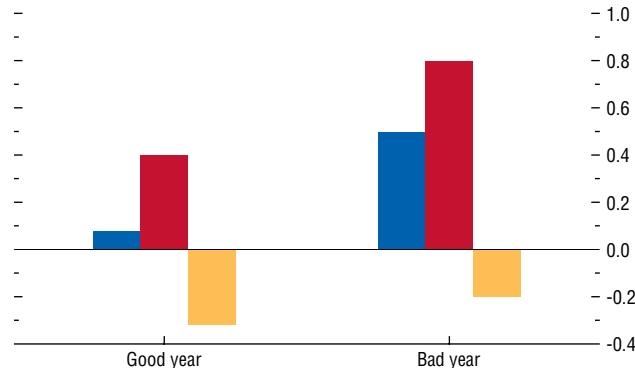
The upper bar chart shows average fiscal policy responses for advanced (ADV) and emerging (EME) economies in (left to right) GDP downturn episodes, neutral episodes, and upturn episodes. A negative number indicates fiscal stimulus. Discretionary fiscal policy is associated with the cyclically adjusted primary balance. The lower bar chart shows average fiscal policy responses in emerging economies when advanced economies are in upturns and downturns. In both charts, the average change in the balance is scaled by the standard deviations of changes in the output gap.

■ Change in primary balance ■ Change in cyclical balance  
■ Change in cyclically adjusted primary balance

Responses of advanced and emerging economies, depending on position in cycle



Response of emerging economies to downturn, depending on position of advanced economies in cycle<sup>1</sup>



Source: IMF staff calculations.

<sup>1</sup>Average change in the balance scaled by the standard deviations of changes in output gap. A good year is defined as a year in which the GDP-weighted average gap of advanced economies is below the median GDP-weighted average gap of advanced economies across all years.

**Table 5.1. Macroeconomic Indicators around Downturns, with and without a Fiscal Impulse: All Economies<sup>1</sup>**

| Median  | Number of Observations in Downturn | Three-Year Average before Downturn | One Year before Downturn | Year of Downturn | One Year after Downturn | Four-Year Average after Downturn |
|---|------------------------------------|------------------------------------|--------------------------|------------------|-------------------------|----------------------------------|
| Real GDP growth                               |                                    |                                    |                          |                  |                         |                                  |
| Fiscal stimulus                               | 51                                 | 3.1                                | 2.2                      | -0.1             | 3.6                     | 3.2                              |
| Fiscal tightening                             | 83                                 | 2.5                                | 2.8                      | 0.7              | 4.2                     | 3.6                              |
| Change in debt-to-GDP ratio                   |                                    |                                    |                          |                  |                         |                                  |
| Fiscal stimulus                               | 43                                 | -1.4                               | -0.5                     | 2.2              | 1.1                     | 0.8                              |
| Fiscal tightening                             | 61                                 | 1.4                                | 1.5                      | 1.2              | -0.9                    | -1.2                             |
| Change in cyclically adjusted primary balance |                                    |                                    |                          |                  |                         |                                  |
| Fiscal stimulus                               | 51                                 | 0.0                                | -0.2                     | -1.1             | 0.0                     | 0.2                              |
| Fiscal tightening                             | 83                                 | 0.0                                | 0.1                      | 1.6              | -0.2                    | 0.2                              |
| Inflation                                     |                                    |                                    |                          |                  |                         |                                  |
| Fiscal stimulus                               | 48                                 | 5.6                                | 5.5                      | 4.7              | 3.0                     | 2.7                              |
| Fiscal tightening                             | 78                                 | 7.1                                | 6.2                      | 5.2              | 5.0                     | 5.1                              |
| Change in nominal exchange rate <sup>2</sup>  |                                    |                                    |                          |                  |                         |                                  |
| Fiscal stimulus                               | 41                                 | -0.6                               | 0.0                      | 2.9              | -0.5                    | 0.1                              |
| Fiscal tightening                             | 72                                 | 4.6                                | 3.3                      | 7.9              | 3.5                     | 2.3                              |
| Current account surplus                       |                                    |                                    |                          |                  |                         |                                  |
| Fiscal stimulus                               | 51                                 | -2.4                               | -2.9                     | -0.8             | -0.9                    | -1.2                             |
| Fiscal tightening                             | 81                                 | -0.9                               | -0.8                     | 0.0              | 0.2                     | -0.1                             |
| Real money growth                             |                                    |                                    |                          |                  |                         |                                  |
| Fiscal stimulus                               | 32                                 | 5.0                                | 2.6                      | 1.7              | 4.2                     | 4.8                              |
| Fiscal tightening                             | 54                                 | 4.6                                | 4.3                      | 3.3              | 4.9                     | 5.0                              |

Note: For each variable, the median is recorded for the three categories of fiscal stance during the first year of the downturn: stimulus, neutral policy, and tightening. In each case, values are recorded for the average of the median three years before the downturn, one year before the downturn, the first year of the downturn itself, one year after the whole downturn episode, and the average for the four years after the downturn episode. Note that some downturns last for more than one year. In a multiyear downturn, the year after the downturn is the first year after the last downturn year.

<sup>1</sup>Fiscal impulse identified during the first year of a downturn as a decline in the cyclically adjusted primary balance to GDP below 0.25 percentage point of GDP.

<sup>2</sup>Exchange rate is given as local currency/U.S. dollars (+ sign denotes a depreciation).

stimulus, and taking into account factors that might affect the transmission of fiscal stimulus.

The main regressor of interest is the fiscal impulse measure.<sup>19</sup> Ideally, the fiscal impulse measure would pick up all discretionary changes in fiscal stance, whether from systematic reactions to the state of the economy or nonsystematic (that is, unexpected) discretionary actions. The systematic component of the fiscal impulse measure is, however, endogenous, which leads to problems with statistical inference. Moreover, as discussed in Box 5.2, it is very difficult to distinguish systematic changes in fiscal policy from automatic stabilizers. In principle, the elasticity-based fiscal impulse measure used in the previous section should achieve this, but

unless the elasticities are perfectly accurate for each period—and potential output is measured correctly—this type of fiscal impulse measure will likely suffer from additional, measurement-error-related endogeneity, undermining the validity of the regressions.

To reduce these endogeneity problems and check for robustness, a second fiscal impulse measure is used that focuses exclusively on the nonsystematic component of discretionary fiscal policy (as is also the case in the fiscal literature that uses structural vector autoregression (SVAR) and “narrative” approaches; see Box 5.2). This measure aims to identify unexpected changes in fiscal stance, based for each country on separate regressions of revenues and expenditures on output growth and a time trend—see Appendix 5.1 for details. (In what follows, this measure will be referred to as the

<sup>19</sup>Note that all the variables are now continuous and no longer use the categories of the event analysis.

regression-based fiscal impulse measure, to distinguish it from the elasticity-based measure.)

Other regressors include two lags of real GDP growth, to control for endogenous inertia in the economy; real money growth (contemporaneous and two lags), as a measure of monetary policy; changes in foreign demand (contemporaneous and two lags); and government size. These were found to be significant at the 10 percent level and were retained in all regression specifications that follow.

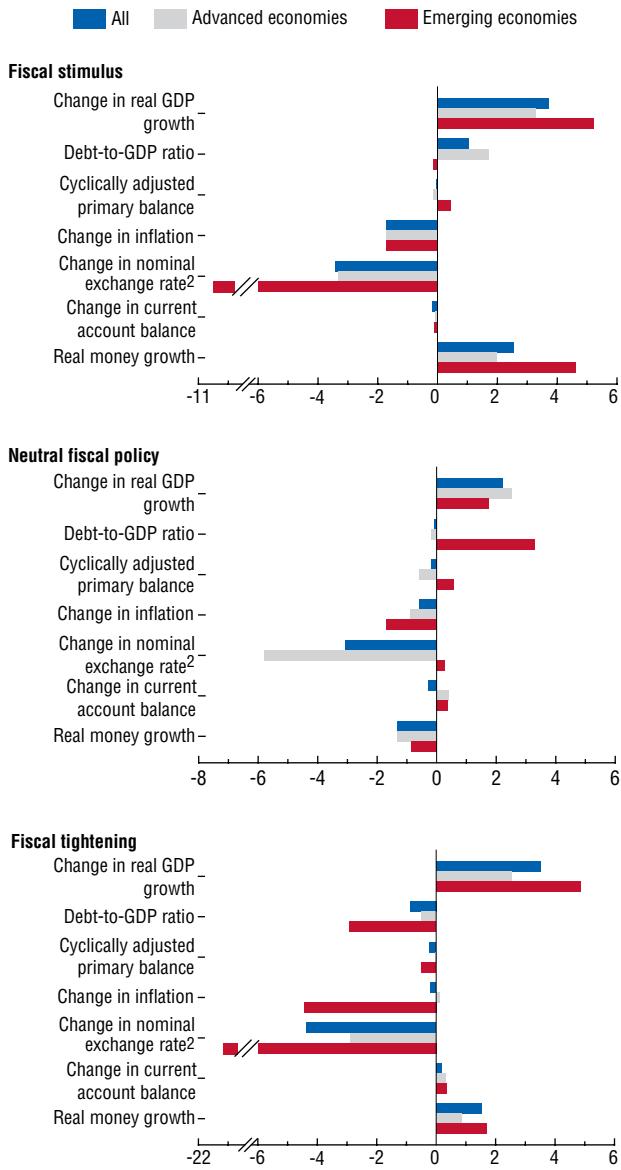
Table 5.4 presents the key results in terms of responses of real GDP to a 1 percent fiscal impulse, using both the elasticity-based and regression-based fiscal impulse measures.<sup>20</sup> The values show the output effects in the year of the fiscal intervention and three years later, with a positive number indicating that positive fiscal stimulus raises output.<sup>21</sup> The results for the baseline specification are presented in the first row. For both fiscal impulse measures, the estimated effect of fiscal stimulus on output growth in the baseline specification is weak—closer to zero than the Keynesian assumption of 1 or more—and turns negative after three years. However, as can be seen in the second and third rows of the table, this conceals important differences across countries. In advanced economies, the multipliers are statistically significant and moderately positive—a 1 percentage point fiscal stimulus leads to an increase in real GDP growth of about 0.1 percent on impact, and up to 0.5 percent above its level in year 0 after three years. This is broadly comparable with the effects found from previous SVAR studies and case studies. By contrast, although emerging economies see impact effects similar to those of advanced economies, the effects on output in the medium term are consistently negative across both fiscal impulse measures—for these economies, discretionary

<sup>20</sup>See Appendix 5.1 for tables of coefficient estimates and regression diagnostics.

<sup>21</sup>Note, however, that the regressions underlying the first nine rows do not distinguish between fiscal stimulus and fiscal tightening—a negative effect on output from fiscal tightening is therefore assumed to be consistent with a positive effect from fiscal stimulus.

**Figure 5.8. Macroeconomic Indicators after Downturns, with and without a Fiscal Stimulus<sup>1</sup>**

The bar charts indicate changes in macroeconomic indicators from the year of downturn to the first year after downturn.



Source: IMF staff calculations.

<sup>1</sup>Fiscal stimulus during the first year of a downturn is defined as a decline in the cyclically adjusted primary balance to GDP below 0.25 percentage point of GDP.

<sup>2</sup>Exchange rate is given as local currency/U.S. dollar (+ sign denotes a depreciation). Value for emerging economies with fiscal stimulus is -10.5; with fiscal tightening, -21.2.

**Table 5.2. Real GDP Growth and Fiscal Impulse under Various Initial Conditions: All Economies<sup>1,2</sup>**

| Conditioning Variables <sup>3</sup>  | Number of Observations in Downturn | Three-Year Average before Downturn | One Year before Downturn | Year of Downturn Real GDP Growth | One Year after Downturn | Four-Year Average after Downturn |
|--------------------------------------|------------------------------------|------------------------------------|--------------------------|----------------------------------|-------------------------|----------------------------------|
| Public debt                          |                                    |                                    |                          |                                  |                         |                                  |
| High                                 | 13                                 | 2.1                                | 1.5                      | -0.1                             | 2.7                     | 2.0                              |
| Low                                  | 30                                 | 3.1                                | 2.4                      | -0.3                             | 3.6                     | 3.2                              |
| Current account balance <sup>4</sup> |                                    |                                    |                          |                                  |                         |                                  |
| High                                 | 22                                 | 2.7                                | 2.4                      | 0.3                              | 2.6                     | 2.4                              |
| Low                                  | 27                                 | 3.2                                | 2.0                      | -0.7                             | 3.9                     | 3.4                              |
| Openness to trade                    |                                    |                                    |                          |                                  |                         |                                  |
| High                                 | 24                                 | 3.0                                | 2.6                      | -0.1                             | 2.7                     | 3.1                              |
| Low                                  | 25                                 | 3.4                                | 1.6                      | -0.3                             | 3.9                     | 3.4                              |
| Exchange rate                        |                                    |                                    |                          |                                  |                         |                                  |
| Fixed                                | 20                                 | 2.8                                | 2.0                      | -0.3                             | 3.1                     | 3.0                              |
| Floating                             | 26                                 | 3.1                                | 1.9                      | 0.2                              | 3.7                     | 3.3                              |

<sup>1</sup>Fiscal impulse is identified during the first year of a downturn as a decline in the cyclically adjusted primary-balance-to-GDP ratio below 0.25 percentage point of GDP.

<sup>2</sup>Initial conditions for variables are defined as a three-year average before the year of a downturn.

<sup>3</sup>The threshold for high debt is 75 percent for advanced economies and 25 percent for emerging economies. All other variable thresholds are the median of the variable across the sample.

<sup>4</sup>A positive value for the current account balance indicates a surplus; a negative value indicates a deficit.

fiscal policy does indeed appear to do more harm than good.

The output responses shown in the next six rows of the table indicate that, overall, revenue-based stimulus measures seem to be more effective in boosting real GDP than expenditure-based measures, particularly in the medium term and in advanced economies. Expenditure-based impulses are found to have consistently negative effects in emerging economies after three years, perhaps reflecting concerns that, once implemented, increased expenditures are difficult to remove.

A key question is whether discretionary fiscal policy can successfully stimulate the economy during downturns. This is addressed in the final four rows of the table. When controlling for downturns, the general effects of fiscal interventions appear to be positive and, if anything, show slightly stronger effects than the baseline specification. However, it is possible that the results for these multipliers are driven by strong negative effects from fiscal tightening and do not reflect significantly positive effects from fiscal stimulus. When controlling specifically for the effects of fiscal stimulus, the effects are in fact consistently negative across the two fiscal impulse measures (although there is some improvement in output

growth in the years that follow, such that the level of output is less negative than initially).

What could be driving such a different result? One concern is that the fiscal impulse measures are not adequately dealing with the endogeneity problem, especially the elasticity-based measure, which could lead to biased results.<sup>22</sup> If it is not a measurement problem, the effects could depend on private sector expectations of the debt implications of the fiscal stimulus. The final two rows show how the effects depend on the level of public debt at the time of the intervention. In low-debt economies, the initial effect of a fiscal stimulus is negative, but there is a positive effect on growth in the years that follow, such that the net effect after three years is relatively negative when using the elasticity-based measure, and positive when using the regression-based measure. By contrast, in high-debt economies

<sup>22</sup>For example, during downturns both fiscal revenues and output fall. To the extent that the regressions do not correct for the response of automatic stabilizers, an automatic response might be picked up as a fiscal stimulus, which, unsurprisingly, is identified as “ineffective” in the regressions. This is more likely in the elasticity-based approach—the assumption of unit-revenue elasticities for emerging economies, for example, may well be too low. This would tend to bias results, especially for the short run.

the effect is consistently large and persistently negative. This suggests that concerns about fiscal sustainability may be dominating spending decisions, even if current fiscal policy would traditionally be thought of as stimulatory.<sup>23</sup>

Additional regressions were run that included interaction terms of the fiscal impulse measure and dummies indicating (1) high or low openness to trade; (2) high or low levels of financial development, as a measure of liquidity constraints; (3) fixed versus floating exchange rate regimes; and (4) high or low current account surpluses, as a measure of external sustainability. Higher levels of trade openness and financial development yield higher multipliers, and multipliers are higher under floating exchange rate regimes. These results run contrary to economic theory, suggesting that debt concerns might dominate the effectiveness of fiscal policy. Indeed, higher-than-average current account balances (generally surpluses) tend to be associated with larger multipliers.<sup>24</sup> Finally, running the baseline regression using two different time subsamples yields a cautionary note: multipliers have apparently been weaker in recent years.<sup>25</sup>

The evidence from this analysis indicates that discretionary fiscal policy can successfully stimulate output growth, especially if it is revenue-based. But there are reasons for caution in employing stimulus packages during downturns, with evidence suggesting that, if it is to work at all, it will do so only when underlying fiscal positions are sound. This indicates that governments need to improve balances during upturns and make credible commitments that stimulus packages will not threaten debt sustainability.

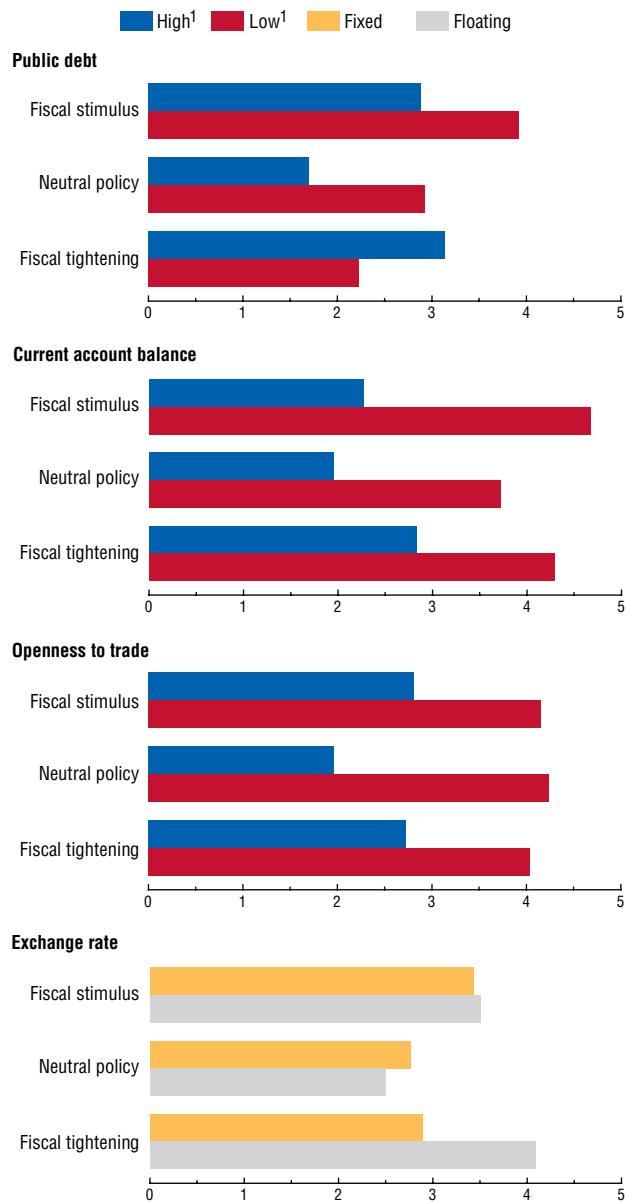
<sup>23</sup>The effects of both fiscal stimulus and fiscal tightening are much worse when controlling for severe downturns. See Appendix 5.1 for more details.

<sup>24</sup>In the medium term, the multipliers are positive when using the regression-based fiscal impulse measure but still negative when using the elasticity-based fiscal impulse measure.

<sup>25</sup>This is particularly true for advanced economies. One potential explanation, consistent with both the empirical evidence and the simulations presented later, is that monetary policy has become less accommodative in those economies.

**Figure 5.9. Changes in Real GDP Growth and Fiscal Policies under Various Initial Conditions**

The bar charts indicate changes in real GDP growth from year of downturn to first year after downturn, differentiated by macroeconomic conditions three years before the downturn (debt, current account, openness to trade, and money growth) and by the exchange rate regime and composition of fiscal impulse in the year of downturn.



Source: IMF staff calculations.

<sup>1</sup>The threshold for high debt is 75 percent for advanced economies and 25 percent for emerging economies. The thresholds for current account balance and trade openness are the median of the variable across the sample.

**Table 5.3. Real GDP Growth and Fiscal Impulse by Composition: All Economies<sup>1,2</sup>**

| Conditioning Variables                | Number of Observations in Downturn | Three-Year Average before Downturn | One Year before Downturn | Year of Downturn Real GDP Growth | One Year after Downturn | Four-Year Average after Downturn |
|---------------------------------------|------------------------------------|------------------------------------|--------------------------|----------------------------------|-------------------------|----------------------------------|
| Fiscal stimulus                       |                                    |                                    |                          |                                  |                         |                                  |
| Revenue-based impulse                 | 5                                  | 4.4                                | 2.8                      | -0.7                             | 3.6                     | 4.1                              |
| Expenditure-based impulse             | 31                                 | 3.1                                | 2.0                      | -0.4                             | 2.9                     | 3.0                              |
| Both expenditure and revenue impulses | 15                                 | 3.0                                | 1.6                      | 0.6                              | 4.1                     | 3.5                              |
| Fiscal tightening                     |                                    |                                    |                          |                                  |                         |                                  |
| Revenue-based impulse                 | 31                                 | 2.4                                | 2.3                      | -0.2                             | 3.3                     | 3.1                              |
| Expenditure-based impulse             | 17                                 | 2.8                                | 3.2                      | 1.2                              | 5.0                     | 4.3                              |
| Both expenditure and revenue impulses | 35                                 | 2.7                                | 3.3                      | 1.1                              | 4.3                     | 4.2                              |

<sup>1</sup>Fiscal impulse is identified during the first year of a downturn as a decline in the cyclically adjusted primary balance to GDP below 0.25 percentage point of GDP.

<sup>2</sup>Initial conditions for variables are defined as a three-year average before the year of a downturn.

## A Simulation-Based Perspective on Fiscal Stimulus

The previous section finds some evidence for moderately positive multipliers, but with important caveats about the type of economy, the composition of the fiscal impulse, and the level of debt. Clearly, there is a large number of potentially important factors that policymakers need to take into account when designing a discretionary fiscal policy action. The objective of this section is to examine, in a controlled setting, how the effects of fiscal stimulus depend on the structure of the economy in question.

The model used is an annual version of the Global Integrated Monetary and Fiscal Model (GIMF). GIMF is a multicountry dynamic stochastic general equilibrium model that includes a number of useful features relative to existing monetary business cycle models (such as both myopic and liquidity-constrained consumers and potential long-term productivity benefits from government investment) and a wide range of fiscal instruments affecting household and business intertemporal choices (government investment, labor taxes, consumption taxes, and transfers to households).<sup>26</sup>

<sup>26</sup>The country blocs are the United States, the euro area, Japan, emerging Asia, and the remaining economies. For a more detailed description of the model, see Kumhof and Laxton (2008).

The first exercise compares outcomes for key macroeconomic variables using various fiscal policy instruments for a large economy, calibrated to match the United States. The results are presented in Figure 5.10. The shock is a temporary fiscal expansion, calibrated to deliver a primary deficit that is 1 percent above baseline in year 1 and 0.5 percent above baseline in year 2. Thereafter, a fiscal reaction function ensures that debt is brought back to its initial level by raising lump-sum taxes. The fiscal stimulus is completely unanticipated in the first year, but its time profile, including the further stimulus in year 2 and the longer-term implications for taxes, is fully understood once initiated. Each row of Figure 5.10 shows the reactions of, from left to right, GDP (in percentage deviations from the baseline), inflation and nominal interest rates (in percentage point deviations from baseline), and real interest rates (in percentage point deviations from baseline). Going down the figure, successive rows show the impact of various fiscal instruments: government investment, consumption taxes, labor income taxes, and transfers to households. In each panel, two responses are shown: one in which nominal interest rates are assumed to react to expected deviations of inflation from target, and one in which nominal interest rates are held constant for the initial two years, thereby accommodating the fiscal stimulus.

**Table 5.4. Responses of Real GDP to Discretionary Fiscal Policy Changes**

| Effect in:   | Real GDP Response                       |            |   |            |
|--|---|------------|---|------------|
|  | Elasticity-based fiscal impulse measure |            | Regression-based fiscal impulse measure |            |
|  | Year zero                               | Year three | Year zero                               | Year three |
| (with respect to positive fiscal impulse by 1 percentage point of GDP) |   |            |   |            |
| Baseline specification   | 0.15                                    | -0.16      | 0.08                                    | -0.02      |
| Country differences  |   |            |   |            |
| Advanced economies only  | 0.12                                    | 0.13       | 0.11                                    | 0.51       |
| Emerging economies only  | 0.21                                    | -0.03      | 0.10                                    | -0.09      |
| Composition  |   |            |   |            |
| Revenue-based policy changes   | 0.21                                    | 0.12       | 0.10                                    | 0.14       |
| Expenditure-based policy changes                                       | 0.13                                    | -0.21      | 0.06                                    | -0.06      |
| Composition: advanced economies only                                   |   |            |   |            |
| Revenue-based policy changes   | 0.35                                    | 0.59       | 0.01                                    | 0.40       |
| Expenditure-based policy changes                                       | -0.09                                   | -0.26      | 0.15                                    | 0.52       |
| Composition: emerging economies only                                   |   |            |   |            |
| Revenue-based policy changes   | 0.23                                    | 0.23       | 0.13                                    | 0.17       |
| Expenditure-based policy changes                                       | 0.20                                    | -0.18      | 0.08                                    | -0.23      |
| Downturns  |   |            |   |            |
| Fiscal stimulus only   | 0.29                                    | 0.00       | 0.10                                    | 0.04       |
| Fiscal stimulus only, high initial debt                                | -1.30                                   | -0.88      | -0.87                                   | -0.29      |
| Fiscal stimulus only, low initial debt                                 | -1.75                                   | -2.05      | -1.05                                   | -0.80      |
|  | -0.96                                   | -0.36      | -0.65                                   | 0.13       |

In each case, there are no long-run changes in potential output; eventually, each of the variables will return to zero.<sup>27</sup> Hence, the experiment focuses on the differences in the short-run impact of the policy measures. The results show the following:

- For the same increase in deficit, there are large differences in the size of short-run multipliers across instruments. On the assumption that it can be implemented immediately and efficiently, government investment has a larger effect than other measures.<sup>28</sup> This is because it has a direct effect on aggregate demand, whereas the effects of taxes and transfers depend on propensities to consume. Investment also has the largest effect on inflation and real interest rates.

<sup>27</sup>This is also true for government investment, but in this case the effect on output is much more long lived, because government infrastructure capital has productive benefits that depreciate only slowly over time.

<sup>28</sup>This is in contrast to the empirical results, which showed more positive effects from revenue-based stimulus. In these simulations, private agents understand that debt will be maintained at initial levels. In practice, it could be that expenditure-based packages are more likely to be made permanent and therefore raise concerns about debt sustainability.

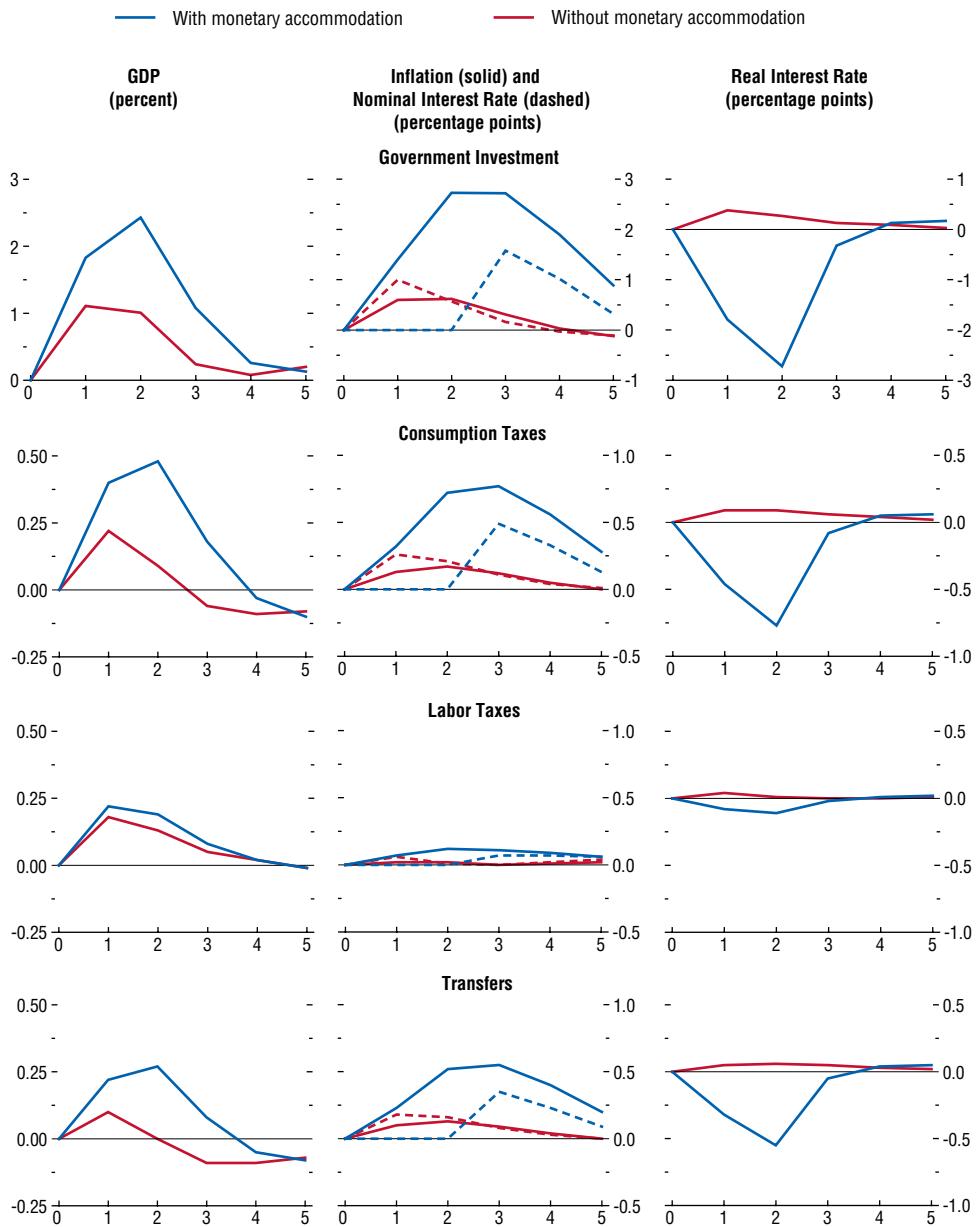
- The monetary policy regime plays a key role in the effectiveness of fiscal stimulus—with accommodation, the output multipliers are up to twice as large, and the effects are more persistent.<sup>29</sup> Concomitantly, inflation is higher. The difference is least for labor taxes, because lowering labor taxes increases incentives for work as well as consumption. As a result, a supply response mutes the inflationary impact. It can also be shown that without monetary accommodation, multipliers are smaller when prices are more flexible.<sup>30</sup> This is because inflation increases more strongly following the stimulus, thereby necessitating a more aggressive hike in interest rates that reduces the output response. With monetary accommodation, greater price flexibility has the opposite effect, because higher inflation implies a larger drop in real interest rates.
- Cuts in the consumption tax and temporarily higher household transfers have a clear

<sup>29</sup>This is consistent with the view that fiscal policy could be most effective when monetary policy is least effective, such as when nominal interest rates are close to zero or the monetary harmonization mechanism is impaired.

<sup>30</sup>Simulations for different degrees of price flexibility are not shown in Figure 5.7.

**Figure 5.10. Effect of Fiscal Expansion in a Large Economy**  
*(Deviation from baseline; years on x-axis; shock occurs in year 0)*

Impulse responses to 1 percent increase in deficit in year 1 and 0.5 percent increase in deficit in year 2.



Source: IMF staff calculations.

“tilting” effect on output (output is above, then below baseline), because they provide incentives to bring forward consumption and investment.<sup>31</sup> Cuts in labor taxes, on the other hand, generate a more consistently positive supply response.

If policy measures are made permanent and financed by an increase in debt, then long-run supply and debt effects become much more important. For all fiscal instruments, higher debt tends to crowd out private output because it leads to higher real interest rates.<sup>32</sup> When there is a permanent increase in transfers, regardless of short-run monetary accommodation, the real interest rate rises in the long run, which reduces output or, at best, leaves it unchanged. Lower tax rates, on the other hand, reduce supply distortions, and therefore generate permanent increases in output, more so when labor taxes are lowered than when consumption taxes are lowered. Making lower tax rates permanent could *raise* the short-term impact, depending on the balance between the positive supply-side effect and negative interest rate effects. The effects from permanently higher government investment depend on whether the spending can generate a higher rate of return than if the resources were available to private investors.

How do the multipliers differ according to the characteristics of the economy? Additional simulations show the following:

- For any given size of fiscal stimulus, multipliers are lower in smaller and more open economies—see Figure 5.11—although those for labor taxes fall by less.<sup>33</sup>

<sup>31</sup>This is an example of a temporary fiscal policy change that is effective because of forward-looking expectations, showing that the “permanent income” criticism of temporary policy measures does not always hold.

<sup>32</sup>In small countries—that is, small enough that interest rates are exogenous—this is still likely to happen. The degree depends on changes in interest rate risk premiums.

<sup>33</sup>The empirical results in the previous section point to the opposite result: multipliers are higher in smaller and more open economies. This suggests that the measure of openness used in the regressions is picking up other effects not accounted for in these simulations.

- A higher share of liquidity-constrained consumers, as might be expected in most emerging economies, results in significantly larger multipliers.
- At the same time, fiscal stimulus may lead, in high-debt emerging economies, to an increase in real interest rates as market participants demand a higher interest rate risk premium. This reduces output multipliers, especially for revenue-based measures, as shown in Figure 5.12. If the increase in interest rate risk premiums is large enough, the multipliers are negative. It is possible that this is the mechanism driving the negative results of fiscal stimulus seen from the empirical work in Table 5.4.

These results indicate that the effects of fiscal stimulus are likely to vary considerably, depending on how the stimulus is implemented and on the type of economy. The results support the idea that the degree of monetary policy accommodation is important, which may have played a role in the smaller estimates of fiscal multipliers in recent years. This is not to say that fiscal policy cannot work; rather, it is likely to be most effective when monetary policy is constrained and ineffective (see also Blinder, 2006). The results also illustrate a potentially important mechanism by which concerns about public debt sustainability could lower fiscal multipliers to a point at which discretionary fiscal policy would do more harm than good.

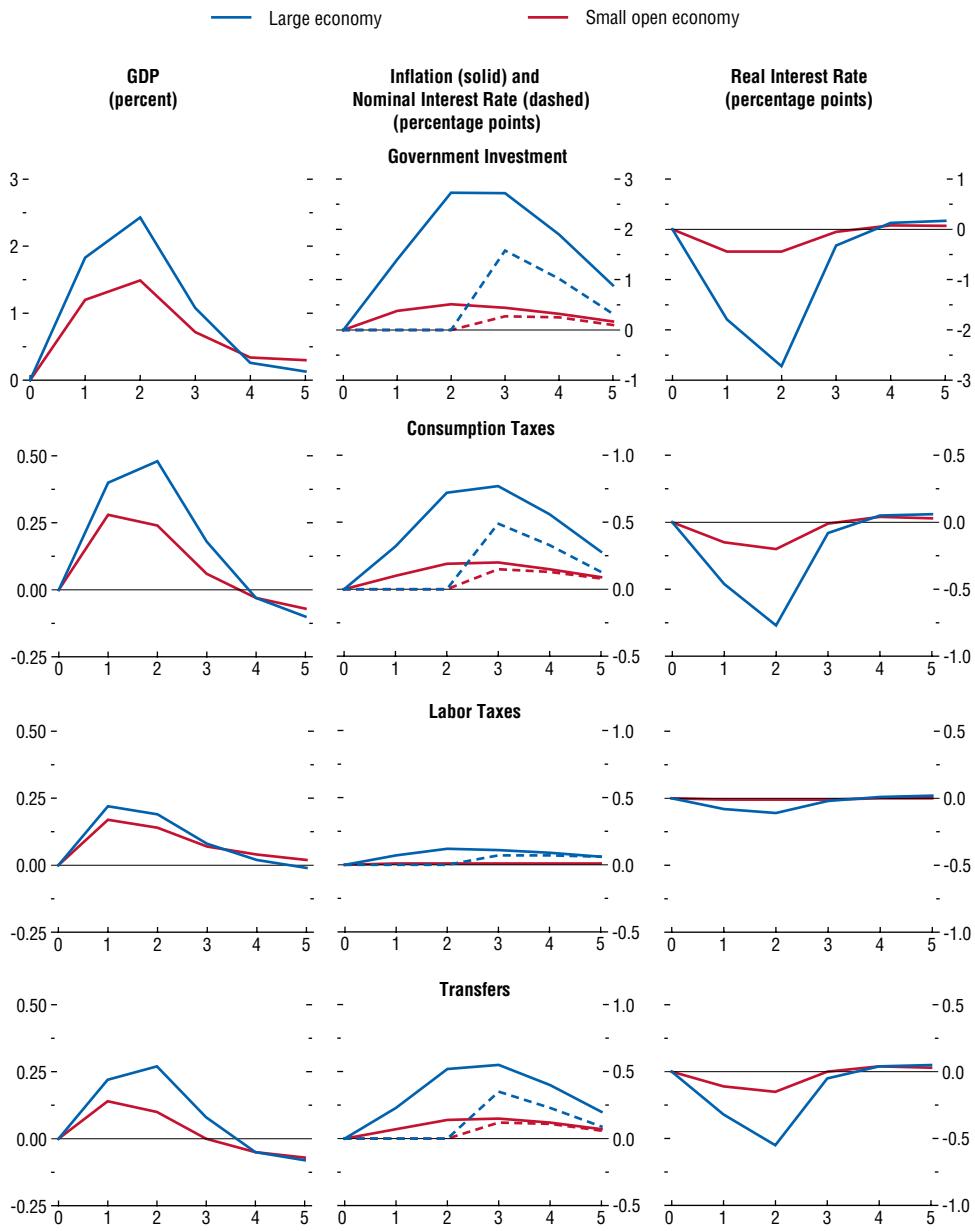
## Conclusions and Policy Considerations

This chapter addresses a simple question: What are the effects of fiscal policy during downturns? The analysis indicates that the answer is complicated and highly dependent on an economy’s characteristics.

One obvious appeal of discretionary fiscal policy is that governments can potentially have a quick effect on spending power, whereas the effects of monetary policy are subject to long and sometimes uncertain lags. And in practice, the policy record in advanced economies shows that discretionary fiscal policy has been used

**Figure 5.11. Fiscal Expansion in a Large Economy Compared with a Small Open Economy with Monetary Accommodation**  
*(Deviation from baseline; years on x-axis; shock occurs in year 0)*

Impulse responses to 1 percent increase in deficit in year 1 and 0.5 percent increase in deficit in year 2.

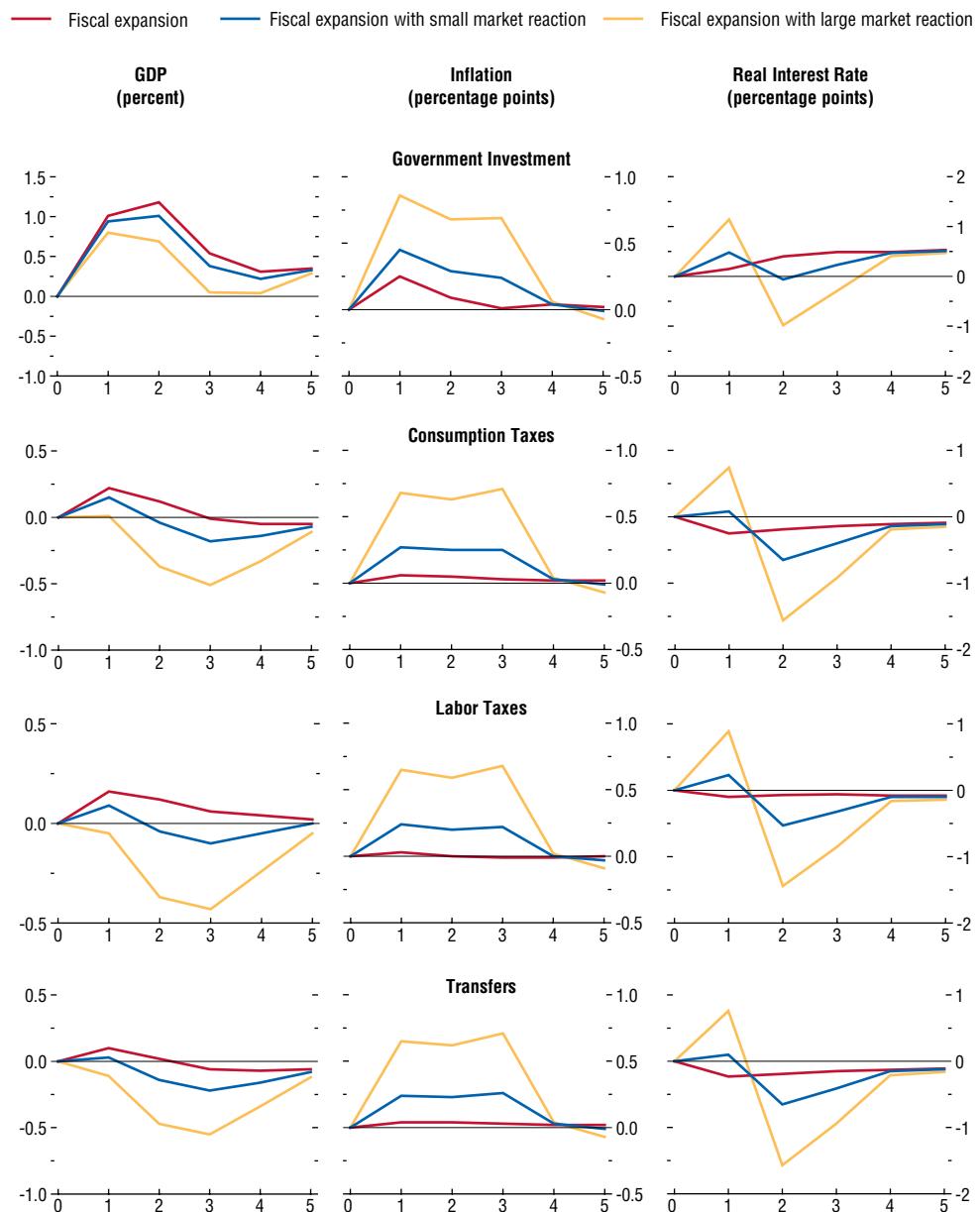


Source: IMF staff calculations.

**Figure 5.12. Effect of Fiscal Expansion in a Small Economy with Market-Risk-Premium Reaction**

(Deviation from baseline; years on x-axis; shock occurs in year 0)

Impulse responses to 1 percent increase in deficit in year 1 and 0.5 percent increase in year 2.



Source: IMF staff calculations.

actively, although not nearly as much as automatic stabilizers or monetary policy. However, discretionary measures have typically been implemented later than automatic stabilizers and changes in monetary stance; they are more often a response to downturns than upturns, sometimes more than necessary; and stimulus measures have often been made permanent, which has had adverse implications for fiscal sustainability.

An examination of the average effects of discretionary fiscal policy across a combined sample of advanced and emerging economies does not provide strong evidence of countercyclical effects on activity. However, a closer analysis suggests that the effects are moderately countercyclical in advanced economies. By contrast, there is only weak evidence for countercyclical effects in emerging economies, and only initially, with indications that effects turn negative in subsequent years. Revenue-based stimulus measures seem to be more effective at boosting output than expenditure-based measures, especially in emerging economies, perhaps reflecting concerns that, once implemented, increased expenditures are difficult to remove.

These empirical findings are broadly consistent with simulations from a multiperiod general equilibrium model. The simulations show how the fiscal multiplier can vary from Keynesian (1 or greater) to negative, depending on the instrument used and the type of economy. In particular, the multiplier is lower when monetary reaction does not accommodate the fiscal stimulus and when there is a strong increase in risk premiums following fiscal stimulus (such as when concerns about servicing debt obligations are high). Increased government spending can be the most direct means of increasing output, if it can be implemented quickly. On the other hand, it is the most inflationary. Tax changes that provide greater rewards for work effort or incentives for bringing consumption forward might be nearly as effective in supporting economic activity, with less risk of inflation.

Given both the interest in fiscal policy as a countercyclical tool and the evidence that discretionary fiscal stimulus can have adverse effects, should governments rely more on automatic stabilizers? Or is it possible to design alternative countercyclical fiscal policy mechanisms that would respond symmetrically and more quickly to changes in the state of economy?<sup>34</sup>

There are two broad possibilities, each with its advantages and disadvantages.

*Increasing the responsiveness of automatic stabilizers:* The extent of passive automatic stabilizers could be augmented, for example, by increasing the progressivity of the revenue system. Such mechanisms would work automatically and would not necessarily increase the size of government. A related approach would be to change certain tax, transfer, or spending programs to introduce links to the state of the economy following simple rules, akin to the Taylor rule for setting interest rates. This could be done by implementing pre-approved temporary spending programs or raising unemployment insurance benefits once the unemployment rate reaches a certain threshold. An advantage of such an approach would be its transparency.

However, such schemes could also bring unintended consequences that would need to be weighed against possible stabilization benefits. A system of temporary consumption tax changes could lead to self-fulfilling falls in current consumption if tax cuts were anticipated. Proposals that call for automatic triggers in response to cyclical developments are also problematic because there are no completely reliable real-time measures of the state of the economy. Responses based on previous periods' outcomes—such as an automatic tax rebate—could be more accurate and less distortionary but might not be as well targeted as those that

<sup>34</sup>This idea goes back at least to Musgrave (1959, p. 512), who coined the phrase “formula flexibility” to describe a system in which changes in taxes and/or expenditures would be legislated in advance to respond to changes in income. More recently, versions have been advocated in Seidman (2003).

are based on current income. It might also be difficult to develop predetermined state-contingent spending programs that are a well-targeted and efficient use of public money (Solow, 2005). Furthermore, all of the above could introduce distortions: schemes to increase tax progressivity or tie unemployment insurance generosity to the state of the economy would likely alter work incentives, and might prove politically difficult to adhere to during upturns. Thus, they would have to be flanked with measures to improve the targeting of support during downturns. Better targeting, however, is likely to pose administrative challenges that could prove expensive to address.

*Changes in fiscal policy governance:* Broader reforms could bolster the credibility of discretionary policy actions, in particular, to reduce the risk of debt bias. This might involve establishing an independent, nonpartisan government agency, such as already exist in many countries—a sort of “fiscal watchdog”—charged with identifying changes in the cyclical state of the economy, assessing the extent to which fiscal policy is consistent with medium-term objectives, and providing advice on various policy measures.<sup>35</sup> This would minimize partisan judgment in the evaluation of economic information and would avoid relying solely on statistical measures of the state of the economy, which can be imprecise. In addition, this arrangement could increase the timeliness and temporariness of the fiscal impulse. Such agencies could also be entrusted with giving advice on which tax and expenditure parameters to vary, as they indeed already do in a number of countries.<sup>36</sup>

<sup>35</sup>For example, the objective of the Swedish Fiscal Policy Council is to provide an independent evaluation of the Swedish government’s fiscal policy, including whether fiscal policy is consistent with the state of the economy in the business cycle.

<sup>36</sup>Some have even proposed that governments delegate limited fiscal responsibility to these nonpartisan agencies, for exclusive use in macroeconomic stabilization (see Ball, 1997, and Calmfors, 2003). Under existing proposals, such agencies could vary certain tax or expenditure parameters, within certain limits set out by the legislative branch and on the basis of a narrow stabi-

Clearly, a careful examination of the potential costs and risks of such systems would be required before implementing any such approaches. In addition to the choice of fiscal instruments and the administrative complexities of changing tax rates or expenditure plans, the system would have to be coordinated with monetary policy goals (see Taylor, 2000). Nonetheless, given the limitations of automatic stabilizers as currently implemented and the risks associated with discretionary fiscal policy, the idea deserves further examination.

## Appendix 5.1. Data and Empirical Methods

### Evidence on the Responsiveness of Fiscal Policy

Quarterly data on the output gap and real GDP growth are taken from the OECD *Economic Outlook*, and are seasonally adjusted. Downturns are defined as quarters in which growth is either negative or below potential, with the output gap more than one standard deviation below zero. Changes in monetary policy are proxied by the quarterly change in the nominal short-term interest rate taken from the IMF’s International Financial Statistics database. All changes are quarter-over-quarter and unannualized. The analysis focuses on “large” changes in discretionary fiscal variables, defined as those that exceed 0.25 percent of GDP a quarter. Similarly, discretionary changes in nominal short-term interest rates are defined as those that exceed 0.25 percent in one quarter.

The vector autoregression (VAR) is estimated for each country using quarterly data. The variables included in the VARs, and their ordering, are as follows: actual real GDP growth minus potential real GDP growth, inflation (based

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lization mandate supplemented by strict accountability requirements. A weakness of such proposals is they present a challenge regarding the role of government and they make it difficult to establish a dividing line between the agency and government in terms of countercyclical fiscal policy (see Debrun, Hauner, and Kumar, 2008, for a detailed survey).

on the GDP deflator), changes in the nominal interest rate, changes in the primary cyclically adjusted fiscal balance, and changes in the automatic (cyclical) fiscal balance. This ordering implies that although policy variables can respond to growth and inflation shocks within one quarter, the transmission lag from policy variables to growth and inflation is at least one quarter. Two lags of each variable are included in the VAR.

### Data Uncertainties and the Risk of Debt Bias

For the purposes of testing for asymmetric responses, each VAR now includes the following variables: growth when the economy is in a downturn and zero otherwise; growth when the economy is in an upturn and zero otherwise; and the previously included variables, that is, inflation, changes in nominal interest rates, and changes in fiscal balances. As before, downturns are defined as quarters in which growth is either negative or below potential, with the output gap more than one standard deviation below zero. The results are robust to changing the ordering of the two halves of growth (downturns and upturns) in the VAR, to alternative ordering for the fiscal and monetary policy variables, and to including a time trend in each equation. Because the VAR is specified in first differences, any trend in fiscal balances over the sample period affects the constant term in the fiscal balance equation.

For the purposes of testing the reliability of preliminary GDP estimates, the analysis updates the estimates of Faust, Rogers, and Wright (2005), which used data ending in 1997. Revisions are defined as the difference between the data as they stood in the most recent OECD *Monthly Economic Indicators* (June 2008) and the data when they were first published in the *Monthly Economic Indicators*. For the United States, the United Kingdom, and Canada, preliminary data are available beginning in 1965:Q1. For Japan, the starting date is 1970:Q1; for Italy and Germany, 1979:Q4; and for France, 1987:Q4.

For the purposes of evaluating the effect of growth estimation errors, each VAR now includes the preliminary estimation errors in addition to the previously included variables. The estimation errors are ordered in the VARs after growth and inflation but before the policy variables. The results are robust to alternative ordering among the errors and policy variables.

### Policy Reactions in Emerging and Advanced Economies

The analysis uses a sample of 21 advanced economies and 20 emerging economies from the IMF's World Economic Outlook (WEO) database, covering the period from 1970 to 2007.<sup>37</sup> The sample includes annual data for general government revenues and expenditures (net of interest payments). Other macroeconomic data (for example, for external balances and inflation) are sourced from the World Bank's World Development Indicators database, the WEO database, and other public sources. The list of economies and episodes of downturn is in Table 5.5 (with years of fiscal stimulus in bold).

In addition to the WEO data, an examination was made using the IMF's *Government Finance Statistics Manual* (GFS) data. One advantage of this data set is that it offers greater disaggregation—revenues can be broken down into personal, corporate, consumption, and trade. Taxes and expenditures can be broken down into household, nonprofit institution, and corporate transfers (subsidies); interest; government employee wages; and other expenditures as well as capital spending. More-disaggregated data potentially allow for finer distinctions regarding the income elasticities of taxes and spending and therefore a more accurate measure of automatic versus cyclical adjustments in revenues and expenditures. Extensive comparisons were made between

<sup>37</sup>Owing to data limitations, India was dropped from the sample used for regressions.

**Table 5.5. List of Countries and Downturn Episodes**

| Country         | Years in Downturn  |
|-----------------|--|
| Argentina       | 1975, 1976, 1978, 1981, 1982, 1985, 1988, 1989, 1990, 1995, <b>1999</b> , 2000, <b>2001</b> , 2002 |
| Australia       | <b>1972</b> , 1978, 1982, <b>1983</b> , <b>1991</b> , <b>1992</b>                                  |
| Austria         | 1975, <b>1978</b> , 1981, 1988, 1997   |
| Belgium         | 1975, 1977, 1987, 1993, <b>2003</b>  |
| Brazil          | 1970, 1981, 1983, 1990, 1992   |
| Canada          | <b>1975</b> , <b>1982</b> , <b>1991</b> , <b>1992</b>  |
| Chile           | 1972, 1973, 1975, 1982, 1983, <b>1999</b>  |
| China           | 1976, 1990, 1991   |
| Colombia        | 1976, 1977, 1983, 1985, 1991, <b>1992</b> , 1999   |
| Czech Republic  | 1990, 1991, 1992, <b>1997</b> , 1998   |
| Denmark         | <b>1974</b> , <b>1975</b> , 1980, <b>1981</b> , 1983, <b>1988</b> , 1993, 2003                     |
| Egypt           | 1973, 1974, 1981   |
| Finland         | <b>1977</b> , <b>1978</b> , <b>1991</b> , <b>1992</b> , <b>1993</b>                                |
| France          | <b>1975</b> , <b>1986</b> , 1987, <b>1993</b> , 1997   |
| Germany         | 1975, 1982, 1989, <b>1990</b> , 1993, 2003   |
| Greece          | 1974, 1981, 1982, 1983, 1987, 1993   |
| Hungary         | 1985, 1988, 1990, <b>1991</b>  |
| Iceland         | 1975, 1976, <b>1983</b> , <b>1985</b> , 1988, 1991, 1992, 2003                                     |
| India           | 1972, 1974, 1979, 1980, 1987, 2002   |
| Indonesia       | 1998   |
| Ireland         | 1975, 1976, 1983, 1993, 1994   |
| Italy           | 1972, 1975, 1980, 1983, 1993, <b>2003</b>  |
| Japan           | 1974, <b>1975</b> , 1987, <b>1994</b> , <b>1998</b> , <b>1999</b>                                  |
| Malaysia        | 1971, 1975, 1985, 1986, 1987, <b>1998</b>  |
| Mexico          | 1977, 1982, 1983, 1986, 1988, 1995, 2001   |
| Netherlands     | 1975, 1980, 1981, 1982, 1993, <b>2003</b> , 2005   |
| New Zealand     | 1972, 1976, 1977, 1979, 1983, <b>1991</b> , 1992, 1998   |
| Pakistan        | 1970, 1972, 2002, 2003   |
| Poland          | 1980, 1981, 1982, 1984, 1990, <b>1991</b>  |
| Portugal        | 1975, 1984, 1985, <b>1986</b> , <b>1993</b> , 2003   |
| Romania         | 1975, <b>1985</b> , 1988, 1989, <b>1990</b> , 1991, <b>1992</b> , 1997, 1998, 1999                 |
| Slovak Republic | 1990, 1991, 1992, 1993   |
| Slovenia        | 1976, 1983, 1987, 1988, 1990, 1991, 1992   |
| South Africa    | 1977, 1978, <b>1982</b> , 1983, 1985, 1986, 1990, <b>1991</b> , <b>1992</b>                        |
| Spain           | 1971, 1981, 1985, 1986, <b>1993</b>  |
| Sweden          | 1977, 1981, 1983, <b>1991</b> , <b>1992</b> , <b>1993</b> , 2003                                   |
| Switzerland     | 1975, 1976, 1978, 1982, 1983, <b>1991</b> , 1993, 2003   |
| Turkey          | 1973, 1979, 1980, 1989, 1994, 1999, 2001   |
| Ukraine         | 1987, 1990, 1991, 1992, 1993, 1994, 1996, <b>1997</b> , 1998, 1999                                 |
| United Kingdom  | 1971, 1974, 1975, 1980, 1981, <b>1991</b> , <b>1992</b>  |
| United States   | <b>1970</b> , 1974, <b>1975</b> , <b>1980</b> , <b>1982</b> , 1991                                 |

<sup>1</sup>Years in bold correspond to use of a fiscal stimulus in a downturn, with fiscal stimulus defined as a decline in the cyclically adjusted primary balance to GDP below 0.25 percentage point of GDP.

WEO and GFS data for the same selection of countries. Two major problems arose. First, to create a sufficiently long time series, various GFS vintages needed to be spliced together, leading to situations in which the components listed above jumped at the splice points, apparently simply because of reclassifications. This led to spurious measures of fiscal impulses, taking away the theoretical advantage of using these data. Second, long time series of GFS data are available only for central government. This can present a deceptive picture of changes in fiscal policy. For example, estimates of fiscal impulses at the central level of government were found to be countercyclical (with the output cycle) for all countries. This finding deserves more investigation, but is outside the scope of this study.

### Fiscal Impulse Measures

The elasticity-based fiscal impulse measure used for the stylized facts, event analysis, and regressions is a cyclically adjusted primary balance, calculated as

$$\text{capb}_t = r_t - e_t^P \frac{Y_t^{\text{real}}}{Y_t^{\text{tr-real}}},$$

where  $r_t$  is the revenue-to-GDP ratio in period  $t$ ,  $e_t^P$  is the primary expenditure-to-GDP ratio in period  $t$ , and  $Y_t^{\text{real}}/Y_t^{\text{tr-real}}$  is real output divided by potential (trend) output in period  $t$ . These estimates of the cyclically adjusted balance rely on output gap estimates derived using a time-series filter, which may not work well when supply shocks are frequent and large, as for many emerging economies. Applying the same elasticities across economies (as assumed for emerging economies), where one has a low elasticity of taxes to output and another has a high elasticity of taxes to output could lead to results implying that the former uses discretionary fiscal policy more actively than the latter, whereas in fact the cause is stronger automatic stabilizers.

The regression-based fiscal impulse measure used for the regressions is constructed as the

difference between a hypothetical primary deficit in period  $t$  assuming no changes in the economic environment and the actual primary deficit in period  $t-1$ . As a first step, note that the actual primary balance in period  $t$  can be expressed as a function of the discretionary policies,  $P_p$  and the economic environment prevailing in that period,  $E_t$ :

$$B_t = B(P_p E_t).$$

The change in the primary balance *with respect to the previous year* can then be decomposed as follows:

$$\begin{aligned} \Delta B_t &= B(P_p E_t) - B(P_{t-1}, E_{t-1}) \\ &= [B(P_p E_t) - B(P_p E_{t-1})] + [B(P_p E_{t-1}) \\ &\quad - B(P_{t-1}, E_{t-1})] \\ &= \Delta B_t^E + \Delta B_t^P. \end{aligned}$$

The term  $B(P_p E_{t-1})$  captures what the primary balance would have been under the period  $t$  policies, assuming the economic environment was the same as in period  $t-1$ . It is then possible to break the change in the balance into two elements. The first element,  $\Delta B_t^E$ , represents the fiscal effects of changes in the economic environment from  $E_{t-1}$  to  $E_t$ . The second element,  $\Delta B_t^P$ , captures the change in the balance as a result of changes in discretionary policies.

In practice, the initial step for calculating the regression-based measure of fiscal impulse is to estimate the following equations, assuming real GDP growth is a good proxy for the economic environment:

$$R_t = \alpha_R + \beta_R \cdot growth_t + \gamma_R \cdot trend_t + u_t$$

$$G_t = \alpha_E + \beta_E \cdot growth_t + \gamma_E \cdot trend_t + e_t$$

where  $R$  is general government revenue in percent of GDP,  $G$  is general government primary expenditure in percent of GDP,  $growth$  is real GDP growth,  $trend$  is a time trend, and  $u$  and  $e$  are residuals. The growth-adjusted revenue, which indicates what the revenue *would* have been in period  $t$  if the growth rate remained unchanged from the previous period, is computed as  $R_t(growth_{t-1}) = \hat{\alpha}_R + \hat{\beta}_R \cdot growth_{t-1} +$

$\hat{\gamma}_R \cdot trend_t + \hat{u}_t$ . The growth-adjusted primary expenditure is computed in the same way, as  $G_t(growth_{t-1}) = \hat{\alpha}_E + \hat{\beta}_E \cdot growth_{t-1} + \hat{\gamma}_E \cdot trend_t + \hat{e}_t$ . The measure for the primary balance that would have prevailed in period  $t$  if the growth rate had been equal to that in period  $t-1$ ,  $B(P_p E_{t-1})$ , can then be calculated as  $R_t(growth_{t-1}) - E_t(growth_{t-1})$ . The actual primary balance in the previous period,  $B(P_{t-1}, E_{t-1})$ , is simply  $R_{t-1} - G_{t-1}$ . The final step in the construction of the fiscal impulse measure is to take the difference between the growth-adjusted measure for the primary balance in period  $t$  and the primary balance in the previous period:

$$\begin{aligned} Fiscal\ impulse_t &= [R_t(growth_{t-1}) - G_t(growth_{t-1})] \\ &\quad - [R_{t-1} - G_{t-1}] \\ &= (\hat{\gamma}_R - \hat{\gamma}_E) + (\hat{u}_t - \hat{u}_{t-1}) \\ &\quad - (\hat{e}_t - \hat{e}_{t-1}). \end{aligned}$$

Note that although  $\hat{u}_t$  and  $\hat{e}_t$  can be expected to be uncorrelated with  $y_t$ ,  $\hat{u}_{t-1}$  and  $\hat{e}_{t-1}$  are correlated with  $y_t$ .

## Regression Analysis

Dynamic panel regressions were run using the Arellano-Bond estimator.<sup>38</sup>

The multipliers presented in Table 5.4 are derived from regression results shown in Table 5.6 (using the elasticity-based fiscal impulse measure) and Table 5.7 (using the regression-based fiscal impulse measure). Note that, because it is based on the primary balance, a negative change in the regression-based measure represents fiscal stimulus, so that a negative coefficient indicates that fiscal stimulus typically has a positive effect on real GDP growth. A positive coefficient on the expenditures-only fiscal impulse or a negative coefficient on the revenue-only fiscal impulse indicate positive effects on growth.

<sup>38</sup>Experiments were also run with single-equation regressions for individual economies. In most cases, the results were insignificant, indicating that there was insufficient variation in the short time samples to adequately differentiate the effects of fiscal stimulus on output growth.

**Table 5.6. Discretionary Fiscal Policy and Growth: Regression Results with Arellano-Bond Dynamic Panel Estimator Using Elasticity-Based Fiscal Impulse Measure<sup>1</sup>**

| Right-Hand-Side Variables  | Baseline Specification | Country Differences, Advanced Economies | Country Differences, Emerging Economies | Downturns        | Components       | Components, Advanced Economies | Components, Emerging Economies |
|--|------------------------|---|---|------------------|------------------|--------------------------------|--------------------------------|
| Real GDP growth  |                        |   |   |                  |                  |                                |                                |
| Lag1   | 0.36<br>(4.18)         | 0.53<br>(8.11)                          | 0.33<br>(3.11)                          | 0.42<br>(7.21)   | 0.37<br>(4.08)   | 0.53<br>(8.52)                 | 0.31<br>(2.87)                 |
| Lag2   | -0.01<br>(-0.15)       | -0.04<br>(-0.85)                        | 0.06<br>(1.11)                          | 0.11<br>(2.83)   | 0.02<br>(0.49)   | -0.04<br>(-0.67)               | 0.08<br>(1.47)                 |
| Changes in cyclically adjusted primary balance (dCAPB)             | -0.15<br>(-1.93)       | -0.12<br>(-1.89)                        | -0.21<br>(-2.51)                        | ...              | ...              | ...                            | ...                            |
| Lag1   | 0.14<br>(3.03)         | 0.01<br>(0.28)                          | 0.13<br>(2.01)                          | ...              | ...              | ...                            | ...                            |
| Lag2   | 0.13<br>(3.78)         | 0.05<br>(0.90)                          | 0.12<br>(3.44)                          | ...              | ...              | ...                            | ...                            |
| Changes in cyclically adjusted primary expenditure                 | ...                    | ...                                     | ...                                     | ...              | 0.13<br>(1.34)   | -0.09<br>(-0.83)               | 0.20<br>(1.59)                 |
| Lag1   | ...                    | ...                                     | ...                                     | ...              | -0.16<br>(-2.66) | 0.00<br>(0.13)                 | -0.21<br>(-2.39)               |
| Changes in revenue   | ...                    | ...                                     | ...                                     | ...              | -0.21<br>(-3.42) | -0.35<br>(-3.97)               | -0.23<br>(-3.35)               |
| Lag1   | ...                    | ...                                     | ...                                     | ...              | 0.05<br>(1.10)   | 0.02<br>(0.29)                 | 0.03<br>(0.49)                 |
| Lag2   | ...                    | ...                                     | ...                                     | ...              | 0.10<br>(2.23)   | 0.02<br>(0.32)                 | 0.06<br>(1.31)                 |
| Neutral dummy x positive fiscal impulse x dCAPB                    | ...                    | ...                                     | ...                                     | -0.35<br>(-2.84) | ...              | ...                            | ...                            |
| Lag1   | ...                    | ...                                     | ...                                     | -0.15<br>(-1.45) | ...              | ...                            | ...                            |
| Lag2   | ...                    | ...                                     | ...                                     | 0.10<br>(1.13)   | ...              | ...                            | ...                            |
| Neutral dummy x negative fiscal impulse x dCAPB                    | ...                    | ...                                     | ...                                     | -0.06<br>(-0.71) | ...              | ...                            | ...                            |
| Lag1   | ...                    | ...                                     | ...                                     | 0.19<br>(1.82)   | ...              | ...                            | ...                            |
| Lag2   | ...                    | ...                                     | ...                                     | 0.13<br>(1.74)   | ...              | ...                            | ...                            |
| Downturn dummy x positive fiscal impulse x high-debt dummy x dCAPB | ...                    | ...                                     | ...                                     | 1.75<br>(2.36)   | ...              | ...                            | ...                            |
| Lag1   | ...                    | ...                                     | ...                                     | -0.30<br>(-0.54) | ...              | ...                            | ...                            |
| Lag2   | ...                    | ...                                     | ...                                     | -0.51<br>(-0.98) | ...              | ...                            | ...                            |
| Downturn dummy x positive fiscal impulse x low-debt dummy x dCAPB  | ...                    | ...                                     | ...                                     | 0.96<br>(3.59)   | ...              | ...                            | ...                            |
| Lag1   | ...                    | ...                                     | ...                                     | -0.50<br>(-3.60) | ...              | ...                            | ...                            |
| Lag2   | ...                    | ...                                     | ...                                     | -0.42<br>(-2.19) | ...              | ...                            | ...                            |
| Downturn dummy x negative fiscal impulse x high-debt dummy x dCAPB | ...                    | ...                                     | ...                                     | -0.44<br>(-2.05) | ...              | ...                            | ...                            |
| Lag1   |                        |   |   | 0.44<br>(1.98)   | ...              | ...                            | ...                            |
| Lag2   |                        |   |   | 0.15<br>(1.59)   | ...              | ...                            | ...                            |

**Table 5.6 (continued)**

| Right-Hand-Side Variables   | Baseline Specification | Country Differences, Advanced Economies | Country Differences, Emerging Economies | Downturns        | Components       | Components, Advanced Economies | Components, Emerging Economies |
|---|------------------------|---|---|------------------|------------------|--------------------------------|--------------------------------|
| Downturn dummy x negative fiscal impulse x low-debt dummy x dCAPB | ...                    | ...                                     | ...                                     | -0.52<br>(-3.75) | ...              | ...                            | ...                            |
| Lag1  | ...                    | ...                                     | ...                                     | 0.50<br>(2.39)   | ...              | ...                            | ...                            |
| Lag2  | ...                    | ...                                     | ...                                     | 0.21<br>(1.65)   | ...              | ...                            | ...                            |
| Deep downturn dummy x positive fiscal impulse x dCAPB             | ...                    | ...                                     | ...                                     | 0.00<br>(0.00)   | ...              | ...                            | ...                            |
| Lag1  | ...                    | ...                                     | ...                                     | -0.80<br>(-4.76) | ...              | ...                            | ...                            |
| Lag2  | ...                    | ...                                     | ...                                     | 0.84<br>(4.00)   | ...              | ...                            | ...                            |
| Deep downturn dummy x negative fiscal impulse x dCAPB             | ...                    | ...                                     | ...                                     | 0.28<br>(1.53)   | ...              | ...                            | ...                            |
| Lag1  | ...                    | ...                                     | ...                                     | 0.00<br>(0.00)   | ...              | ...                            | ...                            |
| Lag2  | ...                    | ...                                     | ...                                     | 0.57<br>(3.63)   | ...              | ...                            | ...                            |
| Upturn dummy x positive fiscal impulse x dCAPB                    | ...                    | ...                                     | ...                                     | -0.80<br>(-4.76) | ...              | ...                            | ...                            |
| Lag1  | ...                    | ...                                     | ...                                     | 0.84<br>(4.00)   | ...              | ...                            | ...                            |
| Lag2  | ...                    | ...                                     | ...                                     | 0.28<br>(1.53)   | ...              | ...                            | ...                            |
| Upturn dummy x negative fiscal impulse x dCAPB                    | ...                    | ...                                     | ...                                     | 0.57<br>(3.63)   | ...              | ...                            | ...                            |
| Lag1  | ...                    | ...                                     | ...                                     | -0.86<br>(-3.95) | ...              | ...                            | ...                            |
| Lag2  | ...                    | ...                                     | ...                                     | -0.57<br>(-3.10) | ...              | ...                            | ...                            |
| Real money growth   | 0.04<br>(1.67)         | 0.02<br>(0.95)                          | 0.07<br>(2.16)                          | 0.05<br>(1.94)   | 0.05<br>(1.96)   | 0.02<br>(1.13)                 | 0.07<br>(2.16)                 |
| Lag1  | 0.02<br>(0.91)         | 0.01<br>(0.46)                          | 0.03<br>(1.02)                          | -0.01<br>(-0.46) | 0.02<br>(0.90)   | 0.01<br>(1.35)                 | 0.03<br>(1.17)                 |
| Lag2  | -0.02<br>(-1.30)       | 0.00<br>(0.22)                          | -0.02<br>(-1.05)                        | -0.02<br>(-1.02) | -0.02<br>(-1.17) | 0.00<br>(-0.23)                | -0.02<br>(-1.18)               |
| Government size   | -0.03<br>(-1.97)       | -0.01<br>(-0.99)                        | -0.04<br>(-1.56)                        | -0.02<br>(-2.16) | -0.03<br>(-1.88) | -0.02<br>(-1.55)               | -0.04<br>(-1.45)               |
| Trade-weighted growth of trading partners                         | 0.35<br>(2.06)         | 0.10<br>(0.71)                          | 0.42<br>(1.81)                          | 0.17<br>(1.37)   | 0.33<br>(1.96)   | -0.01<br>(-0.06)               | 0.44<br>(1.77)                 |
| EMU dummy <sup>2</sup>  | -0.80<br>(-2.35)       | -0.13<br>(-0.50)                        | ...                                     | -0.67<br>(-2.50) | -0.78<br>(-2.58) | -0.12<br>(-0.47)               | ...                            |
| Number of observations  | 796                    | 487                                     | 309                                     | 650              | 796              | 487                            | 309                            |
| Number of countries   | 40                     | 21                                      | 19                                      | 40               | 40               | 21                             | 19                             |
| p-value for Sargan test of overidentifying restrictions           | 0.000                  | 0.000                                   | 0.003                                   | 0.000            | 0.000            | 0.011                          | 0.002                          |
| p-value for Hansen test of overidentifying restrictions           | 1.000                  | 1.000                                   | 1.000                                   | 1.000            | 1.000            | 1.000                          | 1.000                          |
| p-value for the test of no-second-order serial correlation        | 0.811                  | 0.270                                   | 0.868                                   | 0.010            | 0.606            | 0.242                          | 0.845                          |

<sup>1</sup>Dependent variable is real GDP growth. All regressions also included a set of time dummies.<sup>2</sup>EMU = European Monetary Union.

**Table 5.7. Discretionary Fiscal Policy and Growth: Regression Results with Arellano-Bond Dynamic Panel Estimator Using Regression-Based Fiscal Impulse Measure<sup>1</sup>**

| Right-Hand-Side Variables  | Baseline         | Country<br>Differences,<br>Advanced<br>Economies | Country<br>Differences,<br>Emerging<br>Economies | Downturns        | Components       | Components,<br>Advanced<br>Economies | Components,<br>Emerging<br>Economies |
|--|------------------|--|--|------------------|------------------|--------------------------------------|--------------------------------------|
|  |                  |  |  |                  |                  |                                      |                                      |
| Real GDP growth  |                  |  |  |                  |                  |                                      |                                      |
| Lag1   | 0.37<br>(3.86)   | 0.54<br>(8.09)                                   | 0.30<br>(2.67)                                   | 0.43<br>(7.10)   | 0.38<br>(3.73)   | 0.56<br>(7.58)                       | 0.29<br>(2.51)                       |
| Lag2   | -0.03<br>(-0.71) | -0.01<br>(-0.18)                                 | 0.04<br>(0.83)                                   | 0.12<br>(3.04)   | -0.03<br>(-0.68) | -0.01<br>(-0.25)                     | 0.05<br>(0.86)                       |
| Changes in cyclically adjusted primary balance (dCAPB)             | -0.08<br>(-1.18) | -0.11<br>(-1.81)                                 | -0.10<br>(-1.50)                                 | ...              | ...              | ...                                  | ...                                  |
| Lag1   | 0.04<br>(0.79)   | -0.14<br>(-3.18)                                 | 0.08<br>(1.25)                                   | ...              | ...              | ...                                  | ...                                  |
| Lag2   | 0.06<br>(1.89)   | -0.02<br>(-0.33)                                 | 0.10<br>(2.00)                                   | ...              | ...              | ...                                  | ...                                  |
| Changes in cyclically adjusted primary expenditure                 | ...              | ...  | ...  | ...              | 0.06<br>(0.84)   | 0.15<br>(2.27)                       | 0.08<br>(0.87)                       |
| Lag1   | ...              | ...  | ...  | ...              | -0.05<br>(-1.13) | 0.13<br>(2.89)                       | -0.14<br>(-1.78)                     |
| Lag2   | ...              | ...  | ...  | ...              | -0.06<br>(-1.62) | -0.01<br>(-0.20)                     | -0.12<br>(-1.77)                     |
| Changes in revenue   | ...              | ...  | ...  | ...              | -0.10<br>(-1.87) | -0.01<br>(-0.17)                     | -0.13<br>(-1.90)                     |
| Lag1   | ...              | ...  | ...  | ...              | -0.02<br>(-0.36) | -0.13<br>(-1.85)                     | -0.01<br>(-0.18)                     |
| Lag2   | ...              | ...  | ...  | ...              | 0.03<br>(0.97)   | -0.08<br>(-1.29)                     | 0.03<br>(0.53)                       |
| Neutral dummy x positive fiscal impulse x dCAPB                    | ...              | ...  | ...  | -0.39<br>(-3.15) | ...              | ...                                  | ...                                  |
| Lag1   | ...              | ...  | ...  | -0.17<br>(-2.43) | ...              | ...                                  | ...                                  |
| Lag2   | ...              | ...  | ...  | 0.08<br>(0.79)   | ...              | ...                                  | ...                                  |
| Neutral dummy x negative fiscal impulse x dCAPB                    | ...              | ...  | ...  | 0.07<br>(0.51)   | ...              | ...                                  | ...                                  |
| Lag1   | ...              | ...  | ...  | 0.03<br>(0.31)   | ...              | ...                                  | ...                                  |
| Lag2   | ...              | ...  | ...  | 0.19<br>(2.28)   | ...              | ...                                  | ...                                  |
| Downturn dummy x positive fiscal impulse x high debt dummy x dCAPB | ...              | ...  | ...  | 1.05<br>(2.58)   | ...              | ...                                  | ...                                  |
| Lag1   | ...              | ...  | ...  | -0.37<br>(-1.12) | ...              | ...                                  | ...                                  |
| Lag2   | ...              | ...  | ...  | -0.38<br>(-1.54) | ...              | ...                                  | ...                                  |
| Downturn dummy x positive fiscal impulse x low debt dummy x dCAPB  | ...              | ...  | ...  | 0.65<br>(4.87)   | ...              | ...                                  | ...                                  |
| Lag1   | ...              | ...  | ...  | -0.53<br>(-5.50) | ...              | ...                                  | ...                                  |
| Lag2   | ...              | ...  | ...  | -0.33<br>(-2.52) | ...              | ...                                  | ...                                  |

**Table 5.7 (concluded)**

| Right-Hand-Side Variables  | Baseline         | Country Differences, Advanced Economies | Country Differences, Emerging Economies | Downturns        | Components       | Components, Advanced Economies | Components, Emerging Economies |
|--|------------------|---|---|------------------|------------------|--------------------------------|--------------------------------|
| Downturn dummy x negative fiscal impulse x high debt dummy x dCAPB | ...              | ...                                     | ...                                     | -0.40<br>(-1.93) | ...              | ...                            | ...                            |
| Lag1   | ...              | ...                                     | ...                                     | 0.34<br>(1.87)   | ...              | ...                            | ...                            |
| Lag2   | ...              | ...                                     | ...                                     | 0.14<br>(1.29)   | ...              | ...                            | ...                            |
| Downturn dummy x negative fiscal impulse x low debt dummy x dCAPB  | ...              | ...                                     | ...                                     | -0.46<br>(-3.24) | ...              | ...                            | ...                            |
| Lag1   | ...              | ...                                     | ...                                     | 0.30<br>(1.29)   | ...              | ...                            | ...                            |
| Lag2   | ...              | ...                                     | ...                                     | 0.21<br>(1.69)   | ...              | ...                            | ...                            |
| Upturn dummy x positive fiscal impulse x dCAPB                     | ...              | ...                                     | ...                                     | -0.91<br>(-4.59) | ...              | ...                            | ...                            |
| Lag1   | ...              | ...                                     | ...                                     | 0.86<br>(3.67)   | ...              | ...                            | ...                            |
| Lag2   | ...              | ...                                     | ...                                     | 0.19<br>(0.84)   | ...              | ...                            | ...                            |
| Upturn dummy x negative fiscal impulse x dCAPB                     | ...              | ...                                     | ...                                     | 0.57<br>(4.27)   | ...              | ...                            | ...                            |
| Lag1   | ...              | ...                                     | ...                                     | -0.91<br>(-5.62) | ...              | ...                            | ...                            |
| Lag2   | ...              | ...                                     | ...                                     | -0.37<br>(-2.04) | ...              | ...                            | ...                            |
| Real money growth  | 0.05<br>(1.92)   | 0.02<br>(1.06)                          | 0.07<br>(2.41)                          | 0.05<br>(1.92)   | 0.06<br>(2.19)   | 0.02<br>(1.11)                 | 0.08<br>(2.65)                 |
| Lag1   | 0.01<br>(0.83)   | 0.01<br>(0.50)                          | 0.03<br>(1.03)                          | -0.01<br>(-0.43) | 0.01<br>(0.85)   | 0.01<br>(0.50)                 | 0.03<br>(0.99)                 |
| Lag2   | -0.02<br>(-1.37) | 0.00<br>(0.15)                          | -0.02<br>(-0.97)                        | -0.02<br>(-1.03) | -0.02<br>(-1.34) | 0.00<br>(0.27)                 | -0.02<br>(-0.94)               |
| Government size  | -0.04<br>(-2.44) | -0.01<br>(-1.00)                        | -0.04<br>(-1.62)                        | -0.02<br>(-2.26) | -0.04<br>(-2.17) | -0.01<br>(-0.97)               | -0.04<br>(-1.36)               |
| Trade-weighted growth of trading partners                          | 0.34<br>(1.93)   | 0.08<br>(0.60)                          | 0.40<br>(1.77)                          | 0.16<br>(1.29)   | 0.35<br>(1.93)   | 0.08<br>(0.54)                 | 0.43<br>(1.69)                 |
| EMU dummy  | -0.79<br>(-2.28) | -0.19<br>(-0.80)                        |   | -0.71<br>(-2.61) | -0.82<br>(-2.50) | -0.19<br>(-0.83)               | ...                            |
| Number of observations   | 796              | 487                                     | 309                                     | 650              | 796              | 487                            | 309                            |
| Number of countries  | 40               | 21                                      | 19                                      | 40               | 40               | 21                             | 19                             |
| p-value for Sargan test of overidentifying restrictions            | 0.000            | 0.000                                   | 0.001                                   | 0.000            | 0                | 0.004                          | 0.003                          |
| p-value for Hansen test of overidentifying restrictions            | 1.000            | 1.000                                   | 1.000                                   | 1.000            | 1.000            | 1.000                          | 1.000                          |
| p-value for the test of no second order serial correlation         | 0.790            | 0.254                                   | 0.758                                   | 0.019            | 0.739            | 0.428                          | 0.641                          |

<sup>1</sup>Dependent variable is real GDP growth. All regressions also included a set of time dummies.

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# DIVERGENCE OF CURRENT ACCOUNT BALANCES ACROSS EMERGING ECONOMIES

*This chapter seeks to explain the divergence in current account behavior between emerging Asia and emerging Europe. It identifies financial liberalization and EU integration as the main drivers of the large and persistent deficits in emerging Europe but also raises concerns about risks of abrupt endings. In contrast, less open capital accounts and financial sectors contributed to surpluses in emerging Asia. To a large extent, however, these surpluses remain unexplained, raising questions about the role of exchange rates and the desire of some countries to build high levels of reserves after the Asian crisis.*

The pattern of current account balances across emerging economies has become much more diverse in recent years than during the early 1990s, particularly between emerging Asia and Europe.<sup>1</sup> Most of emerging Asia (especially after the 1997–98 crisis), the Middle East, and some members of the Commonwealth of Independent States have reported large current account surpluses, while large current account deficits are observed mainly in emerging Europe and other countries such as Jordan, Pakistan, South Africa, Turkey, Vietnam, and a number of countries in Central America and the Caribbean. The current account deficits in Latin America and Africa remained on average at modest levels. Notably,

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<sup>1</sup>Emerging Asia is defined to include the newly industrialized Asian economies, or NIEs (Korea, Hong Kong SAR, Singapore, and Taiwan POC), the Asian Tigers (Indonesia, Malaysia, the Philippines, and Thailand), China, and other Asia (India, Pakistan, Sri Lanka, and Vietnam). Emerging Europe includes central Europe (Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia), southeastern Europe (Albania, Bulgaria, Croatia, Macedonia, FYR, and Romania), and the Baltics (Estonia, Latvia, and Lithuania).

virtually all of these emerging economies have achieved high growth during the past decade, irrespective of their current account positions.

The divergent current account patterns in emerging Asia and Europe have revived the long-standing debate over the connection between economic development and capital flows—the Lucas paradox (Lucas, 1990). Theory predicts that growth should lead to current account deficits for two reasons. On one hand, high growth and the resulting profitable investment opportunities should make the country attractive to foreign capital. On the other hand, if individuals want to smooth their consumption over time, prospects of continued high growth should lead to higher consumption today because income and consumption can be expected to rise further in the future. The traditional view that capital flows downhill to high-growth countries seems to hold for emerging Europe, whereas the opposite appears to be the case for emerging Asia after 1997–98.

The two patterns may also have different implications for macroeconomic stability. The path of the Asian countries, which combine rapid growth with current account surpluses, may seem safer, at least from the point of view of external vulnerability.<sup>2</sup> However, there may be limits to how long export-led growth can be sustained, particularly if it is associated with a low exchange rate, because of the risks of capital misallocation, overheating, and rising inflation. In contrast, although sustained current account deficits could fuel overconsumption and be vulnerable to “sudden stops” in financial flows, they need not end abruptly if they reflect consumption smoothing or the financing of productive investment during episodes of high

<sup>2</sup>The large current account surpluses may, however, entail a growth and/or welfare cost, but this issue is not examined in this chapter.

growth, as theory would predict (see, for example, Ghosh and Ostry, 1995, and Ostry, 1997).

Against this background, the chapter looks more closely at factors underlying the recent divergence in current account balances across emerging economies and attempts to assess their sustainability.<sup>3</sup> The analysis focuses in particular on explaining the divergence between emerging Asia and emerging Europe and attempts to answer the following questions:

- What components of the current and financial accounts have driven the recent trends in the various emerging regions? How have saving and investment evolved? How does this experience compare to previous episodes of growth spurts, including those of currently advanced economies when they were emerging?
- How can the different growth-current account configurations in emerging economies be explained? Do they reflect temporary economic shocks, macroeconomic policies, or structural factors? For instance, what are the roles of financial liberalization, barriers to access to foreign capital, and the exchange rate?
- Are the current large imbalances atypically persistent relative to previous spells of current account surpluses and deficits? How long will they be sustained? Do particular factors or policies (such as export growth or the exchange rate regime) contribute to whether they resolve smoothly or abruptly?

The chapter finds that much of the regional differences can be explained by structural factors, while also providing some support for the traditional view that high growth prospects attract foreign capital and lower the current account balance. In emerging Europe, the liberalization of the financial sector and the process of integration into the EU are the main drivers of the large current account deficits. In emerg-

ing Asia, structural factors also matter. Low net capital inflows are linked to the more limited openness of the capital accounts and financial sectors, to demographics (younger populations), and to differences in political structures. However, these factors only partially account for these economies' surpluses. The residual current account surpluses are strongly associated with low exchange rates and large accumulations of reserves. However, it is difficult to establish whether these variables reflect deliberate policy action or other unidentified fundamental factors that both raised the current account and lowered the exchange rate since the Asian crisis in 1997–98.

The deficits in emerging Europe appear especially large and persistent relative to historical episodes, and the protracted surpluses in emerging Asia, such as those in China and Malaysia, are equally uncommon among emerging economies. Based on past experience, the very lengthy deficit episodes in emerging Europe can be partly explained by high growth prospects, highly open capital accounts, financial liberalization, and high initial net foreign asset positions. In general, however, the duration of these episodes is already reaching the upper end of expectations, raising questions about their sustainability. The chapter finds that the factors that may cause an abrupt end to these deficits include the region's fixed exchange rate regimes and open capital accounts.

This chapter is organized as follows. The next section examines current account patterns in emerging economies by reviewing developments in the current account, financial account, and saving-investment balance. The following section uses empirical evidence to identify the main economic factors driving these current account imbalances, again focusing on emerging Europe and emerging Asia. The next section puts the duration of present imbalances in historical perspective and examines the determinants of the length of imbalance episodes. The concluding section offers some policy suggestions.

<sup>3</sup>See various issues of the *World Economic Outlook* for complementary analysis of global imbalances (April 2005, September 2005, April 2006, April 2007, and October 2007).

## Recent Current Account Patterns in Emerging Economies

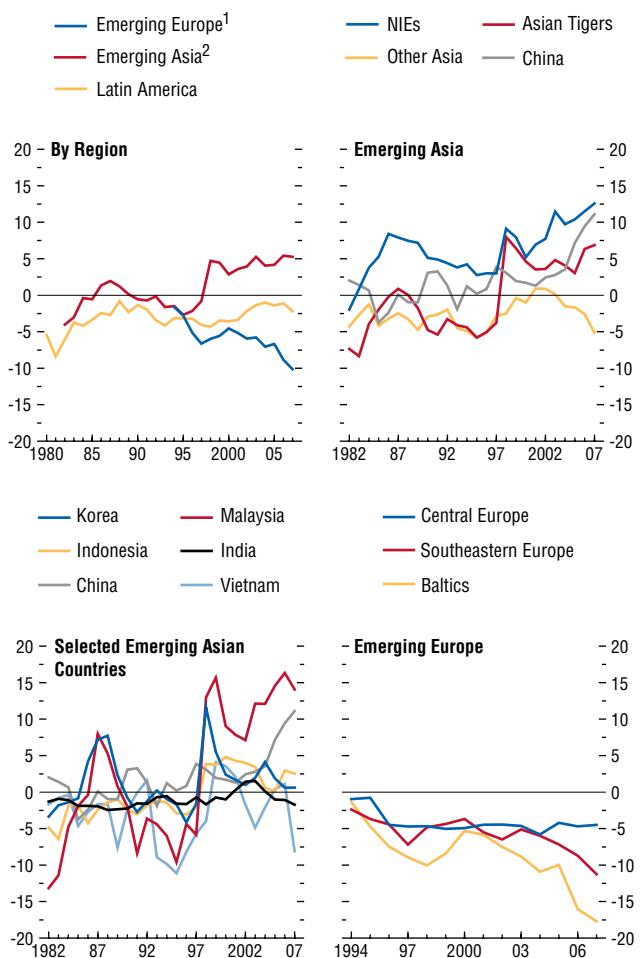
In the mid-1990s the main emerging regions all ran moderate current account deficits, but there is now an increasing divergence in current account balances across emerging regions (Figure 6.1). In particular, emerging Asia is accumulating large and increasing current account surpluses, on the order of 5 percent of GDP in 2007, whereas emerging Europe is running large and growing current account deficits reaching on average 10 percent of GDP in 2007. Most other country groups (Latin America and a group consisting of other emerging economies) are experiencing moderate current account deficits or small surpluses. Oil exporters are also running large current account surpluses, but these are driven by the particular circumstances of countries that rely on a depletable resource and are analyzed separately in Box 6.1. Because their current account positions respond differently to economic determinants, and their saving and investment behavior is driven by different considerations (such as the size of reserves), these countries were omitted from the empirical analysis below.

Within emerging Asia the pattern is also heterogeneous, with some persistent large surpluses and a few substantial deficits. The aggregate surpluses for the region reflect different contributors at different times. In the aftermath of the Asian crisis, the crisis countries (Korea and the Asian Tigers) accumulated large surpluses following the loss of access to international capital flows and in an effort to rebuild reserves. More recently (starting around 2002–03), current account surpluses in several of the crisis countries have come down, with the marked exception of Malaysia, while China started accumulating large current account surpluses. China and Malaysia are the only two cases of persistent large surpluses (see below). By contrast, low-income countries, such as India, Pakistan, Sri Lanka, and Vietnam, have mostly been running deficits, importing capital in accordance with theory. The three small NIEs (Hong Kong SAR,

**Figure 6.1. Patterns of Divergence in Current Account Balance**

(Percent of GDP; simple average)

The increasing divergence of current account imbalances in emerging economies is the result of a homogenous shift to longer deficits in emerging Europe and a more varied transition to surpluses in Asia following the Asian crisis, with initially large improvements by the Asian Tigers and Korea and more recently large surpluses in Malaysia and China.



Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.

<sup>1</sup>Emerging Europe includes central Europe (Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia), southeastern Europe (Albania, Bulgaria, Croatia, Macedonia, FYR, and Romania), and the Baltics (Estonia, Latvia, and Lithuania).

<sup>2</sup>Emerging Asia includes newly industrialized Asian economies (NIEs—Hong Kong SAR, Korea, Singapore, and Taiwan POC), Asian Tigers (Indonesia, Malaysia, Philippines, and Thailand), China, and Other Asia (India, Pakistan, Sri Lanka, and Vietnam).

### Box 6.1. Current Account Determinants for Oil-Exporting Countries

The current account surpluses of oil-exporting countries have widened significantly in the past few years, as oil prices soared. The average current account of oil exporters increased from less than 4 percent of GDP to more than 13 percent between 2002 and 2007 (first figure). During the same period, the sum of the current accounts of those countries increased from less than \$90 billion (0.3 percent of world GDP) to almost \$500 billion (0.9 percent of world GDP). These surpluses are projected to increase further in 2008 as a result of the sharp increase in oil prices.<sup>1</sup>

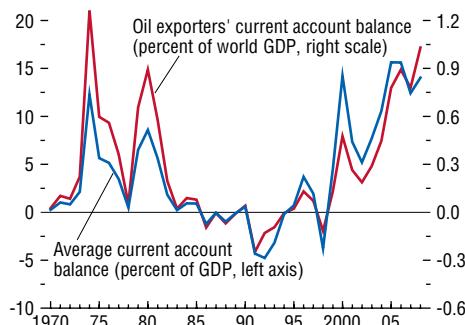
This box explores the medium-run determinants of the current account balance for oil exporters and their differences and similarities to determinants in other countries. It draws on the so-called macroeconomic balance (MB) approach, which is based on the equilibrium relationship between current account balances and a set of fundamentals (measured, when

relevant, as differences from trading partners' averages). These fundamentals include variables such as the fiscal balance, demographics, the oil balance, and economic growth, which are all robust determinants of the current account balance (Lee and others, 2008).

Before turning to the regression analysis, it is useful to highlight three macroeconomic dimensions along which oil exporters are substantially different from the rest of the world:

- Oil-exporting countries are exposed to wide fluctuations in their external accounts, because their exports, by definition, are relatively undiversified and oil prices fluctuate widely. Such volatility is directly reflected in the higher volatility of their terms of trade and current accounts as a percent of GDP (second figure).
- The fiscal balance in oil-exporting countries is typically dominated by swings in fiscal revenues related to oil exports<sup>2</sup> and is hence

#### Current Account Behavior in Oil Exporters



Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.

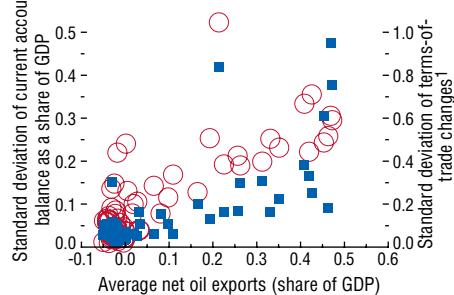
The main authors of this box are Rudolfs Bems and Irineu de Carvalho Filho.

<sup>1</sup>The oil exporters are Algeria, Angola, Azerbaijan, Bahrain, Republic of Congo, Ecuador, Equatorial Guinea, Gabon, I.R. of Iran, Kazakhstan, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Syrian Arab Republic, Turkmenistan, United Arab Emirates, Rep. Bolivariana de Venezuela, and Republic of Yemen.

#### Oil Dependency and Volatility, 1970–2006

■ Standard deviation of current account balances      ○ Standard deviation of terms-of-trade changes<sup>1</sup> (right scale)

#### Current Account and Terms of Trade



Source: IMF staff calculations.

<sup>1</sup>Goods and services terms of trade.

<sup>2</sup>Among other revenue sources, oil-related revenues include royalties on oil exploration, export taxes, oil companies' corporate income taxes, and dividends of state-owned oil companies.

very strongly correlated with the current account as well as being more volatile than for non-oil-exporters.

- Because oil revenues accrue from the sale of an exhaustible resource, transfers from one generation to another play an important role in ensuring intergenerational equity.<sup>3</sup> To avoid sharp decreases in absorption once oil exports decline, countries aim to accumulate foreign assets and use income from such assets to offset the decreasing income from oil. Such transfers are more important for countries that expect to deplete their exhaustible resource endowment within a few decades.

To assess the current account determinants for exporters of exhaustible resources more formally, MB-type regressions are estimated building on the work presented in Lee and others (2008). Oil exporters are incorporated in the framework by allowing for (1) the non-oil fiscal balance as the relevant fiscal variable, in order to separate the effects of oil revenues and the non-oil fiscal balance on the current account; (2) a specific oil-balance coefficient for oil exporters, as well as for those exporters with more limited reserves, to capture intergenerational transfers and the delayed response of consumption and investment to changes in oil income; and (3) a specific lagged current account coefficient for oil exporters, to capture differences in persistence. The analysis also included tests for differences in the other coefficients.

There are two important caveats to the results. First, the quality of historical data for several oil exporters is problematic—in particular, the measurement of the non-oil fiscal balance is fraught with difficulties because the definition of the “oil sector” can differ across countries. Second, the non-oil sector in oil exporters may include oil-related activities (such as petrochemicals and fertilizers). This may imply a stronger link between the cur-

<sup>3</sup>See Bems and de Carvalho Filho (forthcoming), and Thomas, Kim, and Aslam (2008).

#### Determinants of Current Account Balances in Oil-Exporting Countries

|   | MB<br>Sample<br>1970–2004 | All<br>Countries<br>1970–2004 | All<br>Countries<br>1970–2006 |
|---|---------------------------|-------------------------------|-------------------------------|
| Old-age dependency                                | -0.15***                  | -0.14*                        | -0.15                         |
| Population growth                                 | -1.10**                   | -0.98                         | -1.29**                       |
| Output growth                                     | -0.20**                   | -0.19**                       | -0.15**                       |
| Dummy for financial center                        | 0.03***                   | 0.03***                       | 0.03***                       |
| Non-oil fiscal balance/GDP                        | 0.20***                   | 0.20***                       | 0.21***                       |
| Non-oil fiscal balance/GDP (oil exporters)        |                           | 0.45**                        | 0.50***                       |
| Relative income                                   | 0.02*                     | 0.03**                        | 0.02                          |
| Relative income, for oil exporters                |                           | 0.08***                       | 0.08***                       |
| Volatility of terms of trade                      | 0.01                      | 0.07*                         | 0.08*                         |
| Oil balance/GDP                                   | 0.20***                   | 0.28**                        | 0.33***                       |
| Oil balance/GDP (oil exporters)                   |                           | 0.49***                       | 0.61***                       |
| Oil balance/GDP (oil exporters, limited reserves) |                           | 0.59***                       | 0.68***                       |
| Lagged oil balance/GDP                            |                           | -0.11                         | -0.16                         |
| Lagged current account                            | 0.37***                   | 0.38***                       | 0.42***                       |
| Lagged current account (oil exporters)            |                           | 0.56***                       | 0.59***                       |
| Observations                                      | 359                       | 430                           | 483                           |
| R-squared   | 0.62                      | 0.78                          | 0.79                          |

Source: IMF staff estimates.

Note: \*, \*\*, and \*\*\* denote significance at the 10 percent, 5 percent, and 1 percent level, respectively.

rent account and oil prices than pure oil sales would suggest and hence a higher positive coefficient on the oil balance in the current account regression.

Regression results from the extended MB framework are reported in the table.<sup>4</sup> The first column presents coefficients for a subset of developed and emerging market countries that excludes oil exporters, with the excep-

<sup>4</sup>The regression sample excludes Angola, Republic of Congo, Equatorial Guinea, Gabon, and Nigeria, based on average size and GDP per capita during the sample period.

**Box 6.1 (*concluded*)**

tion of Norway, based on a sample spanning 1970–2004, with each observation corresponding to a four-year average. The second and third columns present results for the entire sample of countries (with the third column adding 2005–06 as an additional observation). Estimated coefficients are, in general, statistically and economically significant and have expected signs and plausible magnitudes. Furthermore, the fit of the regression is very good, especially in light of the fact that fixed country effects are not included.

Focusing first on those variables that have similar effects on the current account balance in both groups of countries, the estimates imply that the effects of the dependency ratio (ratio of population above age 65 to population between ages 30 and 64), population growth and per capita GDP growth are statistically and economically indistinguishable across oil exporters and importers. A higher dependency ratio reduces the current account balance, a 1 percentage point increase in the population growth rate relative to trading partners lowers the current account by about 0.7–1.0 percent of GDP, and a 1 percentage point increase in per capita GDP growth relative to trading partners lowers the current account by about 0.2 percent of GDP.

As for the impact of other variables on the current account, there are statistically and economically significant differences between oil exporters and other countries:

- A 1 percentage point improvement in the (non-oil) fiscal balance leads to a 0.4–0.5 percentage point increase in the current account balance in percent of GDP for oil exporters, and to an increase of about 0.15 percentage point for other countries. This result is consistent with evidence that, in less financially developed countries, the relationship between fiscal balance and the current account balance is stronger.
- The current account balance responds more strongly to the oil balance in oil exporters than in oil importers. This result

is consistent with the notion that, because oil is an exhaustible resource, the propensity to save out of an oil price windfall is higher. Also, oil typically plays a more central economic role in oil exporters than in oil importers—as a result, the same oil price shock implies a larger change in income for oil exporters. With adjustment costs to consumption and investment, the response of the current account to an oil price shock is likely to be larger for oil exporters, at least in the short run.

- Among oil exporters, the response of the current account to the oil balance is stronger in countries with lower oil and gas reserves (such as Algeria and Norway), consistent with the fact that their oil revenues are more temporary than for other exporters.
- An increase in relative income raises the current account balance significantly more in oil-exporting countries than in other countries—an oil-exporting country with income half the level in the United States will have, on average, a current account balance that is 3–4 percentage points of GDP smaller than that of a country with income equal to the U.S. level (the difference is  $\frac{1}{2}$ –1 percentage point for other countries). A possible interpretation is that, in countries with volatile relative income and exhaustible resources, like oil exporters, a higher fraction of income would be saved in “good times” (and dissaved in “bad times”) because shocks to income are more likely to be temporary.

In conclusion, this preliminary evidence is broadly consistent with theoretical predictions. Oil-exporting countries are likely to have large external surpluses, particularly at times of peaks in production and high oil prices. This is consistent with the need to smooth consumption over time and between generations, in light of the exhaustible-resource nature of oil, as well as with the partly transitory nature of oil revenue booms and the presence of adjustment costs to consumption and investment.

Singapore, and Taiwan POC) have been running very large current account surpluses, well above 10 percent of GDP, but they are very much special cases: all three have high income levels, and Singapore and Hong Kong SAR are financial centers, pointing to different determinants for their international capital flows. For the most part, these economies are omitted from the rest of the chapter.

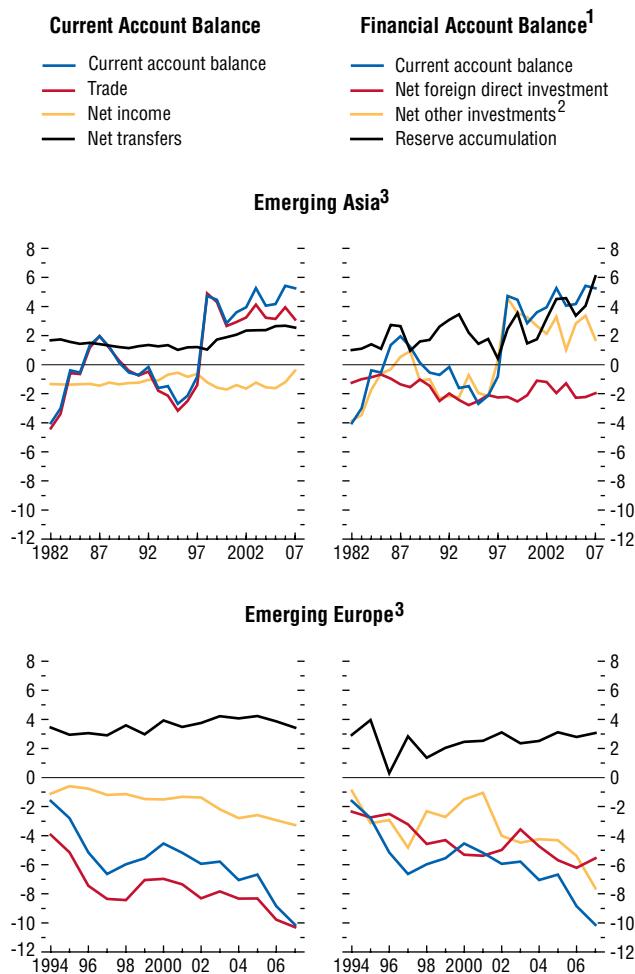
In contrast to the Asian experience, the current account patterns in emerging Europe are more homogenous and include many large, persistent imbalances. Deficits are very large and growing in the Baltics and southeastern Europe, averaging 18 percent and 11 percent of GDP in 2007, respectively. The deficits in central Europe have stabilized at more moderate levels, around 5 percent of GDP on average.

Developments in the current account are mostly driven by the trade balance (Figure 6.2). In emerging Asia, the trade surplus accounts for most of the rise in the current account surplus, although an increase in net private transfers has added an extra percentage point to the current account balance since 1997 (mostly in the Philippines, Vietnam, and Pakistan). Similarly in emerging Europe, the trade deficit explains most of the increase in the current account deficit, with an additional 1½ percentage points of deficit coming from a recent decline in net investment income. However, in recent years, the Czech Republic and Hungary have been running trade surpluses, with their current account deficits mostly driven by negative income balances.

Turning to financial flows, the large surpluses in emerging Asia have been associated with large outflows of non-foreign-direct-investment (non-FDI) capital and an unprecedented accumulation of reserves. Reserves have now reached 39 percent of GDP and cover 9.2 months of imports. A by-product of the large accumulation of reserves in emerging Asia and the oil-producing countries has been the creation of large sovereign wealth funds (SWFs), which has potentially important implications for global capital flows and asset prices (Box 6.2). Emer-

**Figure 6.2. External Balances by Component**  
(Percent of GDP; simple average)

Developments in the current account are mostly driven by the trade balance. In emerging Asia the current transfer balance also improved after 1997, whereas in emerging Europe rising deficits were associated with a deterioration of the net income balance.



Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.

<sup>1</sup>Financial account transactions have been multiplied by -1.

<sup>2</sup>Includes net portfolio investments and net other investments.

<sup>3</sup>See footnotes 1 and 2 in Figure 6.1 for regional breakdowns.

### Box 6.2. Sovereign Wealth Funds: Implications for Global Financial Markets

This box discusses how large, persistent current account surpluses in several, mostly emerging, economies have resulted in sovereign wealth funds (SWFs) becoming key players in the global financial landscape (first figure). It also examines the possible impact of the growing role of SWFs on global capital flows, key asset prices, and financial markets more broadly.<sup>1</sup>

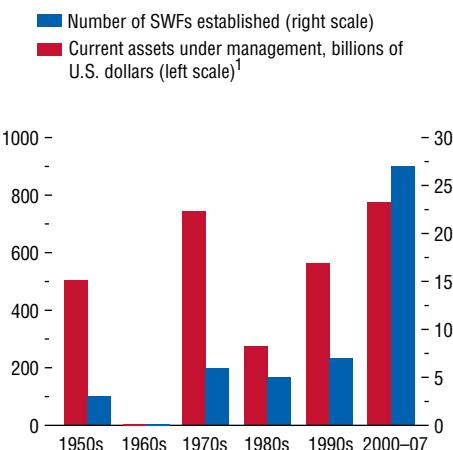
Although many SWFs have been around for many years, if not decades, there has been a sharp increase since 2000 in the number of SWFs and in the assets estimated to be under their management. The growing presence of SWFs is a result of sustained large current account surpluses in several Asian economies and oil-exporting countries. These surpluses—reflecting high commodity prices and favorable trade balances—have translated into a rapid accumulation of foreign reserves by central banks. Reserves have reached a level that many countries have come to believe provides a sufficient cushion against financial or economic shocks. Although many of these countries still have enormous development needs, their absorptive capacity is limited. Therefore, quickly spending the oil- or export-related revenues may be inappropriate or unfeasible. Moreover, there is a growing sense that turning “resources in the ground” into financial assets is an important channel for transferring wealth across generations.

As a result, many countries are seeking to enhance the returns on these large pools of funds. Rather than continuing to invest conservatively through sustained reserve accumulation, they are transferring these assets to SWFs with broader and more aggressive investment mandates. Estimates by market participants suggest that assets under management of SWFs range from \$2 to \$3 trillion—exceeding assets managed by hedge funds (\$1.9 trillion)—and account for about one-fourth to one-third of foreign assets held by sovereigns. Although SWF assets remain small relative to total global

The main authors of this box are Julie Kozack, Douglas Laxton, and Krishna Srinivasan.

<sup>1</sup>See Kozack, Laxton, and Srinivasan (forthcoming).

#### The Number of Sovereign Wealth Funds (SWFs) Has Grown Dramatically



Sources: Media and analyst reports; and IMF staff estimates.

<sup>1</sup>Current estimated assets under management for SWFs established in each time period.

financial assets (about \$190 trillion), they are large relative to mature market stock capitalization and the size of debt and capital markets in emerging economies. That said, part of SWFs’ portfolios is often invested in nonfinancial assets, such as real estate. SWF assets are projected to surpass the stock of global foreign exchange reserves in the not-so-distant future and to top \$7 to \$11 trillion by 2013. Thus it is clear that SWFs will play an increasingly prominent role in global finance.

Against this background, a key concern is the impact of the growing presence of SWFs on the pattern of global capital flows, asset prices, and financial stability more generally. SWFs typically have medium- to long-term investment horizons, suggesting that they are less likely to make abrupt portfolio shifts that could affect market stability. Indeed, during the current financial market turmoil, SWFs have made large capital injections into systemically important financial institutions, suggesting that SWFs can play a stabilizing role in global financial markets. Yet

even a gradual shift toward greater portfolio diversification of reserve assets by sovereigns, including through SWFs, could have implications for the flow of funds between countries, the absolute and relative price of assets, and the evolution of global imbalances.<sup>2</sup>

Analyzing the potential impact of a diversification of sovereign reserves through SWFs is challenging because of the lack of reliable information for several large SWFs, notably concerning their asset allocations. To examine the possible implications of the growing presence of SWFs, illustrative scenarios of asset allocation were constructed for countries that are in the process of shifting away from holding reserves and toward diversifying their assets through SWFs.<sup>3,4</sup> Two stylized, diversified portfolios—one replicating that of Norway's Government Pension Fund (GPF-Global) and the other representative of well-established SWFs—are calibrated and compared with a stylized portfolio of

<sup>2</sup>Foreign official investors are estimated to have kept 10-year U.S. Treasury nominal yields 100 basis points lower than otherwise (Warnock and Warnock, 2006).

<sup>3</sup>The analysis assumes that countries that have recently established SWFs or have announced their intention to do so will channel a portion of their prospective foreign exchange inflows to their respective SWFs. Countries that have recently established or are in the process of establishing SWFs or SWF-type investment funds include Brazil, China, Korea, Russia, and Saudi Arabia; those that are considering the establishment of SWFs (according to market reports) include India, Japan, and Thailand.

<sup>4</sup>The new flows are calculated as the sum of each country's current account balance and net private capital flows, based on *World Economic Outlook* projections for 2008–13. The analysis provides for a *lower bound*—which assumes that countries with recently established SWFs will invest 50 percent of newly available foreign currency inflows in their SWFs; and an *upper bound*—which assumes that in addition, countries that are considering establishing SWFs (based on market reports) invest 50 percent of newly available foreign currency inflows in their SWFs. The upper bound also assumes that 10 percent of the stock of existing reserves of the top 10 emerging economy reserve holders is shifted from reserves to SWF holdings during 2008–13. It is assumed that all new flows into SWFs are invested abroad.

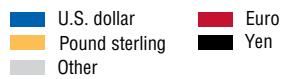
foreign exchange reserve assets, with a view to assessing likely changes in the pattern of global capital flows and the impact on asset prices (second figure).<sup>5</sup> To complement this scenario analysis, the exercise also estimates the impact of a modest shift away from dollar assets in the current stock of reserves for the 10 largest emerging economy reserve holders. A note of caution is warranted. As in many modeling exercises, the results are highly sensitive to the underlying assumptions. For instance, by assuming no portfolio shifts for long-established SWFs, the exercise provides only a partial picture of the possible magnitude of the impact on capital flows and asset prices arising from possible diversification strategies. Moreover, other sovereigns may choose to diversify their existing stock of reserve assets (and not just the top 10 emerging market reserve holders as assumed in the exercise). Finally, while the two stylized portfolios aim to capture possible asset-allocation strategies, it must be recognized that in practice, SWFs are a diverse group with differing mandates, transparency, and governance structures. Even so, this limited exercise provides a sense of the direction and magnitude of the possible impact on markets.

The analysis suggests that the pattern of global capital flows would change significantly, with advanced economies facing lower capital inflows and emerging economies attracting substantially larger inflows (third figure). Relative to reserve assets, which are predominantly dollar-denominated and generally held in the form of U.S. Treasury bills or agency securities, the stylized SWF portfolios are more diversified

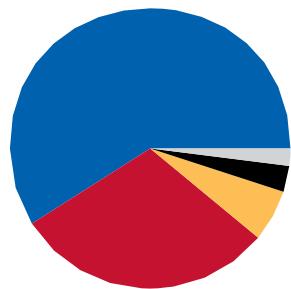
<sup>5</sup>The stylized portfolio of a representative diversified SWF is based on market reports concerning asset allocation and currency composition. Currency Composition of Official Foreign Exchange Reserves (COFER) is an IMF database that records end-of-period quarterly data on the currency composition of official foreign exchange reserves. Aggregate COFER data are used to derive a stylized reserves portfolio, assuming that assets are allocated exclusively toward government bonds, according to the COFER currency composition.

**Box 6.2 (concluded)**

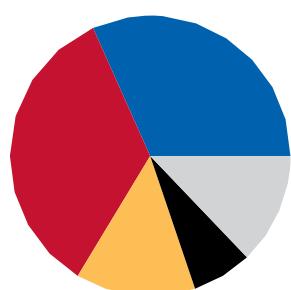
**Currency Composition of Stylized Portfolios**


  
 U.S. dollar      Euro  
 Pound sterling      Yen  
 Other

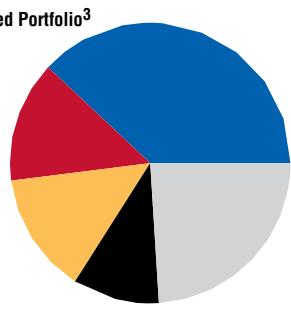
COFER<sup>1</sup>



Norway<sup>2</sup>



Diversified Portfolio<sup>3</sup>



Sources: COFER database; Norges Bank; and IMF staff estimates.

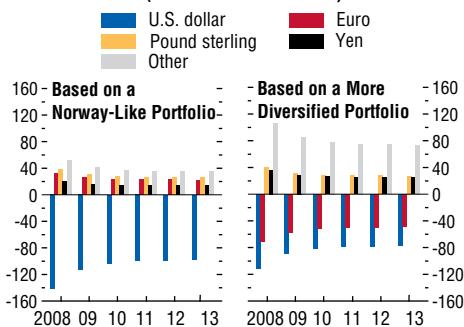
<sup>1</sup>Aggregate data. COFER is an IMF database on the currency composition of official foreign exchange reserves.

<sup>2</sup>At present, Norway's portfolio is invested in 47 percent equities and 53 percent bonds.

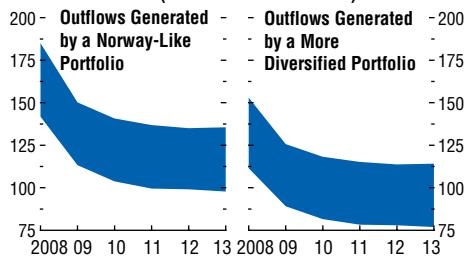
<sup>3</sup>Stylized portfolio of a representative diversified SWF based on market reports about their asset allocation and currency composition.

**Simulation Results**

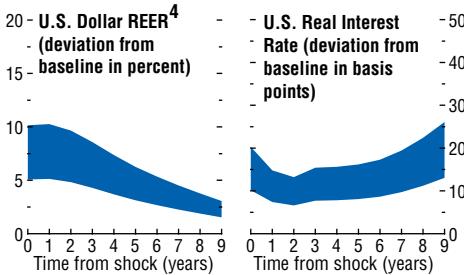
Possible Change in the Currency Composition of Capital Outflows from Selected SWF Countries (billions of U.S. dollars)<sup>1,2</sup>



Range of Possible Capital Outflows from U.S. Dollar Assets (billions of U.S. dollars)<sup>2,3</sup>



Range of Possible Effects on U.S. Exchange and Interest Rates<sup>2,3</sup>



Source: IMF staff estimates.

<sup>1</sup>Based on the assumption that 50 percent of available foreign currency flows to countries listed in footnote 2 are placed with the sovereign wealth fund (SWF) and invested in foreign assets.

<sup>2</sup>Includes Brazil, China, Korea, Russia (National Wealth Fund only), and Saudi Arabia.

<sup>3</sup>The lower bound of the range is based on the assumption described in footnote 1. The upper bound assumes that countries with prospective SWFs (based on media reports) also place 50 percent of available foreign exchange in SWFs to be invested abroad. The upper bound also assumes that 10 percent of the stock of existing reserves of the top 10 emerging economy reserve holders is shifted from reserves to SWF holdings over the period 2008–13.

<sup>4</sup>REER = real effective exchange rate.

across both asset classes and currency exposure. This suggests reduced inflows into government bond markets, with attendant implications for interest rates. The shift away from reserve assets could have the most significant effect on markets in the United States, if countries diversify away from dollar holdings.

- Estimates show that inflows into the United States could decline by  $\frac{1}{2}$ –1 percent of U.S. GDP a year on average, depending on the number of countries in the sample and the assumption made regarding the currency composition of reserves for the 10 largest emerging economy reserve holders. The results also hinge on the asset-allocation strategy that is used to model investments by the prospective SWFs.
- Portfolios that are more weighted to emerging economies—such as the stylized diversified portfolio—would result in lower flows into both dollar and euro assets, whereas flows to emerging economies would tend to increase substantially. By contrast, a portfolio similar to Norway’s SWF—which is heavily weighted toward investments in Europe—would suggest somewhat lower investment in dollar assets and a less sizable, but still positive, inflow to emerging markets.
- To quantify the implications of the potential changes in the pattern of capital flows on interest rates and exchange rates relative to the baseline, simulations were undertaken using the IMF’s GIMF5 model.<sup>6</sup> The results

<sup>6</sup>Simulations were performed on a five-region version of the Global Integrated Monetary and Fiscal

focus on the effects for the United States. They point to a 10–25 basis point increase in U.S. real interest rates and a 2–4 percent depreciation of the U.S. dollar in the long run. The model does predict a sharper depreciation of the dollar in the short run, of some 6–10 percent. The U.S. current account deficit could improve by  $\frac{1}{2}$ –1 percentage point of U.S. GDP, a consequence of a higher country risk premium driven by lower demand for U.S. assets. In the rest of the world, higher capital inflows would lead to lower real interest rates (and thus a larger interest rate differential with the United States) and more appreciated currencies (in real effective terms), and domestic demand would be boosted.

The model estimates do not suggest a disorderly depreciation of the U.S. dollar, nor a disorderly unwinding of global imbalances. In fact, they suggest that the effect of gradual portfolio shifts would be modest in the long run. However, the model estimates do not take into account possible second-round effects, as other investors react to the change in the behavior of SWFs. Overall, the results suggest that lower demand for U.S. assets would help lower the U.S. current account deficit and lower the value of the dollar.

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Model (GIMF5). GIMF5 is an extended version of the Kumhof and Laxton model and includes separate models for the United States, euro area, Japan, emerging Asia, and “remaining countries.” See Kumhof and Laxton (2007).

ing Asia remains a net importer of FDI, but net FDI inflows (in percent of GDP) are small compared with inflows to emerging economies in other regions, and they have not changed much since the beginning of the 1990s. In emerging Europe, the increasing current account deficits are covered to a large extent by net FDI, a relatively stable source of financing, although

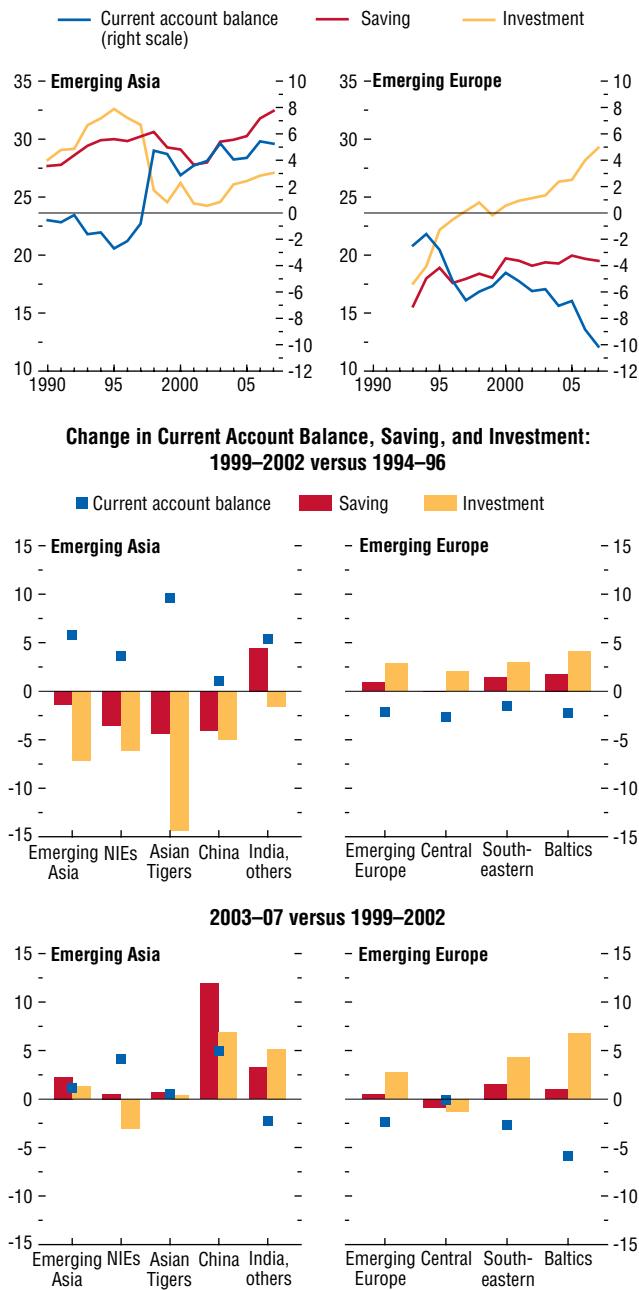
increases in deficits have outpaced net FDI during the past few years. Emerging Europe is also a large importer of non-FDI capital, including both bond-related and equity inflows. Overall reserves have accumulated at a rate of 2–3 percent of GDP a year.

Another way to understand changes in the current account balance is to look at develop-

### Figure 6.3. Current Account Balance, Saving, and Investment<sup>1</sup>

(Percent of GDP; simple average)

In Asia saving and investment declined after 1997, the latter abruptly in the Tigers. Although investment remained below pre-crisis levels, saving and investment were driven up recently by increases in China, India, and others. In contrast, investment grew rapidly in emerging Europe, especially in the lower-income countries, and was coupled with modest gains in saving.



Sources: CEIC Data Company Limited; UN National Account Statistics; and IMF staff calculations.

<sup>1</sup>See footnotes 1 and 2 in Figure 6.1 for regional breakdowns.

ments in saving and investment (Figures 6.3 and 6.4).<sup>4</sup> In emerging Asia, the 1997–98 crisis led to a drastic drop in (mostly) private investment in Korea and the Asian Tigers. Saving also declined, especially public saving, but the decline was much smaller. In contrast, the rising surplus in China during the latter period (2003–06) was driven by a large rebound in private (mostly corporate) saving and a continued increase in public saving.<sup>5</sup> Private and public investment also increased, although by smaller amounts. In emerging Europe, the current account deficits reflected a surge in private investment (mirroring a rise in FDI) and, to a lesser extent, in public investment, especially in the Baltics and southeastern Europe. Public saving also increased modestly in these countries (with the exception of central Europe), whereas private saving was relatively flat. As in emerging Asia, household dissaving has been offset by increased corporate saving, although in recent years, there has been some private dissaving on net.

Compared with other episodes of growth takeoffs, recent current account deficits in emerging Europe are quite large (Figure 6.5).<sup>6</sup> Economies that experienced a growth takeoff at some point during the past 35 years had current account deficits of about 3 percent of GDP on average during the first eight years following the growth takeoff, compared with deficits averaging 6–7 percent of GDP in emerging Europe over the equivalent period. A similar pattern, albeit with a smaller difference, was also observed during the growth takeoffs of a number of countries

<sup>4</sup>The current account balance is the difference between national savings and gross investment.

<sup>5</sup>An argument that has been advanced to explain China's surplus is a high household saving rate, reflecting the lack of social safety nets or habit-based consumption. However, the recent rise in China's current account was associated with an increase in the corporate saving rate and not the household saving rate. Aziz and Cui (2007) argue that a declining labor income share—rather than an increasing household saving rate—has been the main factor behind the declining consumption share of GDP in China.

<sup>6</sup>Appendix 6.1 presents in more detail the criteria used to identify growth takeoffs and the countries and years during which these occurred.

in emerging Asia, with the exception of China.<sup>7</sup> In general, across growth takeoffs, the deepening of the current account deficit was associated with a surge in investment and a small offsetting increase in saving. By comparison, the takeoff in emerging Europe brought a larger acceleration in investment, an experience matched previously only by the takeoffs in the Asian Tigers during the early 1970s. Where emerging Europe stands out from the typical growth takeoff is with respect to the larger net inflows of FDI and the longer duration of deficit episodes.

Interestingly, the growth takeoffs identified here include a number of western European countries with earlier EU entry. These also experienced substantial current account deficits and net inflows of FDI, but on a much smaller scale than emerging Europe. This could partly reflect the fact that their capital accounts were only fully opened in the early 1990s, in most cases after their growth takeoffs.

The current account reversals in emerging Asia during the 1997–98 crisis also stand out relative to experiences in other crisis episodes. Compared with currency and banking crises that occurred since 1980, emerging Asian economies started from bigger deficits on average, and the adjustments in their current accounts and investment levels were much larger and much more abrupt (Figure 6.6).<sup>8</sup> Part of these large reversals were subsequently undone. However, five years after the crisis, surpluses remained higher than in the aftermath of other crisis episodes.

One common characteristic of both emerging Asian and emerging European economies is their high growth rates. Figure 6.7 suggests, consistent with theory, that among high-growth countries (that is, with growth in per capita GDP above 2 percent a year), those countries with higher growth rates tend to have lower current account balances. This negative correlation holds true across all economies, but also

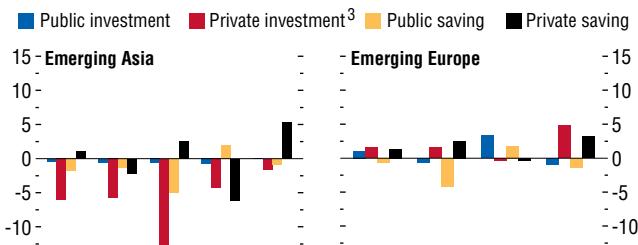
<sup>7</sup>See also Chapter 2 of the April 2004 *World Economic Outlook*.

<sup>8</sup>Dates for the start of currency and banking crises are from Laeven and Valencia (forthcoming).

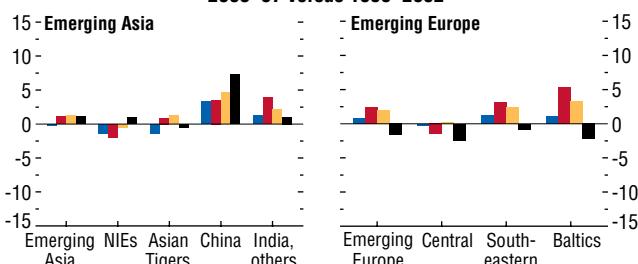
**Figure 6.4. Saving and Investment by Components<sup>1</sup>**  
(Percent of GDP; simple average)

The emergence of a large current account surplus in China in recent years is the result of a sharp increase in corporate saving. Household saving declined in both regions throughout the past decade and is especially low in emerging Europe.

**Change in Public and Private Saving and Investment:  
1999–2002 versus 1994–96<sup>2</sup>**



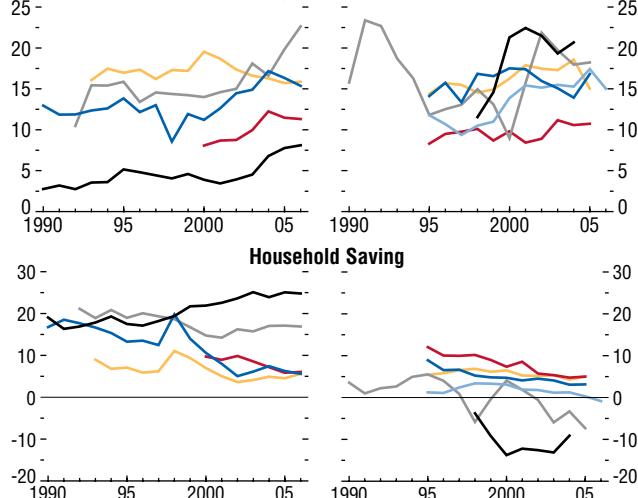
**2003–07 versus 1999–2002<sup>2</sup>**



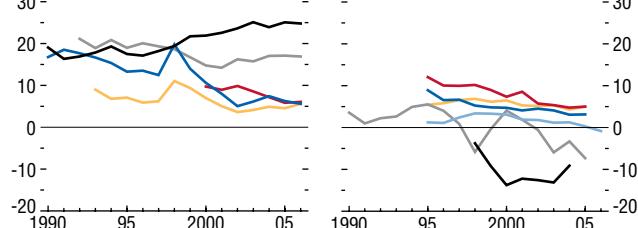
**Components of Private Saving Rates: 1990–2007**



**Corporate Saving**



**Household Saving**



Sources: CEIC Data Company Limited; IMF, *Balance of Payments Statistics*; UN National Account Statistics; and IMF staff calculations.

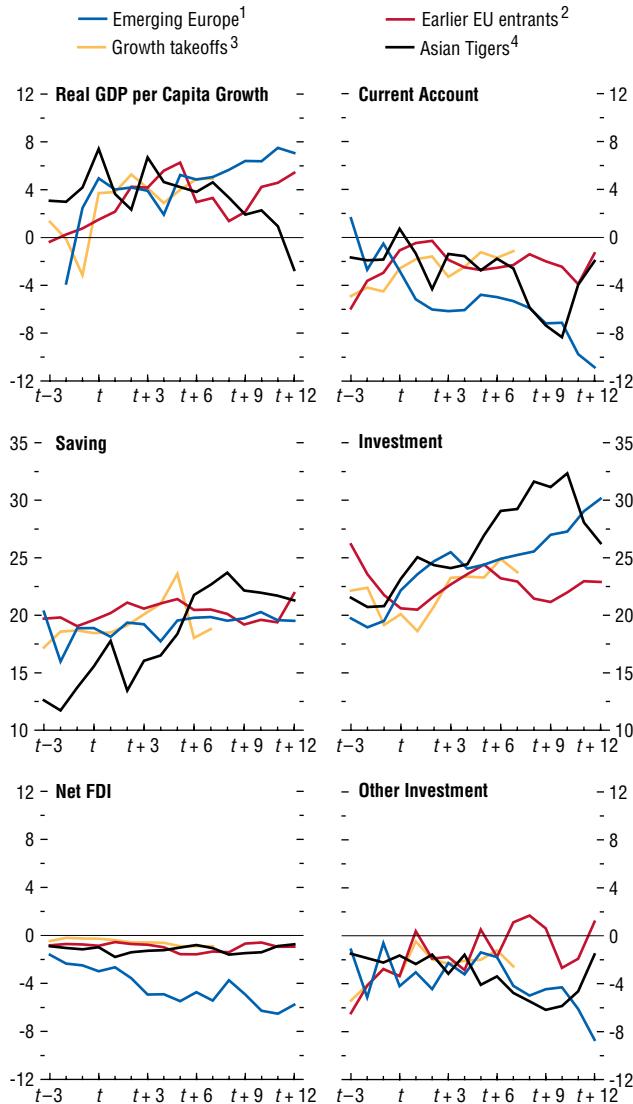
<sup>1</sup>See footnotes 1 and 2 in Figure 6.1 for regional breakdowns.

<sup>2</sup>Indonesia, Poland, and Slovenia are excluded from group averages because of missing data. As a result, data in Figure 6.4 do not add up to the levels in Figure 6.3.

<sup>3</sup>Private investment includes changes in inventories.

**Figure 6.5. Growth Takeoffs**  
(Percent of GDP, simple average; years before and after crisis on x-axis)

The growth takeoff in emerging Europe since 1995 was associated with larger current account deficits and significantly higher net FDI inflows relative to comparable growth takeoffs in other countries.



Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.

<sup>1</sup>The takeoff year for emerging Europe is assumed to be 1995.

<sup>2</sup>For earlier EU entrants the takeoff years are as follows: Greece (1996), Ireland (1985), Portugal (1985), and Spain (1984).

<sup>3</sup>Growth takeoff is defined as the onset of a growth acceleration characterized by an increase in the real per capita growth rate of at least 2 percent and an average growth rate of at least 3.5 percent sustained over an eight-year horizon based on Hausmann, Pritchett, and Rodrik (2005). The figure shows the median value for each variable across all growth accelerations (excluding those in emerging Europe).

<sup>4</sup>Asian Tigers comprise Indonesia, Malaysia, Philippines, and Thailand, for which the takeoff year is 1973.

within each emerging region (China is again a clear exception).<sup>9</sup> The available evidence about current account developments in the advanced economies when they were emerging in the late 19th and early 20th centuries indicates that capital flowed to high-growth countries (Box 6.3).

## What Factors Have Contributed to Recent Current Account Patterns?

The current account balances of emerging economies are affected by multiple factors.<sup>10</sup> This section looks closely at cross-country data relating the level of the current account balance to a broad set of variables that may be important in determining the current account balances of emerging Europe and emerging Asia. The empirical analysis first attempts to explain the current account developments solely based on standard factors that have been highlighted in the literature as important determinants of current account balances. These determinants include the government balance, youth and old-age dependency ratios, the net foreign asset position, and growth opportunities proxied by the initial income level and lagged growth.<sup>11</sup>

<sup>9</sup>This finding holds also if all emerging economies are included rather than only high-growth emerging economies. Excluding China, capital was flowing in aggregate to emerging economies. This evidence contrasts with the recent literature, which has found a positive correlation between growth and the current account (see, for instance, Prasad, Rajan, and Subramanian, 2007; and Gourinchas and Jeanne, 2007). One possible explanation is that many of these studies do not include countries of emerging Europe and include a large number of African countries, for which most capital inflows are official aid inflows and not private capital inflows driven by market considerations. Recent research suggests that aid inflows can have an ambiguous or even negative impact on growth by raising the exchange rate and curbing growth prospects for the tradables sector (see, for example, Rajan and Subramanian, 2005).

<sup>10</sup>See for instance, Aristovnik (2006), Chinn and Ito (2006), Gruber and Kamin (2007, 2008), and Herrmann and Jochem (2005).

<sup>11</sup>See Lee and others (2008). Growth opportunities are expected to lower the current account through higher investment and lower saving. Similarly, high dependency ratios will lower the current account by lowering saving. In contrast, a government surplus will raise the current

These variables explain a large share of current account patterns worldwide, but they are not able to account for the large surpluses in emerging Asia and the large deficits in emerging Europe. The empirical analysis then augments these standard factors with a set of additional variables that characterize financial sector developments that may have played a key role driving current account patterns during recent years.

Over the past 10 years, economies in emerging Europe have very rapidly liberalized their domestic financial systems and opened up their capital accounts (Figure 6.8).<sup>12</sup> The combination of these two liberalizations was reflected in a surge in the number of foreign banks in these countries.<sup>13</sup> Although emerging Asia also made some progress toward domestic financial liberalization, the financial systems of these economies remain much less liberal, with the exception of the NIEs. During the Asian crisis, the Asian Tigers and the NIEs also introduced restrictions on capital account transactions. More than 10 years later, capital accounts remain generally

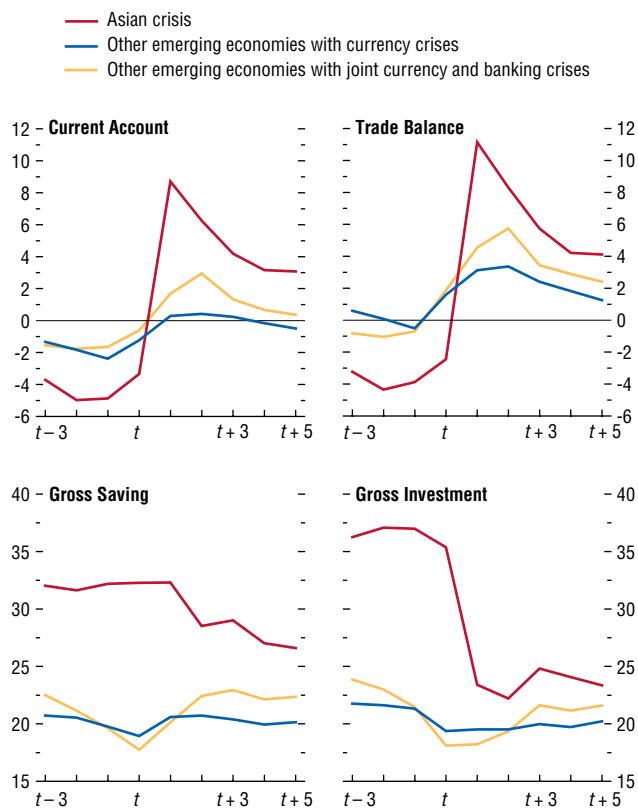
account if it is not fully offset by a decrease in private saving and/or a rise in private investment. Finally, higher net foreign assets are expected to raise the current account by increasing net investment income. The analysis also includes a dummy variable for financial centers as these typically export capital, the oil balance, and time effects to capture developments that affect similarly all countries in a given time period.

<sup>12</sup>This chapter uses an index of domestic financial liberalization that combines information on interest rate controls, credit controls, competition restrictions, state ownership, quality of the banking supervision and regulation, policies to encourage the development of bond and equity markets, and policies to permit access by foreigners to the domestic stock market (Abiad, Detragiache, and Tressel, forthcoming). The capital account openness index is from Chinn and Ito (2006). These two indices are highly correlated, in part because domestic financial liberalization includes a measure of entry barriers to foreign investors. The significance of these variables is thus tested jointly in the regressions.

<sup>13</sup>Another reason for the increase in foreign bank ownership is comparatively better growth opportunities for parent banks, which face tighter income conditions in their home markets. Ayden (forthcoming) finds that tight spreads—the difference between lending and deposit rates—for parent banks in their home markets are associated with an increase of lending by their subsidiaries operating in central and eastern Europe.

**Figure 6.6. Current Account Reversals around Crises<sup>1</sup>**  
(Percent of GDP, simple average; years before and after crisis on x-axis)

The adjustment of the current account during the Asian crisis was more abrupt compared with other crisis episodes. Five years after the crisis, a larger surplus remained in Asia than elsewhere.

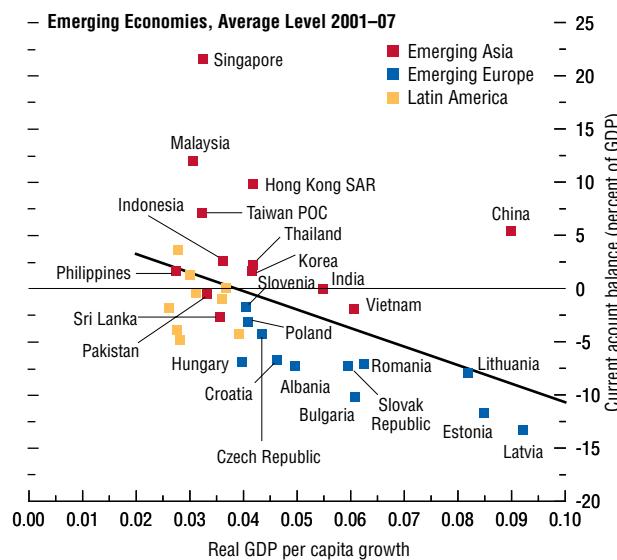


Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.

<sup>1</sup>Asian crisis countries include Indonesia, Korea, Malaysia, Philippines, and Thailand. Other emerging economies with crises comprise Argentina, Brazil, Mexico, Russia, and Turkey, for which 15 crisis episodes were identified based on Laeven and Valencia (forthcoming) over the period 1980–2007.

**Figure 6.7. Current Account Balance and Real GDP per Capita Growth<sup>1</sup>**

Fast-growing emerging economies tend to have lower current account balances.



Sources: IMF, *Balance of Payments Statistics*; and IMF staff calculations.

<sup>1</sup>Countries with less than 2 percent real GDP per capita growth are not shown.

very closed in these economies, with the exception of the NIEs.

Theory does not provide clear guidance on the sign of the net effect of financial sector liberalization and capital account openness on the current account. A more open capital account and a more developed financial system are likely to improve access to foreign capital for financing domestic investment, thereby lowering the current account.<sup>14</sup> However, a more liberalized domestic financial system with greater intermediation opportunities may also encourage domestic saving, with an opposite effect on the current account. On the other hand, domestic financial liberalization can also imply better access to credit and new financial products, which tends to reduce both domestic saving and the current account. Hence, the net effect of financial sector liberalization and capital account openness on the current account is uncertain and remains an empirical question.

Another financial factor that may affect the current account is the financial depth of the economy, measured by the share of credit to the private sector and stock market capitalization in GDP.<sup>15</sup> Greater financial depth could be a sign of a developed financial system, which would raise the current account if it stimulated domestic saving but could lower the current account if it attracts more foreign savings and thereby fuels domestic investment. Financial depth appears much greater in emerging Asia than in emerging Europe, although it has been increasing in both regions (with the exception of the Asian Tigers).

A factor that has received a lot of attention in the context of the Asian current account surpluses is exchange rate policy and preferences for accumulating reserves. However, it is difficult to find an exogenous measure of these policies, because the exchange rate and

<sup>14</sup>In case of a crisis or if the country is not well managed, a more open capital account could also be associated with more capital outflows.

<sup>15</sup>See Chinn and Prasad (2003), Gruber and Kamin (2007, 2008), and Chinn and Ito (2006) for analyses that include this measure (and capital account openness).

reserves are simultaneously determined with the current account balance. Hence, these factors are not part of this formal analysis, although some evidence is provided about their potential role in determining the size of emerging Asia's surpluses. Finally, the exchange rate regime itself (fixed versus flexible) could also affect the current account balance, with fixed exchange rate regimes potentially leading to (temporarily) larger imbalances in response to economic shocks. However, the direction of the effect is unclear, depending on the nature of the initial shock to the current account balance.

### Empirical Analysis

The empirical analysis focuses on determinants of the medium-run current account balance (averaging data over four-year periods) and covers a panel of 58 (non-oil-exporting) advanced and emerging economies during 1983–2006, including emerging Europe for the subperiod 1995–2006 (for data quality reasons; see Appendix 6.2 for more details).<sup>16</sup> It starts by estimating a standard model of the current account and then augments it with a set of financial variables and a measure of political structure.<sup>17</sup> Finally, special factors that have affected emerging Europe are introduced to reflect their specific circumstances.<sup>18</sup>

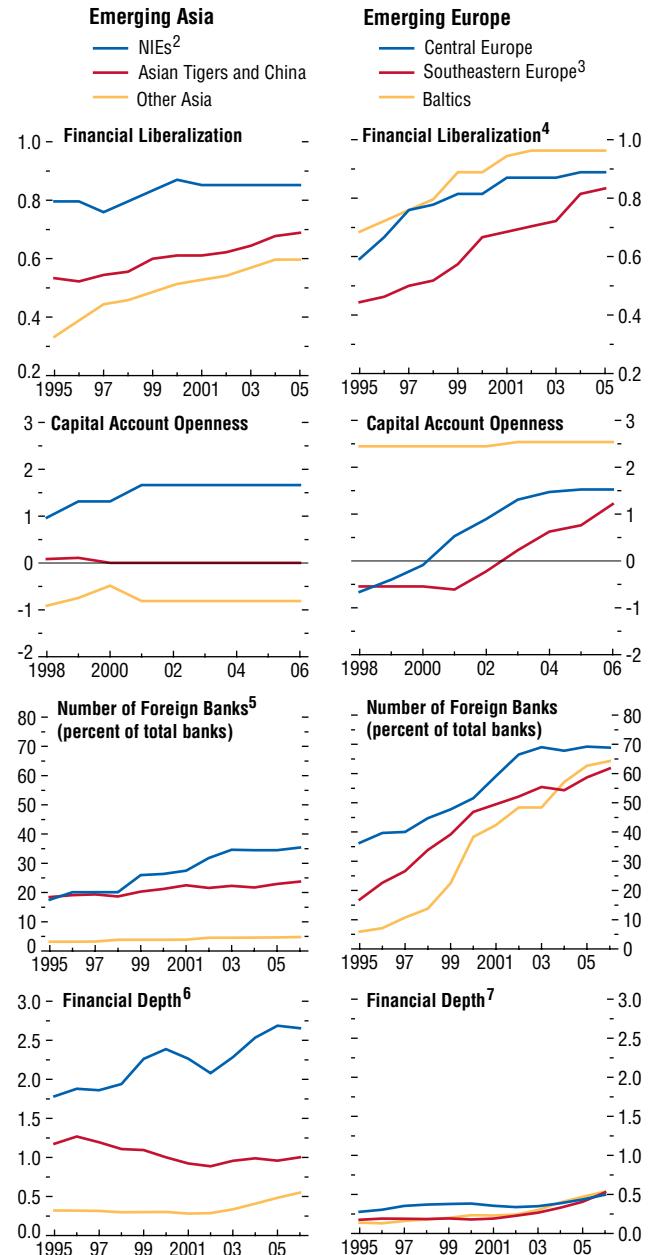
<sup>16</sup>The panel is unbalanced as the variables were not always available for all subperiods for all countries.

<sup>17</sup>The political structure index is the “Polity2” variable from the Polity IV Project (Marshall, Jagers, and Gurr, 2004). It covers a number of dimensions, including the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders and the existence of institutionalized constraints on the exercise of power by the executive.

<sup>18</sup>First, since the collapse of the Council for Mutual Economic Assistance (COMECON), most of these countries embarked on a process of EU integration involving greater macroeconomic stability and improved policies. Hence, progress toward EU integration may have given these countries privileged access to foreign capital. Second, investment needs in emerging Europe may have been especially large as the collapse of the COMECON led to a substantial depreciation of capital stocks while the labor force is well educated.

**Figure 6.8. Patterns of Financial Development<sup>1</sup>**

In emerging Europe domestic financial market liberalization proceeded faster than in emerging Asia (except for the newly industrialized Asian economies (NIEs), which were already at a more advanced stage). The opening up of capital accounts was associated with a rapid influx of foreign banks.



Sources: Abiad, Detragiache, and Tressel (forthcoming); Beck, Demirguc-Kunt, and Levine (2000, updated); Chinn and Ito (2006, updated); Claessens and others (2008); and IMF staff calculations.

<sup>1</sup>See Appendix 6.1 for a definition of variables. See footnotes 1 and 2 in Figure 6.1 for regional breakdowns.

<sup>2</sup>Excludes Taiwan POC.

<sup>3</sup>Excludes Macedonia, FYR.

<sup>4</sup>Excludes Croatia, Slovak Republic, and Slovenia.

<sup>5</sup>Excludes Pakistan and Sri Lanka.

<sup>6</sup>Excludes Vietnam.

<sup>7</sup>Excludes Albania.

### Box 6.3. Historical Perspective on Growth and the Current Account

#### *Current Accounts and Capital Flows: Sources, Size, and Persistence*

The global economy experienced a golden age of integration from the middle of the 19th century until World War I. Numerous factors underpinned the changes: better communications due to the diffusion of the telegraph and the railroad, massive declines in shipping costs, unparalleled mass migrations, the spread of the gold standard, the consolidation of the British Empire, and increasing sophistication of London's financial markets. The largest supplier of funds was Great Britain, which accounted for well over 50 percent of all capital outflows from the surplus countries.<sup>1</sup> Other capital exporters were France, Germany, and the Netherlands.

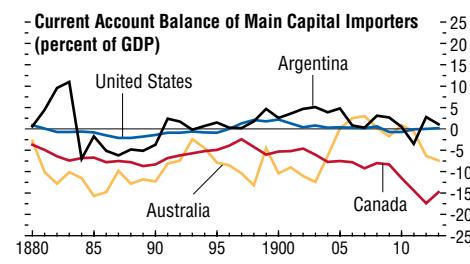
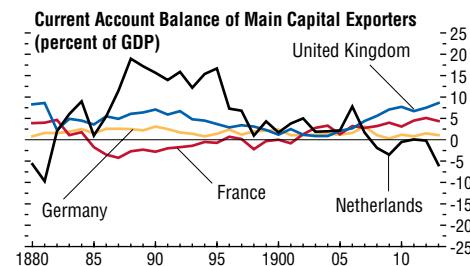
Controls on inflows had yet to be established. And investors were largely left alone to decide where to send their capital, although in some cases political aims in the surplus countries determined the direction of capital flows. The panels of the figure show the current account for surplus countries (or gross capital outflows) between 1870 and 1913 and for the principal capital importers: Argentina, Australia, Canada, and the United States (see Stone, 1999).

Capital inflows were often very persistent. Many of the important capital-importing countries sustained current account deficits for a decade or longer. Other countries that were on more fragile financial footing experienced more short-lived deficits. Meissner and Taylor (2006) estimate that extensive capital importers, such as Argentina, Australia, Canada, and the United States, sustained deficits for long periods, with half-lives for current account deficits of about three years compared with half-lives of roughly three-fourths of a year in

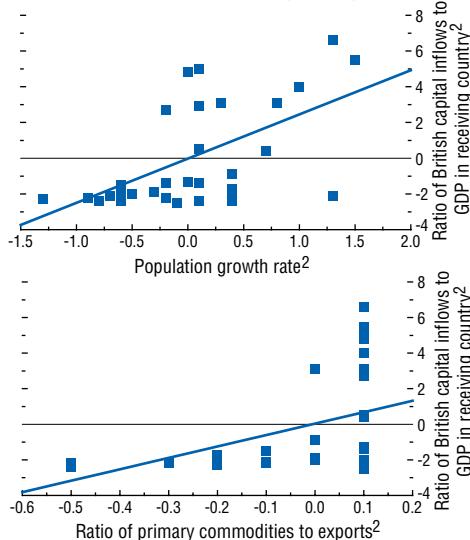
The main author of this box is Christopher M. Meissner.

<sup>1</sup>See Obstfeld and Taylor (2004) for a long-run overview of capital markets; O'Rourke and Williamson (1999) for a historical examination of the first period of globalization; López Córdova and Meissner (2003) on the gold standard and trade, and Mitchener and Weidenmier (forthcoming) on the British Empire and trade.

#### **Capital Flows and Motivations for Capital Exports, 1865–1913**



#### **Determinants of British Capital Exports<sup>1</sup>**



Sources: Clemens and Williamson (2004); and Bordo, Cavallo, and Meissner (2007).

<sup>1</sup>Includes Argentina, Australia, Austria, Brazil, Canada, Chile, Denmark, Egypt, Finland, Greece, Italy, India, Japan, Netherlands, New Zealand, Norway, Portugal, Russia, South Africa, Spain, Sweden, the United States, and Uruguay.

<sup>2</sup>Difference from mean.

smaller recipient countries (such as Chile, Finland, Japan, and Uruguay).

#### *Determinants of Capital Flows*

Argentina, Australia, Canada, and the United States were the main recipients of British capital flows. Capital from France and Germany went primarily to Russia, Turkey, and other European countries. Recent research by Clemens and Williamson (2004) on the motivations for British capital outflows finds that long-term growth prospects mattered most to investors. Capital was most likely to flow toward areas with high population growth rates and high rates of net immigration, areas that focused on exports of commodities based on significant natural resource endowments, and where the population was better educated (see bottom figure panels). Imperial relations, default history, and monetary stability were additional factors that accounted for a small fraction of the observed inflows. Similar economic motivations also played a dominant role for other capital exporters, such as Germany (Esteves, 2008).<sup>2</sup>

In the major recipients such as Canada, Argentina, and Australia, inflows supplemented low rates of domestic saving. Investment was predominantly directed toward key infrastructure projects (railroads, harbors, municipal services) and helped raise productive capacity. Countries with smaller inflows tended to use foreign capital for consumption purposes and to supplement or smooth low government revenues.<sup>3</sup> Many of these countries also had

<sup>2</sup>This finding challenges a long-held conviction that French and German capital flows were significantly determined by the political exigencies of Paris or Berlin.

<sup>3</sup>Investors in the first wave of globalization used many public sources to gain information about the quality of their investments. The *Fenn on the Funds* investors' manual provided short excerpts from past bond prospectuses for each and every sovereign borrower on the London market. Examples of such excerpts from countries that borrowed to plug revenue gaps or to fund costly wars included Russia (an issue to strengthen the special reserve fund), Japan (to pay charges on pensions), Egypt (Pasha loan for

considerable amounts of bond issues dedicated to unspecified purposes.

#### *Sustainability of Capital Flows and Financial Crises*

Some of these large capital inflows ended abruptly with financial crises that temporarily brought growth below long-run trend rates (Catão, 2007). Bordo, Cavallo, and Meissner (2007) show that sudden stops or turnarounds in capital flows are associated with previously high levels of capital inflows and foreign currency exposure. By contrast, strong reserve positions, high export growth, and close political ties with the lender lower the likelihood of a sudden stop in capital inflows in any given year. In particular, larger borrowers with financial credibility or ties to the British Empire (such as Canada) were able to sustain capital inflows even at times of low international liquidity.

Experiences after a crisis differ significantly, but were more severe in less open economies and in countries with underdeveloped financial sectors. The experiences of Argentina and Australia in the early 1890s exemplify this. Argentina had a major banking, currency, and debt crisis in 1890 known as the Baring crisis.<sup>4</sup> Default settlement was not concluded for several years, and a weak financial system and low credibility with international investors suppressed foreign investment for another decade. Around the same time, Australia also had a major banking crisis that lasted for several years.<sup>5</sup> Nevertheless, the component colonies never defaulted on their external obligations, and their credibility as borrowers helped them avoid a currency crisis.<sup>6</sup>

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repayment of existing debt), and Austria (an issue in 1851 to improve the value of the paper florin).

<sup>4</sup>The crisis started because of overly optimistic investment by the Baring Brothers Bank based in London, but it also witnessed an early credit boom generated by a small and poorly regulated domestic banking sector. It ended with a major banking crisis, a currency crash, and a debt default.

<sup>5</sup>The crisis in Australia was triggered by a drought, coupled with an earlier credit boom.

<sup>6</sup>Australia did not issue its own currency at that time, but private bank notes were allowed to become

**Box 6.3 (*concluded*)**

Although the Australian economy recovered only slowly, a rise in domestic saving was able to repay previous debts and stimulate investment.

***Conclusions***

The period between 1870 and 1913 witnessed historically unprecedented levels of international capital flows. These flows were often

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legal tender during the crisis.

long-lasting and financed key infrastructure projects in many large and credible borrowing countries. They were for the most part driven by the desire of investors in industrial countries to invest in fast-growing countries with strong growth prospects, and there were no examples of capital flowing uphill. There were several episodes of disastrous financial crises, in the wake of sudden stops of capital, especially when financial development was weak and countries were less open to trade.

The standard model fits the data well overall but explains only a small part of the pattern of current account balances in emerging Asia and emerging Europe (Table 6.1, column a).<sup>19</sup> In emerging Asia for the subperiod 2003–06, it would predict a current account balance below the sample average by 1.4 percentage points of GDP, whereas the current account balance was actually above the sample average by 3.3 percentage points.<sup>20</sup> Similarly, in emerging Europe, the model would predict a current account balance only moderately below the sample average, by 1.8 percentage points of GDP, whereas the actual current account balance over the subperiod 2003–06 was 7.4 percentage points of GDP below the sample average.

The preferred model, including the financial factors and special effects for emerging Europe, has a much better fit, especially for emerging Europe.<sup>21</sup> Based on the preferred model (shown in column e of Table 6.1), the main contributing factors to the large deficits in emerging Europe have been the financial variables, accounting

for 4.6 percentage points (about 60 percent) of the 7.4 percentage point deficit (deviation from sample average) (Figure 6.9). Among these variables, domestic financial liberalization is the factor with the largest impact by far.<sup>22</sup> Growth opportunities—defined as the scope for convergence through a low initial per capita income level and a high recent growth performance—contributed a further percentage point to the deficit. Other minor factors included low net foreign assets, the fiscal balance, and a negative oil balance. After allowing for special European effects (described below), the unexplained residual for the region as a whole is less than half a percentage point.

In emerging Asia, structural factors are found to have helped raise the current account, but the impact is offset by other factors (in particular high growth opportunities). Thus, about 75 percent of the current account surplus remains unexplained. Structural factors that have contributed to the current account surplus include the lack of financial liberalization, younger populations, and lower values for the

<sup>19</sup>The dummy variables for post-crisis emerging Asia and emerging Europe remain large and highly significant.

<sup>20</sup>This calculation is based on the final model reported in column e of Table 6.1 and sums the contributions of the standard structural factors.

<sup>21</sup>There remains a large and statistically significant dummy variable for emerging Asia in the aftermath of the 1997–98 crisis.

<sup>22</sup>The effect of domestic financial liberalization also captures the removal of entry barriers to foreign capital. The high openness of the capital account also lowers the current account, as does the relatively low level of financial development in emerging Europe (presumably by depressing saving). However, the magnitudes of these two other effects are very small.

**Table 6.1. Determinants of the Current Account Balance<sup>1</sup>**

(Percent of GDP)

|   | Standard Model       | Standard Plus Financial Factors | Standard Plus Financial Factors and Emerging Europe Factors |                      |                     |
|---|----------------------|---------------------------------|---|----------------------|---------------------|
|   | (a)                  | (b)                             | (c)   | (d)                  | (e)                 |
| <b>Standard variables</b>   |                      |                                 |   |                      |                     |
| Net foreign assets (percent of GDP, lagged)                               | 0.040<br>(5.29)***   | 0.035<br>(4.37)***              | 0.036<br>(4.47)***  | 0.035<br>(4.32)***   | 0.035<br>(4.45)***  |
| General government balance (percent of GDP)                               | 0.055<br>(0.87)      | 0.07<br>(1.08)                  | 0.108<br>(1.59)   | 0.115<br>(1.66)*     | 0.118<br>(1.77)*    |
| Oil balance   | 0.247<br>(3.17)***   | 0.226<br>(3.07)***              | 0.229<br>(3.11)***  | 0.232<br>(3.13)***   | 0.231<br>(3.16)***  |
| Old-age dependency ratio  | -0.234<br>(-3.04)*** | -0.178<br>(-2.27)**             | -0.143<br>(-1.80)*  | -0.136<br>(-1.69)*   | -0.134<br>(-1.68)*  |
| Population growth   | -0.755<br>(-1.77)*   | -0.755<br>(-1.88)*              | -0.727<br>(-1.80)*  | -0.682<br>(-1.65)    | -0.681<br>(-1.69)*  |
| Growth opportunities:   |                      |                                 |   |                      |                     |
| Relative income per capita (lagged)                                       | 5.162<br>(3.33)***   | 6.693<br>(3.69)***              | 5.679<br>(3.06)***  | 5.622<br>(3.00)***   | 5.582<br>(3.03)***  |
| Growth of GDP per capita (lagged)   | -0.135<br>(-1.89)*   | -0.181<br>(-2.64)**             | -0.173<br>(-2.58)**   | -0.162<br>(-2.25)**  | -0.167<br>(-2.59)** |
| <b>Financial factors and political structure</b>                          |                      |                                 |   |                      |                     |
| Financial depth (percent of GDP, lagged)                                  | 0.839<br>(1.66)*     | 0.795<br>(1.58)                 | 0.804<br>(1.59)   | 0.820<br>(1.64)      |                     |
| Financial liberalization  | -3.034<br>(-1.85)*   | -2.699<br>(-1.64)               | -2.719<br>(-1.65)   | -2.743<br>(-1.68)*   |                     |
| Capital account openness  | -0.278<br>(-1.49)    | -0.239<br>(-1.24)               | -0.233<br>(-1.20)   | -0.229<br>(-1.25)    |                     |
| Joint significance of financial variables ( <i>p</i> -value)              | 0.01**               | 0.04**                          | 0.04**  | 0.03**               |                     |
| Political structure   | -0.140<br>(-3.45)*** | -0.145<br>(-3.55)***            | -0.145<br>(-3.50)***  | -0.146<br>(-3.54)*** |                     |
| <b>Emerging Europe factors</b>  |                      |                                 |   |                      |                     |
| General government balance interacted with emerging Europe dummy variable |                      | -0.642<br>(-4.58)***            | -0.108<br>(-0.28)   |                      |                     |
| Financial liberalization interacted with emerging Europe dummy variable   |                      | -4.739<br>(-0.82) <sup>2</sup>  | -3.883<br>(-1.54)   | -4.484<br>(-4.47)*** |                     |
| General government balance interacted with EU integration                 |                      |                                 | -1.123<br>(-1.62)   | -1.319<br>(-5.32)*** |                     |
| Financial liberalization interacted with EU integration                   |                      |                                 | -0.077<br>(-0.01)   |                      |                     |
| EU integration  |                      |                                 | -1.182<br>(-0.09)   |                      |                     |
| <b>Regional factors (unexplained effects)</b>                             |                      |                                 |   |                      |                     |
| Emerging Europe dummy variable  | -4.096<br>(-4.45)*** | -3.515<br>(-3.94)***            | 0.074<br>(0.01) <sup>2</sup>                                |                      |                     |
| Asian crisis shift  | 2.921<br>(3.66)***   | 2.352<br>(2.79)***              | 2.430<br>(2.90)***  | 2.479<br>(2.89)***   | 2.518<br>(3.03)***  |
| Observations  | 215                  | 215                             | 215   | 215                  | 215                 |
| Adjusted <i>R</i> -squared  | 0.54                 | 0.57                            | 0.58  | 0.58                 | 0.59                |

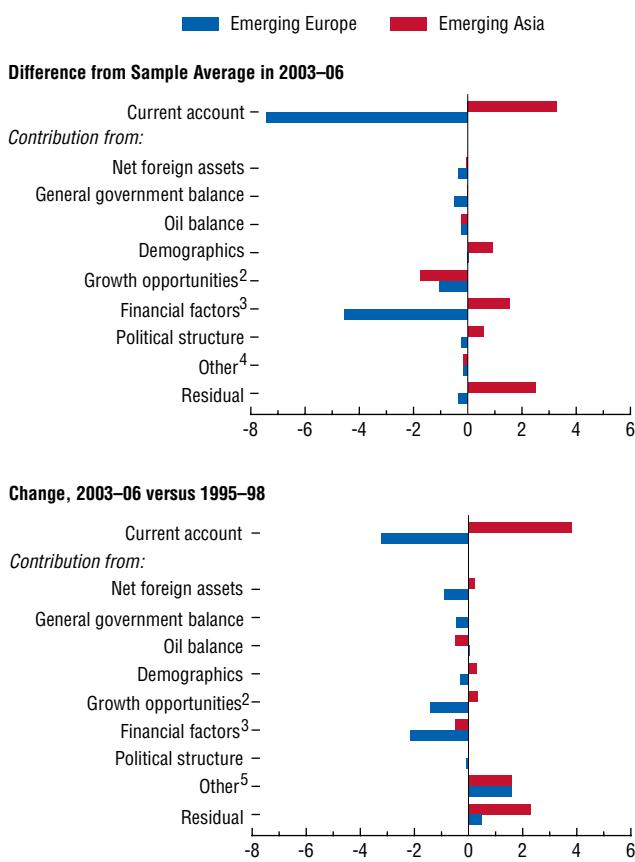
Source: IMF staff calculations.

<sup>1</sup>Robust *t* statistics are in parentheses; \*, \*\*, and \*\*\* denote significance at the 10 percent, 5 percent, and 1 percent level, respectively. All regressions include a constant, a dummy variable for financial-center and time-fixed effects. The regressions are estimated by ordinary least squares.

<sup>2</sup>Jointly significant at the 1 percent level.

**Figure 6.9. Explaining the Current Account Balances of Emerging Asia and Emerging Europe<sup>1</sup>**  
(Percent of GDP)

The current account deficits of emerging Europe are mainly explained by financial factors, whereas a large portion of the surpluses in Asia remains unexplained by standard factors.



Source: IMF staff calculations.

<sup>1</sup>The contribution of each variable in the top (bottom) panel is computed as the deviation of the variable from the sample average (the change in the variable between 1995–98 and 2003–06) times the regression coefficient of the variable from column e of Table 6.1. See Appendix 6.2 for countries included in regional breakdowns.

<sup>2</sup>The contribution of growth opportunities is the sum of the contributions of relative per capita income and growth of per capita GDP.

<sup>3</sup>The contribution of financial factors is the sum of the contributions of financial liberalization, capital account openness, and financial depth.

<sup>4</sup>"Other" is the contribution of a dummy variable for financial centers.

<sup>5</sup>"Other" is the contribution of time-fixed effects.

political structure index, with respective contributions at 1.6, 0.9, and 0.6 points. These factors were partly offset by high growth opportunities, which contributed to lower the current account balance by 1.8 points, and a negative oil balance (as well as a number of other minor factors).

The decomposition of the change in current accounts over time reveals a similar picture: financial liberalization and growth opportunities largely explain the widening of current account deficits in emerging Europe, but the increase in the current account surplus in emerging Asia remains largely unexplained. For both regions, developments in the rest of the world contributed to raise the current account balance.

### Special Factors in Emerging Europe

What are the special factors at work in emerging Europe? To explore this, the preferred model allows for separate regression coefficients for emerging Europe, thereby reducing the emerging Europe dummy to zero (see Table 6.1, column c). The main differentiated effects stem from the fiscal balance and financial liberalization. First, financial liberalization is found to have a more pronounced impact on current account balances in emerging Europe than in the rest of the sample. Therefore, the large contribution of financial liberalization to the current account deficits in emerging Europe reflects both a higher level of financial liberalization and a more pronounced impact on the current account of a given degree of financial liberalization. Second, although a government surplus raises the current account for the sample as a whole (although not very significantly in a statistical sense), it lowers the current account in emerging Europe.

One possible explanation for these differentiated effects is the process of EU integration that most countries in emerging Europe undertook after the collapse of their trade ties with the former Soviet Union.<sup>23</sup> EU integration

<sup>23</sup>See Herrmann and Winkler (2008) for a discussion of the role of European economic integration in current

was a major factor behind financial liberalization, as reflected in the large and rising western European ownership of banks in the region. Progress toward EU integration also involved greater fiscal discipline—one of the Maastricht criteria—which may have given these countries privileged access to foreign capital by signaling greater macroeconomic stability and improved policies. In order to test this hypothesis, a measure of the degree of European integration is built as a score for achieving different stages of the formal integration process, namely EU membership application, initiation of negotiation for EU membership, EU accession, entry into ERM II, and euro adoption.

Interacting the government balance variable with this measure of progress toward EU integration supports this interpretation: the negative impact of a fiscal surplus on the current account is stronger the closer the country is to EU accession (it makes the interaction with the simple dummy variable for emerging Europe insignificant) (see Table 6.1, column d). A smaller government deficit provides confidence to foreign investors of progress toward EU accession and lowers the risk premium as the integration process advances.<sup>24</sup> The divergent fiscal performance between the Baltics and southeastern Europe, which have improved their fiscal position, and central Europe, where the fiscal position has deteriorated, explains much of the current account variation within emerging Europe (Figure 6.10).<sup>25</sup>

In contrast, the differentiated effect of financial liberalization on the current account balance of emerging Europe is not directly related to the institutional measure of European inte-

account deficits in emerging Europe. As in this analysis, they identify region-specific effects that have led to the emergence of what they refer to as “convergence clubs.”

<sup>24</sup>Another possible explanation is a procyclical response of the fiscal balance to the economic boom fueled by foreign capital inflows, which may be especially large in emerging Europe.

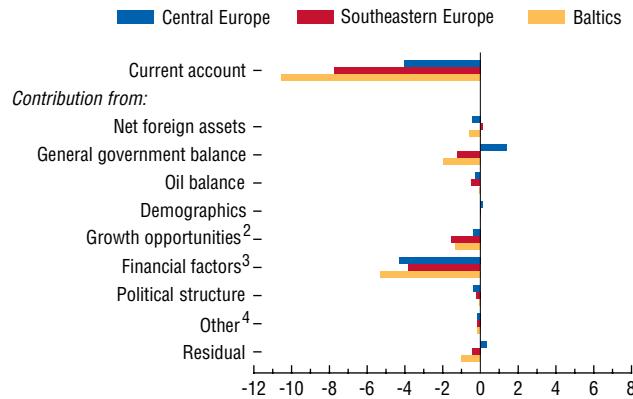
<sup>25</sup>Because opposite fiscal developments occurred in the various subregions of emerging Europe, this factor is however not a main contributor to the aggregate deficit position of emerging Europe.

**Figure 6.10. Explaining Current Account Balances:  
Results by Subregion<sup>1</sup>**

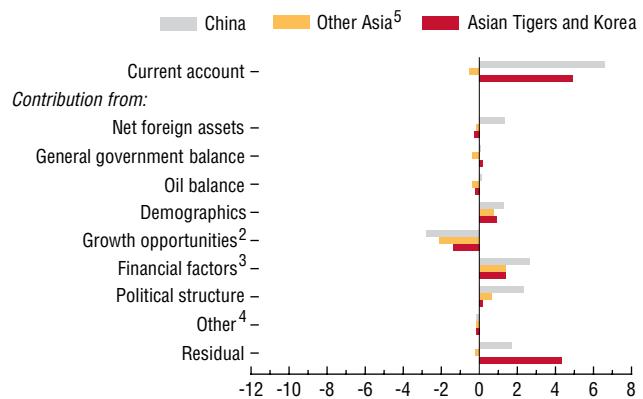
(Percent of GDP; difference from sample average in 2003–06)

Within emerging Europe regional differences are explained mainly by diverging fiscal performances. In emerging Asia, regional differences are largely unexplained by structural factors.

#### Emerging Europe



#### Emerging Asia



Source: IMF staff calculations.

<sup>1</sup>The contribution of each variable is computed as the deviation of the variable from the sample average times the regression coefficient of the variable from column e of Table 6.1. See Appendix 6.2 for countries included in regional breakdowns.

<sup>2</sup>The contribution of growth opportunities is the sum of the contributions of relative income per capita and of per capita GDP growth.

<sup>3</sup>The contribution of financial factors is the sum of the contributions of financial liberalization, capital account openness, and financial depth.

<sup>4</sup>“Other” is the contribution of a dummy variable for financial centers.

<sup>5</sup>Excludes Vietnam due to data availability.

gration. However, there is some evidence that the broad entry of foreign banks, which characterized the process of financial liberalization in these countries, may account for the more pronounced impact on the current account, because foreign banks may have drawn more foreign capital with them and, more generally, may have facilitated better access to foreign capital (see Appendix 6.2).<sup>26</sup>

### Explaining the Residual Current Account Surplus in Emerging Asia

Although the model achieves some success in explaining the current account deficits of emerging Europe with structural factors, in particular domestic financial liberalization, the surpluses in post-crisis emerging Asia remain largely unexplained, even after augmenting standard structural factors by financial variables.<sup>27</sup> Within emerging Asia, most of the structural factors, including growth opportunities, financial liberalization, political structure, and demography, had a similar impact on the current account balances of the various sub-regions, though they had a somewhat larger impact on China's current account balance (see Figure 6.10). However, a large fraction of

<sup>26</sup>Abiad, Leigh, and Mody (2007) find that financial integration played an important role in explaining the current account deficits in emerging Europe. Herrmann and Winkler (2008) also find evidence that the presence of foreign banks was an important contributor in explaining the difference between the current account balances of emerging Asia and emerging Europe. Mihaljek (2007) finds that foreign banks played an important role in the rising credit growth in central and eastern European economies by introducing new products, improving financial sector efficiency, and strengthening risk management.

<sup>27</sup>Additional variables were tested but were not statistically significant. These included the share of employment in agriculture and the productivity differential between agriculture and the rest of the economy (to capture the large pool of underemployed labor in emerging Asia), the share of subsidies and social transfers in GDP (as a proxy for social safety nets), an index of terms of trade and the standard deviation of this index (as a motive for precautionary saving), a measure of trade openness, the exchange rate regime, and a variable indicating the start of banking crises.

the current account surplus in the Asian Tigers (including Korea) and, to a lesser extent, in China is left unexplained by the structural factors. One factor often mentioned to explain the large surpluses in emerging Asia is the valuation of exchange rates. A measure of the deviation of the real effective exchange rate from its predicted level suggests that, since the Asian crisis, the Asian Tigers and China have had declining or low exchange rates relative to the predicted levels, although some correction has taken place since 2003 (Figure 6.11).<sup>28</sup> Low-income Asian countries, on the other hand, have had low but appreciating exchange rates during most of the period. Various reasons for the low and/or declining exchange rates have been advanced, such as a desire to accumulate large reserves for precautionary motives, which may have been relevant for the crisis countries for some time following the Asian crisis, and a growth model based on exports (Aizenman, 2006, 2007; Becker and others, 2007; Cheung and Qian, 2007; and Jeanne, 2007).<sup>29</sup>

There is a clear negative correlation between the unexplained component of the current

<sup>28</sup>The real effective exchange rate deviation is based on the equilibrium real exchange rate approach developed as part of the IMF Consultative Group on Exchange Rate Issues (CGER) assessment and is calculated as the residual from a regression of the consumer price index (CPI)-based real effective exchange rate on the productivity differential between tradables and nontradables (to capture the Balassa-Samuelson effect), other factors affecting relative prices (government consumption, trade restriction index, price controls, and commodity terms of trade), and net foreign assets (see Lee and others, 2008). The advantage of using the residual from the equilibrium real exchange rate approach is that, unlike a quantity-based measure of deviation from equilibrium, it does not use information about the size of the current account.

<sup>29</sup>Cheung and Qian (2007) find evidence of competitive hoarding of reserves in emerging Asia aimed at preventing a real exchange rate appreciation and hence a loss in competitiveness. Controlling for conventional variables, they estimate that a \$1 increase in international reserves by one country has been associated with an increase of about \$0.6 by the other countries in the region. Zhang (forthcoming) argues that the increase in the Chinese current account and, in particular, in corporate saving partly reflects disguised capital inflows (through over-invoicing for exports) in anticipation of an appreciation of the currency.

account balance—after structural factors have been taken into account—and the deviation of the exchange rate from its predicted level, suggesting that a low exchange rate is associated with a higher current account balance (Figure 6.12).<sup>30</sup> There is also a positive but weaker correlation between the stock of reserves (a proxy of preferences for reserve accumulation) and the current account balance. A simple regression (not shown) confirms that the deviation of the exchange rate from its predicted level and (to a lesser extent) the high stock of reserves cut the unexplained current account surplus in emerging Asia in half, to about 1 percentage point of GDP.

However, such simple regressions do not give reliable results on causality because the deviation of the exchange rate from its predicted value is not truly exogenous, but is rather jointly determined with the current account. Therefore, it is hard to discern whether the low and/or declining exchange rates in emerging Asia were the result of deliberate policy action or the endogenous outcome of unidentified fundamental factors which are omitted from the current account model and which impacted both the current account and the exchange rate. An exogenous measure of exchange rate policy is difficult to obtain.

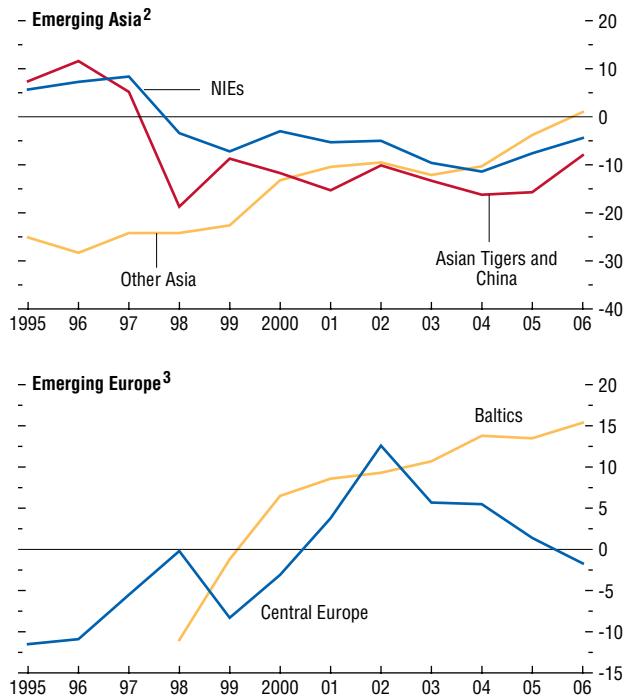
## Sustainability of Current Account Imbalances

The large and long-lasting current account imbalances in emerging Europe and emerging Asia prompt two questions: How long can these imbalances be sustained? And are they likely to end abruptly or be resolved smoothly? The current account deficits of emerging Europe can largely be explained by structural and financial variables, but this does not mean that the defi-

<sup>30</sup>The semi-elasticity of the current-account-to-GDP ratio to the exchange rate is proportional to the country's trade openness (Lee and others, 2008). Therefore, the measure of exchange rate deviation was interacted with the ratio of the sum of exports and imports (adjusted for trade in intermediate goods) to GDP.

**Figure 6.11. Deviation from Predicted Real Effective Exchange Rates<sup>1</sup> (Percent)**

Relative to predicted levels, exchange rates in emerging Asia were undervalued in recent years, while they were overvalued in emerging Europe. More recently, exchange rates returned to equilibrium levels in central Europe, while the deviation from predicted levels increased in the Baltics.



Source: IMF staff calculations.

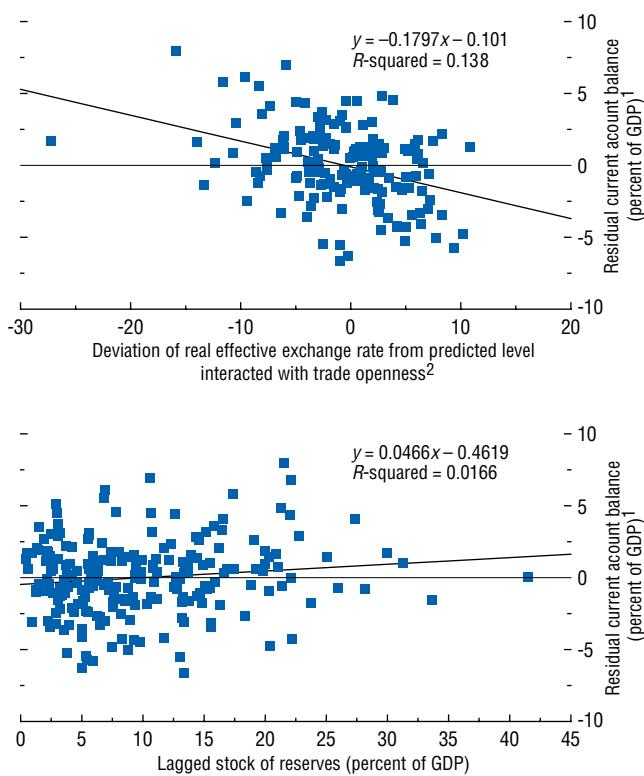
<sup>1</sup>Based on the equilibrium real exchange rate approach developed as part of the IMF CGER assessment (Lee and others, 2008).

<sup>2</sup>NIEs are Hong Kong SAR, Korea, and Singapore. Asian Tigers are Indonesia, Malaysia, Philippines, and Thailand. Other Asia includes India and Pakistan.

<sup>3</sup>Central Europe includes Czech Republic, Hungary, Poland, and Slovak Republic. Comparable data were not available for southeastern Europe.

**Figure 6.12. Residual Current Account Balance, Deviation of Real Effective Exchange Rate from Predicted Level and Stock of Reserves**  
(Percent of GDP unless noted otherwise)

A low exchange rate and a high stock of reserves, possibly reflecting preferences for reserve accumulation, are associated with a higher residual current account balance.



Sources: IMF, *Balance of Payments Statistics*; IMF, *International Financial Statistics*; Lee and others (2008); and IMF staff calculations.

<sup>1</sup>The residual current account balance is the unexplained current account balance once structural factors are accounted for, based on the regression in column e of Table 6.1.

<sup>2</sup>Trade openness is measured as the ratio of the sum of exports and imports (adjusted for trade in intermediates) to GDP.

cits are sustainable indefinitely. The rapid opening of the financial sector in emerging Europe has not only accelerated access to capital, it has also facilitated a credit boom, with the attendant risk that funds are being channeled to less productive uses (Duenwald, Gueorguiev, and Schaechter, 2005; and Rioja and Valev, 2004).

The chapter identifies and analyzes a number of historical episodes of large, persistent surpluses and deficits in order to draw lessons as to the likely persistence of the current imbalances in emerging Europe and emerging Asia.<sup>31</sup>

Large, persistent current account imbalances are defined as current account deficits or surpluses that exceed 3 percent of GDP for at least three years, provided that no large reversal occurs during that period.<sup>32</sup> Using this criterion, there were 69 deficit episodes and 15 surplus episodes during 1960–2007, with a higher incidence during 1990–2005 (Figure 6.13; see Appendix 6.2 for a list of all episodes). Interestingly, while the vast majority of current account deficits in emerging Europe qualify as large and persistent imbalances, only Malaysia and China meet the criteria for a large and persistent surplus in the aftermath of the Asian crisis.<sup>33</sup> Deficit episodes are further separated according to whether or not they were resolved abruptly, with abrupt endings characterized by an improvement of the current account of 4 percentage points of GDP in the year following the end of

<sup>31</sup>There are few empirical studies of the persistence of current account imbalance episodes in emerging economies. Edwards (2007) reports that large current account surpluses exhibit little persistence. Aizenman and Sun (2008) find that the length of current account deficits is negatively related to the relative size of the deficit.

<sup>32</sup>See Appendix 6.2 for a detailed description of the methodology, which is based on the adjustment algorithm developed in Chapter 3 of the April 2007 *World Economic Outlook*. The criteria are similar to the ones used to define large reversals in the literature (see, for example, Freund and Warnock, 2005).

<sup>33</sup>Large, persistent surpluses are also identified for some of the NIEs. However, these are no longer considered emerging economies, and Singapore and Hong Kong SAR differ because they are financial centers.

the episode.<sup>34</sup> About one-third of the completed deficit episodes ended abruptly.

The surplus episodes in China and Malaysia are historically atypical. There have been few large, persistent current account surpluses—they account for only one-quarter of all persistent imbalance episodes—and they occurred primarily in advanced economies. Earlier studies also find abrupt adjustments of surplus episodes to be rare (Edwards, 2007).<sup>35</sup> The remainder of this section therefore focuses on deficit episodes, which are by far the most common type of large, persistent imbalances, especially in emerging economies.<sup>36</sup>

The ongoing deficits in emerging Europe stand out, because of both their length and their magnitude (Figure 6.14). On average, current account deficits in emerging Europe have lasted 9½ years, about 3 years longer than in other emerging economies, and most of these episodes are still ongoing. Interestingly, the historical evidence shows that longer deficits are not necessarily more shallow than shorter ones (with the ongoing episodes in emerging European countries clearly fitting this pattern); they also are no more likely to end abruptly.<sup>37</sup> This may reflect the fact that persistent deficits can also be a sign of economic strength, reflecting an abundance of investment opportunities or a catch-up in productivity, which attract larger inflows of foreign capital and lead ultimately to a smooth resolution.<sup>38</sup>

<sup>34</sup>For a similar definition, see Edwards (2007).

<sup>35</sup>Chapter 3 of the April 2007 *World Economic Outlook* finds that surplus reversals in advanced and emerging economies were associated with accelerations in GDP growth and with real exchange rate appreciations.

<sup>36</sup>This pattern is consistent with the notion of capital flowing downhill to countries with greater growth opportunities and with recent findings in the literature (see *World Economic Outlook*, April 2007, and Edwards, 2007).

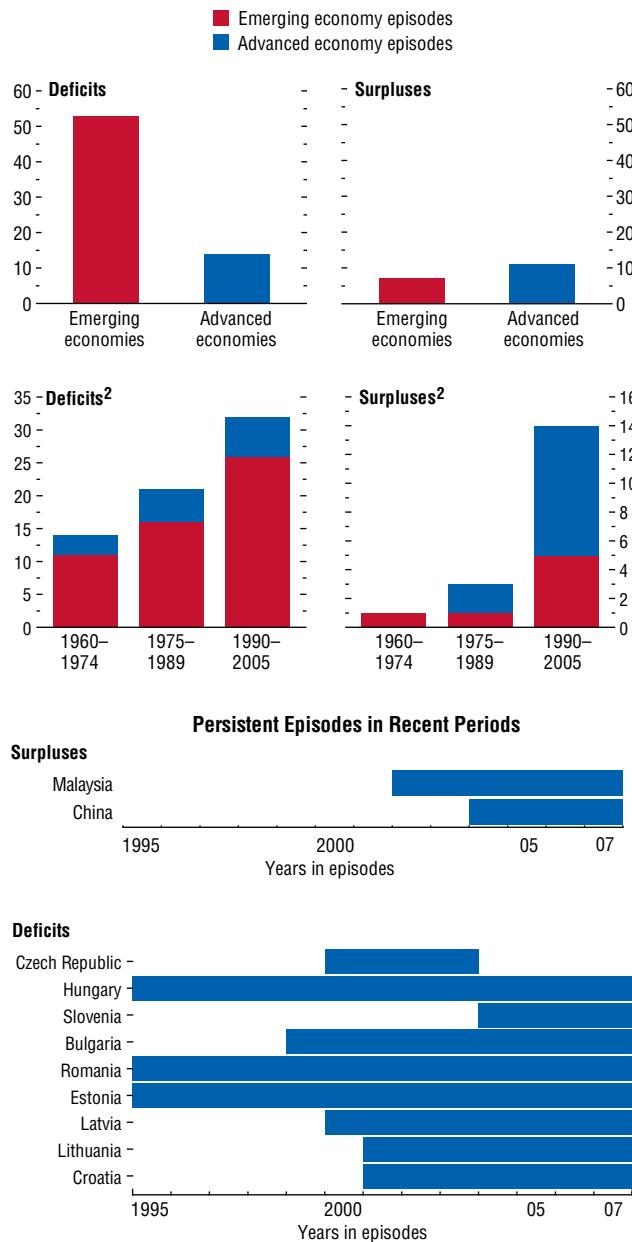
<sup>37</sup>The finding is robust to variations in the size of the adjustment, using either 2 or 3 percent of GDP as a threshold for identifying an abrupt adjustment.

<sup>38</sup>Another potential reason for a positive correlation between the length and depth of episodes is that longer periods of foreign borrowing tend to weaken net foreign asset positions, which in turn weigh negatively on the net

**Figure 6.13. Persistently Large Current Account Deficit and Surplus Episodes, 1960–2007<sup>1</sup>**

(Number of episodes unless noted otherwise)

The majority of imbalance episodes in emerging economies are deficits and they have become more common since the 1990s.



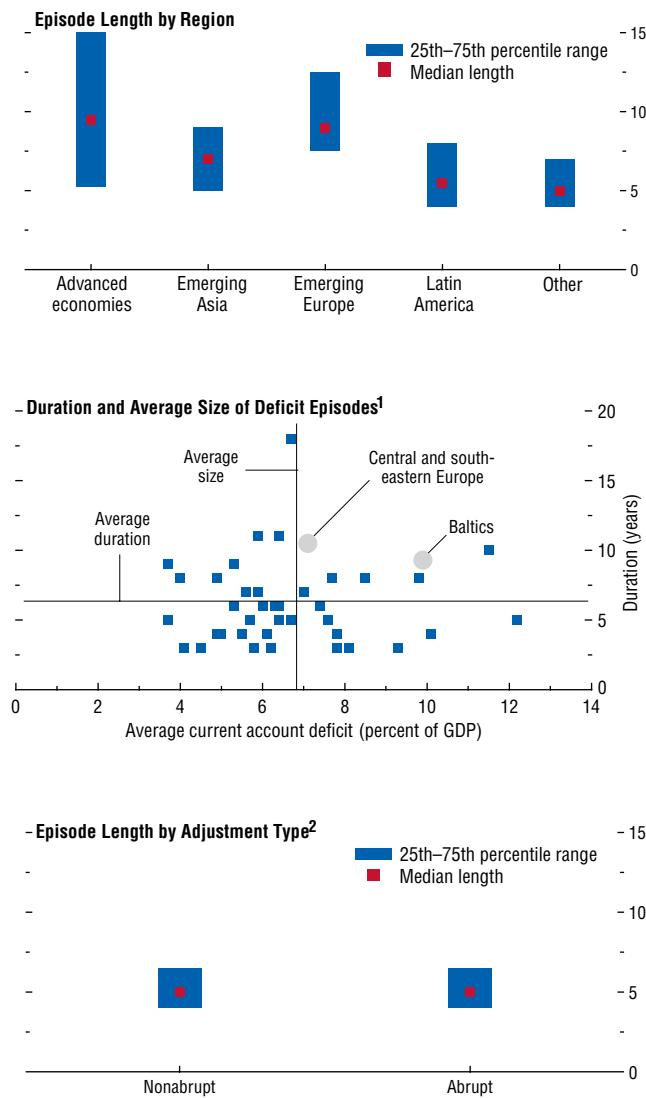
Sources: IMF, *Balance of Payments Statistics*; and IMF staff estimates.

<sup>1</sup>Persistently large deficit and surplus episodes are defined as consecutive current account balances exceeding 3 percent of GDP for a minimum of three years, with no large adjustment (improvement or deterioration) during the episode, as defined in Chapter 3 of the April 2007 *World Economic Outlook*.

<sup>2</sup>Start year of episodes.

**Figure 6.14. Duration of Large, Persistent Current Account Deficits, 1960–2007  
(Years)**

Episodes in emerging Europe tend to be longer than in other emerging economies. Longer episodes are not more shallow measured by the average current account deficit, nor do they end more abruptly.



Sources: IMF, *Balance of Payments Statistics*; and IMF staff estimates.

<sup>1</sup>Sample comprises only complete episodes in emerging economies. Incomplete episodes from emerging Europe are included for comparison. Duration and size of deficit are not correlated.

<sup>2</sup>Abrupt adjustment is defined as an improvement of the current account balance by more than 4 percent of GDP in the year after the episode ends.

The regional variations in the length of imbalances comes out clearly in survival functions from duration analysis (Figure 6.15), which report the estimated likelihood that a large deficit will continue at a given duration, based on a statistical analysis of observations following the Kaplan-Meier estimation for survival curves. The flatter curve for emerging Europe (top left panel) indicates higher likelihoods of remaining in a large deficit and hence implies longer durations than for other regions.<sup>39</sup> A comparison of survival functions by different subgroups and characteristics shows that deficits last longer when the economy has a high initial net foreign asset position, a more open capital account, lower real per capita income, and higher GDP growth. There appears to be little direct evidence that the type of exchange rate regime influences the length of deficit episodes.

A more formal analysis of the duration of imbalances suggests that growth opportunities, the opening of the capital account, liberalization of the financial system, and initially high net foreign assets are important in explaining the length of deficit episodes in emerging Europe (Table 6.2; see Appendix 6.2 for more details).<sup>40</sup> These are broadly the same factors that explain the greater magnitude of these economies' deficits (see Figures 6.9 and 6.10). Higher growth opportunities, measured by a low initial level of income per capita and high growth observed during deficit episodes, offer more

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income component of the current account. See also Lane and Milesi-Feretti (2007).

<sup>39</sup>Berg, Ostry, and Zettelmeyer (2008) use a similar empirical approach, but analyze the duration and survival rates of growth upbreaks.

<sup>40</sup>The model does a good job at predicting that episodes will be longer in emerging Europe, on average two to three years longer than for other emerging economies, which is in line with current observations. Moreover, once structural factors are taken into account, regional factors are no longer significant (see Table 6.2, columns a and e). The regression analysis confirms that the depth of the current account deficit during the episode does not influence its length. Other factors that increase the length of deficits include slow activity in advanced economies, which frees capital to flow to emerging economies, and a higher score on the political structure index.

productive investment opportunities and hence tend to prolong the economy's access to foreign capital. The openness of the capital account eases access to foreign capital, and financial liberalization may improve the intermediation of funds and hence make the deficit more sustainable.<sup>41</sup> The empirical analysis also indicates that a weak contribution of net exports to real GDP growth tends to reduce the length of imbalance episodes.<sup>42</sup>

The estimated model and observed fundamentals can be used to predict the length of deficit episodes in emerging Europe. The forecasts suggest that most of these deficits have persisted longer than expected (Figure 6.16).<sup>43</sup> Because most deficit episodes in emerging Europe are still ongoing, the specification used for predicting the duration is based on parameters excluding these countries (see Table 6.2, column f); this also ensures that their specific characteristics do not determine the results. The longest spells are predicted for Estonia, Romania, and Slovak Republic, with an average duration of 8.9 years. The deficits in the remaining two Baltic countries (Latvia and Lithuania) are forecast to last 7.8 years, whereas significantly shorter spells (4.2 years) are predicted for Bulgaria and Hungary.<sup>44</sup>

<sup>41</sup>Three noteworthy factors do not empirically correlate with the duration of large deficits: (1) the depth of the current account deficits during the episode, although lower payment obligations on foreign liabilities—measured by the average net income balance—improve the ability to continue foreign borrowing; (2) the type of capital inflows, in particular, the average size of FDI inflows; and (3) the type of exchange rate regime (fixed versus flexible), although the latter does help explain how the imbalance episodes are resolved (see further below). See Appendix 6.2 for details on results related to domestic financial liberalization.

<sup>42</sup>Data limitations made it difficult to build a large enough sample to test directly for the impact of deviations of the real exchange rate from its predicted value. The results over a small sample suggest that an exchange rate overvaluation tends to shorten deficit episodes, but the coefficient was not statistically significant.

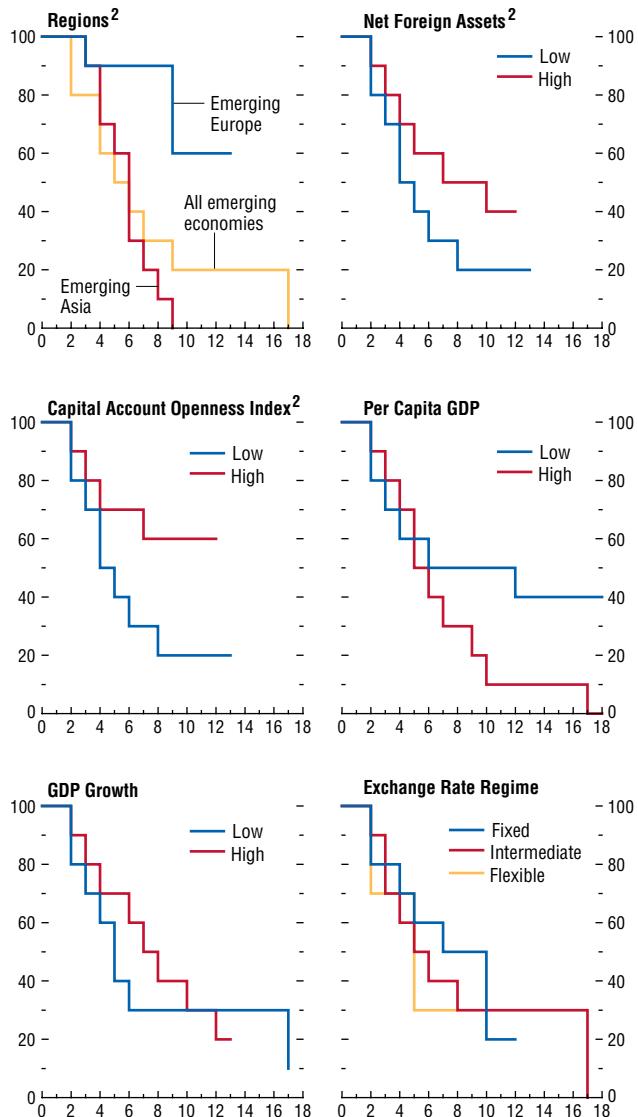
<sup>43</sup>Financial globalization, through its positive effect on the availability of external financing, could also explain the longer-than-expected borrowing episodes.

<sup>44</sup>If predictions were made "in sample," that is, based on an estimated model also including data from emerg-

**Figure 6.15. Survival Functions of Deficit Episodes<sup>1</sup>**

(Number of years on x-axis, percent on y-axis)

The main factors associated with prolonged foreign borrowing (that is, high survival rates) are high initial net foreign asset positions, capital account openness, and favorable growth opportunities.



Source: IMF staff estimates.

<sup>1</sup>Kaplan-Meier survival function estimates. High and low levels are defined relative to the median level.

<sup>2</sup>Difference in survival functions is statistically significant at the 10 percent level or less (log-rank test).

ing Europe, expected deficit lengths would be significantly larger and more than double for the Baltics.

**Table 6.2. Duration Regressions of Persistent and Large Current Account Deficits<sup>1</sup>**

|  | Regional<br>Factors<br>Only<br>(a) | Regional<br>and<br>Standard<br>Factors<br>(b) | Regional,<br>Standard,<br>and Other<br>Factors<br>(c) | Regional,<br>Standard,<br>and Other<br>Factors<br>(d) | Baseline with<br>Standard and<br>Other Factors<br>(e) | Baseline with<br>Standard and<br>Other Factors,<br>Excluding<br>Emerging<br>Europe<br>(f) |
|--|------------------------------------|---|---|---|---|---|
| <b>Standard variables</b>                                    |                                    |   |   |   |   |   |
| Net foreign assets (percent of GDP) initial level            | 1.00<br>(-0.16)                    | 0.98<br>(-1.02)                               | 0.98<br>(-1.37)                                       | 0.98*<br>(-1.79)                                      | 0.96**<br>(-2.21)                                     |   |
| Log of per capita GDP initial level                          | 1.08<br>(0.16)                     | 1.96<br>(1.13)                                | 8.33***<br>(2.86)                                     | 3.13***<br>(2.74)                                     | 4.84***<br>(3.24)                                     |   |
| Average current account balance                              | 0.97<br>(-0.25)                    | 1.03<br>(0.29)                                | 1.09<br>(0.70)  | 1.17<br>(1.23)  | 1.02<br>(0.13)  |   |
| Average net income account balance                           | 0.67*<br>(-1.89)                   | 0.68*<br>(-1.68)                              | 0.74<br>(-1.60)                                       | 0.83<br>(-1.22)                                       | 0.83<br>(-1.01)                                       |   |
| Average output gap (advanced economies)                      | 1.01**<br>(2.33)                   | 1.01***<br>(3.18)                             | 1.01***<br>(3.16)                                     | 1.02***<br>(4.07)                                     | 1.01***<br>(3.42)                                     |   |
| <b>Financial factors and political structure<sup>2</sup></b> |                                    |   |   |   |   |   |
| Average capital account openness                             |                                    | 0.62***<br>(-2.68)                            | 0.52***<br>(-3.58)                                    | 0.58***<br>(-3.14)                                    | 0.47***<br>(-3.91)                                    |   |
| Average political structure                                  |                                    | 0.92**<br>(-1.99)                             | 0.93<br>(-1.61)                                       | 0.89***<br>(-2.90)                                    | 0.92**<br>(-2.13)                                     |   |
| <b>Growth performance factors</b>                            |                                    |   |   |   |   |   |
| Average real GDP per capita growth                           |                                    |   | 0.84<br>(-1.15)                                       | 0.77**<br>(-2.11)                                     | 1.01<br>(0.11)  |   |
| Average net export growth contribution <sup>3</sup>          |                                    |   | 0.58**<br>(-2.99)                                     | 0.75*<br>(-1.94)                                      | 0.67**<br>(-2.51)                                     |   |
| <b>Regional factors</b>                                      |                                    |   |   |   |   |   |
| Emerging Europe <sup>4</sup>                                 | 0.13*<br>(-1.87)                   | 0.07**<br>(-2.26)                             | 0.04**<br>(-2.48)                                     | 0.13<br>(-1.41)                                       |   |   |
| Emerging Asia <sup>4</sup>                                   | 2.72*<br>(1.70)                    | 2.34<br>(0.89)                                | 0.9<br>(-0.09)  | 11.2<br>(1.58)  |   |   |
| Latin America  | 2.35*<br>(1.66)                    | 1.28<br>(0.29)                                | 0.57<br>(-0.53)                                       | 3.49<br>(0.96)  |   |   |
| Other emerging markets                                       | 5.49**<br>(1.98)                   | 6.13**<br>(2.04)                              | 2.03<br>(0.74)  | 4.52<br>(1.50)  |   |   |
| Episodes   | 48                                 | 48  | 48  | 48  | 48  | 49  |
| Number of failures   | 31                                 | 31  | 31  | 31  | 31  | 30  |
| Mean squared error <sup>5</sup>                              | 22.3                               | 12.7  | 14.4  | 6.8   | 7.3   | 3.3   |

Source: IMF staff calculations.

<sup>1</sup>Note: *t* statistics are in parentheses; \*, \*\*, and \*\*\* denote significance at the 10 percent, 5 percent, and 1 percent level, respectively.

Averages are computed as mean values over the deficit episode. Weibull regression. Coefficients report odds ratio with values smaller (larger) than 1 measuring lower (higher) risks of an episode ending, implying longer (shorter) durations of persistent deficits.

<sup>2</sup>The effect of domestic financial sector liberalization is explored in Appendix 6.2.

<sup>3</sup>Net export growth contribution is defined as the average annual real GDP growth rate during the episode attributable to changes in net export balance.

<sup>4</sup>See Table 6.4 in Appendix 6.2 for countries included in regional breakdowns.

<sup>5</sup>Mean squared forecast error for episode length of complete episodes.

Economies in emerging Europe have been able to attract foreign capital for sustained periods in part because of favorable initial conditions (for example, high net foreign assets compared to other persistent deficit episodes) and, in most countries, a rapid opening of capital accounts. However, the average growth

contribution from net exports has been low compared to sustained borrowing episodes in other emerging economies. This is likely related to strong exchange rates in several of these countries and may also reflect low productivity growth in the tradables sector, as a large share of investment has been going into the nontrad-

ables sector (see Figure 6.11).<sup>45</sup> There are some warning signs in the Baltics and Bulgaria that productivity growth has slowed (albeit from high levels) and has been especially low in industry since 2003 (Figure 6.17).

An extension of the empirical model examining how imbalance episodes have been resolved in the past suggests that the Baltics and Bulgaria are at a higher risk of an abrupt ending of their deficits because of the very high openness of their capital accounts and their fixed exchange rate regimes.<sup>46</sup> This vulnerability is heightened by their strong exchange rates, especially for the Baltics. In general, a more open capital account has been associated with prolonged deficit episodes that tend to end abruptly. Fixed exchange rate regimes are also associated with abrupt endings, but these episodes tend to be shorter (see Appendix 6.2 for details).<sup>47</sup> Among the countries that had very open capital accounts and experienced an abrupt ending of their deficit is Malaysia (1995), whereas Thailand (1982) experienced an abrupt ending under a fixed exchange rate regime. On the other hand, a higher value on the political structure index is associated with longer-lasting and more smoothly ending episodes.

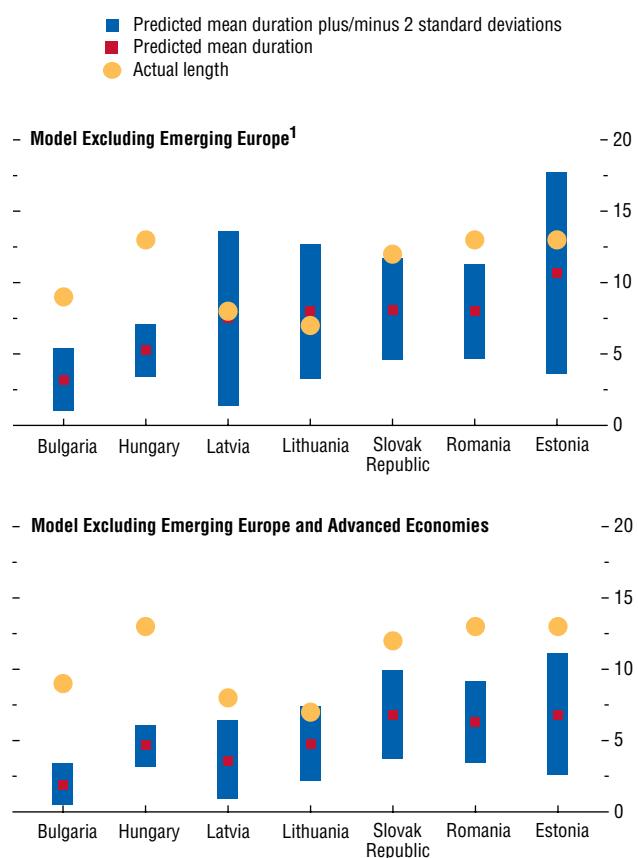
<sup>45</sup>While it is true that improvements in transportation, financial services, and utility sectors enhance productivity, a significant amount of investment is taking place in real estate and retail trade, with less clear productivity-enhancing benefits (Rahman, 2008). See also Bems and Schellekens (2007).

<sup>46</sup>Determinants and implications of current account reversals were discussed in Chapter 3 of the April 2007 *World Economic Outlook*. This analysis finds that current account reversals were preceded by a positive output gap and had varied implications for output growth: contractionary reversals were associated with low openness to trade and large initial deficits. In contrast, expansionary reversals were associated with larger-than-average total real depreciations and increases in savings rates (mainly public), which allowed investment rates to be sustained.

<sup>47</sup>This finding complements recent empirical findings on the persistence of current account imbalances under different exchange rate regimes. Chinn and Wei (2008) find no direct link between exchange rate regimes and current account persistence. This result is qualified by Ghosh, Terrones, and Zettelmeyer (2008), who report that large reversals appear correlated with fixed exchange rate regimes.

**Figure 6.16. Predicted Duration and Actual Length of Ongoing Deficit Episodes (Years)**

Relative to a fundamentals-based model prediction, the ongoing episodes in emerging Europe appear quite long, especially in comparison with data from other emerging economies.

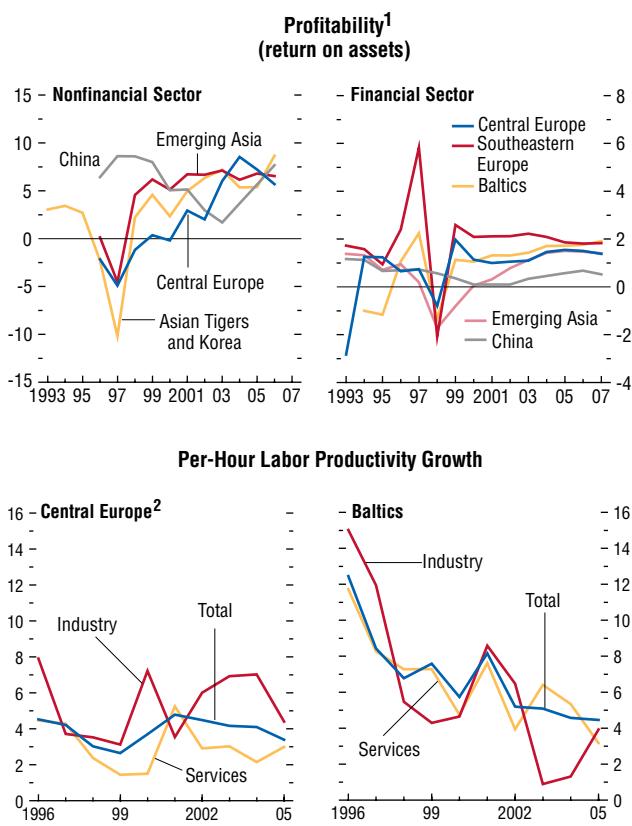


Source: IMF staff estimates.

<sup>1</sup>Based on column f of Table 6.2.

**Figure 6.17. Corporate Profitability and Productivity Growth (Percent)**

Corporate profitability is robust in emerging Asia and emerging Europe. However, productivity growth shows signs of slowing in the Baltics.



Sources: Brooks and Ueda (2005, updated July 2008); and Groningen Growth and Development Centre, 60-industry database, September 2006.

<sup>1</sup>Central Europe includes Czech Republic, Hungary, Poland, and Slovak Republic. Southeastern Europe includes Albania, Bulgaria, Croatia, Macedonia, FYR, and Romania. Baltics are Estonia, Latvia, and Lithuania. Emerging Asia includes China, India, Indonesia, Korea, Malaysia, Pakistan, Philippines, and Thailand. Asian Tigers are Malaysia, Indonesia, Philippines, and Thailand.

<sup>2</sup>Central Europe includes Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia.

## Conclusions and Policy Implications

The growing divergence of current account imbalances in emerging economies has led to much discussion about the underlying causes and the implications for growth and sustainability. Some suggest that large surpluses in emerging Asia could imply that income convergence can be achieved without a need to borrow large amounts of foreign capital and therefore without the associated vulnerabilities to external stability. By contrast, emerging Europe's ability to borrow foreign capital for long periods suggests that the standard growth model, with capital flowing downhill, remains relevant. This chapter explores the reasons for these diverging trends and assesses the sustainability of the growing current account imbalances.

The empirical analysis suggests that structural changes have been a main factor explaining the different regional trends. In emerging Europe, the large current account deficits are related to a rapid liberalization of domestic financial markets and open capital accounts, which attracted large capital inflows and prompted a rapid rise of foreign bank ownership. The process of integration into the EU also enhanced foreign capital inflows by improving prospects for economic and policy stability.

Economies in emerging Asia typically have less open capital accounts, and liberalization of domestic financial markets lags other regions. Several countries in emerging Asia also have different political structures and younger populations. These factors, and in particular the lack of financial liberalization, explain a substantial part of the current account surpluses in the region. As these countries move toward more financial liberalization in the future, this may help lower the surpluses by both raising consumption and increasing foreign financing of investment. However, a large fraction of the persistent current account surpluses in these economies remains unexplained. One candidate explanation is the undervaluation of their exchange rates. However, it is difficult to establish definitively whether the low exchange

rate levels reflect deliberate policy action—for example, an attempt by some countries to build high levels of international reserves after the Asian crisis—or other unidentified factors that moved current accounts decisively into surplus after 1997–98.

As current account imbalances have increased, the duration of imbalance episodes has also lengthened, raising concerns about their sustainability. Indeed, the number of large, persistent current account deficits has risen rapidly since the 1990s, with many of these located in emerging Europe. The main economic factors that explain prolonged deficits are favorable initial net foreign asset positions, growth opportunities, and open capital accounts. By contrast, prolonged surpluses are rare among emerging economies.

Based on an analysis of historical patterns, ongoing deficits in emerging Europe are expected to last longer than in other regions, although most are already at or beyond the upper end of their expected duration. The basic characteristics of emerging European economies explain the prolonged length of their deficits, but this is no safeguard against hard landings. Risk factors for abrupt endings to deficits identified in the empirical analysis include fixed exchange rate regimes and open capital accounts, which are characteristic of many of these economies. These countries' choice of a fixed exchange rate regime may be motivated by many factors, in particular, the desire to enter the euro area, but having made this choice, these countries need to protect themselves against external vulnerabilities by ensuring that product and labor markets are flexible, that strong financial regulatory and supervisory frameworks are in place, and that macroeconomic policies are consistent with domestic and external balance (see IMF, 2007).

The large surpluses in emerging Asia may be safer from the point of view of external vulnerability. However, they may also entail lower-than-desirable consumption over the near term and a less efficient allocation of capital, given that saving and investment choices are made within

financial and corporate governance systems that need to be more responsive to market forces.<sup>48</sup> A gradual return to equilibrium exchange rate levels would help address these concerns and help forestall the type of negative effects on productivity and growth that have been experienced in other countries that have grown rapidly over extended periods with high rates of investment. At the same time, as emphasized in the IMF-led Multilateral Consultation on Global Imbalances, a broader set of policies would help smooth the adjustment process, including rebalancing the components of aggregate demand and further financial liberalization to improve both access to credit and the quality of financial intermediation.

## Appendix 6.1. Variable Definitions and Data Source

*The main authors of this appendix are Stephan Danninger and Florence Jaumotte.*

This appendix provides further details on the construction of the variables used in Chapter 6 and the sources of the data. The analysis is based on annual data from 1980 until most current. It covers countries with a 2006 level of real GDP per capita above \$2,000 and a population of at least 2 million and excludes oil exporters (according to the IMF *World Economic Outlook* definition).

### Balance of Payments Data

The main source for balance of payments data is the IMF *Balance of Payments Statistics*, complemented by data from the IMF World Economic Outlook (WEO) database and the External Wealth of Nations Mark II database created by Lane and Milesi-Ferretti (2006) (for stock data on foreign assets and liabilities).

<sup>48</sup>See Box 3.2 in the September 2006 *World Economic Outlook* and Box 2.3 in the April 2007 *World Economic Outlook*.

## Saving and Investment

Saving and investment data are taken from the IMF WEO database. The breakdown of saving and investment into their public and private components is from the United Nations National Accounts Statistics database and IMF WEO database. Private saving is further disaggregated into corporate and household savings rates using the United Nations National Accounts Statistics database and, where necessary, the CEIC Asia database. Post-2003 data for China's corporate and household saving rates are based on staff estimates.

## Standard Determinants

The general government balance, the oil balance (defined as the difference between oil exports and imports), and real GDP per capita growth are from the IMF WEO database, whereas output per capita in constant purchasing-power-parity (PPP) terms is taken from the World Bank's *World Development Indicators*. The latter is divided by the level in the United States to generate relative income per capita. Finally, population growth and the old-age dependency ratio are from the World Bank's *World Development Indicators*.

## Additional Factors

### Financial factors

Financial depth is measured by the sum of credit to the private sector by deposit money banks and other financial institutions and stock market capitalization, divided by GDP. The source is a 2007 update of the Financial Structure Database prepared by Beck, Demirguc-Kunt, and Levine (2000). Data for China are based on IMF staff calculations. The capital account openness index is taken from an update of Chinn and Ito (2006) and is based on principal components extracted from disaggregated capital and current account restriction measures in the IMF *Annual Report on Exchange Arrangements and Exchange Restrictions*. Financial

liberalization is an index combining information on interest rate controls, credit controls, competition restrictions, state ownership, quality of the banking supervision and regulation, policies to encourage the development of bond and equity markets, and policies to permit access by foreigners to the domestic stock market. The index is from Abiad, Detragiache, and Tressel (forthcoming). Finally, the fraction of foreign banks is taken from Claessens and others (2008). A bank is considered foreign-owned if at least 50 percent of its shares are held by foreign nationals in a given year (only direct ownership is considered).

### Exchange rate

The deviation of the real effective exchange rate from its predicted value is based on the equilibrium real exchange rate approach developed as part of the IMF CGER assessment and is calculated as the residual from a regression of the CPI-based real effective exchange rate on the productivity differential between tradables and nontradables (the so-called Balassa-Samuelson effect), other factors affecting relative prices (government consumption, trade restriction index, price controls, and commodity terms of trade), and net foreign assets (see Lee and others, 2008). Exchange rate deviation measures for the Baltics not available through the IMF CGER assessment are staff estimates based on a similar methodology. The classification of exchange rate regimes into fixed, intermediate, and flexible is a "de facto" IMF exchange rate regime index kindly provided by IMF staff member Harald Anderson.

### Political factors

The political structure index is the "Polity2" variable from the Polity IV Project (Marshall, Jaggers, and Gurr, 2004). It covers a number of dimensions, including the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders and the existence of institutionalized constraints on the exercise of power by the executive.

The EU integration measure captures how far countries in emerging Europe (and Turkey) are along the different stages of the formal integration process, namely, EU membership application, initiation of negotiation for EU membership, EU accession, entry into ERM II, and euro adoption. A score of 0.2 is given for each stage; hence the maximum score is 1.

### Vulnerability Indicators

Profitability of the nonfinancial sector is calculated as net income plus interest expense to last year's assets, adjusted for CPI inflation. Profitability of the financial sector is earnings before extraordinary items and taxes in percent of total assets. The data are from a July 2008 update of Brooks and Ueda (2005) based on data from Worldscope and Datastream.

Data on hourly labor productivity growth in industry, services, and the aggregate economy for the Baltics and central Europe are from the Groningen Growth and Development Centre, 60-industry database, September 2006.

### Event Study: Growth Accelerations and Current Account Developments

To compare current account developments in emerging Europe with experiences from past growth accelerations, an event study analysis was conducted based on the definition of growth accelerations proposed by Hausmann, Pritchett, and Rodrik (2005). An event is defined as the onset of an acceleration in growth with the start date identified by two criteria:

- growth is rapid:  $g_{t,t+n} \geq 3.5$  percent per year, with  $g_{t,t+8} = \ln(y_{t+8}) - \ln(y_t)$  being the real per capita GDP growth rate at time  $t$  over an eight-year horizon, and
- growth accelerates:  $\Delta(g_t) = (g_{t,t+8}) - (g_{t-8,t}) \geq 2.0$  percent with  $\Delta(g_t)$  being the change in the growth rate at time  $t$ .

Once an acceleration in growth is under way, identification of the end of an acceleration is based on two criteria: the average growth rate declines below 2 percent, and growth in the

year following the end of the event dips below 3 percent.

These criteria were applied to the sample of non-oil-exporting emerging and advanced economies of this chapter between 1960 and 2007.<sup>49</sup> A total of 63 episodes were identified, of which 10 episodes from emerging Europe were dropped due to their overlap with the comparator countries. Data limitations excluded the use of another 38 episodes—29 accelerations had start dates prior to 1970—so that the final group of episodes comprised 15 growth accelerations including the following countries: Cameroon, China, Chile, Dominican Republic, Egypt, Finland, Greece, India, Indonesia, Ireland, Lao P.D.R., and Portugal. The average growth rate prior to the onset of the identified accelerations is –1.1 percent.

### Appendix 6.2. Econometric Approach

*The main authors of this Appendix are Stephan Danninger and Florence Jaumotte.*

This appendix describes in greater detail the model underlying the econometric analysis of the determinants of the current account balances and its estimation. It also presents some additional results on the heterogeneity of coefficients across regions. Finally, it provides technical details of the duration analysis.

### Determinants of the Current Account Balance

The model used in the empirical analysis relates the current account balance (expressed in percent of GDP) to a number of standard determinants and a range of new factors. The following equation is adopted as the specification for the analysis:

$$\frac{CA}{Y} = \alpha_1 + \alpha_2 \left( \frac{NFA}{Y} \right) + \alpha_3 \left( \frac{GGB}{Y} \right) + \alpha_4 \left( \frac{NX_{oil}}{Y} \right)$$

<sup>49</sup>The algorithm for identifying growth accelerations was generously provided by Jeromin Zettelmeyer and Jean Salvati.

$$\begin{aligned}
& + \alpha_5 \left( \frac{Pop_{old}}{Pop_{wa}} \right) + \alpha_6 g_{pop} + \alpha_7 \left( \frac{y}{y_{US}} \right) + \alpha_8 (g_y) \\
& + \sum_k \beta_k X_k + \gamma_1 EE + \gamma_2 APC + \gamma_3 FC \\
& + \sum_l \delta_l t_l + \varepsilon,
\end{aligned} \tag{1}$$

where  $CA$  is the current account balance,  $Y$  is nominal GDP,  $NFA$  is net foreign assets,  $GGB$  is the general government balance,  $NX_{oil}$  is the oil balance,  $Pop_{old}$  is the population ages 65 and over,  $Pop_{wa}$  is the working-age population,  $g_{pop}$  is the population growth rate,  $y$  is GDP per capita in constant PPP terms,  $g_y$  is the growth rate of real per capita income,  $EE$  is a dummy variable taking the value 1 for emerging Europe and zero otherwise,  $APC$  is a dummy variable taking the value 1 for emerging Asia starting in 1999 (after the Asian crisis years),  $FC$  is a dummy variable taking the value 1 for financial centers,  $t$  is time-fixed effects, and  $X$  denotes a range of new factors added to the standard model in several stages (see main text). These are financial structure variables (financial depth, domestic financial liberalization, capital account openness) and a measure of political structure.

Following the literature (see, for example, Lee and others, 2008), a number of variables are calculated as deviations from the average for the rest of the world. These are the ratio of the general government balance to GDP, the demographic variables, the growth of GDP per capita, and the measure of political structure. Data are averaged over four years to focus on determinants of medium-term movements in the current account. In order to minimize endogeneity problems, net foreign assets, relative income per capita, and financial depth are measured in the year preceding the four-year period under consideration; the growth rate of real GDP per capita is measured over the four years preceding the current four-year period. The equations do not include country-fixed effects and retain the cross-sectional information since they will be used to explain differences between countries. Time-fixed effects are included to capture developments that affect similarly all countries

in a given year (for example, the aggregate balance of savings and investment). The model is estimated using ordinary least squares and heteroscedasticity-robust standard errors.<sup>50</sup>

The sample of countries for which all variables used in the regressions were available consists of 58 advanced and emerging economies, of which 21 are advanced economies and 37 are emerging economies. Based on data availability, the following countries are included:

- Advanced economies: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.
- Emerging economies: Argentina, Bolivia, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Czech Republic, Egypt, El Salvador, Estonia, Georgia, Hungary, India, Indonesia, Israel, Jamaica, Jordan, Korea, Latvia, Lithuania, Malaysia, Mexico, Morocco, Pakistan, Paraguay, Peru, Philippines, Poland, Romania, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, and Uruguay.

The results of the estimations are reported in the text.

### Additional Results: Heterogeneity between Regions

Reflecting emerging Europe's special circumstances, the empirical analysis allowed and tested for different coefficients for this group of countries relative to the rest of the sample. Equation (1) was extended to include interaction terms between each of its variables and a dummy variable for countries of emerging Europe. The hypothesis that the dummy variable for emerging Europe and all the interaction terms are zero (that is, that the effects of the variables are similar for emerging Europe and other sample countries) could

<sup>50</sup>Results are robust to including the capital account-to-GDP ratio as an explanatory variable, to control for changes over time in the classification of capital transfers.

**Table 6.3. Explaining Differentiated Effects in Emerging Europe**

|  | Full Sample<br>(a)   | Restricted Sample<br>(b) | Plus Foreign Bank Presence<br>(c) | Plus Foreign Bank Presence<br>(d) |
|--|----------------------|--------------------------|-----------------------------------|-----------------------------------|
| <b>Financial factors and political structure</b>               |                      |                          |                                   |                                   |
| Financial depth (percent of GDP, lagged)                       | 0.82<br>(1.64)       | 0.217<br>(0.27)          | 0.207<br>(0.25)                   | 0.186<br>(0.21)                   |
| Financial liberalization                                       | -2.743<br>(-1.68)*   | -3.757<br>(-0.64)        | -3.823<br>(-0.64)                 | -6.186<br>(-1.17)                 |
| Capital account openness                                       | -0.229<br>(-1.25)    | -0.435<br>(-1.07)        | -0.444<br>(-1.11)                 | -0.423<br>(-1.05)                 |
| Joint significance of financial variables ( <i>p</i> -value)   | 0.03**<br>(-3.54)*** | 0.23<br>(-0.36)          | 0.22<br>(-0.32)                   | 0.1<br>(-0.39)                    |
| Political structure  | -0.146<br>(-3.54)*** | -0.033<br>(-0.36)        | -0.03<br>(-0.32)                  | -0.038<br>(-0.39)                 |
| <b>Emerging Europe factors</b>                                 |                      |                          |                                   |                                   |
| General government balance interacted with EU integration      | -1.319<br>(-5.32)*** | -1.348<br>(-3.43)***     | -1.371<br>(-3.33)***              | -1.443<br>(-3.35)***              |
| Financial liberalization interacted with emerging Europe dummy | -4.484<br>(-4.47)*** | -3.533<br>(-1.85)*       | -3.287<br>(-1.35)                 | -3.128<br>(-2.27)**               |
| Fraction of foreign banks                                      |                      |                          | -0.476<br>(-0.26)                 |                                   |
| <b>Regional factors (unexplained effects)</b>                  |                      |                          |                                   |                                   |
| Asian crisis shift   | 2.518<br>(3.03)***   | 4.2<br>(3.21)***         | 4.192<br>(3.19)***                | 4.509<br>(3.76)***                |
| Observations   | 215                  | 77                       | 77                                | 77                                |
| Adjusted <i>R</i> -squared                                     | 0.59                 | 0.66                     | 0.65                              | 0.64                              |

Source: IMF staff calculations.

Note: Robust *t* statistics are in parentheses; \*, \*\*, and \*\*\* denote significance at the 10 percent, 5 percent, and 1 percent level, respectively. All regressions control for net foreign assets, the general government balance, the oil balance, the old-age dependency ratio, population growth, the relative income per capita, growth of GDP per capita, a dummy for financial centers, a constant, and time-fixed effects. The regressions are estimated by ordinary least squares. See footnotes 1 and 2 in Figure 6.1 for regional breakdowns.

not be rejected except for the interaction terms involving the general government balance and domestic financial liberalization.<sup>51</sup>

While the text shows that the differentiated effect of the fiscal balance can be directly attributed to the EU integration process, this section provides more evidence on the reason for the differentiated impact of financial liberalization. Financial liberalization has a stronger negative impact on the current account in emerging Europe than in the rest of the sample. This likely reflects the much stronger presence of foreign banks. Some supportive evidence for this hypothesis was found using available data on the fraction of foreign banks from Claessens and others (2008) (the sample size falls to 77 observations). While domestic financial liberalization

(interacted with the emerging Europe dummy) dominates the fraction of foreign banks when they are entered jointly, the fraction of foreign banks has a coefficient of a magnitude and significance similar to that of domestic financial liberalization (interacted with the emerging Europe dummy) when it is entered on its own (Table 6.3, columns c and d). This provides some supportive evidence that the stronger presence of foreign banks in emerging Europe may have contributed to the stronger impact of domestic financial liberalization on the current account.

### Duration Analysis and Current Account Imbalances

This part provides greater detail on the identification of large, persistent current account

<sup>51</sup>The *p*-value for this test is 11 percent.

imbalances and describes the econometric methodology and additional results from the duration analysis discussed in the main text.

The method for identifying large, persistent current account imbalances is based on the approach developed in Chapter 3 of the April 2007 *World Economic Outlook* but with modified parameters. For this chapter, the cutoff values for large current account imbalance episodes are a deficit or surplus of 3 percent of GDP or larger for at least three years and during which no current account reversal occurs.<sup>52</sup> The latter criterion ensures that the end of an episode is dated at the onset of any large adjustments, regardless of whether the imbalance crosses the 3 percent of GDP threshold. Table 6.4 lists all large, persistent current account imbalance episodes that meet these criteria.

### Duration Analysis

A duration analysis was performed to relate different fundamental determinants to the length of current account imbalances. Due to the small number of persistent surpluses, the analysis was limited to deficits.

The empirical approach models the hazard rate of the duration of an imbalance episode, which is equivalent to the conditional probability that an episode ends in the next period, given a set of determinants  $x$ :

$$\lambda(t, x(t)) = \lim_{h \geq 0} F(t \leq T < t+h | x) / h = f(t|x) / (1 - F(t|x)).$$

Formally, the hazard rate is defined as the ratio of the density function  $f(t|x)$  of the duration  $T$ , and the survival function  $1 - F(t, x)$ , where  $F(t, x)$  is the cumulative distribution function of  $T$ .<sup>53</sup> The empirical implementation for estimating the hazard rate is based on a proportional hazard rate model:

<sup>52</sup>A description of the method used for identifying current account reversals and persistent imbalances can be found in Appendix 3.1 of the April 2007 *World Economic Outlook*.

<sup>53</sup>For details on duration analysis concepts, see Kiefer (1988) and Wooldridge (2002).

$$\lambda(t, x(t)) = \exp(\beta x(t)) \lambda_0(t),$$

with a Weibull specification for the baseline hazard rate  $\lambda_0 = p t^{p-1}$ . The parameters  $p$  and  $\beta$  are estimated via maximum likelihood and determine the shape of the baseline hazard rate function  $\lambda_0$  and the size of proportional shifts in the baseline hazard rate related to determinants  $x(t)$ . Due to concerns about endogeneity of fundamental factors with respect to the length of an episode, the model uses time-invariant controls  $x$ .<sup>54</sup>

The empirical analysis is based on 48 large, persistent current account deficits and covers episodes from both advanced (35 percent) and emerging economies (65 percent). The main results are reported in the text. Other explanatory variables and specifications were explored—for instance capital account openness has a larger effect at higher levels of per capita income—but did not improve the model's fit. Additional results in Table 6.5 pertain to the role of domestic financial liberalization on the duration of episodes, which were omitted in the main text due to reduced country coverage. The analysis shows that domestic financial sector liberalization increases the length of an episode (column a), but that this effect disappears once measures of political structure and capital account openness are included (column b). There is however evidence that the speed of liberalization adds to the episode length (column c), but the same is not true for the speed of capital account liberalization and change in political institutions (not shown). This finding is consistent with the interpretation of panel regression results presented in the main text, which highlight the large effect of domestic financial sector liberalization on capital inflows in the past decade.

### Deficit Episodes and Resolution of Imbalances

To explore the link between duration of persistent deficits and their resolution, a compet-

<sup>54</sup>A specification using time-varying controls was estimated and generated similar results to the ones reported in the main body of the chapter.

**Table 6.4. List of Persistently Large Current Account Imbalance Episodes**

| Country                   | Start Year | End Year | Length in Years | Average Current Account Balance (percent of GDP) | Average Current Account Balance (percent of GDP) |            |          |                 |       |  |  |  |
|---------------------------|------------|----------|-----------------|--|--|------------|----------|-----------------|-------|--|--|--|
|                           |            |          |                 |  | Country  | Start Year | End Year | Length in Years |       |  |  |  |
| <i>Deficit Episodes</i>   |            |          |                 |  |  |            |          |                 |       |  |  |  |
| <b>Advanced economies</b> |            |          |                 |  |  |            |          |                 |       |  |  |  |
| United States             | 1999       | 2007     | 9               | -4.8   | Israel   | 1978       | 1982     | 5               | -5.7  |  |  |  |
| Denmark                   | 1979       | 1986     | 8               | -3.7   | Egypt  | 1970       | 1975     | 6               | -5.3  |  |  |  |
| Norway                    | 1974       | 1977     | 4               | -8.8   | Sri Lanka  | 1986       | 1994     | 9               | -5.3  |  |  |  |
| Canada                    | 1989       | 1993     | 5               | -3.7   | Indonesia  | 1967       | 1971     | 5               | -3.7  |  |  |  |
| Greece                    | 1979       | 1985     | 7               | -4.6   | Korea  | 1965       | 1974     | 10              | -11.5 |  |  |  |
| Greece                    | 1996       | 2007     | 12              | -6.8   | Malaysia   | 1991       | 1995     | 5               | -6.4  |  |  |  |
| Ireland                   | 1969       | 1981     | 13              | -6.2   | Pakistan   | 1988       | 1996     | 9               | -3.7  |  |  |  |
| Portugal                  | 1996       | 2007     | 12              | -8.0   | Philippines                                      | 1976       | 1982     | 7               | -5.6  |  |  |  |
| Spain                     | 1974       | 1976     | 3               | -3.8   | Singapore  | 1977       | 1980     | 4               | -7.8  |  |  |  |
| Spain                     | 1990       | 1992     | 3               | -3.5   | Thailand   | 1977       | 1981     | 5               | -6.4  |  |  |  |
| Spain                     | 2000       | 2007     | 8               | -5.8   | Thailand   | 1990       | 1996     | 7               | -7.0  |  |  |  |
| Australia                 | 1981       | 2007     | 27              | -4.6   | Tunisia  | 1980       | 1984     | 5               | -6.7  |  |  |  |
| New Zealand               | 1979       | 1984     | 6               | -6.4   | Albania  | 1999       | 2007     | 9               | -6.6  |  |  |  |
| New Zealand               | 1992       | 2007     | 16              | -5.4   | Bulgaria   | 1999       | 2007     | 9               | -9.1  |  |  |  |
| <b>Emerging economies</b> |            |          |                 |  |  |            |          |                 |       |  |  |  |
| Bolivia                   | 1983       | 1987     | 5               | -7.6   | Czech Republic                                   | 2000       | 2003     | 4               | -5.5  |  |  |  |
| Bolivia                   | 1990       | 1992     | 3               | -6.2   | Slovak Republic                                  | 1996       | 2007     | 12              | -7.3  |  |  |  |
| Bolivia                   | 1995       | 1998     | 4               | -6.1   | Estonia  | 1995       | 2007     | 13              | -9.6  |  |  |  |
| Brazil                    | 1971       | 1974     | 4               | -4.9   | Latvia   | 2000       | 2007     | 8               | -12.2 |  |  |  |
| Brazil                    | 1977       | 1982     | 6               | -6.4   | Hungary  | 1995       | 2007     | 13              | -6.5  |  |  |  |
| Brazil                    | 1999       | 2001     | 3               | -4.1   | Lithuania  | 2001       | 2007     | 7               | -7.9  |  |  |  |
| Chile                     | 1981       | 1984     | 4               | -10.1  | Croatia  | 2001       | 2007     | 7               | -6.7  |  |  |  |
| Chile                     | 1996       | 1998     | 3               | -4.5   | Macedonia, FYR                                   | 1994       | 2004     | 11              | -5.9  |  |  |  |
| Costa Rica                | 1967       | 1974     | 8               | -8.5   | Romania  | 1995       | 2007     | 13              | -6.3  |  |  |  |
| Costa Rica                | 1977       | 1981     | 5               | -12.2  | <i>Surplus Episodes</i>                          |            |          |                 |       |  |  |  |
| Costa Rica                | 1987       | 1989     | 3               | -5.8   | <b>Advanced economies</b>                        |            |          |                 |       |  |  |  |
| Costa Rica                | 1997       | 2007     | 11              | -4.5   | Belgium  | 2001       | 2007     | 7               | 3.5   |  |  |  |
| Dominican Republic        | 1967       | 1973     | 7               | -5.9   | Denmark  | 2001       | 2007     | 7               | 2.8   |  |  |  |
| Dominican Republic        | 1978       | 1980     | 3               | -7.8   | Netherlands                                      | 1988       | 1997     | 10              | 4.1   |  |  |  |
| El Salvador               | 2003       | 2007     | 5               | -4.8   | Netherlands                                      | 2001       | 2007     | 7               | 5.7   |  |  |  |
| Guatemala                 | 1987       | 1990     | 4               | -5.0   | Norway   | 1991       | 1997     | 7               | 4.3   |  |  |  |
| Guatemala                 | 1996       | 2007     | 12              | -5.3   | Norway   | 2001       | 2007     | 7               | 14.7  |  |  |  |
| Honduras                  | 1975       | 1980     | 6               | -7.4   | Sweden   | 1999       | 2007     | 9               | 5.4   |  |  |  |
| Honduras                  | 1991       | 1996     | 6               | -6.3   | Switzerland                                      | 1984       | 2007     | 24              | 8.3   |  |  |  |
| Honduras                  | 1999       | 2007     | 9               | -3.9   | Japan  | 1991       | 2007     | 17              | 2.9   |  |  |  |
| Mexico                    | 1974       | 1981     | 8               | -4.0   | Finland  | 2005       | 2007     | 3               | 4.3   |  |  |  |
| Panama                    | 1997       | 1999     | 3               | -8.1   | <b>Emerging economies</b>                        |            |          |                 |       |  |  |  |
| Panama                    | 2003       | 2007     | 5               | -5.6   | Argentina  | 2004       | 2007     | 4               | 2.8   |  |  |  |
| Paraguay                  | 1967       | 1974     | 8               | -9.8   | Egypt  | 2004       | 2007     | 4               | 3.2   |  |  |  |
| Paraguay                  | 1977       | 1987     | 11              | -6.4   | Hong Kong SAR                                    | 1967       | 1975     | 9               | 11.9  |  |  |  |
| Peru                      | 1990       | 1995     | 6               | -6.0   | Hong Kong SAR                                    | 1985       | 1989     | 5               | 7.4   |  |  |  |
| Jamaica                   | 1967       | 1984     | 18              | -6.7   | Malaysia   | 2002       | 2007     | 6               | 12.7  |  |  |  |
| Jamaica                   | 2002       | 2007     | 6               | -11.0  | Singapore  | 1998       | 2007     | 10              | 20.2  |  |  |  |
| Israel                    | 1962       | 1964     | 3               | -9.3   | Namibia  | 1993       | 2007     | 15              | 5.7   |  |  |  |
| Israel                    | 1968       | 1975     | 8               | -7.7   | China  | 2002       | 2007     | 6               | 6.1   |  |  |  |

Source: IMF staff calculations.

Note: Large, persistent imbalances defined as a current account imbalance of at least 3 percent of GDP lasting for a minimum of three years based on method reported in Appendix 3.1 in the April 2007 *World Economic Outlook*.

**Table 6.5 Duration Analysis and Domestic Financial Sector Liberalization<sup>1</sup>**

|   | Standard and Other Factors<br>(a) | Standard and Other Factors<br>(b) | Standard and Other Factors<br>(c) |
|---|-----------------------------------|-----------------------------------|-----------------------------------|
| <b>Standard factors</b>                             |                                   |                                   |                                   |
| Net financial assets initial level (percent of GDP) | 0.97*<br>(-1.80)                  | 0.97*<br>(-1.92)                  | 0.97*<br>(-1.90)                  |
| Log of per capita GDP initial level                 | 2.44**<br>(2.12)                  | 3.47***<br>(2.65)                 | 3.19**<br>(2.36)                  |
| Current account balance average                     | 1.16<br>(1.47)                    | 1.22<br>(1.53)                    | 1.11<br>(0.76)                    |
| Net income account balance average                  | 0.96<br>(-0.26)                   | 0.9<br>(-0.62)                    | 0.8<br>(-1.19)                    |
| Output gap average (advanced economies)             | 1.01***<br>(2.92)                 | 1.01***<br>(3.66)                 | 1.01***<br>(3.47)                 |
| <b>Financial factors and political structure</b>    |                                   |                                   |                                   |
| Domestic financial sector liberalization average    | 0.03***<br>(-3.35)                | 0.26<br>(-1.02)                   | 2.61<br>(0.59)                    |
| Change in domestic financial sector liberalization  |                                   | 0.02***<br>(-2.59)                |                                   |
| Capital account openness average                    |                                   | 0.63**<br>(-2.18)                 | 0.48**<br>(-2.85)                 |
| Political structure average                         |                                   | 0.92**<br>(-2.16)                 | 0.92**<br>(-1.98)                 |
| <b>Growth performance factors</b>                   |                                   |                                   |                                   |
| Real GDP per capital growth average                 | 0.9<br>(-0.90)                    | 0.83<br>(-1.39)                   | 1.00<br>(0.01)                    |
| Real export growth average                          | 0.81<br>(-1.34)                   | 0.78<br>(-1.58)                   | 0.76*<br>(-1.69)                  |
| Observations  | 43                                | 43                                | 43                                |

Source: IMF staff calculations.

Note: Z statistics are in parentheses; \*, \*\*, and \*\*\* denote significance at the 10 percent, 5 percent, and 1 percent level, respectively. Averages computed as mean values over the deficit episode, changes are computed as the average difference of variable value between the beginning and end of the episode. Coefficients indicate odds ratio with smaller (larger) values than one measuring lower (higher) risk of an episode completion implying longer (shorter) expected durations of episodes.

ing risks model was estimated using the same set of determinants as in Table 6.2. The empirical specification follows an approach proposed by Lunn and McNeil (1995) and explores the hazard rates for different exit types (abrupt and non-abrupt endings). The model assumes that in each period the total exit risk can be separated into two additively separable risks for abrupt and non-abrupt endings. The approach adds interaction terms between fundamental determinants

**Table 6.6. Duration Analysis and Risk of Abrupt and Non-Abrupt Endings**

|   | Standard Model<br>(a) | Competing Risks Model<br>(b) | Competing Risks Model<br>(c) |
|---|-----------------------|------------------------------|------------------------------|
| <b>Factors for common hazard</b>                    |                       |                              |                              |
| Net financial assets initial level (percent of GDP) | 0.98<br>(-1.38)       | 0.97**<br>(-2.03)            | 0.98<br>(-1.10)              |
| Log of per capita GDP initial level                 | 2.16**<br>(2.27)      | 2.48**<br>(2.28)             | 2.14*<br>(1.72)              |
| Net income account balance average                  | 0.85<br>(-1.19)       | 0.94<br>(-0.36)              | 0.81<br>(-1.12)              |
| Output gap average (advanced economies)             | 1.01***<br>(4.22)     | 1.01***<br>(3.37)            | 1.01***<br>(3.11)            |
| Capital account openness average                    | 0.66***<br>(-3.00)    | 0.80<br>(-1.42)              | 0.78<br>(-1.58)              |
| Political structure average                         | 0.92**<br>(-2.55)     | 0.88***<br>(-3.22)           | 0.89***<br>(-3.02)           |
| Real GDP per capita growth average                  | 0.84<br>(-1.62)       | 0.77***<br>(-2.85)           | 0.79**<br>(-2.23)            |
| Real export growth average                          | 0.86<br>(-1.57)       | 0.93<br>(-0.51)              | 0.8<br>(-1.25)               |
| Flexibility of exchange rate regime average         |                       |                              | 3.50***<br>(2.70)            |
| <b>Factors of hazard with abrupt endings</b>        |                       |                              |                              |
| Net financial assets initial level (percent of GDP) |                       | 1.05**<br>(2.19)             | 1.04<br>(1.54)               |
| Log of per capita GDP initial level                 |                       | 0.37<br>(-1.04)              | 0.41<br>(-0.93)              |
| Net income account balance average                  |                       | 0.64<br>(-1.21)              | 0.74<br>(-0.84)              |
| Output gap average (advanced economies)             |                       | 0.99<br>(-1.20)              | 0.99<br>(-1.41)              |
| Capital account openness average                    |                       | 0.39*<br>(-1.79)             | 0.38*<br>(-1.74)             |
| Political structure average                         |                       | 1.15*<br>(1.65)              | 1.17<br>(1.52)               |
| Real GDP per capita growth average                  |                       | 1.58<br>(1.12)               | 1.54<br>(1.05)               |
| Real export growth average                          |                       | 0.84<br>(-0.71)              | 1.17<br>(0.41)               |
| Flexibility of exchange rate regime average         |                       |                              | 0.077*<br>(-1.71)            |
| Observations  | 96                    | 96                           | 96                           |
| Episodes  | 48                    | 48                           | 48                           |

Source: IMF staff calculations.

Note: Z statistics are in parentheses; \*, \*\*, and \*\*\* denote significance at the 10 percent, 5 percent, and 1 percent level, respectively. Averages computed as mean value over the current account deficit episode. Coefficients report odds ratio with smaller (larger) values than 1, indicating decreased (increased) risk of an episode ending.

and an exit type variable, which allows estimation of differences in hazard rates by exit type. The model is implemented through a semiparametric Cox proportional hazard model.

Table 6.6 presents estimation results for a baseline and two competing risks model specifi-

cations. The coefficients of the standard determinants (column a) are similar to the ones presented in the main body of the chapter using a Weibull specification (see Table 6.2). Note however that the number of observations is twice as large compared to the original duration model specification since each observation is entered twice to allow for different (competing) risks' effects. The results in columns (b) and (c) report hazard rate models for a common baseline hazard rate (top panel) and differences for hazards with abrupt endings (lower panel). The interaction effects specification implies that the total hazard rate for abrupt endings is determined by the sum of the direct and the interaction effects.

The majority of explanatory variables do not have significant additive risk factors (lower panel) and hence do not indicate different hazard rates by exit types. Significant interaction effects are however found for net foreign assets, capital account openness, and political structure.<sup>55</sup> Combining the direct and interaction effects, the results indicate that longer spells due to greater capital account openness bear an increasing risk of abrupt endings (column b in Table 6.6). The results are different for net foreign assets and political structure due to the offsetting signs of the direct and interaction effects. They imply that higher values on both indicators increase the length of non-abrupt episodes, but there are no effects for abrupt endings.

In column c of Table 6.6, a variable capturing the flexibility of the exchange rate regime is introduced. The direct effect of this variable on the length of non-abrupt episodes is negative, whereas the interaction effect has the opposite sign and more than offsets the direct effect. This implies that a more flexible exchange rate regime reduces the length of episodes that end non-abruptly—supporting the view that flexibility reduces persistence—and that fixed regimes are linked to shorter episodes that end more abruptly.

<sup>55</sup>For net foreign assets a test of the joint significance of the direct and interaction effects is rejected.

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# IMF EXECUTIVE BOARD DISCUSSION OF THE OUTLOOK, SEPTEMBER 2008

*The following remarks by the Acting Chair were made at the conclusion of the Executive Board's discussion of the World Economic Outlook on September 19, 2008.<sup>1</sup>*

## Global Prospects and Policies

Executive Directors noted that, after a four-year expansion, the world economy is slowing rapidly, buffeted by many forces, notably a deep financial crisis, a housing downturn in a number of advanced economies, and a surge in commodity prices until recent months. Many advanced economies are close to recession, and emerging economies are also generally decelerating. Looking ahead, Directors agreed that continuing strained financial conditions will weigh heavily on global growth prospects. With credit defaults still on the rise, pressures on financial institutions' capital positions will remain exceptionally high. The necessary process of deleveraging will therefore be difficult and protracted, and credit availability will be very tight. Directors underscored the unusual uncertainties in the global outlook and the difficulty of predicting the severity of the slowdown. Nevertheless, assuming that the many public initiatives under way are successful in lowering financial market strains and rebuilding confidence, it is the IMF staff view that the still relatively sound nonfinancial corporate balance sheets in advanced economies and resilient domestic demand in emerging economies should support the beginning of a global economic recovery later in 2009, as the effects of the commodity price shocks unwind and housing activity in the United States stabilizes.

<sup>1</sup>The IMF staff provided an informal briefing to the Executive Board on October 3, 2008, on the revisions to the *World Economic Outlook* made in light of the developments in global financial markets and commodity markets since the Executive Board discussion of September 19, and this summing up reflects the updates provided and the ensuing discussion at that time.

Directors noted that the uncertainty surrounding the economic outlook is exceptionally large, with risks clearly to the downside. The principal risk relates to the potential for a further deterioration in financial conditions and more protracted balance-sheet adjustments. Directors acknowledged that, as the events of recent weeks demonstrate, the financial crisis has not yet run its full course, and other major disturbances may still lie ahead. Risks of an intensified negative feedback loop between the financial system and the real sectors of advanced economies have risen, as have the risks of stronger spillovers to emerging markets. A further marked weakening of commodity prices could pose a downside risk to already slowing growth in several commodity-exporting emerging economies.

Directors underscored the complex challenges facing policymakers at this juncture in light of the uncertain outlook and the financial turmoil. First and foremost, policymakers in the advanced economies will need to address stresses in financial markets in a coherent and consistent manner, while adjusting macroeconomic policies with a view to striking the right balance between supporting growth and combatting inflation. The financial authorities should continue to give priority to stabilizing financial conditions, including guarding against systemic failures through liquidity provision and prompt intervention when needed, while also being mindful of the need to avoid moral hazard. This likely will require broad and well-coordinated policy actions. On monetary policy, given tight credit conditions, growing unemployment fears, subdued wage growth, and still-well-anchored inflation expectations, the IMF staff sees scope

for easing in advanced economies with relatively higher real rates of interest. A number of other Directors, however, favored a cautious approach to easing, pointing to the risks of second-round effects from the recent increases in inflation and the challenge of ensuring that expectations remain well anchored. On fiscal policy, Directors welcomed the timely support being provided to a number of economies. However, they recalled the importance of medium-term consolidation and thus suggested that further fiscal initiatives should be limited to dealing with financial problems as needed.

In the wake of recent commodity price declines and the projected slowdown in global activity, Directors expected headline inflation to moderate in emerging and developing economies. This means that macroeconomic policies could stay on hold in an increasing number of these economies, or even ease if the outlook threatened to deteriorate further. In other economies, many Directors observed that underlying inflation pressures remain an issue. They observed that these economies face greater risks of second-round effects than advanced economies, owing to the higher share of food and fuel in consumption baskets and low spare capacity. Many Directors therefore considered that policymakers in these countries should lean toward tightening the overall stance of macroeconomic policies. Additionally, these Directors underscored that monetary policy should take the lead role in short-term stabilization in economies with inflation targeting and flexible exchange rate management, while recognizing that country circumstances differ and that open capital markets can pose special challenges in these cases. They recognized the challenges facing countries with heavily managed exchange rate regimes that are now in effect importing an accommodative monetary policy stance from the United States, while still experiencing strong growth and current account surpluses. A number of Directors observed that more flexible exchange rates would help in some cases by providing scope for adjusting monetary conditions and fostering a rebalancing of demand in

their economies. Several other Directors stressed that the choice of the exchange rate regime depends on broader considerations, and that in the countries with fixed exchange rates, fiscal policy would have to take the lead in relieving any excess demand pressures that threaten the viability of the peg. Several Directors argued that more monetary and fiscal tightening may not be needed, as headline inflation is likely to moderate in the near term and a slowing global economy would alleviate overheating concerns.

## Advanced Economies

Although the U.S. economy continued to grow at a moderate pace in the first half of 2008, Directors agreed that activity is likely to slow appreciably in the second half. Given the exceptionally unsettled financial market conditions, most Directors expected a prolonged period of very low growth, followed by a gradual recovery that would begin later in 2009. The pickup would be driven by a turnaround in private consumption and residential investment as commodity and housing prices stabilize, although financial conditions are expected to remain tight. Directors expected underlying price pressures to be contained as economic slack rises in the coming months.

Against this background, Directors acknowledged that the U.S. authorities' accommodative monetary policy thus far has provided support to the economy in the face of financial stress and the continuing housing correction. They thought that further easing should not be ruled out in view of the deteriorating outlook. By the same token, once economic recovery gains traction and financial conditions stabilize, policies should shift toward a less supportive stance. The fiscal stimulus package has also provided a useful and timely boost to activity. However, given long-term fiscal challenges, further policy initiatives should be focused on providing support for the banking and housing sectors as needed to maintain stability. Directors welcomed the recent intervention in government-sponsored enterprises (GSEs) as an important step to ensure

the continued availability of housing financing, while stressing the need for fundamental GSE reform over the medium run. More broadly, they welcomed the authorities' recent additional efforts to ensure an orderly resolution of the ongoing crisis, while remaining mindful of the need to contain moral hazard.

Directors observed that western European economies have slowed considerably. Higher oil and food prices have undercut real disposable incomes, while tighter financial conditions have raised the costs of household mortgages and slowed investment. In some countries, particularly the United Kingdom and Spain, weak housing has weighed heavily on economic activity. Although European banks entered the turmoil from a position of strength, they have been exposed in varying degrees to losses on their holdings of U.S. mortgage-related assets, tightening liquidity conditions, and deteriorating credit quality. As in the United States, financial institutions have been shaken by recent events, with some requiring public support. Given the need for further deleveraging to rebuild confidence, Directors thought that overall credit conditions will likely remain tight for some time. Growth is expected to remain weak for a prolonged period of time before starting to recover gradually later in 2009, as credit markets and commodity prices stabilize and confidence is restored.

With the prospect of a further weakening of economic activity and generally well-anchored inflationary expectations, as well as high risk premiums, many Directors considered that inflation pressures would subside over the near term, providing scope to ease monetary policies. Underscoring the benefits of rules-based policies and the medium-term need for consolidation, Directors encouraged firm adherence to national and EU fiscal policy frameworks, which would generally weigh against fiscal stimulus packages, unless downside risks materialize. Furthermore, a decisive commitment to concerted action with respect to addressing growing financial sector strains would go a long way toward restoring more orderly conditions in financial markets.

Directors observed that the near-term outlook for Japan has deteriorated. Although financial conditions have tightened to a lesser extent than in other major economies owing to the lower exposure of Japanese banks to securitized products, Directors expected that high food and fuel prices and weaker external growth would weigh on consumer and business activity. Most Directors considered that, with the economy weakening and underlying price pressures well contained, the monetary stance should remain accommodative. For fiscal policy, the priority remains medium-term consolidation owing to a rapidly aging population and rising public debt—although automatic stabilizers could be allowed to operate in the event of a sharp downturn.

## Emerging and Developing Economies

Growth of emerging Asian economies is expected to moderate over the near term, but to remain around trend in many cases. However, Directors emphasized the increasing risk that growth could slow more markedly owing to intensified financial market stress and a sharper-than-anticipated slowdown in trading partner countries. On the other hand, in some countries inflation could remain at elevated levels, despite the recent easing in commodity prices, as spare capacity has largely been eroded. Thus, countries' policies need to be tailored to their particular circumstances, which are diverse. Most Directors were of the view that countries with heavily managed exchange rate regimes would benefit from shifting to more flexible exchange rate management that would provide more scope for monetary adjustment and foster global rebalancing. At the same time, Directors underscored that global rebalancing would require a mix of appropriate and complementary policies and could not be left solely to adjustments in exchange rates. Fiscal restraint could help reduce inflation concerns, while continued efforts at fiscal consolidation remain an important priority for other countries in the region.

Directors observed that Latin American economies face a challenging combination of

slowing activity, volatile financial conditions, and still-elevated inflation pressures. While acknowledging growing downside risks to growth, largely reflecting external factors, many Directors stressed that the priority for policies in a number of countries remains to quell the surge of inflation. While tightening has occurred, notably in countries with inflation-targeting regimes, more action will likely be needed in some countries where real interest rates have become significantly negative and policy credibility is being eroded. Shifts in international oil and food prices should be allowed to pass through to the domestic market, using targeted programs to protect the poor.

Directors noted that, after a prolonged economic expansion, activity in emerging Europe has started to moderate, with the Baltic countries undergoing sharp corrections as earlier booms have started to unwind. Some countries with large current account deficits could be vulnerable to a reversal of capital inflows. Containing inflation pressures also remains a concern, particularly in southeastern European economies. This underlines the importance of macroeconomic policies that steer economies toward a “soft landing,” as well as of prudential and regulatory policies to contain balance sheet vulnerabilities.

Real GDP growth remains strong in the Commonwealth of Independent States, underpinned by terms-of-trade gains and expansionary macroeconomic policies, although external conditions are becoming more noticeably difficult for several countries. Directors agreed that stronger policy action is needed in many countries in the region to rein in rising inflation pressures and address external pressures. A comprehensive policy response would require a combination of monetary tightening and greater exchange rate flexibility, combined with a prudent fiscal stance. Over the longer term, Directors emphasized that the region should continue to reduce its vulnerability to commodity price shifts through diversification of the economy away from primary commodities.

Directors were encouraged that growth in sub-Saharan Africa is expected to show resilience

to the global slowdown, but expressed concern about the impact of the recent surge in food and fuel prices on poverty and about risks of a lower pace of financing and investment inflows. The oil-exporting countries in this region face the challenge of managing the windfall gains from high commodity prices. A number of oil-importing countries, where the negative terms-of-trade shock has weakened fiscal and external positions, will need to tighten their macroeconomic policies, while stepped-up donor support will be essential to help low-income countries cope with high commodity prices.

Directors observed that activity in the Middle East continues to grow at a robust pace, supported by higher oil prices, an improving business environment, and a buildup in government spending in oil-exporting countries. Inflation pressures either remain high or have risen considerably. Directors recommended focusing public spending on infrastructure to address supply bottlenecks, while some cautioned that rising inflation pressures may require exercising greater restraint over current spending to counterbalance strong private demand growth. A few Directors suggested that some countries should consider moving away from U.S. currency pegs. At the same time, Directors emphasized the need to continue strengthening macroeconomic policy frameworks and pursuing structural reforms that are key to the region’s medium-term prospects. Financial sector reforms would be important to develop financial systems that can support high and sustained growth and more independent monetary policy.

## Other Issues

Regarding the strains in financial markets, Directors emphasized that the immediate tasks are to safeguard financial stability, restore healthy financial balance sheets by encouraging the rebuilding of capital bases, and guard against systemic failures through liquidity provision and intervention as needed. They emphasized that this would require broad and well-coordinated policy action. Over a longer

horizon, determined efforts will be needed to build firmer underpinnings for financial intermediation, learning lessons from the weaknesses revealed by the present period of turbulence. Central objectives include ensuring more effective and resilient risk management by individual institutions, developing new securitization techniques to improve incentives, and strengthening accounting and credit ratings systems to raise transparency. Another important task will be to strengthen approaches to crisis management and resolution, including clarifying roles of different official agencies, bolstering deposit insurance schemes, and ensuring adequate intervention instruments, while taking care to avoid exacerbating moral hazard. In many of these areas, but particularly for the purpose of preventing, managing, and resolving financial stress, coordination across national boundaries will be crucial, given the ever-larger international integration of financial institutions and markets.

Directors generally saw merit in giving consideration to introducing a macroeconomic element in the financial prudential framework to weigh against the inherent procyclicality of credit creation. Many Directors saw merit in the possibility of extending monetary policy frameworks to provide for “leaning against the wind” of asset price movements. However, a number of other Directors pointed to the complexities that this involves and questioned the potential benefits.

Directors emphasized that joint multilateral efforts will be crucial to relieve strains in commodity and financial markets in a lasting way. Many Directors agreed with the IMF staff’s analysis in Chapter 3, which finds little concrete evidence that rising investor interest in commodities as an alternative asset or speculation has had a systematic or lasting impact on prices, although swings in market sentiment may have contributed to short-term price dynamics. Some Directors, however, had further questions and requested additional analysis, based on data refinements. Directors considered that the focus should be on policies to encourage stronger supply and demand responses to improve market

balances, while avoiding measures that could exacerbate market tightness in the short term.

Directors stressed that the multilateral strategy endorsed by the IMFC in 2005 and elaborated by the Multilateral Consultation on Global Imbalances in 2006 and 2007 remains relevant but should be applied flexibly. In this context, they acknowledged that the issues related to global imbalances are shifting. U.S. fiscal consolidation remains a key medium-term objective, but countercyclical fiscal stimulus and public support for the housing and financial sectors have been warranted to alleviate the current slowdown and stabilize markets. For their part, the euro area and Japan should press ahead with product and labor market reforms to raise potential growth in their economies. China needs to build on the progress in boosting domestic demand and continue to contribute to addressing global imbalances. The recent increase in surpluses of Middle Eastern oil exporters is an inevitable counterpart of higher oil prices, given absorptive capacity constraints, and it appears that the recycling of surpluses to importing economies has generally worked well so far. Nevertheless, it will be important to ensure a transparent and open environment for capital flows, including through finalizing a set of good practices for sovereign wealth funds. IMF staff analysis shows that there has been further—albeit uneven—progress toward realignment of major world currencies. The real effective exchange rate of the U.S. dollar is now judged to have moved broadly into line with medium-run fundamentals, and this should help lower the U.S. current account deficit. However, the dollar realignment is mostly attributable to the depreciation against the euro rather than against the currencies of major current account surplus countries. Also, the real effective exchange rate of the euro remains on the strong side of fundamentals. Directors noted the IMF staff’s assessment that China’s exchange rate is still substantially undervalued. At this juncture, it is important to resist protectionist pressures and to make progress toward multilateral trade liberalization by unblocking the Doha Round.



# STATISTICAL APPENDIX

The Statistical Appendix presents historical data, as well as projections. It comprises five sections: Assumptions, What's New, Data and Conventions, Classification of Countries, and Statistical Tables.

The assumptions underlying the estimates and projections for 2008–09 and the medium-term scenario for 2010–13 are summarized in the first section. The second section presents a brief description of changes to the database and statistical tables. The third section provides a general description of the data and of the conventions used for calculating country group composites. The classification of countries in the various groups presented in the *World Economic Outlook* is summarized in the fourth section.

The last, and main, section comprises the statistical tables. Data in these tables have been compiled on the basis of information available through early October 2008. The figures for 2008 and beyond are shown with the same degree of precision as the historical figures solely for convenience; because they are projections, the same degree of accuracy is not to be inferred.

## Assumptions

Real effective *exchange rates* for the advanced economies are assumed to remain constant at their average levels during the period August 18 to September 15, 2008. For 2008 and 2009, these assumptions imply average U.S. dollar/SDR conversion rates of 1.596 and 1.567, U.S. dollar/euro conversion rates of 1.52 and 1.50, and yen/U.S. dollar conversion rates of 106.5 and 108.3, respectively.

It is assumed that the *price of oil* will average \$107.25 a barrel in 2008 and \$100.50 a barrel in 2009.

Established *policies* of national authorities are assumed to be maintained. The more specific

policy assumptions underlying the projections for selected advanced economies are described in Box A1.

With regard to *interest rates*, it is assumed that the London interbank offered rate (LIBOR) on six-month U.S. dollar deposits will average 3.2 percent in 2008 and 3.1 percent in 2009, that three-month euro deposits will average 4.8 percent in 2008 and 4.2 percent in 2009, and that six-month Japanese yen deposits will average 1.0 percent in 2008 and 1.2 percent in 2009.

With respect to *introduction of the euro*, on December 31, 1998, the Council of the European Union decided that, effective January 1, 1999, the irrevocably fixed conversion rates between the euro and currencies of the member states adopting the euro are as follows.

See Box 5.4 of the October 1998 *World Economic Outlook* for details on how the conversion rates were established.

|        |   |          |                               |
|--------|---|----------|-------------------------------|
| 1 euro | = | 13.7603  | Austrian schillings           |
|        | = | 40.3399  | Belgian francs                |
|        | = | 0.585274 | Cyprus pound <sup>1</sup>     |
|        | = | 1.95583  | Deutsche mark                 |
|        | = | 5.94573  | Finnish markkaa               |
|        | = | 6.55957  | French francs                 |
|        | = | 340.750  | Greek drachma <sup>2</sup>    |
|        | = | 0.787564 | Irish pound                   |
|        | = | 1,936.27 | Italian lire                  |
|        | = | 40.3399  | Luxembourg francs             |
|        | = | 0.42930  | Maltese lira <sup>3</sup>     |
|        | = | 2,20371  | Netherlands guilders          |
|        | = | 200.482  | Portuguese escudos            |
|        | = | 239.640  | Slovenian tolars <sup>4</sup> |
|        | = | 166.386  | Spanish pesetas               |

<sup>1</sup>Established on January 1, 2008.

<sup>2</sup>Established on January 1, 2001.

<sup>3</sup>Established on January 1, 2008.

<sup>4</sup>Established on January 1, 2007.

## Box A1. Economic Policy Assumptions Underlying the Projections for Selected Economies

The short-term *fiscal policy assumptions* used in the *World Economic Outlook* are based on officially announced budgets, adjusted for differences between the national authorities and the IMF staff regarding macroeconomic assumptions and projected fiscal outturns. The medium-term fiscal projections incorporate policy measures that are judged likely to be implemented. When the IMF staff has insufficient information to assess the authorities' budget intentions and prospects for policy implementation, an unchanged structural primary balance is assumed, unless otherwise indicated. Specific assumptions used in some of the advanced economies follow (see also Tables B5–B7 in the Statistical Appendix for data on fiscal and structural balances).<sup>1</sup>

**United States.** The fiscal projections are based on the administration's fiscal year 2009 budget and mid-session review. The fiscal projections do not reflect the impact of the most recent government interventions in financial markets, instead accounting only for the \$25 billion in support for the government-sponsored enterprises estimated by the Congressional Budget Office (CBO) in July 2008. Adjustments are made to account for differences in macroeconomic projections as well as IMF staff assumptions about (1) additional defense spending

<sup>1</sup>The output gap is actual minus potential output, as a percent of potential output. Structural balances are expressed as a percent of potential output. The structural budget balance is the budgetary position that would be observed if the level of actual output coincided with potential output. Changes in the structural budget balance consequently include effects of temporary fiscal measures, the impact of fluctuations in interest rates and debt-service costs, and other noncyclical fluctuations in the budget balance. The computations of structural budget balances are based on IMF staff estimates of potential GDP and revenue and expenditure elasticities (see the October 1993 *World Economic Outlook*, Annex I). Net debt is defined as gross debt minus financial assets of the general government, which include assets held by the social security insurance system. Estimates of the output gap and of the structural balance are subject to significant margins of uncertainty.

based on analysis by the CBO, (2) slower compression in the growth rate of discretionary spending, and (3) continued alternative minimum tax relief beyond fiscal year 2009. Projections also assume that proposed Medicare savings are achieved only partially and that personal retirement accounts are not introduced.

**Japan.** The medium-term fiscal projections assume that expenditure and revenue of the general government (excluding social security) are adjusted in line with the current government target to achieve primary fiscal balance (excluding social security) by fiscal year 2011.

**Germany.** Projections reflect the measures announced in the Stability Program Update 2007. Projections for 2008 include a loss in revenue owing to corporate tax reform and a cut in social security contribution rates (unemployment insurance). Over the medium term, health expenditures accelerate because the population is aging and health care reform measures have not been taken.

**France.** For 2008, the fiscal projections are based on the budget law and assume higher social security spending growth, largely owing to higher-than-targeted increases in health care outlays. Medium-term projections reflect the authorities' official tax revenue forecast but assume different spending (less deceleration) and nontax revenue profiles, consistent with an unchanged policy assumption.

**Italy.** For 2009, the projection is based on the IMF staff's evaluation of the fiscal package that anticipated the 2009 budget, as passed in August 2008. For 2010–13, a constant primary structural balance is assumed.

**United Kingdom.** The medium-term revenue projections are consistent with the IMF staff's macroeconomic assumptions. The expenditure projections assume that after the planned consolidation, set out in the 2008 budget, expenditures will continue in terms of the percent of GDP through 2012–13.

**Canada.** Projections use the baseline forecasts in the 2008 federal budget and the 2007

**Economic Statement.** The IMF staff makes some adjustments to this forecast for differences in macroeconomic projections. The IMF staff forecast also incorporates the most recent data releases from Statistics Canada, including provincial and territorial budgetary outturns through the first quarter of 2008.

*Australia.* The fiscal projections through fiscal year 2011/12 are based on the budget published in May 2008. For the remainder of the projection period, the IMF staff assumes unchanged policies.

*Austria.* Projections for 2008 are based on current policies. For the medium term, fiscal policy assumptions take into account announced future policy measures, including tax cuts, that are judged likely to be implemented.

*Belgium.* Projections for 2008 are IMF staff estimates based on the 2008 budget voted by the Parliament in May 2008 and adjusted for macroeconomic assumptions. Projections for 2009 are IMF staff estimates, adjusted for macroeconomic assumptions and assuming unchanged policies.

*Brazil.* The fiscal projections for 2008 are based on the 2008 budget guidelines law and recent pronouncements by the authorities regarding their policy intentions. For the outer years, the IMF staff assumes unchanged policies, with a further increase in public investment in line with the authorities' intentions.

*China.* Projections for 2008 are based on IMF staff estimates and data for the first three months, with some adjustment for the IMF staff's definition of overall budget balance. For 2009–13, IMF staff projections assume that spending, especially in social sectors, will increase, with the deficit roughly constant at its projected 2008 level (about 1 percent of GDP).

*Denmark.* Projections for 2008 and 2009 are aligned with the latest official budget estimates and the underlying projections, adjusted where appropriate for the IMF staff's macroeconomic assumptions. For 2009–13, the projections incorporate key features of the prior medium-term fiscal plan as embodied in the authorities' November 2007 Convergence Program submitted to the

European Union. The projections imply convergence of the budget toward a close-to-balanced position from an initial surplus position. This is consistent with the authorities' projection of a closure of the output gap over the medium term, as well as being in line with their objectives for long-term fiscal sustainability and debt reduction.

*Greece.* Projections are based on the 2008 budget, the latest Stability Program, and other forecasts and data provided by the authorities.

*Hong Kong SAR.* Fiscal projections for 2007–10 are consistent with the authorities' medium-term strategy as outlined in the fiscal year 2007/08 budget, with projections for 2011–13 based on the assumptions underlying the IMF staff's medium-term macroeconomic scenario.

*India.* Estimates for 2007 are based on data on budgetary execution. Projections for 2008 and beyond are based on available information on the authorities' fiscal plans, with some adjustments for the IMF staff's assumptions.

*Korea.* The fiscal projections reflect the 2008 budget and the five-year medium-term budget for 2009–13, with some adjustment for measures announced since the passage of the budget as well as the IMF staff's assumptions and macroeconomic projections.

*Mexico.* Fiscal projections for 2008 build on the authorities' budget and also take into consideration higher-than-budgeted oil prices. Projections for 2009 and beyond are based on IMF staff calculations in line with the Federal Government Fiscal Responsibility Law, requiring a zero overall balance according to the traditional budget definition.

*Netherlands.* The fiscal projections build on the 2007 budget, the latest Stability Program, and other forecasts provided by the authorities.

*New Zealand.* The fiscal projections through fiscal year 2011/12 are based on the 2008 budget, released in May 2008. For the remainder of the projection period, the IMF staff assumes unchanged policies. The New Zealand fiscal account switched to generally accepted accounting principles beginning in fiscal year 2006/07, with no comparable historical data.

### **Box A1 (*concluded*)**

*Portugal.* Fiscal projections for 2008–10 are based on unchanged policies specified in the 2008 Budgetary Policy Steering Report. They take into account the anticipated savings from the reforms that have already been introduced (for example, of the social security system and public sector administration reform). Beyond 2011, no further consolidation is assumed, and the structural primary balance is kept unchanged.

*Russia.* Fiscal projections for Russia are based on the 2008 budget, the authorities' proposed medium-term budget for 2009–11 and, for later years, the ceiling for the non-oil deficit of the federal government as imposed by the budget code. Differences in expenditure projections between those of the IMF staff and of the authorities for 2009 and beyond reflect mainly different assumptions for real GDP, inflation, and revenues.

*Singapore.* For fiscal year 2007/08, expenditure projections are based on budget numbers, whereas revenue projections reflect the IMF staff's estimates of the impact of new policy measures, including an increase in the goods and services tax. Medium-term revenue projections assume that capital gains on fiscal reserves will be included in investment income.

*Spain.* Fiscal projections through 2010 are based on the 2008 budget and policies outlined in the authorities' updated Stability Program 2007–10, adjusted for the IMF staff's macroeconomic assumptions, information from recent

statistical releases, and official announcements. In subsequent years, fiscal projections assume unchanged policies.

*Sweden.* Fiscal projections are based on information provided in the 2009 Fiscal Policy Bill (April 2008), with adjustments reflecting incoming fiscal data and the IMF staff's views on the macroeconomic environment.

*Switzerland.* Projections for 2008–13 are based on IMF staff calculations, which incorporate measures to restore balance in the federal accounts and strengthen social security finances.

**Monetary policy assumptions** are based on the established policy framework in each country. In most cases, this implies a nonaccommodative stance over the business cycle: official interest rates will increase when economic indicators suggest that inflation will rise above its acceptable rate or range, and they will decrease when indicators suggest that prospective inflation will not exceed the acceptable rate or range, prospective output growth is below its potential rate, and the margin of slack in the economy is significant. On this basis, the London interbank offered rate on six-month U.S. dollar deposits is assumed to average 3.2 percent in 2008 and 3.1 percent in 2009 (see Table 1.1). The rate on three-month euro deposits is assumed to average 4.8 percent in 2008 and 4.2 percent in 2009. The interest rate on six-month Japanese yen deposits is assumed to average 1.0 percent in 2008 and 1.2 percent in 2009.

### **What's New**

No changes have been introduced for this issue of the *World Economic Outlook*.

### **Data and Conventions**

Data and projections for 183 countries form the statistical basis for the *World Economic Outlook* (the World Economic Outlook database). The data are maintained jointly by the IMF's Research Department and area departments,

with the latter regularly updating country projections based on consistent global assumptions.

Although national statistical agencies are the ultimate providers of historical data and definitions, international organizations are also involved in statistical issues, with the objective of harmonizing methodologies for the national compilation of statistics, including the analytical frameworks, concepts, definitions, classifications, and valuation procedures used in the production of economic statistics. The World Economic

Outlook database reflects information from both national source agencies and international organizations.

The comprehensive revision of the standardized *System of National Accounts 1993* (SNA), the IMF's *Balance of Payments Manual, Fifth Edition* (BPM5), the *Monetary and Financial Statistics Manual* (MFSM), and the *Government Finance Statistics Manual 2001* (GFSM 2001) represented significant improvements in the standards of economic statistics and analysis.<sup>1</sup> The IMF was actively involved in all these projects, particularly the *Balance of Payments, Monetary and Financial Statistics*, and *Government Finance Statistics* manuals, which reflects the IMF's special interest in countries' external positions, financial sector stability, and public sector fiscal positions. The process of adapting country data to the new definitions began in earnest when the manuals were released. However, full concordance with the manuals is ultimately dependent on the provision by national statistical compilers of revised country data, and hence the *World Economic Outlook* estimates are still only partially adapted to these manuals.

In line with recent improvements in standards for reporting economic statistics, several countries have phased out their traditional *fixed-base-year* method of calculating real macroeconomic variables levels and growth by switching to a *chain-weighted* method of computing aggregate growth. Recent dramatic changes in the structure of these economies have caused these countries to revise the way in which they measure real GDP levels and growth. Switching to the chain-weighted method of computing aggregate growth, which uses current price information, allows countries to measure GDP growth more

<sup>1</sup>Commission of the European Communities, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations, and World Bank, *System of National Accounts 1993* (Brussels/Luxembourg, New York, Paris, and Washington, 1993); International Monetary Fund, *Balance of Payments Manual, Fifth Edition* (Washington, 1993); International Monetary Fund, *Monetary and Financial Statistics Manual* (Washington, 2000); and International Monetary Fund, *Government Finance Statistics Manual* (Washington, 2001).

accurately by eliminating upward biases in new data.<sup>2</sup> Currently, real macroeconomic data for Albania, Australia, Austria, Azerbaijan, Belgium, Bulgaria, Canada, Cyprus, the Czech Republic, Denmark, Estonia, the euro area, Finland, France, Georgia, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Italy, Japan, Kazakhstan, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Russia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, and the United States are based on chain-weighted methodology. However, data before 1996 (Albania), 1994 (Azerbaijan), 1995 (Belgium), 2000 (Bulgaria), 1995 (Cyprus), 1995 (Czech Republic), 2001 (Estonia), 1995 (euro area), 1996 (Georgia), 1991 (Germany), 2000 (Greece), 1990 (Iceland), 1995 (Ireland), 1994 (Japan), 1994 (Kazakhstan), 1995 (Luxembourg), 2000 (Malta), 1995 (Poland), 1995 (Russia), 1995 (Slovenia), and 1995 (Spain) are based on unrevised national accounts and subject to revision in the future.

The members of the European Union have adopted a harmonized system for the compilation of national accounts, referred to as ESA 1995. All national accounts data from 1995 onward are presented on the basis of the new system. Revision by national authorities of data prior to 1995 to conform to the new system has progressed but, in some cases, has not been completed. In such cases, historical *World Economic Outlook* data have been carefully adjusted to avoid breaks in the series. Users of EU national accounts data prior to 1995 should nevertheless exercise caution until such time as the revision of historical data by national statistical agencies has been fully completed. See Box 1.2 of the May 2000 *World Economic Outlook*.

Composite data for country groups in the *World Economic Outlook* are either sums or weighted averages of data for individual countries. Unless otherwise indicated, multiyear aver-

<sup>2</sup>Charles Steindel, 1995, "Chain-Weighting: The New Approach to Measuring GDP," *Current Issues in Economics and Finance* (Federal Reserve Bank of New York), Vol. 1 (December).

ages of growth rates are expressed as compound annual rates of change.<sup>3</sup> Arithmetically weighted averages are used for all data except inflation and money growth for the emerging and developing economies group, for which geometric averages are used. The following conventions apply.

- Country group composites for exchange rates, interest rates, and the growth rates of monetary aggregates are weighted by GDP converted to U.S. dollars at market exchange rates (averaged over the preceding three years) as a share of group GDP.
- Composites for other data relating to the domestic economy, whether growth rates or ratios, are weighted by GDP valued at PPPs as a share of total world or group GDP.<sup>4</sup>
- Composites for data relating to the domestic economy for the euro area (15 member countries throughout the entire period unless otherwise noted) are aggregates of national source data using GDP weights. Annual data are not adjusted for calendar day effects. For data prior to 1999, data aggregations apply 1995 European currency unit exchange rates.
- Composite unemployment rates and employment growth are weighted by labor force as a share of group labor force.
- Composites relating to the external economy are sums of individual country data after conversion to U.S. dollars at the average market exchange rates in the years indicated for balance of payments data and at end-of-year market exchange rates for debt denominated in currencies other than U.S. dollars. Composites of changes in foreign trade volumes

<sup>3</sup>Averages for real GDP and its components, employment, per capita GDP, inflation, factor productivity, trade, and commodity prices are calculated based on the compound annual rate of change, except for the unemployment rate, which is based on the simple arithmetic average.

<sup>4</sup>See Box A2 of the April 2004 *World Economic Outlook* for a summary of the revised PPP-based weights and Annex IV of the May 1993 *World Economic Outlook*. See also Anne-Marie Gulde and Marianne Schulze-Ghattas, "Purchasing Power Parity Based Weights for the World Economic Outlook," in *Staff Studies for the World Economic Outlook* (International Monetary Fund, December 1993), pp. 106–23.

and prices, however, are arithmetic averages of percent changes for individual countries weighted by the U.S. dollar value of exports or imports as a share of total world or group exports or imports (in the preceding year).

For central and eastern European countries, external transactions in nonconvertible currencies (through 1990) are converted to U.S. dollars at the implicit U.S. dollar/ruble conversion rates obtained from each country's national currency exchange rate for the U.S. dollar and for the ruble.

All data refer to calendar years, except for the following countries, which refer to fiscal years: Australia (July/June), Egypt (July/June), Haiti (October/September), Islamic Republic of Iran (April/March), Mauritius (July/June), Myanmar (April/March), Nepal (July/June), New Zealand (July/June), Pakistan (July/June), Samoa (July/June), and Tonga (July/June).

## Classification of Countries

### Summary of the Country Classification

The country classification in the *World Economic Outlook* divides the world into two major groups: advanced economies and emerging and developing economies.<sup>5</sup> Rather than being based on strict criteria, economic or otherwise, this classification has evolved over time with the objective of facilitating analysis by providing a reasonably meaningful organization of data. Table A provides an overview of these standard groups in the *World Economic Outlook*, showing the number of countries in each group and the average 2007 shares of groups in aggregate PPP-valued GDP, total exports of goods and services, and population.

A few countries are currently not included in these groups, either because they are not IMF members and their economies are not monitored by the IMF or because databases have

<sup>5</sup>As used here, the term "country" does not in all cases refer to a territorial entity that is a state as understood by international law and practice. It also covers some territorial entities that are not states, but for which statistical data are maintained on a separate and independent basis.

**Table A. Classification by *World Economic Outlook* Groups and Their Shares in Aggregate GDP, Exports of Goods and Services, and Population, 2007<sup>1</sup>**  
 (Percent of total for group or world)

|   | Number of Countries | GDP                               |             | Exports of Goods and Services     |             | Population                        |             |
|---|---------------------|-----------------------------------|-------------|-----------------------------------|-------------|-----------------------------------|-------------|
|   |                     | Advanced economies                | World       | Advanced economies                | World       | Advanced economies                | World       |
| <b>Advanced economies</b>                                 | <b>31</b>           | <b>100.0</b>                      | <b>56.3</b> | <b>100.0</b>                      | <b>66.2</b> | <b>100.0</b>                      | <b>15.2</b> |
| United States   |                     | 37.9                              | 21.3        | 14.5                              | 9.6         | 30.7                              | 4.7         |
| Euro area   | 15                  | 28.6                              | 16.1        | 44.3                              | 29.4        | 32.3                              | 4.9         |
| Germany   |                     | 7.7                               | 4.3         | 13.9                              | 9.2         | 8.4                               | 1.3         |
| France  |                     | 5.6                               | 3.2         | 6.1                               | 4.0         | 6.3                               | 1.0         |
| Italy   |                     | 4.9                               | 2.8         | 5.4                               | 3.6         | 6.0                               | 0.9         |
| Spain   |                     | 3.7                               | 2.1         | 3.4                               | 2.3         | 4.6                               | 0.7         |
| Japan   |                     | 11.7                              | 6.6         | 7.1                               | 4.7         | 13.0                              | 2.0         |
| United Kingdom  |                     | 5.9                               | 3.3         | 6.5                               | 4.3         | 6.2                               | 0.9         |
| Canada  |                     | 3.5                               | 2.0         | 4.4                               | 2.9         | 3.3                               | 0.5         |
| Other advanced economies                                  | 12                  | 12.5                              | 7.0         | 23.2                              | 15.3        | 14.4                              | 2.2         |
| <i>Memorandum</i>   |                     |                                   |             |                                   |             |                                   |             |
| Major advanced economies                                  | 7                   | 77.2                              | 43.5        | 57.9                              | 38.3        | 73.8                              | 11.2        |
| Newly industrialized Asian economies                      | 4                   | 6.6                               | 3.7         | 13.4                              | 8.9         | 8.4                               | 1.3         |
| <br><b>Emerging and developing economies</b>              |                     |                                   |             |                                   |             |                                   |             |
|   |                     | Emerging and developing economies | World       | Emerging and developing economies | World       | Emerging and developing economies | World       |
| <b>Emerging and developing economies</b>                  | <b>141</b>          | <b>100.0</b>                      | <b>43.7</b> | <b>100.0</b>                      | <b>33.8</b> | <b>100.0</b>                      | <b>84.8</b> |
| <b>Regional groups</b>                                    |                     |                                   |             |                                   |             |                                   |             |
| Africa  | 47                  | 6.8                               | 3.0         | 7.4                               | 2.5         | 15.0                              | 12.7        |
| Sub-Saharan   | 44                  | 5.3                               | 2.3         | 5.5                               | 1.9         | 13.6                              | 11.5        |
| Excluding Nigeria and South Africa                        | 42                  | 2.8                               | 1.2         | 2.8                               | 0.9         | 10.1                              | 8.6         |
| Central and eastern Europe                                | 13                  | 9.3                               | 4.0         | 13.6                              | 4.6         | 3.2                               | 2.8         |
| Commonwealth of Independent States <sup>2</sup>           | 13                  | 10.2                              | 4.5         | 10.2                              | 3.4         | 5.1                               | 4.3         |
| Russia  |                     | 7.3                               | 3.2         | 6.8                               | 2.3         | 2.6                               | 2.2         |
| Developing Asia   | 23                  | 46.1                              | 20.1        | 39.3                              | 13.3        | 62.3                              | 52.9        |
| China   |                     | 24.8                              | 10.8        | 23.2                              | 7.8         | 24.0                              | 20.4        |
| India   |                     | 10.5                              | 4.6         | 4.1                               | 1.4         | 21.2                              | 18.0        |
| Excluding China and India                                 | 21                  | 10.8                              | 4.7         | 12.1                              | 4.1         | 17.1                              | 14.5        |
| Middle East   | 13                  | 8.7                               | 3.8         | 14.3                              | 4.8         | 4.3                               | 3.7         |
| Western Hemisphere  | 32                  | 18.9                              | 8.3         | 15.1                              | 5.1         | 10.0                              | 8.5         |
| Brazil  |                     | 6.4                               | 2.8         | 3.2                               | 1.1         | 3.4                               | 2.9         |
| Mexico  |                     | 4.7                               | 2.1         | 5.0                               | 1.7         | 1.9                               | 1.6         |
| <b>Analytical groups</b>                                  |                     |                                   |             |                                   |             |                                   |             |
| <b>By source of export earnings</b>                       |                     |                                   |             |                                   |             |                                   |             |
| Fuel  | 24                  | 19.3                              | 8.4         | 26.8                              | 9.1         | 11.0                              | 9.4         |
| Nonfuel   | 117                 | 80.7                              | 35.2        | 73.2                              | 24.7        | 89.0                              | 75.5        |
| of which, primary products                                | 20                  | 1.7                               | 0.7         | 2.1                               | 0.7         | 4.0                               | 3.4         |
| <b>By external financing source</b>                       |                     |                                   |             |                                   |             |                                   |             |
| Net debtor countries                                      | 116                 | 55.1                              | 24.1        | 47.1                              | 15.9        | 64.8                              | 55.0        |
| of which, official financing                              | 30                  | 3.4                               | 1.5         | 2.4                               | 0.8         | 10.6                              | 9.0         |
| <b>Net debtor countries by debt servicing experience</b>  |                     |                                   |             |                                   |             |                                   |             |
| Countries with arrears and/or rescheduling during 2002–06 | 49                  | 9.7                               | 4.3         | 6.9                               | 2.3         | 17.1                              | 14.5        |
| Other net debtor countries                                | 67                  | 45.3                              | 19.8        | 40.3                              | 13.6        | 47.7                              | 40.5        |
| <b>Other groups</b>                                       |                     |                                   |             |                                   |             |                                   |             |
| Heavily indebted poor countries                           | 31                  | 1.8                               | 0.8         | 1.2                               | 0.4         | 8.4                               | 7.1         |
| Middle East and North Africa                              | 19                  | 10.5                              | 4.6         | 16.4                              | 5.6         | 6.5                               | 5.5         |

<sup>1</sup>The GDP shares are based on the purchasing-power-parity (PPP) valuation of country GDPs. The number of countries comprising each group reflects those for which data are included in the group aggregates.

<sup>2</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

not yet been fully developed. Because of data limitations, group composites do not reflect the following countries: the Islamic Republic of Afghanistan, Bosnia and Herzegovina, Brunei Darussalam, Eritrea, Iraq, Liberia, Montenegro, Serbia, Somalia, Timor-Leste, and Zimbabwe. Cuba and the Democratic People's Republic of Korea are examples of countries that are not IMF members, whereas San Marino, among the advanced economies, and Aruba, Marshall Islands, the Federated States of Micronesia, and Palau, among the developing economies, are examples of countries for which databases have not been completed.

## General Features and Composition of Groups in the World Economic Outlook Classification

### Advanced Economies

The 31 advanced economies are listed in Table B. The seven largest in terms of GDP—the United States, Japan, Germany, France, Italy, the United Kingdom, and Canada—constitute the subgroup of *major advanced economies*, often referred to as the Group of Seven (G7). The 15 members of the *euro area* and the four *newly industrialized Asian economies* are also distinguished as subgroups. Composite data shown in the tables for the euro area cover the current members for all years, even though the membership has increased over time.

In 1991 and subsequent years, data for *Germany* refer to west Germany and the eastern Länder (that is, the former German Democratic Republic). Before 1991, economic data were not available on a unified basis or in a consistent manner. Hence, in tables featuring data expressed as annual percent change, these apply to west Germany in years up to and including 1991, but to unified Germany from 1992 onward. In general, data on national accounts and domestic economic and financial activity through 1990 cover west Germany only, whereas data for the central government and balance of payments apply to west Germany through June 1990 and to unified Germany thereafter.

Table C lists the member countries of the European Union, not all of which are classified as advanced economies in the *World Economic Outlook*.

### Emerging and Developing Economies

The group of emerging and developing economies (141 countries) includes all countries that are not classified as advanced economies.

The *regional breakdowns* of emerging and developing economies—*Africa, central and eastern Europe, Commonwealth of Independent States, developing Asia, Middle East, and Western Hemisphere*—largely conform to the regional breakdowns in the IMF's *International Financial Statistics*. In both classifications, Egypt and Libya are included in the *Middle East* region rather than in Africa. In addition, the *World Economic Outlook* sometimes refers to the regional group of Middle East and

**Table B. Advanced Economies by Subgroup**

| Major Currency Areas | Other Subgroups |             |                                      |                          |                            |                          |
|----------------------|-----------------|-------------|--------------------------------------|--------------------------|----------------------------|--------------------------|
|                      | Euro area       |             | Newly industrialized Asian economies | Major advanced economies | Other advanced economies   |                          |
| United States        | Austria         | Italy       | Hong Kong SAR <sup>1</sup>           | Canada                   | Australia                  | New Zealand              |
| Euro area            | Belgium         | Luxembourg  | Korea                                | France                   | Denmark                    | Norway                   |
| Japan                | Cyprus          | Malta       | Singapore                            | Germany                  | Hong Kong SAR <sup>1</sup> | Singapore                |
|                      | Finland         | Netherlands | Taiwan Province of China             | Italy                    | Iceland                    | Sweden                   |
|                      | France          | Portugal    |                                      | Japan                    | Israel                     | Switzerland              |
|                      | Germany         | Slovenia    |                                      | United Kingdom           | Korea                      | Taiwan Province of China |
|                      | Greece          | Spain       |                                      | United States            |                            |                          |
|                      | Ireland         |             |                                      |                          |                            |                          |

<sup>1</sup>On July 1, 1997, Hong Kong was returned to the People's Republic of China and became a Special Administrative Region of China.

**Table C. European Union**

|                |         |             |                 |
|----------------|---------|-------------|-----------------|
| Austria        | Finland | Latvia      | Romania         |
| Belgium        | France  | Lithuania   | Slovak Republic |
| Bulgaria       | Germany | Luxembourg  | Slovenia        |
| Cyprus         | Greece  | Malta       | Spain           |
| Czech Republic | Hungary | Netherlands | Sweden          |
| Denmark        | Ireland | Poland      | United Kingdom  |
| Estonia        | Italy   | Portugal    |                 |

North African countries, also referred to as the MENA countries, whose composition straddles the Africa and Middle East regions. This group is defined as the Arab League countries plus the Islamic Republic of Iran (see Table D).

**Table D. Middle East and North African Countries**

|               |            |              |                      |
|---------------|------------|--------------|----------------------|
| Algeria       | Jordan     | Morocco      | Syrian Arab Republic |
| Bahrain       | Kuwait     | Oman         | Tunisia              |
| Djibouti      | Lebanon    | Qatar        | United Arab Emirates |
| Egypt         | Libya      | Saudi Arabia | Yemen, Rep. of       |
| Iran, I.R. of | Mauritania | Sudan        |                      |

Emerging and developing economies are also classified according to *analytical criteria*. The analytical criteria reflect countries' composition of export earnings and other income from abroad; exchange rate arrangements; a distinction between net creditor and net debtor countries; and, for the net debtor countries, financial criteria based on external financing sources and experience with external debt servicing. The detailed composition of emerging and developing economies in the regional and analytical groups is shown in Tables E and F.

The analytical criterion, by *source of export earnings*, distinguishes between categories *fuel* (Standard International Trade Classification—SITC 3) and *nonfuel* and then focuses on *nonfuel primary products* (SITCs 0, 1, 2, 4, and 68).

The financial criteria focus on *net creditor countries*, *net debtor countries*, and *heavily indebted poor countries* (HIPC). Net debtor countries are further differentiated on the basis of two additional financial criteria: by *official external financing* and by *experience with debt servicing*.<sup>6</sup> The

<sup>6</sup>During 2002–06, 49 countries incurred external payments arrears or entered into official or commercial bank debt-rescheduling agreements. This group of countries

**Table E. Emerging and Developing Economies by Region and Main Source of Export Earnings**

|   | Fuel   | Nonfuel Primary Products   |
|---|--|--|
| <b>Africa</b>                             | Algeria<br>Angola<br>Congo, Rep. of<br>Equatorial Guinea<br>Gabon<br>Nigeria<br>Sudan  | Botswana<br>Burkina Faso<br>Burundi<br>Chad<br>Congo, Dem.<br>Rep. of<br>Guinea<br>Guinea-Bissau<br>Malawi<br>Mauritania<br>Mozambique<br>Sierra Leone<br>Zambia |
| <b>Commonwealth of Independent States</b> | Azerbaijan<br>Kazakhstan<br>Russia<br>Turkmenistan   | Mongolia<br>Tajikistan<br>Uzbekistan   |
| <b>Developing Asia</b>                    |  | Papua New Guinea<br>Solomon Islands  |
| <b>Middle East</b>                        | Bahrain<br>Iran, I.R. of<br>Kuwait<br>Libya<br>Oman<br>Qatar<br>Saudi Arabia<br>Syrian Arab Republic<br>United Arab Emirates<br>Yemen, Rep. of |  |
| <b>Western Hemisphere</b>                 | Ecuador<br>Trinidad and Tobago<br>Venezuela, Rep.<br>Boliv. de   | Chile<br>Guyana<br>Suriname  |

Note: Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

HIPC group comprises the countries considered by the IMF and the World Bank for their debt initiative, known as the HIPC Initiative, with the aim of reducing the external debt burdens of all the eligible HIPCs to a “sustainable” level in a reasonably short period of time.<sup>7</sup>

is referred to as *countries with arrears and/or rescheduling during 2002–06*.

<sup>7</sup>See David Andrews, Anthony R. Boote, Syed S. Rizavi, and Sukwinder Singh, *Debt Relief for Low-Income Countries: The Enhanced HIPC Initiative*, IMF Pamphlet Series, No. 51 (Washington: International Monetary Fund, November 1999).

**Table F. Emerging and Developing Economies by Region, Net External Position, and Status as Heavily Indebted Poor Countries**

|   | Net External Position |                            | Heavily<br>Indebted<br>Poor<br>Countries | Net External Position |                            | Heavily<br>Indebted<br>Poor<br>Countries |
|---|-----------------------|----------------------------|--|-----------------------|----------------------------|--|
|   | Net<br>creditor       | Net<br>debtor <sup>1</sup> |  | Net<br>creditor       | Net<br>debtor <sup>1</sup> |  |
| <b>Africa</b>   |                       |                            |  |                       |                            |  |
| <b>Maghreb</b>  |                       |                            |  |                       |                            |  |
| Algeria   | *                     |                            |  |                       |                            | *  |
| Morocco   |                       | *                          |  |                       |                            | *  |
| Tunisia   |                       | *                          |  |                       |                            | *  |
| <b>Sub-Saharan</b>                                    |                       |                            |  |                       |                            |  |
| South Africa  |                       | *                          |  |                       |                            | *  |
| <b>Horn of Africa</b>                                 |                       |                            |  |                       |                            |  |
| Djibouti  |                       | *                          |  |                       |                            | *  |
| Ethiopia  | *                     | *                          |  |                       |                            | *  |
| Sudan   |                       | *                          |  |                       |                            | *  |
| <b>Great Lakes</b>                                    |                       |                            |  |                       |                            |  |
| Burundi   | *                     | *                          |  |                       |                            | *  |
| Congo, Dem. Rep. of                                   | *                     | *                          |  |                       |                            | *  |
| Kenya   | *                     |                            |  |                       |                            | *  |
| Rwanda  | *                     | *                          |  |                       |                            | *  |
| Tanzania  | *                     | *                          |  |                       |                            | *  |
| Uganda  | *                     | *                          |  |                       |                            | *  |
| <b>Southern Africa</b>                                |                       |                            |  |                       |                            |  |
| Angola  | *                     |                            |  |                       |                            |  |
| Botswana  | *                     |                            |  |                       |                            |  |
| Comoros   |                       | *                          |  |                       |                            |  |
| Lesotho   |                       | *                          |  |                       |                            |  |
| Madagascar  |                       | *                          |  |                       |                            | *  |
| Malawi  |                       | *                          |  |                       |                            | *  |
| Mauritius   |                       | *                          |  |                       |                            |  |
| Mozambique  | *                     | *                          |  |                       |                            | *  |
| Namibia   | *                     |                            |  |                       |                            |  |
| Seychelles  |                       | *                          |  |                       |                            |  |
| Swaziland   |                       | *                          |  |                       |                            |  |
| Zambia  |                       | *                          |  |                       |                            | *  |
| <b>West and Central Africa</b>                        |                       |                            |  |                       |                            |  |
| Cape Verde  | *                     |                            |  |                       |                            |  |
| Gambia, The   | *                     | *                          |  |                       |                            |  |
| Ghana   | *                     | *                          |  |                       |                            |  |
| Guinea  | *                     | *                          |  |                       |                            |  |
| Mauritania  | *                     | *                          |  |                       |                            |  |
| Nigeria   | *                     |                            |  |                       |                            |  |
| São Tomé and Príncipe                                 | *                     | *                          |  |                       |                            |  |
| Sierra Leone  | *                     | *                          |  |                       |                            |  |
| <b>CFA franc zone</b>                                 |                       |                            |  |                       |                            |  |
| Benin   | *                     | *                          |  |                       |                            |  |
| Burkina Faso  | *                     | *                          |  |                       |                            |  |
| Cameroon  | *                     | *                          |  |                       |                            |  |
| Central African Republic                              | *                     | *                          |  |                       |                            |  |
| Chad  | *                     | *                          |  |                       |                            |  |
| Congo, Rep. of  | *                     | *                          |  |                       |                            |  |
| Côte d'Ivoire   | *                     |                            |  |                       |                            |  |
| Equatorial Guinea                                     | *                     |                            |  |                       |                            |  |
| Gabon   | *                     |                            |  |                       |                            |  |
| Guinea-Bissau   | *                     | *                          |  |                       |                            |  |
| Mali  | *                     | *                          |  |                       |                            |  |
| Niger   | *                     | *                          |  |                       |                            |  |
| Senegal   | *                     | *                          |  |                       |                            |  |
| Togo  | *                     |                            |  |                       |                            |  |
| <b>Central and eastern Europe</b>                     |                       |                            |  |                       |                            |  |
| Albania   |                       |                            |  |                       |                            | *  |
| Bulgaria  |                       |                            |  |                       |                            | *  |
| Croatia   |                       |                            |  |                       |                            | *  |
| Czech Republic  |                       |                            |  |                       |                            | *  |
| Estonia   |                       |                            |  |                       |                            | *  |
| Hungary   |                       |                            |  |                       |                            | *  |
| Latvia  |                       |                            |  |                       |                            | *  |
| Lithuania   |                       |                            |  |                       |                            | *  |
| Macedonia, FYR  |                       |                            |  |                       |                            | *  |
| Poland  |                       |                            |  |                       |                            | *  |
| Romania   |                       |                            |  |                       |                            | *  |
| Slovak Republic                                       |                       |                            |  |                       |                            | *  |
| Turkey  |                       |                            |  |                       |                            | *  |
| <b>Commonwealth of Independent States<sup>2</sup></b> |                       |                            |  |                       |                            |  |
| Armenia   |                       |                            |  |                       |                            | •  |
| Azerbaijan  |                       |                            |  |                       |                            | *  |
| Belarus   |                       |                            |  |                       |                            | *  |
| Georgia   |                       |                            |  |                       |                            | *  |
| Kazakhstan  |                       |                            |  |                       |                            | *  |
| Kyrgyz Republic                                       |                       |                            |  |                       |                            | *  |
| Moldova   |                       |                            |  |                       |                            | *  |
| Mongolia  |                       |                            |  |                       |                            | •  |
| Russia  |                       |                            |  |                       |                            | *  |
| Tajikistan  |                       |                            |  |                       |                            | *  |
| Turkmenistan  |                       |                            |  |                       |                            | *  |
| Ukraine   |                       |                            |  |                       |                            | *  |
| Uzbekistan  |                       |                            |  |                       |                            | *  |
| <b>Developing Asia</b>                                |                       |                            |  |                       |                            |  |
| Bhutan  |                       |                            |  |                       |                            | •  |
| Cambodia  |                       |                            |  |                       |                            | •  |
| China   |                       |                            |  |                       | *                          |  |
| Fiji  |                       |                            |  |                       |                            | *  |
| Indonesia   |                       |                            |  |                       |                            | *  |
| Kiribati  |                       |                            |  |                       | *                          |  |
| Lao PDR   |                       |                            |  |                       |                            | *  |
| Malaysia  |                       |                            |  |                       | *                          |  |
| Myanmar   |                       |                            |  |                       |                            | *  |
| Papua New Guinea                                      |                       |                            |  |                       | *                          |  |
| Philippines   |                       |                            |  |                       |                            | *  |
| Samoa   |                       |                            |  |                       |                            | *  |
| Solomon Islands                                       |                       |                            |  |                       |                            | •  |
| Thailand  |                       |                            |  |                       |                            | *  |
| Tonga   |                       |                            |  |                       |                            | •  |
| Vanuatu   |                       |                            |  |                       |                            | *  |
| Vietnam   |                       |                            |  |                       |                            | •  |
| <b>South Asia</b>                                     |                       |                            |  |                       |                            |  |
| Bangladesh  |                       |                            |  |                       |                            | •  |
| India   |                       |                            |  |                       |                            | *  |
| Maldives  |                       |                            |  |                       |                            | *  |
| Nepal   |                       |                            |  |                       |                            | •  |
| Pakistan  |                       |                            |  |                       |                            | *  |
| Sri Lanka   |                       |                            |  |                       |                            | •  |

**Table F (concluded)**

|                                | Net External Position |                            |  | Heavily<br>Indebted<br>Poor<br>Countries | Net External Position |                            |   | Heavily<br>Indebted<br>Poor<br>Countries |
|--------------------------------|-----------------------|----------------------------|--|--|-----------------------|----------------------------|---|--|
|                                | Net<br>creditor       | Net<br>debtor <sup>1</sup> |  |  | Net<br>creditor       | Net<br>debtor <sup>1</sup> |   |  |
| <b>Middle East</b>             |                       |                            |  |  |                       |                            |   |  |
| Bahrain                        | *                     |                            |  | Peru                                     |                       |                            | * |  |
| Iran, I.R. of                  | *                     |                            |  | Uruguay                                  |                       |                            | • |  |
| Kuwait                         | *                     |                            |  | Venezuela, Rep. Boliv. de                |                       |                            | * |  |
| Libya                          | *                     |                            |  |  |                       |                            |   |  |
| Oman                           | *                     |                            |  |  |                       |                            |   |  |
| Qatar                          | *                     |                            |  |  |                       |                            |   |  |
| Saudi Arabia                   | *                     |                            |  |  |                       |                            |   |  |
| United Arab Emirates           | *                     |                            |  |  |                       |                            |   |  |
| Yemen, Rep. of                 | *                     |                            |  |  |                       |                            |   |  |
| <b>Mashreq</b>                 |                       |                            |  |  |                       |                            |   |  |
| Egypt                          |                       | *                          |  |  |                       |                            |   | *  |
| Jordan                         |                       | *                          |  |  |                       |                            |   | *  |
| Lebanon                        |                       | *                          |  |  |                       |                            |   | *  |
| Syrian Arab Republic           |                       | *                          |  |  |                       |                            |   | *  |
| <b>Western Hemisphere</b>      |                       |                            |  |  |                       |                            |   |  |
| Mexico                         |                       | *                          |  |  |                       |                            |   |  |
| <b>South America</b>           |                       |                            |  |  |                       |                            |   |  |
| Argentina                      |                       | *                          |  |  |                       |                            |   |  |
| Bolivia                        |                       | *                          |  |  |                       |                            |   |  |
| Brazil                         | •                     | *                          |  |  |                       |                            |   |  |
| Chile                          |                       | *                          |  |  |                       |                            |   |  |
| Colombia                       |                       | *                          |  |  |                       |                            |   |  |
| Ecuador                        |                       | *                          |  |  |                       |                            |   |  |
| Paraguay                       |                       | *                          |  |  |                       |                            |   |  |
| Antigua and Barbuda            |                       |                            |  |  |                       |                            | * |  |
| Bahamas, The                   |                       |                            |  |  |                       |                            | * |  |
| Barbados                       |                       |                            |  |  |                       |                            | * |  |
| Belize                         |                       |                            |  |  |                       |                            | * |  |
| Dominica                       |                       |                            |  |  |                       |                            | * |  |
| Dominican Republic             |                       |                            |  |  |                       |                            | * |  |
| Grenada                        |                       |                            |  |  |                       |                            | • |  |
| Guyana                         |                       |                            |  |  |                       |                            | * | *  |
| Haiti                          |                       |                            |  |  |                       |                            | • | *  |
| Jamaica                        |                       |                            |  |  |                       |                            | * |  |
| St. Kitts and Nevis            |                       |                            |  |  |                       |                            | * |  |
| St. Lucia                      |                       |                            |  |  |                       |                            | * |  |
| St. Vincent and the Grenadines |                       |                            |  |  |                       |                            | • |  |
| Suriname                       |                       |                            |  |  |                       |                            | * |  |
| Trinidad and Tobago            |                       |                            |  |  |                       |                            | * |  |

<sup>1</sup>Dot instead of star indicates that the net debtor's main external finance source is official financing.

<sup>2</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

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**Table A1. Summary of World Output<sup>1</sup>**  
*(Annual percent change)*

|   | Average<br>1990–99 | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013       |
|---|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>World</b>  | <b>2.9</b>         | <b>4.7</b> | <b>2.2</b> | <b>2.8</b> | <b>3.6</b> | <b>4.9</b> | <b>4.5</b> | <b>5.1</b> | <b>5.0</b> | <b>3.9</b> | <b>3.0</b> | <b>4.7</b> |
| <b>Advanced economies</b>                                 | <b>2.7</b>         | <b>4.0</b> | <b>1.2</b> | <b>1.6</b> | <b>1.9</b> | <b>3.2</b> | <b>2.6</b> | <b>3.0</b> | <b>2.6</b> | <b>1.5</b> | <b>0.5</b> | <b>2.5</b> |
| United States   | 3.1                | 3.7        | 0.8        | 1.6        | 2.5        | 3.6        | 2.9        | 2.8        | 2.0        | 1.6        | 0.1        | 2.3        |
| Euro area   | ...                | 3.8        | 1.9        | 0.9        | 0.8        | 2.1        | 1.6        | 2.8        | 2.6        | 1.3        | 0.2        | 2.2        |
| Japan   | 1.5                | 2.9        | 0.2        | 0.3        | 1.4        | 2.7        | 1.9        | 2.4        | 2.1        | 0.7        | 0.5        | 1.7        |
| Other advanced economies <sup>2</sup>                     | 3.4                | 5.2        | 1.7        | 3.3        | 2.5        | 4.0        | 3.3        | 3.8        | 3.9        | 2.2        | 1.6        | 3.6        |
| <b>Emerging and developing economies</b>                  | <b>3.2</b>         | <b>5.9</b> | <b>3.8</b> | <b>4.8</b> | <b>6.3</b> | <b>7.5</b> | <b>7.1</b> | <b>7.9</b> | <b>8.0</b> | <b>6.9</b> | <b>6.1</b> | <b>6.9</b> |
| <b>Regional groups</b>                                    |                    |            |            |            |            |            |            |            |            |            |            |            |
| Africa  | 2.3                | 3.5        | 4.9        | 6.2        | 5.4        | 6.5        | 5.8        | 6.1        | 6.3        | 5.9        | 6.0        | 5.4        |
| Central and eastern Europe                                | 1.2                | 4.9        | 0.4        | 4.2        | 4.8        | 6.9        | 6.1        | 6.7        | 5.7        | 4.5        | 3.4        | 5.0        |
| Commonwealth of Independent States <sup>3</sup>           | ...                | 9.1        | 6.1        | 5.2        | 7.8        | 8.2        | 6.8        | 8.2        | 8.6        | 7.2        | 5.7        | 5.6        |
| Developing Asia   | 7.2                | 7.0        | 5.8        | 6.9        | 8.2        | 8.6        | 9.0        | 9.9        | 10.0       | 8.4        | 7.7        | 8.8        |
| Middle East   | 4.3                | 5.5        | 2.6        | 3.8        | 7.1        | 5.8        | 5.7        | 5.7        | 5.9        | 6.4        | 5.9        | 5.4        |
| Western Hemisphere  | 2.9                | 4.1        | 0.7        | 0.5        | 2.2        | 6.1        | 4.7        | 5.5        | 5.6        | 4.6        | 3.2        | 4.2        |
| <b>Memorandum</b>   |                    |            |            |            |            |            |            |            |            |            |            |            |
| European Union  | 2.0                | 3.9        | 2.1        | 1.4        | 1.5        | 2.7        | 2.2        | 3.3        | 3.1        | 1.7        | 0.6        | 2.8        |
| <b>Analytical groups</b>                                  |                    |            |            |            |            |            |            |            |            |            |            |            |
| <b>By source of export earnings</b>                       |                    |            |            |            |            |            |            |            |            |            |            |            |
| Fuel  | -0.2               | 7.0        | 4.3        | 4.7        | 6.9        | 7.7        | 6.9        | 7.1        | 7.4        | 6.7        | 5.9        | 5.0        |
| Nonfuel<br>of which, primary products                     | 4.2                | 5.7        | 3.7        | 4.8        | 6.1        | 7.5        | 7.2        | 8.1        | 8.2        | 6.9        | 6.1        | 7.3        |
| 3.1   | 3.3                | 4.0        | 3.5        | 4.8        | 7.2        | 5.8        | 5.1        | 5.8        | 5.4        | 5.3        | 5.4        |            |
| <b>By external financing source</b>                       |                    |            |            |            |            |            |            |            |            |            |            |            |
| Net debtor countries<br>of which, official financing      | 3.1                | 4.7        | 2.2        | 3.2        | 4.6        | 6.3        | 6.1        | 6.8        | 6.6        | 5.6        | 4.7        | 5.8        |
| 4.3   | 4.8                | 4.2        | 3.9        | 5.3        | 6.4        | 7.0        | 7.2        | 7.1        | 6.4        | 5.7        | 6.4        |            |
| <b>Net debtor countries by debt-servicing experience</b>  |                    |            |            |            |            |            |            |            |            |            |            |            |
| Countries with arrears and/or rescheduling during 2002–06 | 3.3                | 3.3        | 2.6        | 1.6        | 5.7        | 6.7        | 6.7        | 6.7        | 6.5        | 5.8        | 4.9        | 5.5        |
| <b>Memorandum</b>   |                    |            |            |            |            |            |            |            |            |            |            |            |
| <b>Median growth rate</b>                                 |                    |            |            |            |            |            |            |            |            |            |            |            |
| Advanced economies  | 3.0                | 3.9        | 1.9        | 1.8        | 1.9        | 3.7        | 2.9        | 3.4        | 3.7        | 1.8        | 1.2        | 3.0        |
| Emerging and developing economies                         | 3.3                | 4.3        | 3.6        | 4.0        | 4.9        | 5.5        | 5.6        | 6.2        | 6.0        | 5.5        | 5.0        | 5.1        |
| <b>Output per capita</b>                                  |                    |            |            |            |            |            |            |            |            |            |            |            |
| Advanced economies  | 2.0                | 3.3        | 0.5        | 1.0        | 1.3        | 2.6        | 1.9        | 2.4        | 1.9        | 0.9        | -0.1       | 1.9        |
| Emerging and developing economies                         | 1.6                | 4.6        | 2.4        | 3.4        | 4.9        | 6.1        | 5.8        | 6.6        | 6.7        | 5.6        | 4.8        | 5.5        |
| <b>World growth based on market exchange rates</b>        | <b>2.4</b>         | <b>4.2</b> | <b>1.5</b> | <b>1.9</b> | <b>2.7</b> | <b>4.0</b> | <b>3.4</b> | <b>3.9</b> | <b>3.7</b> | <b>2.7</b> | <b>1.9</b> | <b>3.8</b> |
| <b>Value of world output in billions of U.S. dollars</b>  |                    |            |            |            |            |            |            |            |            |            |            |            |
| At market exchange rates                                  | 27,383             | 31,916     | 31,677     | 32,954     | 37,048     | 41,677     | 45,022     | 48,665     | 54,585     | 62,054     | 64,168     | 82,523     |
| At purchasing power parities                              | 31,729             | 41,748     | 43,659     | 45,634     | 48,252     | 52,000     | 55,924     | 60,610     | 65,281     | 69,229     | 72,395     | 93,305     |

<sup>1</sup>Real GDP.<sup>2</sup>In this table, “other advanced economies” means advanced economies excluding the United States, euro area countries, and Japan.<sup>3</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

**Table A2. Advanced Economies: Real GDP and Total Domestic Demand**  
*(Annual percent change)*

|                                      | Average<br>1990–99 | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013       | Fourth Quarter <sup>1</sup><br>2007 | 2008       | 2009       |
|--------------------------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------------------------------|------------|------------|
| <b>Real GDP</b>                      |                    |            |            |            |            |            |            |            |            |            |            |            |                                     |            |            |
| <b>Advanced economies</b>            | <b>2.7</b>         | <b>4.0</b> | <b>1.2</b> | <b>1.6</b> | <b>1.9</b> | <b>3.2</b> | <b>2.6</b> | <b>3.0</b> | <b>2.6</b> | <b>1.5</b> | <b>0.5</b> | <b>2.5</b> | <b>2.6</b>                          | <b>0.7</b> | <b>1.0</b> |
| United States                        | 3.1                | 3.7        | 0.8        | 1.6        | 2.5        | 3.6        | 2.9        | 2.8        | 2.0        | 1.6        | 0.1        | 2.3        | 2.3                                 | 0.8        | 0.4        |
| Euro area                            | ...                | 3.8        | 1.9        | 0.9        | 0.8        | 2.1        | 1.6        | 2.8        | 2.6        | 1.3        | 0.2        | 2.2        | 2.1                                 | 0.4        | 0.6        |
| Germany                              | 2.3                | 3.2        | 1.2        | —          | -0.2       | 1.2        | 0.8        | 3.0        | 2.5        | 1.8        | —          | 1.7        | 1.7                                 | 0.7        | 0.6        |
| France                               | 1.9                | 3.9        | 1.9        | 1.0        | 1.1        | 2.5        | 1.9        | 2.2        | 2.2        | 0.8        | 0.2        | 2.8        | 2.2                                 | -0.1       | 0.8        |
| Italy                                | 1.4                | 3.7        | 1.8        | 0.5        | —          | 1.5        | 0.6        | 1.8        | 1.5        | -0.1       | -0.2       | 1.3        | 0.1                                 | -0.1       | 0.2        |
| Spain                                | 2.8                | 5.1        | 3.6        | 2.7        | 3.1        | 3.3        | 3.6        | 3.9        | 3.7        | 1.4        | -0.2       | 3.3        | 3.2                                 | 0.1        | 0.1        |
| Netherlands                          | 3.1                | 3.9        | 1.9        | 0.1        | 0.3        | 2.2        | 2.0        | 3.4        | 3.5        | 2.3        | 1.0        | 2.2        | 4.1                                 | 0.8        | 2.3        |
| Belgium                              | 2.3                | 3.8        | 0.9        | 1.4        | 1.0        | 2.7        | 2.0        | 2.9        | 2.8        | 1.4        | 0.2        | 2.4        | 2.4                                 | 0.4        | 0.9        |
| Austria                              | 2.5                | 3.7        | 0.5        | 1.6        | 0.8        | 2.5        | 2.9        | 3.4        | 3.1        | 2.0        | 0.8        | 2.2        | 2.7                                 | 1.2        | 1.0        |
| Finland                              | 1.5                | 5.0        | 2.6        | 1.6        | 1.8        | 3.7        | 2.8        | 4.9        | 4.5        | 2.5        | 1.6        | 2.3        | 4.0                                 | 1.6        | 1.9        |
| Greece                               | 1.9                | 4.5        | 4.5        | 3.9        | 5.0        | 4.6        | 3.8        | 4.2        | 4.0        | 3.2        | 2.0        | 3.5        | 3.6                                 | 2.5        | 2.4        |
| Portugal                             | 3.4                | 3.9        | 2.0        | 0.8        | -0.8       | 1.5        | 0.9        | 1.4        | 1.9        | 0.6        | 0.1        | 1.8        | 1.9                                 | 0.4        | 0.2        |
| Ireland                              | 6.9                | 9.2        | 5.8        | 6.4        | 4.5        | 4.7        | 6.4        | 5.7        | 6.0        | -1.8       | -0.6       | 4.1        | 5.6                                 | -3.3       | 2.1        |
| Luxembourg                           | 4.7                | 8.4        | 2.5        | 4.1        | 2.1        | 4.9        | 5.0        | 6.1        | 4.5        | 2.3        | 1.8        | 3.4        | 3.1                                 | 1.3        | 2.4        |
| Slovenia                             | ...                | 4.1        | 3.1        | 3.7        | 2.8        | 4.4        | 4.1        | 5.7        | 6.1        | 4.3        | 3.7        | 3.7        | 4.9                                 | 3.2        | 6.1        |
| Cyprus                               | 3.7                | 5.0        | 4.0        | 2.1        | 1.9        | 4.2        | 3.9        | 4.0        | 4.4        | 3.4        | 2.8        | 4.1        | 4.4                                 | 2.4        | 3.6        |
| Malta                                | 5.0                | -1.0       | -1.6       | 2.6        | -0.3       | 1.1        | 3.5        | 3.1        | 3.7        | 2.8        | 2.3        | 3.4        | 3.7                                 | 2.0        | 2.5        |
| Japan                                | 1.5                | 2.9        | 0.2        | 0.3        | 1.4        | 2.7        | 1.9        | 2.4        | 2.1        | 0.7        | 0.5        | 1.7        | 1.4                                 | 0.2        | 0.9        |
| United Kingdom                       | 2.2                | 3.9        | 2.5        | 2.1        | 2.8        | 2.8        | 2.1        | 2.8        | 3.0        | 1.0        | -0.1       | 3.1        | 2.9                                 | -0.3       | 0.7        |
| Canada                               | 2.4                | 5.2        | 1.8        | 2.9        | 1.9        | 3.1        | 2.9        | 3.1        | 2.7        | 0.7        | 1.2        | 2.8        | 2.8                                 | 0.3        | 1.7        |
| Korea                                | 6.1                | 8.5        | 3.8        | 7.0        | 3.1        | 4.7        | 4.2        | 5.1        | 5.0        | 4.1        | 3.5        | 4.7        | 5.9                                 | 2.4        | 5.2        |
| Australia                            | 3.3                | 3.5        | 2.1        | 4.2        | 3.0        | 3.9        | 2.8        | 2.7        | 4.2        | 2.5        | 2.2        | 3.6        | 4.2                                 | 1.9        | 2.5        |
| Taiwan Province of China             | 6.5                | 5.8        | -2.2       | 4.6        | 3.5        | 6.2        | 4.2        | 4.9        | 5.7        | 3.8        | 2.5        | 5.0        | 6.4                                 | 2.5        | 5.8        |
| Sweden                               | 1.7                | 4.4        | 1.1        | 2.4        | 1.9        | 4.1        | 3.3        | 4.1        | 2.7        | 1.2        | 1.4        | 3.0        | 2.4                                 | 0.7        | 1.7        |
| Switzerland                          | 1.1                | 3.6        | 1.2        | 0.4        | -0.2       | 2.5        | 2.5        | 3.4        | 3.3        | 1.7        | 0.7        | 1.7        | 3.7                                 | 0.1        | 1.7        |
| Hong Kong SAR                        | 3.5                | 8.0        | 0.5        | 1.8        | 3.0        | 8.5        | 7.1        | 7.0        | 6.4        | 4.1        | 3.5        | 5.0        | 7.0                                 | 2.1        | 6.1        |
| Denmark                              | 2.4                | 3.5        | 0.7        | 0.5        | 0.4        | 2.3        | 2.5        | 3.9        | 1.7        | 1.0        | 0.5        | 1.6        | 1.5                                 | 3.1        | -3.0       |
| Norway                               | 3.6                | 3.3        | 2.0        | 1.5        | 1.0        | 3.9        | 2.7        | 2.5        | 3.7        | 2.5        | 1.2        | 2.2        | 4.7                                 | 1.4        | 0.9        |
| Israel                               | 5.4                | 8.9        | -0.3       | -0.6       | 1.8        | 5.0        | 5.1        | 5.2        | 5.4        | 4.3        | 2.8        | 3.7        | 5.8                                 | 2.4        | 4.2        |
| Singapore                            | 7.5                | 10.1       | -2.4       | 4.2        | 3.5        | 9.0        | 7.3        | 8.2        | 7.7        | 3.6        | 3.5        | 5.5        | 5.4                                 | 4.0        | 4.4        |
| New Zealand                          | 2.5                | 3.8        | 2.6        | 4.9        | 4.1        | 4.5        | 2.7        | 1.9        | 3.2        | 0.7        | 1.5        | 2.9        | 3.7                                 | —          | 1.5        |
| Iceland                              | 2.2                | 4.3        | 3.9        | 0.1        | 2.4        | 7.7        | 7.4        | 4.4        | 4.9        | 0.3        | -3.1       | 3.3        | 6.4                                 | -1.3       | -6.0       |
| <i>Memorandum</i>                    |                    |            |            |            |            |            |            |            |            |            |            |            |                                     |            |            |
| Major advanced economies             | 2.5                | 3.6        | 1.0        | 1.2        | 1.8        | 2.9        | 2.3        | 2.7        | 2.2        | 1.2        | 0.1        | 2.2        | 2.0                                 | 0.5        | 0.6        |
| Newly industrialized Asian economies | 6.1                | 7.7        | 1.2        | 5.5        | 3.2        | 5.9        | 4.8        | 5.6        | 5.6        | 4.0        | 3.2        | 4.9        | 6.1                                 | 2.6        | 5.4        |
| <b>Real total domestic demand</b>    |                    |            |            |            |            |            |            |            |            |            |            |            |                                     |            |            |
| <b>Advanced economies</b>            | <b>2.7</b>         | <b>4.0</b> | <b>1.1</b> | <b>1.7</b> | <b>2.1</b> | <b>3.3</b> | <b>2.6</b> | <b>2.8</b> | <b>2.2</b> | <b>0.8</b> | <b>0.1</b> | <b>2.4</b> | <b>2.1</b>                          | <b>0.1</b> | <b>0.4</b> |
| United States                        | 3.3                | 4.4        | 0.9        | 2.2        | 2.8        | 4.1        | 3.0        | 2.6        | 1.4        | 0.1        | -0.9       | 2.2        | 1.4                                 | -0.6       | -0.3       |
| Euro area                            | ...                | 3.4        | 1.2        | 0.4        | 1.5        | 1.9        | 1.8        | 2.6        | 2.2        | 0.8        | 0.1        | 2.1        | 2.0                                 | 0.2        | 0.5        |
| Germany                              | 2.3                | 2.2        | -0.5       | -2.0       | 0.6        | -0.1       | —          | 2.1        | 1.1        | 0.6        | -0.2       | 1.3        | 1.3                                 | 0.2        | 0.5        |
| France                               | 1.6                | 4.4        | 1.7        | 1.1        | 1.8        | 3.4        | 2.7        | 2.4        | 2.9        | 0.9        | 0.6        | 2.8        | 2.6                                 | 0.3        | 1.0        |
| Italy                                | 1.3                | 3.0        | 1.6        | 1.3        | 0.8        | 1.3        | 0.8        | 1.8        | 1.3        | -0.2       | -0.4       | 1.5        | 0.1                                 | —          | -1.1       |
| Spain                                | 2.7                | 5.3        | 3.8        | 3.2        | 3.8        | 4.8        | 5.1        | 5.1        | 4.2        | 0.8        | -1.9       | 3.0        | 3.6                                 | -1.3       | -1.0       |
| Japan                                | 1.4                | 2.4        | 1.0        | -0.4       | 0.8        | 1.9        | 1.7        | 1.6        | 1.0        | -0.3       | 0.4        | 1.8        | 0.1                                 | -0.4       | 1.0        |
| United Kingdom                       | 2.2                | 3.9        | 3.0        | 3.2        | 2.9        | 3.4        | 1.9        | 2.6        | 3.6        | 0.8        | -0.6       | 3.2        | 3.5                                 | -1.1       | 0.3        |
| Canada                               | 1.8                | 4.8        | 1.2        | 3.2        | 4.6        | 4.2        | 4.8        | 4.7        | 4.3        | 2.9        | 1.6        | 3.0        | 6.3                                 | 0.9        | 1.5        |
| Other advanced economies             | 4.1                | 5.5        | 0.3        | 3.9        | 1.4        | 4.8        | 3.3        | 3.7        | 4.5        | 2.8        | 2.4        | 3.8        | 4.6                                 | 2.6        | 2.3        |
| <i>Memorandum</i>                    |                    |            |            |            |            |            |            |            |            |            |            |            |                                     |            |            |
| Major advanced economies             | 2.5                | 3.7        | 1.1        | 1.3        | 2.2        | 3.1        | 2.3        | 2.5        | 1.7        | 0.3        | -0.3       | 2.2        | 1.6                                 | -0.4       | 0.2        |
| Newly industrialized Asian economies | 5.9                | 7.8        | -0.1       | 4.5        | 0.1        | 4.9        | 2.6        | 4.0        | 4.4        | 3.1        | 3.2        | 4.3        | 5.0                                 | 3.3        | 3.5        |

<sup>1</sup>From fourth quarter of preceding year.

**Table A3. Advanced Economies: Components of Real GDP**  
*(Annual percent change)*

|                                      | Ten-Year Averages |            |            |             |             |            |            |            |            |            | 2008        | 2009        |  |
|--------------------------------------|-------------------|------------|------------|-------------|-------------|------------|------------|------------|------------|------------|-------------|-------------|--|
|                                      | 1990–99           | 2000–09    | 2000       | 2001        | 2002        | 2003       | 2004       | 2005       | 2006       | 2007       |             |             |  |
| <b>Private consumer expenditure</b>  |                   |            |            |             |             |            |            |            |            |            |             |             |  |
| <b>Advanced economies</b>            | <b>2.8</b>        | <b>2.2</b> | <b>3.8</b> | <b>2.3</b>  | <b>2.2</b>  | <b>1.9</b> | <b>2.8</b> | <b>2.5</b> | <b>2.7</b> | <b>2.6</b> | <b>0.9</b>  | —           |  |
| United States                        | 3.3               | 2.5        | 4.7        | 2.5         | 2.7         | 2.8        | 3.6        | 3.0        | 3.0        | 2.8        | 0.5         | -0.9        |  |
| Euro area                            | ...               | 1.4        | 3.1        | 2.0         | 0.9         | 1.3        | 1.6        | 1.6        | 1.8        | 1.5        | 0.3         | -0.1        |  |
| Germany                              | 2.4               | 0.2        | 2.4        | 1.9         | -0.8        | 0.1        | 0.1        | 0.2        | 1.0        | -0.4       | -1.0        | -1.1        |  |
| France                               | 1.6               | 2.2        | 3.6        | 2.6         | 2.4         | 2.0        | 2.5        | 2.6        | 2.3        | 2.4        | 0.8         | 0.4         |  |
| Italy                                | 1.6               | 0.8        | 2.4        | 0.7         | 0.2         | 1.0        | 0.7        | 0.9        | 1.1        | 1.4        | -0.3        | -0.3        |  |
| Spain                                | 2.5               | 3.0        | 5.0        | 3.4         | 2.8         | 2.9        | 4.2        | 4.2        | 3.9        | 3.5        | 1.1         | -1.3        |  |
| Japan                                | 1.9               | 1.2        | 0.7        | 1.6         | 1.1         | 0.4        | 1.6        | 1.3        | 2.0        | 1.5        | 0.7         | 0.6         |  |
| United Kingdom                       | 2.5               | 2.6        | 4.7        | 3.1         | 3.5         | 3.0        | 2.9        | 1.9        | 2.1        | 3.0        | 2.0         | —           |  |
| Canada                               | 2.2               | 3.5        | 4.0        | 2.3         | 3.6         | 3.0        | 3.3        | 3.7        | 4.3        | 4.5        | 3.9         | 2.2         |  |
| Other advanced economies             | 4.1               | 3.2        | 5.6        | 2.6         | 3.9         | 1.1        | 3.5        | 3.4        | 3.5        | 4.2        | 2.2         | 1.7         |  |
| <i>Memorandum</i>                    |                   |            |            |             |             |            |            |            |            |            |             |             |  |
| Major advanced economies             | 2.6               | 2.0        | 3.6        | 2.2         | 2.0         | 2.0        | 2.6        | 2.3        | 2.5        | 2.3        | 0.6         | -0.3        |  |
| Newly industrialized Asian economies | 5.9               | 3.4        | 7.4        | 3.3         | 5.1         | -0.3       | 2.4        | 3.4        | 3.8        | 4.3        | 2.1         | 2.1         |  |
| <b>Public consumption</b>            |                   |            |            |             |             |            |            |            |            |            |             |             |  |
| <b>Advanced economies</b>            | <b>1.9</b>        | <b>2.2</b> | <b>2.5</b> | <b>2.8</b>  | <b>3.3</b>  | <b>2.3</b> | <b>1.8</b> | <b>1.2</b> | <b>1.7</b> | <b>2.1</b> | <b>2.2</b>  | <b>1.7</b>  |  |
| United States                        | 1.1               | 2.1        | 1.7        | 3.1         | 4.3         | 2.5        | 1.5        | 0.3        | 1.6        | 1.9        | 2.5         | 1.7         |  |
| Euro area                            | ...               | 1.9        | 2.4        | 2.1         | 2.4         | 1.8        | 1.4        | 1.5        | 2.0        | 2.2        | 1.8         | 1.6         |  |
| Germany                              | 2.0               | 1.0        | 1.4        | 0.5         | 1.5         | 0.4        | -0.7       | 0.4        | 0.6        | 2.2        | 2.0         | 2.0         |  |
| France                               | 1.7               | 1.6        | 1.9        | 1.2         | 1.9         | 2.0        | 2.3        | 1.2        | 1.3        | 1.4        | 1.4         | 1.6         |  |
| Italy                                | 0.2               | 1.8        | 2.2        | 3.9         | 2.4         | 1.9        | 2.2        | 1.9        | 0.8        | 1.2        | 0.8         | 0.4         |  |
| Spain                                | 3.3               | 4.6        | 5.3        | 3.9         | 4.5         | 4.8        | 6.3        | 5.5        | 4.6        | 4.9        | 3.9         | 2.9         |  |
| Japan                                | 3.0               | 1.7        | 4.3        | 3.0         | 2.4         | 2.3        | 1.9        | 1.6        | -0.4       | 0.7        | 0.4         | 1.0         |  |
| United Kingdom                       | 1.2               | 2.6        | 3.1        | 2.4         | 3.4         | 3.5        | 3.4        | 1.7        | 1.6        | 1.8        | 2.3         | 2.6         |  |
| Canada                               | 0.9               | 2.8        | 3.1        | 3.9         | 2.5         | 3.1        | 2.0        | 1.5        | 3.8        | 3.7        | 4.1         | 0.9         |  |
| Other advanced economies             | 3.6               | 2.8        | 2.4        | 3.1         | 3.6         | 2.1        | 1.9        | 2.4        | 3.2        | 2.8        | 3.4         | 3.0         |  |
| <i>Memorandum</i>                    |                   |            |            |             |             |            |            |            |            |            |             |             |  |
| Major advanced economies             | 1.5               | 1.9        | 2.3        | 2.7         | 3.2         | 2.3        | 1.6        | 0.9        | 1.2        | 1.7        | 2.0         | 1.5         |  |
| Newly industrialized Asian economies | 5.2               | 3.4        | 2.9        | 3.7         | 4.5         | 2.4        | 1.8        | 3.0        | 4.0        | 3.6        | 4.4         | 3.9         |  |
| <b>Gross fixed capital formation</b> |                   |            |            |             |             |            |            |            |            |            |             |             |  |
| <b>Advanced economies</b>            | <b>3.4</b>        | <b>1.7</b> | <b>5.0</b> | <b>-0.8</b> | <b>-1.5</b> | <b>2.2</b> | <b>4.6</b> | <b>4.5</b> | <b>3.8</b> | <b>1.8</b> | <b>-0.5</b> | <b>-1.9</b> |  |
| United States                        | 5.1               | 0.8        | 6.1        | -1.7        | -3.5        | 3.2        | 6.1        | 5.8        | 2.0        | -2.0       | -2.7        | -4.6        |  |
| Euro area                            | ...               | 2.1        | 4.9        | 0.5         | -1.4        | 1.4        | 2.4        | 3.0        | 5.0        | 4.3        | 2.2         | -0.6        |  |
| Germany                              | 2.7               | 1.0        | 3.0        | -3.7        | -6.1        | -0.3       | -0.3       | 1.1        | 7.7        | 4.3        | 5.2         | -0.5        |  |
| France                               | 1.4               | 2.8        | 7.2        | 2.4         | -1.7        | 2.2        | 3.6        | 4.4        | 4.8        | 4.9        | 1.1         | -0.1        |  |
| Italy                                | 1.1               | 1.8        | 6.3        | 2.7         | 3.7         | -1.2       | 2.3        | 0.7        | 2.5        | 1.2        | 0.2         | 0.2         |  |
| Spain                                | 3.3               | 3.6        | 6.6        | 4.8         | 3.4         | 5.9        | 5.1        | 7.0        | 7.1        | 5.3        | -1.9        | -6.0        |  |
| Japan                                | —                 | -0.3       | 1.2        | -0.9        | -4.9        | -0.5       | 1.4        | 3.1        | 1.3        | -0.6       | -2.3        | -0.4        |  |
| United Kingdom                       | 2.3               | 1.9        | 2.7        | 2.6         | 3.6         | 1.1        | 4.9        | 2.2        | 6.0        | 7.1        | -4.0        | -6.1        |  |
| Canada                               | 1.9               | 4.5        | 4.7        | 4.0         | 1.6         | 6.2        | 7.8        | 9.2        | 7.1        | 3.9        | 1.3         | 0.2         |  |
| Other advanced economies             | 4.9               | 4.0        | 6.8        | -4.4        | 3.8         | 2.8        | 7.3        | 4.7        | 5.4        | 6.6        | 3.5         | 3.5         |  |
| <i>Memorandum</i>                    |                   |            |            |             |             |            |            |            |            |            |             |             |  |
| Major advanced economies             | 3.2               | 1.1        | 4.8        | -0.6        | -2.6        | 1.9        | 4.3        | 4.4        | 3.2        | 0.5        | -1.3        | -2.8        |  |
| Newly industrialized Asian economies | 7.1               | 3.6        | 10.5       | -5.9        | 2.2         | 2.3        | 7.8        | 2.0        | 4.0        | 5.1        | 2.8         | 5.5         |  |

**Table A3 (concluded)**

|                                      | Ten-Year Averages |            |             |             |             |             |             |             |            |             | 2008        | 2009        |  |
|--------------------------------------|-------------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|-------------|-------------|--|
|                                      | 1990–99           | 2000–09    | 2000        | 2001        | 2002        | 2003        | 2004        | 2005        | 2006       | 2007        |             |             |  |
| <b>Final domestic demand</b>         |                   |            |             |             |             |             |             |             |            |             |             |             |  |
| <b>Advanced economies</b>            | <b>2.5</b>        | <b>2.0</b> | <b>3.6</b>  | <b>1.8</b>  | <b>1.5</b>  | <b>2.1</b>  | <b>2.9</b>  | <b>2.7</b>  | <b>2.7</b> | <b>2.2</b>  | <b>0.7</b>  | <b>-0.3</b> |  |
| United States                        | 3.3               | 2.1        | 4.5         | 1.8         | 1.8         | 2.8         | 3.8         | 3.1         | 2.6        | 1.8         | 0.3         | -1.1        |  |
| Euro area                            | ...               | 1.7        | 3.4         | 1.7         | 0.7         | 1.4         | 1.7         | 1.8         | 2.5        | 2.3         | 1.0         | 0.1         |  |
| Germany                              | 2.4               | 0.6        | 2.0         | 0.4         | -1.4        | 0.1         | -0.1        | 0.4         | 2.2        | 1.1         | 1.0         | -0.3        |  |
| France                               | 1.6               | 2.2        | 3.9         | 2.2         | 1.4         | 2.1         | 2.7         | 2.6         | 2.5        | 2.7         | 1.0         | 0.6         |  |
| Italy                                | 1.2               | 1.2        | 3.1         | 1.7         | 1.3         | 0.7         | 1.4         | 1.1         | 1.3        | 1.4         | —           | -0.1        |  |
| Spain                                | 2.8               | 3.4        | 5.4         | 3.9         | 3.2         | 4.0         | 4.8         | 5.2         | 4.9        | 4.2         | 0.7         | -1.9        |  |
| Japan                                | 1.5               | 0.9        | 1.4         | 1.2         | -0.2        | 0.5         | 1.6         | 1.9         | 1.4        | 0.9         | -0.1        | 0.4         |  |
| United Kingdom                       | 2.2               | 2.5        | 4.1         | 2.9         | 3.5         | 2.8         | 3.3         | 1.9         | 2.6        | 3.4         | 1.0         | -0.5        |  |
| Canada                               | 1.8               | 3.6        | 4.0         | 2.9         | 3.0         | 3.7         | 3.9         | 4.4         | 4.8        | 4.2         | 3.3         | 1.5         |  |
| Other advanced economies             | 4.2               | 3.3        | 5.4         | 0.9         | 3.7         | 1.7         | 4.0         | 3.4         | 3.8        | 4.6         | 2.7         | 2.5         |  |
| <i>Memorandum</i>                    |                   |            |             |             |             |             |             |             |            |             |             |             |  |
| Major advanced economies             | 2.5               | 1.8        | 3.6         | 1.7         | 1.3         | 2.0         | 2.8         | 2.5         | 2.4        | 1.8         | 0.5         | -0.4        |  |
| Newly industrialized Asian economies | 6.1               | 3.4        | 7.6         | 0.8         | 4.1         | 0.8         | 3.5         | 3.0         | 3.9        | 4.5         | 2.6         | 3.3         |  |
| <b>Stock building<sup>1</sup></b>    |                   |            |             |             |             |             |             |             |            |             |             |             |  |
| <b>Advanced economies</b>            | —                 | —          | <b>0.1</b>  | <b>-0.6</b> | —           | <b>0.1</b>  | <b>0.3</b>  | <b>-0.1</b> | —          | <b>-0.1</b> | <b>-0.2</b> | <b>0.1</b>  |  |
| United States                        | 0.1               | —          | -0.1        | -0.9        | 0.4         | —           | 0.4         | -0.1        | —          | -0.4        | -0.1        | 0.3         |  |
| Euro area                            | ...               | -0.1       | —           | -0.5        | -0.3        | 0.1         | 0.2         | —           | 0.1        | —           | -0.2        | —           |  |
| Germany                              | -0.1              | -0.2       | -0.1        | -0.9        | -0.6        | 0.5         | —           | -0.4        | —          | 0.1         | -0.6        | 0.1         |  |
| France                               | —                 | —          | 0.5         | -0.4        | -0.4        | -0.3        | 0.7         | 0.1         | -0.1       | 0.3         | -0.2        | —           |  |
| Italy                                | —                 | —          | -0.2        | 0.1         | —           | 0.1         | -0.1        | -0.2        | 0.5        | -0.1        | 0.3         | -0.3        |  |
| Spain                                | -0.1              | —          | -0.1        | -0.1        | —           | -0.1        | —           | -0.1        | 0.2        | -0.1        | 0.1         | —           |  |
| Japan                                | -0.1              | 0.1        | 1.0         | -0.2        | -0.3        | 0.2         | 0.3         | -0.1        | 0.2        | 0.1         | -0.2        | —           |  |
| United Kingdom                       | —                 | —          | -0.1        | 0.1         | -0.3        | 0.2         | —           | —           | —          | 0.2         | -0.2        | —           |  |
| Canada                               | —                 | —          | 0.8         | -1.7        | 0.2         | 0.8         | 0.1         | 0.3         | -0.1       | 0.1         | -0.4        | 0.2         |  |
| Other advanced economies             | —                 | —          | 0.1         | -0.5        | 0.1         | -0.2        | 0.6         | -0.1        | -0.1       | —           | 0.2         | -0.1        |  |
| <i>Memorandum</i>                    |                   |            |             |             |             |             |             |             |            |             |             |             |  |
| Major advanced economies             | —                 | —          | 0.2         | -0.6        | 0.1         | 0.1         | 0.3         | -0.1        | 0.1        | -0.1        | -0.2        | 0.1         |  |
| Newly industrialized Asian economies | -0.1              | —          | 0.1         | -0.8        | 0.3         | -0.6        | 1.1         | -0.4        | 0.1        | -0.1        | 0.4         | -0.1        |  |
| <b>Foreign balance<sup>1</sup></b>   |                   |            |             |             |             |             |             |             |            |             |             |             |  |
| <b>Advanced economies</b>            | —                 | —          | <b>-0.1</b> | —           | <b>-0.2</b> | <b>-0.5</b> | <b>-0.3</b> | <b>-0.2</b> | <b>0.1</b> | <b>0.3</b>  | <b>0.7</b>  | <b>0.5</b>  |  |
| United States                        | -0.2              | —          | -0.9        | -0.2        | -0.7        | -0.4        | -0.7        | -0.2        | —          | 0.6         | 1.4         | 1.0         |  |
| Euro area                            | ...               | 0.2        | 0.5         | 0.7         | 0.5         | -0.7        | 0.2         | -0.2        | 0.2        | 0.4         | 0.4         | 0.2         |  |
| Germany                              | —                 | 1.0        | 1.1         | 1.7         | 2.0         | -0.8        | 1.4         | 0.7         | 1.0        | 1.4         | 1.3         | 0.2         |  |
| France                               | 0.3               | -0.4       | -0.5        | 0.1         | -0.1        | -0.7        | -0.9        | -0.8        | -0.3       | -0.8        | —           | -0.4        |  |
| Italy                                | 0.1               | -0.1       | 0.6         | 0.2         | -0.8        | -0.8        | 0.2         | -0.3        | —          | 0.1         | 0.2         | 0.1         |  |
| Spain                                | -0.2              | -0.5       | -0.4        | -0.2        | -0.6        | -0.8        | -1.7        | -1.6        | -1.2       | -0.7        | 0.5         | 1.7         |  |
| Japan                                | 0.1               | 0.5        | 0.5         | -0.8        | 0.7         | 0.7         | 0.8         | 0.3         | 0.8        | 1.1         | 0.9         | 0.1         |  |
| United Kingdom                       | —                 | -0.2       | —           | -0.5        | -1.1        | -0.1        | -0.7        | 0.1         | 0.1        | -0.7        | 0.2         | 0.5         |  |
| Canada                               | 0.6               | -0.9       | 0.6         | 0.7         | -0.1        | -2.5        | -0.9        | -1.7        | -1.3       | -1.5        | -2.1        | -0.4        |  |
| Other advanced economies             | 0.3               | 0.7        | 0.7         | 0.9         | 0.2         | 1.2         | 0.5         | 0.9         | 1.0        | 0.6         | 0.4         | 0.3         |  |
| <i>Memorandum</i>                    |                   |            |             |             |             |             |             |             |            |             |             |             |  |
| Major advanced economies             | —                 | 0.1        | -0.2        | —           | -0.2        | -0.4        | -0.2        | -0.1        | 0.1        | 0.4         | 0.9         | 0.5         |  |
| Newly industrialized Asian economies | 0.1               | 1.6        | 0.3         | 1.1         | 1.1         | 3.0         | 1.8         | 2.5         | 2.2        | 1.9         | 1.3         | 0.5         |  |

<sup>1</sup>Changes expressed as percent of GDP in the preceding period.

**Table A4. Emerging and Developing Economies, by Country: Real GDP<sup>1</sup>**  
*(Annual percent change)*

|                          | Average<br>1990–99 | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013       |
|--------------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Africa</b>            | <b>2.3</b>         | <b>3.5</b> | <b>4.9</b> | <b>6.2</b> | <b>5.4</b> | <b>6.5</b> | <b>5.8</b> | <b>6.1</b> | <b>6.3</b> | <b>5.9</b> | <b>6.0</b> | <b>5.4</b> |
| Algeria                  | 1.5                | 2.2        | 2.7        | 4.7        | 6.9        | 5.2        | 5.1        | 2.0        | 4.6        | 4.9        | 4.5        | 5.2        |
| Angola                   | 0.6                | 3.0        | 3.1        | 14.5       | 3.3        | 11.2       | 20.6       | 18.6       | 21.1       | 16.0       | 12.8       | 0.1        |
| Benin                    | 4.9                | 4.9        | 6.2        | 4.5        | 3.9        | 3.1        | 2.9        | 3.8        | 4.6        | 5.1        | 5.7        | 6.0        |
| Botswana                 | 6.0                | 8.4        | 4.7        | 5.3        | 6.4        | 6.6        | 4.7        | 3.4        | 5.7        | 5.3        | 4.6        | 5.0        |
| Burkina Faso             | 5.1                | 1.8        | 6.6        | 4.7        | 7.3        | 4.6        | 7.1        | 5.5        | 3.6        | 4.5        | 5.6        | 6.0        |
| Burundi                  | -1.3               | -0.9       | 2.1        | 4.4        | -1.2       | 4.8        | 0.9        | 5.1        | 3.6        | 4.5        | 5.0        | 5.5        |
| Cameroon <sup>2</sup>    | 0.3                | 4.2        | 4.5        | 4.0        | 4.0        | 3.7        | 2.3        | 3.2        | 3.5        | 3.8        | 4.6        | 5.3        |
| Cape Verde               | 6.1                | 7.3        | 6.1        | 5.3        | 4.7        | 4.3        | 6.5        | 10.8       | 6.9        | 6.0        | 6.5        | 6.7        |
| Central African Republic | 0.4                | 1.8        | 0.3        | -0.6       | -7.6       | 1.0        | 2.4        | 4.0        | 4.2        | 3.5        | 4.5        | 5.0        |
| Chad                     | 3.2                | -0.9       | 11.7       | 8.5        | 14.7       | 33.6       | 7.9        | 0.2        | 0.2        | 0.4        | 5.0        | 2.4        |
| Comoros                  | 1.5                | 1.4        | 3.3        | 4.1        | 2.5        | -0.2       | 4.2        | 1.2        | 0.5        | 0.5        | 1.7        | 4.5        |
| Congo, Dem. Rep. of      | -5.6               | -6.9       | -2.1       | 3.5        | 5.8        | 6.6        | 7.9        | 5.6        | 6.3        | 10.0       | 10.3       | 7.3        |
| Congo, Rep. of           | 0.8                | 7.6        | 3.8        | 4.6        | 0.8        | 3.5        | 7.8        | 6.2        | -1.6       | 9.1        | 12.1       | 1.4        |
| Côte d'Ivoire            | 3.5                | -4.6       | —          | -1.6       | -1.7       | 1.6        | 1.9        | 0.7        | 1.6        | 2.9        | 4.7        | 6.4        |
| Djibouti                 | -1.2               | 0.5        | 2.0        | 2.6        | 3.2        | 3.0        | 3.2        | 4.8        | 5.3        | 5.9        | 6.9        | 7.2        |
| Equatorial Guinea        | 29.2               | 18.2       | 63.4       | 19.5       | 14.0       | 38.0       | 9.7        | 1.3        | 21.4       | 7.4        | 4.6        | 1.2        |
| Eritrea                  | ...                | -12.4      | 8.8        | 3.0        | -2.7       | 1.5        | 2.6        | -1.0       | 1.3        | 1.2        | 2.0        | 4.8        |
| Ethiopia                 | 2.6                | 5.9        | 7.7        | 1.2        | -3.5       | 9.8        | 12.6       | 11.6       | 11.4       | 8.4        | 6.5        | 7.7        |
| Gabon                    | 2.4                | -1.9       | 2.1        | -0.3       | 2.4        | 1.1        | 3.0        | 1.2        | 5.6        | 3.9        | 7.0        | 1.5        |
| Gambia, The              | 4.2                | 5.5        | 5.8        | -3.2       | 6.9        | 7.0        | 5.1        | 6.5        | 6.3        | 5.5        | 6.0        | 5.5        |
| Ghana                    | 4.5                | 3.7        | 4.2        | 4.5        | 5.2        | 5.6        | 5.9        | 6.4        | 6.3        | 6.5        | 5.8        | 6.8        |
| Guinea                   | 4.2                | 2.9        | 3.8        | 4.2        | 1.2        | 2.3        | 3.0        | 2.4        | 1.8        | 4.5        | 4.7        | 5.3        |
| Guinea-Bissau            | 0.6                | 7.5        | 0.2        | -7.1       | -0.6       | 2.2        | 3.2        | 1.8        | 2.5        | 3.2        | 3.1        | 3.9        |
| Kenya                    | 2.1                | 0.6        | 4.7        | 0.3        | 2.8        | 4.6        | 5.9        | 6.4        | 7.0        | 3.3        | 6.4        | 6.5        |
| Lesotho                  | 4.0                | 2.3        | 1.8        | 2.8        | 2.7        | 4.2        | 2.9        | 7.2        | 4.9        | 5.2        | 5.4        | 5.2        |
| Liberia                  | ...                | 29.3       | 2.9        | 3.7        | -31.3      | 2.6        | 5.3        | 7.8        | 9.5        | 8.6        | 14.3       | 12.0       |
| Madagascar               | 1.6                | 4.5        | 6.0        | -12.4      | 15.3       | 3.3        | 4.7        | 6.6        | 6.4        | 2.1        | 7.5        | 6.1        |
| Malawi                   | 3.9                | 0.8        | -4.1       | 1.9        | 4.2        | 5.0        | 2.3        | 8.2        | 7.9        | 7.1        | 7.8        | 6.5        |
| Mali                     | 5.5                | -3.2       | 12.1       | 4.3        | 7.2        | 2.4        | 6.1        | 5.3        | 3.1        | 4.8        | 5.2        | 4.5        |
| Mauritania               | 2.6                | 1.9        | 2.9        | 1.1        | 5.6        | 5.2        | 5.4        | 11.4       | 1.0        | 5.0        | 6.8        | 6.2        |
| Mauritius                | 5.8                | 7.2        | 4.2        | 1.5        | 3.8        | 4.8        | 3.1        | 3.6        | 4.2        | 6.6        | 6.2        | 5.1        |
| Morocco                  | 2.6                | 1.8        | 7.6        | 3.3        | 6.3        | 4.8        | 3.0        | 7.8        | 2.7        | 6.5        | 5.5        | 6.0        |
| Mozambique               | 6.4                | 1.5        | 12.3       | 9.2        | 6.5        | 7.9        | 8.4        | 8.7        | 7.0        | 6.5        | 6.7        | 6.5        |
| Namibia                  | 3.8                | 3.5        | 2.4        | 6.7        | 3.5        | 6.6        | 4.7        | 3.9        | 3.6        | 3.9        | 4.2        | 4.6        |
| Niger                    | 1.1                | -2.6       | 7.4        | 5.3        | 7.7        | -0.8       | 7.4        | 5.2        | 3.2        | 4.4        | 4.5        | 4.4        |
| Nigeria                  | 2.6                | 5.3        | 8.2        | 21.2       | 10.3       | 10.6       | 5.4        | 6.2        | 5.9        | 6.2        | 8.1        | 7.0        |
| Rwanda                   | -0.1               | 8.1        | 8.5        | 11.0       | 0.3        | 5.3        | 7.1        | 5.5        | 6.0        | 6.0        | 5.6        | 5.6        |
| São Tomé and Príncipe    | 1.2                | 0.4        | 3.1        | 11.6       | 5.4        | 6.6        | 5.7        | 6.7        | 6.0        | 5.8        | 6.0        | 8.0        |
| Senegal                  | 2.7                | 3.2        | 4.6        | 0.7        | 6.7        | 5.9        | 5.6        | 2.3        | 4.8        | 4.3        | 5.8        | 5.4        |
| Seychelles               | 4.8                | 4.3        | -2.3       | 1.2        | -5.9       | -2.9       | 1.2        | 5.3        | 5.5        | 2.5        | 3.0        | 3.8        |
| Sierra Leone             | -7.8               | 3.8        | 18.2       | 27.4       | 9.5        | 7.4        | 7.3        | 7.4        | 6.8        | 5.5        | 5.9        | 6.5        |
| South Africa             | 1.4                | 4.2        | 2.7        | 3.7        | 3.1        | 4.9        | 5.0        | 5.4        | 5.1        | 3.8        | 3.3        | 5.0        |
| Sudan                    | 2.7                | 8.4        | 6.2        | 5.4        | 7.1        | 5.1        | 6.3        | 11.3       | 10.2       | 8.5        | 7.7        | 4.7        |
| Swaziland                | 3.7                | 2.0        | 1.0        | 1.8        | 3.9        | 2.5        | 2.2        | 2.9        | 3.5        | 2.6        | 2.5        | 2.5        |
| Tanzania                 | 3.1                | 4.9        | 6.0        | 7.2        | 6.9        | 7.8        | 7.4        | 6.7        | 7.1        | 7.5        | 8.0        | 7.5        |
| Togo                     | 1.6                | -1.3       | -2.3       | -0.3       | 5.2        | 2.4        | 1.3        | 4.1        | 2.1        | 2.5        | 3.5        | 4.0        |
| Tunisia                  | 5.0                | 4.7        | 5.0        | 1.7        | 5.6        | 6.0        | 4.0        | 5.5        | 6.3        | 5.5        | 5.0        | 5.8        |
| Uganda                   | 6.3                | 5.4        | 5.2        | 8.6        | 6.6        | 6.8        | 6.3        | 10.8       | 7.9        | 9.8        | 8.1        | 6.0        |
| Zambia                   | -0.6               | 3.6        | 4.9        | 3.3        | 5.1        | 5.4        | 5.3        | 6.2        | 6.3        | 5.8        | 6.4        | 6.0        |
| Zimbabwe <sup>3</sup>    | 2.0                | -7.3       | -2.7       | -4.4       | -10.4      | -3.6       | -4.0       | -5.4       | -6.1       | ...        | ...        | ...        |

**Table A4 (continued)**

|   | Average<br>1990–99 | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013       |
|---|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Central and eastern Europe<sup>4</sup></b>           | <b>1.2</b>         | <b>4.9</b> | <b>0.4</b> | <b>4.2</b> | <b>4.8</b> | <b>6.9</b> | <b>6.1</b> | <b>6.7</b> | <b>5.7</b> | <b>4.5</b> | <b>3.4</b> | <b>5.0</b> |
| Albania   | -0.5               | 7.3        | 7.0        | 4.2        | 5.8        | 5.7        | 5.8        | 5.4        | 6.0        | 6.1        | 6.3        | 6.1        |
| Bosnia and Herzegovina                                  | ...                | 5.2        | 3.6        | 5.0        | 3.5        | 6.3        | 3.9        | 6.9        | 6.8        | 5.5        | 5.0        | 4.0        |
| Bulgaria  | -5.4               | 5.4        | 4.1        | 4.5        | 5.0        | 6.6        | 6.2        | 6.3        | 6.2        | 6.3        | 4.2        | 6.5        |
| Croatia   | ...                | 2.9        | 4.4        | 5.6        | 5.3        | 4.3        | 4.3        | 4.8        | 5.6        | 3.8        | 3.7        | 4.8        |
| Czech Republic  | -0.3               | 3.6        | 2.5        | 1.9        | 3.6        | 4.5        | 6.3        | 6.8        | 6.6        | 4.0        | 3.4        | 4.5        |
| Estonia   | ...                | 9.6        | 7.7        | 7.8        | 7.1        | 7.5        | 9.2        | 10.4       | 6.3        | -1.5       | 0.5        | 5.2        |
| Hungary   | 0.1                | 5.2        | 4.1        | 4.4        | 4.2        | 4.8        | 4.1        | 3.9        | 1.3        | 1.9        | 2.3        | 3.4        |
| Latvia  | ...                | 6.9        | 8.0        | 6.5        | 7.2        | 8.7        | 10.6       | 12.2       | 10.3       | -0.9       | -2.2       | 3.5        |
| Lithuania   | ...                | 4.1        | 6.6        | 6.9        | 10.3       | 7.3        | 7.9        | 7.9        | 8.9        | 3.9        | 0.7        | 5.5        |
| Macedonia, FYR  | ...                | 4.5        | -4.5       | 0.9        | 2.8        | 4.1        | 4.1        | 4.0        | 5.0        | 5.5        | 5.0        | 4.0        |
| Montenegro  | ...                | ...        | 1.1        | 1.9        | 2.5        | 4.4        | 4.2        | 8.6        | 9.7        | 7.5        | 5.0        | 4.0        |
| Poland  | 2.6                | 4.3        | 1.2        | 1.4        | 3.9        | 5.3        | 3.6        | 6.2        | 6.6        | 5.2        | 3.8        | 5.1        |
| Romania   | -2.5               | 2.1        | 5.7        | 5.1        | 5.2        | 8.5        | 4.2        | 7.9        | 6.0        | 8.6        | 4.8        | 6.0        |
| Serbia  | ...                | 4.5        | 5.4        | 3.6        | 2.8        | 8.2        | 6.0        | 5.6        | 7.1        | 6.0        | 6.0        | 5.5        |
| Slovak Republic   | ...                | 1.4        | 3.4        | 4.8        | 4.8        | 5.2        | 6.6        | 8.5        | 10.4       | 7.4        | 5.6        | 4.7        |
| Turkey  | 3.9                | 6.8        | -5.7       | 6.2        | 5.3        | 9.4        | 8.4        | 6.9        | 4.6        | 3.5        | 3.0        | 5.0        |
| <b>Commonwealth of Independent States<sup>4,5</sup></b> | <b>...</b>         | <b>9.1</b> | <b>6.1</b> | <b>5.2</b> | <b>7.8</b> | <b>8.2</b> | <b>6.8</b> | <b>8.2</b> | <b>8.6</b> | <b>7.2</b> | <b>5.7</b> | <b>5.6</b> |
| Russia  | ...                | 10.0       | 5.1        | 4.7        | 7.3        | 7.2        | 6.4        | 7.4        | 8.1        | 7.0        | 5.5        | 5.5        |
| Excluding Russia  | ...                | 6.6        | 8.9        | 6.6        | 9.1        | 10.8       | 7.7        | 10.2       | 9.8        | 7.6        | 6.2        | 5.7        |
| Armenia   | ...                | 6.0        | 9.6        | 13.2       | 14.0       | 10.5       | 14.0       | 13.3       | 13.8       | 10.0       | 8.0        | 6.0        |
| Azerbaijan  | ...                | 6.2        | 6.5        | 8.1        | 10.5       | 10.4       | 24.3       | 30.5       | 23.4       | 16.0       | 16.4       | -1.8       |
| Belarus   | ...                | 5.8        | 4.7        | 5.0        | 7.0        | 11.4       | 11.4       | 10.0       | 8.2        | 9.2        | 8.0        | 5.0        |
| Georgia   | ...                | 1.9        | 4.7        | 5.5        | 11.1       | 5.9        | 9.6        | 9.4        | 12.4       | 3.5        | 4.0        | 5.0        |
| Kazakhstan  | ...                | 9.8        | 13.5       | 9.8        | 9.3        | 9.6        | 9.7        | 10.7       | 8.9        | 4.5        | 5.3        | 6.8        |
| Kyrgyz Republic   | ...                | 5.4        | 5.3        | -0.0       | 7.0        | 7.0        | -0.2       | 3.1        | 8.2        | 7.5        | 6.7        | 6.3        |
| Moldova   | ...                | 2.1        | 6.1        | 7.8        | 6.6        | 7.4        | 7.5        | 4.8        | 4.0        | 6.5        | 6.5        | 6.0        |
| Mongolia  | -0.4               | 3.9        | 0.2        | 4.7        | 7.0        | 10.6       | 7.3        | 8.6        | 9.9        | 9.0        | 8.1        | 5.3        |
| Tajikistan  | ...                | 8.3        | 10.2       | 9.1        | 10.2       | 10.6       | 6.7        | 7.0        | 7.8        | 6.0        | 7.0        | 7.0        |
| Turkmenistan  | ...                | 18.6       | 20.4       | 15.8       | 17.1       | 14.7       | 13.0       | 11.4       | 11.6       | 10.8       | 10.3       | 10.2       |
| Ukraine   | ...                | 5.9        | 9.2        | 5.2        | 9.6        | 12.1       | 2.7        | 7.3        | 7.6        | 6.4        | 2.5        | 6.5        |
| Uzbekistan  | ...                | 3.8        | 4.2        | 4.0        | 4.2        | 7.7        | 7.0        | 7.3        | 9.5        | 8.0        | 7.5        | 6.0        |

**Table A4 (continued)**

|                        | Average<br>1990–99 | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007        | 2008       | 2009       | 2013       |
|------------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|
| <b>Developing Asia</b> | <b>7.2</b>         | <b>7.0</b> | <b>5.8</b> | <b>6.9</b> | <b>8.2</b> | <b>8.6</b> | <b>9.0</b> | <b>9.9</b> | <b>10.0</b> | <b>8.4</b> | <b>7.7</b> | <b>8.8</b> |
| Afghanistan, I.R. of   | ...                | ...        | ...        | ...        | 15.1       | 8.8        | 16.1       | 8.2        | 11.5        | 7.5        | 8.3        | 7.2        |
| Bangladesh             | 4.8                | 5.6        | 4.8        | 4.8        | 5.8        | 6.1        | 6.3        | 6.5        | 6.3         | 7.0        | 5.6        | 6.7        |
| Bhutan                 | 5.3                | 7.2        | 6.8        | 10.9       | 7.2        | 6.8        | 7.0        | 8.8        | 17.9        | 6.6        | 5.7        | 6.7        |
| Brunei Darussalam      | ...                | 2.9        | 2.7        | 3.9        | 2.9        | 0.5        | 0.4        | 4.4        | 0.6         | -0.5       | 2.8        | 3.0        |
| Cambodia               | ...                | 8.8        | 8.1        | 6.6        | 8.5        | 10.3       | 13.3       | 10.8       | 10.2        | 7.0        | 6.0        | 7.4        |
| China                  | 9.9                | 8.4        | 8.3        | 9.1        | 10.0       | 10.1       | 10.4       | 11.6       | 11.9        | 9.7        | 9.3        | 10.0       |
| Fiji                   | 5.8                | -1.8       | 2.0        | 3.2        | 1.0        | 5.5        | 0.7        | 3.3        | -3.1        | 2.5        | 2.0        | 2.7        |
| India                  | 5.6                | 5.7        | 3.9        | 4.6        | 6.9        | 7.9        | 9.1        | 9.8        | 9.3         | 7.9        | 6.9        | 8.0        |
| Indonesia              | 4.1                | 5.4        | 3.6        | 4.5        | 4.8        | 5.0        | 5.7        | 5.5        | 6.3         | 6.1        | 5.5        | 6.7        |
| Kiribati               | 4.3                | 3.9        | 3.2        | 8.1        | -1.3       | -1.5       | 1.7        | 2.4        | 2.0         | 3.7        | 2.5        | 1.1        |
| Lao PDR                | 6.4                | 5.8        | 5.7        | 5.9        | 6.1        | 6.4        | 7.1        | 8.1        | 7.9         | 7.5        | 6.8        | 7.1        |
| Malaysia               | 7.1                | 8.7        | 0.5        | 5.4        | 5.8        | 6.8        | 5.3        | 5.8        | 6.3         | 5.8        | 4.8        | 6.0        |
| Maldives               | 6.5                | 4.8        | 3.5        | 6.5        | 8.5        | 9.5        | -4.6       | 18.0       | 7.6         | 6.5        | 6.5        | 6.0        |
| Myanmar                | 6.0                | 13.7       | 11.3       | 12.0       | 13.8       | 13.6       | 13.6       | 12.7       | 5.5         | 2.0        | 6.0        | 4.0        |
| Nepal                  | 4.9                | 6.1        | 5.6        | 0.1        | 3.9        | 4.7        | 3.1        | 3.7        | 3.2         | 4.7        | 5.5        | 5.5        |
| Pakistan               | 4.0                | 4.3        | 2.0        | 3.2        | 4.8        | 7.4        | 7.7        | 6.9        | 6.4         | 5.8        | 3.5        | 6.0        |
| Papua New Guinea       | 4.5                | -2.5       | -0.1       | -0.2       | 2.2        | 2.7        | 3.4        | 2.6        | 6.2         | 5.8        | 4.7        | 2.6        |
| Philippines            | 2.8                | 6.0        | 1.8        | 4.4        | 4.9        | 6.4        | 5.0        | 5.4        | 7.2         | 4.4        | 3.8        | 5.5        |
| Samoa                  | 2.0                | 5.0        | 8.1        | 5.5        | 2.1        | 2.4        | 6.0        | 1.8        | 6.0         | 4.5        | 4.0        | 3.5        |
| Solomon Islands        | 4.3                | -14.3      | -8.0       | -2.8       | 6.5        | 8.0        | 5.0        | 6.1        | 10.3        | 7.3        | 4.0        | 3.2        |
| Sri Lanka              | 5.2                | 6.0        | -1.5       | 4.0        | 5.9        | 5.4        | 6.2        | 7.7        | 6.8         | 6.1        | 5.1        | 5.0        |
| Thailand               | 5.1                | 4.8        | 2.2        | 5.3        | 7.1        | 6.3        | 4.5        | 5.1        | 4.8         | 4.7        | 4.5        | 6.0        |
| Timor-Leste            | ...                | 15.5       | 16.5       | -6.7       | -6.2       | 0.3        | 2.3        | -3.4       | 19.8        | 2.5        | 0.6        | 3.8        |
| Tonga                  | 1.5                | 5.4        | 2.6        | 3.0        | 3.2        | 1.4        | 5.4        | 0.6        | -3.2        | 1.2        | 2.6        | 1.6        |
| Vanuatu                | 3.6                | 2.7        | -2.5       | -7.4       | 3.2        | 5.5        | 6.5        | 7.2        | 6.5         | 6.0        | 5.5        | 3.0        |
| Vietnam                | 7.4                | 6.8        | 6.9        | 7.1        | 7.3        | 7.8        | 8.4        | 8.2        | 8.5         | 6.3        | 5.5        | 7.4        |
| <b>Middle East</b>     | <b>4.3</b>         | <b>5.5</b> | <b>2.6</b> | <b>3.8</b> | <b>7.1</b> | <b>5.8</b> | <b>5.7</b> | <b>5.7</b> | <b>5.9</b>  | <b>6.4</b> | <b>5.9</b> | <b>5.4</b> |
| Bahrain                | 4.8                | 5.2        | 4.6        | 5.2        | 7.2        | 5.6        | 7.9        | 6.5        | 6.0         | 6.3        | 6.0        | 6.0        |
| Egypt                  | 4.1                | 5.4        | 3.5        | 3.2        | 3.2        | 4.1        | 4.5        | 6.8        | 7.1         | 7.2        | 6.0        | 6.9        |
| Iran, I.R. of          | 5.1                | 5.1        | 3.7        | 7.5        | 7.2        | 5.1        | 4.7        | 5.8        | 6.4         | 5.5        | 5.0        | 4.5        |
| Iraq                   | ...                | ...        | ...        | ...        | ...        | ...        | ...        | ...        | ...         | ...        | ...        | ...        |
| Jordan                 | 4.2                | 4.3        | 5.3        | 5.8        | 4.2        | 8.6        | 7.1        | 6.3        | 6.0         | 5.5        | 5.3        | 6.0        |
| Kuwait                 | 0.1                | 4.7        | 0.2        | 3.0        | 17.3       | 10.7       | 11.4       | 6.3        | 4.6         | 5.9        | 5.8        | 6.0        |
| Lebanon                | 5.4                | 1.7        | 4.5        | 3.3        | 4.1        | 7.5        | 1.1        | —          | 4.0         | 6.0        | 5.0        | 5.0        |
| Libya                  | -2.4               | 3.7        | -4.3       | -1.3       | 13.0       | 4.4        | 10.3       | 6.7        | 6.8         | 7.1        | 8.1        | 7.9        |
| Oman                   | 4.9                | 5.5        | 7.5        | 2.6        | 2.0        | 5.3        | 6.0        | 6.8        | 6.4         | 7.4        | 6.0        | 5.6        |
| Qatar                  | 4.2                | 10.9       | 6.3        | 3.2        | 6.3        | 17.7       | 9.2        | 15.0       | 15.9        | 16.8       | 21.4       | 5.5        |
| Saudi Arabia           | 3.1                | 4.9        | 0.5        | 0.1        | 7.7        | 5.3        | 5.6        | 3.0        | 3.5         | 5.9        | 4.3        | 5.0        |
| Syrian Arab Republic   | 5.6                | 2.3        | 3.7        | 5.9        | 1.1        | 2.8        | 3.3        | 4.4        | 3.9         | 4.2        | 5.2        | 4.7        |
| United Arab Emirates   | 5.4                | 12.4       | 1.7        | 2.6        | 11.9       | 9.7        | 8.2        | 9.4        | 7.4         | 7.0        | 6.0        | 5.6        |
| Yemen, Rep. of         | ...                | 6.2        | 3.8        | 3.9        | 3.7        | 4.0        | 5.6        | 3.2        | 3.3         | 3.5        | 8.1        | 4.4        |

**Table A4 (concluded)**

|                                | Average<br>1990–99 | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013       |
|--------------------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Western Hemisphere</b>      | <b>2.9</b>         | <b>4.1</b> | <b>0.7</b> | <b>0.5</b> | <b>2.2</b> | <b>6.1</b> | <b>4.7</b> | <b>5.5</b> | <b>5.6</b> | <b>4.6</b> | <b>3.2</b> | <b>4.2</b> |
| Antigua and Barbuda            | 3.3                | 3.3        | 1.5        | 2.0        | 4.3        | 5.2        | 5.5        | 12.2       | 6.1        | 2.1        | 4.0        | 4.5        |
| Argentina                      | 4.2                | -0.8       | -4.4       | -10.9      | 8.8        | 9.0        | 9.2        | 8.5        | 8.7        | 6.5        | 3.6        | 3.0        |
| Bahamas, The                   | 1.8                | 1.9        | 0.8        | 2.3        | 1.0        | 1.3        | 2.5        | 3.4        | 2.8        | 1.0        | 1.2        | 2.0        |
| Barbados                       | 0.4                | 2.3        | -2.6       | 0.7        | 2.0        | 4.8        | 4.3        | 3.3        | 3.3        | 1.7        | 1.0        | 3.0        |
| Belize                         | 5.8                | 13.0       | 5.0        | 5.1        | 9.3        | 4.6        | 3.1        | 4.7        | 1.2        | 4.0        | 2.5        | 2.5        |
| Bolivia                        | 4.0                | 2.5        | 1.7        | 2.5        | 2.7        | 4.2        | 4.4        | 4.8        | 4.6        | 5.9        | 5.0        | 4.5        |
| Brazil                         | 1.7                | 4.3        | 1.3        | 2.7        | 1.1        | 5.7        | 3.2        | 3.8        | 5.4        | 5.2        | 3.5        | 4.0        |
| Chile                          | 6.4                | 4.5        | 3.5        | 2.2        | 4.0        | 6.0        | 5.6        | 4.3        | 5.1        | 4.5        | 3.8        | 5.0        |
| Colombia                       | 2.9                | 2.9        | 2.2        | 2.5        | 4.6        | 4.7        | 5.7        | 6.8        | 7.7        | 4.0        | 3.5        | 5.0        |
| Costa Rica                     | 5.4                | 1.8        | 1.1        | 2.9        | 6.4        | 4.3        | 5.9        | 8.8        | 7.3        | 4.0        | 3.5        | 5.5        |
| Dominica                       | 2.6                | 1.3        | -4.2       | -5.1       | 0.1        | 3.0        | 3.3        | 4.0        | 1.5        | 2.6        | 2.8        | 3.0        |
| Dominican Republic             | 4.9                | 5.7        | 1.8        | 5.8        | -0.3       | 1.3        | 9.3        | 10.7       | 8.5        | 4.7        | 2.8        | 6.3        |
| Ecuador                        | 2.2                | 2.8        | 5.3        | 4.2        | 3.6        | 8.0        | 6.0        | 3.9        | 2.5        | 3.0        | 3.0        | 4.5        |
| El Salvador                    | 4.9                | 2.2        | 1.7        | 2.3        | 2.3        | 1.9        | 3.1        | 4.2        | 4.7        | 3.0        | 2.6        | 4.5        |
| Grenada                        | 4.3                | 7.0        | -3.0       | 1.6        | 7.1        | -6.4       | 11.5       | -1.1       | 4.3        | 3.7        | 4.2        | 4.2        |
| Guatemala                      | 3.7                | 2.5        | 2.4        | 3.9        | 2.5        | 3.2        | 3.3        | 5.2        | 5.7        | 4.5        | 4.0        | 4.5        |
| Guyana                         | 4.7                | -1.3       | 2.3        | 1.1        | -0.7       | 1.6        | -1.9       | 5.1        | 5.5        | 4.6        | 4.5        | 3.6        |
| Haiti                          | 0.2                | 0.9        | -1.0       | -0.3       | 0.4        | -3.5       | 1.8        | 2.3        | 3.2        | 2.5        | 4.0        | 4.0        |
| Honduras                       | 2.7                | 5.7        | 2.7        | 3.8        | 4.5        | 6.2        | 6.1        | 6.3        | 6.3        | 4.2        | 4.0        | 4.2        |
| Jamaica                        | 0.9                | 0.7        | 1.5        | 1.1        | 2.3        | 1.0        | 1.4        | 2.5        | 1.2        | 0.7        | 0.9        | 2.7        |
| Mexico                         | 3.3                | 6.6        | -0.2       | 0.8        | 1.7        | 4.0        | 3.1        | 4.9        | 3.2        | 2.1        | 1.8        | 4.4        |
| Nicaragua                      | 3.1                | 4.1        | 3.0        | 0.8        | 2.5        | 5.3        | 4.4        | 3.9        | 3.8        | 3.0        | 3.5        | 5.0        |
| Panama                         | 6.1                | 2.7        | 0.6        | 2.2        | 4.2        | 7.5        | 7.2        | 8.5        | 11.5       | 8.3        | 7.8        | 6.5        |
| Paraguay                       | 2.4                | -3.3       | 2.1        | —          | 3.8        | 4.1        | 2.9        | 4.3        | 6.8        | 5.5        | 4.2        | 5.0        |
| Peru                           | 3.1                | 3.0        | 0.2        | 5.0        | 4.0        | 5.1        | 6.7        | 7.7        | 8.9        | 9.2        | 7.0        | 6.5        |
| St. Kitts and Nevis            | 4.0                | 4.3        | 2.0        | 1.0        | 0.5        | 7.6        | 4.8        | 6.4        | 3.1        | 3.5        | 2.7        | 2.0        |
| St. Lucia                      | 3.1                | —          | -4.1       | 0.6        | 3.5        | 3.8        | 4.4        | 4.9        | 1.7        | 2.3        | 3.1        | 4.4        |
| St. Vincent and the Grenadines | 3.5                | 2.0        | -0.1       | 3.2        | 2.8        | 6.8        | 2.6        | 6.9        | 6.6        | 5.0        | 4.7        | 4.3        |
| Suriname                       | 0.5                | -0.1       | 6.8        | 2.6        | 6.0        | 8.2        | 4.5        | 4.8        | 5.5        | 6.5        | 4.8        | 4.8        |
| Trinidad and Tobago            | 3.9                | 7.6        | 3.8        | 7.9        | 14.4       | 7.8        | 6.1        | 12.2       | 5.5        | 5.0        | 4.5        | 3.7        |
| Uruguay                        | 3.2                | -1.4       | -3.4       | -11.0      | 2.2        | 11.8       | 6.6        | 7.0        | 7.4        | 6.5        | 5.5        | 4.0        |
| Venezuela                      | 2.4                | 3.7        | 3.4        | -8.9       | -7.8       | 18.3       | 10.3       | 10.3       | 8.4        | 6.0        | 2.0        | 2.0        |

<sup>1</sup>For many countries, figures for recent years are IMF staff estimates. Data for some countries are for fiscal years.

<sup>2</sup>The percent changes in 2002 are calculated over a period of 18 months, reflecting a change in the fiscal year cycle (from July–June to January–December).

<sup>3</sup>Given recent trends, it is not possible to forecast GDP with any precision, and consequently no projections for 2008 and beyond are shown.

<sup>4</sup>Data for some countries refer to real net material product (NMP) or are estimates based on NMP. For many countries, figures for recent years are IMF staff estimates. The figures should be interpreted only as indicative of broad orders of magnitude because reliable, comparable data are not generally available. In particular, the growth of output of new private enterprises of the informal economy is not fully reflected in the recent figures.

<sup>5</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

**Table A5. Summary of Inflation  
(Percent)**

|   | Average<br>1990–99 | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013       |
|---|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>GDP deflators</b>                                      |                    |            |            |            |            |            |            |            |            |            |            |            |
| <b>Advanced economies</b>                                 | <b>2.6</b>         | <b>1.5</b> | <b>1.9</b> | <b>1.6</b> | <b>1.7</b> | <b>2.0</b> | <b>2.1</b> | <b>2.1</b> | <b>2.1</b> | <b>2.2</b> | <b>1.7</b> | <b>1.9</b> |
| United States   | 2.2                | 2.2        | 2.4        | 1.7        | 2.1        | 2.9        | 3.3        | 3.2        | 2.7        | 2.2        | 1.6        | 1.9        |
| Euro area   | ...                | 1.5        | 2.4        | 2.6        | 2.2        | 1.8        | 2.0        | 2.0        | 2.2        | 2.4        | 1.8        | 2.1        |
| Japan   | 0.6                | -1.7       | -1.2       | -1.5       | -1.6       | -1.1       | -1.2       | -1.0       | -0.8       | -0.6       | 0.3        | 1.1        |
| Other advanced economies <sup>1</sup>                     | 3.3                | 2.1        | 2.0        | 1.7        | 2.1        | 2.2        | 2.0        | 1.9        | 2.4        | 3.2        | 2.5        | 1.9        |
| <b>Consumer prices</b>                                    |                    |            |            |            |            |            |            |            |            |            |            |            |
| <b>Advanced economies</b>                                 | <b>3.0</b>         | <b>2.2</b> | <b>2.1</b> | <b>1.5</b> | <b>1.8</b> | <b>2.0</b> | <b>2.3</b> | <b>2.4</b> | <b>2.2</b> | <b>3.6</b> | <b>2.0</b> | <b>2.0</b> |
| United States   | 3.0                | 3.4        | 2.8        | 1.6        | 2.3        | 2.7        | 3.4        | 3.2        | 2.9        | 4.2        | 1.8        | 2.1        |
| Euro area <sup>2</sup>                                    | ...                | 2.2        | 2.4        | 2.3        | 2.1        | 2.1        | 2.2        | 2.2        | 2.1        | 3.5        | 1.9        | 1.9        |
| Japan   | 1.2                | -0.8       | -0.7       | -0.9       | -0.3       | —          | -0.3       | 0.3        | —          | 1.6        | 0.9        | 1.5        |
| Other advanced economies                                  | 3.5                | 1.8        | 2.1        | 1.7        | 1.8        | 1.7        | 2.1        | 2.1        | 2.1        | 3.9        | 3.0        | 2.2        |
| <b>Emerging and developing economies</b>                  | <b>51.3</b>        | <b>8.5</b> | <b>7.7</b> | <b>6.8</b> | <b>6.6</b> | <b>5.9</b> | <b>5.7</b> | <b>5.4</b> | <b>6.4</b> | <b>9.4</b> | <b>7.8</b> | <b>4.8</b> |
| <b>Regional groups</b>                                    |                    |            |            |            |            |            |            |            |            |            |            |            |
| Africa  | 24.9               | 11.7       | 11.0       | 9.0        | 8.6        | 6.4        | 7.1        | 6.3        | 6.2        | 10.2       | 8.3        | 4.8        |
| Central and eastern Europe                                | 60.1               | 24.9       | 21.5       | 16.4       | 10.1       | 6.3        | 5.1        | 5.4        | 5.6        | 7.8        | 5.7        | 3.2        |
| Commonwealth of Independent States <sup>3</sup>           | ...                | 24.1       | 20.3       | 14.0       | 12.3       | 10.4       | 12.1       | 9.4        | 9.7        | 15.6       | 12.6       | 7.5        |
| Developing Asia   | 8.7                | 1.9        | 2.8        | 2.1        | 2.6        | 4.1        | 3.8        | 4.2        | 5.4        | 7.8        | 6.2        | 3.7        |
| Middle East   | 10.9               | 4.1        | 3.8        | 5.3        | 6.1        | 7.1        | 6.2        | 7.0        | 10.6       | 15.8       | 14.4       | 8.2        |
| Western Hemisphere  | 98.4               | 8.3        | 6.5        | 8.7        | 10.5       | 6.6        | 6.3        | 5.3        | 5.4        | 7.9        | 7.3        | 5.6        |
| <b>Memorandum</b>   |                    |            |            |            |            |            |            |            |            |            |            |            |
| European Union  | 10.0               | 3.1        | 3.0        | 2.5        | 2.2        | 2.3        | 2.3        | 2.3        | 2.4        | 3.9        | 2.4        | 2.1        |
| <b>Analytical groups</b>                                  |                    |            |            |            |            |            |            |            |            |            |            |            |
| <b>By source of export earnings</b>                       |                    |            |            |            |            |            |            |            |            |            |            |            |
| Fuel  | 76.0               | 14.4       | 13.4       | 11.8       | 11.5       | 9.8        | 9.6        | 8.5        | 9.8        | 15.2       | 13.4       | 8.7        |
| Nonfuel<br>of which, primary products                     | 45.1               | 7.1        | 6.3        | 5.6        | 5.5        | 5.0        | 4.8        | 4.7        | 5.6        | 8.1        | 6.5        | 3.9        |
|   | 55.0               | 17.8       | 15.4       | 8.4        | 6.6        | 4.0        | 7.2        | 7.4        | 6.5        | 10.7       | 8.3        | 4.8        |
| <b>By external financing source</b>                       |                    |            |            |            |            |            |            |            |            |            |            |            |
| Net debtor countries<br>of which, official financing      | 52.2               | 9.4        | 8.4        | 8.1        | 7.3        | 5.4        | 5.9        | 6.1        | 5.9        | 8.7        | 7.5        | 4.3        |
|   | 17.5               | 4.2        | 4.3        | 4.7        | 6.6        | 7.3        | 7.9        | 7.5        | 8.9        | 15.6       | 12.9       | 6.0        |
| <b>Net debtor countries by debt-servicing experience</b>  |                    |            |            |            |            |            |            |            |            |            |            |            |
| Countries with arrears and/or rescheduling during 2002–06 | 28.5               | 7.2        | 8.3        | 11.2       | 7.6        | 5.8        | 8.6        | 9.9        | 7.2        | 10.7       | 10.6       | 5.8        |
| <b>Memorandum</b>   |                    |            |            |            |            |            |            |            |            |            |            |            |
| <b>Median inflation rate</b>                              |                    |            |            |            |            |            |            |            |            |            |            |            |
| Advanced economies  | 2.8                | 2.7        | 2.5        | 2.3        | 2.1        | 1.9        | 2.1        | 2.2        | 2.1        | 3.8        | 2.6        | 2.0        |
| Emerging and developing economies                         | 10.1               | 4.0        | 4.7        | 3.3        | 4.3        | 4.5        | 5.7        | 5.6        | 6.2        | 9.6        | 7.4        | 4.0        |

<sup>1</sup>In this table, “other advanced economies” means advanced economies excluding the United States, euro area countries, and Japan.

<sup>2</sup>Based on Eurostat's harmonized index of consumer prices.

<sup>3</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

**Table A6. Advanced Economies: Consumer Prices**

(Annual percent change)

|                                      | Average<br>1990–99 | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013       | End of Period<br>2007 | 2008       | 2009       |
|--------------------------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------------------|------------|------------|
| <b>Consumer Prices</b>               |                    |            |            |            |            |            |            |            |            |            |            |            |                       |            |            |
| <b>Advanced economies</b>            | <b>3.0</b>         | <b>2.2</b> | <b>2.1</b> | <b>1.5</b> | <b>1.8</b> | <b>2.0</b> | <b>2.3</b> | <b>2.4</b> | <b>2.2</b> | <b>3.6</b> | <b>2.0</b> | <b>2.0</b> | <b>3.1</b>            | <b>3.2</b> | <b>1.7</b> |
| United States                        | 3.0                | 3.4        | 2.8        | 1.6        | 2.3        | 2.7        | 3.4        | 3.2        | 2.9        | 4.2        | 1.8        | 2.1        | 4.1                   | 3.1        | 1.6        |
| Euro area <sup>1</sup>               | ...                | 2.2        | 2.4        | 2.3        | 2.1        | 2.1        | 2.2        | 2.2        | 2.1        | 3.5        | 1.9        | 1.9        | 3.1                   | 2.9        | 1.7        |
| Germany                              | 2.4                | 1.4        | 1.9        | 1.4        | 1.0        | 1.8        | 1.9        | 1.8        | 2.3        | 2.9        | 1.4        | 1.7        | 3.1                   | 2.4        | 0.8        |
| France                               | 1.9                | 1.8        | 1.8        | 1.9        | 2.2        | 2.3        | 1.9        | 1.9        | 1.6        | 3.4        | 1.6        | 1.8        | 2.8                   | 2.6        | 1.6        |
| Italy                                | 4.1                | 2.6        | 2.3        | 2.6        | 2.8        | 2.3        | 2.2        | 2.2        | 2.0        | 3.4        | 1.9        | 2.0        | 1.8                   | 4.6        | 1.6        |
| Spain                                | 4.3                | 3.5        | 2.8        | 3.6        | 3.1        | 3.1        | 3.4        | 3.6        | 2.8        | 4.5        | 2.6        | 2.4        | 4.3                   | 3.6        | 2.2        |
| Netherlands                          | 2.3                | 2.3        | 5.1        | 3.8        | 2.2        | 1.4        | 1.5        | 1.7        | 1.6        | 2.9        | 2.6        | 2.0        | 1.6                   | 2.9        | 2.6        |
| Belgium                              | 2.0                | 2.7        | 2.4        | 1.6        | 1.5        | 1.9        | 2.5        | 2.3        | 1.8        | 4.6        | 2.8        | 1.9        | 3.1                   | 4.1        | 2.2        |
| Austria                              | 2.1                | 2.0        | 2.3        | 1.7        | 1.3        | 2.0        | 2.1        | 1.7        | 2.2        | 3.5        | 2.3        | 1.8        | 3.5                   | 2.9        | 1.8        |
| Finland                              | 2.1                | 3.0        | 2.7        | 2.0        | 1.3        | 0.1        | 0.8        | 1.3        | 1.6        | 3.9        | 2.5        | 2.0        | 1.9                   | 4.5        | 2.7        |
| Greece                               | 10.8               | 2.9        | 3.7        | 3.9        | 3.4        | 3.0        | 3.5        | 3.3        | 3.0        | 4.4        | 3.1        | 2.5        | 3.9                   | 3.7        | 2.9        |
| Portugal                             | 5.7                | 2.8        | 4.4        | 3.7        | 3.3        | 2.5        | 2.1        | 3.0        | 2.4        | 3.2        | 2.0        | 2.1        | 2.4                   | 3.2        | 2.0        |
| Ireland                              | 2.4                | 5.3        | 4.0        | 4.7        | 4.0        | 2.3        | 2.2        | 2.7        | 2.9        | 3.5        | 2.4        | 2.0        | 3.2                   | 3.3        | 2.2        |
| Luxembourg                           | 2.2                | 3.2        | 2.7        | 2.1        | 2.0        | 2.2        | 2.5        | 2.7        | 2.3        | 3.7        | 1.8        | 2.0        | 3.4                   | 2.8        | 2.0        |
| Slovenia                             | ...                | 8.8        | 8.4        | 7.5        | 5.6        | 3.6        | 2.5        | 2.5        | 3.6        | 5.9        | 3.3        | 3.3        | 5.6                   | 4.7        | 3.0        |
| Cyprus                               | 3.7                | 4.9        | 2.0        | 2.8        | 4.0        | 1.9        | 2.0        | 2.2        | 2.2        | 4.6        | 3.5        | 2.0        | 3.7                   | 4.4        | 2.9        |
| Malta                                | 3.1                | 3.0        | 2.5        | 2.6        | 1.9        | 2.7        | 2.5        | 2.6        | 0.7        | 3.7        | 2.2        | 2.4        | 3.1                   | 2.8        | 2.4        |
| Japan                                | 1.2                | -0.8       | -0.7       | -0.9       | -0.3       | —          | -0.3       | 0.3        | —          | 1.6        | 0.9        | 1.5        | 0.7                   | 1.9        | 0.5        |
| United Kingdom <sup>1</sup>          | 3.3                | 0.9        | 1.2        | 1.3        | 1.4        | 1.3        | 2.0        | 2.3        | 2.3        | 3.8        | 2.9        | 2.0        | 2.0                   | 4.6        | 2.0        |
| Canada                               | 2.2                | 2.7        | 2.5        | 2.3        | 2.7        | 1.8        | 2.2        | 2.0        | 2.1        | 2.5        | 2.1        | 2.0        | 2.4                   | 2.9        | 1.9        |
| Korea                                | 5.7                | 2.3        | 4.1        | 2.8        | 3.5        | 3.6        | 2.8        | 2.2        | 2.5        | 4.8        | 4.0        | 3.0        | 3.6                   | 5.0        | 3.0        |
| Australia                            | 2.5                | 4.5        | 4.4        | 3.0        | 2.8        | 2.3        | 2.7        | 3.5        | 2.3        | 4.6        | 3.6        | 2.8        | 3.0                   | 4.8        | 3.2        |
| Taiwan Province of China             | 2.9                | 1.3        | —          | -0.2       | -0.3       | 1.6        | 2.3        | 0.6        | 1.8        | 4.2        | 2.5        | 1.5        | 3.3                   | 4.3        | 1.8        |
| Sweden                               | 3.6                | 1.3        | 2.7        | 1.9        | 2.3        | 1.0        | 0.8        | 1.5        | 1.7        | 3.4        | 2.8        | 2.0        | 2.5                   | 3.3        | 2.4        |
| Switzerland                          | 2.3                | 1.6        | 1.0        | 0.6        | 0.6        | 0.8        | 1.2        | 1.0        | 0.7        | 2.6        | 1.5        | 1.0        | 2.0                   | 1.2        | 1.5        |
| Hong Kong SAR                        | 6.8                | -3.7       | -1.6       | -3.0       | -2.6       | -0.4       | 0.9        | 2.0        | 2.0        | 4.8        | 4.3        | 3.0        | 3.8                   | 3.8        | 5.1        |
| Denmark                              | 2.1                | 2.9        | 2.4        | 2.4        | 2.1        | 1.2        | 1.8        | 1.9        | 1.7        | 3.4        | 2.8        | 1.9        | 2.3                   | 3.7        | 2.4        |
| Norway                               | 2.4                | 3.1        | 3.0        | 1.3        | 2.5        | 0.4        | 1.6        | 2.3        | 0.8        | 3.2        | 2.7        | 2.5        | 2.8                   | 1.4        | 2.4        |
| Israel                               | 11.2               | 1.1        | 1.1        | 5.7        | 0.7        | -0.4       | 1.3        | 2.1        | 0.5        | 4.8        | 3.3        | 2.0        | 3.4                   | 5.1        | 1.9        |
| Singapore                            | 1.9                | 1.3        | 1.0        | -0.4       | 0.5        | 1.7        | 0.5        | 1.0        | 2.1        | 6.5        | 3.3        | 1.7        | 3.9                   | 5.6        | 2.6        |
| New Zealand                          | 2.1                | 2.6        | 2.6        | 2.6        | 1.7        | 2.3        | 3.0        | 3.4        | 2.4        | 4.2        | 3.8        | 2.2        | 3.2                   | 4.8        | 2.9        |
| Iceland                              | 4.1                | 5.1        | 6.6        | 4.8        | 2.1        | 3.2        | 4.0        | 6.8        | 5.0        | 12.1       | 11.2       | 2.0        | 5.9                   | 14.9       | 9.1        |
| <i>Memorandum</i>                    |                    |            |            |            |            |            |            |            |            |            |            |            |                       |            |            |
| Major advanced economies             | 2.6                | 2.1        | 1.9        | 1.3        | 1.7        | 2.0        | 2.3        | 2.4        | 2.2        | 3.5        | 1.7        | 1.9        | 3.0                   | 3.0        | 1.4        |
| Newly industrialized Asian economies | 4.7                | 1.2        | 1.9        | 1.0        | 1.4        | 2.4        | 2.2        | 1.6        | 2.2        | 4.8        | 3.5        | 2.5        | 3.6                   | 4.7        | 2.9        |

<sup>1</sup>Based on Eurostat's harmonized index of consumer prices.

**Table A7. Emerging and Developing Economies, by Country: Consumer Prices<sup>1</sup>**  
*(Annual percent change)*

|                          | Average<br>1990–99 | End of Period |             |            |            |            |            |            |            |             |            | 2007       | 2008       | 2009        |            |
|--------------------------|--------------------|---------------|-------------|------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|-------------|------------|
|                          |                    | 2000          | 2001        | 2002       | 2003       | 2004       | 2005       | 2006       | 2007       | 2008        | 2009       |            |            |             |            |
| <b>Africa</b>            | <b>24.9</b>        | <b>11.7</b>   | <b>11.0</b> | <b>9.0</b> | <b>8.6</b> | <b>6.4</b> | <b>7.1</b> | <b>6.3</b> | <b>6.2</b> | <b>10.2</b> | <b>8.3</b> | <b>4.8</b> | <b>7.1</b> | <b>11.2</b> | <b>6.8</b> |
| Algeria                  | 17.3               | 0.3           | 4.2         | 1.4        | 2.6        | 3.6        | 1.6        | 2.5        | 3.6        | 4.3         | 4.0        | 2.9        | 4.4        | 4.2         | 3.9        |
| Angola                   | 463.0              | 325.0         | 152.6       | 108.9      | 98.3       | 43.6       | 23.0       | 13.3       | 12.2       | 12.1        | 9.3        | 4.5        | 11.8       | 11.0        | 8.0        |
| Benin                    | 7.2                | 4.2           | 4.0         | 2.4        | 1.5        | 0.9        | 5.4        | 3.8        | 1.3        | 8.8         | 6.5        | 2.8        | 0.3        | 13.1        | 3.7        |
| Botswana                 | 10.9               | 8.5           | 6.6         | 8.0        | 9.2        | 7.0        | 8.6        | 11.6       | 7.1        | 12.6        | 11.9       | 9.5        | 8.1        | 13.4        | 10.7       |
| Burkina Faso             | 4.3                | -0.3          | 4.7         | 2.3        | 2.0        | -0.4       | 6.4        | 2.4        | -0.2       | 9.5         | 5.0        | 2.0        | 2.3        | 5.5         | 3.5        |
| Burundi                  | 13.5               | 24.3          | 9.3         | -1.3       | 10.7       | 8.0        | 13.4       | 2.8        | 8.3        | 24.3        | 15.4       | 5.2        | 14.7       | 23.7        | 9.8        |
| Cameroon <sup>2</sup>    | 4.9                | 0.8           | 2.8         | 6.3        | 0.6        | 0.3        | 2.0        | 5.1        | 0.9        | 4.1         | 2.1        | 2.0        | 3.5        | 2.5         | 1.7        |
| Cape Verde               | 7.3                | -2.4          | 3.7         | 1.9        | 1.2        | -1.9       | 0.4        | 4.8        | 4.4        | 5.7         | 4.9        | 2.0        | 3.4        | 6.5         | 4.1        |
| Central African Republic | 3.5                | 3.2           | 3.8         | 2.3        | 4.4        | -2.2       | 2.9        | 6.7        | 0.9        | 8.5         | 6.7        | 2.5        | -0.2       | 13.0        | 3.8        |
| Chad                     | 4.1                | 3.8           | 12.4        | 5.2        | -1.8       | -5.4       | 7.9        | 7.9        | -8.8       | 5.0         | 3.0        | 3.0        | 0.8        | 2.9         | 3.0        |
| Comoros                  | 2.5                | 5.9           | 5.6         | 3.6        | 3.7        | 4.5        | 3.0        | 3.4        | 4.5        | 5.9         | 5.6        | 3.1        | 2.2        | 9.6         | 1.6        |
| Congo, Dem. Rep. of      | 848.4              | 550.0         | 357.3       | 25.3       | 12.8       | 4.0        | 21.4       | 13.2       | 16.7       | 17.5        | 15.1       | 10.0       | 10.0       | 23.5        | 11.5       |
| Congo, Rep. of           | 7.3                | 0.4           | 0.8         | 3.1        | 1.5        | 3.8        | 2.5        | 4.7        | 2.6        | 4.0         | 4.0        | 3.0        | -1.7       | 5.0         | 3.0        |
| Côte d'Ivoire            | 6.0                | -0.4          | 4.4         | 3.1        | 3.3        | 1.5        | 3.9        | 2.5        | 1.9        | 5.6         | 5.7        | 3.0        | 1.5        | 9.0         | 3.0        |
| Djibouti                 | 4.2                | 1.6           | 1.8         | 0.6        | 2.0        | 3.1        | 3.1        | 3.5        | 5.0        | 8.1         | 6.0        | 3.0        | 5.0        | 8.1         | 6.0        |
| Equatorial Guinea        | 6.1                | 4.8           | 8.8         | 7.6        | 7.3        | 4.2        | 5.7        | 4.5        | 2.8        | 6.4         | 5.5        | 4.0        | 3.7        | 6.5         | 5.2        |
| Eritrea                  | ...                | 19.9          | 14.6        | 16.9       | 22.7       | 25.1       | 12.5       | 15.1       | 9.3        | 11.0        | 10.5       | 8.5        | 12.3       | 11.0        | 10.0       |
| Ethiopia                 | 7.1                | 6.2           | -5.2        | -7.2       | 15.1       | 8.6        | 6.8        | 12.3       | 15.8       | 25.3        | 40.8       | 9.1        | 15.1       | 55.3        | 18.0       |
| Gabon                    | 5.5                | 0.5           | 2.1         | 0.2        | 2.1        | 0.4        | 1.2        | -1.4       | 5.0        | 5.1         | 5.7        | 2.5        | 5.9        | 5.1         | 5.5        |
| Gambia, The              | 5.4                | 0.9           | 4.5         | 8.6        | 17.0       | 14.3       | 5.0        | 2.1        | 5.4        | 6.0         | 5.5        | 4.0        | 6.0        | 6.0         | 5.0        |
| Ghana                    | 26.8               | 25.2          | 32.9        | 14.8       | 26.7       | 12.6       | 15.1       | 10.2       | 10.7       | 16.8        | 13.3       | 5.0        | 12.7       | 17.8        | 13.0       |
| Guinea                   | 8.5                | 6.8           | 5.4         | 3.0        | 11.0       | 17.5       | 31.4       | 34.7       | 22.9       | 17.9        | 9.3        | 5.0        | 12.8       | 15.0        | 10.0       |
| Guinea-Bissau            | 35.6               | 8.6           | 3.3         | 3.3        | -3.5       | 0.8        | 3.4        | 2.0        | 4.6        | 9.6         | 6.2        | 3.0        | 9.3        | 9.8         | 3.0        |
| Kenya                    | 16.0               | 10.0          | 5.8         | 2.0        | 9.8        | 11.6       | 10.3       | 14.5       | 9.8        | 25.0        | 6.5        | 5.0        | 12.0       | 24.0        | 6.5        |
| Lesotho                  | 11.1               | 6.1           | 6.9         | 12.5       | 7.3        | 5.0        | 3.4        | 6.1        | 8.0        | 11.2        | 9.5        | 4.9        | 10.5       | 12.7        | 9.1        |
| Liberia                  | ...                | 5.3           | 12.1        | 14.2       | 10.3       | 3.6        | 6.9        | 7.2        | 11.4       | 19.2        | 11.4       | 5.0        | 11.7       | 18.8        | 8.5        |
| Madagascar               | 16.4               | 10.7          | 6.9         | 16.2       | -1.1       | 14.0       | 18.4       | 10.8       | 10.3       | 9.4         | 8.8        | 5.0        | 8.2        | 11.0        | 8.5        |
| Malawi                   | 29.0               | 29.6          | 27.2        | 17.3       | 9.6        | 11.4       | 15.5       | 13.9       | 7.9        | 8.2         | 7.9        | 6.7        | 7.5        | 8.2         | 7.0        |
| Mali                     | 3.8                | -0.7          | 5.2         | 5.0        | -1.3       | -3.1       | 6.4        | 1.9        | 2.5        | 2.5         | 2.5        | 2.5        | 2.5        | 2.5         | 2.5        |
| Mauritania               | 5.0                | 6.8           | 7.7         | 5.4        | 5.3        | 10.4       | 12.1       | 6.2        | 7.3        | 12.5        | 9.5        | 5.0        | 7.4        | 12.0        | 7.0        |
| Mauritius                | 8.2                | 4.2           | 5.4         | 6.5        | 3.9        | 4.7        | 4.9        | 8.9        | 9.1        | 8.8         | 8.6        | 5.0        | 10.0       | 9.7         | 7.5        |
| Morocco                  | 4.4                | 1.9           | 0.6         | 2.8        | 1.2        | 1.5        | 1.0        | 3.3        | 2.0        | 3.9         | 3.5        | 2.6        | 2.0        | 3.9         | 3.5        |
| Mozambique               | 31.8               | 12.7          | 9.1         | 16.8       | 13.5       | 12.6       | 6.4        | 13.2       | 8.2        | 10.1        | 8.4        | 5.4        | 10.3       | 9.2         | 8.1        |
| Namibia                  | 10.2               | 9.3           | 9.3         | 11.3       | 7.2        | 4.1        | 2.3        | 5.1        | 6.7        | 8.7         | 8.1        | 4.7        | 7.1        | 9.1         | 7.0        |
| Niger                    | 4.5                | 2.9           | 4.0         | 2.7        | -1.8       | 0.4        | 7.8        | 0.1        | 0.1        | 8.3         | 3.5        | 2.0        | 4.7        | 6.4         | 3.5        |
| Nigeria                  | 28.5               | 6.9           | 18.0        | 13.7       | 14.0       | 15.0       | 17.8       | 8.3        | 5.5        | 11.0        | 11.1       | 8.5        | 6.6        | 13.1        | 9.8        |
| Rwanda                   | 16.3               | 3.9           | 3.4         | 2.0        | 7.4        | 12.0       | 9.0        | 8.9        | 9.1        | 12.0        | 8.0        | 5.0        | 6.6        | 15.5        | 5.0        |
| São Tomé and Príncipe    | 39.2               | 11.0          | 9.2         | 10.1       | 9.8        | 13.3       | 17.2       | 23.1       | 18.5       | 25.9        | 19.8       | 5.0        | 27.6       | 24.5        | 16.0       |
| Senegal                  | 4.0                | 0.7           | 3.0         | 2.3        | —          | 0.5        | 1.7        | 2.1        | 5.9        | 5.4         | 2.8        | 2.2        | 6.2        | 4.1         | 2.2        |
| Seychelles               | 2.0                | 6.3           | 6.0         | 0.2        | 3.3        | 3.9        | 0.8        | -1.4       | 5.7        | 27.3        | 28.7       | 3.0        | 16.8       | 21.2        | 35.2       |
| Sierra Leone             | 42.6               | -0.9          | 2.6         | -3.7       | 7.5        | 14.2       | 12.1       | 9.5        | 11.7       | 15.3        | 13.9       | 6.5        | 13.8       | 15.7        | 12.1       |
| South Africa             | 9.8                | 5.4           | 5.7         | 9.2        | 5.8        | 1.4        | 3.4        | 4.7        | 7.1        | 11.8        | 8.0        | 4.5        | 9.0        | 12.7        | 6.6        |
| Sudan                    | 75.2               | 8.0           | 4.9         | 8.3        | 7.7        | 8.4        | 8.5        | 7.2        | 8.0        | 16.0        | 10.0       | 4.5        | 8.8        | 12.0        | 8.0        |
| Swaziland                | 9.5                | 7.2           | 7.5         | 11.7       | 7.4        | 3.4        | 4.8        | 5.3        | 8.2        | 12.7        | 8.9        | 5.3        | 9.8        | 13.5        | 7.5        |
| Tanzania                 | 21.3               | 6.2           | 5.1         | 4.6        | 4.4        | 4.1        | 4.4        | 7.3        | 7.0        | 9.2         | 6.5        | 5.0        | 6.4        | 8.3         | 5.0        |
| Togo                     | 6.0                | 1.9           | 3.9         | 3.1        | -0.9       | 0.4        | 6.8        | 2.2        | 1.0        | 5.2         | 5.2        | 3.4        | 3.4        | 4.9         | 4.5        |
| Tunisia                  | 4.8                | 2.3           | 2.0         | 2.7        | 2.7        | 3.6        | 2.0        | 4.5        | 3.1        | 5.1         | 4.5        | 2.7        | 5.3        | 4.7         | 4.5        |
| Uganda                   | 16.3               | 5.8           | 4.5         | -2.0       | 5.7        | 5.0        | 8.0        | 6.6        | 6.8        | 7.3         | 7.8        | 4.5        | 4.4        | 12.5        | 4.5        |
| Zambia                   | 68.3               | 26.1          | 21.7        | 22.2       | 21.4       | 18.0       | 18.3       | 9.0        | 10.7       | 11.8        | 8.6        | 5.0        | 8.9        | 12.7        | 9.0        |
| Zimbabwe <sup>3</sup>    | 28.1               | 55.6          | 73.4        | 133.2      | 365.0      | 350.0      | 237.8      | 1,016.7    | 10,452.6   | ...         | ...        | ...        | 108,844.1  | ...         | ...        |

**Table A7 (continued)**

|   | Average<br>1990–99 | End of Period |             |             |             |             |             |            |            |             |             |            |             |             |             |
|---|--------------------|---------------|-------------|-------------|-------------|-------------|-------------|------------|------------|-------------|-------------|------------|-------------|-------------|-------------|
|   |                    | 2000          | 2001        | 2002        | 2003        | 2004        | 2005        | 2006       | 2007       | 2008        | 2009        | 2013       | 2007        | 2008        | 2009        |
| <b>Central and eastern Europe<sup>4</sup></b>           | <b>60.1</b>        | <b>24.9</b>   | <b>21.5</b> | <b>16.4</b> | <b>10.1</b> | <b>6.3</b>  | <b>5.1</b>  | <b>5.4</b> | <b>5.6</b> | <b>7.8</b>  | <b>5.7</b>  | <b>3.2</b> | <b>6.6</b>  | <b>7.3</b>  | <b>5.5</b>  |
| Albania   | 34.7               | —             | 3.1         | 5.2         | 2.3         | 2.9         | 2.4         | 2.4        | 2.9        | 4.0         | 3.0         | 2.8        | 3.1         | 3.9         | 3.0         |
| Bosnia and Herzegovina                                  | ...                | 5.0           | 4.5         | 0.3         | 0.5         | 0.3         | 3.6         | 6.1        | 1.5        | 8.5         | 5.2         | 2.5        | 4.9         | 8.1         | 3.5         |
| Bulgaria  | 110.3              | 10.3          | 7.4         | 5.8         | 2.3         | 6.1         | 6.0         | 7.4        | 7.6        | 12.2        | 7.0         | 3.4        | 11.6        | 9.6         | 6.5         |
| Croatia   | ...                | 4.6           | 3.8         | 1.7         | 1.8         | 2.0         | 3.3         | 3.2        | 2.9        | 7.0         | 4.9         | 3.0        | 5.8         | 6.5         | 4.0         |
| Czech Republic  | 13.9               | 3.8           | 4.7         | 1.8         | 0.1         | 2.8         | 1.8         | 2.5        | 2.8        | 6.7         | 3.4         | 2.0        | 5.4         | 5.7         | 3.4         |
| Estonia   | ...                | 4.0           | 5.8         | 3.6         | 1.3         | 3.0         | 4.1         | 4.4        | 6.6        | 10.2        | 5.1         | 2.9        | 9.6         | 6.9         | 5.2         |
| Hungary   | 22.0               | 9.8           | 9.2         | 5.3         | 4.6         | 6.8         | 3.6         | 3.9        | 7.9        | 6.3         | 4.1         | 3.0        | 7.4         | 5.5         | 3.4         |
| Latvia  | ...                | 2.6           | 2.5         | 1.9         | 2.9         | 6.2         | 6.7         | 6.5        | 10.1       | 15.9        | 10.6        | 3.1        | 14.0        | 14.6        | 8.8         |
| Lithuania   | ...                | 1.1           | 1.6         | 0.3         | -1.1        | 1.2         | 2.7         | 3.8        | 5.8        | 11.3        | 6.2         | 2.4        | 8.2         | 9.2         | 5.7         |
| Macedonia, FYR  | ...                | 6.4           | 5.5         | 2.2         | 1.2         | -0.4        | 0.5         | 3.2        | 2.3        | 8.5         | 3.0         | 3.0        | 6.7         | 5.5         | 3.0         |
| Montenegro  | ...                | ...           | 23.7        | 19.7        | 7.5         | 3.1         | 3.4         | 2.1        | 3.5        | 9.2         | 5.2         | 3.0        | ...         | ...         | ...         |
| Poland  | 51.4               | 10.1          | 5.5         | 1.9         | 0.8         | 3.5         | 2.1         | 1.0        | 2.5        | 4.0         | 3.3         | 2.5        | 4.0         | 3.0         | 4.3         |
| Romania   | 110.3              | 45.7          | 34.5        | 22.5        | 15.3        | 11.9        | 9.0         | 6.6        | 4.8        | 8.2         | 6.6         | 3.5        | 6.6         | 7.9         | 6.2         |
| Serbia  | ...                | 70.0          | 91.8        | 19.5        | 11.7        | 10.1        | 17.3        | 12.7       | 6.8        | 10.7        | 7.5         | 7.5        | 10.1        | 8.5         | 8.0         |
| Slovak Republic   | ...                | 12.2          | 7.2         | 3.5         | 8.4         | 7.5         | 2.8         | 4.3        | 1.9        | 3.9         | 3.6         | 2.5        | 2.5         | 4.1         | 3.0         |
| Turkey  | 76.1               | 55.0          | 54.2        | 45.1        | 25.3        | 8.6         | 8.2         | 9.6        | 8.8        | 10.5        | 8.4         | 4.0        | 8.4         | 10.9        | 7.5         |
| <b>Commonwealth of Independent States<sup>4,5</sup></b> | <b>...</b>         | <b>24.1</b>   | <b>20.3</b> | <b>14.0</b> | <b>12.3</b> | <b>10.4</b> | <b>12.1</b> | <b>9.4</b> | <b>9.7</b> | <b>15.6</b> | <b>12.6</b> | <b>7.5</b> | <b>13.0</b> | <b>14.8</b> | <b>10.7</b> |
| Russia  | ...                | 20.8          | 21.5        | 15.8        | 13.7        | 10.9        | 12.7        | 9.7        | 9.0        | 14.0        | 12.0        | 7.7        | 11.9        | 13.8        | 10.5        |
| Excluding Russia  | ...                | 34.1          | 17.1        | 9.2         | 8.6         | 9.1         | 10.7        | 8.9        | 11.6       | 19.7        | 14.2        | 6.9        | 15.7        | 17.2        | 11.3        |
| Armenia   | ...                | -0.8          | 3.1         | 1.1         | 4.7         | 7.0         | 0.6         | 2.9        | 4.4        | 9.4         | 5.0         | 4.0        | 6.6         | 7.5         | 5.0         |
| Azerbaijan  | ...                | 1.8           | 1.5         | 2.8         | 2.2         | 6.7         | 9.7         | 8.4        | 16.6       | 22.4        | 20.0        | 15.0       | 19.5        | 25.0        | 15.0        |
| Belarus   | ...                | 168.6         | 61.1        | 42.6        | 28.4        | 18.1        | 10.3        | 7.0        | 8.4        | 15.3        | 9.6         | 7.2        | 12.1        | 16.3        | 6.3         |
| Georgia   | ...                | 4.0           | 4.7         | 5.6         | 4.8         | 5.7         | 8.3         | 9.2        | 9.2        | 10.0        | 7.6         | 6.0        | 11.0        | 8.0         | 8.0         |
| Kazakhstan  | ...                | 13.3          | 8.4         | 5.9         | 6.4         | 6.9         | 7.6         | 8.6        | 10.8       | 17.6        | 9.8         | 6.0        | 18.8        | 11.5        | 8.0         |
| Kyrgyz Republic   | ...                | 18.7          | 6.9         | 2.1         | 3.1         | 4.1         | 4.3         | 5.6        | 10.2       | 24.5        | 12.2        | 5.1        | 20.1        | 20.0        | 12.0        |
| Moldova   | ...                | 31.3          | 9.8         | 5.3         | 11.7        | 12.5        | 11.9        | 12.7       | 12.4       | 13.7        | 9.7         | 5.0        | 13.1        | 11.5        | 9.5         |
| Mongolia  | ...                | 11.6          | 6.2         | 0.9         | 5.1         | 7.9         | 12.5        | 5.1        | 9.0        | 26.0        | 18.8        | 5.3        | 15.1        | 27.5        | 10.0        |
| Tajikistan  | ...                | 32.9          | 38.6        | 12.2        | 16.4        | 7.2         | 7.3         | 10.0       | 13.2       | 21.6        | 15.5        | 6.0        | 19.8        | 18.0        | 13.0        |
| Turkmenistan  | ...                | 8.0           | 11.6        | 8.8         | 5.6         | 5.9         | 10.7        | 8.2        | 6.3        | 13.0        | 12.0        | 6.0        | 8.6         | 12.0        | 12.0        |
| Ukraine   | ...                | 28.2          | 12.0        | 0.8         | 5.2         | 9.0         | 13.5        | 9.1        | 12.8       | 25.3        | 18.8        | 5.8        | 16.6        | 21.6        | 14.7        |
| Uzbekistan  | ...                | 25.0          | 27.3        | 27.3        | 11.6        | 6.6         | 10.0        | 14.2       | 12.3       | 11.1        | 10.6        | 8.0        | 11.9        | 11.0        | 10.0        |

**Table A7 (continued)**

|                        | Average     |            |            |            |            |            |            |            |             |             |             |            | End of Period |             |             |
|------------------------|-------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|------------|---------------|-------------|-------------|
|                        | 1990–99     | 2000       | 2001       | 2002       | 2003       | 2004       | 2005       | 2006       | 2007        | 2008        | 2009        | 2013       | 2007          | 2008        | 2009        |
| <b>Developing Asia</b> | <b>8.7</b>  | <b>1.9</b> | <b>2.8</b> | <b>2.1</b> | <b>2.6</b> | <b>4.1</b> | <b>3.8</b> | <b>4.2</b> | <b>5.4</b>  | <b>7.8</b>  | <b>6.2</b>  | <b>3.7</b> | <b>6.3</b>    | <b>7.4</b>  | <b>6.2</b>  |
| Afghanistan, I.R. of   | ...         | ...        | ...        | 5.1        | 24.1       | 13.2       | 12.3       | 5.1        | 13.0        | 24.0        | 9.5         | 5.0        | 20.7          | 15.6        | 6.0         |
| Bangladesh             | 6.4         | 2.5        | 1.9        | 3.7        | 5.4        | 6.1        | 7.0        | 7.1        | 9.1         | 10.1        | 10.0        | 4.7        | 9.6           | 10.5        | 9.4         |
| Bhutan                 | 9.8         | 4.0        | 3.4        | 2.5        | 2.1        | 4.6        | 5.3        | 5.0        | 5.2         | 7.7         | 5.0         | 3.9        | 4.8           | 6.4         | 4.5         |
| Brunei Darussalam      | ...         | 1.2        | 0.6        | -2.3       | 0.3        | 0.9        | 1.1        | 0.2        | 0.3         | 0.8         | 1.0         | 1.2        | ...           | ...         | ...         |
| Cambodia               | ...         | -0.8       | 0.2        | 3.3        | 1.2        | 3.9        | 5.8        | 4.7        | 5.9         | 20.1        | 9.0         | 4.3        | 10.8          | 16.3        | 9.6         |
| China                  | 7.5         | 0.4        | 0.7        | -0.8       | 1.2        | 3.9        | 1.8        | 1.5        | 4.8         | 6.4         | 4.3         | 3.3        | 6.6           | 4.5         | 5.5         |
| Fiji                   | 4.2         | 1.1        | 4.3        | 0.8        | 4.2        | 2.8        | 2.4        | 2.5        | 4.3         | 7.0         | 6.0         | 4.0        | 6.0           | 7.0         | 6.0         |
| India                  | 9.5         | 4.0        | 3.8        | 4.3        | 3.8        | 3.8        | 4.2        | 6.2        | 6.4         | 7.9         | 6.7         | 3.9        | 5.5           | 9.2         | 5.1         |
| Indonesia              | 13.6        | 3.8        | 11.5       | 11.8       | 6.8        | 6.1        | 10.5       | 13.1       | 6.2         | 9.8         | 8.8         | 4.7        | 5.6           | 12.0        | 7.5         |
| Kiribati               | 3.4         | 0.4        | 6.0        | 3.2        | 2.5        | -1.9       | -0.5       | -0.2       | 0.2         | 1.0         | 1.5         | 2.5        | 3.7           | 2.8         | 2.5         |
| Lao PDR                | 22.6        | 23.2       | 9.3        | 9.2        | 15.5       | 10.5       | 7.2        | 6.8        | 4.5         | 8.4         | 5.4         | 4.5        | 5.6           | 7.3         | 5.0         |
| Malaysia               | 3.7         | 1.6        | 1.4        | 1.8        | 1.1        | 1.4        | 3.0        | 3.6        | 2.0         | 6.0         | 4.7         | 2.5        | 2.2           | 7.2         | 3.3         |
| Maldives               | 8.4         | -1.2       | 0.7        | 0.9        | -2.8       | 6.3        | 3.3        | 3.5        | 7.4         | 15.0        | 4.0         | 3.0        | 10.3          | 9.5         | 3.5         |
| Myanmar                | 26.9        | -1.7       | 34.5       | 58.1       | 24.9       | 3.8        | 10.7       | 25.7       | 33.9        | 34.5        | 30.0        | 18.0       | 29.0          | 40.0        | 20.0        |
| Nepal                  | 9.8         | 3.4        | 2.4        | 2.9        | 4.7        | 4.0        | 4.5        | 8.0        | 6.4         | 8.0         | 8.5         | 4.0        | 5.1           | 13.4        | 5.3         |
| Pakistan               | 9.6         | 3.6        | 4.4        | 2.5        | 3.1        | 4.6        | 9.3        | 7.9        | 7.8         | 12.0        | 23.0        | 7.0        | 7.0           | 21.5        | 20.0        |
| Papua New Guinea       | 8.6         | 15.6       | 9.3        | 11.8       | 14.7       | 2.1        | 1.8        | 2.4        | 0.9         | 5.0         | 5.0         | 4.0        | 3.2           | 5.5         | 4.5         |
| Philippines            | 9.6         | 4.0        | 6.8        | 2.9        | 3.5        | 6.0        | 7.7        | 6.2        | 2.8         | 10.1        | 7.0         | 3.5        | 3.9           | 12.2        | 4.3         |
| Samoa                  | 4.4         | -0.2       | 1.9        | 7.4        | 4.3        | 7.9        | 1.9        | 3.8        | 6.0         | 7.1         | 5.1         | 3.0        | 5.1           | 6.0         | 4.7         |
| Solomon Islands        | 10.7        | 6.9        | 7.6        | 9.3        | 10.0       | 6.9        | 7.4        | 11.2       | 7.7         | 15.1        | 8.8         | 5.0        | 10.9          | 6.7         | 6.5         |
| Sri Lanka              | 11.2        | 6.2        | 14.2       | 9.6        | 9.0        | 9.0        | 11.0       | 10.0       | 15.8        | 23.7        | 20.0        | 14.8       | 18.7          | 22.2        | 17.7        |
| Thailand               | 5.0         | 1.6        | 1.7        | 0.6        | 1.8        | 2.8        | 4.5        | 4.6        | 2.2         | 5.7         | 3.2         | 1.6        | 3.2           | 2.5         | 6.5         |
| Timor-Leste            | ...         | 63.6       | 3.6        | 4.8        | 7.0        | 3.2        | 1.8        | 4.1        | 7.8         | 4.0         | 3.5         | 3.2        | 7.8           | 4.0         | 3.5         |
| Tonga                  | 4.4         | 5.3        | 6.9        | 10.4       | 11.1       | 11.7       | 9.7        | 7.0        | 5.1         | 14.5        | 12.3        | 4.2        | 5.6           | 6.0         | 6.0         |
| Vanuatu                | 3.2         | 2.5        | 3.7        | 2.0        | 3.0        | 1.4        | 1.2        | 2.0        | 3.9         | 3.8         | 3.0         | 2.5        | 4.1           | 3.8         | 2.5         |
| Vietnam                | 19.2        | -1.6       | -0.4       | 4.0        | 3.2        | 7.7        | 8.2        | 7.5        | 8.3         | 24.0        | 15.0        | 6.0        | 12.6          | 25.0        | 11.0        |
| <b>Middle East</b>     | <b>10.9</b> | <b>4.1</b> | <b>3.8</b> | <b>5.3</b> | <b>6.1</b> | <b>7.1</b> | <b>6.2</b> | <b>7.0</b> | <b>10.6</b> | <b>15.8</b> | <b>14.4</b> | <b>8.2</b> | <b>11.4</b>   | <b>16.1</b> | <b>13.8</b> |
| Bahrain                | 0.8         | -0.7       | -1.2       | -0.5       | 1.7        | 2.3        | 2.6        | 2.2        | 3.4         | 4.5         | 6.0         | 3.0        | 4.0           | 10.5        | 6.0         |
| Egypt                  | 10.7        | 2.8        | 2.4        | 2.4        | 3.2        | 8.1        | 8.8        | 4.2        | 11.0        | 11.7        | 16.1        | 7.5        | 8.6           | 20.2        | 12.0        |
| Iran, I.R. of          | 23.5        | 12.8       | 11.3       | 15.7       | 15.6       | 15.3       | 10.4       | 11.9       | 18.4        | 26.0        | 22.0        | 15.0       | 22.5          | 24.0        | 22.0        |
| Iraq                   | ...         | ...        | ...        | ...        | ...        | ...        | ...        | ...        | ...         | ...         | ...         | ...        | ...           | ...         | ...         |
| Jordan                 | 5.0         | 0.7        | 1.8        | 1.8        | 1.6        | 3.4        | 3.5        | 6.3        | 5.4         | 15.8        | 7.6         | 2.8        | 5.7           | 16.1        | 5.5         |
| Kuwait                 | 3.6         | 1.6        | 1.4        | 0.8        | 1.0        | 1.3        | 4.1        | 3.1        | 5.5         | 9.0         | 7.5         | 4.5        | 5.5           | 9.0         | 7.5         |
| Lebanon                | 24.9        | -0.4       | -0.4       | 1.8        | 1.3        | 1.7        | -0.7       | 5.6        | 4.1         | 11.0        | 6.2         | 2.2        | 6.0           | 8.6         | 3.8         |
| Libya                  | 6.2         | -2.9       | -8.8       | -9.9       | -2.1       | 1.0        | 2.9        | 1.4        | 6.2         | 12.0        | 10.0        | 6.0        | 7.3           | 12.0        | 10.0        |
| Oman                   | 1.6         | -1.2       | -0.8       | -0.3       | 0.2        | 0.7        | 1.9        | 3.4        | 5.9         | 11.2        | 9.0         | 5.0        | 8.6           | 10.0        | 8.0         |
| Qatar                  | 2.9         | 1.7        | 1.4        | 0.2        | 2.3        | 6.8        | 8.8        | 11.8       | 13.8        | 15.0        | 13.0        | 5.0        | 13.8          | 15.0        | 13.0        |
| Saudi Arabia           | 1.2         | -1.1       | -1.1       | 0.2        | 0.6        | 0.4        | 0.6        | 2.3        | 4.1         | 11.5        | 10.0        | 5.0        | 4.1           | 11.5        | 10.0        |
| Syrian Arab Republic   | 7.2         | -3.9       | 3.4        | -0.5       | 5.8        | 4.4        | 7.2        | 10.4       | 4.7         | 8.0         | 7.0         | 5.0        | 4.8           | -10.0       | 7.0         |
| United Arab Emirates   | 3.6         | 1.4        | 2.7        | 2.9        | 3.2        | 5.0        | 6.2        | 9.3        | 11.1        | 12.9        | 10.8        | 3.4        | ...           | ...         | ...         |
| Yemen, Rep. of         | 37.0        | 10.9       | 11.9       | 12.2       | 10.8       | 12.5       | 11.8       | 18.2       | 12.5        | 17.2        | 14.4        | 10.4       | 8.6           | 15.9        | 13.0        |

**Table A7 (concluded)**

|                                | Average<br>1990–99 | End of Period |            |            |             |            |            |            |            |            |            |            |            |            |            |
|--------------------------------|--------------------|---------------|------------|------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                                |                    | 2000          | 2001       | 2002       | 2003        | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013       | 2007       | 2008       | 2009       |
| <b>Western Hemisphere</b>      | <b>98.4</b>        | <b>8.3</b>    | <b>6.5</b> | <b>8.7</b> | <b>10.5</b> | <b>6.6</b> | <b>6.3</b> | <b>5.3</b> | <b>5.4</b> | <b>7.9</b> | <b>7.3</b> | <b>5.6</b> | <b>6.3</b> | <b>8.5</b> | <b>6.6</b> |
| Antigua and Barbuda            | 3.4                | -0.6          | 1.7        | 2.4        | 2.0         | 2.0        | 2.1        | 1.8        | 1.4        | 3.0        | 2.0        | 2.0        | 5.1        | 3.0        | 2.0        |
| Argentina                      | 59.3               | -0.9          | -1.1       | 25.9       | 13.4        | 4.4        | 9.6        | 10.9       | 8.8        | 9.1        | 9.1        | 9.0        | 8.5        | 9.0        | 9.0        |
| Bahamas, The                   | 2.8                | 1.6           | 2.0        | 2.2        | 3.0         | 1.0        | 2.2        | 1.8        | 2.5        | 4.5        | 3.5        | 2.0        | 2.9        | 5.7        | 2.0        |
| Barbados                       | 2.9                | 2.4           | 2.6        | -1.2       | 1.6         | 1.4        | 6.1        | 7.3        | 4.0        | 9.0        | 6.4        | 2.6        | 4.8        | 14.5       | -2.7       |
| Belize                         | 2.0                | 0.7           | 1.2        | 2.2        | 2.6         | 3.1        | 3.7        | 4.2        | 2.3        | 4.6        | 3.3        | 2.5        | 4.1        | 4.0        | 2.5        |
| Bolivia                        | 10.4               | 4.6           | 1.6        | 0.9        | 3.3         | 4.4        | 5.4        | 4.3        | 8.7        | 14.3       | 10.6       | 4.0        | 11.7       | 13.0       | 9.9        |
| Brazil                         | 325.4              | 7.1           | 6.8        | 8.4        | 14.8        | 6.6        | 6.9        | 4.2        | 3.6        | 5.7        | 5.1        | 4.5        | 4.5        | 6.3        | 4.5        |
| Chile                          | 11.5               | 3.8           | 3.6        | 2.5        | 2.8         | 1.1        | 3.1        | 3.4        | 4.4        | 8.9        | 6.5        | 3.0        | 7.8        | 8.5        | 4.9        |
| Colombia                       | 22.0               | 9.2           | 8.0        | 6.3        | 7.1         | 5.9        | 5.0        | 4.3        | 5.5        | 7.3        | 5.5        | 3.4        | 5.7        | 7.2        | 4.9        |
| Costa Rica                     | 16.7               | 11.0          | 11.3       | 9.2        | 9.4         | 12.3       | 13.8       | 11.5       | 9.4        | 12.2       | 10.9       | 4.5        | 10.8       | 13.0       | 9.0        |
| Dominica                       | 2.3                | 0.9           | 1.6        | 0.1        | 1.6         | 2.4        | 1.6        | 2.6        | 2.7        | 2.2        | 1.5        | 1.5        | 3.4        | 2.4        | 1.5        |
| Dominican Republic             | 14.2               | 7.7           | 8.9        | 5.2        | 27.4        | 51.5       | 4.2        | 7.6        | 6.1        | 12.3       | 10.7       | 7.9        | 8.9        | 14.3       | 7.7        |
| Ecuador                        | 38.6               | 96.1          | 37.7       | 12.6       | 7.9         | 2.7        | 2.1        | 3.3        | 2.3        | 8.5        | 5.1        | 2.5        | 3.3        | 9.5        | 4.0        |
| El Salvador                    | 10.4               | 2.3           | 3.8        | 1.9        | 2.1         | 4.5        | 4.7        | 4.0        | 3.9        | 7.6        | 7.4        | 3.0        | 4.9        | 9.0        | 6.0        |
| Grenada                        | 2.9                | 0.6           | 1.7        | 1.1        | 2.2         | 2.3        | 3.5        | 4.2        | 3.9        | 7.8        | 4.5        | 2.3        | 7.4        | 6.2        | 3.9        |
| Guatemala                      | 14.5               | 6.0           | 7.3        | 8.1        | 5.6         | 7.6        | 9.1        | 6.6        | 6.8        | 10.6       | 7.7        | 4.1        | 8.7        | 9.8        | 6.5        |
| Guyana                         | 21.8               | 6.1           | 2.7        | 5.4        | 6.0         | 4.7        | 6.9        | 6.7        | 12.2       | 8.6        | 6.8        | 5.0        | 14.0       | 9.0        | 7.0        |
| Haiti                          | 20.7               | 11.5          | 16.5       | 9.3        | 26.7        | 28.3       | 16.8       | 14.2       | 9.0        | 14.5       | 11.5       | 5.5        | 7.9        | 16.0       | 9.5        |
| Honduras                       | 19.5               | 11.0          | 9.7        | 7.7        | 7.7         | 8.1        | 8.8        | 5.6        | 6.9        | 11.2       | 10.3       | 5.5        | 8.9        | 12.1       | 8.4        |
| Jamaica                        | 26.7               | 8.1           | 6.9        | 7.0        | 10.1        | 13.5       | 15.1       | 8.5        | 9.3        | 20.2       | 15.4       | 4.5        | 16.8       | 18.3       | 12.0       |
| Mexico                         | 20.1               | 9.5           | 6.4        | 5.0        | 4.5         | 4.7        | 4.0        | 3.6        | 4.0        | 4.9        | 4.2        | 3.0        | 3.7        | 5.7        | 3.3        |
| Nicaragua                      | 66.5               | 9.9           | 4.7        | 4.0        | 6.5         | 8.5        | 9.6        | 9.1        | 11.1       | 20.5       | 11.4       | 7.0        | 16.9       | 17.1       | 9.2        |
| Panama                         | 1.1                | 1.4           | 0.3        | 1.0        | 0.6         | 0.5        | 2.9        | 2.5        | 4.2        | 9.2        | 5.9        | 4.0        | 6.4        | 9.6        | 4.8        |
| Paraguay                       | 16.2               | 9.0           | 7.3        | 10.5       | 14.2        | 4.3        | 6.8        | 9.6        | 8.1        | 10.5       | 5.6        | 3.0        | 5.9        | 8.6        | 5.0        |
| Peru                           | 112.1              | 3.8           | 2.0        | 0.2        | 2.3         | 3.3        | 1.6        | 2.0        | 1.8        | 5.6        | 4.4        | 2.0        | 3.9        | 5.8        | 3.5        |
| St. Kitts and Nevis            | 3.5                | 2.1           | 2.1        | 2.1        | 2.3         | 2.2        | 3.4        | 8.5        | 4.5        | 2.6        | 4.0        | 2.2        | 2.1        | 4.5        | 3.5        |
| St. Lucia                      | 3.2                | 3.7           | 5.4        | -0.3       | 1.0         | 1.5        | 3.9        | 3.6        | 1.9        | 7.2        | 4.9        | 2.2        | 6.8        | 6.0        | 3.9        |
| St. Vincent and the Grenadines | 3.1                | 0.2           | 0.8        | 0.8        | 0.2         | 3.0        | 3.7        | 3.0        | 6.9        | 9.3        | 6.2        | 3.4        | 8.3        | 9.6        | 3.8        |
| Suriname                       | 70.9               | 58.6          | 39.8       | 15.5       | 23.0        | 9.1        | 9.9        | 11.3       | 6.4        | 15.5       | 9.5        | 6.1        | 8.4        | 15.0       | 9.5        |
| Trinidad and Tobago            | 5.9                | 3.6           | 5.5        | 4.2        | 3.8         | 3.7        | 6.9        | 8.3        | 7.9        | 10.1       | 10.0       | 6.0        | 7.6        | 11.5       | 8.5        |
| Uruguay                        | 45.1               | 4.8           | 4.4        | 14.0       | 19.4        | 9.2        | 4.7        | 6.4        | 8.1        | 6.8        | 6.2        | 5.0        | 8.5        | 7.0        | 6.5        |
| Venezuela                      | 46.1               | 16.2          | 12.5       | 22.4       | 31.1        | 21.7       | 16.0       | 13.7       | 18.7       | 27.2       | 33.5       | 30.0       | 22.5       | 32.0       | 35.0       |

<sup>1</sup>In accordance with standard practice in the *World Economic Outlook*, movements in consumer prices are indicated as annual averages rather than as December/December changes during the year, as is the practice in some countries. For many countries, figures for recent years are IMF staff estimates. Data for some countries are for fiscal years.

<sup>2</sup>The percent changes in 2002 are calculated over a period of 18 months, reflecting a change in the fiscal year cycle (from July–June to January–December).

<sup>3</sup>2007 represents an estimate. No projections for 2008 and beyond are shown because Zimbabwe is in hyperinflation, and inflation can no longer be forecasted in a meaningful way. Unless policies change, inflation can increase without limit.

<sup>4</sup>For many countries, inflation for the earlier years is measured on the basis of a retail price index. Consumer price indices with broader and more up-to-date coverage are typically used for more recent years.

<sup>5</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

**Table A8. Major Advanced Economies: General Government Fiscal Balances and Debt<sup>1</sup>**  
*(Percent of GDP)*

|                                   | Average<br>1992–2001 | 2002  | 2003  | 2004  | 2005  | 2006  | 2007  | 2008  | 2009  | 2013  |
|-----------------------------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Major advanced economies</b>   |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -2.8                 | -4.0  | -4.8  | -4.2  | -3.4  | -2.4  | -2.2  | -3.2  | -3.7  | -2.4  |
| Output gap <sup>2</sup>           | 0.1                  | -0.1  | -0.4  | 0.2   | 0.3   | 0.7   | 0.7   | -0.1  | -1.8  | -0.1  |
| Structural balance <sup>2</sup>   | -2.7                 | -4.0  | -4.5  | -4.2  | -3.4  | -2.6  | -2.5  | -3.2  | -2.9  | -2.3  |
| <b>United States</b>              |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -1.8                 | -3.8  | -4.8  | -4.4  | -3.3  | -2.2  | -2.7  | -4.1  | -4.6  | -2.9  |
| Output gap <sup>2</sup>           | 0.6                  | 0.4   | 0.3   | 1.2   | 1.4   | 1.6   | 1.2   | 0.4   | -1.6  | —     |
| Structural balance <sup>2</sup>   | -2.0                 | -3.9  | -4.9  | -4.7  | -3.8  | -2.8  | -3.1  | -4.3  | -3.9  | -2.8  |
| Net debt                          | 47.7                 | 38.1  | 41.5  | 43.0  | 43.4  | 42.5  | 43.2  | 46.3  | 50.7  | 56.9  |
| Gross debt                        | 64.2                 | 56.1  | 59.4  | 60.4  | 60.7  | 59.9  | 60.7  | 61.5  | 65.4  | 70.4  |
| <b>Euro area</b>                  |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -3.5                 | -2.6  | -3.1  | -3.0  | -2.5  | -1.3  | -0.6  | -1.5  | -2.0  | -0.8  |
| Output gap <sup>2</sup>           | -0.1                 | 0.2   | -0.9  | -0.7  | -1.0  | -0.2  | 0.5   | 0.2   | -1.1  | —     |
| Structural balance <sup>2</sup>   | -3.0                 | -2.7  | -2.7  | -2.5  | -2.1  | -1.4  | -0.9  | -1.1  | -1.1  | -0.5  |
| Net debt                          | 58.3                 | 58.3  | 59.7  | 60.2  | 60.6  | 58.7  | 56.9  | 56.4  | 57.1  | 54.3  |
| Gross debt                        | 70.3                 | 68.2  | 69.3  | 69.7  | 70.3  | 68.6  | 66.5  | 69.9  | 70.6  | 66.7  |
| <b>Germany<sup>3</sup></b>        |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -2.2                 | -3.7  | -4.0  | -3.8  | -3.3  | -1.5  | -0.2  | -0.3  | -0.8  | —     |
| Output gap <sup>2</sup>           | 0.2                  | -0.2  | -1.7  | -1.9  | -2.3  | -0.8  | 0.4   | 1.0   | -0.3  | —     |
| Structural balance <sup>2,4</sup> | -1.8                 | -2.9  | -3.2  | -2.8  | -2.3  | -1.2  | -0.2  | -0.8  | -0.3  | —     |
| Net debt                          | 46.8                 | 54.3  | 57.7  | 60.0  | 61.8  | 60.2  | 57.7  | 56.1  | 56.8  | 55.8  |
| Gross debt                        | 54.3                 | 59.6  | 62.8  | 64.7  | 66.4  | 66.0  | 63.2  | 76.4  | 77.0  | 73.5  |
| <b>France</b>                     |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -3.7                 | -3.1  | -4.1  | -3.6  | -3.0  | -2.4  | -2.7  | -3.3  | -3.9  | -1.5  |
| Output gap <sup>2</sup>           | -0.8                 | 0.7   | -0.2  | 0.2   | —     | 0.1   | 0.2   | -1.0  | -2.7  | —     |
| Structural balance <sup>2,4</sup> | -3.1                 | -3.5  | -3.8  | -3.5  | -3.2  | -2.3  | -2.6  | -2.7  | -2.3  | -1.5  |
| Net debt                          | 44.8                 | 49.1  | 53.2  | 55.3  | 56.7  | 53.9  | 54.2  | 55.5  | 57.8  | 57.1  |
| Gross debt                        | 54.1                 | 58.8  | 62.9  | 65.0  | 66.4  | 63.6  | 63.9  | 65.2  | 67.5  | 66.8  |
| <b>Italy</b>                      |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -5.5                 | -2.9  | -3.5  | -3.5  | -4.2  | -3.4  | -1.6  | -2.6  | -2.9  | -2.4  |
| Output gap <sup>2</sup>           | -0.5                 | 0.7   | -0.5  | -0.2  | -0.8  | -0.2  | 0.2   | -0.6  | -1.6  | -1.0  |
| Structural balance <sup>2,4</sup> | -5.3                 | -4.1  | -3.4  | -3.7  | -4.0  | -3.3  | -1.8  | -2.3  | -2.1  | -1.9  |
| Net debt                          | 109.5                | 102.1 | 101.5 | 100.8 | 102.7 | 102.7 | 101.1 | 101.3 | 102.5 | 101.9 |
| Gross debt                        | 114.9                | 105.7 | 104.4 | 103.8 | 105.8 | 106.5 | 104.0 | 104.3 | 105.5 | 104.9 |
| <b>Japan</b>                      |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -4.6                 | -8.0  | -8.0  | -6.2  | -5.0  | -3.8  | -3.2  | -3.4  | -3.9  | -3.2  |
| Excluding social security         | -6.2                 | -7.9  | -8.1  | -6.6  | -5.4  | -3.8  | -2.7  | -2.7  | -3.4  | -3.1  |
| Output gap <sup>2</sup>           | -0.5                 | -2.3  | -2.2  | -1.1  | -0.9  | -0.2  | 0.2   | -0.7  | -1.8  | —     |
| Structural balance <sup>2</sup>   | -4.4                 | -7.0  | -7.1  | -5.7  | -4.7  | -3.7  | -3.3  | -3.1  | -3.2  | -3.2  |
| Excluding social security         | -6.8                 | -7.3  | -7.6  | -6.4  | -5.2  | -3.8  | -2.7  | -2.6  | -3.0  | -3.1  |
| Net debt                          | 37.0                 | 72.6  | 76.5  | 82.7  | 84.6  | 88.4  | 90.6  | 94.3  | 97.6  | 99.2  |
| Gross debt                        | 108.5                | 160.9 | 167.2 | 178.1 | 191.6 | 194.7 | 195.4 | 198.6 | 200.9 | 191.1 |
| <b>United Kingdom</b>             |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -3.0                 | -1.9  | -3.3  | -3.4  | -3.3  | -2.6  | -2.7  | -3.5  | -4.4  | -3.5  |
| Output gap <sup>2</sup>           | -0.4                 | -0.1  | -0.1  | 0.1   | -0.4  | -0.1  | 0.3   | -1.1  | -3.2  | —     |
| Structural balance <sup>2</sup>   | -2.5                 | -1.9  | -2.9  | -3.4  | -3.0  | -2.6  | -2.8  | -2.9  | -2.8  | -2.6  |
| Net debt                          | 37.1                 | 32.0  | 33.7  | 35.6  | 37.4  | 38.1  | 38.3  | 37.6  | 38.5  | 39.7  |
| Gross debt                        | 42.6                 | 37.2  | 38.5  | 40.3  | 42.1  | 43.3  | 44.1  | 43.4  | 44.3  | 45.8  |
| <b>Canada</b>                     |                      |       |       |       |       |       |       |       |       |       |
| Actual balance                    | -2.7                 | -0.1  | -0.1  | 0.9   | 1.5   | 1.3   | 1.4   | 0.7   | 0.6   | 1.2   |
| Output gap <sup>2</sup>           | -0.2                 | 0.2   | -0.7  | -0.2  | 0.0   | 0.5   | 0.6   | -1.4  | -2.8  | —     |
| Structural balance <sup>2</sup>   | -2.4                 | -0.2  | 0.2   | 1.0   | 1.5   | 1.1   | 1.1   | 1.2   | 1.7   | 1.2   |
| Net debt                          | 60.4                 | 42.6  | 38.7  | 34.5  | 30.0  | 26.4  | 23.2  | 21.5  | 20.4  | 12.2  |
| Gross debt                        | 93.5                 | 80.6  | 76.6  | 72.4  | 70.5  | 67.9  | 64.2  | 60.7  | 58.4  | 43.1  |

Note: The methodology and specific assumptions for each country are discussed in Box A1 in this Statistical Appendix.

<sup>1</sup>Debt data refer to end of year. Debt data are not always comparable across countries.

<sup>2</sup>Percent of potential GDP.

<sup>3</sup>Beginning in 1995, the debt and debt-service obligations of the Treuhandanstalt (and of various other agencies) were taken over by general government. This debt is equivalent to 8 percent of GDP, and the associated debt service to ½ to 1 percent of GDP.

<sup>4</sup>Excludes one-off receipts from the sale of mobile telephone licenses (the equivalent of 2.5 percent of GDP in 2000 for Germany, 0.1 percent of GDP in 2001 and 2002 for France, and 1.2 percent of GDP in 2000 for Italy). Also excludes one-off receipts from sizable asset transactions, in particular 0.5 percent of GDP for France in 2005.

**Table A9. Summary of World Trade Volumes and Prices**  
*(Annual percent change)*

|   | Ten-Year Averages |         |       |       |      |       |      |      |      |      | 2008  | 2009 |  |
|---|-------------------|---------|-------|-------|------|-------|------|------|------|------|-------|------|--|
|   | 1990–99           | 2000–09 | 2000  | 2001  | 2002 | 2003  | 2004 | 2005 | 2006 | 2007 |       |      |  |
| <b>Trade in goods and services</b>                    |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| <b>World trade<sup>1</sup></b>                        |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Volume  | 6.5               | 6.5     | 12.3  | 0.3   | 3.5  | 5.4   | 10.7 | 7.6  | 9.3  | 7.2  | 4.9   | 4.1  |  |
| Price deflator  |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| In U.S. dollars                                       | —                 | 5.0     | -0.5  | -3.6  | 1.2  | 10.4  | 9.7  | 5.6  | 5.0  | 8.1  | 15.3  | 0.2  |  |
| In SDRs   | -0.7              | 3.6     | 3.1   | -0.1  | -0.6 | 2.1   | 3.7  | 5.8  | 5.5  | 3.9  | 10.6  | 2.0  |  |
| <b>Volume of trade</b>                                |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Exports   |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Advanced economies                                    | 6.5               | 5.3     | 11.9  | -0.5  | 2.4  | 3.3   | 9.1  | 6.1  | 8.4  | 5.9  | 4.3   | 2.5  |  |
| Emerging and developing economies                     | 7.5               | 9.2     | 13.8  | 2.6   | 6.9  | 10.5  | 13.9 | 10.8 | 11.0 | 9.5  | 6.3   | 7.4  |  |
| Imports   |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Advanced economies                                    | 6.4               | 4.8     | 11.9  | -0.5  | 2.7  | 4.1   | 9.4  | 6.4  | 7.5  | 4.5  | 1.9   | 1.1  |  |
| Emerging and developing economies                     | 6.5               | 11.2    | 13.8  | 3.2   | 6.2  | 10.0  | 16.0 | 12.0 | 14.7 | 14.2 | 11.7  | 10.5 |  |
| <b>Terms of trade</b>                                 |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Advanced economies                                    | —                 | -0.5    | -2.6  | 0.4   | 0.8  | 1.0   | —    | -1.5 | -1.2 | 0.3  | -1.8  | -0.1 |  |
| Emerging and developing economies                     | -0.7              | 2.4     | 6.0   | -2.3  | 0.3  | 1.1   | 3.0  | 5.2  | 4.9  | 1.7  | 5.5   | -0.9 |  |
| <b>Trade in goods</b>                                 |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| <b>World trade<sup>1</sup></b>                        |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Volume  | 6.7               | 6.6     | 13.0  | -0.4  | 3.7  | 6.3   | 10.9 | 7.6  | 9.3  | 6.5  | 5.2   | 4.4  |  |
| Price deflator  |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| In U.S. dollars                                       | -0.3              | 5.1     | 0.2   | -3.9  | 0.6  | 9.9   | 9.8  | 6.1  | 5.7  | 8.2  | 16.0  | -0.1 |  |
| In SDRs   | -0.9              | 3.7     | 3.9   | -0.4  | -1.1 | 1.6   | 3.8  | 6.4  | 6.1  | 4.0  | 11.3  | 1.8  |  |
| <b>World trade prices in U.S. dollars<sup>2</sup></b> |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Manufactures  | 0.3               | 4.6     | -5.3  | -3.4  | 2.1  | 14.4  | 9.5  | 3.6  | 3.7  | 8.8  | 13.8  | 0.5  |  |
| Oil   | —                 | 18.8    | 57.0  | -13.8 | 2.5  | 15.8  | 30.7 | 41.3 | 20.5 | 10.7 | 50.8  | -6.3 |  |
| Nonfuel primary commodities                           | -2.2              | 6.9     | 4.2   | -4.8  | 1.9  | 5.9   | 15.2 | 6.1  | 23.2 | 14.1 | 13.3  | -6.2 |  |
| Food  | -2.3              | 6.9     | 2.5   | -2.0  | 3.5  | 6.3   | 14.0 | -0.9 | 10.5 | 15.2 | 29.8  | -5.8 |  |
| Beverages   | -0.5              | 4.6     | -18.4 | -13.3 | 24.3 | 4.8   | -0.9 | 18.1 | 8.4  | 13.8 | 27.5  | -7.1 |  |
| Agricultural raw materials                            | -0.6              | 2.1     | 5.5   | -3.4  | -0.2 | 0.6   | 4.1  | 0.5  | 8.8  | 5.0  | 3.6   | -2.7 |  |
| Metals  | -4.1              | 11.5    | 13.2  | -10.3 | -3.5 | 11.8  | 34.6 | 22.4 | 56.2 | 17.4 | -1.9  | -8.4 |  |
| <b>World trade prices in SDRs<sup>2</sup></b>         |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Manufactures  | -0.3              | 3.2     | -1.8  | 0.1   | 0.4  | 5.7   | 3.6  | 3.9  | 4.2  | 4.5  | 9.2   | 2.4  |  |
| Oil   | -0.6              | 17.2    | 62.8  | -10.7 | 0.8  | 7.1   | 23.6 | 41.6 | 21.0 | 6.4  | 44.7  | -4.6 |  |
| Nonfuel primary commodities                           | -2.9              | 5.5     | 8.1   | -1.3  | 0.2  | -2.1  | 9.0  | 6.3  | 23.8 | 9.6  | 8.7   | -4.5 |  |
| Food  | -2.9              | 5.4     | 6.2   | 1.5   | 1.8  | -1.7  | 7.8  | -0.7 | 11.0 | 10.7 | 24.5  | -4.1 |  |
| Beverages   | -1.1              | 3.2     | -15.4 | -10.2 | 22.2 | -3.1  | -6.3 | 18.3 | 8.8  | 9.4  | 22.3  | -5.4 |  |
| Agricultural raw materials                            | -1.2              | 0.7     | 9.4   | 0.1   | -1.9 | -7.0  | -1.6 | 0.8  | 9.3  | 0.9  | -0.6  | -0.9 |  |
| Metals  | -4.8              | 10.0    | 17.4  | -7.0  | -5.1 | 3.3   | 27.3 | 22.7 | 56.9 | 12.8 | -5.9  | -6.7 |  |
| <b>World trade prices in euros<sup>2</sup></b>        |                   |         |       |       |      |       |      |      |      |      |       |      |  |
| Manufactures  | 0.7               | 1.1     | 9.3   | -0.3  | -3.1 | -4.5  | -0.4 | 3.4  | 2.9  | -0.4 | 2.4   | 1.9  |  |
| Oil   | 0.4               | 14.8    | 81.3  | -11.1 | -2.8 | -3.3  | 18.9 | 41.0 | 19.5 | 1.4  | 35.6  | -5.0 |  |
| Nonfuel primary commodities                           | -1.9              | 3.3     | 20.4  | -1.8  | -3.3 | -11.6 | 4.8  | 5.9  | 22.3 | 4.5  | 1.9   | -4.9 |  |
| Food  | -2.0              | 3.3     | 18.3  | 1.1   | -1.8 | -11.2 | 3.7  | -1.1 | 9.6  | 5.6  | 16.8  | -4.5 |  |
| Beverages   | -0.1              | 1.1     | -5.7  | -10.5 | 17.9 | -12.5 | -9.9 | 17.8 | 7.5  | 4.2  | 14.7  | -5.8 |  |
| Agricultural raw materials                            | -0.3              | -1.3    | 21.8  | -0.4  | -5.4 | -16.0 | -5.3 | 0.3  | 8.0  | -3.8 | -6.8  | -1.3 |  |
| Metals  | -3.8              | 7.8     | 30.7  | -7.4  | -8.4 | -6.7  | 22.4 | 22.2 | 55.0 | 7.5  | -11.8 | -7.1 |  |

**Table A9 (concluded)**

|  | Ten-Year Averages |         |       |       |       |       |        |        |        |        |        |        |
|--|-------------------|---------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
|  | 1990–99           | 2000–09 | 2000  | 2001  | 2002  | 2003  | 2004   | 2005   | 2006   | 2007   | 2008   | 2009   |
| <b>Trade in goods</b>                            |                   |         |       |       |       |       |        |        |        |        |        |        |
| <b>Volume of trade</b>                           |                   |         |       |       |       |       |        |        |        |        |        |        |
| Exports  |                   |         |       |       |       |       |        |        |        |        |        |        |
| Advanced economies                               | 6.4               | 5.2     | 12.7  | -1.3  | 2.3   | 3.9   | 8.8    | 5.6    | 8.5    | 5.1    | 4.3    | 2.6    |
| Emerging and developing economies                | 7.5               | 9.3     | 13.9  | 2.0   | 7.0   | 11.6  | 14.0   | 10.9   | 10.9   | 9.2    | 6.9    | 7.4    |
| Fuel exporters                                   | 2.8               | 5.5     | 7.5   | 0.5   | 3.0   | 12.1  | 8.9    | 5.4    | 4.2    | 4.0    | 5.1    | 4.3    |
| Nonfuel exporters                                | 9.5               | 10.7    | 15.8  | 2.6   | 8.3   | 11.5  | 15.8   | 12.8   | 13.6   | 11.4   | 7.5    | 8.6    |
| Imports  |                   |         |       |       |       |       |        |        |        |        |        |        |
| Advanced economies                               | 6.7               | 5.0     | 12.6  | -1.4  | 3.1   | 5.0   | 9.7    | 6.3    | 7.8    | 3.8    | 2.3    | 1.4    |
| Emerging and developing economies                | 6.8               | 11.3    | 14.6  | 3.1   | 6.3   | 11.4  | 17.0   | 12.5   | 12.8   | 13.2   | 11.8   | 10.8   |
| Fuel exporters                                   | -0.5              | 14.6    | 11.3  | 16.0  | 8.7   | 9.6   | 16.1   | 17.5   | 14.2   | 20.2   | 17.3   | 15.8   |
| Nonfuel exporters                                | 9.0               | 10.6    | 15.1  | 1.0   | 5.8   | 11.7  | 17.2   | 11.6   | 12.5   | 11.8   | 10.6   | 9.7    |
| <b>Price deflators in SDRs</b>                   |                   |         |       |       |       |       |        |        |        |        |        |        |
| Exports  |                   |         |       |       |       |       |        |        |        |        |        |        |
| Advanced economies                               | -1.1              | 2.7     | 0.3   | -0.2  | -0.9  | 2.5   | 3.0    | 3.7    | 4.2    | 3.7    | 9.3    | 1.8    |
| Emerging and developing economies                | —                 | 6.9     | 14.8  | -1.0  | 0.1   | 1.4   | 7.5    | 13.9   | 10.8   | 5.4    | 16.1   | 1.6    |
| Fuel exporters                                   | 0.5               | 13.8    | 43.7  | -7.3  | 0.6   | 4.2   | 17.1   | 33.2   | 18.1   | 8.0    | 33.1   | -1.1   |
| Nonfuel exporters                                | -0.2              | 4.3     | 6.1   | 1.4   | -0.1  | 0.5   | 4.3    | 7.0    | 7.8    | 4.3    | 9.6    | 2.6    |
| Imports  |                   |         |       |       |       |       |        |        |        |        |        |        |
| Advanced economies                               | -1.4              | 3.2     | 3.4   | -0.8  | -1.9  | 1.2   | 3.1    | 5.6    | 5.6    | 3.5    | 10.9   | 1.7    |
| Emerging and developing economies                | 0.7               | 4.1     | 6.6   | 1.1   | -0.6  | 0.3   | 4.1    | 6.8    | 6.6    | 4.2    | 10.6   | 2.3    |
| Fuel exporters                                   | 1.0               | 3.8     | 1.9   | 0.4   | 0.9   | 0.7   | 4.2    | 7.3    | 7.8    | 4.6    | 8.1    | 2.3    |
| Nonfuel exporters                                | 0.5               | 4.2     | 7.5   | 1.2   | -0.9  | 0.2   | 4.1    | 6.7    | 6.3    | 4.2    | 11.2   | 2.2    |
| <b>Terms of trade</b>                            |                   |         |       |       |       |       |        |        |        |        |        |        |
| Advanced economies                               | 0.3               | -0.5    | -3.0  | 0.6   | 1.0   | 1.2   | -0.1   | -1.8   | -1.4   | 0.2    | -1.4   | 0.1    |
| Emerging and developing economies                | -0.7              | 2.6     | 7.7   | -2.1  | 0.7   | 1.0   | 3.3    | 6.7    | 4.0    | 1.1    | 4.9    | -0.7   |
| Regional groups                                  |                   |         |       |       |       |       |        |        |        |        |        |        |
| Africa   | -0.4              | 5.6     | 13.7  | -3.5  | 0.2   | 2.8   | 4.0    | 14.4   | 9.7    | 3.9    | 16.6   | -3.2   |
| Central and eastern Europe                       | -0.6              | 0.2     | -2.3  | 3.5   | 0.9   | —     | 1.4    | -0.8   | -1.5   | 1.1    | -0.6   | 0.5    |
| Commonwealth of Independent States <sup>3</sup>  | -2.2              | 7.7     | 23.3  | -2.6  | -2.0  | 9.0   | 12.1   | 14.6   | 8.9    | 2.8    | 17.5   | -3.6   |
| Developing Asia                                  | -0.2              | -0.8    | -3.9  | 0.9   | 0.5   | -0.6  | -1.9   | -0.8   | -0.1   | -0.7   | -2.7   | 1.7    |
| Middle East                                      | 0.3               | 8.3     | 39.7  | -8.3  | 1.7   | -0.8  | 10.6   | 25.4   | 5.9    | 1.7    | 18.6   | -3.2   |
| Western Hemisphere                               | -0.9              | 3.1     | 7.4   | -4.2  | 1.7   | 3.1   | 5.9    | 5.8    | 8.8    | 2.2    | 4.3    | -2.8   |
| Analytical groups                                |                   |         |       |       |       |       |        |        |        |        |        |        |
| By source of export earnings                     |                   |         |       |       |       |       |        |        |        |        |        |        |
| Fuel exporters                                   | -0.5              | 9.7     | 41.1  | -7.6  | -0.2  | 3.4   | 12.4   | 24.1   | 9.5    | 3.2    | 23.1   | -3.3   |
| Nonfuel exporters                                | -0.7              | 0.1     | -1.3  | 0.1   | 0.8   | 0.2   | 0.2    | 0.4    | 1.4    | 0.1    | -1.4   | 0.3    |
| <b>Memorandum</b>                                |                   |         |       |       |       |       |        |        |        |        |        |        |
| <b>World exports in billions of U.S. dollars</b> |                   |         |       |       |       |       |        |        |        |        |        |        |
| Goods and services                               | 5,755             | 13,121  | 7,880 | 7,612 | 7,992 | 9,309 | 11,299 | 12,834 | 14,759 | 17,130 | 20,770 | 21,622 |
| Goods  | 4,583             | 10,560  | 6,349 | 6,076 | 6,355 | 7,429 | 9,022  | 10,295 | 11,903 | 13,751 | 16,860 | 17,560 |
| Average oil price <sup>4</sup>                   | —                 | 18.8    | 57.0  | -13.8 | 2.5   | 15.8  | 30.7   | 41.3   | 20.5   | 10.7   | 50.8   | -6.3   |
| In U.S. dollars a barrel                         | 18.20             | 54.07   | 28.2  | 24.3  | 25.0  | 28.9  | 37.8   | 53.4   | 64.3   | 71.1   | 107.3  | 100.5  |
| Export unit value of manufactures <sup>5</sup>   | 0.3               | 4.6     | -5.3  | -3.4  | 2.1   | 14.4  | 9.5    | 3.6    | 3.7    | 8.8    | 13.8   | 0.5    |

<sup>1</sup>Average of annual percent change for world exports and imports.<sup>2</sup>As represented, respectively, by the export unit value index for the manufactures of the advanced economies; the average of U.K. Brent, Dubai, and West Texas Intermediate crude oil prices; and the average of world market prices for nonfuel primary commodities weighted by their 2002–04 shares in world commodity exports.<sup>3</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.<sup>4</sup>Average of U.K. Brent, Dubai, and West Texas Intermediate crude oil prices.<sup>5</sup>For the manufactures exported by the advanced economies.

**Table A10. Summary of Balances on Current Account**

(Billions of U.S. dollars)

|   | 2000          | 2001          | 2002          | 2003          | 2004          | 2005          | 2006          | 2007          | 2008          | 2009          | 2013          |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>Advanced economies</b>                                 | <b>-264.8</b> | <b>-200.9</b> | <b>-213.2</b> | <b>-209.3</b> | <b>-206.1</b> | <b>-392.2</b> | <b>-454.0</b> | <b>-368.8</b> | <b>-430.2</b> | <b>-268.6</b> | <b>-199.5</b> |
| United States   | -417.4        | -382.4        | -461.3        | -523.4        | -625.0        | -729.0        | -788.1        | -731.2        | -664.1        | -485.9        | -479.1        |
| Euro area <sup>1</sup>                                    | -35.2         | 8.3           | 49.8          | 48.4          | 120.3         | 46.7          | 32.9          | 29.3          | -65.5         | -54.3         | -14.6         |
| Japan   | 119.6         | 87.8          | 112.6         | 136.2         | 172.1         | 165.7         | 170.4         | 211.0         | 194.3         | 179.2         | 153.3         |
| Other advanced economies <sup>2</sup>                     | 68.2          | 85.4          | 85.7          | 129.6         | 126.5         | 124.5         | 130.8         | 122.1         | 105.2         | 92.4          | 141.0         |
| <i>Memorandum</i>   |               |               |               |               |               |               |               |               |               |               |               |
| Newly industrialized Asian economies                      | 38.9          | 47.5          | 55.3          | 80.5          | 81.9          | 75.0          | 84.4          | 106.1         | 84.1          | 81.8          | 102.8         |
| <b>Emerging and developing economies</b>                  | <b>86.5</b>   | <b>41.2</b>   | <b>76.9</b>   | <b>144.5</b>  | <b>215.1</b>  | <b>445.9</b>  | <b>617.0</b>  | <b>634.2</b>  | <b>784.9</b>  | <b>612.9</b>  | <b>493.3</b>  |
| <b>Regional groups</b>                                    |               |               |               |               |               |               |               |               |               |               |               |
| Africa  | 8.1           | 1.0           | -8.8          | -4.1          | 2.1           | 15.6          | 27.8          | 4.0           | 40.1          | 3.6           | -46.7         |
| Central and eastern Europe                                | -31.4         | -15.5         | -23.1         | -36.8         | -57.6         | -59.4         | -87.7         | -120.7        | -164.4        | -174.2        | -218.5        |
| Commonwealth of Independent States <sup>3</sup>           | 48.3          | 33.0          | 30.3          | 36.0          | 63.8          | 88.3          | 97.7          | 74.3          | 127.9         | 80.9          | -106.9        |
| Developing Asia   | 38.6          | 36.6          | 64.6          | 82.5          | 89.3          | 161.5         | 277.6         | 403.4         | 380.0         | 410.2         | 697.3         |
| Middle East   | 71.5          | 39.9          | 30.3          | 59.1          | 97.0          | 204.7         | 253.9         | 257.0         | 438.6         | 365.0         | 280.3         |
| Western Hemisphere  | -48.5         | -53.9         | -16.3         | 7.8           | 20.6          | 35.2          | 47.7          | 16.2          | -37.3         | -72.6         | -112.1        |
| <i>Memorandum</i>   |               |               |               |               |               |               |               |               |               |               |               |
| European Union  | -82.9         | -25.3         | 18.7          | 21.2          | 65.0          | -10.7         | -60.5         | -111.0        | -232.1        | -223.0        | -243.0        |
| <b>Analytical groups</b>                                  |               |               |               |               |               |               |               |               |               |               |               |
| <b>By source of export earnings</b>                       |               |               |               |               |               |               |               |               |               |               |               |
| Fuel  | 151.7         | 83.5          | 61.6          | 106.4         | 185.8         | 353.9         | 439.6         | 405.5         | 711.3         | 558.8         | 239.5         |
| Nonfuel   | -65.2         | -42.3         | 15.3          | 38.1          | 29.4          | 92.0          | 177.5         | 228.6         | 73.6          | 54.1          | 253.8         |
| of which, primary products                                | -2.5          | -3.8          | -4.6          | -3.0          | 0.2           | 0.9           | 9.2           | 10.3          | -1.7          | -4.3          | -5.2          |
| <b>By external financing source</b>                       |               |               |               |               |               |               |               |               |               |               |               |
| Net debtor countries                                      | -95.9         | -72.5         | -34.5         | -30.7         | -68.6         | -99.8         | -104.4        | -179.4        | -322.0        | -371.6        | -503.9        |
| of which, official financing                              | -5.1          | -3.9          | -4.2          | -5.8          | -5.5          | -6.2          | -6.5          | -17.0         | -26.7         | -27.7         | -32.5         |
| <b>Net debtor countries by debt-servicing experience</b>  |               |               |               |               |               |               |               |               |               |               |               |
| Countries with arrears and/or rescheduling during 2002–06 | -8.4          | -5.2          | 12.1          | 15.0          | 0.1           | -9.7          | 0.7           | -14.7         | -36.8         | -48.3         | -67.4         |
| <b>World<sup>1</sup></b>                                  | <b>-178.4</b> | <b>-159.7</b> | <b>-136.3</b> | <b>-64.8</b>  | <b>9.0</b>    | <b>53.7</b>   | <b>163.0</b>  | <b>265.3</b>  | <b>354.7</b>  | <b>344.3</b>  | <b>293.8</b>  |
| <i>Memorandum</i>   |               |               |               |               |               |               |               |               |               |               |               |
| In percent of total world current account transactions    | -1.1          | -1.0          | -0.8          | -0.3          | —             | 0.2           | 0.6           | 0.8           | 0.9           | 0.8           | 0.5           |
| In percent of world GDP                                   | -0.6          | -0.5          | -0.4          | -0.2          | —             | 0.1           | 0.3           | 0.5           | 0.6           | 0.5           | 0.4           |

<sup>1</sup>Reflects errors, omissions, and asymmetries in balance of payments statistics on current account, as well as the exclusion of data for international organizations and a limited number of countries. Calculated as the sum of the balance of individual euro area countries. See “Classification of Countries” in the introduction to this Statistical Appendix.

<sup>2</sup>In this table, “other advanced economies” means advanced economies excluding the United States, euro area countries, and Japan.

<sup>3</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

**Table A11. Advanced Economies: Balance on Current Account**

(Percent of GDP)

|                                      | 2000        | 2001        | 2002        | 2003        | 2004        | 2005        | 2006        | 2007        | 2008        | 2009        | 2013        |
|--------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Advanced economies</b>            | <b>-1.0</b> | <b>-0.8</b> | <b>-0.8</b> | <b>-0.7</b> | <b>-0.6</b> | <b>-1.1</b> | <b>-1.3</b> | <b>-0.9</b> | <b>-1.0</b> | <b>-0.6</b> | <b>-0.4</b> |
| United States                        | -4.3        | -3.8        | -4.4        | -4.8        | -5.3        | -5.9        | -6.0        | -5.3        | -4.6        | -3.3        | -2.8        |
| Euro area <sup>1</sup>               | -0.6        | 0.1         | 0.7         | 0.6         | 1.2         | 0.5         | 0.3         | 0.2         | -0.5        | -0.4        | -0.1        |
| Germany                              | -1.7        | —           | 2.0         | 2.0         | 4.7         | 5.2         | 6.1         | 7.6         | 7.3         | 6.8         | 6.5         |
| France                               | 1.6         | 1.9         | 1.4         | 0.8         | 0.6         | -0.6        | -0.7        | -1.2        | -2.8        | -2.7        | -2.9        |
| Italy                                | -0.5        | -0.1        | -0.8        | -1.3        | -0.9        | -1.6        | -2.6        | -2.5        | -2.8        | -2.4        | -1.0        |
| Spain                                | -4.0        | -3.9        | -3.3        | -3.5        | -5.3        | -7.4        | -8.9        | -10.1       | -10.1       | -7.7        | -5.6        |
| Netherlands                          | 1.9         | 2.4         | 2.5         | 5.5         | 7.5         | 7.1         | 8.2         | 6.8         | 5.6         | 5.1         | 4.2         |
| Belgium                              | 4.0         | 3.4         | 4.6         | 4.1         | 3.5         | 2.6         | 2.7         | 2.1         | —           | -1.1        | -0.9        |
| Austria                              | -0.7        | -0.8        | 2.7         | 1.7         | 2.1         | 2.0         | 2.4         | 3.2         | 2.8         | 2.4         | 2.1         |
| Finland                              | 8.1         | 8.6         | 8.8         | 5.1         | 6.5         | 3.6         | 4.6         | 4.6         | 3.4         | 2.9         | 2.3         |
| Greece                               | -7.8        | -7.2        | -6.5        | -6.6        | -5.8        | -7.4        | -11.1       | -14.1       | -14.0       | -14.1       | -11.5       |
| Portugal                             | -10.2       | -9.9        | -8.1        | -6.1        | -7.6        | -9.5        | -10.1       | -9.8        | -12.0       | -12.7       | -11.2       |
| Ireland                              | -0.4        | -0.6        | -1.0        | —           | -0.6        | -3.5        | -3.6        | -5.4        | -5.0        | -4.4        | -3.2        |
| Luxembourg                           | 13.2        | 8.8         | 10.5        | 8.2         | 11.9        | 11.1        | 10.5        | 9.9         | 8.6         | 8.2         | 5.8         |
| Slovenia                             | -2.7        | 0.2         | 1.0         | -0.8        | -2.7        | -2.0        | -2.8        | -4.9        | -4.7        | -4.7        | -3.7        |
| Cyprus                               | -5.2        | -3.3        | -3.7        | -2.2        | -5.0        | -5.6        | -5.9        | -9.7        | -9.7        | -7.8        | -4.5        |
| Malta                                | -13.1       | -4.1        | 2.5         | -3.1        | -5.8        | -8.7        | -8.2        | -5.4        | -7.7        | -6.4        | -3.5        |
| Japan                                | 2.6         | 2.1         | 2.9         | 3.2         | 3.7         | 3.6         | 3.9         | 4.8         | 4.0         | 3.7         | 2.8         |
| United Kingdom                       | -2.6        | -2.1        | -1.7        | -1.6        | -2.1        | -2.6        | -3.4        | -3.8        | -3.6        | -3.4        | -3.0        |
| Canada                               | 2.7         | 2.3         | 1.7         | 1.2         | 2.3         | 1.9         | 1.4         | 0.9         | 0.9         | —           | 1.3         |
| Korea                                | 2.4         | 1.7         | 1.0         | 2.0         | 4.1         | 1.9         | 0.6         | 0.6         | -1.3        | -0.7        | —           |
| Australia                            | -3.8        | -2.0        | -3.7        | -5.3        | -6.1        | -5.8        | -5.3        | -6.2        | -4.9        | -4.3        | -5.0        |
| Taiwan Province of China             | 2.8         | 6.5         | 8.9         | 10.0        | 6.0         | 4.9         | 7.2         | 8.6         | 7.8         | 6.5         | 4.9         |
| Sweden                               | 4.0         | 4.3         | 5.0         | 7.2         | 6.7         | 6.8         | 8.5         | 8.5         | 6.4         | 5.8         | 4.1         |
| Switzerland                          | 12.3        | 7.8         | 8.3         | 12.9        | 12.9        | 13.6        | 14.7        | 16.6        | 9.3         | 8.7         | 12.0        |
| Hong Kong SAR                        | 4.1         | 5.9         | 7.6         | 10.4        | 9.5         | 11.4        | 12.1        | 13.5        | 11.7        | 10.3        | 6.7         |
| Denmark                              | 1.4         | 3.1         | 2.5         | 3.4         | 3.1         | 4.4         | 2.9         | 1.1         | 1.3         | 1.8         | 1.7         |
| Norway                               | 15.0        | 16.1        | 12.6        | 12.3        | 12.7        | 16.3        | 17.3        | 15.4        | 19.1        | 18.0        | 17.7        |
| Israel                               | -0.8        | -1.1        | -0.8        | 1.2         | 2.4         | 3.2         | 5.9         | 3.2         | 0.4         | 0.5         | 1.5         |
| Singapore                            | 11.6        | 12.5        | 12.6        | 23.2        | 16.7        | 18.6        | 21.8        | 24.3        | 19.1        | 17.0        | 17.5        |
| New Zealand                          | -5.1        | -2.8        | -3.9        | -4.3        | -6.4        | -8.5        | -8.7        | -8.2        | -9.3        | -8.1        | -5.6        |
| Iceland                              | -10.2       | -4.3        | 1.5         | -4.8        | -9.8        | -16.1       | -25.4       | -14.6       | -18.2       | -13.7       | -5.5        |
| <i>Memorandum</i>                    |             |             |             |             |             |             |             |             |             |             |             |
| Major advanced economies             | -1.6        | -1.4        | -1.5        | -1.5        | -1.4        | -1.8        | -2.0        | -1.5        | -1.3        | -0.9        | -0.7        |
| Euro area <sup>2</sup>               | -1.5        | -0.3        | 0.8         | 0.4         | 0.8         | 0.2         | —           | 0.3         | -0.5        | -0.5        | -0.2        |
| Newly industrialized Asian economies | 3.5         | 4.6         | 5.0         | 6.9         | 6.4         | 5.2         | 5.3         | 6.2         | 4.7         | 4.3         | 4.0         |

<sup>1</sup>Calculated as the sum of the balances of individual euro area countries.<sup>2</sup>Corrected for reporting discrepancies in intra-area transactions.

**Table A12. Emerging and Developing Economies, by Country: Balance on Current Account  
(Percent of GDP)**

|                          | 2000       | 2001       | 2002        | 2003        | 2004       | 2005       | 2006       | 2007       | 2008       | 2009       | 2013        |
|--------------------------|------------|------------|-------------|-------------|------------|------------|------------|------------|------------|------------|-------------|
| <b>Africa</b>            | <b>1.8</b> | <b>0.2</b> | <b>-1.9</b> | <b>-0.7</b> | <b>0.3</b> | <b>1.9</b> | <b>2.9</b> | <b>0.4</b> | <b>3.0</b> | <b>0.2</b> | <b>-2.2</b> |
| Algeria                  | 16.7       | 12.9       | 7.7         | 13.0        | 13.1       | 20.6       | 24.8       | 22.8       | 28.1       | 19.8       | 10.4        |
| Angola                   | 8.7        | -16.0      | -1.3        | -5.2        | 3.5        | 16.8       | 23.3       | 11.3       | 18.0       | 15.9       | 10.7        |
| Benin                    | -7.7       | -6.4       | -8.4        | -8.3        | -7.2       | -5.5       | -5.7       | -6.7       | -9.8       | -8.1       | -5.5        |
| Botswana                 | 8.8        | 9.9        | 3.3         | 5.6         | 3.6        | 14.8       | 17.6       | 15.9       | 9.3        | 7.6        | 11.3        |
| Burkina Faso             | -12.3      | -11.2      | -10.0       | -8.7        | -10.6      | -11.7      | -9.6       | -8.3       | -12.7      | -12.1      | -8.7        |
| Burundi                  | -8.6       | -4.6       | -3.5        | -4.6        | -8.4       | -1.2       | -14.5      | -16.0      | -21.9      | -14.8      | -10.8       |
| Cameroon                 | -1.4       | -3.6       | -5.1        | -1.8        | -3.8       | -3.4       | 0.6        | -1.9       | 1.3        | -1.1       | -4.9        |
| Cape Verde               | -10.9      | -10.7      | -11.2       | -11.2       | -14.4      | -3.4       | -5.0       | -9.1       | -10.6      | -10.9      | -10.7       |
| Central African Republic | -1.3       | -1.7       | -1.6        | -2.2        | 0.4        | -6.2       | -2.7       | -4.4       | -6.3       | -5.9       | -5.6        |
| Chad                     | -15.4      | -31.3      | -93.8       | -47.8       | -16.7      | 3.1        | -10.6      | 1.7        | 10.0       | -1.8       | -2.9        |
| Comoros                  | 1.7        | 3.0        | -1.7        | -3.2        | -4.6       | -7.2       | -6.1       | -6.7       | -8.1       | -9.5       | -7.9        |
| Congo, Dem. Rep. of      | -4.0       | -4.0       | -1.6        | 1.0         | -2.4       | -10.4      | -2.4       | -1.8       | -1.9       | -12.6      | -4.7        |
| Congo, Rep. of           | 7.9        | -5.6       | 0.6         | -4.1        | 12.7       | 5.3        | 2.3        | -19.3      | 10.7       | 21.4       | 9.4         |
| Côte d'Ivoire            | -2.8       | -0.6       | 6.7         | 2.1         | 1.6        | 0.2        | 2.8        | -0.7       | 3.8        | -0.6       | -4.9        |
| Djibouti                 | -9.0       | -2.9       | -1.6        | 3.4         | -1.3       | -3.2       | -14.7      | -24.8      | -33.5      | -32.9      | -13.8       |
| Equatorial Guinea        | -15.8      | -41.2      | 0.9         | -33.3       | -21.6      | -6.2       | 7.1        | 4.3        | 12.5       | 2.8        | 3.8         |
| Eritrea                  | -0.6       | -4.6       | 6.8         | 9.7         | -0.7       | 0.3        | -3.6       | -3.7       | -3.0       | -2.1       | 2.6         |
| Ethiopia                 | -4.2       | -3.0       | -4.7        | -1.4        | -4.0       | -6.0       | -9.1       | -4.5       | -5.0       | -5.2       | -4.7        |
| Gabon                    | 19.7       | 11.0       | 6.8         | 9.5         | 11.2       | 22.9       | 18.7       | 14.8       | 17.0       | 18.1       | 6.8         |
| Gambia, The              | -3.1       | -2.6       | -2.8        | -5.1        | -6.1       | -15.1      | -11.5      | -12.5      | -13.9      | -12.5      | -11.1       |
| Ghana                    | -8.4       | -5.3       | 0.5         | 1.7         | -2.8       | -7.0       | -9.0       | -10.9      | -13.1      | -13.2      | -12.2       |
| Guinea                   | -6.4       | -2.7       | -2.5        | -0.2        | -1.9       | -0.6       | 0.5        | -2.0       | -6.3       | -6.7       | -6.7        |
| Guinea-Bissau            | -5.6       | -22.1      | -10.7       | -2.8        | 1.8        | -5.1       | -13.9      | -2.2       | 0.2        | -11.6      | -11.8       |
| Kenya                    | -2.3       | -3.1       | 2.2         | -0.2        | 0.1        | -0.8       | -2.3       | -3.1       | -6.1       | -4.5       | -4.1        |
| Lesotho                  | -18.0      | -12.5      | -20.1       | -12.3       | -5.6       | -7.3       | 4.4        | 3.6        | 0.1        | -1.4       | -3.0        |
| Liberia                  | -19.2      | -25.0      | -18.2       | -35.4       | -26.2      | -39.1      | -24.5      | -18.7      | -65.9      | -43.9      | -11.0       |
| Madagascar               | -5.6       | -1.3       | -6.0        | -4.7        | -8.8       | -10.6      | -8.4       | -13.9      | -23.1      | -21.2      | -6.5        |
| Malawi                   | -5.3       | -6.8       | -12.5       | -5.8        | -7.3       | -10.1      | -6.4       | -2.1       | -8.2       | -5.4       | -7.3        |
| Mali                     | -10.0      | -10.4      | -3.1        | -6.2        | -8.4       | -8.3       | -3.7       | -7.2       | -6.6       | -6.9       | -3.4        |
| Mauritania               | -9.0       | -11.7      | 3.0         | -13.6       | -34.6      | -47.2      | -1.3       | -11.4      | -6.3       | -3.0       | 5.4         |
| Mauritius                | -1.5       | 3.4        | 5.7         | 2.4         | 0.8        | -3.5       | -5.3       | -8.0       | -4.7       | -6.6       | -3.5        |
| Morocco                  | -1.3       | 4.3        | 3.6         | 3.2         | 1.7        | 1.8        | 2.2        | -0.1       | 0.4        | -0.3       | -0.1        |
| Mozambique               | -16.2      | -17.6      | -18.8       | -15.5       | -8.9       | -11.4      | -9.2       | -9.5       | -13.6      | -13.3      | -12.1       |
| Namibia                  | 9.0        | 1.9        | 3.7         | 6.7         | 8.2        | 5.5        | 16.0       | 18.2       | 14.0       | 12.4       | 6.3         |
| Niger                    | -6.7       | -5.1       | -6.6        | -8.3        | -7.8       | -9.3       | -8.6       | -7.7       | -10.7      | -20.6      | -7.6        |
| Nigeria                  | 11.7       | 4.9        | -13.1       | -6.1        | 5.0        | 7.1        | 9.5        | 2.1        | 6.2        | 0.6        | -3.5        |
| Rwanda                   | -6.5       | -6.0       | -10.7       | -12.4       | -1.9       | -1.1       | -7.3       | -5.0       | -9.3       | -12.4      | -10.1       |
| São Tomé and Príncipe    | -17.5      | -22.7      | -17.0       | -13.9       | -16.8      | -10.3      | -41.3      | -30.2      | -29.6      | -34.5      | -30.2       |
| Senegal                  | -6.5       | -4.3       | -5.6        | -6.1        | -6.1       | -7.8       | -9.4       | -10.4      | -11.1      | -11.4      | -12.1       |
| Seychelles               | -7.3       | -23.4      | -16.3       | 0.4         | -7.0       | -23.6      | -17.2      | -37.0      | -38.3      | -35.1      | -44.0       |
| Sierra Leone             | -8.8       | -6.3       | -2.0        | -4.8        | -5.8       | -7.1       | -3.5       | -3.8       | -6.3       | -4.2       | -3.2        |
| South Africa             | -0.1       | 0.3        | 0.8         | -1.1        | -3.2       | -4.0       | -6.5       | -7.3       | -8.0       | -8.1       | -8.3        |
| Sudan                    | -8.4       | -12.7      | -10.3       | -7.9        | -6.5       | -11.1      | -15.2      | -12.6      | -6.3       | -6.7       | -5.8        |
| Swaziland                | -4.9       | -4.3       | 4.8         | 6.8         | 3.1        | -4.1       | -7.4       | -1.4       | -5.3       | -2.0       | -2.6        |
| Tanzania                 | -4.8       | -4.5       | -6.2        | -4.2        | -3.6       | -4.1       | -7.7       | -9.0       | -9.8       | -10.0      | -9.8        |
| Togo                     | -9.0       | -9.3       | -5.5        | -4.2        | -3.0       | -5.3       | -6.0       | -6.4       | -9.6       | -8.5       | -6.5        |
| Tunisia                  | -4.2       | -5.1       | -3.6        | -2.9        | -1.9       | -1.1       | -2.0       | -2.6       | -3.4       | -3.5       | -2.7        |
| Uganda                   | -6.7       | -3.7       | -4.6        | -5.5        | -3.0       | -4.5       | -3.5       | -2.8       | -3.4       | -5.8       | -3.7        |
| Zambia                   | -18.2      | -19.9      | -13.8       | -14.7       | -11.7      | -10.0      | -0.7       | -7.1       | -9.5       | -6.6       | -3.6        |
| Zimbabwe <sup>1</sup>    | 0.6        | -0.7       | -3.1        | -6.0        | -7.8       | -10.2      | -7.0       | -3.5       | ...        | ...        | ...         |

**Table A12 (continued)**

|   | 2000        | 2001        | 2002        | 2003        | 2004        | 2005        | 2006        | 2007        | 2008        | 2009        | 2013        |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Central and eastern Europe</b>                     | <b>-4.8</b> | <b>-2.5</b> | <b>-3.2</b> | <b>-4.1</b> | <b>-5.2</b> | <b>-4.6</b> | <b>-6.0</b> | <b>-6.6</b> | <b>-7.1</b> | <b>-7.2</b> | <b>-6.7</b> |
| Albania   | -3.7        | -3.7        | -7.2        | -5.2        | -4.0        | -6.1        | -5.6        | -9.2        | -10.5       | -7.1        | -5.0        |
| Bosnia and Herzegovina                                | -6.9        | -12.5       | -17.8       | -19.4       | -16.3       | -18.0       | -8.4        | -12.7       | -15.8       | -13.5       | -13.0       |
| Bulgaria  | -5.6        | -5.6        | -2.4        | -5.5        | -6.6        | -12.0       | -15.6       | -21.4       | -24.4       | -21.5       | -12.9       |
| Croatia   | -2.9        | -3.7        | -8.4        | -6.2        | -5.0        | -6.3        | -7.9        | -8.6        | -10.1       | -10.2       | -7.2        |
| Czech Republic  | -4.7        | -5.3        | -5.7        | -6.3        | -5.3        | -1.3        | -2.6        | -1.8        | -2.2        | -2.5        | -2.8        |
| Estonia   | -5.4        | -5.2        | -10.6       | -11.3       | -11.7       | -10.0       | -16.7       | -18.1       | -10.8       | -8.7        | -9.3        |
| Hungary   | -8.4        | -6.0        | -7.0        | -7.9        | -8.4        | -6.8        | -6.1        | -5.0        | -5.5        | -6.1        | -6.5        |
| Latvia  | -4.7        | -7.5        | -6.7        | -8.2        | -12.8       | -12.4       | -22.7       | -22.9       | -15.1       | -8.3        | -5.3        |
| Lithuania   | -5.9        | -4.7        | -5.2        | -6.9        | -7.7        | -7.1        | -10.7       | -14.6       | -14.9       | -8.7        | -8.3        |
| Macedonia, FYR  | -1.9        | -7.2        | -9.4        | -4.1        | -8.4        | -2.6        | -0.9        | -3.0        | -14.0       | -13.8       | -8.9        |
| Montenegro  | ...         | ...         | ...         | -6.8        | -7.2        | -8.5        | -24.7       | -39.6       | -39.6       | -36.8       | -16.7       |
| Poland  | -5.8        | -2.8        | -2.5        | -2.1        | -4.0        | -1.2        | -2.7        | -3.8        | -4.7        | -5.7        | -5.9        |
| Romania   | -3.7        | -5.5        | -3.3        | -5.8        | -8.4        | -8.9        | -10.4       | -14.0       | -13.8       | -13.3       | -12.7       |
| Serbia  | -1.8        | -2.5        | -8.2        | -7.2        | -12.1       | -8.7        | -10.0       | -15.9       | -18.6       | -19.3       | -15.4       |
| Slovak Republic                                       | -3.3        | -8.3        | -8.0        | -5.9        | -7.8        | -8.5        | -7.1        | -5.4        | -5.1        | -4.7        | -3.0        |
| Turkey  | -3.7        | 2.0         | -0.3        | -2.5        | -3.7        | -4.6        | -6.0        | -5.7        | -6.5        | -6.7        | -5.5        |
| <b>Commonwealth of Independent States<sup>2</sup></b> | <b>13.7</b> | <b>8.0</b>  | <b>6.5</b>  | <b>6.3</b>  | <b>8.2</b>  | <b>8.8</b>  | <b>7.5</b>  | <b>4.4</b>  | <b>5.5</b>  | <b>3.0</b>  | <b>-2.3</b> |
| Russia  | 18.0        | 11.1        | 8.4         | 8.2         | 10.1        | 11.0        | 9.5         | 5.9         | 6.5         | 3.4         | -3.2        |
| Excluding Russia                                      | 1.5         | -0.9        | 1.0         | 0.4         | 2.3         | 1.6         | 1.1         | -0.5        | 2.3         | 1.8         | 1.1         |
| Armenia   | -14.6       | -9.5        | -6.2        | -6.8        | -0.5        | -1.0        | -1.8        | -6.4        | -9.7        | -10.8       | -8.1        |
| Azerbaijan  | -3.5        | -0.9        | -12.3       | -27.8       | -29.8       | 1.3         | 17.7        | 28.9        | 38.3        | 38.6        | 12.0        |
| Belarus   | -3.2        | -3.3        | -2.2        | -2.4        | -5.2        | 1.4         | -3.9        | -6.8        | -5.9        | -8.0        | -7.2        |
| Georgia   | -7.9        | -6.4        | -6.8        | -8.6        | -8.9        | -11.9       | -15.9       | -20.0       | -20.8       | -18.7       | -11.9       |
| Kazakhstan  | 3.0         | -5.4        | -4.2        | -0.9        | 0.8         | -1.8        | -2.4        | -6.9        | 4.3         | 3.3         | 3.3         |
| Kyrgyz Republic                                       | -4.3        | -1.5        | -4.0        | 1.7         | 4.9         | 2.8         | -3.1        | -0.2        | -4.2        | -5.4        | -2.0        |
| Moldova   | -7.6        | -1.8        | -1.2        | -6.6        | -2.3        | -10.3       | -11.8       | -17.0       | -19.9       | -19.1       | -16.4       |
| Mongolia  | -5.0        | -13.0       | -8.7        | -7.1        | 1.3         | 1.1         | 7.0         | 2.5         | -12.6       | -12.6       | 0.1         |
| Tajikistan  | -1.6        | -4.9        | -3.5        | -1.3        | -3.9        | -2.7        | -2.8        | -11.2       | -8.5        | -8.1        | -4.5        |
| Turkmenistan  | 8.2         | 1.7         | 6.7         | 2.7         | 0.6         | 5.1         | 15.7        | 15.4        | 26.5        | 33.0        | 35.6        |
| Ukraine   | 4.7         | 3.7         | 7.5         | 5.8         | 10.6        | 2.9         | -1.5        | -3.7        | -7.2        | -9.2        | -5.7        |
| Uzbekistan  | 1.8         | -1.0        | 1.2         | 8.7         | 10.1        | 13.6        | 17.2        | 19.1        | 16.8        | 12.8        | 8.4         |

**Table A12 (continued)**

|                        | 2000        | 2001       | 2002       | 2003       | 2004        | 2005        | 2006        | 2007        | 2008        | 2009        | 2013       |
|------------------------|-------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|
| <b>Developing Asia</b> | <b>1.7</b>  | <b>1.5</b> | <b>2.4</b> | <b>2.7</b> | <b>2.6</b>  | <b>4.0</b>  | <b>5.9</b>  | <b>7.0</b>  | <b>5.4</b>  | <b>5.2</b>  | <b>5.8</b> |
| Afghanistan, I.R. of   | ...         | ...        | -3.7       | -15.7      | -4.9        | -2.8        | -4.9        | 0.8         | 0.9         | -3.0        | -4.6       |
| Bangladesh             | -1.4        | -0.9       | 0.3        | 0.3        | -0.3        | —           | 1.2         | 1.1         | 1.0         | 0.9         | -0.5       |
| Bhutan                 | -9.0        | -8.5       | -15.8      | -23.6      | -17.9       | -30.4       | -4.3        | 11.0        | 11.7        | 2.8         | -28.6      |
| Brunei Darussalam      | 50.0        | 48.4       | 41.2       | 47.7       | 48.6        | 52.8        | 56.3        | 48.8        | 55.0        | 55.6        | 56.7       |
| Cambodia               | -2.8        | -1.1       | -2.4       | -3.6       | -2.2        | -4.2        | -1.1        | -3.6        | -10.3       | -9.8        | -5.7       |
| China                  | 1.7         | 1.3        | 2.4        | 2.8        | 3.6         | 7.2         | 9.4         | 11.3        | 9.5         | 9.2         | 9.9        |
| Fiji                   | -5.6        | -7.0       | -1.2       | -6.1       | -13.6       | -14.0       | -22.6       | -15.5       | -21.3       | -21.4       | -15.0      |
| India                  | -1.0        | 0.3        | 1.4        | 1.5        | 0.1         | -1.3        | -1.1        | -1.4        | -2.8        | -3.1        | -2.1       |
| Indonesia              | 4.8         | 4.3        | 4.0        | 3.5        | 0.6         | 0.1         | 3.0         | 2.5         | 0.1         | -0.1        | -2.0       |
| Kiribati               | -1.2        | 22.2       | 10.5       | 12.6       | -3.4        | -42.2       | -27.6       | -31.1       | -43.7       | -47.0       | -53.6      |
| Lao PDR                | -9.1        | -12.8      | -11.6      | -12.1      | -16.9       | -17.4       | -10.8       | -17.3       | -16.3       | -16.5       | -6.5       |
| Malaysia               | 9.0         | 7.9        | 8.0        | 12.0       | 12.1        | 14.5        | 16.1        | 15.6        | 14.8        | 13.2        | 11.2       |
| Maldives               | -8.2        | -9.4       | -5.6       | -4.6       | -16.2       | -35.9       | -40.3       | -45.0       | -48.3       | -37.0       | -4.0       |
| Myanmar                | -0.8        | -2.4       | 0.2        | -1.0       | 2.4         | 3.7         | 9.5         | 6.8         | 3.6         | 1.6         | -4.8       |
| Nepal                  | 2.9         | 4.5        | 4.2        | 2.4        | 2.7         | 2.0         | 2.2         | 0.5         | 1.9         | 1.7         | -0.6       |
| Pakistan               | -0.3        | 0.4        | 3.9        | 4.9        | 1.8         | -1.4        | -3.9        | -4.8        | -8.7        | -6.4        | -3.5       |
| Papua New Guinea       | 8.5         | 6.5        | -1.0       | 4.5        | 2.2         | 4.2         | 2.9         | 4.3         | 3.3         | 1.7         | -3.7       |
| Philippines            | -2.9        | -2.4       | -0.4       | 0.4        | 1.9         | 2.0         | 4.5         | 4.4         | 2.4         | 2.2         | 0.5        |
| Samoa                  | 1.0         | 0.1        | -1.1       | -95.3      | -6.8        | -1.6        | -4.6        | -6.1        | -9.4        | -8.4        | 0.2        |
| Solomon Islands        | -10.1       | -9.4       | -6.5       | 9.1        | 23.5        | -9.8        | -5.6        | -2.8        | -6.8        | -9.6        | -11.9      |
| Sri Lanka              | -6.3        | -1.1       | -1.4       | -0.4       | -3.1        | -2.7        | -5.3        | -4.2        | -7.5        | -7.1        | -7.0       |
| Thailand               | 7.6         | 4.4        | 3.7        | 3.4        | 1.7         | -4.3        | 1.1         | 6.4         | 3.1         | 2.0         | -0.4       |
| Timor-Leste            | -15.0       | -19.3      | -22.9      | -21.4      | 14.8        | 61.0        | 192.2       | 253.3       | 230.5       | 178.1       | 94.3       |
| Tonga                  | -6.2        | -9.5       | 5.1        | -3.1       | 4.2         | -2.6        | -9.7        | -10.4       | -10.4       | -8.8        | -7.6       |
| Vanuatu                | 2.0         | 2.0        | -5.4       | -6.6       | -5.0        | -7.4        | -5.7        | -9.9        | -11.4       | -13.2       | -6.5       |
| Vietnam                | 3.5         | 2.1        | -1.7       | -4.9       | -3.5        | -0.9        | -0.3        | -9.9        | -11.7       | -10.4       | -6.3       |
| <b>Middle East</b>     | <b>11.3</b> | <b>6.3</b> | <b>4.7</b> | <b>8.3</b> | <b>11.7</b> | <b>20.0</b> | <b>21.1</b> | <b>18.4</b> | <b>22.9</b> | <b>17.1</b> | <b>8.7</b> |
| Bahrain                | 10.6        | 2.8        | -0.7       | 2.0        | 4.2         | 11.0        | 13.8        | 16.7        | 18.0        | 15.0        | 9.0        |
| Egypt                  | -1.2        | —          | 0.7        | 2.4        | 4.3         | 3.2         | 0.8         | 1.5         | 0.6         | -0.9        | -2.7       |
| Iran, I.R. of          | 13.0        | 5.2        | 3.1        | 0.6        | 0.9         | 8.8         | 9.2         | 10.1        | 11.2        | 6.7         | -1.1       |
| Iraq                   | ...         | ...        | ...        | ...        | ...         | ...         | ...         | ...         | ...         | ...         | ...        |
| Jordan                 | 0.7         | 0.1        | 5.7        | 12.2       | 0.8         | -17.4       | -11.3       | -17.5       | -18.5       | -16.3       | -11.5      |
| Kuwait                 | 38.9        | 23.9       | 11.2       | 19.7       | 30.6        | 46.6        | 52.2        | 43.1        | 44.6        | 39.3        | 39.1       |
| Lebanon                | -17.2       | -19.3      | -14.1      | -13.2      | -15.5       | -13.6       | -5.6        | -12.7       | -14.0       | -13.7       | -9.3       |
| Libya                  | 29.8        | 12.3       | 3.0        | 19.9       | 22.3        | 38.4        | 45.8        | 34.0        | 36.5        | 29.5        | 24.3       |
| Oman                   | 15.5        | 9.8        | 6.7        | 3.8        | 2.4         | 15.2        | 12.1        | 8.0         | 10.1        | 5.6         | 5.4        |
| Qatar                  | 23.2        | 27.3       | 21.9       | 25.3       | 22.4        | 33.2        | 28.4        | 29.2        | 42.9        | 35.6        | 23.0       |
| Saudi Arabia           | 7.6         | 5.1        | 6.3        | 13.1       | 20.8        | 28.7        | 27.9        | 25.1        | 32.5        | 23.8        | 8.6        |
| Syrian Arab Republic   | 5.2         | 5.7        | 7.2        | 1.0        | -1.9        | -2.1        | -2.9        | -1.4        | -2.7        | -2.9        | -4.2       |
| United Arab Emirates   | 17.3        | 9.5        | 4.9        | 8.5        | 9.1         | 18.0        | 22.6        | 20.5        | 22.6        | 18.8        | 10.9       |
| Yemen, Rep. of         | 13.8        | 6.8        | 4.1        | 1.5        | 1.6         | 3.8         | 1.1         | -6.1        | 2.9         | 2.1         | —          |

**Table A12 (concluded)**

|                                | 2000        | 2001        | 2002        | 2003       | 2004       | 2005       | 2006       | 2007       | 2008        | 2009        | 2013        |
|--------------------------------|-------------|-------------|-------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| <b>Western Hemisphere</b>      | <b>-2.3</b> | <b>-2.7</b> | <b>-0.9</b> | <b>0.4</b> | <b>0.9</b> | <b>1.3</b> | <b>1.5</b> | <b>0.4</b> | <b>-0.8</b> | <b>-1.6</b> | <b>-1.9</b> |
| Antigua and Barbuda            | -9.8        | -8.0        | -11.5       | -12.9      | -8.3       | -12.4      | -16.1      | -19.4      | -18.2       | -14.6       | -11.6       |
| Argentina                      | -3.2        | -1.4        | 8.9         | 6.3        | 2.1        | 2.0        | 2.6        | 1.7        | 0.8         | -0.6        | -0.8        |
| Bahamas, The                   | -12.6       | -11.6       | -7.8        | -8.6       | -5.4       | -14.3      | -25.0      | -21.9      | -15.1       | -12.8       | -8.9        |
| Barbados                       | -5.7        | -4.4        | -6.8        | -6.3       | -12.4      | -12.8      | -8.7       | -7.2       | -9.9        | -9.1        | -6.4        |
| Belize                         | -20.3       | -21.9       | -17.7       | -18.2      | -14.7      | -13.6      | -2.1       | -4.2       | -4.1        | -3.0        | -6.0        |
| Bolivia                        | -5.3        | -3.4        | -4.1        | 1.0        | 3.8        | 6.5        | 11.3       | 13.1       | 12.1        | 7.4         | 4.7         |
| Brazil                         | -3.8        | -4.2        | -1.5        | 0.8        | 1.8        | 1.6        | 1.3        | 0.1        | -1.8        | -2.0        | -1.7        |
| Chile                          | -1.2        | -1.6        | -0.9        | -1.1       | 2.2        | 1.2        | 4.7        | 4.4        | -1.1        | -0.9        | -2.5        |
| Colombia                       | 0.8         | -1.2        | -1.5        | -1.1       | -0.8       | -1.3       | -1.8       | -2.9       | -2.2        | -1.9        | -1.3        |
| Costa Rica                     | -4.3        | -3.7        | -4.9        | -5.0       | -4.3       | -5.2       | -4.9       | -5.8       | -7.8        | -6.6        | -5.7        |
| Dominica                       | -19.7       | -18.4       | -13.6       | -12.8      | -16.5      | -28.0      | -17.8      | -23.6      | -27.5       | -22.9       | -17.4       |
| Dominican Republic             | -4.2        | -3.0        | -3.6        | 4.9        | 4.8        | -1.4       | -3.6       | -5.4       | -13.5       | -12.4       | -7.7        |
| Ecuador                        | 5.3         | -3.2        | -4.8        | -1.5       | -1.7       | 0.8        | 3.9        | 2.3        | 5.6         | 1.5         | -0.1        |
| El Salvador                    | -3.3        | -1.1        | -2.8        | -4.7       | -4.0       | -3.3       | -3.6       | -5.5       | -6.1        | -5.3        | -3.9        |
| Grenada                        | -17.7       | -19.7       | -26.6       | -25.3      | -9.7       | -31.4      | -33.1      | -32.6      | -36.4       | -35.1       | -24.4       |
| Guatemala                      | -6.1        | -6.7        | -6.1        | -4.6       | -4.9       | -4.5       | -5.0       | -5.0       | -5.8        | -5.9        | -5.0        |
| Guyana                         | -14.1       | -15.0       | -11.9       | -8.6       | -9.3       | -14.8      | -19.4      | -18.2      | -22.2       | -18.7       | -9.4        |
| Haiti                          | -1.0        | -2.0        | -0.9        | -1.6       | -1.6       | 2.6        | -1.4       | -1.1       | -3.0        | -2.9        | —           |
| Honduras                       | -7.1        | -6.3        | -3.6        | -6.8       | -7.7       | -3.0       | -4.7       | -10.0      | -13.9       | -10.5       | -7.9        |
| Jamaica                        | -5.0        | -8.3        | -12.7       | -8.6       | -7.3       | -10.6      | -11.7      | -16.4      | -16.0       | -12.8       | -8.0        |
| Mexico                         | -3.0        | -2.6        | -2.0        | -1.2       | -0.9       | -0.6       | -0.2       | -0.6       | -1.4        | -2.2        | -2.8        |
| Nicaragua                      | -20.1       | -19.4       | -17.7       | -16.2      | -14.5      | -14.6      | -13.6      | -18.3      | -23.9       | -21.1       | -16.4       |
| Panama                         | -5.9        | -1.5        | -0.8        | -4.5       | -7.5       | -4.9       | -3.2       | -8.0       | -11.7       | -13.9       | -8.9        |
| Paraguay                       | -2.3        | -4.2        | 1.8         | 2.3        | 2.1        | 0.8        | 1.5        | 1.9        | 1.4         | 0.5         | -0.3        |
| Peru                           | -2.8        | -2.1        | -1.9        | -1.5       | —          | 1.4        | 3.0        | 1.4        | -2.0        | -1.8        | -1.3        |
| St. Kitts and Nevis            | -21.0       | -32.0       | -39.1       | -34.8      | -20.1      | -18.3      | -21.1      | -28.4      | -30.6       | -30.2       | -24.8       |
| St. Lucia                      | -13.4       | -15.6       | -15.0       | -14.7      | -10.9      | -17.1      | -29.7      | -29.1      | -28.3       | -26.7       | -17.9       |
| St. Vincent and the Grenadines | -7.1        | -10.4       | -11.5       | -20.8      | -24.8      | -22.3      | -24.0      | -26.5      | -26.5       | -22.8       | -19.2       |
| Suriname                       | -3.8        | -15.2       | -5.6        | -10.8      | -2.1       | -4.3       | 1.8        | 2.9        | 1.3         | 0.8         | 1.4         |
| Trinidad and Tobago            | 6.6         | 5.0         | 0.9         | 8.7        | 12.5       | 23.7       | 25.2       | 25.8       | 22.3        | 19.7        | 9.2         |
| Uruguay                        | -2.8        | -2.9        | 3.2         | -0.5       | 0.3        | —          | -2.4       | -0.8       | -2.6        | -1.9        | -1.4        |
| Venezuela                      | 10.1        | 1.6         | 8.2         | 14.1       | 13.8       | 17.7       | 14.7       | 8.8        | 8.5         | 3.4         | —           |

<sup>1</sup>Given recent trends, it is not possible to forecast nominal GDP with any precision, and consequently no projections for 2008 and beyond are shown.

<sup>2</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

**Table A13. Emerging and Developing Economies: Net Capital Flows<sup>1</sup>**

(Billions of U.S. dollars)

|   | Average<br>1997–99 | 2000   | 2001   | 2002   | 2003   | 2004   | 2005   | 2006   | 2007    | 2008    | 2009   |
|---|--------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|
| <b>Emerging and developing economies</b>  |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | 118.9              | 71.6   | 75.5   | 77.1   | 162.5  | 236.5  | 248.7  | 223.0  | 632.8   | 528.6   | 286.6  |
| Private direct investment, net            | 163.4              | 172.0  | 187.2  | 156.6  | 166.2  | 189.0  | 261.8  | 246.0  | 379.0   | 443.6   | 414.6  |
| Private portfolio flows, net              | 52.0               | 16.0   | -78.7  | -91.9  | -13.0  | 12.7   | -20.4  | -107.3 | 54.5    | -6.6    | -89.1  |
| Other private capital flows, net          | -96.5              | -116.3 | -33.0  | 12.4   | 9.2    | 34.8   | 7.3    | 84.4   | 199.5   | 91.8    | -38.7  |
| Official flows, net <sup>3</sup>          | 18.1               | -34.2  | -0.4   | -1.0   | -50.5  | -71.1  | -109.9 | -158.0 | -140.7  | -158.6  | -135.4 |
| Change in reserves <sup>4</sup>           | -74.4              | -138.0 | -124.7 | -195.1 | -364.0 | -508.4 | -595.8 | -754.3 | -1256.1 | -1270.1 | -920.2 |
| <i>Memorandum</i>                         |                    |        |        |        |        |        |        |        |         |         |        |
| Current account <sup>5</sup>              | -27.3              | 124.3  | 87.4   | 131.3  | 226.4  | 300.0  | 525.1  | 709.9  | 745.5   | 869.6   | 695.6  |
| <b>Africa</b>                             |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | 8.6                | -3.1   | 2.3    | 1.8    | 3.9    | 13.1   | 26.3   | 36.0   | 39.6    | 43.7    | 62.3   |
| Private direct investment, net            | 7.4                | 7.7    | 23.2   | 14.4   | 17.6   | 16.2   | 23.8   | 21.8   | 31.3    | 31.4    | 34.0   |
| Private portfolio flows, net              | 6.9                | -2.1   | -7.9   | -1.6   | -0.4   | 6.0    | 3.6    | 18.4   | 12.1    | 8.3     | 11.0   |
| Other private capital flows, net          | -5.6               | -8.7   | -13.1  | -10.9  | -13.3  | -9.2   | -1.1   | -4.1   | -3.6    | 4.3     | 17.5   |
| Official flows, net <sup>3</sup>          | 2.1                | 1.0    | 0.1    | 3.9    | 1.1    | -1.6   | -5.3   | -16.6  | -1.8    | 6.5     | 3.7    |
| Change in reserves <sup>4</sup>           | -2.6               | -13.4  | -10.6  | -5.7   | -11.5  | -31.9  | -43.3  | -54.2  | -60.3   | -99.3   | -78.3  |
| <b>Central and eastern Europe</b>         |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | 32.4               | 38.6   | 11.1   | 53.7   | 53.6   | 74.3   | 119.2  | 119.9  | 173.8   | 179.9   | 181.7  |
| Private direct investment, net            | 18.1               | 23.5   | 24.0   | 24.5   | 17.1   | 36.1   | 51.7   | 64.3   | 74.8    | 77.3    | 81.8   |
| Private portfolio flows, net              | 4.3                | 3.8    | 0.9    | 2.1    | 8.0    | 28.4   | 21.5   | 9.9    | -7.7    | 10.4    | 15.5   |
| Other private capital flows, net          | 10.0               | 11.4   | -13.8  | 27.2   | 28.5   | 9.8    | 45.9   | 45.6   | 106.7   | 92.2    | 84.5   |
| Official flows, net <sup>3</sup>          | -1.5               | 1.6    | 6.0    | -7.5   | -5.1   | -6.0   | -7.9   | -4.7   | -2.4    | -2.4    | -2.2   |
| Change in reserves <sup>4</sup>           | -10.1              | -6.2   | -2.7   | -18.1  | -12.8  | -14.7  | -45.9  | -22.8  | -41.6   | -22.9   | -21.3  |
| <b>Commonwealth of Independent States</b> |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | -7.2               | -27.9  | 6.8    | 15.4   | 19.3   | 3.1    | 31.7   | 56.8   | 125.3   | 19.8    | 26.0   |
| Private direct investment, net            | 5.4                | 2.3    | 4.9    | 5.2    | 5.4    | 13.0   | 11.5   | 21.0   | 26.0    | 28.7    | 35.0   |
| Private portfolio flows, net              | 1.0                | -10.0  | -1.2   | 0.4    | -0.5   | 4.4    | -4.8   | 12.8   | 15.5    | -0.2    | 5.4    |
| Other private capital flows, net          | -13.6              | -20.2  | 3.0    | 9.9    | 14.3   | -14.3  | 25.0   | 23.1   | 83.8    | -8.8    | -14.5  |
| Official flows, net <sup>3</sup>          | -0.5               | -5.8   | -5.0   | -10.5  | -9.3   | -7.4   | -20.3  | -29.7  | -5.7    | -8.4    | -4.9   |
| Change in reserves <sup>4</sup>           | 1.6                | -20.4  | -14.4  | -15.1  | -32.8  | -54.9  | -77.2  | -128.6 | -168.3  | -129.9  | -92.1  |
| <b>Emerging Asia<sup>6</sup></b>          |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | 1.3                | 6.3    | 23.5   | 23.1   | 64.2   | 147.8  | 90.9   | 48.3   | 163.0   | 291.6   | 22.0   |
| Private direct investment, net            | 63.1               | 61.6   | 54.0   | 53.3   | 70.4   | 64.5   | 104.3  | 96.5   | 160.4   | 224.5   | 181.2  |
| Private portfolio flows, net              | 23.4               | 19.7   | -50.1  | -60.0  | 7.9    | 13.4   | -9.3   | -110.7 | 14.8    | -24.8   | -108.4 |
| Other private capital flows, net          | -85.2              | -75.0  | 19.5   | 29.9   | -14.1  | 69.9   | -4.0   | 62.5   | -12.2   | 91.9    | -50.7  |
| Official flows, net <sup>3</sup>          | 10.7               | -1.8   | -13.0  | 2.8    | -18.0  | -13.4  | -21.2  | -22.0  | -37.0   | -9.5    | -18.9  |
| Change in reserves <sup>4</sup>           | -59.0              | -60.1  | -87.7  | -154.8 | -236.7 | -338.7 | -288.3 | -373.3 | -662.8  | -752.4  | -546.2 |
| <b>Middle East<sup>7</sup></b>            |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | 9.3                | -5.2   | -7.3   | -22.1  | 2.6    | -16.9  | -57.5  | -47.5  | 33.7    | -99.6   | -86.2  |
| Private direct investment, net            | 7.2                | 6.0    | 12.3   | 9.2    | 17.5   | 10.2   | 18.3   | 15.1   | 7.0     | 8.0     | 11.8   |
| Private portfolio flows, net              | -5.0               | 3.1    | -12.6  | -17.4  | -17.0  | -20.8  | -36.5  | -24.3  | -12.7   | -23.4   | -31.2  |
| Other private capital flows, net          | 7.1                | -14.2  | -7.1   | -13.8  | 2.1    | -6.3   | -39.2  | -38.2  | 39.4    | -84.2   | -66.9  |
| Official flows, net <sup>3</sup>          | 1.3                | -23.5  | -13.9  | -8.1   | -24.2  | -33.7  | -24.4  | -66.4  | -93.9   | -147.0  | -115.3 |
| Change in reserves <sup>4</sup>           | -3.4               | -31.3  | -11.1  | -2.9   | -36.7  | -46.2  | -107.5 | -126.0 | -192.3  | -191.7  | -161.9 |
| <b>Western Hemisphere</b>                 |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | 74.5               | 62.8   | 39.2   | 5.1    | 19.0   | 15.2   | 38.1   | 9.5    | 97.4    | 93.2    | 80.8   |
| Private direct investment, net            | 62.3               | 71.0   | 68.7   | 50.2   | 38.2   | 49.0   | 52.3   | 27.3   | 79.5    | 73.7    | 70.8   |
| Private portfolio flows, net              | 21.3               | 1.5    | -7.9   | -15.3  | -11.0  | -18.7  | 5.1    | -13.4  | 32.6    | 23.1    | 18.6   |
| Other private capital flows, net          | -9.1               | -9.6   | -21.6  | -29.8  | -8.3   | -15.1  | -19.3  | -4.4   | -14.6   | -3.6    | -8.6   |
| Official flows, net <sup>3</sup>          | 5.9                | -5.8   | 25.4   | 18.4   | 4.9    | -8.9   | -30.8  | -18.6  | 0.0     | 2.3     | 2.2    |
| Change in reserves <sup>4</sup>           | -0.9               | -6.7   | 1.7    | 1.5    | -33.6  | -22.1  | -33.8  | -49.5  | -130.8  | -74.0   | -20.3  |
| <i>Memorandum</i>                         |                    |        |        |        |        |        |        |        |         |         |        |
| <b>Fuel-exporting countries</b>           |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | -4.8               | -43.6  | -6.4   | -16.4  | 11.6   | -18.4  | -38.1  | -3.8   | 120.9   | -141.0  | -103.1 |
| <b>Other countries</b>                    |                    |        |        |        |        |        |        |        |         |         |        |
| Private capital flows, net <sup>2</sup>   | 123.7              | 115.2  | 81.9   | 93.6   | 150.9  | 254.9  | 286.8  | 226.7  | 511.9   | 669.6   | 389.6  |

<sup>1</sup>Net capital flows comprise net direct investment, net portfolio investment, and other long- and short-term net investment flows, including official and private borrowing. In this table, Hong Kong SAR, Israel, Korea, Singapore, and Taiwan Province of China are included.<sup>2</sup>Because of data limitations, flows listed under private capital flows, net, may include some official flows.<sup>3</sup>Excludes grants and includes overseas investments of official investment agencies.<sup>4</sup>A minus sign indicates an increase.<sup>5</sup>The sum of the current account balance, net private capital flows, net official flows, and the change in reserves equals, with the opposite sign, the sum of the capital account and errors and omissions.<sup>6</sup>Consists of developing Asia and the newly industrialized Asian economies.<sup>7</sup>Includes Israel.

**Table A14. Emerging and Developing Economies: Private Capital Flows<sup>1</sup>**  
*(Billions of U.S. dollars)*

|   | Average<br>1997–99 | 2000   | 2001  | 2002  | 2003   | 2004   | 2005   | 2006     | 2007     | 2008    | 2009     |
|---|--------------------|--------|-------|-------|--------|--------|--------|----------|----------|---------|----------|
| <b>Emerging and developing economies</b>  |                    |        |       |       |        |        |        |          |          |         |          |
| Private capital flows, net                | 118.9              | 71.6   | 75.5  | 77.1  | 162.5  | 236.5  | 248.7  | 223.0    | 632.8    | 528.6   | 286.6    |
| Inflow                                    | 253.1              | 314.3  | 160.1 | 167.8 | 414.8  | 634.7  | 838.9  | 1,276.9  | 2,017.0  | 1,344.3 | 1,293.6  |
| Outflow                                   | -87.0              | -242.3 | -90.5 | -90.4 | -256.4 | -400.3 | -591.1 | -1,053.8 | -1,384.4 | -815.7  | -1,006.6 |
| <b>Africa</b>                             |                    |        |       |       |        |        |        |          |          |         |          |
| Private capital flows, net                | 8.6                | -3.1   | 2.3   | 1.8   | 3.9    | 13.1   | 26.3   | 36.0     | 39.6     | 43.7    | 62.3     |
| Inflow                                    | 20.4               | 5.7    | 14.5  | 14.0  | 18.0   | 25.8   | 45.3   | 70.2     | 69.5     | 78.9    | 93.1     |
| Outflow                                   | -7.3               | -8.8   | -12.3 | -12.2 | -14.1  | -12.7  | -19.0  | -34.1    | -29.7    | -34.9   | -30.6    |
| <b>Central and eastern Europe</b>         |                    |        |       |       |        |        |        |          |          |         |          |
| Private capital flows, net                | 32.4               | 38.6   | 11.1  | 53.7  | 53.6   | 74.3   | 119.2  | 119.9    | 173.8    | 179.9   | 181.7    |
| Inflow                                    | 38.1               | 48.6   | 20.4  | 55.0  | 64.0   | 103.8  | 140.1  | 175.3    | 211.8    | 203.8   | 201.1    |
| Outflow                                   | -1.5               | -9.9   | -9.3  | -1.3  | -10.5  | -29.5  | -20.9  | -55.4    | -38.0    | -23.8   | -19.4    |
| <b>Commonwealth of Independent States</b> |                    |        |       |       |        |        |        |          |          |         |          |
| Private capital flows, net                | -7.2               | -27.9  | 6.8   | 15.4  | 19.3   | 3.1    | 31.7   | 56.8     | 125.3    | 19.8    | 26.0     |
| Inflow                                    | 11.2               | -5.5   | 11.0  | 22.6  | 46.4   | 63.2   | 112.3  | 161.7    | 282.8    | 182.4   | 195.0    |
| Outflow                                   | -1.4               | -22.3  | -4.3  | -7.1  | -27.2  | -60.1  | -80.6  | -104.9   | -157.5   | -162.6  | -169.0   |
| <b>Emerging Asia<sup>2</sup></b>          |                    |        |       |       |        |        |        |          |          |         |          |
| Private capital flows, net                | 1.3                | 6.3    | 23.5  | 23.1  | 64.2   | 147.8  | 90.9   | 48.3     | 163.0    | 291.6   | 22.0     |
| Inflow                                    | 61.4               | 139.6  | 48.0  | 63.2  | 207.1  | 308.7  | 366.8  | 512.9    | 823.1    | 653.6   | 512.8    |
| Outflow                                   | -56.2              | -132.9 | -29.9 | -40.0 | -147.2 | -163.1 | -278.0 | -464.8   | -660.7   | -362.5  | -490.8   |
| <b>Middle East<sup>3</sup></b>            |                    |        |       |       |        |        |        |          |          |         |          |
| Private capital flows, net                | 9.3                | -5.2   | -7.3  | -22.1 | 2.6    | -16.9  | -57.5  | -47.5    | 33.7     | -99.6   | -86.2    |
| Inflow                                    | 17.1               | 41.2   | -3.7  | -11.6 | 32.1   | 67.1   | 83.9   | 246.3    | 403.6    | 18.1    | 94.8     |
| Outflow                                   | -7.1               | -46.4  | -4.1  | -10.3 | -29.4  | -83.9  | -140.1 | -293.6   | -369.7   | -117.5  | -180.8   |
| <b>Western Hemisphere</b>                 |                    |        |       |       |        |        |        |          |          |         |          |
| Private capital flows, net                | 74.5               | 62.8   | 39.2  | 5.1   | 19.0   | 15.2   | 38.1   | 9.5      | 97.4     | 93.2    | 80.8     |
| Inflow                                    | 104.8              | 84.8   | 69.8  | 24.7  | 47.1   | 66.0   | 90.5   | 110.5    | 226.3    | 207.5   | 196.8    |
| Outflow                                   | -13.6              | -22.0  | -30.6 | -19.6 | -28.1  | -50.8  | -52.4  | -101.0   | -128.8   | -114.3  | -116.0   |

<sup>1</sup>Private capital flows comprise direct investment, portfolio investment, and other long- and short-term investment flows. In this table, Hong Kong SAR, Israel, Korea, Singapore, and Taiwan Province of China are included.

<sup>2</sup>Consists of developing Asia and the newly industrialized Asian economies.

<sup>3</sup>Includes Israel.

**Table A15. Emerging and Developing Economies: Reserves<sup>1</sup>**

|   | 2000         | 2001         | 2002           | 2003           | 2004           | 2005           | 2006           | 2007           | 2008           | 2009           |
|---|--------------|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <i>Billions of U.S. dollars</i>                           |              |              |                |                |                |                |                |                |                |                |
| <b>Emerging and developing economies</b>                  | <b>801.1</b> | <b>896.1</b> | <b>1,072.9</b> | <b>1,395.6</b> | <b>1,848.5</b> | <b>2,339.6</b> | <b>3,095.8</b> | <b>4,308.4</b> | <b>5,552.7</b> | <b>6,459.5</b> |
| <b>Regional groups</b>                                    |              |              |                |                |                |                |                |                |                |                |
| Africa  | 54.3         | 64.6         | 72.2           | 90.4           | 126.4          | 160.5          | 221.6          | 281.9          | 381.2          | 459.5          |
| Sub-Saharan   | 35.3         | 35.8         | 36.3           | 40.2           | 62.6           | 83.3           | 116.2          | 144.3          | 192.0          | 233.5          |
| excluding Nigeria and South Africa                        | 19.0         | 19.0         | 22.7           | 26.3           | 32.2           | 36.2           | 50.6           | 62.5           | 82.3           | 106.8          |
| Central and eastern Europe                                | 91.2         | 91.3         | 121.7          | 149.1          | 172.0          | 202.2          | 240.2          | 281.7          | 304.6          | 325.9          |
| Commonwealth of Independent States <sup>2</sup>           | 33.2         | 43.9         | 58.1           | 92.4           | 148.7          | 214.4          | 356.8          | 525.1          | 655.0          | 747.1          |
| Russia  | 24.8         | 33.1         | 44.6           | 73.8           | 121.5          | 176.5          | 296.2          | 445.2          | 558.7          | 638.3          |
| Excluding Russia  | 8.4          | 10.8         | 13.5           | 18.5           | 27.2           | 37.9           | 60.6           | 79.9           | 96.3           | 108.8          |
| Developing Asia   | 320.7        | 379.5        | 496.2          | 669.7          | 933.9          | 1,155.5        | 1,489.3        | 2,106.9        | 2,830.4        | 3,360.3        |
| China   | 168.9        | 216.3        | 292.0          | 409.2          | 615.5          | 822.5          | 1,069.5        | 1,531.3        | 2,201.3        | 2,701.3        |
| India   | 38.4         | 46.4         | 68.2           | 99.5           | 127.2          | 132.5          | 171.3          | 249.6          | 254.0          | 243.8          |
| Excluding China and India                                 | 113.4        | 116.9        | 136.0          | 161.1          | 191.2          | 200.5          | 248.5          | 326.0          | 375.1          | 415.2          |
| Middle East   | 146.1        | 157.9        | 163.9          | 198.3          | 246.7          | 351.6          | 477.2          | 671.2          | 865.9          | 1,030.8        |
| Western Hemisphere  | 155.7        | 158.8        | 160.7          | 195.6          | 220.8          | 255.5          | 310.7          | 441.5          | 515.5          | 535.9          |
| Brazil  | 31.5         | 35.8         | 37.7           | 49.1           | 52.8           | 53.6           | 85.6           | 180.1          | 207.4          | 211.7          |
| Mexico  | 35.5         | 44.8         | 50.6           | 59.0           | 64.1           | 74.1           | 76.3           | 86.6           | 97.1           | 105.9          |
| <b>Analytical groups</b>                                  |              |              |                |                |                |                |                |                |                |                |
| <b>By source of export earnings</b>                       |              |              |                |                |                |                |                |                |                |                |
| Fuel  | 192.0        | 216.6        | 232.8          | 310.2          | 436.7          | 626.1          | 931.6          | 1,310.8        | 1,716.2        | 2,034.4        |
| Nonfuel   | 609.1        | 679.5        | 840.1          | 1,085.5        | 1,411.9        | 1,713.5        | 2,164.2        | 2,997.6        | 3,836.4        | 4,425.0        |
| of which, primary products                                | 26.2         | 25.2         | 26.5           | 27.6           | 29.2           | 31.9           | 39.8           | 42.5           | 56.3           | 61.6           |
| <b>By external financing source</b>                       |              |              |                |                |                |                |                |                |                |                |
| Net debtor countries                                      | 420.0        | 443.7        | 527.0          | 644.6          | 745.4          | 825.8          | 1,024.2        | 1,364.5        | 1,515.1        | 1,601.3        |
| of which, official financing                              | 17.3         | 18.4         | 18.8           | 26.1           | 30.0           | 33.8           | 44.3           | 59.9           | 69.2           | 78.6           |
| <b>Net debtor countries by debt-servicing experience</b>  |              |              |                |                |                |                |                |                |                |                |
| Countries with arrears and/or rescheduling during 2002–06 | 76.7         | 72.6         | 81.6           | 98.5           | 110.6          | 122.6          | 150.9          | 194.5          | 209.3          | 232.8          |
| <b>Other groups</b>                                       |              |              |                |                |                |                |                |                |                |                |
| Heavily indebted poor countries                           | 10.6         | 11.2         | 13.7           | 16.4           | 19.6           | 20.7           | 27.0           | 32.3           | 38.5           | 47.3           |
| Middle East and north Africa                              | 165.5        | 187.1        | 200.6          | 249.6          | 312.4          | 431.3          | 585.0          | 810.7          | 1,058.3        | 1,260.7        |

**Table A15 (concluded)**

|   | 2000        | 2001        | 2002        | 2003        | 2004        | 2005        | 2006        | 2007        | 2008        | 2009        |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <i>Ratio of reserves to imports of goods and services<sup>3</sup></i> |             |             |             |             |             |             |             |             |             |             |
| <b>Emerging and developing economies</b>                              | <b>44.9</b> | <b>49.7</b> | <b>55.4</b> | <b>60.6</b> | <b>62.8</b> | <b>66.3</b> | <b>73.5</b> | <b>83.5</b> | <b>84.7</b> | <b>88.5</b> |
| <b>Regional groups</b>  |             |             |             |             |             |             |             |             |             |             |
| Africa  | 39.9        | 46.3        | 46.9        | 48.1        | 54.3        | 57.7        | 68.6        | 71.4        | 75.9        | 82.2        |
| Sub-Saharan   | 34.4        | 34.1        | 31.3        | 27.9        | 35.2        | 38.5        | 45.5        | 47.1        | 49.8        | 54.5        |
| excluding Nigeria and South Africa                                    | 34.8        | 32.6        | 37.0        | 35.7        | 35.2        | 32.0        | 39.0        | 39.3        | 40.5        | 47.5        |
| Central and eastern Europe  | 35.5        | 35.7        | 42.0        | 39.8        | 35.1        | 35.5        | 34.6        | 32.2        | 27.0        | 26.9        |
| Commonwealth of Independent States <sup>2</sup>                       | 30.5        | 34.3        | 40.9        | 52.6        | 65.3        | 76.9        | 101.6       | 111.0       | 103.0       | 102.4       |
| Russia  | 40.6        | 44.6        | 52.9        | 71.5        | 93.0        | 107.4       | 141.7       | 157.5       | 146.4       | 143.4       |
| Excluding Russia  | 17.5        | 20.0        | 23.3        | 25.6        | 28.0        | 33.1        | 42.6        | 42.0        | 37.9        | 38.2        |
| Developing Asia   | 49.1        | 58.3        | 68.1        | 74.5        | 79.5        | 81.8        | 89.7        | 106.4       | 113.3       | 118.8       |
| China   | 67.4        | 79.7        | 89.0        | 91.1        | 101.5       | 115.5       | 125.4       | 148.0       | 166.0       | 174.2       |
| India   | 52.6        | 65.0        | 90.0        | 107.1       | 97.0        | 72.8        | 76.3        | 88.2        | 71.8        | 61.9        |
| Excluding China and India   | 34.5        | 37.9        | 41.8        | 45.1        | 43.7        | 38.7        | 42.7        | 49.3        | 45.8        | 47.0        |
| Middle East   | 75.6        | 78.7        | 74.2        | 78.0        | 77.4        | 91.7        | 101.9       | 114.4       | 115.5       | 119.9       |
| Western Hemisphere  | 35.8        | 37.1        | 40.1        | 47.3        | 44.3        | 42.2        | 43.5        | 52.1        | 49.5        | 48.2        |
| Brazil  | 43.5        | 49.2        | 61.1        | 77.2        | 65.9        | 54.8        | 71.0        | 114.3       | 92.2        | 87.7        |
| Mexico  | 18.6        | 24.2        | 27.3        | 31.4        | 29.8        | 30.5        | 27.4        | 28.3        | 27.1        | 28.5        |
| <b>Analytical groups</b>  |             |             |             |             |             |             |             |             |             |             |
| <b>By source of export earnings</b>                                   |             |             |             |             |             |             |             |             |             |             |
| Fuel  | 64.6        | 66.3        | 63.8        | 72.4        | 81.0        | 94.1        | 114.1       | 124.1       | 125.3       | 128.9       |
| Nonfuel   | 41.0        | 46.1        | 53.5        | 57.9        | 58.7        | 59.9        | 63.8        | 73.1        | 73.9        | 77.3        |
| of which, primary products  | 65.3        | 62.6        | 63.3        | 59.0        | 49.3        | 43.9        | 48.1        | 41.6        | 43.2        | 43.0        |
| <b>By external financing source</b>                                   |             |             |             |             |             |             |             |             |             |             |
| Net debtor countries  | 36.9        | 39.6        | 45.6        | 48.3        | 44.3        | 40.6        | 42.5        | 46.7        | 41.1        | 40.2        |
| of which, official financing  | 24.7        | 26.4        | 25.3        | 30.8        | 28.3        | 27.8        | 30.5        | 32.8        | 29.5        | 31.1        |
| <b>Net debtor countries by debt-servicing experience</b>              |             |             |             |             |             |             |             |             |             |             |
| Countries with arrears and/or rescheduling during 2002–06             | 42.0        | 41.1        | 48.4        | 51.1        | 45.5        | 40.1        | 43.3        | 46.7        | 38.3        | 39.1        |
| <b>Other groups</b>   |             |             |             |             |             |             |             |             |             |             |
| Heavily indebted poor countries                                       | 28.5        | 28.9        | 30.9        | 34.6        | 32.4        | 29.6        | 33.0        | 32.8        | 31.1        | 34.7        |
| Middle East and north Africa  | 72.0        | 78.3        | 76.4        | 82.5        | 82.1        | 94.8        | 106.7       | 117.7       | 119.9       | 125.1       |

<sup>1</sup>In this table, official holdings of gold are valued at SDR 35 an ounce. This convention results in a marked underestimate of reserves for countries that have substantial gold holdings.

<sup>2</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

<sup>3</sup>Reserves at year-end in percent of imports of goods and services for the year indicated.

**Table A16. Summary of Sources and Uses of World Savings**  
(Percent of GDP)

|                                | Averages |           |      |      |      |      |      |      |      | Average<br>2010–13 |
|--------------------------------|----------|-----------|------|------|------|------|------|------|------|--------------------|
|                                | 1986–93  | 1994–2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009               |
| <b>World</b>                   |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 22.7     | 22.1      | 20.6 | 20.9 | 22.0 | 22.9 | 23.9 | 24.1 | 24.0 | 24.1               |
| Investment                     | 22.3     | 22.4      | 20.9 | 21.1 | 22.0 | 22.5 | 23.2 | 23.5 | 23.5 | 23.6               |
| <b>Advanced economies</b>      |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 22.2     | 21.6      | 19.1 | 19.1 | 19.8 | 20.1 | 20.7 | 20.5 | 19.6 | 19.6               |
| Investment                     | 22.7     | 21.8      | 19.9 | 19.9 | 20.5 | 21.0 | 21.4 | 21.2 | 20.7 | 20.2               |
| Net lending                    | -0.5     | -0.2      | -0.7 | -0.8 | -0.7 | -0.9 | -0.7 | -0.7 | -1.1 | -0.7               |
| Current transfers              | -0.4     | -0.5      | -0.6 | -0.6 | -0.7 | -0.7 | -0.7 | -0.8 | -0.8 | -0.7               |
| Factor income                  | -0.3     | 0.1       | 0.2  | 0.1  | 0.4  | 0.8  | 1.1  | 0.8  | 0.3  | 0.3                |
| Resource balance               | 0.2      | 0.2       | -0.4 | -0.4 | -0.5 | -0.9 | -1.1 | -0.7 | -0.6 | -0.2               |
| <b>United States</b>           |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 16.3     | 17.0      | 14.2 | 13.3 | 13.8 | 14.8 | 15.5 | 14.2 | 12.6 | 13.4               |
| Investment                     | 18.8     | 19.6      | 18.4 | 18.4 | 19.4 | 20.0 | 20.1 | 18.8 | 17.5 | 16.7               |
| Net lending                    | -2.6     | -2.6      | -4.2 | -5.1 | -5.5 | -5.1 | -4.6 | -4.6 | -4.9 | -3.3               |
| Current transfers              | -0.4     | -0.6      | -0.6 | -0.7 | -0.7 | -0.7 | -0.7 | -0.8 | -0.8 | -0.7               |
| Factor income                  | -0.4     | 0.1       | 0.5  | 0.1  | 0.4  | 1.3  | 1.8  | 1.3  | 0.6  | 1.1                |
| Resource balance               | -1.7     | -2.2      | -4.0 | -4.5 | -5.2 | -5.7 | -5.7 | -5.1 | -4.7 | -3.6               |
| <b>Euro area</b>               |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | ...      | 21.4      | 20.8 | 20.8 | 21.7 | 21.3 | 22.1 | 22.5 | 21.8 | 21.4               |
| Investment                     | ...      | 21.0      | 20.0 | 20.1 | 20.4 | 20.8 | 21.6 | 22.1 | 22.2 | 21.8               |
| Net lending                    | ...      | 0.5       | 0.8  | 0.7  | 1.3  | 0.5  | 0.5  | 0.4  | -0.4 | -0.4               |
| Current transfers <sup>1</sup> | -0.5     | -0.7      | -0.7 | -0.8 | -0.8 | -0.9 | -1.0 | -1.0 | -1.0 | -1.0               |
| Factor income <sup>1</sup>     | -0.3     | -0.4      | -0.9 | -0.7 | -0.1 | -0.2 | 0.1  | -0.3 | -0.7 | -0.9               |
| Resource balance <sup>1</sup>  | 1.0      | 1.6       | 2.4  | 2.1  | 2.2  | 1.7  | 1.2  | 1.6  | 1.2  | 1.4                |
| <b>Germany</b>                 |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 23.8     | 20.5      | 19.3 | 19.4 | 21.8 | 22.1 | 23.7 | 25.9 | 25.9 | 24.8               |
| Investment                     | 21.8     | 21.4      | 17.3 | 17.4 | 17.1 | 16.9 | 17.6 | 18.3 | 18.6 | 18.0               |
| Net lending                    | 2.0      | -0.9      | 2.0  | 2.0  | 4.7  | 5.2  | 6.1  | 7.6  | 7.3  | 6.8                |
| Current transfers              | -1.6     | -1.4      | -1.3 | -1.2 | -1.3 | -1.3 | -1.2 | -1.3 | -1.3 | -1.3               |
| Factor income                  | 0.8      | -0.3      | -0.8 | -0.7 | 0.9  | 1.1  | 1.6  | 1.7  | 1.1  | 0.6                |
| Resource balance               | 2.8      | 0.8       | 4.1  | 3.9  | 5.0  | 5.3  | 5.6  | 7.1  | 7.5  | 7.3                |
| <b>France</b>                  |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 20.4     | 20.7      | 20.5 | 20.0 | 20.3 | 19.6 | 20.7 | 20.9 | 19.5 | 19.2               |
| Investment                     | 20.7     | 18.8      | 19.0 | 18.9 | 19.6 | 20.3 | 21.1 | 22.1 | 22.8 | 23.0               |
| Net lending                    | -0.3     | 1.9       | 1.6  | 1.2  | 0.7  | -0.6 | -0.4 | -1.1 | -3.3 | -3.7               |
| Current transfers              | -0.6     | -0.8      | -1.0 | -1.1 | -1.1 | -1.3 | -1.2 | -1.2 | -1.2 | -1.2               |
| Factor income                  | -0.5     | 0.7       | 0.8  | 1.2  | 1.2  | 1.2  | 1.9  | 1.6  | 0.6  | 0.3                |
| Resource balance               | 0.8      | 2.1       | 1.7  | 1.1  | 0.6  | -0.5 | -1.1 | -1.5 | -2.8 | -3.0               |
| <b>Italy</b>                   |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 20.3     | 21.1      | 20.4 | 19.4 | 19.9 | 19.1 | 19.0 | 19.0 | 19.2 | 19.4               |
| Investment                     | 21.7     | 19.8      | 21.1 | 20.7 | 20.8 | 20.8 | 21.5 | 21.5 | 21.9 | 21.8               |
| Net lending                    | -1.3     | 1.4       | -0.8 | -1.3 | -0.9 | -1.6 | -2.6 | -2.5 | -2.8 | -2.4               |
| Current transfers              | -0.4     | -0.5      | -0.4 | -0.5 | -0.6 | -0.7 | -0.9 | -0.9 | -0.7 | -0.8               |
| Factor income                  | -1.6     | -1.1      | -1.2 | -1.3 | -1.1 | -1.0 | -0.9 | -1.3 | -1.3 | -1.3               |
| Resource balance               | 0.7      | 3.0       | 0.8  | 0.6  | 0.7  | —    | -0.7 | -0.3 | -0.8 | 0.6                |
| <b>Japan</b>                   |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 33.7     | 29.3      | 25.9 | 26.1 | 26.8 | 27.2 | 27.8 | 28.6 | 27.4 | 27.0               |
| Investment                     | 30.9     | 26.9      | 23.1 | 22.8 | 23.0 | 23.6 | 24.0 | 23.8 | 23.4 | 23.3               |
| Net lending                    | 2.7      | 2.3       | 2.9  | 3.2  | 3.7  | 3.6  | 3.9  | 4.7  | 4.0  | 3.8                |
| Current transfers              | -0.1     | -0.2      | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2               |
| Factor income                  | 0.7      | 1.2       | 1.7  | 1.7  | 1.9  | 2.3  | 2.7  | 3.1  | 2.9  | 2.8                |
| Resource balance               | 2.1      | 1.3       | 1.3  | 1.7  | 2.0  | 1.5  | 1.4  | 1.9  | 1.3  | 1.1                |
| <b>United Kingdom</b>          |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 16.1     | 16.1      | 15.3 | 15.1 | 15.0 | 14.7 | 14.2 | 14.6 | 13.4 | 12.7               |
| Investment                     | 18.8     | 17.4      | 17.1 | 16.7 | 17.1 | 17.3 | 17.6 | 18.4 | 17.1 | 16.1               |
| Net lending                    | -2.6     | -1.3      | -1.7 | -1.6 | -2.1 | -2.6 | -3.4 | -3.8 | -3.6 | -3.4               |
| Current transfers              | -0.7     | -0.8      | -0.8 | -0.9 | -0.9 | -0.9 | -0.9 | -1.0 | -1.0 | -1.1               |
| Factor income                  | -0.4     | 0.3       | 1.7  | 1.5  | 1.5  | 1.7  | 0.8  | 0.6  | 0.9  | 0.6                |
| Resource balance               | -1.6     | -0.8      | -2.6 | -2.3 | -2.7 | -3.4 | -3.3 | -3.4 | -3.5 | -3.0               |
| <b>Canada</b>                  |          |           |      |      |      |      |      |      |      |                    |
| Savings                        | 17.2     | 19.8      | 21.0 | 21.2 | 23.0 | 23.9 | 24.3 | 24.1 | 23.5 | 22.7               |
| Investment                     | 20.6     | 19.6      | 19.3 | 20.0 | 20.7 | 22.0 | 22.9 | 23.3 | 22.6 | 22.7               |
| Net lending                    | -3.4     | 0.2       | 1.7  | 1.2  | 2.3  | 1.9  | 1.4  | 0.9  | 0.9  | 1.0                |
| Current transfers              | -0.2     | 0.1       | —    | —    | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1               |
| Factor income                  | -3.4     | -3.2      | -2.6 | -2.5 | -1.9 | -1.6 | -0.9 | -0.9 | -0.8 | -1.0               |
| Resource balance               | 0.2      | 3.4       | 4.3  | 3.7  | 4.2  | 3.7  | 2.4  | 1.9  | 1.8  | 1.1                |

**Table A16 (continued)**

|   | Averages |           |      |      |      |      |      |      |      |      |                 |
|---|----------|-----------|------|------|------|------|------|------|------|------|-----------------|
|   | 1986–93  | 1994–2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | Average 2010–13 |
| <b>Newly industrialized Asian economies</b>           |          |           |      |      |      |      |      |      |      |      |                 |
| Savings   | 35.7     | 33.0      | 29.7 | 31.5 | 32.8 | 31.3 | 31.4 | 32.2 | 31.6 | 31.3 | 31.9            |
| Investment  | 29.8     | 29.9      | 24.7 | 24.7 | 26.5 | 25.9 | 26.0 | 25.9 | 26.9 | 27.1 | 27.9            |
| Net lending   | 5.9      | 3.1       | 5.0  | 6.8  | 6.3  | 5.3  | 5.3  | 6.3  | 4.7  | 4.3  | 4.0             |
| Current transfers                                     | 0.1      | -0.3      | -0.7 | -0.8 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7            |
| Factor income   | 1.3      | 0.6       | 0.5  | 0.8  | 0.5  | -0.1 | 0.3  | 0.9  | 1.0  | 0.8  | 1.0             |
| Resource balance                                      | 4.5      | 2.8       | 5.2  | 6.7  | 6.6  | 6.1  | 5.8  | 6.1  | 4.4  | 4.2  | 3.6             |
| <b>Emerging and developing economies</b>              |          |           |      |      |      |      |      |      |      |      |                 |
| Savings   | 24.3     | 24.2      | 26.3 | 28.0 | 29.7 | 31.5 | 33.0 | 33.4 | 33.7 | 33.3 | 33.4            |
| Investment  | 25.3     | 25.0      | 25.0 | 26.0 | 27.3 | 27.3 | 28.2 | 29.3 | 29.7 | 30.4 | 31.3            |
| Net lending   | -2.5     | -0.8      | 1.2  | 2.0  | 2.4  | 4.2  | 4.8  | 4.1  | 4.1  | 2.9  | 2.1             |
| Current transfers                                     | 0.5      | 0.9       | 1.4  | 1.6  | 1.5  | 1.6  | 1.5  | 1.5  | 1.3  | 1.2  | 1.1             |
| Factor income   | -1.5     | -1.6      | -2.0 | -2.0 | -2.0 | -1.6 | -1.6 | -1.4 | -1.7 | -1.3 | -0.8            |
| Resource balance                                      | -0.8     | —         | 1.8  | 2.4  | 2.9  | 4.2  | 4.9  | 4.1  | 4.4  | 3.0  | 1.7             |
| <i>Memorandum</i>                                     |          |           |      |      |      |      |      |      |      |      |                 |
| Acquisition of foreign assets                         | 1.1      | 3.6       | 3.5  | 5.7  | 7.0  | 9.2  | 11.2 | 13.7 | 9.3  | 7.4  | 6.5             |
| Change in reserves                                    | 0.3      | 1.1       | 2.3  | 3.8  | 4.7  | 5.0  | 5.5  | 7.9  | 6.4  | 4.3  | 3.4             |
| <b>Regional groups</b>                                |          |           |      |      |      |      |      |      |      |      |                 |
| <b>Africa</b>   |          |           |      |      |      |      |      |      |      |      |                 |
| Savings   | 18.0     | 18.5      | 20.3 | 21.4 | 22.9 | 24.2 | 26.1 | 25.0 | 27.3 | 25.5 | 24.6            |
| Investment  | 19.5     | 20.2      | 22.1 | 21.8 | 22.9 | 22.5 | 23.3 | 24.5 | 24.2 | 25.1 | 25.8            |
| Net lending   | -1.5     | -1.6      | -1.8 | -0.4 | 0.1  | 1.7  | 2.7  | 0.5  | 3.1  | 0.4  | -1.2            |
| Current transfers                                     | 2.4      | 2.6       | 3.0  | 3.1  | 3.2  | 3.0  | 2.9  | 3.0  | 2.9  | 2.7  | 2.5             |
| Factor income   | -3.6     | -3.9      | -4.6 | -4.4 | -5.0 | -5.3 | -5.0 | -5.6 | -5.6 | -5.5 | -4.6            |
| Resource balance                                      | -0.3     | -0.3      | -0.1 | 0.9  | 1.9  | 4.0  | 4.8  | 3.1  | 5.8  | 3.2  | 0.9             |
| <i>Memorandum</i>                                     |          |           |      |      |      |      |      |      |      |      |                 |
| Acquisition of foreign assets                         | 0.1      | 2.6       | 2.8  | 3.3  | 4.4  | 5.8  | 6.9  | 6.5  | 8.5  | 5.9  | 4.1             |
| Change in reserves                                    | 0.1      | 1.4       | 1.2  | 2.0  | 4.5  | 5.2  | 5.7  | 5.5  | 7.3  | 5.2  | 3.5             |
| <b>Central and eastern Europe</b>                     |          |           |      |      |      |      |      |      |      |      |                 |
| Savings   | 25.3     | 19.9      | 18.1 | 17.1 | 17.4 | 17.7 | 18.2 | 18.6 | 18.9 | 19.3 | 20.4            |
| Investment  | 26.3     | 22.7      | 21.3 | 21.2 | 22.5 | 22.2 | 24.0 | 25.0 | 25.6 | 25.9 | 26.7            |
| Net lending   | -1.0     | -2.8      | -3.2 | -4.1 | -5.1 | -4.5 | -5.8 | -6.3 | -6.7 | -6.6 | -6.3            |
| Current transfers                                     | 1.4      | 1.7       | 1.7  | 1.5  | 1.4  | 1.4  | 1.4  | 1.3  | 1.2  | 1.3  | 1.4             |
| Factor income   | -1.4     | -1.2      | -2.1 | -2.5 | -2.9 | -2.5 | -2.7 | -2.8 | -2.5 | -2.4 | -2.5            |
| Resource balance                                      | -0.9     | -3.4      | -2.8 | -3.2 | -3.6 | -3.4 | -4.6 | -4.8 | -5.4 | -5.5 | -5.2            |
| <i>Memorandum</i>                                     |          |           |      |      |      |      |      |      |      |      |                 |
| Acquisition of foreign assets                         | 1.1      | 1.9       | 3.3  | 2.2  | 3.3  | 5.0  | 4.8  | 4.7  | 1.9  | 1.5  | 2.0             |
| Change in reserves                                    | -0.4     | 1.6       | 2.5  | 1.4  | 1.3  | 3.5  | 1.6  | 2.3  | 1.0  | 0.9  | 1.3             |
| <b>Commonwealth of Independent States<sup>2</sup></b> |          |           |      |      |      |      |      |      |      |      |                 |
| Savings   | ...      | 24.7      | 26.6 | 27.5 | 29.7 | 29.9 | 29.8 | 29.4 | 30.4 | 28.3 | 25.9            |
| Investment  | ...      | 21.0      | 20.2 | 21.2 | 21.5 | 21.1 | 22.4 | 25.1 | 25.0 | 25.5 | 26.7            |
| Net lending   | ...      | 3.6       | 6.4  | 6.3  | 8.3  | 8.8  | 7.3  | 4.3  | 5.4  | 2.8  | -0.8            |
| Current transfers                                     | ...      | 0.4       | 0.6  | 0.6  | 0.5  | 0.6  | 0.5  | 0.4  | 0.3  | 0.3  | 0.2             |
| Factor income   | ...      | -2.0      | -2.0 | -2.8 | -2.1 | -2.8 | -3.5 | -3.0 | -3.4 | -3.0 | -2.4            |
| Resource balance                                      | ...      | 5.2       | 7.9  | 8.4  | 9.9  | 11.0 | 10.4 | 6.9  | 8.4  | 5.5  | 1.5             |
| <i>Memorandum</i>                                     |          |           |      |      |      |      |      |      |      |      |                 |
| Acquisition of foreign assets                         | ...      | 4.7       | 5.5  | 11.6 | 13.9 | 15.2 | 16.2 | 17.5 | 11.2 | 8.4  | 6.3             |
| Change in reserves                                    | ...      | 1.1       | 3.3  | 5.7  | 7.1  | 7.7  | 9.9  | 9.9  | 5.6  | 3.4  | 2.9             |

**Table A16 (continued)**

|                                     | Averages |           |      |      |      |      |      |      | 2008 | 2009 | Average<br>2010–13 |
|-------------------------------------|----------|-----------|------|------|------|------|------|------|------|------|--------------------|
|                                     | 1986–93  | 1994–2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |      |      |                    |
| <b>Developing Asia</b>              |          |           |      |      |      |      |      |      |      |      |                    |
| Savings                             | 28.8     | 32.7      | 33.7 | 36.6 | 38.4 | 41.4 | 43.8 | 45.1 | 44.6 | 44.9 | 46.3               |
| Investment                          | 31.4     | 32.4      | 31.2 | 33.8 | 35.9 | 37.3 | 37.9 | 38.1 | 39.2 | 39.7 | 40.6               |
| Net lending                         | -2.6     | 0.4       | 2.5  | 2.8  | 2.6  | 4.1  | 5.9  | 7.0  | 5.4  | 5.2  | 5.8                |
| Current transfers                   | 0.8      | 1.3       | 1.9  | 2.1  | 2.0  | 2.1  | 2.1  | 2.2  | 2.0  | 1.8  | 1.7                |
| Factor income                       | -1.8     | -1.4      | -1.5 | -1.1 | -1.0 | -0.7 | -0.6 | -0.3 | -0.3 | —    | 0.6                |
| Resource balance                    | -1.6     | 0.4       | 2.1  | 1.8  | 1.6  | 2.6  | 4.4  | 5.2  | 3.6  | 3.4  | 3.5                |
| <i>Memorandum</i>                   |          |           |      |      |      |      |      |      |      |      |                    |
| Acquisition of foreign assets       | 2.4      | 5.9       | 5.2  | 6.1  | 7.3  | 9.6  | 11.4 | 14.7 | 12.1 | 9.2  | 9.1                |
| Change in reserves                  | 0.9      | 1.7       | 4.2  | 5.5  | 7.4  | 5.9  | 6.8  | 10.7 | 10.3 | 6.7  | 5.6                |
| <b>Middle East</b>                  |          |           |      |      |      |      |      |      |      |      |                    |
| Savings                             | 17.6     | 25.5      | 28.4 | 32.5 | 35.7 | 42.7 | 43.6 | 43.3 | 47.4 | 42.8 | 38.4               |
| Investment                          | 23.8     | 22.4      | 23.7 | 24.2 | 24.0 | 22.7 | 22.6 | 24.9 | 24.5 | 25.7 | 26.5               |
| Net lending                         | -6.3     | 3.1       | 4.7  | 8.3  | 11.6 | 20.0 | 21.0 | 18.4 | 22.8 | 17.0 | 11.9               |
| Current transfers                   | -3.5     | -2.9      | -2.5 | -2.2 | -2.0 | -1.7 | -1.8 | -1.6 | -1.4 | -1.4 | -1.4               |
| Factor income                       | 2.3      | 2.6       | 0.5  | 0.2  | 0.3  | 1.5  | 2.4  | 2.7  | 1.3  | 2.3  | 3.8                |
| Resource balance                    | -5.1     | 3.3       | 6.7  | 10.3 | 13.3 | 20.3 | 20.4 | 17.3 | 22.9 | 16.1 | 9.5                |
| <i>Memorandum</i>                   |          |           |      |      |      |      |      |      |      |      |                    |
| Acquisition of foreign assets       | -0.5     | 4.8       | 2.6  | 12.8 | 17.5 | 26.2 | 36.6 | 42.6 | 20.2 | 18.3 | 13.4               |
| Change in reserves                  | -0.4     | 1.2       | 0.6  | 5.0  | 5.5  | 10.3 | 10.4 | 13.9 | 10.1 | 7.7  | 4.4                |
| <b>Western Hemisphere</b>           |          |           |      |      |      |      |      |      |      |      |                    |
| Savings                             | 18.6     | 17.7      | 19.3 | 19.8 | 22.0 | 22.0 | 23.2 | 22.7 | 22.0 | 21.5 | 21.4               |
| Investment                          | 19.1     | 20.7      | 19.9 | 19.2 | 20.8 | 20.5 | 21.6 | 22.4 | 23.1 | 23.4 | 23.8               |
| Net lending                         | -0.5     | -3.0      | -0.7 | 0.6  | 1.1  | 1.5  | 1.5  | 0.3  | -1.1 | -1.9 | -2.3               |
| Current transfers                   | 0.8      | 0.9       | 1.7  | 1.9  | 2.0  | 2.0  | 2.0  | 1.8  | 1.5  | 1.5  | 1.5                |
| Factor income                       | -2.3     | -2.7      | -2.7 | -3.0 | -2.9 | -2.2 | -2.3 | -2.1 | -2.8 | -2.5 | -2.4               |
| Resource balance                    | 1.0      | -1.2      | 0.3  | 1.6  | 2.0  | 1.7  | 1.9  | 0.6  | 0.2  | -1.0 | -1.4               |
| <i>Memorandum</i>                   |          |           |      |      |      |      |      |      |      |      |                    |
| Acquisition of foreign assets       | 0.7      | 1.7       | 1.2  | 2.9  | 2.8  | 3.0  | 3.2  | 6.1  | 3.2  | 2.1  | 1.6                |
| Change in reserves                  | 0.6      | 0.2       | -0.1 | 1.8  | 1.0  | 1.3  | 1.6  | 3.6  | 1.7  | 0.4  | 0.3                |
| <b>Analytical groups</b>            |          |           |      |      |      |      |      |      |      |      |                    |
| <b>By source of export earnings</b> |          |           |      |      |      |      |      |      |      |      |                    |
| <b>Fuel</b>                         |          |           |      |      |      |      |      |      |      |      |                    |
| Savings                             | 26.6     | 26.1      | 28.9 | 31.1 | 34.1 | 38.2 | 38.6 | 37.0 | 39.3 | 35.4 | 31.4               |
| Investment                          | 28.8     | 22.4      | 23.5 | 23.3 | 23.4 | 22.4 | 22.9 | 25.3 | 24.3 | 25.1 | 26.0               |
| Net lending                         | -2.2     | 3.7       | 5.4  | 7.8  | 10.7 | 15.8 | 15.6 | 11.7 | 14.9 | 10.3 | 5.4                |
| Current transfers                   | -1.5     | -1.9      | -1.7 | -1.4 | -1.1 | -0.9 | -0.9 | -0.9 | -0.9 | -0.9 | -0.9               |
| Factor income                       | —        | -0.7      | -1.7 | -2.3 | -2.1 | -2.0 | -1.9 | -1.9 | -2.6 | -1.8 | -0.6               |
| Resource balance                    | -0.7     | 6.3       | 8.8  | 11.5 | 13.9 | 18.7 | 18.4 | 14.5 | 18.3 | 13.0 | 6.9                |
| <i>Memorandum</i>                   |          |           |      |      |      |      |      |      |      |      |                    |
| Acquisition of foreign assets       | 0.2      | 5.0       | 3.0  | 11.7 | 14.8 | 20.0 | 24.3 | 26.3 | 15.5 | 12.7 | 9.0                |
| Change in reserves                  | -0.3     | 0.9       | 1.0  | 5.2  | 6.9  | 9.2  | 10.3 | 11.1 | 8.6  | 6.0  | 3.8                |
| <b>Nonfuel</b>                      |          |           |      |      |      |      |      |      |      |      |                    |
| Savings                             | 23.2     | 23.9      | 25.7 | 27.3 | 28.7 | 29.8 | 31.5 | 32.3 | 32.0 | 32.5 | 34.1               |
| Investment                          | 25.0     | 25.5      | 25.4 | 26.6 | 28.3 | 28.7 | 29.7 | 30.4 | 31.4 | 32.1 | 33.2               |
| Net lending                         | -2.1     | -1.7      | 0.3  | 0.7  | 0.4  | 1.1  | 1.8  | 1.9  | 0.6  | 0.4  | 0.9                |
| Current transfers                   | 1.2      | 1.4       | 2.0  | 2.2  | 2.1  | 2.2  | 2.2  | 2.2  | 2.0  | 1.9  | 1.9                |
| Factor income                       | -1.7     | -1.8      | -2.0 | -1.9 | -1.9 | -1.5 | -1.5 | -1.3 | -1.4 | -1.1 | -0.8               |
| Resource balance                    | -0.8     | -1.3      | 0.3  | 0.4  | 0.2  | 0.4  | 1.1  | 1.1  | -0.1 | -0.4 | -0.2               |
| <i>Memorandum</i>                   |          |           |      |      |      |      |      |      |      |      |                    |
| Acquisition of foreign assets       | 1.3      | 3.4       | 3.6  | 4.4  | 5.1  | 6.4  | 7.5  | 10.1 | 7.3  | 5.6  | 5.7                |
| Change in reserves                  | 0.5      | 1.1       | 2.5  | 3.5  | 4.2  | 3.9  | 4.2  | 7.0  | 5.7  | 3.7  | 3.3                |

**Table A16 (concluded)**

|  | Averages |           |      |      |      |      |      |       |       |       |                    |
|--|----------|-----------|------|------|------|------|------|-------|-------|-------|--------------------|
|  | 1986–93  | 1994–2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007  | 2008  | 2009  | Average<br>2010–13 |
| <b>By external financing source</b>                              |          |           |      |      |      |      |      |       |       |       |                    |
| <b>Net debtor countries</b>                                      |          |           |      |      |      |      |      |       |       |       |                    |
| Savings  | 20.8     | 19.6      | 20.1 | 20.8 | 21.7 | 21.9 | 23.0 | 23.3  | 22.9  | 23.0  | 23.9               |
| Investment   | 22.9     | 22.2      | 20.9 | 21.4 | 23.0 | 23.4 | 24.4 | 25.3  | 26.0  | 26.3  | 27.3               |
| Net lending  | -2.1     | -2.6      | -0.8 | -0.6 | -1.3 | -1.5 | -1.4 | -2.0  | -3.0  | -3.3  | -3.4               |
| Current transfers  | 1.5      | 1.8       | 2.6  | 2.7  | 2.6  | 2.7  | 2.7  | 2.6   | 2.5   | 2.5   | 2.5                |
| Factor income  | -2.4     | -2.4      | -2.4 | -2.5 | -2.7 | -2.4 | -2.5 | -2.4  | -2.6  | -2.3  | -2.4               |
| Resource balance   | -1.1     | -2.5      | -1.0 | -0.8 | -1.2 | -1.8 | -1.7 | -2.2  | -3.0  | -3.5  | -3.5               |
| <i>Memorandum</i>  |          |           |      |      |      |      |      |       |       |       |                    |
| Acquisition of foreign assets                                    | 0.8      | 1.7       | 2.4  | 3.0  | 2.9  | 3.1  | 4.2  | 6.2   | 2.6   | 2.0   | 2.1                |
| Change in reserves   | 0.5      | 0.8       | 1.5  | 2.0  | 1.5  | 1.8  | 2.3  | 4.0   | 1.5   | 0.8   | 1.1                |
| <b>Official financing</b>  |          |           |      |      |      |      |      |       |       |       |                    |
| Savings  | 14.2     | 17.6      | 20.2 | 21.1 | 22.3 | 23.2 | 23.9 | 23.2  | 22.4  | 22.0  | 22.5               |
| Investment   | 17.1     | 20.5      | 22.0 | 23.2 | 24.2 | 24.8 | 25.6 | 27.0  | 27.4  | 26.4  | 26.3               |
| Net lending  | -2.8     | -2.9      | -1.8 | -2.1 | -1.8 | -1.6 | -1.7 | -3.8  | -5.1  | -4.4  | -3.8               |
| Current transfers  | 4.2      | 5.7       | 7.0  | 7.5  | 8.2  | 8.6  | 8.8  | 9.3   | 8.6   | 7.9   | 7.9                |
| Factor income  | -0.8     | -0.6      | -0.5 | -1.5 | -0.8 | -1.8 | -2.0 | -1.2  | -1.0  | -1.2  | -1.4               |
| Resource balance   | -6.3     | -7.9      | -8.3 | -8.1 | -9.2 | -8.5 | -8.5 | -11.9 | -12.7 | -11.1 | -10.3              |
| <i>Memorandum</i>  |          |           |      |      |      |      |      |       |       |       |                    |
| Acquisition of foreign assets                                    | 0.5      | 2.8       | 1.5  | 4.6  | 2.8  | 4.2  | 3.6  | 8.5   | 4.4   | 3.3   | 3.9                |
| Change in reserves   | 0.5      | 0.5       | -0.2 | 3.0  | 1.2  | 2.1  | 2.9  | 4.2   | 2.0   | 1.8   | 2.4                |
| <b>Net debtor countries by debt-servicing experience</b>         |          |           |      |      |      |      |      |       |       |       |                    |
| <b>Countries with arrears and/or rescheduling during 2002–06</b> |          |           |      |      |      |      |      |       |       |       |                    |
| Savings  | 17.1     | 19.3      | 21.0 | 23.1 | 21.6 | 21.9 | 23.7 | 23.3  | 22.4  | 22.2  | 22.8               |
| Investment   | 23.1     | 22.3      | 18.7 | 20.6 | 21.4 | 22.6 | 23.6 | 24.3  | 24.3  | 24.7  | 25.3               |
| Net lending  | -6.0     | -3.0      | 2.3  | 2.5  | 0.2  | -0.7 | 0.2  | -0.9  | -1.9  | -2.4  | -2.5               |
| Current transfers  | 1.6      | 2.1       | 3.9  | 4.0  | 3.9  | 4.5  | 4.4  | 4.0   | 3.9   | 3.6   | 3.6                |
| Factor income  | -5.6     | -3.1      | -4.0 | -3.3 | -4.1 | -3.8 | -3.7 | -3.5  | -3.1  | -2.4  | -2.5               |
| Resource balance   | -1.9     | -2.0      | 2.3  | 1.8  | 0.5  | -1.3 | -0.5 | -1.4  | -2.7  | -3.7  | -3.6               |
| <i>Memorandum</i>  |          |           |      |      |      |      |      |       |       |       |                    |
| Acquisition of foreign assets                                    | 1.0      | 2.0       | 3.3  | 3.9  | 2.5  | 2.6  | 3.7  | 4.7   | 1.9   | 1.9   | 1.5                |
| Change in reserves   | 0.2      | 0.5       | 0.9  | 2.3  | 1.5  | 1.7  | 2.2  | 3.3   | 0.9   | 1.3   | 1.1                |

Note: The estimates in this table are based on individual countries' national accounts and balance of payments statistics. Country group composites are calculated as the sum of the U.S dollar values for the relevant individual countries. This differs from the calculations in the April 2005 and earlier *World Economic Outlooks*, where the composites were weighted by GDP valued at purchasing power parities as a share of total world GDP. For many countries, the estimates of national savings are built up from national accounts data on gross domestic investment and from balance-of-payments-based data on net foreign investment. The latter, which is equivalent to the current account balance, comprises three components: current transfers, net factor income, and the resource balance. The mixing of data source, which is dictated by availability, implies that the estimates for national savings that are derived incorporate the statistical discrepancies. Furthermore, errors, omissions, and asymmetries in balance of payments statistics affect the estimates for net lending; at the global level, net lending, which in theory would be zero, equals the world current account discrepancy. Despite these statistical shortcomings, flow of funds estimates, such as those presented in these tables, provide a useful framework for analyzing development in savings and investment, both over time and across regions and countries.

<sup>1</sup>Calculated from the data of individual euro area countries.

<sup>2</sup>Mongolia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

**Table A17. Summary of World Medium-Term Baseline Scenario**

|   | Eight-Year Averages |            | Four-Year Average<br>2006–09 |            | 2006       | 2007       | 2008       | 2009       | Four-Year Average<br>2010–13 |
|---|---------------------|------------|------------------------------|------------|------------|------------|------------|------------|------------------------------|
|   | 1990–97             | 1998–2005  | 2006–09                      | 2006       |            |            |            |            | 2010–13                      |
| <i>Annual percent change unless otherwise noted</i> |                     |            |                              |            |            |            |            |            |                              |
| <b>World real GDP</b>                               | <b>2.9</b>          | <b>3.6</b> | <b>4.2</b>                   | <b>5.1</b> | <b>5.0</b> | <b>3.9</b> | <b>3.0</b> | <b>4.6</b> |                              |
| Advanced economies                                  | 2.6                 | 2.6        | 1.9                          | 3.0        | 2.6        | 1.5        | 0.5        | 2.5        |                              |
| Emerging and developing economies                   | 3.3                 | 5.2        | 7.2                          | 7.9        | 8.0        | 6.9        | 6.1        | 6.9        |                              |
| <i>Memorandum</i>                                   |                     |            |                              |            |            |            |            |            |                              |
| Potential output                                    |                     |            |                              |            |            |            |            |            |                              |
| Major advanced economies                            | 2.5                 | 2.3        | 2.1                          | 2.2        | 2.1        | 2.0        | 1.9        | 1.9        |                              |
| <b>World trade, volume<sup>1</sup></b>              | <b>6.9</b>          | <b>6.2</b> | <b>6.4</b>                   | <b>9.3</b> | <b>7.2</b> | <b>4.9</b> | <b>4.1</b> | <b>7.1</b> |                              |
| Imports   |                     |            |                              |            |            |            |            |            |                              |
| Advanced economies                                  | 6.2                 | 6.0        | 3.7                          | 7.5        | 4.5        | 1.9        | 1.1        | 5.2        |                              |
| Emerging and developing economies                   | 8.0                 | 7.7        | 12.8                         | 14.7       | 14.2       | 11.7       | 10.5       | 11.0       |                              |
| Exports   |                     |            |                              |            |            |            |            |            |                              |
| Advanced economies                                  | 6.9                 | 5.2        | 5.2                          | 8.4        | 5.9        | 4.3        | 2.5        | 5.3        |                              |
| Emerging and developing economies                   | 8.3                 | 8.4        | 8.5                          | 11.0       | 9.5        | 6.3        | 7.4        | 10.1       |                              |
| Terms of trade                                      |                     |            |                              |            |            |            |            |            |                              |
| Advanced economies                                  | -0.1                | -0.1       | -0.7                         | -1.2       | 0.3        | -1.8       | -0.1       | 0.2        |                              |
| Emerging and developing economies                   | -0.6                | 1.4        | 2.8                          | 4.9        | 1.7        | 5.5        | -0.9       | -0.2       |                              |
| <b>World prices in U.S. dollars</b>                 |                     |            |                              |            |            |            |            |            |                              |
| Manufactures  | 1.3                 | 1.6        | 6.6                          | 3.7        | 8.8        | 13.8       | 0.5        | 1.5        |                              |
| Oil   | 0.9                 | 13.6       | 17.2                         | 20.5       | 10.7       | 50.8       | -6.3       | 0.6        |                              |
| Nonfuel primary commodities                         | 0.0                 | 0.5        | 10.5                         | 23.2       | 14.1       | 13.3       | -6.2       | -2.6       |                              |
| <i>Consumer prices</i>                              |                     |            |                              |            |            |            |            |            |                              |
| Advanced economies                                  | 3.4                 | 1.9        | 2.5                          | 2.4        | 2.2        | 3.6        | 2.0        | 2.0        |                              |
| Emerging and developing economies                   | 62.9                | 8.3        | 7.2                          | 5.4        | 6.4        | 9.4        | 7.8        | 5.3        |                              |
| <i>Interest rates (in percent)</i>                  |                     |            |                              |            |            |            |            |            |                              |
| Real six-month LIBOR <sup>2</sup>                   | 3.1                 | 1.6        | 1.8                          | 2.1        | 2.6        | 1.0        | 1.5        | 3.2        |                              |
| World real long-term interest rate <sup>3</sup>     | 4.0                 | 2.4        | 1.5                          | 1.7        | 2.0        | 0.4        | 1.8        | 2.8        |                              |
| <i>Percent of GDP</i>                               |                     |            |                              |            |            |            |            |            |                              |
| <b>Balances on current account</b>                  |                     |            |                              |            |            |            |            |            |                              |
| Advanced economies                                  | —                   | -0.7       | -1.0                         | -1.3       | -0.9       | -1.0       | -0.6       | -0.5       |                              |
| Emerging and developing economies                   | -1.6                | 1.2        | 4.0                          | 4.9        | 4.1        | 4.1        | 2.9        | 2.2        |                              |
| <b>Total external debt</b>                          |                     |            |                              |            |            |            |            |            |                              |
| Emerging and developing economies                   | 34.2                | 35.8       | 25.4                         | 26.6       | 26.9       | 24.2       | 23.8       | 23.5       |                              |
| <b>Debt service</b>                                 |                     |            |                              |            |            |            |            |            |                              |
| Emerging and developing economies                   | 4.6                 | 6.3        | 4.7                          | 5.8        | 4.8        | 4.1        | 4.0        | 4.0        |                              |

<sup>1</sup>Data refer to trade in goods and services.<sup>2</sup>London interbank offered rate on U.S. dollar deposits minus percent change in U.S. GDP deflator.<sup>3</sup>GDP-weighted average of 10-year (or nearest maturity) government bond rates for the United States, Japan, Germany, France, Italy, the United Kingdom, and Canada.

# **WORLD ECONOMIC OUTLOOK AND STAFF STUDIES FOR THE WORLD ECONOMIC OUTLOOK, SELECTED TOPICS, 2000–2008**

## **I. Methodology—Aggregation, Modeling, and Forecasting**

- Revised Purchasing Power Parity Based Weights for the *World Economic Outlook*  
The Global Current Account Discrepancy
- How Well Do Forecasters Predict Turning Points?  
The Information Technology Revolution: Measurement Issues  
Measuring Capital Account Liberalization  
The Accuracy of *World Economic Outlook* Growth Forecasts: 1991–2000  
On the Accuracy of Forecasts of Recovery  
The Global Current Account Discrepancy and Other Statistical Problems  
The Global Economy Model  
How Should We Measure Global Growth?  
Measuring Foreign Reserves  
The Effects of Tax Cuts in a Global Fiscal Model  
How Accurate Are the Forecasts in the *World Economic Outlook*?  
Drawing the Line Between Personal and Corporate Savings  
Measuring Inequality: Conceptual, Methodological, and Measurement Issues  
New Business Cycle Indices for Latin America: A Historical Reconstruction  
Implications of New PPP Estimates for Measuring Global Growth  
Measuring Output Gaps  
Assessing and Communicating Risks to the Global Outlook

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## **II. Historical Surveys**

- The World Economy in the Twentieth Century  
The Monetary System and Growth During the Commercial Revolution  
The Great Depression  
Historical Evidence on Financial Crises  
A Historical Perspective on Booms, Busts, and Recessions  
Institutional Development: The Influence of History and Geography  
External Imbalances Then and Now  
Long-Term Interest Rates from a Historical Perspective  
Recycling Petrodollars in the 1970s  
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World Economic Outlook*

Globalization and Growth in the Twentieth Century  
*Nicholas Crafts*

May 2000

The International Monetary System in the (Very) Long Run  
*Barry Eichengreen and Nathan Sussman*

May 2000

### III. Economic Growth—Sources and Patterns

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*Rüdiger Soltwedel, Dirk Dohse, and Christiane Krieger-Boden*

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## VIII. Exchange Rate Issues

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Currency Crises: In Search of Common Elements  
*Jahangir Aziz, Francesco Caramazza, and Rani Salgado*  
Business Cycle Influences on Exchange Rates: Survey and Evidence  
*Ronald MacDonald and Phillip Suragel*

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## IX. External Payments, Trade, Capital Movements, and Foreign Debt

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- The Enhanced HIPC Initiative in Africa
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