15 December 2022

Recent developments in the global economy

Note for the Global Economy Meeting at 09:15 CET on Monday 9 January 2023

Introduction

The global economy is slowing, but inflation is still high and the outlook clouded. Over the past two months, inflation showed some signs of abating, as commodity prices retreated and higher policy rates started to bite, but it remained well above central bank targets. Growth continued to slow on the back of tighter financial conditions, falling asset prices and lingering concerns in energy markets, but labour markets remained tight in many economies. Developments in financial markets reflected shifting views of the monetary policy trajectory ahead. Overall, despite some pronounced swings, global financial conditions changed little on net. The US dollar pulled back, easing some of the dollar funding pressures that emerged as the year-end approached.

Unprecedently high levels of debt, both public and private, could complicate the central banks' task of bringing inflation back to target while limiting as far as possible the cost to the real economy. Setting aside the issue of elevated public debt – a topic that deserves analysis on its own – the thematic part of this note examines how these high private debt levels and their composition could affect monetary policy transmission and the policy questions faced by central banks.

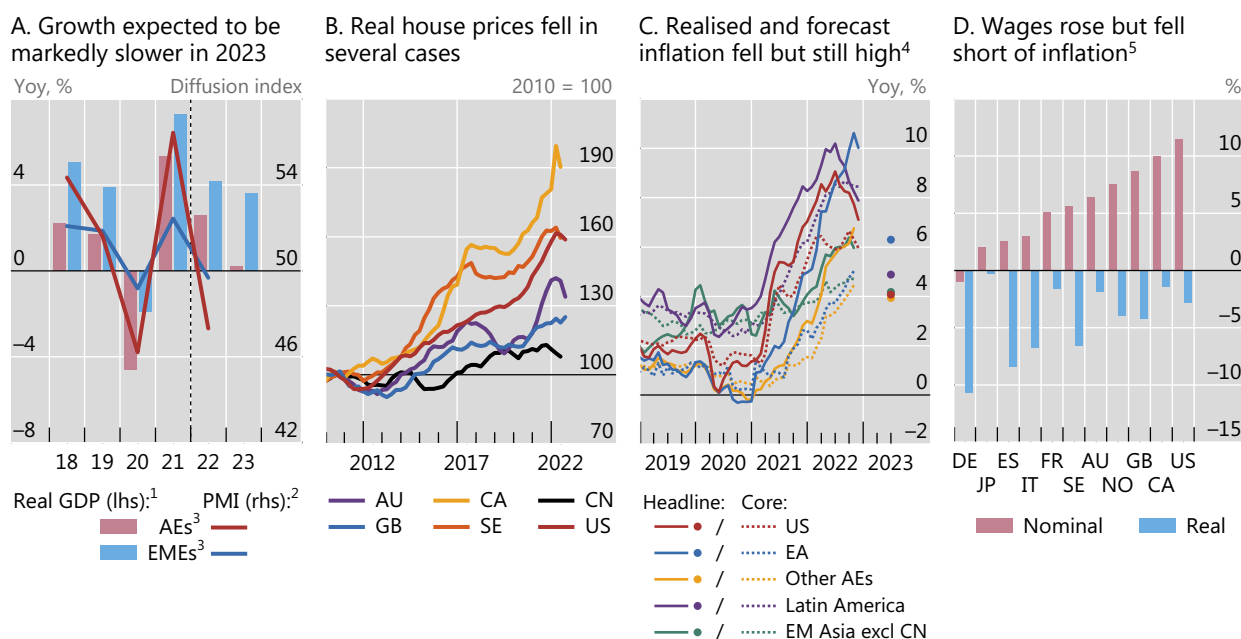## Recent macroeconomic and financial developments

The global economy will have grown by some 2.9%, in 2022 and will slow markedly to 1.9% in 2023 (Graph 1.A). Notwithstanding slight upward revisions for 2022 in the latter part of the year linked to the improved near-term energy market outlook in Europe, forecasts were revised down repeatedly through the year (Graph A.1). PMIs are in contractionary territory in advanced economies (AEs) and slowing towards it in emerging market economies (EMEs). Falling house prices (Graph 1.B) and high energy prices, notably in Europe, and increases in borrowing costs have depressed consumer confidence to all-time lows and weighed on business sentiment. In China, the pandemic has intensified the domestic headwinds related to the real estate market woes, although recent signs that the zero-Covid policy may be reconsidered have been boosting markets.

Inflation is expected to fall in 2023 but to remain well above central bank targets for the third year in a row (Graph 1.C). For most jurisdictions, forecasts continued to be revised upwards through 2022, but the size of the adjustments declined (Graph A.1) and inflation surprises diminished (Graph A.2). Lower commodity prices helped slow down the increases in headline inflation and, in a number of economies, especially where monetary policy tightening had started earlier, both headline and core inflation saw some deceleration.

However, labour markets in many jurisdictions remained tight, even as some signs of softening appeared. The signs typically showed up in fewer vacancies rather than in employment. In a few European economies, including Austria, Denmark and the Netherlands, the unemployment rate rose over the past three months, although it remained remarkably low. Nominal wage growth accelerated despite concerns about the outlook, although real wages fell further (Graph 1.D).

Slow growth and high inflation cloud the global economic outlook Graph 1

A. Growth expected to be markedly slower in 2023	B. Real house prices fell in several cases	C. Realised and forecast inflation fell but still high[4]	D. Wages rose but fell short of inflation[5]

Real GDP (lhs):[1] PMI (rhs):[2]
AEs[3] ▬
EMEs[3] ▬

AU ▬ CA ▬ CN ▬
GB ▬ SE ▬ US ▬

Headline: Core:
▬ ● / ⋯⋯ US
▬ ● / ⋯⋯ EA
▬ ● / ⋯⋯ Other AEs
▬ ● / ⋯⋯ Latin America
▬ ● / ⋯⋯ EM Asia excl CN

Nominal Real

[1] Latest Consensus forecasts for 2022–23.   [2] Composite purchasing managers' indices: a value above (below) 50 indicates that the number of firms reporting improvement in activity is higher (lower) as the number reporting deterioration. Annual averages; except for 2022, where November figures are plotted.   [3] Weighted averages based on GDP and PPP exchange rates. For real GDP, 11 AEs and 22 EMEs; for PMI, five AEs and three EMEs.   [4] Dots show latest Consensus Economics forecasts for 2023: for Latin America, end-year forecasts; annual averages otherwise. For the regions, weighted averages based on GDP and PPP exchange rates for seven AEs, five Latin American and nine Asian economies.   [5] Hourly earnings in manufacturing sector. Changes between Q1 2020 and Q3 2022. For AU, between Q4 2019 and Q2 2022; for DE, ES and FR, between Q1 2020 and Q2 2022.

Sources: OECD; Consensus Economics; Oxford Economics; Refinitiv Datastream; IHS Markit; national data; BIS.
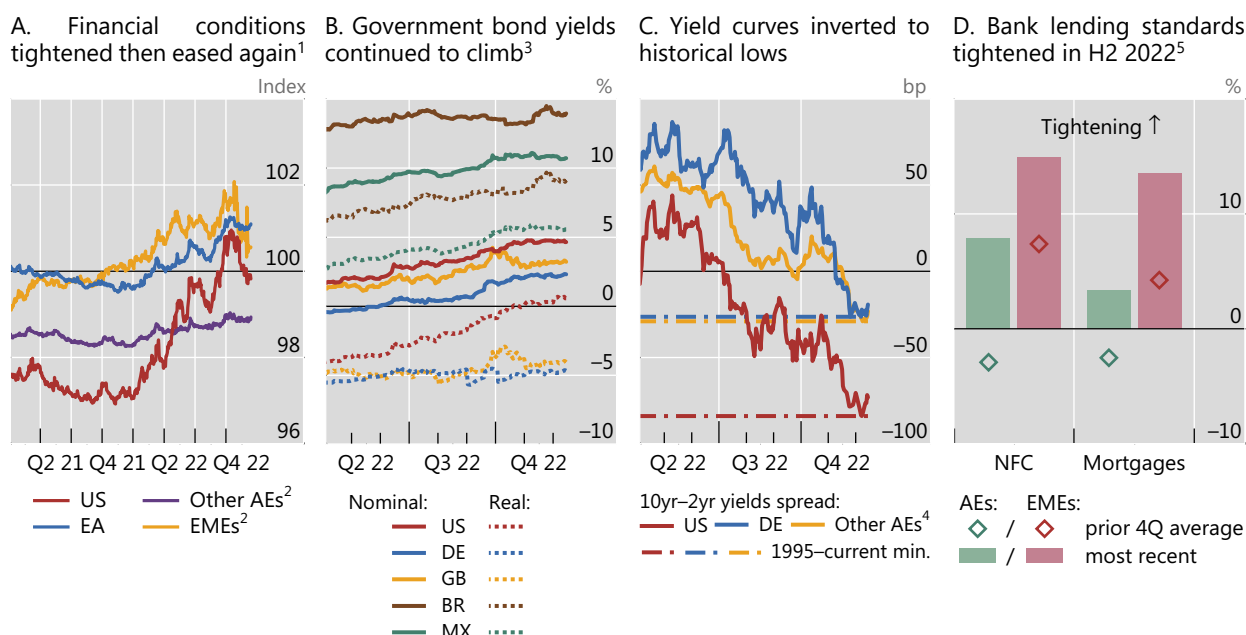
Against this backdrop, global monetary policy tightening entered a new phase. The Federal Reserve scaled back the size of its rate increase to 50 basis points in December, while raising the median forecast for its benchmark rate in 2023 to a level slightly higher than previously projected. The ECB likewise reduced the size of its rate hike and set out principles for quantitative tightening with the detailed parameters to follow in February. Central banks in eastern Europe and Latin America – early tighteners – typically pared down or paused rate hikes; those in emerging Asia largely kept to their previous pace.

Changes in the anticipated monetary policy stance continued to shape financial markets. Core sovereign bond yields rose before pulling back somewhat on signs of decelerating inflation. Risky asset prices and global financial conditions danced to the same tune (Graph 2.A). Short-term real government bond yields remained negative in some major AEs (Graph 2.B) although medium-term forward real rates reached levels not seen since the Great Financial Crisis (GFC), more in line with historical norms. On net, yield curve slopes inverted, in some cases to historical lows (Graph 2.C). Illiquidity remained a concern in core bond markets. Bank lending standards tightened (Graph 2.D).

The monetary policy outlook also drove exchange rates and capital flows. The US dollar weakened after reaching multi-year peaks. EMEs were generally resilient, with asset prices largely tracking those in AEs and capital flows stable. While outflows from Chinese bonds quickened related to large interest rate differentials, they remained well below early-2022 levels and were recently supported by policy actions, including the easing of Covid-related restrictions.

Financial markets reflect changes in expected monetary policy paths

Graph 2

A. Financial conditions tightened then eased again[1]	B. Government bond yields continued to climb[3]	C. Yield curves inverted to historical lows	D. Bank lending standards tightened in H2 2022[5]

A. Financial conditions tightened then eased again[1]
Index

- US
- EA
- Other AEs[2]
- EMEs[2]

B. Government bond yields continued to climb[3]
%

Nominal: / Real:
- US
- DE
- GB
- BR
- MX

C. Yield curves inverted to historical lows
bp

10yr–2yr yields spread:
- US
- DE
- Other AEs[4]
- 1995–current min.

D. Bank lending standards tightened in H2 2022[5]
%

Tightening ↑

NFC   Mortgages

AEs: / EMEs:
- prior 4Q average
- most recent

[1] Goldman Sachs Financial Conditions Index: a value of 100 indicates country-specific long-term averages; each unit above (below) 100 denoted financial conditions that are one standard deviation tighter (looser) than average.   [2] Weighted averages of eight AEs and 15 EMEs.   [3] One-year. Deflated by the weighted average of the current and next year Consensus forecasts for year-on-year headline inflation.   [4] Simple average of seven AEs.   [5] Scores are computed as percentage of respondent banks reporting moderately or substantially stronger, net of those reporting moderately or substantially weaker lending standards. Simple averages across seven AEs and 11 EMEs.

Sources: Bloomberg; CEIC; Consensus Economics; Refinitiv Datastream; Haver analytics; BIS.

Private debt, monetary policy and the economy

Central banks are tightening monetary policy to bring inflation down against the backdrop of elevated debt levels. How relevant will this be for the impact on aggregate demand and the associated trade-offs?

Recent aggregate debt developments

Current private debt levels (households plus non-financial firms) are historically high relative to GDP (Graph 3.A).[1] They have been on an upward trend since the 1970s, although the rate of increase slowed or plateaued after the GFC. This was due largely to the deleveraging that took place in countries such as the United States and the United Kingdom, where a financial boom had first ignited the crisis. The general increase in debt during the Covid-19 outbreak was, on balance, reabsorbed towards the end of the pandemic. Currently, debt-to-GDP ratios stand above 150% in AEs, with peaks at above 200% in Canada and Sweden (Graph A.4.A). In most EMEs, they are naturally lower, often below 100%, with China and Korea standing out at well above 200%.[2]
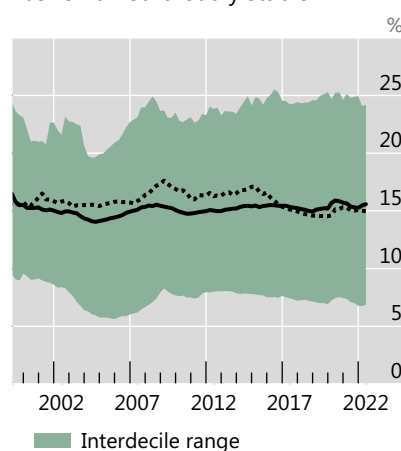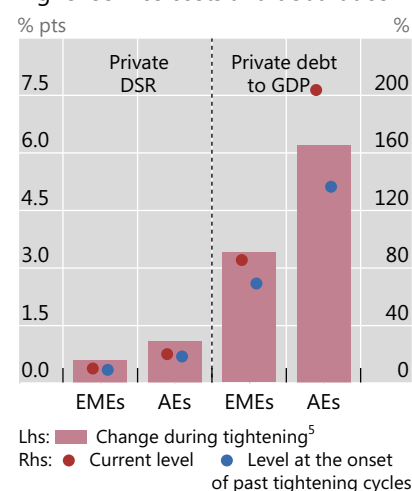
While high debt might be expected to go hand in hand with high servicing costs, debt service-to-GDP ratios have remained broadly stable since the early 2000s (Graph 3.B). The combination of higher debt but stable debt servicing costs reflects, to a large extent, the decline in interest rates. The ratios are especially low by historical standards in AEs, eg Australia, the United Kingdom or the United States, as well as in some EMEs, eg India, Mexico and South Africa (Graph A.4.B).

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[1]   The same is true of government debt. See Graphs A.3.A and A.3.B for time path and cross-country comparisons.

[2]   Graphs A.5.A and A.5.B provide the evolution over time of household and NFC debt, respectively.

High debts pave the way to sharp increases in servicing costs as policy tightens   Graph 3

A. Private debt is close to historical highs...[1, 2]
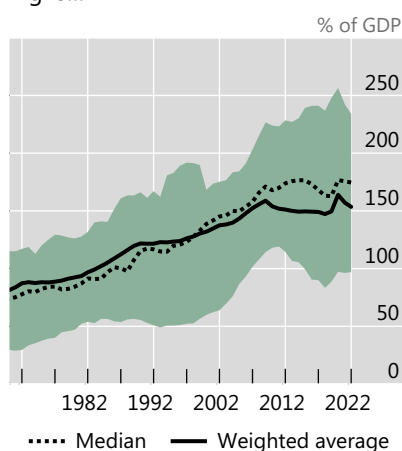
B. ...while the servicing cost of debt has remained broadly stable[1, 3]

C. Policy tightening historically led to higher service costs and debt ratios[1, 4]

...... Median   —— Weighted average   � Interdecile range

Lhs: ▮ Change during tightening[5]
Rhs: ● Current level   ● Level at the onset of past tightening cycles

[1] Non-financial private sectors.   [2] Total credit. Latest available quarter for 2022. Sample of 20 AEs and eight EMEs.   [3] Debt service ratio. Sample of 17 AEs and 13 EMEs.   [4] Sample of nine AEs and seven EMEs. Median figures.   [5] Change over six quarters relative to tightening start. Tightening cycle dating based on Cavallino et al (2022), excluding the most recent and ongoing episode.

Sources: Cavallino et al (2022); IMF; BIS.

Despite the prevailing moderate service costs, high debt ratios could have a material influence on the calibration of policy tightening as they will raise the impact of higher interest rates on debt service burdens. As previous tightening episodes indicate, higher rates tend to increase DSRs (Graph 3.C) and this likely makes aggregate demand more sensitive to the tightening.[3] But by how much? And with what consequences?

Private debt and monetary policy effects on expenditures

High debt levels can increase the sensitivity of aggregate demand to tighter monetary policy through several channels. First, they boost the impact of higher rates on debt service costs, thereby depressing disposable incomes and cash flows, and weighing on expenditures (*flow effect*). Second, they increase the income transfers from agents with high marginal propensity to spend to those with a relatively low one (*distributional effect*). Third, they make balance sheets more vulnerable to higher rates, strengthening the tightening of financing conditions and possibly leading to financial stress (*stock effect*). Last, reliance on foreign borrowing and foreign currency-denominated debt, especially in EMEs, amplifies cross-country spillovers and spillbacks, and increases risks of adverse balance sheet effects (*FX effect*).

The evidence indicates that the level of private debt has a non-negligible impact on the sensitivity of aggregate demand to monetary policy. A stylised exercise suggests that, in response to temporarily higher policy rates, output falls significantly more in countries with higher private debt (Graph 4.A). The additional output loss reaches about 0.4% of GDP after three years.[4] This reflects two forces. One is the larger drag on disposable income: one year after the tightening, the debt service ratio (DSR), ie the ratio of interest and principal repayments to income, is about 0.2

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[3]   As an example, heavily indebted firms may refrain from exploiting profitable opportunities, fearing that profits would benefit debt holders rather than shareholders ("debt overhangs").
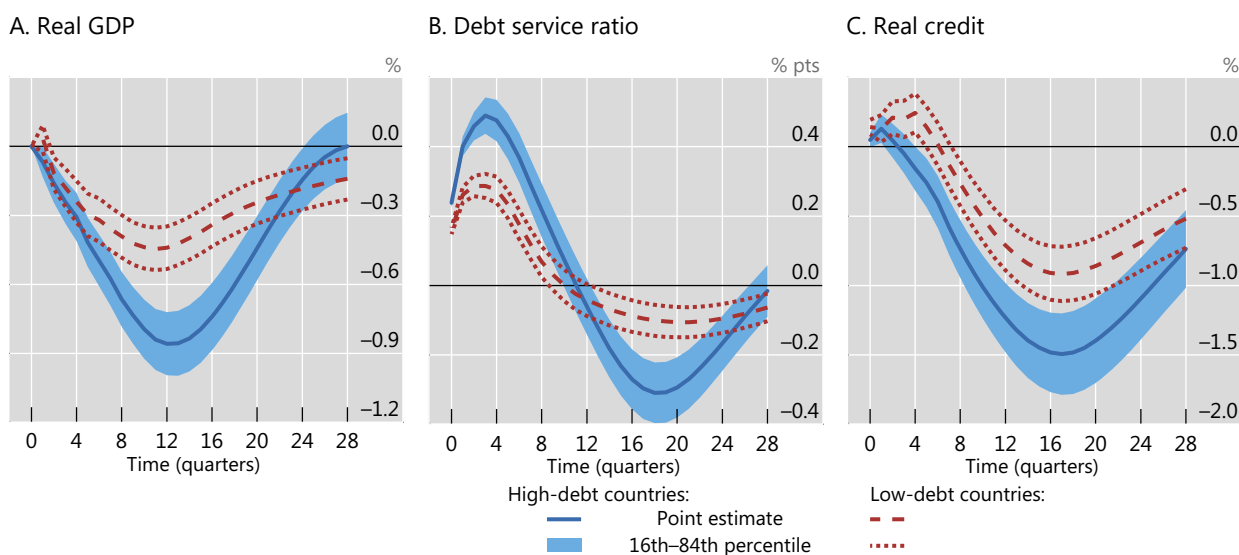
[4]   Despite a steady increase in private debt, some evidence indicates that monetary policy easings have not become more powerful. More specific analysis suggests that this is partly the result of very low rates (Borio et al (2021)) and of asymmetries, ie high debt tending to amplify the impact of rate hikes but to dampen that of cuts (Kim and Lim (2020)).

percentage points higher in high-debt countries than in low-debt ones (Graph 4.B). Another is the larger fall in the stock of real credit, despite an initial increase (Graph 4.C). Moreover, unlike the DSR, real credit remains persistently lower in high-debt countries, reflecting the higher sensitivity of financial conditions to policy rates and the debt overhang. The additional drop in high-debt countries reaches 0.6 percentage points after four years and keeps weighing on output even as the DSR falls back to long-run levels.

Monetary transmission is stronger in economies where debt is high[1]

Impulse responses to a 1 percentage point increase in the policy rate   Graph 4

A. Real GDP   B. Debt service ratio   C. Real credit

High-debt countries:
Point estimate
16th–84th percentile

Low-debt countries:

[1] The panels show impulse responses with one standard error bootstrapped confidence bands that are robust to correlation across economies.

Source: Hofmann and Peersman (2017).

The sectoral picture

Beyond these aggregate effects, more granular sectoral information sheds light on the influence of the composition and distribution of the debt. In particular, the higher the share of variable rate debt (or short-maturity debt), the larger the impact on cashflows and hence on expenditures. And the more uneven the distribution of debt, notably the higher the share of vulnerable borrowers, the bigger the impact, too; weak borrowers respond more strongly to avoid falling into distress or may not be able to avoid doing so in the first place.

Some simple exercises can illustrate these general points. Consider households and firms in turn.

In the case of the household sector, mortgage debt plays a critical role. This debt accounts for 70–90% of household debt in most jurisdictions.[5] A stylised, model-based comparison of two economies with realistic differences in home ownership and debt structures illustrates the role of variable rate or short maturity debt (Graph 5.A).[6] In the economy where most households are renters or homeowners holding fixed rate mortgages (FRMs), an increase in the policy rate has only a minor effect on consumption (about –0.3% after four years). By contrast, in the economy where households are mostly owners and hold adjustable-rate mortgages (ARMs), the fall

[5]   See Zabai (2017).

[6]   Modelling assumptions reflect data for Germany and Spain in 2017 (43.9% and 75.9% for homeownership rates and 14.2% and 86.3% for the share of ARM, respectively). See Graph A.6.A for cross-country data for homeownership and mortgage figures.
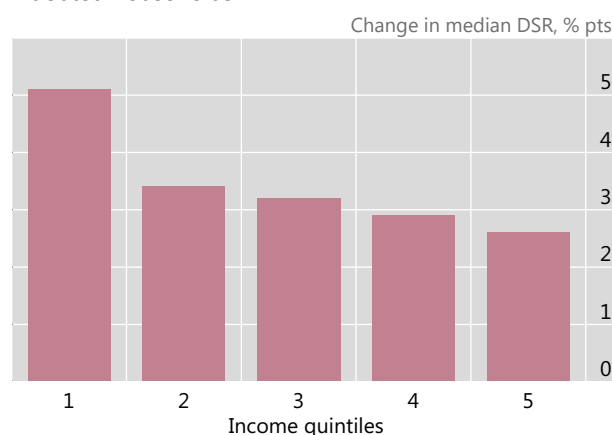
Debt composition and distribution amplify the consumption response to a hike

Graph 5

A. Reliance on adjustable rate mortgages amplifies the consumption response to tighter monetary policy[1]

Change in consumption, %

Years after monetary shock

— Country A   — Country B
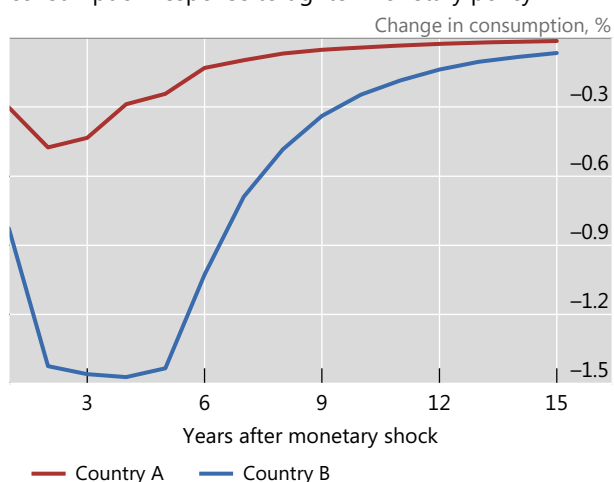
B. Higher rates raise the DSR, particularly for low-income indebted households[2]

Change in median DSR, % pts

Income quintiles

[1] Aggregate household consumption response to a 100 basis point tightening in a life-cycle model with housing. Homeownership rate and share of ARM in countries A and B are similar to those in Germany and Spain, respectively.   [2] Median debt-service-to-income ratio of euro area households in each income quintile. Difference between two scenarios: 300 basis point rate increase and baseline (HFCS).

Sources: European Mortgage Federation; ECB, Household Finance and Consumption Survey (HFCS, 2017); national data; BIS.
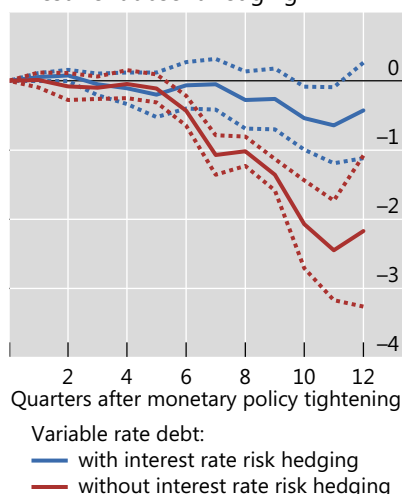
in consumption is about five times bigger, mostly reflecting a larger and faster pass-through of policy rates to effective borrowing costs.

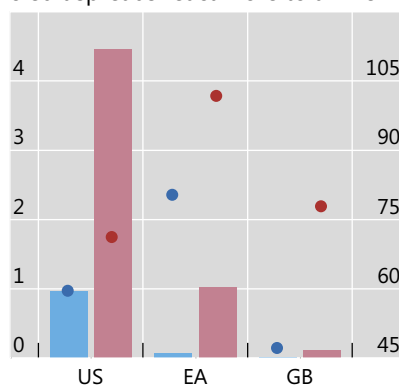## High NFC debt and interest rate exposure compound the effect of tightening
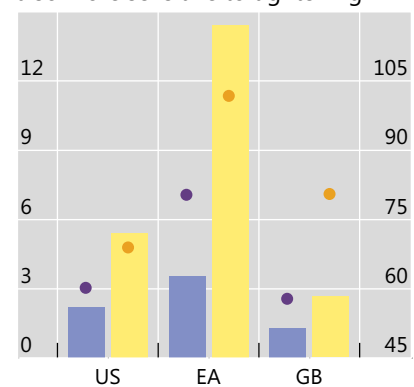
In per cent

Graph 6

A. Variable rate debt weighs on investment absent hedging[1]

Quarters after monetary policy tightening

Variable rate debt:
— with interest rate risk hedging
— without interest rate risk hedging

B. When NFCs are highly indebted, credit spreads react more to a hike[2]

Corp. spreads (lhs):   Average debt/GDP(rhs):
■ High debt   ● High debt
■ Low debt   ● Low debt

C. With high debt, firm failures are also more sensitive to tightening[3]

Firm failures (lhs):   Average debt/GDP (rhs):
■ High debt   ● High debt
■ Low debt   ● Low debt

[1] Investment response to a 100 bp tightening for firms with high exposure to variable rate debt and with or without interest rate hedging. Dotted lines show +/–1 standard deviation. Estimation period: Q1 2000–Q4 2019.   [2] Peak responses relative to sample average of corporate bond (one–three-year maturity) spreads to a 25 basis point tightening, when NFC debt to GDP is low or high (debt cut-off: 65% for US, 90% for EA, 70% for GB). Estimation periods: Dec 1996–Jun 2016 for US, Jan 1991–Jun 2019 for EA and Dec 1996–Dec 2014 for GB.   [3] Peak responses relative to sample average of firm bankruptcies to a 25 basis point tightening, when NFC debt to GDP is low or high (debt cut-off levels similar to panel B). Estimation periods: Q1 1994–Q2 2016 for US, Jan 1991–Jun 2019 for EA and Q1 1990–Q4 2014 for GB.

Sources: Refinitiv Datastream; ICE Bank of America Merrill Lynch; BIS.

As regards the distribution of debt, evidence from the euro area shows that higher policy rates raise the debt service cost, particularly for indebted households
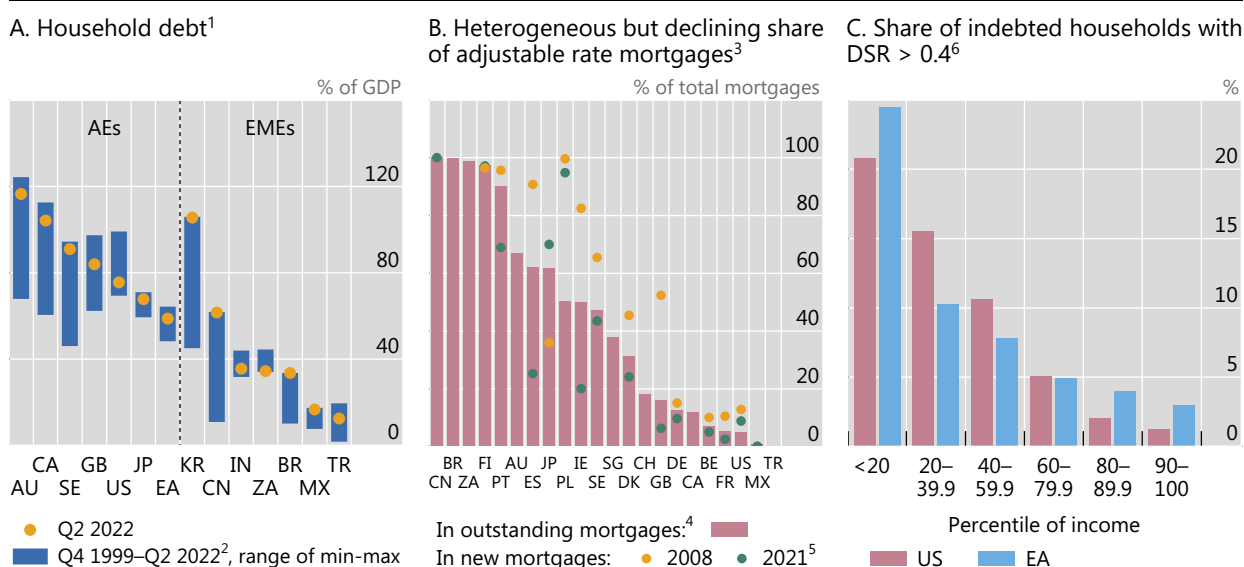
with lower incomes (Graph 5.B). Since these have a relatively high marginal propensity to consume, the corresponding drop in consumption is larger.[7]

The picture is very similar for firms. First, following a monetary policy tightening, firms with more variable rate debt scale back investment more aggressively. But firms using (interest rate risk) hedging instruments do not, probably because the pass-through to effective borrowing costs is weaker (Graph 6.A). Second, credit spreads charged to financially vulnerable firms with high debt burdens widen by more when policy rates go up (Graph 6.B). Similarly, tighter monetary policy exposes such firms to a greater risk of bankruptcy. In the United States and the euro area, bankruptcies increase two to four times more in response to tighter monetary policy when NFC debt is relatively high (Graph 6.C).[8]

These results shed light on the likely consequences of the evolution of the level and composition of debt across sectors and jurisdictions (Tables A.1).

Higher household debt masks significant changes in composition and distribution   Graph 7

A. Household debt[1]

B. Heterogeneous but declining share of adjustable rate mortgages[3]

C. Share of indebted households with DSR > 0.4[6]

- Q2 2022
- Q4 1999–Q2 2022[2], range of min-max

In outstanding mortgages:[4]
In new mortgages: ● 2008   ● 2021[5]

US   EA

[1] Total credit.   [2] For CN, Q1 2006–Q2 2022; for IN, Q2 2007–Q2 2022; for ZA, Q1 2008–Q2 2022.   [3] Definitions differ among economies and variables.   [4] Reference period is 2020–22, depending on data availability. Also includes BIS estimations.   [5] For JP, 2020.   [6] Share of indebted households with a ratio of debt payments to gross income above 40%, in each percentile of income.

Sources: Agarwal et al (2022); Board of Governors of the Federal Reserve System, Survey of Consumer Finances (2019); ECB, Household Finance and Consumption Survey (2017); European Mortgage Federation; Refinitiv Datastream; national data; BIS.

Looking at the main trends in household debt, some points stand out. First, the debt-to-income ratio has risen, and especially so since 2016 for highly indebted households, reversing the post-GFC deleveraging trend (Graph A.6.C).[9] In many jurisdictions, the ratios are currently close to historical peaks, except for those countries where household debt was at the heart of the GFC: there, deleveraging has pushed the ratio to relatively low levels (Graph 7.A). Second, the share of ARMs declined as interest rates reached unprecedented troughs (Graph 7.B). That said, ARMs still account for a large fraction of outstanding mortgages in several

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[7]   Graph A.6.B shows the increase in the share of financial vulnerable households by income bracket following a tightening.
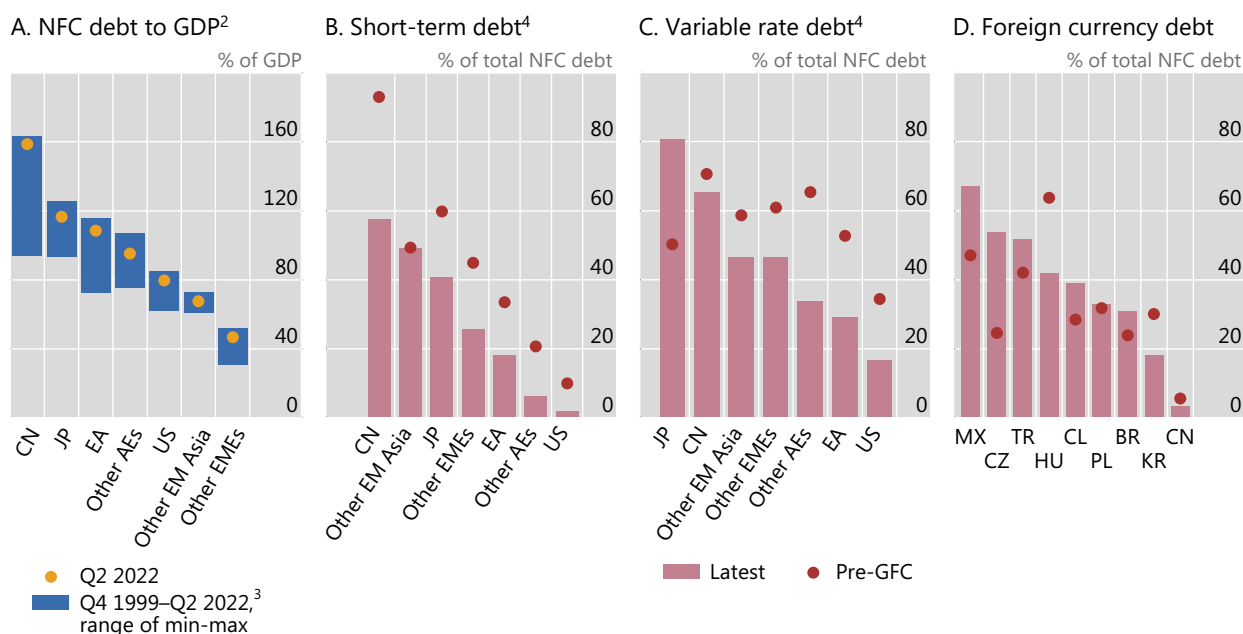
[8]   Following higher rates, highly indebted NFCs cut investment by more (Graph A.7.A), this effect being larger for firms using real estate as collateral (Graph A.7.B). Similarly, Bahaj et al (2022) show that highly indebted NFCs also cut hiring more abruptly in response to higher policy rates.

[9]   See CGFS (2022) for a recent assessment of household debt vulnerabilities.

jurisdictions, particularly in EMEs.[10] This is especially significant since, as indicated by DSR data for the euro area and the United States, indebted lower income households tend to be financially more vulnerable (Graph 7.C).[11]

Higher NFC debt comes with different risk exposures[1]   Graph 8

A. NFC debt to GDP[2]   B. Short-term debt[4]   C. Variable rate debt[4]   D. Foreign currency debt

- Q2 2022
- Q4 1999–Q2 2022,[3] range of min-max

Latest ● Pre-GFC

[1] For the regions, weighted averages based on GDP and PPP exchange rates across eight AEs, eight (seven for panel A) EM Asian economies and 12 (ten for panel A) other EMEs.   [2] Total credit.   [3] For CN, Q1 2006–Q2 2022; for other EM Asia, Q2 2007–Q2 2022; for other EMEs, Q1 2008–Q2 2022.   [4] Median value per country. Only firms reporting between 2008 and 2021 are used.

Sources: S&P Capital; IIF; BIS.

The evolution of NFC debt exhibits some similarities but also some differences relative to that of households. In contrast to household debt, the increase in NFC debt has been more uniform across countries, as it has been less affected by the GFC. The debt-to-GDP ratio is now at historical highs in many jurisdictions (Graph 8.A). At the same time, just as in the case of household debt, the short-term and variable rate components appear to have generally fallen since the mid-2000s (Graph 8.B and 8.C).[12] Last, the evolution of FX debt, which is much more important for NFCs than for households (Graph 8.D), has varied across countries. In some cases, notably in eastern Europe and Asia, the share of FX debt in total debt has fallen, while in others, such as Mexico, Chile, Turkey and Czechia, it has increased since the GFC. Information on currency mismatches is limited, although the growth of FX derivative markets in EMEs may have reduce them.[13] At the same time, these instruments can add to funding needs and exacerbate strains at times of dollar funding stress.

Turning to the creditor mix, NFCs have significantly stepped up their borrowing from non-bank financial institutions (NBFIs), particularly outside Asia (Graph A.8.B). This diversification has some benefits for firms in terms of risk and funding sources,

[10]   In China, Brazil and South Africa, the share of ARMs is close to 100%. In some AEs, including the United States, Germany, France or the United Kingdom, it is well below 20%, although substantially higher in other AEs.

[11]   In addition, household FX debt has shrunk significantly over the last decade: FX debt accounts for less than 5% of total household debt in all EMEs, except in Poland and Singapore.

[12]   That said, substantial amounts of debt are expected to mature over the next two years (see Graph A.8.A). Considering countries listed in table A.1, such debts account for 12–32% of total debt in AEs, and 10–39% in EMEs.

[13]   Notwithstanding data limitations, outstanding FX swaps, forwards and currency swaps with "non-financial customers", a proxy for NFCs, amounted to $12 trillion in mid-2022.
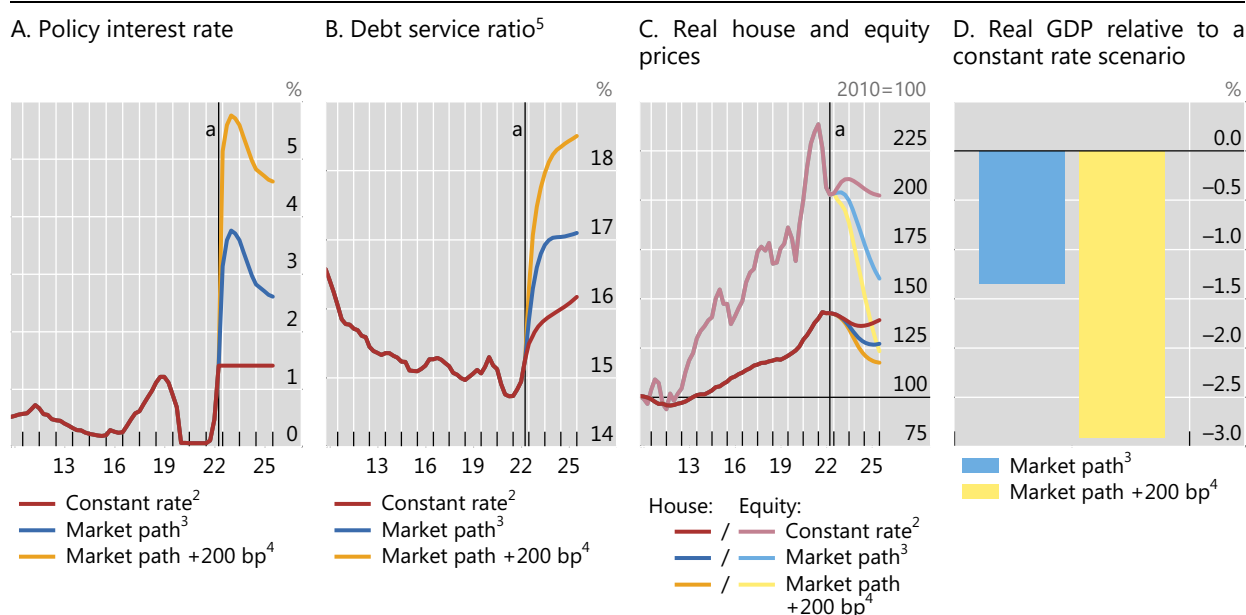
as it provides a "spare tyre".[14] That said, NBFIs (often) feature hidden leverage and liquidity mismatches, which makes them more vulnerable to strains.[15] And some evidence suggests their credit supply is more procyclical than that of banks.[16]

How much could a policy tightening dent aggregate demand?

How do these various pieces fit together at present? Quantifying the possible impact of alternative interest rates paths on aggregate demand is no easy task. At the same time, some stylised simulations building on historical regularities can shed light on these issues, including the interaction with asset prices.[17]

Impact on aggregate demand of further tightening under high debt[1]   Graph 9

A. Policy interest rate

B. Debt service ratio[5]

C. Real house and equity prices

D. Real GDP relative to a constant rate scenario

House: Equity:
— / — Constant rate[2]
— / — Market path[3]
— / — Market path +200 bp[4]

Market path[3]
Market path +200 bp[4]

— Constant rate[2]
— Market path[3]
— Market path +200 bp[4]

[a] Simulations starts in Q4 2022.   [1] GDP-Weighted average of projected outcomes for 12 AEs.   [2] Policy rates at their Q3 2022 levels throughout the projection period.   [3] Policy rates follow financial market expectations as of Q3 2022.   [4] Policy rates evolve according to financial market expectations as of Q3 2022 plus 200 basis points.   [5] Private sector's interest and principal payments to income.

Sources: Bloomberg; national data; BIS (2022).

Simulations indicate that the impact of higher policy rates on activity can be substantial.[18] If policy rates evolve according to current financial market expectations (Graph 9.A), private sector DSRs would rise by more than 1 percentage point after 6 quarters, to their highest level in more than a decade (Graph 9.B). If rates increase by 200 additional basis points, private sector DSRs could rise by 1 percentage point more. As higher debt costs erode disposable income and weaken aggregate demand, house and equity prices would fall (Graph 9.C), leading to negative wealth effects that would further depress activity. Altogether, the results suggest that output could fall

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[14]   Elliot et al (2022) show that higher policy rates shift credit supply from banks to non-banks, thereby dampening any associated consumption and investment effects.

[15]   Differences in the maturity of NBFI credit to NFCs also matter. NFCs in the property sector, for instance, have large up-front funding needs and rely on short-term borrowing.

[16]   See Fleckenstein et al (2020) and Aramonte et al (2022).

[17]   Country sample: AU,BE,CA,DE,ES,FR,GB,IT,JP,NL,SE,US. Graph A.9 reports results for selected EMEs.

[18]   Simulations in Appendix B show that the current high levels of private sector indebtedness would amplify the response of aggregate demand to additional monetary policy tightening (Graph B).

by some 1.5% in the market path scenario relative to a constant rate baseline and by almost 3% in the high rates scenario (Graph 9.D).[19]

It is hard to tell whether these results are under- or over-estimates. On the one hand, they are based on average debt structures. In particular, they do not allow for the changes in the composition of the debt that have on balance made it less sensitive to interest rate increases. On the other hand, they do not consider non-linear effects, including, for instance, those linked to financial stress.

Policy issues

Past experience shows that high debts increase the economy's sensitivity to monetary policy tightening. With more bang for the buck, central banks may need to tighten less to bring economic activity and inflation down. But how much less? Several uncertainties complicate policy calibration in the current context.

First, there are simply no historical precedents for a tightening of monetary policy on the back of such high debt levels. Stress in the financial sector could emerge, further depressing economic activity. While banks are better capitalised than pre-GFC, they could still face strains from a deterioration of credit quality. Moreover, the NBFI sector is more vulnerable, as underscored by some recent episodes of stress. The central bank could then find itself in the uncomfortable and challenging position of having to tighten while at the same time intervening to stabilise markets.

Second, public debt levels are also at historical highs. As debt service costs rise, fiscal space shrinks, especially where debt is high and fiscal sustainability at risk. Moreover, large shocks to energy and foods prices and declining real wages have increased pressure on governments to extend fiscal support. This could add to inflationary pressures (through higher aggregate demand or currency depreciations) and even be a source of financial stress.

Finally, as is typical of transitions from low- to high-inflation regimes, uncertainty about inflation dynamics is particularly high.[20] Models are least useful precisely during such transitions. And should an inflation psychology set in, it would become harder to bring inflation back to target, especially for "the last mile".

All this means that central banks face a delicate, if familiar, balancing act between tightening too much or too little. As the tightening proceeds, the issues concern less the speed of the tightening and more the terminal level of interest rates and how long they will be kept there. The balancing act is especially challenging given the unprecedented synchronisation and speed of the tightening across the world.

Issues for discussion

1. How do you assess current private debt levels? What have been the most relevant changes, in the level and composition of private debt?

2. What characteristics of household and corporate debt affect the impact of monetary policy on real activity?

3. How does high debt impact the monetary policy strategy, in particular the speed and duration of tightening as well as the level of the terminal rate?

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[19]   In addition, they assume exogenous inflation expectations and do not allow for the possibility of wage-price spirals. See below for a discussion of some of these uncertainties.
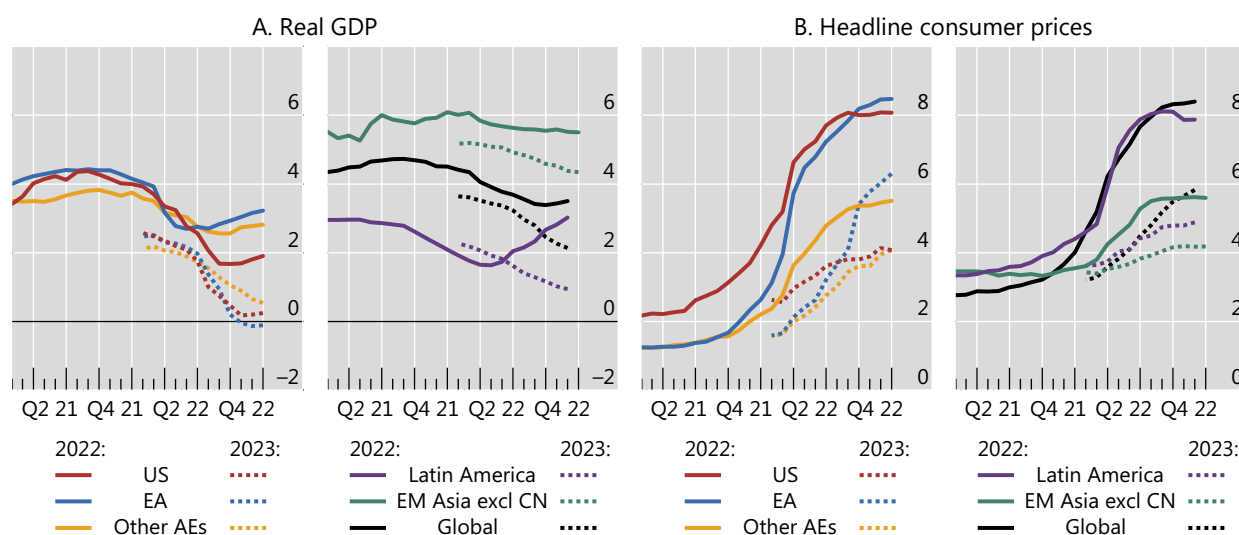
[20] See BIS (2022), chapter 2.

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Annex A: Graphs

Consensus forecasts for 2022 and 2023[1]

Year-on-year changes, in per cent

Graph A.1

A. Real GDP

B. Headline consumer prices

2022:		2023:
US		US
EA		EA
Other AEs		Other AEs

2022:		2023:
Latin America		Latin America
EM Asia excl CN		EM Asia excl CN
Global		Global

[1] For the regions, weighted averages based on GDP and PPP exchange rates for nine AEs, five Latin American, nine Asian EMEs and 36 economies as global.

Sources: Consensus Economics; BIS.

Macroeconomic surprise indices[1]

Index

Graph A.2

A. Citi economic surprise index

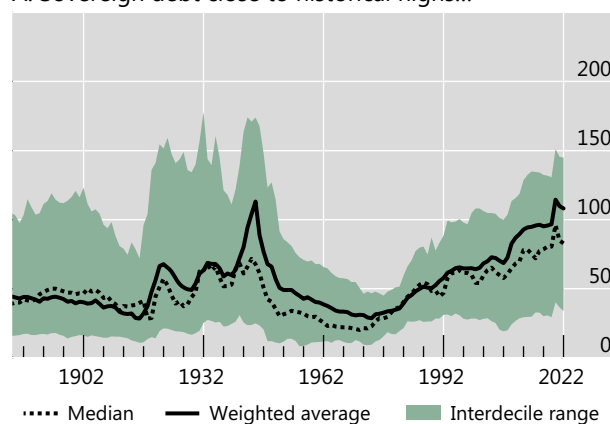B. Citi inflation surprise index

— EMEs — Global — US — EA — GB
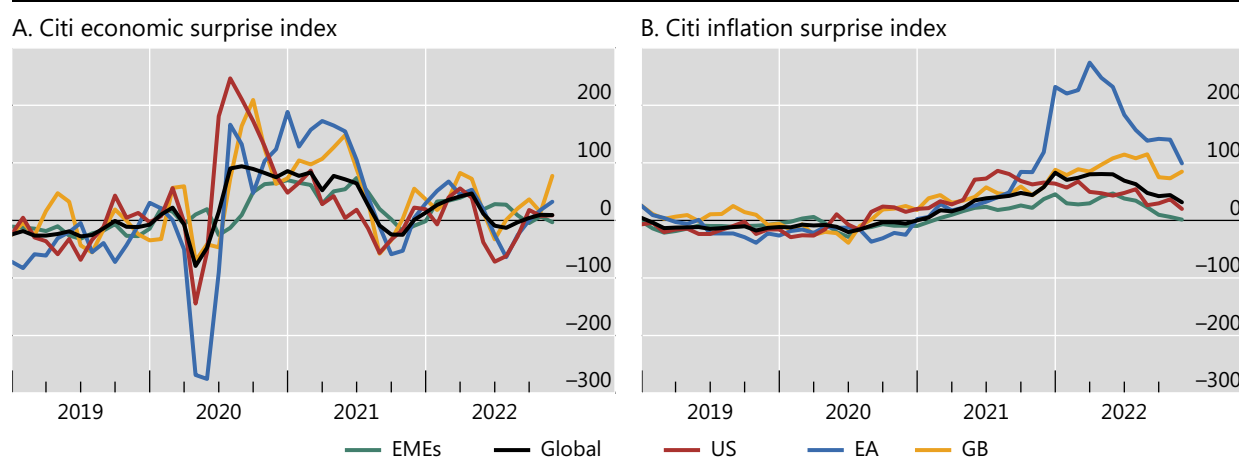
[1] Defined as weighted historical standard deviations of macro data/inflation surprises. A positive reading suggests that economic releases have on balance been beating consensus: stronger macro data/higher inflation than expected. The index is calculated daily in a rolling three-month window. For EMEs and Global, Citigroup definition.
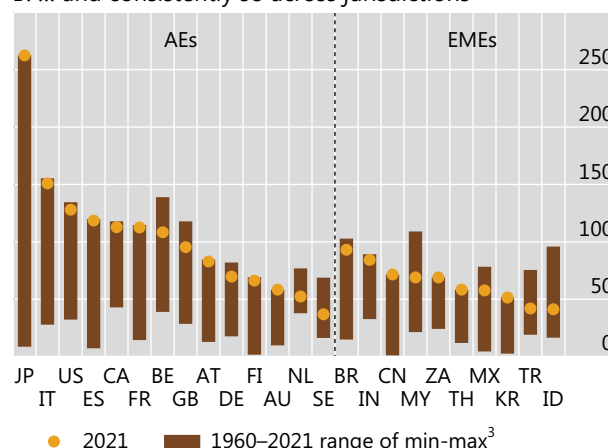
Source: Bloomberg.

Sovereign debt is at post-WWII highs in several jurisdictions[1]

As a percentage of GDP   Graph A.3

A. Sovereign debt close to historical highs...[2]
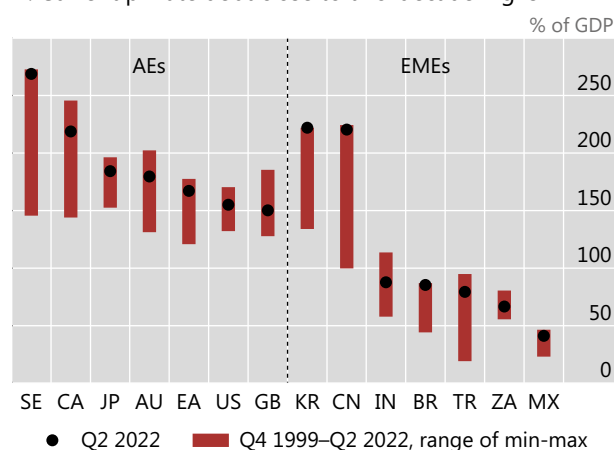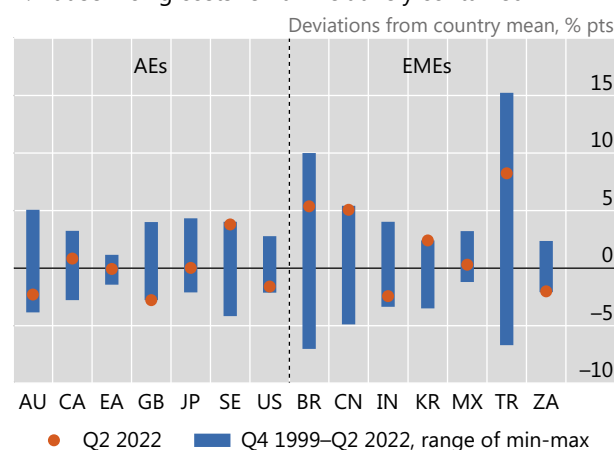

B. ... and consistently so across jurisdictions

···· Median   —— Weighted average   ▇ Interdecile range

● 2021   ▇ 1960–2021 range of min-max[3]

[1] General government debt.   [2] Debt at nominal value, latest available quarter for 2022. Sample of 19 AEs and four EMEs.   [3] For CN, 1984–2021; for ID, 1976–2021.

Sources: Ò Jordà et al (2016); S Abbas et al (2010); European Commission; IMF; OECD; Refinitiv Datastream; Global Financial Data; Oxford Economics; BIS.

Low debt servicing costs, despite high private debt levels

Graph A.4

A. Current private debt close to two-decade highs[1,2]

% of GDP

B. But servicing costs remain relatively contained[1,3]

Deviations from country mean, % pts

● Q2 2022   ▇ Q4 1999–Q2 2022, range of min-max

● Q2 2022   ▇ Q4 1999–Q2 2022, range of min-max

[1] Non-financial private sectors.   [2] Total credit.   [3] Debt service ratio. Country-specific means are based on all available data from 1999 onwards. For EA and TR, range of minimum and maximum figures between Q1 2002 and Q2 2022.
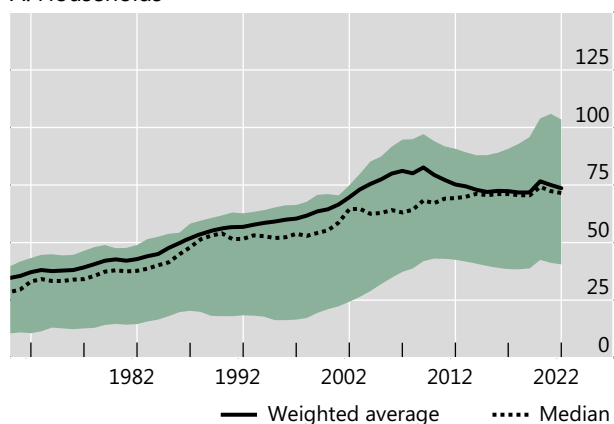
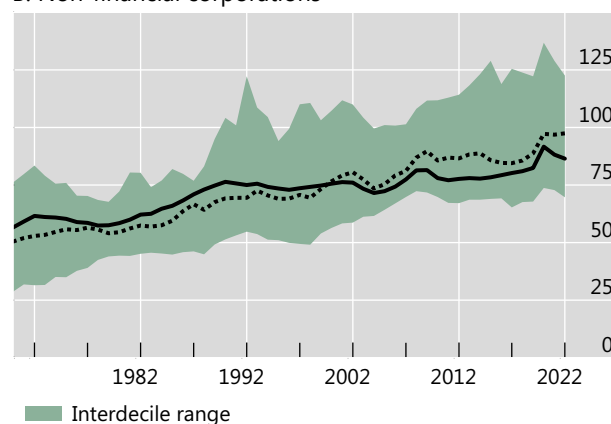Source: BIS.

Rising household and NFC debt levels globally[1]

As a percentage of GDP   Graph A.5

A. Households

B. Non-financial corporations

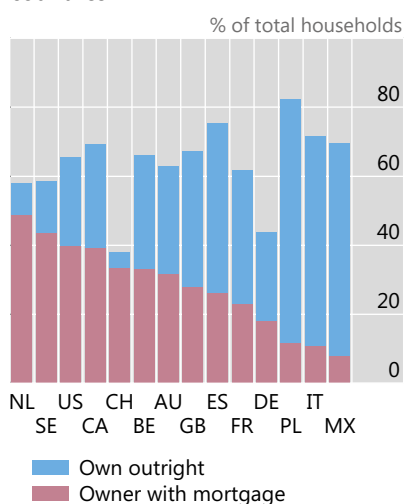Legend: — Weighted average ····· Median � Interdecile range

[1] Total credit. Latest available quarter for 2022. Sample of eight AEs and two EMEs.
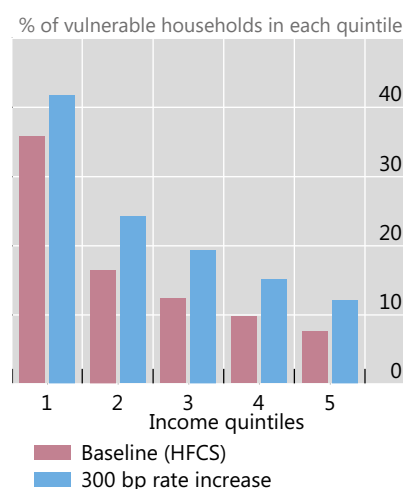
Sources: IMF; BIS.

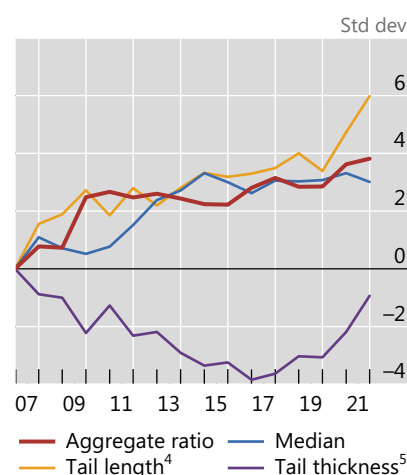## A tightening magnifies the build-up of vulnerabilities for indebted households   Graph A.6

A. Homeownership with and without a mortgage differ significantly across countries[1]

% of total households

B. A tightening raises the share of financially vulnerable households[2]

% of vulnerable households in each quintile

C. Household debt-to-income[3]

Std dev

Legend A: ■ Own outright ■ Owner with mortgage

Legend B: ■ Baseline (HFCS) ■ 300 bp rate increase

Income quintiles

Legend C: — Aggregate ratio — Median — Tail length[4] — Tail thickness[5]

[1] 2020 or latest available. [2] Share of euro area vulnerable households, ie with a debt service-to-income ratio above 40%, in the baseline scenario (HFCS) and after a 300 bp interest rate increase. [3] Average across countries. Each series is standardised to start at zero in 2006 and have a unit standard deviation. [4] Difference between the 75th percentile and the median. [5] Ratio of the difference between the 90th and the 75th percentiles and the difference between the 75th percentile and the median.
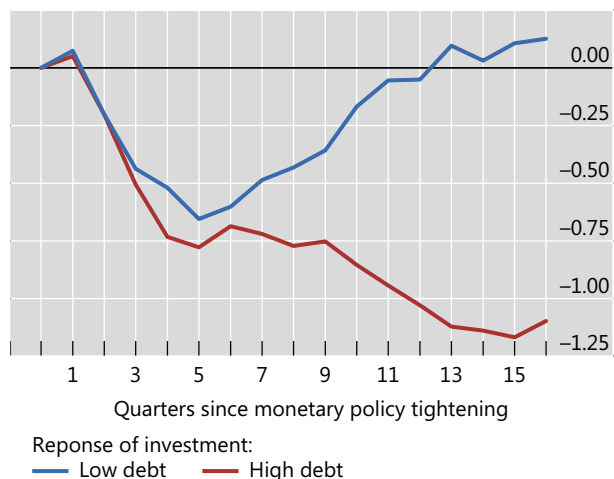
Sources: Banerjee et al (2022); ECB, Household Finance and Consumption Survey (HFCS, 2017); OECD; BIS.

Investment of firms with high debts and high reliance on physical capital drops significantly more following rate hikes
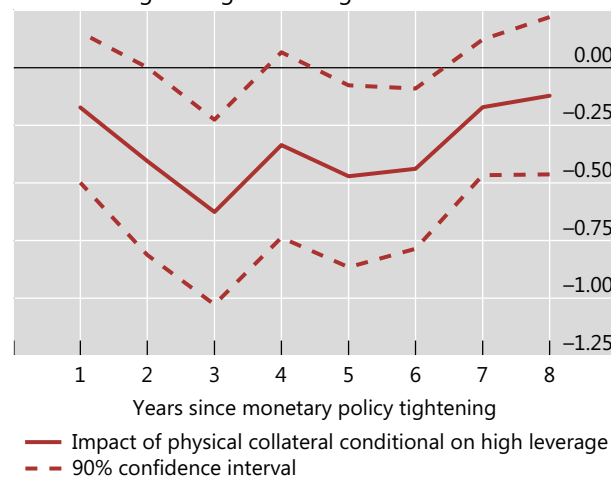
In per cent

A. Hikes weigh more on investment when NFCs are highly indebted[1]

B. Higher reliance on physical collateral amplifies the effect of a tightening on leveraged firms' investment[2]

Quarters since monetary policy tightening

Years since monetary policy tightening

Reponse of investment:
—— Low debt   —— High debt

—— Impact of physical collateral conditional on high leverage
- - - 90% confidence interval

[1] Aggregate investment response to a 25 bp tightening in the United States, when NFC debt to GDP is low (less than 60%) or high (above 60%). Estimation period: Q1 1987–Q2 2016. Results qualitatively similar, but quantitatively larger for more indebted jurisdictions such as the euro area.   [2] Additional response of investment for firms with a leverage ratio higher than 65% due to a 10% higher share of tangible assets. Estimates based on firm-level annual data for the United Kingdom; 25 bp tightening; estimation period: 1986–2014.
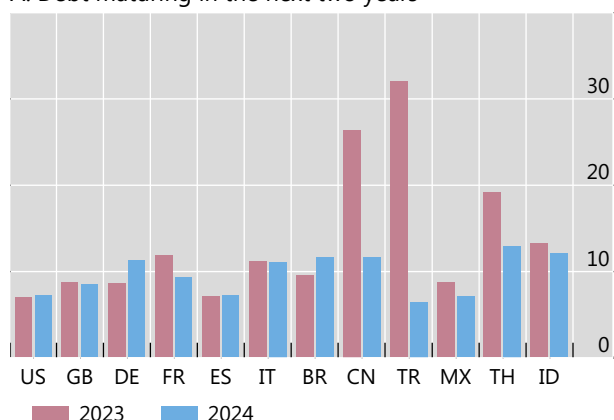
Sources: Worldscope; BIS.

NFCs debt maturing in next two years is large; share of non-bank debt has risen
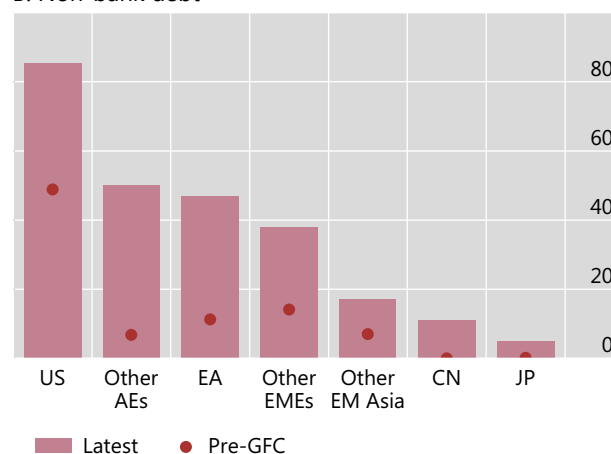
In percentage of total NFC debt

A. Debt maturing in the next two years[1]

B. Non-bank debt[2]

US GB DE FR ES IT BR CN TR MX TH ID

■ 2023   ■ 2024

US   Other AEs   EA   Other EMEs   Other EM Asia   CN   JP

■ Latest   ● Pre-GFC

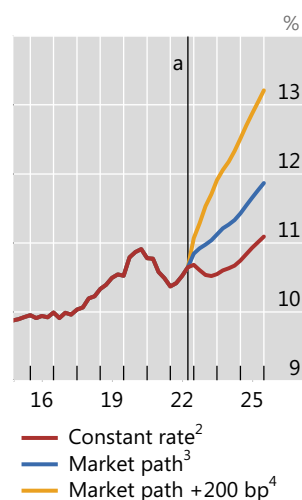[1] Sum of NFC debt maturing in the respective year divided by total outstanding debt as of 2021. Sample of firms based on those reported in Capital IQ Capital Structure Details.   [2] For the regions, weighted averages based on GDP and PPP exchange rates across eight AEs, eight EM Asian economies. and 12 other EMEs. Median value per country. Only firms reporting between 2008 and 2021 are used.
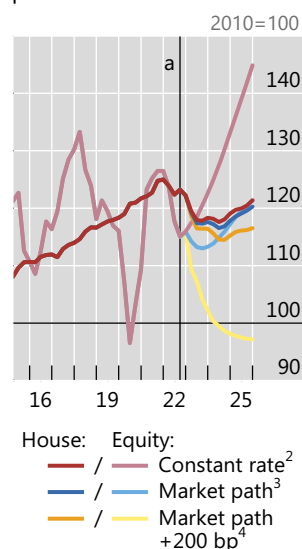
Sources: S&P Capital; BIS.

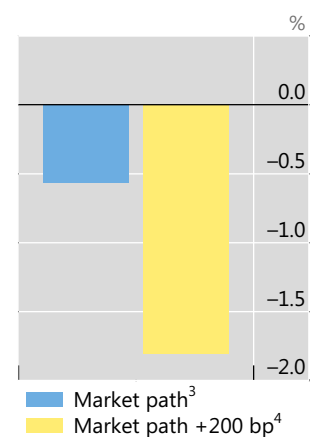## Impact on aggregate demand of further tightening under high debt in EMEs [1]
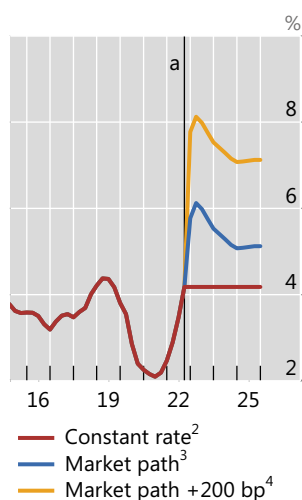
A. Policy interest rate

B. Debt service ratio[5]

C. Real house and equity prices

D. Real GDP relative to a constant rate scenario

A. Policy interest rate:
- Constant rate[2]
- Market path[3]
- Market path +200 bp[4]

B. Debt service ratio[5]:
- Constant rate[2]
- Market path[3]
- Market path +200 bp[4]

C. Real house and equity prices:

House: Equity:
- / Constant rate[2]
- / Market path[3]
- / Market path +200 bp[4]

D.
- Market path[3]
- Market path +200 bp[4]

[a] Simulation starts in Q4 2022.   [1] Weighted average of projected outcomes in HK, ID, KR, MY, MX, PL and TH, based on GDP and PPP exchange rates.   [2] Policy rates remain at their Q3 2022 levels throughout the projection period.   [3] Policy rates follow financial market expectations as of Q3 2022.   [4] Policy rates evolve according to financial market expectations as of Q3 2022 plus 200 basis points.   [5] Ratio of interest payments on private sector debt to private sector income.

Sources: Bloomberg; national data; BIS.

Selected credit descriptive statistics[1]

In per cent, except otherwise indicated   Table A.1

Advanced economies

	Households				Non-financial corporates				
	Debt to GDP	Servicing cost[2] (% pts)	Adjustable rate mortgages[3]	Homeown-ers with mortgage	Debt to GDP[4]	Servicing cost[2] (% pts)	Maturity[5] (years)	Variable rate debt	Debt due in 2023–24
AU	116.5	-1.7	67.0	31.8	63.6	-11.0	8.8	35.3	25.1
BE	61.2	0.2	6.9	33.2	141	-4.7	6.6	27.5	17.0
CA	104.3	0.1	12.0	39.3	114.1	-0.8	13.1	23.3	12.2
FR	66.5	0.3	5.3	23.1	164.6	4.7	8.8	23.6	21.2
DE	55.9	-0.9	12.6	18.2	72.3	0.9	9.6	31.5	19.9
IT	42.8	-0.4		10.8	70.1	-6.6	7.4	26.1	22.3
JP	67.8	0.0	61.9		118.5	6.0	13.3	80.7	16.4
NL	98.7	-3.5		48.8	142.2	0.3	7.7	19.1	19.1
ES	56.6	-2.3	62.0	26.4	98.7	-8.8	8.4	22.7	14.4
SE	91.0	0.8	47.2	43.6	177.8	4.6	6.6	44.5	31.8
CH	129.5		18.3	33.5	149.4		6.8	30.3	22.5
GB	83.9	-1.8	16.0	28	66.3	-4.9	9.6	35.2	17.2
US	75.5	-1.3	5.1	39.7	79.5	0.5	11.6	16.5	14.2

Emerging market economies

	Total	Households		Non-financial corporates			
	Servicing cost[2] (% pts)	Debt to GDP	Debt to GDP[4]	Maturity[5] (years)	Variable rate debt	Foreign currency debt	Debt due in 2023–24
AR		4.4	17.8	4.8	21.9	34.1	32.8
BR	6.3	33.6	52	7.3	81.3	30.8	21.2
CN	3.4	61.6	158.7	3.4	65.5	3.3	38.0
HK	8.1	94.6	289.8	5.7	57.5	82.9	31.0
IN	-3.5	35.5	52.2	4.9	54.1	13.8	39.2
ID	-0.1	16.5	25.2	7.1	37.2	35.4	25.4
KR	2.2	105.6	116.5	6.6	30.3	18.1	30.8
MY	-0.3	69.4	64.9	8.9	61.4	22.2	18.2
MX	0.5	16.6	24.2	10.4	39.3	67	15.8
PL	-0.6	29.8	42	5	56.5	32.9	26.5
SA		14.2		10.3	84	17.7	9.8
ZA	-1.8	34.4	32.2	6.3	55.9	47.5	22.4
TH	0.8	88.9	88.6	6.5	37.2	15.8	32.1
TR	6.7	12.5	66.9	4.6	35.8	51.7	38.5

Colours in the heatmap indicate the level of each indicator relative to the other countries, categorised by terciles from dark blue (upper tercile) to light blue (lower tercile).

[1] Latest data available.   [2] Debt service ratios. Deviations from country mean.   [3] Definitions differ among economies. Also includes BIS estimations.   [4] Total credit.   [5] Weighted average remaining maturity.

Sources: OECD; European Mortgage Federation; IIF; S&P Capital IQ; national data; BIS.

Annex B: Estimating the macroeconomic effects of monetary policy tightening across high and low debt economies

We estimate country-specific VAR models for 12 economies (AU, BE, CA, DE, ES, FR, GB, IT, JP, NL, SE, and US) over the period 1993Q1–2019 Q4.[21] VAR models include seven variables: private sector debt-to-income ratios, real house prices, real equity prices, real income, effective private sector interest rates, the aggregate price level and real GDP. Policy rates are included as an exogenous variable while coefficients of some VAR equations (eg equity prices) are restricted to reflect realistic information lags.

Using the models' estimates, we project forward some key macroeconomic variables considering three alternative scenarios. In the first scenario, policy rates are constant at levels reached in Q3 2022 over the whole projection period. In the second scenario, policy rates follow the market expected path (as of 23 November 2022). In the last scenario, policy rates jump 200 bp above the market expectations.

To explore the role played by private sector debt, we classify countries as high- or low-debt and estimate the responses of key macro aggregates to an increase in the policy rate (250 bp or 400 bp), considering the same policy rate shock across all countries.[22]

Unsurprisingly, higher rates tend to raise the debt servicing cost and the more so, the higher the economy's starting debt level (Graph B.1.A). In addition, as higher debt servicing costs reduce disposable income and weigh on aggregate demand, equity markets fall (Graph B.1.B), leading to negative wealth effects that further depress activity. Altogether, output in high-debt countries falls by an additional 0.4 to 0.6 percentage points over six quarters, relative to low-debt countries (Graph B.1.C).

High debt levels amplify stock and flow effects of tighter policy on output[1]   Graph B.1

A. Debt service ratio[2]   B. Real equity prices   C. Real GDP

Low debt   High debt
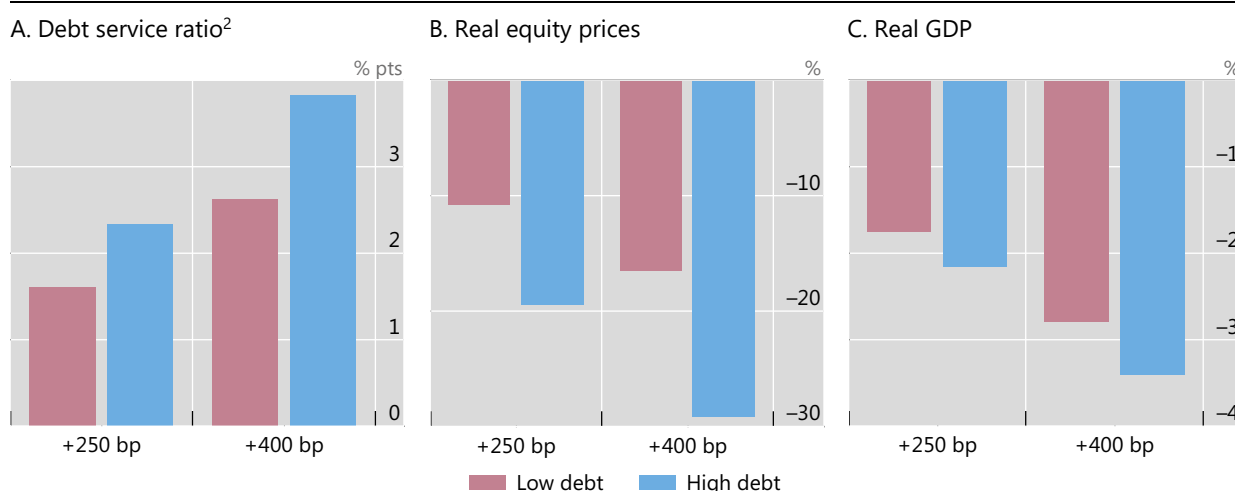
[1] Cumulative change in debt service ratio, equity prices and real GDP six quarters after a permanent monetary policy tightening. Changes computed relative to a baseline with policy rates at Q3 2022 value. Low-debt economies: AU, DE, ES, GB, IT and US. High-debt economies: BE, CA, FR, JP, NL and SE.   [2] Ratio of interest payments on private sector debt to private sector income.

Source: BIS.

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[21] The sample varies slightly across countries due to data availability.

[22] Low-debt countries: AU, DE, ES, IT, GB, and US. High-debt countries: BE, CA, FR, NL, JP and SE.