CHAPTER IV INSTITUTIONAL INVESTORS IN EMERGING MARKETS

A key element in reducing the volatility of capital flows to emerging markets is the development of a stable investor base for emerging market securities. The prospects for developing such an investor base depend on such factors as the composition of the existing investor base, the economic and regulatory considerations influencing investors' asset allocations vis-à-vis emerging markets, the entry of new classes of investors, and the development of new instruments for transferring resources across national borders and hedging the associated risks.

As noted in the September 2003 *Global Financial Stability Report* (Chapter IV), changes in the composition of the investor base have had an important influence on the volatility of capital flows to emerging markets and on the degree of contagion experienced during crises. One key development has been the sharp drop in the participation of banks and hedge funds and an increased participation of nonbank institutional investors. Another important change in the investor base has been the relative decline in "dedicated" relative to "crossover" investors.[1] Crossover investors are more likely to make opportunistic investments and to be more influenced by developments in other asset classes. Although the increased importance of crossover investors may have increased volatility of capital flows, it has also broadened and diversified the investor base. Another development broadening the investor base has been the rapid growth of local emerging market nonbank institutional investors such as pension funds, mutual funds, and life insurance companies. These investors have become an important source of demand for both local-currency- and foreign-currency-denominated emerging market assets. In particular, the steady growth of pension funds in Latin America and Central Europe are underpinning the development of local bond markets.

This chapter seeks to provide a better understanding of nonbank institutional investors' asset allocation decisions vis-à-vis emerging market securities. It examines the behavior of both mature market institutional investors that participate actively in emerging markets, and local emerging market institutional investors. For mature markets, the focus is on insurance companies, pension funds, hedge funds, and mutual funds (as well as other asset managers). The scale of assets under management is compared with the market capitalization of the local and external bonds and equities issued by emerging market entities. In addition, the chapter assesses the institutional constraints (as imposed by regulation and by investor mandates), as well as risk and return configurations, that make emerging market instruments a more or less attractive asset class to global investors. The trading and investment strategies of the various investors are also analyzed with regard to how they affect the stability of capital flows to emerging markets.

For emerging markets, the chapter examines the investment behavior of local pension funds, insurance companies, and mutual funds. For pension funds in particular, the focus is on their impact on the development of local markets, their diversification needs, and the constraints imposed by investment and mark-

[1]A "dedicated" investor's performance is measured against an emerging market asset benchmark, such as the EMBI or MSCI emerging market index. A "crossover" investor's performance is not measured against any emerging market benchmark.

to-market regulations. Insurance companies are examined in terms of asset and liability management and duration-seeking behavior and of regulatory constraints, including guaranteed returns and solvency/consumer protection issues. Finally, for mutual funds, the source of growth of assets under management, the principal types of funds offered in different regions, redemption policies, and market dynamics are examined.

The final section draws conclusions regarding the major trends in the institutional investor base for emerging markets and their implication for financial stability. This section also examines the key policy issues, particularly those relating to regulations that prevent diversification and/or magnify price volatility, issues of transparency in the mutual and hedge fund industries, and the establishment of a level playing field for different institutional investors offering similar products. Policies that could facilitate the further development of the institutional investor base are also discussed. In particular, steps that countries can take to make their markets more attractive to mature market institutional investors and to facilitate the development of their local institutional base are described.

Mature Market Institutional Investors

Institutional investors provide smaller individual investors with a means of pooling risk, thus providing diversification and enhanced risk-return opportunities for end investors. Their superior capacity to absorb and process information and their ability to conduct a large volume of transactions lower the cost of intermediation and benefit investors and issuers alike. In addition to providing better risk management and lower transaction costs, the long-term liabilities of pension funds and insurance companies allow them to invest in and contribute to the development and stability of longer-term securities markets. Finally, institutional investors also contribute to better transparency and governance, to the improvement of market microstructure, and to the adoption of innovative financial products. However, some analysts argue that some institutional investors—pension funds in particular—tend to follow a herding behavior and magnify volatility in asset markets. Others also note that hedge funds' strategies may destabilize financial markets and increase volatility and sovereign issuance costs.

International portfolio theory suggests that institutional investors can achieve better risk-return profiles by diversifying abroad, mainly because of additional diversification of nonsystematic national risks. A number of studies (e.g., Grauer and Hakansson, 1987; and Solnik, 1998) suggest that gains from international equity-portfolio diversification are large, but the "home bias" in most mature market investors' portfolios remains a puzzle. While the case for investing in emerging market securities during the 1990s was diminished by the string of crises in the second half of the decade, the recent stellar performance of the asset class seems to have solidified its role in international portfolios (Box 4.1).

Moreover, the dismal performance of mature market stocks in the aftermath of the bursting of the technology, media, and telecommunications (TMT) bubble and the low interest rate environment have increased institutional investors' interest in so-called alternative investments. Alternative investments are private equity, real estate, hedge funds, and special debt-offerings (such as credit derivatives and distressed debt), and they provide investors with new sources of excess returns as well as diversification from traditional bond and equity investments (Greenwich Associates, 2002; and Graham, 2003). Although most of the growth in alternative investments has been in private equity, institutional demand for hedge fund products has also increased more recently. And this has—indirectly and to some extent—increased interest in emerging market assets.

The most remarkable change in the institutional investor base for emerging market

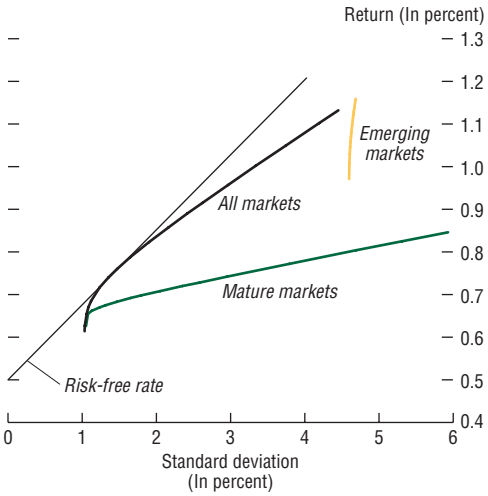
Box 4.1. The Benefits of Portfolio Diversification: Do They Really Exist?

The basic tenet of portfolio theory is that diversification reduces risk. This suggests that an optimally diversified portfolio should be one that is invested across as many asset classes and markets as possible. However, ex post empirical evidence suggests that this is not necessarily the case, with distinctly concentrated portfolios outperforming diversified ones over certain holding periods on a risk-adjusted basis. Moreover, a dichotomy exists: while "concentrated" portfolios have historically been more desirable in terms of optimizing the risk-return trade-off, traditional institutional investors are—in practice—bound by investment parameters that may not necessarily allow such narrow allocations, even if they could reasonably estimate optimal portfolios ex ante. It is therefore unlikely that actual allocations would reflect optimal historical performance.

The effectiveness of any diversification strategy depends on the correlation or covariance between returns on the individual assets within a portfolio. Portfolio managers can achieve risk reduction by adding new securities to their portfolios, provided that the return on each new security added is not *perfectly positively* correlated with the returns on the existing portfolio. The increasing globalization of financial markets has clearly extended the universe of investment—and thus diversification—opportunities for international investors.

Using a mean-variance framework to construct optimal portfolios from historical returns data—including emerging and mature market equities and fixed-income securities—over the 1991 to 2002 period,[1] the following investment strategies are separately examined: (1) mature markets only (equities and fixed income); (2) emerging markets only (equities and fixed income); and (3) all markets (mature and emerging) and asset classes (equities and fixed income).

The Efficient Frontier
(January 1991 – July 2002)



The Figure depicts the efficient frontier for each of the three investment strategies over the January 1991 to July 2002 period.[2] Consistent with portfolio diversification theory, the global market portfolio was the most efficient, offering a higher return for any given level of risk, compared with the mature or emerging market portfolios. Not surprisingly, the results also show that emerging market assets offered diversification benefits to mature market investors over the 1991 to 2002 sample period, with returns dominating those of mature market investments, within the 4.6 to 4.7 standard deviation range.

Interestingly, however, investing in the equities asset class offered few diversification benefits, relative to fixed income assets, over this period. The

[1]The framework consists of the following categories: *Mature markets,* which includes equity indices MSCI European Union, MSCI Japan, the S&P500 and NASDAQ and the bond indices Salomon Smith Barney Investment Grade (U.S. high-grade corporates) and Merrill Lynch High Yield (U.S. high-yield corporates); *emerging markets,* which includes equity indices MSCI Total Emerging Market Free, MSCI Emerging Asia, MSCI Latin America, MSCI Europe and Middle East and the EMBI bond index; and *global markets,* which includes all of the above equity and bond indices.

[2]The EMBI series, which is available from 1991, stopped at July 2002.

Box 4.1 *(concluded)*

Portfolio Diversification: Optimal Asset Allocation (Ex Post)

Sample Period	Optimal Allocation
Jan 1991 to Dec 2002	EMBI, 19 percent; U.S. high-grade, 81 percent
Jan 1991 to Jun 1997	EMBI, 43 percent; Latin equity, 6 percent; NASDAQ, 51 percent
Jul 1997 to Jul 2002	EMBI, 22 percent; U.S. high-grade, 60 percent; U.S. high-yield, 18 percent

optimal portfolio comprised bonds allocated to the EMBI and U.S. high-grade corporate classes, with the U.S. bonds notable in their importance within the portfolio (see Table).[3] In this instance, equities-only investors would have been, on average, always worse off than their fixed income counterparts.

The sample is subsequently divided into two separate holding periods: the first holding period from January 1991 to June 1997, the second from July 1997 to July 2002.[4] The results suggest that diversification across both fixed-income and equity assets, as well as across mature and emerging markets, was optimal for the investor over the 1991 to mid-1997 period. Since July 1997, however, fixed-income investments, across both mature and emerging markets, provided higher risk-adjusted returns than equities.

In conclusion, it appears that while diversification across asset classes and markets generally benefits investors, the optimal asset mix changes over time. In many instances, the concentration of the optimal allocation—which could require a significant allocation into one particular instrument or asset class—could be too extreme for the traditional institutional investor. This could partly explain the growing popularity of more "nimble" investor classes, such as hedge funds and crossover investors, which have greater flexibility in their investment mandates and are increasingly targeting absolute returns, rather than adhering to specific benchmarks.

[3]IMF (2000) shows that emerging market equities were attractive assets in 1988–94 for mature market investors by offering higher returns with little added risk, while emerging market bonds overall added more risk to the portfolio with uncertain return benefits.

[4]The onset of the Asian financial crisis provides a natural structural break, as this proved to be the beginning of a series of emerging market crises. The average annual risk-free rates used for these two holding periods are 6.8 percent and 5.4 percent, respectively.

instruments in the late 1990s has been the increase of crossover investors relative to both dedicated investors and hedge funds. Analysts have noted that the increase in crossover investors has increased volatility while a reduction in hedge fund activity has been associated with a drop in volatility. However, hedge funds have been growing again, and market participants expressed different views on the volatile behavior of crossover investors. In particular, while crossover investors may display more opportunistic behavior vis-à-vis the emerging market asset class, they tend to buy and hold assets. Indeed, although there are different kinds of crossover investors, an increasing share of this investor base is ultimately pension funds and insurance companies, which are likely to be long-term, stable investors.

The 1990s have witnessed a sharp expansion of assets under management for nonbank institutional investors in mature markets (Table 4.1).[2] For the group comprising insurance companies, pension funds, and mutual funds, assets under management expanded by

[2]An unknown amount of double counting occurs when the assets under management of these institutions are added. This reflects the fact, for example, that pension funds place funds with mutual funds. An offset to this double counting is that the assets under management of hedge funds are not included.

Table 4.1. Mature Markets: Assets Under Management by Institutional Investors[1]

	1993	1994	1995	1996	1997	1998	1999	2000	2001
					(In billions of U.S. dollars)				
Institutional investors	**18,248**	**20,153**	**23,141**	**25,432**	**27,686**	**32,435**	**36,596**	**36,233**	**34,723**
Insurance companies	6,991	7,822	8,980	9,369	9,702	11,010	11,960	11,519	11,146
Pension funds	5,332	5,868	6,660	7,545	8,281	9,527	10,337	10,279	9,515
Investment companies[2]	4,050	4,478	5,309	6,200	7,293	9,201	11,168	11,293	11,091
Other institutional investors	1,876	1,986	2,192	2,318	2,409	2,697	3,132	3,143	2,971
Memo item:									
Hedge funds[3]		39	45	61	100	112	150	172	217
Mature market bank assets	**4,491**	**4,798**	**5,453**	**5,613**	**6,074**	**5,301**	**5,699**	**5,917**	**6,192**
					(In percent of institutional investors' assets)				
Mature market bank assets	**24.6**	**23.8**	**23.6**	**22.1**	**21.9**	**16.3**	**15.6**	**16.3**	**17.8**
Emerging markets	**15.5**	**15.5**	**14.3**	**15.8**	**13.8**	**11.4**	**14.5**	**13.9**	**14.4**
Stock market capitalization	**11.3**	**10.8**	**9.6**	**10.7**	**9.1**	**6.6**	**10.1**	**9.1**	**9.0**
Africa	1.0	1.1	1.2	1.0	0.9	0.6	0.8	0.6	0.5
Asia	7.8	7.3	6.5	7.2	5.0	4.2	6.6	5.9	5.8
Europe	0.2	0.2	0.2	0.4	0.8	0.3	0.7	0.4	0.5
Middle East	0.0	0.0	0.0	0.2	0.3	0.3	0.5	0.5	0.5
Western Hemisphere	2.3	2.2	1.7	1.9	2.1	1.2	1.5	1.7	1.7
Bonds oustanding	**4.2**	**4.6**	**4.8**	**5.1**	**4.7**	**4.7**	**4.4**	**4.8**	**5.4**
Asia	2.4	2.5	2.7	2.8	2.2	2.6	2.7	3.0	3.4
Western Hemisphere	0.9	1.3	1.3	1.5	1.6	1.6	1.2	1.3	1.4
Africa, Europe, and Middle East	0.8	0.8	0.8	0.8	0.8	0.6	0.5	0.5	0.6
					(In percent of mature markets GDP)				
Institutional investors	**94.7**	**97.6**	**102.0**	**111.9**	**124.2**	**143.5**	**154.4**	**151.4**	**147.2**
Insurance companies	36.3	37.9	39.6	41.2	43.5	48.7	50.5	48.1	47.3
Pension funds	27.7	28.4	29.4	33.2	37.1	42.2	43.6	43.0	40.3
Investment companies	21.0	21.7	23.4	27.3	32.7	40.7	47.1	47.2	47.0
Other institutional investors	9.7	9.6	9.7	10.2	10.8	11.9	13.2	13.1	12.6
Mature market bank assets	**23.3**	**23.2**	**24.0**	**24.7**	**27.2**	**23.5**	**24.0**	**24.7**	**26.2**

Sources: BIS; CISDM; IFS; OECD; S&P/IFC, *EMDB;* and World Federation of Exchanges.

[1]OECD countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the United States.

[2]Investment companies' include closed-end and managed investment companies, mutual funds, and unit investment trusts (see OECD, 2003).

[3]Assets under management of hedge funds are based on the information provided by CISDM (formerly MAR/Hedge), which covers mainly the U.S.-based hedge funds. Eureka/Hedge, which tracks European and Asian based hedge funds, does not provide historical assets under management.

90 percent between 1993 and 2001 and reached $34 trillion. The expansion was most rapid in the United States (113 percent) and in the countries in the European Union (111 percent). As a result of this rapid growth, assets under management for these companies rose from 95 percent of GDP at the end of 1993 to 147 percent at the end of 2001. The assets of these nonbank institutional investors also expanded much more rapidly than bank assets. Indeed, bank assets fell from the equivalent of 25 percent of nonbank institutional investors' assets under management in 1993 to 18 percent in 2001.

The assets under management of the nonbank institutional investors are very large relative to any measure of either the size of emerging markets or capital flows to these markets. To gauge comparative size, one can compare the assets under management of mature market institutional investors with the total market capitalization of emerging market bonds and equities. In addition, to examine the effects of a reallocation of institutional investors' assets under management toward emerging markets, one can consider what fraction of the assets under management would have to be shifted to emerging markets

to equal the level of capital flows that actually took place during a given period. At the end of 2001, for example, the total market value of all external and domestic bonds and equities issues by emerging market residents amounted to only 14 percent of the assets under management of the mature market nonbank institutional investors. Moreover, total emerging market issuance of international bonds, equities, and syndicated lending ($135.6 billion) in 2001 was equivalent to roughly a half of 1 percent of assets under management of these institutional investors. It is evident that even a modest adjustment in the allocation of the assets under management of these institutional investors toward emerging markets can lead to substantial capital flows. Naturally, if these flows are focused on a particular region, the magnitude of the flows can be relatively more sizable. For example, Asia had the largest equity and bond market capitalization ($3.18 trillion) and received the largest capital inflows ($67.5 billion) in 2001, but these were equivalent to 9 percent and 0.2 percent, respectively, of the assets under management of the mature market nonbank institutional investors' assets under management.

The potential large-scale capital flows that could be generated by even a relatively small shift in the portfolio behavior of the mature market nonbank institutional investors raises several issues, including the extent of their holdings of claims on emerging markets, the stability of their investments, and whether there are any economic or regulatory factors that inhibit investments in emerging markets. In this chapter, these issues are addressed by examining the behavior of three types of mature market institutional investors: pension funds, life insurance companies, and asset managers (as represented by mutual funds and hedge funds). Subsequently, there is also consideration of the behavior of local nonbank institutional investors in emerging markets.

In what follows, key features of institutional investors' asset allocation decisions vis-à-vis emerging market securities are described. Even though the risk-return configuration of emerging market securities may warrant allocations in an increasingly globalized portfolio, regulations and investors' mandates—sometimes related to risk management methods and the nature of liabilities—constitute additional constraints that could reduce institutional investors' allocation to emerging market securities.[3]

Pension Funds and Insurance Companies

Pension funds and life insurance companies are long-term investors whose investment process consists of strategic asset allocation decisions—which determine broad portfolio distributions across asset classes, such as bonds and equities—as well as tactical asset allocation that involves deviations from the basic asset categories to exploit short-term profit opportunities.[4] Finally, security selection refers to the choice of individual assets to be held within each asset class. The asset allocation decisions are driven by the preferences of the pension fund trustees or insurer's investment committees, which take into account the risk/return trade-offs of different portfolios as well as the nature of their liabilities and regulations.

The importance of liability considerations is apparent in the different asset allocation decision of defined benefit versus defined contribution pension funds. In defined benefit plans, the plan sponsor guarantees an agreed level of retirement benefits to the plan members. The plan sponsor, hence, bears the risk that the returns from the investment portfolio

[3]Other factors that may limit foreign investment by mature markets' institutional investors are low levels of financial transparency, corporate governance, and integrity in emerging markets.

[4]This chapter focuses on the life business and does not cover property and casualty insurance.

may not be enough to cover the pension fund liabilities, or funding gap risk. The plan sponsor can minimize this risk by choosing financial assets that match the plan's liabilities: domestic assets are better for matching domestic liabilities than foreign securities (Davis and Steil, 2001). In contrast, the retirement benefits in defined contribution plans are tied up to the pension fund portfolio performance. Regardless of whether the asset allocation is decided by the pension plan sponsor, or by the pension plan member, as is the case in the 401(k) pension plans in the United States, the investment risk is borne exclusively by the pension plan member. Therefore, the appropriate investment strategy in defined contribution plans is to maximize the expected return of the portfolio for a given level or risk, as suggested by modern portfolio theory (Davis and Steil, 2001). Some authors (Blake, 2003) argue that pension funds offering defined contribution plans would invest more in equities and in foreign securities (including emerging markets) than pension funds offering defined benefit plans.

The analysis above is supported partly by the historical evolution of asset allocation in some of the mature market pension funds. For instance, in the United States defined benefit plans covered 87 percent of pension plan participants in 1975 but only 20 percent in 1999.[5] At the same time, foreign investment in 2002 increased to more than 12 percent from less than 3 percent in 1986.[6] In the United Kingdom, in contrast, defined benefit plans covered up to 85 percent of all plan participants in 1999 (Association of British Insurers, 2000). After the release of the Myners report in 2001, stricter regulations were introduced to encourage a closer matching of assets and liabilities. Surveys by the William Mercer Company show that pension funds met the requirements by increasing the domestic bond allocation to 12.5 percent in 2003 from 9.5 percent in 2000 while reducing their domestic equity allocation to 38 percent from 47 percent. The foreign equity allocation, however, remained steady at 25 percent.

Despite these arguments favoring diversification, current investment levels in emerging markets by pension funds are relatively small. In the United States, a survey by Greenwich Associates (2003) indicates that large public pension funds do not invest in emerging market bonds. Furthermore, these funds' allocation to emerging market equities is estimated to be around 1 percent of assets.[7] In Japan, foreign investment by the government pension fund has been limited only to mature markets. In the United Kingdom, Kimmis and others (2002) report that emerging market securities represented around 2 to 3 percent of pension assets.

Investment regulation does not appear to be a major impediment to investing in emerging market securities. A recent survey by the OECD shows that only Germany and Italy imposed tight investment limits on foreign securities (Yermo, 2003a). In Germany, pension funds only can invest up to 10 percent of assets in foreign equity and 10 percent in bonds from non-European Union countries. In Italy, the ceiling on foreign equity and bonds of non-OECD countries is 5 percent of assets. Pension funds, however, can invest up to 50 percent of assets under management in OECD emerging market countries such as Mexico, Korea, and the EU accession countries. In contrast, there are no investment limits in the United Kingdom and the United States (see the section on local pension funds). Countries that do not place invest-

[5]Hinz (2000); in terms of assets under management, each one holds about half the total.

[6]Data sources include Blake, Lehmann, and Timmermann (1999), and Greenwich and Associates (2003).

[7]The survey indicates that foreign equity holding of public pension funds in the United States amounted to 12 percent of assets under management by the end of 2002. The 1 percent weight is obtained by assuming that the relative weight of emerging markets in the portfolio is equal to the 8 percent weight of emerging markets in Morgan Stanley's All Country World Index (ACWI)—excluding the United States.

ment limits on foreign securities rely on the "prudent man rule" or prudent investor rule. The rule requires pension fund managers to make sensible investment decisions based on what is perceived as best practice among other large and prudent institutional investors.

A primary obstacle to increased asset allocation to emerging markets is the risk aversion of pension fund trustees. The repeated occurrence of financial crises in emerging markets has reduced the diversification benefits from emerging market investments and heightened the perception that emerging markets are excessively volatile. As a result, pension fund trustees have become wary of investing in emerging markets for fear of facing substantial short-term losses. In the United Kingdom, risk aversion among trustees seems to have been encouraged by regulations designed to strengthen U.K. pension funds, such as Minimum Funding Requirements and a new accounting standard, FRS17, that encourage a closer matching of assets and liabilities (Kimmis and others, 2002; and Blake, 2003). In the United States, fear of litigation over serious short-term underperformance increases the risk perception of pension fund managers.

Pension fund trustees in the United Kingdom tend to rely heavily on the advice of external consultants for selecting the fund's asset allocation and on external asset managers for security selection. Their asset allocation methods and fund management styles do not favor investment in emerging market securities. The reliance on third parties is explained partly by the fact that a substantial fraction of the funds' trustees lack investment expertise.[8] Some asset and liability management models used for asset allocation require the availability of long time series and tend to discourage asset classes that are relatively young and underresearched—such as emerging market securities. The two main styles of fund management are balanced mandates and specialists mandates. Balanced mandates measure manager performance relative to a peer group while specialists mandates use a customized benchmark, making it difficult for managers to invest in any asset class that others are not investing in or that is not included in major indices.

The increasing allocation to emerging market securities, including from pension funds in continental Europe, are reportedly outsourced to specialized asset managers—many of them in the United Kingdom. According to analysts, this delegation of asset allocation and security selection has conflicting implications: it improves the quality of the decision-making process and ensures adequate discrimination across emerging markets, but the quarterly appraisals of managers encourage a short-term focus on performance objectives, defeating to some extent the long-term horizon of pension funds.

Emerging market investment is also affected by non-economic factors. Foremost among them is the requirement that pension funds invest only in a number of "permissible countries" that satisfy "socially responsible" investment conditions. A recent study by Wilshire Associates commissioned by Calpers, the largest public pension fund in the United States, used both traditional market indicators and country factors to select permissible equity markets (Wilshire Associates, 2002). Market indicators include market liquidity and volatility, market regulation, the adequacy of the legal system, investor protection rules, capital market openness, settlement proficiency, and transaction costs. Country factors include political stability, transparency, and "productive" labor practices.[9] In 1999, Calpers's exclusion of some Asian countries

[8]See Myners (2001). In contrast, in the Netherlands, the pension fund board may decide the asset allocation itself, as board members are investment professionals (Davis, 2002).

[9]Socially responsible guidelines could potentially lead to the exclusion of companies that follow good labor standards but are headquartered in countries with overall weak labor standards and/or political systems.

from the list of "permissible" countries caused a brief sell-off in these countries' stock markets as investors tried to front-run a possible sell-off by pension funds. In February 2003, stock markets in Malaysia and Thailand benefited from the inclusion of these countries in the permissible country list. More recently, Argentina, Peru, and Turkey failed to meet Calpers's criteria and were excluded from the list.[10] Although another pension fund is reportedly considering the use of similar criteria to select countries to invest in, analysts do not expected the practice to spread to others. Socially responsible investment guidelines are also used in countries other than the United States. For example, in the United Kingdom, 19 percent of private sector funds and 31 percent of public sector funds reported taking into account ethical considerations in their investment decisions (Targett, 2000).

Large public pension funds approach alternative investment opportunities with caution, and, while pension funds are increasingly interested in alternative investment opportunities, actual allocations are still relatively small. A large public pension fund, for instance, has approved an allocation of up to $1 billion for hedge funds, but has managed to implement only half of that amount. The investment officers have noted that investing in hedge funds is time-consuming because of the opacity of hedge funds' investment strategies, and that the size of most hedge funds is too small for the pension fund industry asset allocations.

The asset allocation decisions of insurance companies are heavily influenced by the profile of their liabilities. As noted in Chapter III, the relative shares of equity and fixed-income allocations vary considerably among different mature market insurance sectors. However, the need to limit the mismatch that would arise from a large share of contracts that generate fixed-income-type obligations leads many insurers to make a significant portfolio allocation to bonds. Similarly, the importance of matching assets and liabilities would suggest that the insurers also tend to have lower shares of foreign assets than other institutional investors.

The strategic asset allocation of mature market insurance companies vis-à-vis emerging market securities also depends on their size and geographical presence. Global insurance companies tend to follow their insurance business—that is, issuance of local policies—and match locally the liabilities of their subsidiaries in emerging markets. That is, they invest in local securities and try to extend duration as much as possible in the local market, providing support to the development and stability of emerging market securities markets. An example of this support was provided during the recent turbulence in Hungary's local bond market. The subsidiaries of two large global insurers are the largest holders of Hungary's 10-year local bonds, and their need for duration and a buy-and-hold attitude contributed to support the market during the November 2003 sell-off by leveraged players (see Chapter II, Box 2.2).[11]

Medium- and small-sized mature market life insurers that do not distribute their insurance policies in emerging markets tend to perceive the asset class as an opportunity to diversify and enhance yields. Some of them reportedly have a higher share of their portfolio allocated to emerging market securities (5 to 10 percent of total assets, compared with around 1 to 3 percent for the large ones), and although they are of the buy-and-hold type, they are not tied to any particular emerging market by the nature of their liabilities and hence may constitute a less stable segment of the investor base. They reportedly do most of

[10]However, market participants reported that the exclusion did not seem to have negative effects in the respective stock markets.

[11]However, some market participants noted that the insurers' ability to lend the securities could have contributed to the sell-off.

their investment decisions in-house, but in some cases they do not have the resources to do the research needed to invest in emerging markets.

The major constraint to investing in emerging markets is the insurance companies' own ratings, which have been under pressure over the past few years.[12] In contrast, losses from emerging market investments have been small, even though insurers did not emerge totally unscathed from Argentina. Typically, equity and credit losses have been mitigated by selling other bonds whose prices have risen in a declining interest rate environment. Also, many European life insurance products offer policyholders a guaranteed minimum return and some participation in investment results above the guaranteed rate. Guaranteed returns on life policies, combined with the collapse in equity prices and the low interest rate environment, have also had a negative impact on the insurers' balance sheets (Wilson, 2003). As a result of these losses and balance sheet weaknesses, life insurance companies are operating in a risk-averse mode and are keeping their allocations to emerging markets stable.

As a result of the combined pressures from the need to enhance yields and the preservation of their own ratings, some insurance companies have invested indirectly in emerging market securities through the purchase of structured products. These include principal-protected notes with large coupons—associated sometimes with emerging market securities—securitization of emerging market future flow receivables or CDOs (collateralized debt obligations), with investment-grade ratings. They are considered promising avenues for investing in emerging markets, but actual investments are still relatively small. Moreover, market participants note that bad experiences with some CDOs in 1998–99 have made the instruments a difficult "sell" with management. Nevertheless, some asset managers consider that emerging market CDOs—backed by both sovereign and corporate bonds—can potentially widen the emerging market investor base. They noted that adequately structured CDOs, with long lock-in periods that ameliorate redemption risks, have delivered annualized returns above 20 percent over the last two years. The outstanding recent performance of some emerging market CDOs, compared to the poor performance of high-yield CDOs, has attracted the attention of European insurers and pension funds.

Mutual and Hedge Funds

Between 1993 and 2001, the assets under management of mature market investment companies increased more rapidly (174 percent) than that of any other institutional investor (Table 4.1). As a result, the proportion of total assets under management of all institutional investors held by mutual funds rose from 22 percent in 1993 to 32 percent in 2001.[13] Mutual funds are investment companies that combine the assets of investors—individual and institutional—and collectively invest those assets in equities, bonds, and money market instruments.[14] Globally, mutual funds take on a variety of structures. Mutual funds are "open-end" investment companies if they are required to redeem outstanding shares at any time, upon demand, and at a

[12]See Chapter III. Market participants noted that pressures on ratings came from developments both in the asset and the liability side of the balance sheet in 2002, but that in 2003 pressures derived mostly from the liability side.

[13]Mutual fund assets under management are estimated to have grown by a further 5 percent by June 2003; as a result of this growth, mature market mutual fund assets grew to 43 percent of GDP at the end of June 2003. At the end of June 2003, about 40 percent of these funds were focused on equities, 23 percent on bonds, and 37 percent on money market and other investments.

[14]Investors invest in a mutual fund by purchasing shares issued by the fund, which then uses the cash raised to invest in equities, bonds, and other securities.

price determined by the current value of the funds' net assets, known as the net asset value (NAV). In contrast, a "closed-end" mutual fund issues a fixed number of shares that trade on the stock exchange or the over-the-counter market. Unit trusts buy and hold a fixed portfolio of equities, bonds, or other securities; units in the trust are sold to investors who receive their proportionate share of dividends and interest paid by the respective investments. A unit trust has a stated date for termination, upon which investors receive their proportionate share of net assets.[15]

Mature market mutual funds have grown for a variety of reasons. In some countries, the growing importance of defined contribution pension systems has increased the placement of funds with mutual funds by both individual and institutions. Indeed, Davis and Steil (2001, p. 17) estimate that about 30 percent of mutual fund assets under management reflect placement of funds by other financial institutions, notably pension funds. Moreover, financial market deregulation and capital account liberalization have allowed foreign mutual funds to enter previously closed markets. Tax considerations have also played a role, especially in countries where retail investors have been allowed to create tax deferred retirement accounts.

The growth of mutual funds has been viewed by most analysts as a positive development because the industry has provided investors with diversified investment opportunities and professional asset management services. However, from the perspective of financial market stability, concerns have arisen at times about the ability of mutual funds to meet large scale redemptions (see Davis and Steil, 2001, pp. 278–82). While retail investors are likely to hold more diverse views than the asset managers of a relatively small set of large institutional investors, market analysts argue that retail investors can be subject to fads (such as the TMT episode during the 1990s) and that this may lead mutual funds to focus on a single approach to investing. Since households can often switch funds at a low cost, a concern has been that a withdrawal from a favored investment style could generate large-scale redemptions, and trigger an asset sell-off.

Mutual funds can address large-scale redemptions through on-balance-sheet liquidity and/or forced sales of securities. The amount of liquidity held by a mutual fund is a portfolio decision, but holding large amounts of liquid assets will generally reduce a fund's performance.[16] As a result, large-scale redemptions have typically been met by forced sales of assets, which at times have put strong downward pressure on already declining asset prices. One means of mitigating the effects of large-scale redemption on mutual funds has been to establish a family of different funds so that investors can shift to another fund within the family (for example, from equities to a money market fund). However, some analysts argue that concerns about mass redemptions are inconsistent with the fact that, in mature markets, mass redemptions of mutual fund shares have been relatively rare.[17] For example, on October 19, 1987, when U.S. equity prices fell sharply, only 3.2 percent of equity transactions were associated with sales of equity fund shares (Davis and Steil, 2001, p. 280). In part, this reflects the fact that a significant proportion of equity mutual fund shares were held for retirement purposes. Nonetheless, the recent

[15]An exchange-traded fund (ETF) is an investment company whose shares are traded on stock exchanges at market-determined prices.

[16]Funds can also arrange backup lines of credit from banks or from within a family of funds. Only committed bank lines of credit are likely to be secure sources of funds, especially if the fund is facing heavy redemptions and will involve an up-front fee. In the United States, interfund family lending is strictly restricted.

[17]The experience with mass redemption in emerging markets is discussed on pages 140–43.

Table 4.2. U.S. International Mutual Funds: Total Net Assets
(In billions of U.S. dollars)

Investment objective	1996	1997	1998	1999	2000	2001	2002
Equity funds							
Emerging markets equities	14.0	16.0	12.7	22.1	15.4	13.7	13.7
Global equities	105.2	137.5	159.8	236.4	228.0	183.0	140.9
International equities	134.1	164.9	187.2	276.2	262.1	206.3	183.7
Regional equities	31.8	27.9	32.0	50.5	37.2	25.8	20.2
Subtotal	*285.2*	*346.4*	*391.6*	*585.3*	*542.7*	*428.8*	*358.5*
Total U.S. equity funds	**1,726.1**	**2,368.0**	**2,978.2**	**4,041.9**	**3,961.9**	**3,418.2**	**2,667.1**
Bond funds							
Global general bonds	17.5	16.1	15.9	14.9	12.7	12.4	13.2
Global short-term bonds	5.4	6.1	5.7	4.0	3.3	2.7	3.2
Global other bonds	2.8	3.8	3.3	4.0	4.0	4.0	4.7
Subtotal	*25.7*	*26.0*	*24.9*	*22.9*	*19.9*	*19.1*	*21.1*
Total U.S. bond funds	**645.4**	**724.2**	**830.6**	**812.5**	**811.2**	**925.1**	**1,125.1**

Source: Investment Company Institute.

mutual fund scandal in the United States saw relatively large redemptions from funds accused of improper trading activities. Between September and December 2003, one firm lost about 12 percent of its assets under management, mostly from institutional clients.

From the perspective of emerging markets, the categories of crossover equity investors include *global equity funds* (which invest primarily in equity securities traded worldwide, including U.S. companies) and *international equity funds* (which invest primarily in equity securities of companies located outside the United States). Dedicated equity funds include *emerging market funds* (which invest primarily in companies based in developing markets around the world). Meanwhile, *regional equity funds* (which invest in companies based in a specific part of the world, and may comprise both mature and emerging markets) could represent either dedicated or crossover accounts, albeit more benchmark indices are available for the former.[18] Within the fixed-income universe, crossover investors include *global bond funds* (which invest in debt securities worldwide, and may invest up to 25 percent of assets in companies located in the United States) and *international bond funds* (which must invest at least two-thirds of the portfolio outside the United States). *Emerging market bond funds* invest primarily in the debt of less-developed regions.

Equity allocations overseas by U.S. funds—amounting to $359 billion out of $2.7 trillion total equity funds in 2002—have continued to surpass debt allocations by far (see Table 4.2). Of this amount, dedicated emerging market accounts represented $13.7 billion in 2002—or around 4 percent of total U.S. equity mutual funds—and appear relatively insignificant compared with the size of local equity funds in emerging markets. This allocation appears in line with the MSCI All Country World Index (ACWI), which has assigned a weighting of around 4 percent to emerging market equities. Moreover, total allocations by U.S. mutual funds, both dedicated and crossover, to other countries' debt—including both mature and emerging markets—in 2002 remained very small (less than $21 billion) as a proportion of total net assets of all U.S. bond funds (of $1.2 trillion). Indeed, the size of the U.S. allocation was dwarfed by the total

[18]For instance, the widely used Morgan Stanley Capital International (MSCI) group of regional equity indices largely comprise separate benchmarks for either mature or emerging markets.

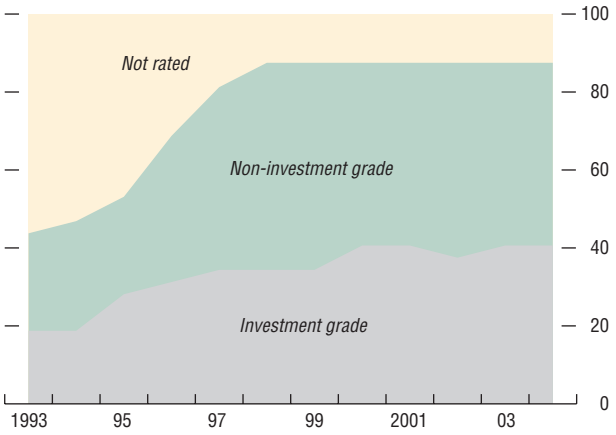
size of local bond mutual funds in emerging markets.

The improving credit quality in emerging markets, as evidenced by the number of credit upgrades in 2003, has infused confidence in traditional high-grade crossover investors. For instance, recent institutional mandates to invest in emerging debt are widely considered a stable source of funds, as they are generally seen as longer-term, strategic allocation decisions. As more emerging market sovereigns receive an investment grade rating over time, and an increased proportion of global investment portfolios are committed to these countries and are included in core benchmarks, capital flows to these countries are expected to become less volatile. Already, more than 40 percent of the Emerging Market Bond Index Global (EMBIG) is represented by investment grade issuers (see Figure 4.1).

Among retail investors in the United States, crossover funds in both equity and debt asset classes have benefited from new net flows in 2003. On balance, equity funds have been more attractive to investors than bond funds, with international equity funds in receipt of net cash inflows of almost $14 billion for the year, while dedicated emerging market equity accounts posted net inflows of almost $5 billion.

Generally, institutional inflows are viewed as a more stable source of assets under management, compared to the retail flows that have been fuelling the growth of emerging market bond funds over the past year (see Box 4.2 for a summary of some empirical evidence on the behavior of mutual funds during crisis periods). The less sophisticated retail investors are seen to be more likely to pull out their investments quickly during a market event. For instance, analysts argue that most European institutional investors are said to prefer to follow buy-and-hold strategies unless their views on a country turn excessively negative. Additionally, the large size of some portfolios, high transaction costs, and lack of liquidity in emerging markets prevent excessive trading

Figure 4.1. Composition of Emerging Market Debt[1]
(Percent of countries)



Sources: Moody's; Standard & Poor's; and J.P. Morgan Chase & Co.
[1]Based on EMBIG group of countries. Data for 2004 are as of March 2, 2004.

Box 4.2. The Behavior of Mutual Funds During Periods of Emerging Market Volatility

The increased presence of foreign investors—more specifically, mutual funds from mature markets that hold almost 95 percent of total industry net assets (or $11.7 trillion out of $12.4 trillion)—has raised concerns about their potential to destabilize emerging financial markets. The biggest concern is that these institutional investors would "herd" and pull out of emerging markets en masse during periods of financial stress and cause further disruption to already weakened markets.

Contrary to perceptions that international investors are responsible for instability and crises in emerging markets,[1] studies of the investment pattern of U.S. mutual funds in emerging markets (Rea, 1996; Rea and Marcis, 1996; and Post and Millar, 1998) suggest that neither shareholders nor portfolio managers behaved in a manner that exacerbated market volatility during emerging market crises in the 1990s.[2] The evidence indicates that shareholders in U.S. emerging market equity funds did not redeem shares in large volumes during periods of market weakness in the 1990s—any withdrawal tended to be made in modest amounts and over a period of time.[3] Similarly, portfolio managers at these mutual funds did not reallocate investments between countries in a way that would have intensified price swings. Indeed, portfolio managers were frequently observed to have purchased shares when prices were falling and to have sold in rising markets. Overall, any liquidation of securities in falling markets was found to be small relative to the size of the positions taken in those markets. Moreover, U.S. mutual fund allocations to emerging market equities represent only a very small proportion of emerging market capitalization.[4] In contrast, Kaminsky, Lyons, and Schmukler (2001) argued that emerging market mutual fund flows around crises were unstable.

In other studies on the impact of emerging market mutual funds, Borensztein and Gelos (2003a) examined a sample consisting of 80 percent of dedicated emerging market equity funds worldwide and found herding behavior among these funds to be moderate, albeit statistically significant. However, this behavior did not appear to be more prevalent during crisis periods, and was unlikely to have been sufficiently strong enough to have accounted for instances of high volatility in international capital markets. Moreover, Borensztein and Gelos (2003b) found that open-end funds tended to sell down their holdings more than closed-end funds (which are not subject to redemptions by individual investors), implying that withdrawals by individuals, rather than fund managers, were driving the retrenchment of funds from emerging markets during crises.[5]

[1]See Aitken (1998).

[2]U.S. mutual funds held some 55 percent of worldwide industry net assets in 2003.

[3]Rea and Marcis (1996) argue that this suggests that U.S. equity fund investors are generally experienced investors with a basic understanding of investment risk and have long-term investment objectives and horizons. A 1996 survey by the Investment Company Institute shows that shareholders of international and global mutual funds, which invest in markets outside the United States, tend to be more willing to take above-average risk than those not owning such funds.

[4]In 1996, prior to the onset of the Asian financial crisis, U.S. equity mutual funds held an estimated $27.7 billion in emerging market stocks, equivalent to 1.2 percent of the $2.2 trillion in stock market capitalization of developing countries.

[5]Kim and Wei's (2002) research into transactions by portfolio investors in Korea indicated that herding behavior was more prevalent among individual investors, compared to institutional investors, and more so among non-resident investors than residents.

and practically force fund managers to adopt a buy-and-hold approach, which sometimes makes tactical asset allocations in emerging markets rather difficult.

Another type of closed-end fund that has been active in emerging markets is the hedge fund, which is typically a private unadvertised mutual fund whose investors are wealthy indi-

viduals and institutions.[19] Another major difference from conventional mutual funds is that they are allowed to take leveraged positions and are not subject to regulatory reporting requirements. Following the demise of several large macro hedge funds during 1998–2000, the hedge fund industry growth picked up again: the total assets under management of U.S.-based hedge funds almost doubled during 2001–03. The total size of the global hedge fund industry is now estimated at around $725–$750 billion compared to around $300 billion in 1997.[20] The universe of European and Asian hedge funds, though much smaller than the U.S. hedge fund industry, has been recently expanding at an even faster pace. The total assets under management of the Asia-focused hedge funds rose to $22.4 billion as of mid-2002 from about $12 billion at the end of 2000, while the assets of European hedge funds increased to $112 billion as of mid-2003 from $46 billion at the end of 2000.[21]

As with the mutual fund industry, the recent growth of the hedge fund industry has been supported by increased allocations toward hedge funds by other institutional investors (such as pension funds, endowments, and foundations). The search for "alternative" investments has reflected (1) a general dissatisfaction with traditional "benchmark-based" portfolio management amid poor performance of global markets in recent years; (2) the growing asset-liability mismatches of many institutional accounts in mature markets and, hence, the need to pick up yield; and (3) the aggressive marketing efforts of investment consultants. Indeed, many institutional investors prefer to invest in hedge funds through funds of hedge funds, because of lower monitoring costs, easier scaling of investments, and better opportunities to diversify across a larger number of styles/managers. As a result, the number of funds of funds has continued to expand rapidly over the past two years, while their ability to allocate the growing institutional investments efficiently has not been tested yet.

The hedge funds most active in emerging markets are global funds, dedicated emerging market funds, macro funds, and event-driven funds (distressed securities and merger arbitrage).[22] Macro hedge funds are the "classic" opportunistic hedge funds that take positions whenever they see apparent macroeconomic imbalances that are not properly reflected in asset prices; they use leverage and derivatives, and their investment horizon can be either short (under one month) or long (more than 12 months). Global hedge funds typically use a top-down/bottom-up approach in that they tend to be stock-pickers in the markets that they like based on macroeconomic analysis. Dedicated emerging market hedge funds are

[19]Hong Kong SAR and Singapore have recently allowed hedge funds to be marketed to retail investors. In Hong Kong SAR, minimum individual subscription thresholds are: (1) single hedge fund, US$50,000; (2) fund of hedge funds, US$10,000; and (3) hedge funds with a capital guarantee feature, no minimum subscription. In Singapore, differentiated minimum subscription levels are: (1) single hedge fund, S$100,000 (US$59,000 per investor); (2) fund of hedge funds, S$20,000 (US$12,000) per investor; and (3) capital protected or capital guaranteed funds, no minimum subscription.

[20]According to Tremont TASS, one of the leading hedge fund data providers. It should also be noted that the majority of the top 100 hedge funds, which are believed to have more than $300 billion in assets under management, do not report to any data vendors. Thus, most hedge fund data providers capture at best 60 percent of the hedge fund universe and typically estimate the assets under management of other funds not included in their databases.

[21]The source for European and Asian-based hedge funds, Eureka Hedge, does not provide historical series on assets under management.

[22]Convertible arbitrage and fixed-income arbitrage funds that may occasionally invest in emerging market securities as well are typically included in the "market neutral" category. It should be noted, however, that there are significant differences between the "style" classifications used by various hedge fund data providers, and, at present, there is no single database that offers both consistent classification (by asset class/region/investment method) and comprehensive data coverage of the hedge fund universe.

similar in their investment strategies to global hedge funds, but tend to focus on specific regions. Event-driven funds try to profit on asset price movements around special events, such as mergers or acquisitions (merger arbitrage) or default (distressed securities).

In normal times, hedge funds are generally cautious about investing in locally traded assets in emerging market countries because of the relatively high cross-border risk, though they may at times do so when there is a clear trend in credit dynamics and an upside potential in local instruments is perceived to be higher than that in the foreign currency denominated bonds.[23] Indeed, the hedge funds' activities in many emerging markets are often constrained by the lack of infrastructure for borrowing/lending securities (or explicit regulatory constraints on short selling), lack of derivative instruments, thin markets, and high concentration of liquidity in a few instruments. In such markets, hedge funds often tend to have a long bias and use strategies similar to those employed by mutual funds. Although at present hedge funds' exposures to most local emerging equity and bond markets are relatively small compared to that of other institutional investors, hedge funds will likely become a bigger part of the crossover investor base for emerging market instruments going forward,[24] especially given the recent rapid expansion of the global hedge fund industry, and in particular that of dedicated emerging market hedge funds.[25]

In considering hedge fund activities in both primary and secondary markets for emerging market claims, analysts have debated the role of hedge funds as a source of either liquidity and/or potentially destabilizing trading strategies. The impact of the hedge funds' activities on price dynamics depends on the funds' strategies and investment horizon. Given that hedge funds, by nature, are more nimble than traditional "real money funds" and tend to trade more actively, they generally contribute to higher turnover and better liquidity in markets in which they participate. For example, as a result of the exit of hedge funds and proprietary trading desks of investment banks from the South African foreign exchange spot and swap markets after the tightening of capital controls in the second half of 2001, the average daily turnover fell by over 40 percent. At the same time, the bid-ask spreads widened and the implied foreign exchange rate options' volatility increased. Also, since hedge funds typically have lock-up periods and do not experience redemption pressures similar to those faced by retail mutual funds, they are better able to invest in less liquid securities and also to withstand periods of high volatility. Thus, hedge funds are less likely to be forced to sell into a falling market and can, at times, maintain contrarian positions during extended periods. All of the above suggests that hedge funds can and, in fact, do play a positive (or even stabilizing) role in various markets. However, because hedge funds have fewer investment restrictions than other insti-

[23]However, hedge funds, especially macro hedge funds, are known to punt fixed income and local currency markets in emerging market countries when there are perceived macroeconomic imbalances that are not properly reflected in asset prices (short-term directional bets) or specific misalignments in interest and exchange rates (e.g., a profitable "carry trade" opportunity).

[24]Compared to the pre-Asian crisis period, hedge funds are not nearly as important players in emerging debt markets as they used to be, mainly because they are now a smaller part of the emerging debt market investor base and also not as large (or as leveraged) as back then. Based on the information provided by a major market-maker in emerging debt markets, hedge funds now account for only 17 percent (12 percent macro hedge funds, 5 percent dedicated emerging market hedge funds) of the emerging debt market foreign institutional investor base, while in 1998, they accounted for about 30 percent (20 percent macro hedge funds, 10 percent dedicated emerging market hedge funds).

[25]According to one of the leading hedge fund data providers (CISDM/formerly MAR/Hedge), total assets under management of emerging market hedge funds have doubled during 2003, reaching over $40 billion.

tutional investors, they are perceived to have an "edge" over other investors as well as the ability to manipulate markets. Another concern is that since hedge funds use leverage, they may have to unwind positions at times of market stress, exacerbating selling pressures and volatility.

The finance literature has covered extensively the types of trading strategies that could play a role in destabilizing market dynamics. Such strategies include various momentum strategies, such as *positive-feedback trading*, which involves selling an asset after its price falls or buying an asset when its price rises, and *herding*—that is, imitating the behavior of other market participants instead of trading on one's own private information. Positive feedback trading can be a result of dynamic hedging, an application of a "stop-loss" rule (i.e., liquidating a position when investor's losses reach certain critical level), or a decision to unwind a leveraged position because of the inability or unwillingness to meet the margin calls (a shortfall in collateral on the margin account due to a decline in asset price).[26]

However, both academic and market research that analyzed the hedge funds' activities during the emerging market currency crises of 1994–98 found little evidence that hedge funds consistently used "positive-feedback" strategies (Brown, Goetzmann, and Park, 1998; Fung, Hsieh, and Tsatsaronis, 1999; Fung and Hsieh, 2000; and Eichengreen and Mathieson, 1998) or other strategies that could have had a destabilizing impact on market dynamics. In addition, these studies found no evidence that hedge funds earned abnormal profits during the Mexican or the Asian currency crises. The analysis of hedge fund positioning in several more recent emerging market currency crisis episodes yielded similar conclusions (see the Appendix to this chapter).

With regard to herding, hedge funds are generally perceived to be less likely to "herd" than other investors, such as mutual funds and pension funds, because they tend to be relatively well informed and their performance is not measured relative to any benchmark.[27] A related concern is that hedge funds and proprietary trading desks (often referred to as "smart money") are often "imitated" by other investors.[28] Although market participants may at times attempt to mimic hedge-fund strategies, hedge funds are usually reluctant to reveal their portfolio allocations because of concerns that the replication of their portfolios by other traders may erode profit margins. There are, however, circumstances when hedge funds may use trading strategies that require a coordinated effort of many market players to be successful. The most obvious example is a speculative attack against a currency peg/band. In this case, hedge funds would (if and when they initiate the attack) actually prefer to be followed by other market participants, because their actions may help to generate a critical mass that is needed to break the peg. Then, for example, the leaked information about position(s) of certain large hedge fund(s) vis-à-vis an emerging market currency may serve as a trigger for similar position-taking (or herding) by other investors, especially if hedge funds are perceived to be better informed than the rest of the market (see, for example, Corsetti and others, 2004).

As far as market manipulation is concerned, the evidence against hedge funds presented in various sources has been mainly anecdotal. For example, the Market Dynamics Study

[26]Various types of market manipulation, such as trade-based or information-based manipulation, may disrupt markets as well.

[27]It is often difficult to distinguish between "herding" and similar position taking based on private information by several different investors following the same or similar "investment styles."

[28]However, given the lack of high-frequency data on the hedge funds' positions and performance, it is difficult to test the hypothesis about hedge funds being "market leaders" during the episodes of market turbulence.

Group of the Financial Stability Forum, which was asked to assess concerns of authorities in Australia, Hong Kong SAR, Malaysia, New Zealand, Singapore, and South Africa about the possible destabilizing impact of highly leveraged institutions (proprietary desks and hedge funds) in the foreign exchange markets of these countries during 1998, "was unable to reach a conclusion on the extent to which manipulation and collusion might have occurred in the six economies and whether market integrity was compromised." (Financial Stability Forum, 2000, page 125).

One form of market manipulation that hedge funds have been frequently suspected of is the trade-based manipulation. For instance, speculators can establish positions in two related markets (e.g., spot and future markets or primary and secondary markets) and by aggressively selling/buying in one market (at a loss) induce the less informed players to take certain actions that would move the price in a related market in the direction that would allow speculators to more than offset their losses (see, for example, Kyle, 1984, on trade-based manipulation in spot and future markets; also, the many accounts of the Hong-Kong SAR "double play"). One of the more recent complaints about hedge funds manipulating markets by simultaneously taking positions in different market segments comes from emerging market debt fund managers. According to some market participants, after shorting some sovereign bonds in the secondary market, hedge funds would often try to induce an upward shift of the sovereign yield curve by obtaining a sizable amount of a "new" bond just issued by the sovereign in the primary market and almost immediately selling it in the secondary market (El-Erian, 2003). Such strategy could indeed be profitable, if the gains from shorting the "old" bond more than offset the losses incurred when flipping the "new" bond (the latter can be either because of the relative sizes of the short and long positions or because of a relatively large price fall of the illiquid "old" bond).

Local Institutional Investors

The growth of institutional investors in the mature markets since the 1970s was associated with substantial growth and structural changes in capital markets, and emerging markets are following a similar path of growing institutionalization of savings and capital market development. Institutional investors' assets under management are also growing rapidly in most emerging markets, with the enactment of pension fund reforms and the growing popularity of mutual funds. Low levels of insurance penetration are also leading to relatively rapid growth in insurance companies' assets under management. The growth in assets under management is contributing to the development of local securities markets, but excessive regulation and lack of investor sophistication is creating important challenges for the efficiency and stability of local markets.

Pension Funds and Insurance Companies

A number of emerging markets have introduced pension reforms that are leading to an important increase in assets under management of private asset managers. Following the lead of Chile, which initiated the reform drive in Latin America, several other countries in Latin America and, more recently, in central and eastern Europe have adopted variants of a funded, privately managed, defined contribution personal accounts retirement system.[29] Assets under management of private pension funds in Latin America have grown from around 4 percent of GDP in 1997, to around 9 percent of GDP in 2002 (see Table 4.3).

[29]Most countries still saw the need to continue the pay-as-you-go (PAYG) system for older workers during a transitional period, and the compromise was to move to what the World Bank refers to as the multi-pillar framework (Holzmann, 1999).

Table 4.3. Pension Fund Assets
(In percent of GDP)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Latin America												
Argentina	n.a.	n.a.	n.a.	0.2	1.0	2.0	3.0	3.9	5.9	7.2	7.7	11.2
Bolivia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.8	2.5	4.0	5.8	6.3	7.3
Colombia	n.a.	n.a.	n.a.	0.0	0.3	0.8	1.3	2.1	3.3	4.3	5.3	6.7
Costa Rica	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.7	0.8
Chile	18.3	22.6	26.0	28.2	31.2	33.2	32.8	38.5	42.2	46.1	52.5	53.5
El Salvador	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.4	1.7	3.7	5.8	7.6
Mexico	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.2	1.4	2.4	2.9	4.4	5.0
Peru	n.a.	n.a.	0.1	0.6	1.1	1.7	2.6	3.1	4.7	5.2	6.8	8.0
Uruguay	n.a.	n.a.	n.a.	n.a.	n.a.	0.2	0.9	1.7	2.8	4.0	5.6	7.2
Subtotal	1.1	1.4	1.5	1.9	3.2	3.6	4.0	5.2	6.3	7.0	8.2	9.2
Europe												
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.3	0.3	0.8
Hungary	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.3	2.1	3.1	3.9	4.5
Kazakhstan	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.3	2.7	4.2	5.6	6.0
Poland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.5	2.4	3.5
Subtotal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.4	0.6	2.0	2.9	3.8
Asia												
Hong Kong SAR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.4	0.4	0.4
Malaysia	38.5	40.3	41.5	42.6	43.4	45.4	45.9	51.1	53.9	52.3	55.9	56.5
Singapore	61.7	63.4	55.5	53.5	55.5	55.8	56.2	62.2	64.1	60.3	63.8	64.9
Subtotal	21.7	23.8	22.5	22.8	24.9	25.3	23.5	20.8	21.5	20.5	21.6	21.5
Total	6.3	6.9	6.7	7.1	9.6	10.2	9.8	9.8	11.0	11.4	12.6	14.2

Sources: IMF, *International Financial Statistics;* Federacion Internacional de Administradoras de Pensiones (FIAP); Central Provident Fund (Singapore); Employees Provident Fund (Malaysia); Financial Supervisory Authority (Hungary); Mandatory Provident Fund (Hong Kong SAR); and IMF staff calculations.

Chile's assets under management have reached 54 percent of GDP after 22 years of operation of the fully funded system, while the other countries are just in the early stages of asset accumulation (see Table 4.3). The growth of assets under management has been particularly rapid in Mexico, Peru, Uruguay, Hungary, and Kazakhstan.

Retirement income in Asia is provided mainly through government-sponsored national provident funds.[30] For example, in Malaysia and Singapore the government sponsors (and to a large extent also manages) a fully funded, defined-contribution system for civilian workers, and these systems have achieved a high level of assets under management (see Table 4.3). In Korea, the national pension system is fully funded but offers defined benefits and has not reached the levels of other Asian nations. National mandatory provident funds have not contributed substantially to the development of local capital markets in spite of managing sizable assets (Holzmann, MacArthur, and Sin, 2000). Fund management in these countries is very conservative, with the result that assets are heavily concentrated in government securities. In Korea, for instance, two-thirds of the assets of the National Pension Scheme are channeled to the government as direct loans, while a large share of Singapore's Central Provident Fund assets are invested in non-marketable government securities (Asher and Newman, 2001). Centralized fund management also may have held up the development of a competitive fund management industry and its

[30]The exception in the region is Hong Kong SAR, where the Mandatory Provident Fund allows citizens to select their investment plans among a large number of approved private investment funds. However, the system started operating in the year 2000 and has yet to accumulate a sizable amount of assets under management.

positive impact in local securities markets (Holzmann, MacArthur, and Sin, 2000).[31]

The rapid growth of assets managed by private pension funds in Latin America and central Europe is having a positive impact on the development of local securities markets, which has so far been concentrated in local bond markets. Pension funds have contributed to government efforts to develop liquid benchmark yield curves, especially in Hungary, Poland, and Mexico. They have also supported the growth of medium- to long-term corporate bonds.[32] A remarkable achievement in the case of Chile is the creation of a long-run market in corporate bonds. As documented in Cifuentes, Desormeaux, and Gonzalez (2002), the average maturity of bond issuance was between 10 and 15 years in the first half of the 1990s, and more recently it has been between 10 and 20 years, and even 30-year bonds have been issued. Most corporate bonds in Chile are indexed to the *Unidad de Fomento* (UF, a unit of account linked to the CPI), and analysts agree that indexed bonds have been an optimal instrument for pension funds and insurance companies. In Argentina in the second half of the 1990s and in Mexico in the last four years, the rapid growth in local corporate bond issuance has also been associated with an acceleration in the growth of pension funds' assets under management (Roldos, 2003). Pension funds have also had a significant impact in Chile's stock markets as well as in other financial markets and institutions.[33]

The growth in private pension funds' assets under management has contributed not just to the development of local securities market. It has also had a significant impact on the sovereign external debt markets. Brainard (2001) notes that local pension funds and their investment guidelines have become essential considerations for investors in external debt markets. Developing a local investor base for sovereign external debt reduces price volatility and hence market risk for foreign investors. Despite the short history of some reformed systems, the hypothesis that assets managed by local pension funds offer stability to foreign debt markets seems to have empirical backing (see Roldos, 2003).

The growth in pension funds' assets under management is likely to accelerate over the next decade or so, and it is unclear whether local securities markets will be able to respond to such growth in the demand for financial assets. Projections from Salomon Smith Barney (see Garcia-Cantera and others, 2002) suggests that by the year 2015 most systems are going to reach a level of assets under management of around 25 to 30 percent of GDP, roughly the level of the average of the Group of Seven countries in 1998. Although the institutional, demographic, and financial structures differ across both groups of countries, a comparison of both experiences (Roldos, 2003) suggests that securities markets in the pension reform countries could potentially double in size (relative to GDP) in about a

[31]Governments in Asia have started to encourage individual saving plans, adopting measures such as favorable tax treatment to individual pension plans in Korea; individual saving plans assets, however, remain small throughout the region. Singapore has also allowed members to invest a small portion of CPF savings in approved mutual funds, while Malaysia has granted permission to the EPF to invest offshore.

[32]See Mathieson and others (2004). As noted below, other institutional investors (in particular, insurance companies, see Chapter III) benefit as well with the development of an adequate volume and variety of credit products.

[33]Walker and LeFort (2000) find a statistically significant impact of pension funds' assets under management on Chile's equity prices and the cost of capital, together with a noticeable contribution to lower volatility and sensitivity to external shocks. The authors also show that in the cases of Chile, Argentina, and Peru, pension reform contributed significantly to the accumulation of "institutional capital," a combination of a better legal and regulatory framework, increased professionalism in the investment decision making process, and increased transparency and integrity. They also note that the accumulation of funds was associated with the growth of annuities, mortgage bonds, and other asset-backed securities; the creation of closed-end mutual funds and local rating companies; and the introduction of innovations in securities trading and custody (see also Yermo, 2003b).

decade. Whether these emerging markets could respond to the increased pension fund demand with a substantial volume and enough diversity of securities, as well as with the institutions to ensure financial stability, is one of the key questions for emerging markets and one of the key challenges for regulators of securities markets and the pension industry. In particular, portfolio restrictions intended to protect workers' future pension benefits and to foster the development of local securities markets may be preventing an adequate diversification of the funds' portfolios and may be distorting asset values.

Although almost no pension fund in emerging markets is allowed to follow the "prudent man" rules, four of the big countries in Table 4.4 (Argentina, Brazil, Hungary, and Poland) are allowed to invest up to half of their portfolio in stocks, and another group (Chile, Colombia, and Peru) has a ceiling of 30 to 40 percent. The exception is Mexico, which, together with a number of smaller countries in the region, does not allow pension funds to invest in equities.[34] Actual portfolio allocations do not seem to be extremely constrained by the limits, and show as much variance as in the mature markets. While in the U.S. and the U.K. pension funds hold around 60 percent of their assets in stocks, Japan's pension funds hold 28 percent and Germany's almost none. Emerging market pension funds hold smaller shares of their portfolios in stocks. In central Europe, Poland stands out with a 28 percent allocation in stocks, while Hungary holds 14 percent of its portfolio in shares and the Czech Republic holds 11 percent. In Latin America, Peru's funds hold around 31 percent of their portfolios in stocks, while Brazil's funds hold 28 percent; Argentina, Colombia, and Chile hold less than 10 percent in shares.[35]

Table 4.4. Pension Funds Portfolio Limits and Actual Asset Allocation, 2001–02
(In percent of total assets)

	Equities		Foreign Assets	
	Limit[1]	Actual[2]	Limit[1]	Actual[2]
Mature markets				
United Kingdom	P	60.9	P	22.9
United States	P	58.8	P	11.0[3]
Germany	30	0.1	30[4]	7.0[3]
Japan	30	27.7	30[5]	22.9
Canada	—	28.2	30	15.0[3]
France	—	—	—	5.0[3]
Italy	P	4.4	P[6]	0.0[3]
Emerging markets				
Argentina	49	6.6	10	8.9
Brazil	50	27.8	0	—
Chile	39	9.0	25	16.4
Colombia	30	4.3	10	—
Mexico	0	0.0	10[7]	—
Peru	35	31.3	8	7.2
Hungary	50	13.8	30	2.5
Poland	50	27.6	5[8]	0.3[3]

Sources: For mature markets, OECD (2003); Davis and Steil (2001); Davis (2002); and Yermo (2003a). For Emerging Markets, FIAP; Brainard (2001); Roldos (2003); and Garcia-Cantera and others (2002).

[1]Numbers refer to maximum allocation; P indicates that the prudent man rule applies.

[2]Data for mature markets are end of 2001 and for emerging markets are end of 2002.

[3]For 1998, see Davis (2002).

[4]In EU equity, 10 percent in foreign bonds and equities of non-EU countries. These limits are for *pensionkassen,* which are under the supervision of the insurance regulator. Other *pensionfonds* are not subject to investment limits.

[5]No investment limits for public employee funds.

[6]Securities of OECD countries not traded in regulated markets up to 50 percent; non-OECD securities traded in regulated markets limited to 5 percent (forbidden if traded in non-regulated markets).

[7]Only sovereign and investment grade Mexican corporate debt permitted in foreign limit.

[8]Polish Brady Bonds do not count against this limit.

There are a number of reasons to justify relatively large bond allocations in pension funds' portfolios, but diversification arguments suggest that equities may deserve a bigger role than they currently have in some countries. Campbell and Viceira (2002) indicate that bonds—in particular, indexed bonds—should comprise a large share of the

[34]Although legislation to invest in equities has already been approved, some members of the board of the regulatory agency (CONSAR) remain averse toward investment in equities due to perceived riskiness of the asset class. There is, however, also a gradual recognition that workers' savings would reap higher returns from investing in equities albeit at higher risk, especially in the current low interest rate environment and the rising stock market.

[35]In the case of Chile, the share increases to 21.8 percent if one includes holdings of equity mutual funds.

optimal portfolio of long-term investors. Besides containing the risk inherent in equities, a large allocation of government bonds helps to smooth the transition to a funded system. The recent Argentine crisis, however, has highlighted the risks involved in a concentrated exposure to the sovereign: as the government tried to decrease the cost of servicing its debt in 2001, pension fund companies and banks were forced to make asset allocation decisions that they probably would not have made in other market conditions (see Garcia-Cantera and others, 2002).[36] Thus, as noted in Box 4.1, an optimal asset allocation would include a non-negligible equity allocation. Indeed, despite the extended bear market in equities in the early 2000s, well-balanced portfolios have performed relatively well in the medium term. If local stock markets are unable to provide the needed instruments, local pension funds ought to seek international alternatives.

The limits to investments in foreign securities are stricter in emerging markets than in the mature markets (Table 4.4), but some fund managers appear to be reluctant to increase international allocations. Here, again, the experience of Chile is a good example. Only a decade after the inception of the private pension funds were they allowed to invest in foreign assets, up to 3 percent of their portfolio. The limit was then increased to 9 percent in 1995, 12 percent in 1997, 20 percent in 2001, 25 percent in June 2002, and has been at 30 percent since December 2003. Pension funds did not diversify abroad in a meaningful way in the first half of the 1990s, owing to high domestic assets returns. But following two years of large negative returns in the local stock market, a strong reallocation toward foreign assets began in 1997 and the funds currently hold around 25 percent of their assets abroad.[37] In Hungary, where the limit has been at 30 percent for several years, actual allocations are under 5 percent as a result of bad experiences with losses in the aftermath of the bursting of the TMT bubble. In Colombia, funds were allowed to invest in international equity mutual funds in April 2002, but market participants argue that allocations are under 2 percent because of a fear of not meeting required minimum returns.

The limits on international investments could distort not only portfolio allocations but also asset prices. Such limits amount to controls on capital outflows that impose a wedge, for instance, between the prices of local and foreign bonds. The case of Mexico is illustrative. In February 2003, the spread between external (swapped to pesos through cross-currency swaps) and local bonds was around 300 basis points. Analysts consider that the wide spread was caused mainly by regulations preventing some investors, especially pension funds, from arbitraging the domestic and external curves (Abdel-Motaal, 2002). The spread compressed to around 100 basis points in September 2003. The compression was arguably driven by increased arbitrage trades by institutions other than pension funds and by the gradual phasing out of these constraints by the authorities (see Box 4.3 for details). Similarly, in Peru, Brady bonds pay much higher spreads than local corporate bonds, owing to the fact that pensions can invest only up to 5 percent of their portfolio in Bradys versus 40 percent in corporate bonds.

[36]The subsequent default, devaluation, and pesificacion of deposits and local bonds have caused losses to the pension funds and have raised concerns on the increased intervention of the government in the industry. The Superintendency of Pension Funds notes, however, that the pension fund administrators have managed to prevent to a large extent the fall in asset values in real terms, even when the dollar value of assets under management declined substantially.

[37]A large share is done through global mutual funds. Mexican regulators are reluctant to follow this route as they argue that it would be difficult to monitor the funds' allocations and that pensioners would be paying management fees twice.

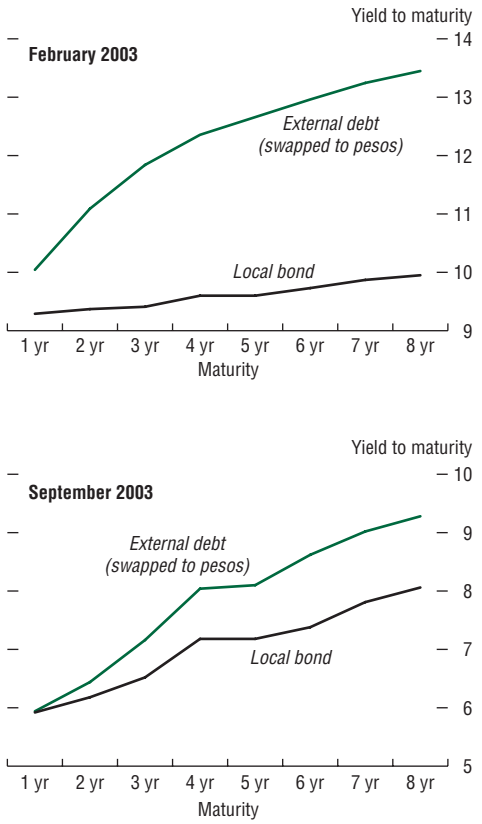
Box 4.3. Pension Fund Regulations and Local Yield Curves: The Case of Mexico[1]

During the past three years, it has been observed that the external U.S. dollar-denominated Mexican sovereign yield curve, when swapped into Mexican pesos using cross-currency swaps, always carries a premium (or currency swap spread) over the domestic Mexican peso-denominated sovereign yield curve. For instance, the eight-year maturity cross-currency swap spread of 300 basis points observed in February 2003 was not unusual given the historical range of 150 to 350 basis points observed for the period 2000–02 (see the Figure). Also, the currency swap spread tends to widen with maturity. It has been widely documented that domestic corporate issuers have taken advantage of this yield curve anomaly to lower their financing costs by simultaneously issuing peso-denominated bonds and swapping the peso payments into U.S. dollars (Oswald and Sekiguchi, 2002; and Kumar, 2003).

The existence of the currency swap spread creates a carry-trade arbitrage opportunity for investors. The simplest way to execute the carry-trade arbitrage is by selling short domestic sovereign bonds and using the proceeds to buy an external sovereign bond. The coupons of the external bond are then swapped into Mexican pesos using a currency swap to meet the coupon payments corresponding to the short position in the domestic bond. Because local markets in Mexico only offer floating-for-floating currency swaps, it is first necessary to swap the bonds' coupons into floating rate using fixed-for-floating interest rate swaps.

The long persistence of the carry-trade arbitrage suggests the existence of fundamental and technical factors that drive a wedge between both yield curves. The foremost fundamental factor affecting the cross-currency swap spread is default risk. The instruments underlying the domestic yield curve and the external sovereign curve are issued under different jurisdictions, and hence are subject to different legal regimes.

Mexico: External and Domestic Yield Curves
(In percent)



Source: J.P. Morgan Chase & Co.

Therefore, recovery rates in case of default are different for domestic and external bonds.

It can also be argued that default risk is higher for external bonds than for domestic bonds. For instance, governments can always print money to pay off the domestic debt. They can also exercise pressure on domestic investors to force a rollover of domestic debt, as was the case in Argentina in 2001.[2]

[1]The box is based on the analysis presented in Abdel-Motaal (2002).

[2]Notwithstanding these arguments, the Russian default on domestic debt in 1998 shows that external debt is not always riskier than domestic debt.

Box 4.3 *(concluded)*

The carry-trade arbitrage strategy is risky since the sovereign may default on the external bond. In this case, the investor cannot count on the coupons of the external bond to meet the U.S. dollar payments in the currency swap.

The arguments above suggest that the external bond must carry a premium or spread over the domestic bond to compensate investors for taking additional default risk. However, market analysts consider that the default risk premium is not large enough to account fully for the observed spreads. According to them, technical factors, most of them associated with investment restrictions that affect Mexican pension funds (AFORES), are the main drivers of the spreads (Abdel-Motaal, 2002; and Oswald and Sekiguchi, 2002). The technical factors include a lack of repo markets; regulations on pension funds' use of derivatives and investments in foreign currency instruments; and the funds' portfolio duration. These factors are explained next.

The first step in executing the carry-trade arbitrage strategy is selling short domestic bonds. This step can be executed only if there is a liquid local repo market for government bonds. In practice, this market is non-existent in Mexico, as short-selling of domestic bonds is not allowed. Investors can still take short positions using buy-sell operations. These operations, however, lack enough liquidity and are viable only for investors taking rather small positions (Abdel-Motaal, Newman, and Romo, 2003).

Before December 2003, pension fund regulations prohibited the use of derivatives, including interest rate and currency swaps. In consequence, a substantial segment of the domestic investor base is effectively barred from executing the carry-trade arbitrage strategy. Furthermore, if pension funds were fixed interest rate receivers in interest rate swaps they could exercise downward pressure on spreads even if they were not arbitraging the yield curve anomaly. Market analysts forecast that spreads will likely start compressing once pension funds are allowed to trade derivatives in early 2004.

Restrictions on foreign investment also contribute to sustain the currency swap spread. Pension funds cannot hold more than 10 percent of assets in Mexican external debt. So, even when pension funds can trade derivatives, the foreign investment restriction reduces the funds' incentives to earn the currency swap spread.

In spite of these technical factors, the Figure shows the currency swap spread compressed from February 2003 to September 2003. This compression can be attributed partly to the exploitation of the yield curve anomaly by investors other than pension funds and partly to an extension of portfolio duration following the introduction of Value-at-Risk (VaR) in December 2002.

Failure to adjust restrictions on pension funds' investment policies could increase the concentration of risk exposures and magnify price volatility. In addition to restrictions on equities and international investments, most countries have also adopted tight restrictions on the percentage of a company's capital or outstanding bonds that a pension fund can hold (Yermo, 2000). For example, in Argentina, funds can hold at most 5 percent of a company's capital and 5 percent of its bonds. When local stock markets are small (as in most emerging markets), with a limited number of qualifying companies, rapidly growing funds will quickly reach these limits, reducing their possibilities of diversification and increasing the risk of local stock market bubbles.[38] Market participants expressed fears of a market bubble in the Warsaw Stock Exchange when Polish pension funds,

[38]For example, in Chile, until 1997, only 30 stocks out of a total of 300 were eligible for pension fund investment. In Argentina, fund managers noted that there were roughly only 14–15 eligible companies listed on the stock market.

together with local and international mutual funds, shifted their portfolios away from bonds and into local equities (Kwiecinski and Wiatr, 2003). Also, as the size of funds grows relative to the local markets, individual funds are often able to move prices. This often also results in liquidity constraints for funds, since they cannot sell assets without putting downward pressure on prices. For example, when the Chilean investment regime was partially liberalized in 1985, pension funds found it difficult to close their fixed-income position and asset allocations changed only slowly in response to the liberalization (Srinivas, Whitehouse, and Yermo, 2000).

The reduction of limits on foreign investments by local pension funds amounts to a removal of capital controls on outflows, and care should be taken about the macroeconomic consequences.[39] In particular, as the Chilean and Canadian experiences have shown, a sudden shift of pension funds' allocations abroad could lead to a substantial exchange rate depreciation (Patterson and Normand, 2002; and Roldos, 2003). In Chile, the increase in the share of foreign assets, from 2 percent by end-1997 to 12 percent by end-1999, was associated with a roughly 20 percent depreciation of the peso. In Canada, an increase of the foreign investment limit from 20 percent in January 2000 to 30 percent in January 2001 contributed to a three-fold increase in capital outflows, which in turn contributed to a 10 percent depreciation of the Canadian dollar in the period January 2000 through January 2002.[40]

In central Europe and Latin America, mark-to-market and minimum return requirements have encouraged herd behavior and excessive focus on short-term returns among pension fund managers. Some countries require funds to achieve certain minimum rates of return, often calculated relative to the industry average.[41] This amounts to an extreme form of "peer-group" benchmarking that induces funds to move in herds, allocating their assets in a suboptimal manner and magnifying price fluctuations. Similarly, in several countries pension funds have to mark-to-market their portfolios on a daily basis for regulatory purposes—and on a monthly basis for investors. Increased focus on short-term results induce managers to behave like mutual fund managers, and there is excessive turnover in pension fund portfolios, as is the case in Hungary and Poland. Also, the use of risk management tools (such as Value-at-Risk in Mexico) leads pension fund managers to avoid volatile assets with favorable risk-adjusted returns since they increase the return volatility of the portfolio.

Herd behavior does not seem to be a problem for provident funds in Asia, as the national provident fund is the sole provider of pension benefits. However, there are concerns on the funds' performance and accountability. National provident funds in Asia are centrally managed and, in general, follow conservative investment strategies. Empirical studies suggest that this has resulted in poor performance in several Asian funds. For instance, provident funds in Malaysia and Singapore have performed marginally better than bank deposits. In addition, the allocation of pension funds' assets also may be excessively influenced by political interests that do not necessarily benefit contributors. For instance, pension funds in Korea were asked to contribute to a stock market stabilization plan in 2000, while in Malaysia, provident fund assets have been used to recapitalize banks and finance housing construction (*FinanceAsia*,

[39]Other things equal, this would exacerbate the position of some emerging markets as net exporters of capital (see IMF, 2003), an issue that will be taken up in future issues of the GFSR.

[40]In both cases, however, the depreciations were also associated with deteriorations in non-energy commodity prices.

[41]For an overview of regulations in Latin America, see Yermo (2000).

Table 4.5. Assets Under Management by Insurance Companies[1]
(In percent of GDP)

	1998	1999	2000	2001	2002
Asia					
Korea	25.8	29.4	30.2	34.0	35.8
Malaysia	13.6	15.1	14.9	20.5	21.0
Philippines	3.5	3.7	3.8	3.7	4.0
Singapore	18.5	23.3	24.4	34.1	37.6
Thailand	5.8	6.5	6.6	7.6	8.3
Eastern Europe, Middle East, Africa					
Hungary	3.3	3.9	4.2	4.5	3.8
Poland[2]	3.0	3.6	4.3	5.0	6.0
Turkey	1.1	1.6	1.5	1.5	n.a.
South Africa[2]				74.4	68.7
Latin America					
Argentina	1.8	2.3	2.7	3.2	4.6
Brazil	n.a.	2.1	2.6	2.6	2.8
Chile	14.4	17.1	18.6	19.2	19.9
Colombia	0.8	0.8	0.8	0.9	1.0
Mexico	1.4	1.4	1.3	1.5	1.7
Peru	na	na	na	2.0	2.2

Sources: National regulators; and IMF staff estimates.
[1]Both life and general insurers.
[2]Life insurers only.

October 2000). Some authors have also noted a number of challenges in the transparency and accountability of provident funds.[42]

In contrast to Latin America and emerging Europe, local life insurance companies are the leading institutional investors in emerging Asia. This is related in part to the Asian tradition of using insurance products as savings products.[43] Assets under management have increased very rapidly over the past five years, particularly in Korea, Malaysia, and Singapore (Table 4.5). In Latin America, however, pension funds are the more dominant institutional investors, while insurance penetration remains low. The growth of pension funds has nevertheless contributed to the expansion of the life insurance sector, in particular with a sharp rise in the sale of annuities (see Garcia-Cantera and others, 2001). The growth of annuities markets has not been restricted to privatized systems, and Singapore has also witnessed a rapid growth in recent years, as a result of the reform of regulations governing withdrawals from the Central Provident Fund (see MacKenzie, 2002).

The investment decisions of life insurance companies operating in emerging markets depend on regulatory constraints, the development of local capital markets, and risk management guidelines. In most emerging market economies, insurers are required to maintain local assets to match local liabilities.[44] Thus most local insurance assets are invested in local capital markets. With the exception of Hong Kong SAR (which follows prudent man rules) and, to some extent, Singapore, most countries have a strong bias toward fixed-income instruments, since many regulations explicitly limit investments in equity and real estate and prohibit investment in foreign instruments.

Increasingly, insurers in emerging markets are beginning to use asset and liability management principles and risk management tools to make their strategic asset allocation decisions. However, the lack of long-term, fixed-income instruments and relative illiquidity in bond and equity markets constitutes the biggest hurdle to the management of duration gaps. In Korea, for example, a typical life insurer's liability has an average duration of 7 years, while the average duration of its assets is only 3½ years. Similar duration gaps exist in many other emerging markets. Faced with such a gap, insurers have relatively few options to increase asset duration and most strive to invest in the long-end of the local fixed-income market. As a result, insurance compa-

[42]Holzman, MacArthur, and Sin (2000); Asher (1999 and 2000); Asher and Newman (2001).

[43]In countries where insurance products are also used for savings purposes, the products tend to have a savings component in addition to the standard term life insurance.

[44]The "localization" requirement is intended for policyholder protection in cases of insurer's bankruptcy so that assets are held locally and can be used to compensate the policyholders. Hong Kong SAR is an exception. However, the Office of the Commissioner of Insurance is evaluating the current regulation on investment with a view to strengthen asset valuation and safeguard policyholder assets in the future.

nies are the largest investors in the 10-year segment of the local bond market. Also, while insurers provide a stable demand for local long bonds, their buy-and-hold behavior constrains liquidity in the secondary markets. This, in turn, makes portfolio adjustment costly and hinders asset and liability management. The paucity of interest rate derivatives and long-term swaps also constrains such activities.

Many insurers thus choose to manage duration gaps through the liability side by repricing existing products and offering new products of shorter duration. In particular, unit-linked products are gaining popularity in many emerging Asian and European markets.[45] In Hungary, for example, two-thirds of the new life insurance contracts are unit-linked products, while in Poland, one-third of life insurance products are unit-linked (Dorfman and Ennsfellner, 2002). These products usually carry a low minimum return with a "bonus" component depending on the equity market performance. The existence of the "bonus" effectively lowers the duration of the liability. By some estimates, a 20-year unit-linked life product has an effective duration of only six years. The emergence of unit-linked life products has transferred some market risk to policyholders and thus facilitates asset and liability management; however, such products pose certain competitive pressure to the mutual fund industry where traditional products carry no minimum return at all.

In a number of Latin American countries, a significant share of life insurance contracts are specified in foreign currency. This "dollarization" of liabilities is a consequence of the region's history of high inflation and exchange rate volatility. As a result, Mexican regulators, for instance, require that dollar-linked liabilities be matched with dollar-linked assets, making insurance companies one of the largest holders of sovereign dollar-denominated external debts (see Oswald and Sekiguchi, 2002). Although this offers significant support for these instruments, external diversification for the Mexican insurance industry is limited to portfolio investments in foreign-currency-denominated securities issued by Mexican entities.[46] In contrast, Colombia's regulatory framework does not have formal guidelines on asset-liability management. Nevertheless, even local insurance companies hold more than 20 percent of their assets in foreign-currency-denominated assets. Unlike the case of Mexico, Colombian insurance companies can invest in foreign currency debt instruments of any sovereign or corporate that is investment grade.

Most emerging markets have adopted solvency requirements for insurance companies that are based on or similar to those of the European Union directives (see OECD, 2001). A few economies, including Singapore, Indonesia, Malaysia, and Taiwan Province of China, have adopted risk-based capital (RBC) regimes that are similar to the U.S. and Japanese systems.[47] Under the European system, only underwriting risk is included in the calculation of the solvency requirement, while the U.S. and Japanese system explicitly accounts for investment and asset and liability mismatching risks in addition to the underwriting risk.[48] Given the growing importance of investment risks, analysts have argued that

[45]Unit-linked products are a form of variable life insurance products that combine insurance with an investment component. Usually the products carry a minimum return and in addition a "bonus" that varies with market movements. The appeal of this type of insurance is that the policyholders can benefit in a transparent way from the higher-than-average long-term returns on the equity markets while retaining the advantages of life insurance products.

[46]Insurance companies in Mexico are allowed to use derivatives for currency-asset-liability matching purposes, but in practice they rarely use them.

[47]See Chapter III for a broad description of the main mature market insurance regulations.

[48]The main risks insurers carry on their balance sheet can be classified as: (1) investment risks; (2) underwriting risks; and (3) asset/liability matching risks (see Babbel and Santomero, 1996; and Chapter III).

the European system does not adequately address the risks in insurance operation.[49] Under the European system, investment risks are controlled by means of investment regulations on a particular investment, asset class, or region. Consequently, regulators in many emerging market economies prescribe specific investments as well as the percentage of their assets that insurers are permitted to invest in each.

Moreover, many emerging market regulations do not provide specific guidance on asset and liability management, and this could lead to excessive risk taking. While subsidiaries of global insurance companies in emerging markets normally have to adhere to internal risk control guidelines on asset and liability management, local insurers usually lack such expertise and guidance. Therefore, some local insurers seek yield enhancement at the expense of asset and liability management. For example, in Hungary, market participants noted that during the recent turmoil in the local bond market that sent the short-term interest rates soaring, most local subsidiaries of global insurers continued to invest in the long end of the yield curve to minimize the duration gap. However, local insurers reportedly shifted their allocations to the short end of the curve to pick up yield at the expense of increasing their duration gap. When solvency requirements only account for underwriting risk, asset-liability mismatches do not cost the insurer in terms of statutory capital; market participants refer to this as "free risk." In the past, U.S. and Canadian life insurers faced similar situations, when competitive pressure drove insurance companies to incur asset and liability mismatches (and associated market and credit risks) while seeking higher returns (Briys and de Varenne, 1996). A large number of insurance companies failed in the United States in the late 1980s and early 1990s, while a few also went bankrupt in Canada in the early 1990s. These failures eventually led to changes in the U.S. and Canadian insurance regulations in the mid-1990s. (For the experience of insurance companies during recent emerging market crises, see Box 4.4.)

As in the mature markets, regulations in several emerging markets dictate minimum guaranteed returns on insurance products. However, only a few countries (including Thailand, Croatia, and Korea) reportedly have guaranteed returns that are higher than market rates. Moreover, in Thailand, policyholders are not only given guaranteed returns at maturity but they also enjoy guaranteed surrender values. During a rising interest rate environment, customers with products that are locked at guaranteed returns below the current market rate could simply cash out with the guaranteed surrender value and shop for better rates. This could force the insurers selling their bond portfolio at a loss. In a declining rate environment, many insurers have to re-calculate their liabilities on the historical products that were offered at a high guaranteed return with a lower discount rate. This re-calculation has reportedly caused many insurers to raise reserves to meet solvency requirements, which again could lead to undesirable portfolio adjustment.

Insurance regulations do not require the marking-to-market of assets on a daily basis and usually liabilities are not marked-to-market at all, thereby differentiating insurers from other institutional investors in emerging markets as well. While in most countries regulatory valuation principles prescribe for marking assets to market, the reporting for insurers is usually on quarterly basis (Dickinson, 2002). Thus, insurers can at times "sit through" short-term market turbulence, thus providing stability to the market, as long as their sol-

[49]A quantitative comparison of the two sets of regulations suggests that the U.S. RBC system produces higher capital requirements for U.S. insurers than under the European system (Swiss Re, 2000).

Box 4.4. The Impact of Emerging Market Crises on Insurance Companies

Financial crises worsen the operating results and balance sheets of all financial intermediaries, but the effects are particularly severe for insurance companies. A financial crisis is usually accompanied by a sharp decline in output, a massive devaluation, increasing inflation and interest rates, and a collapse in asset values. The consequences of these drastic economic changes for the insurance industry are manifold: demand for insurance products drops, resulting in lower premiums and a rise in early terminations of existing contracts; claims increase due to higher inflation and an adverse environment; insurers' assets decline in value; and rising inflation requires higher reserve on the liability side. Thus, a financial crisis poses a major threat to the solvency and liquidity of the insurance industry.

This has become rather clear after recent emerging market crises, as noted in a recent study by Swiss Re (2003). Life insurers suffered not only from a decline in new business, but also from an increase in lapses—nonpayment of premiums on existing life products. As the Table shows, new business collapsed during the year of the crisis and lapse ratios increased by almost three-fold in the year after the crisis. In Argentina, probably due to the expectation of a future crisis, the lapse ratio steadily increased beginning two years before the crisis. Savings-type policies were the most sensitive to changes in income and wealth and thus experienced the most pronounced decline in premiums. The increase in lapses was more significant in Indonesia and Argentina, where a majority of life products were denominated in U.S. dollars. In Argentina, contracts with a savings component were mostly cancelled once the parity was broke and the majority of new products sold after the crisis were one-year local-currency-denominated pure insurance products—a major setback to a once sophisticated insurance market.

Balance sheet pressure threatened the solvency of many insurers and sometimes lead to a costly restructuring process. Virtually all local assets lost in value, and claims were higher, which required higher reserves relative to premiums. Equity relative to capital declined. Thus, solvency, measured as the capital-to-reserve and the capital-to-premium ratio, was in question. Furthermore, insufficient asset and liability management that led to large asset-liability mismatches for the life insurers and poor risk management practices have aggravated the adverse impact and resulted in a few bankruptcies, as in Korea.

The crises hit local and foreign insurers alike, but the latter were generally better equipped to withstand episodes of financial crisis. First, foreign insurers' better diversified investment portfolio and more sophisticated asset and liability management helped them to weather the financial storm. Second, they could always rely on additional capital from the parent company to shore up the balance sheet. As a result, in a few countries, such as Mexico, Indonesia, and Thailand, foreign insurers picked up market share after the crisis.

To remain liquid and solvent through a financial crisis, insurers need to protect their balance sheets and design products that can cope with a volatile environment. Proper asset and liability management is the key to maintaining a strong balance sheet, while creating a well-diversified portfolio and buying reinsurance to transfer away part of the risk are also beneficial. As the insurer's ability to conduct asset and liability management is constrained by the development of local capital markets as well as regulatory limits, a few countries recently have relaxed the investment regulations. From the liability side, insurers could move away from guaranteed benefits to unit linked products to reduce the investment risk.

Financial Crises and Emerging Market Insurers

	T–2	*T*–1	*T*	*T*+1	*T*+2
New business, percent change (year on year)					
Indonesia	25.4	21.6	–12.6	0.9	34.4
Thailand	10.1	–16.3	–29.1	37.9	40.5
Lapse ratios, in percent					
Indonesia	3.7	2.6	5.5	12.8	7.9
Thailand	3.2	3.4	5.4	9.2	8.3
Argentina	9.6	15.4	31.3		

Source: Swiss Re (2003).
T refers to the year of the financial crisis. It is 1998 for Indonesia and Thailand, and 2002 for Argentina.

vency is not threatened.[50] This perhaps makes them a more diversified and stable investor. Furthermore, most insurers are not benchmarked against any particular index, so the risk of "herding" with other investors during drastic market swings is mitigated. But most regulations only require using market value for assets but not for liabilities. The asymmetric mark-to-market requirement on the two sides of the balance sheet could have undesirable consequences. For example, in Singapore, reports indicated that during the recent equity market downturn, many insurers suffered losses on their equity holdings. While their liabilities linked to equity market performance would have been correspondingly lower, the regulation does not provide for re-calculating the liability based on the market value. Consequently, some insurers appeared to have insufficient capital due to the decline in their assets and, to meet the solvency requirements, had to sell equities in a falling market.[51,52]

Local Mutual Funds

As in the mature markets, mutual funds in emerging markets have been among the fastest-growing institutional investors (Table 4.6). Indeed, mutual fund assets under management in emerging markets grew by 96 percent between the end of 1997 and June 2003 and, as a result, rose from 8 percent of GDP to 15 percent. One key difference between mutual funds in mature and emerging markets has been the relative importance of bond and equity funds. In the mature markets, the assets under management of equity funds are often much larger than those of bond funds (particularly in Japan, the United Kingdom, and the United States). In contrast, emerging market bond funds in a number of countries have larger assets under management than do equity funds, particularly in Brazil, Mexico, Korea, and Taiwan Province of China. In part, this reflects the difference in the relative development of the local markets in mature and emerging markets. In many emerging markets, the degree of liquidity of local government bond markets is markedly better than in local equity markets.[53] In addition, this difference reflects a search for higher yields on the part of retail investors. As nominal interest rates have declined in many emerging markets since the late 1990s, retail investors have seen extended declines in the interest earned on traditional savings instruments, such as bank time deposits. To obtain higher yields, retail investors subscribed to bond funds that invested in longer-term government and corporate bonds.

One issue that has arisen recently in a number of emerging markets is whether these local mutual funds will be a stable source of demand for local instruments. One particular concern is that retail investors may not be fully aware of the market risks associated with holding positions in longer-term bond funds. In Colombia, for example, mutual funds were at the center of a "mini-crisis" in the treasury bond (TES) market in July–September 2002. Prior to the crisis, many local mutual funds were heavily invested in long-dated (10-year) government bonds, and they had marketed their funds as savings products. Analysts noted, however, that these marketing campaigns stressed the credit ratings of the funds without

[50]Some insurers report the use of internal risk management, which requires assets to be marked-to-market on daily basis. However, as long as the valuation movement does not violate the prudential limits set internally, the need to adjust asset allocation can be avoided.

[51]While Singapore life insurers did see their asset positions deteriorate during the equity market downturn in the early part of 2003, their balance sheets improved significantly following the stock market rally in the rest of the year.

[52]In mature markets, asymmetric mark-to-market also presents similar challenges. For more discussion on appropriate accounting standards, see Chapter III.

[53]In many Asian emerging markets, however, equity markets are generally regarded as more liquid than bond markets.

Table 4.6. Emerging Market Mutual Funds: Total Net Assets[1]

	1997	1998	1999	2000	2001	2002	2003[2]
				(In billions of U. S. dollars)			
Emerging markets	**349.25**	**514.07**	**700.17**	**673.05**	**687.40**	**693.45**	**685.49**
Africa	**12.69**	**12.16**	**18.24**	**16.92**	**14.56**	**20.98**	**25.70**
South Africa	12.69	12.16	18.24	16.92	14.56	20.98	25.70
Asia	**216.50**	**370.82**	**518.63**	**463.11**	**466.82**	**501.33**	**428.01**
Hong Kong SAR	58.46	98.77	182.27	195.92	170.07	164.32	201.15
India	9.35	8.69	13.07	13.83	13.49	n.a.	n.a.
Korea	53.11	165.03	167.18	110.61	119.44	149.54	133.76
Malaysia	8.66	10.19	11.39	11.39	12.46	14.13	18.63
Philippines	n.a.	n.a.	0.12	0.11	0.21	0.47	0.63
Singapore	74.55	67.84	109.85	95.94	97.91	105.74	n.a.
Taiwan Province of China	12.37	20.31	31.15	32.07	49.74	62.15	66.83
Thailand	n.a.	n.a.	3.61	3.23	3.49	4.97	7.00
East Europe	**1.66**	**2.57**	**4.14**	**5.67**	**4.35**	**18.55**	**25.88**
Czech Republic	0.36	0.56	1.47	1.99	1.78	3.30	4.12
Hungary	0.71	1.48	1.73	1.95	2.26	3.38	4.55
Poland	0.54	0.51	0.76	1.55	n.a.	5.47	7.50
Romania	n.a.	n.a.	n.a.	0.01	0.01	0.03	0.03
Russia	0.04	0.03	0.18	0.18	0.30	0.37	0.61
Turkey	n.a.	n.a.	n.a.	n.a.	n.a.	6.00	9.07
Latin America	**118.40**	**128.53**	**159.17**	**187.34**	**201.68**	**152.58**	**205.90**
Argentina	5.25	6.93	6.99	7.43	3.75	1.02	1.32
Brazil	108.61	118.69	117.76	148.54	148.19	96.73	143.79
Chile	4.55	2.91	4.09	n.a.	5.09	6.71	6.14
Colombia	n.a.	n.a.	10.87	11.97	12.92	15.63	16.89
Costa Rica	n.a.	n.a.	n.a.	0.92	n.a.	1.74	2.17
Mexico	n.a.	n.a.	19.47	18.49	31.72	30.76	35.59
				(In percent of GDP)			
Emerging markets	**7.74**	**12.51**	**17.81**	**15.66**	**16.45**	**16.80**	**14.96**
Africa	**8.52**	**9.10**	**13.92**	**13.21**	**12.74**	**20.08**	**16.27**
South Africa	8.52	9.10	13.92	13.21	12.74	20.08	16.27
Asia	**12.18**	**24.86**	**31.42**	**26.07**	**27.34**	**27.84**	**22.26**
Hong Kong SAR	33.66	59.77	113.46	118.48	104.44	101.74	126.36
India	2.30	2.12	2.99	3.00	2.83	n.a.	n.a.
Korea	11.15	52.05	41.17	23.97	27.96	31.37	25.96
Malaysia	8.65	14.12	14.38	12.64	14.16	14.90	18.41
Philippines	n.a.	n.a.	0.15	0.14	0.29	0.61	0.77
Singapore	78.16	82.82	134.98	104.87	115.37	121.58	n.a.
Taiwan Province of China	4.25	7.60	10.82	10.36	17.69	22.07	23.14
Thailand	n.a.	n.a.	2.95	2.64	3.03	3.93	5.35
East Europe	**0.19**	**0.33**	**0.60**	**0.75**	**0.55**	**2.07**	**2.37**
Czech Republic	0.68	0.98	2.68	3.87	3.11	4.74	4.88
Hungary	1.56	3.13	3.59	4.18	4.36	5.14	5.51
Poland	0.36	0.31	0.47	0.94	n.a.	2.89	3.63
Romania	n.a.	n.a.	n.a.	0.02	0.02	0.06	0.06
Russia	0.01	0.01	0.09	0.07	0.10	0.11	0.14
Turkey	n.a.	n.a.	n.a.	n.a.	n.a.	3.37	3.83
Latin America	**6.95**	**7.57**	**10.91**	**11.46**	**12.85**	**11.49**	**14.61**
Argentina	1.79	2.32	2.47	2.61	1.40	1.10	1.03
Brazil	13.44	15.11	22.47	24.76	29.09	21.81	28.36
Chile	5.51	3.67	5.61	n.a.	7.46	10.09	8.81
Colombia	n.a.	n.a.	13.43	15.25	15.75	22.14	23.26
Costa Rica	n.a.	n.a.	n.a.	5.76	n.a.	10.27	12.19
Mexico	n.a.	n.a.	4.05	3.18	5.08	4.83	5.79

Sources: Bloomberg; Federation of Malaysian Unit Trust Managers; Investment Company Institute; Monetary Authority of Singapore; Stock Exchange of Thailand; Superintendencia Bancaria; and Superintendencia Valores Colombia.

[1]Funds of funds are not included; home-domiciled funds except for Hong Kong SAR, Korea, New Zealand, and Singapore, which include home- and foreign-domiciled funds.

[2]As of the end of June 2003.

fully indicating the market risks that were associated with their products if interest rates were to rise. When a sharp decline in interest rates occurred between February and June 2002, investors placed funds with bond funds due to the attractiveness of the 10-year bond yield and thereby took on significant duration risk. However, an increased perception of regional risk in July 2002 led to a sell-off of Colombia's Yankee bonds and a sharp increase in external debt spreads—in tandem with Brazil spreads. In addition, rising concerns about the country's fiscal situation eventually prompted investors to sell their TES holdings. After this initial sell-off, mutual funds began to experience redemptions from retail investors and were forced to liquidate their positions in a falling market, pushing bond prices down further. In the space of 10 days, the yield on the government bond maturing in 2012 went up from 12 to 20 percent. Following this episode, mutual funds shortened the duration of their fixed-income portfolios.

The experience in Thailand's bond market in 2003 also illustrates how a turn in the interest rate cycle can interact with regulatory requirements, institutional investor investment strategies, and retail investor risk aversion to induce interest rate volatility in less-than-liquid markets. Between March 2002 and July 2003, the yield on the 10-year government bond declined from 6.1 percent to 2.5 percent. As banks also reduced their deposit rates, retail investors shifted from deposits to bond mutual funds (which grew by 16 percent during this period) in search of higher yields. The investment strategies of the bond mutual fund managers were influenced by the perception that, while retail investors were searching for higher yields, they were averse to seeing higher volatility in the net asset value (NAV) of their bond accounts. In attempting to stabilize the NAVs of the bond funds, mutual fund managers faced asymmetrical mark-to-market requirements whereby liquid assets were marked-to-market on a daily basis whereas illiquid assets were not.[54] As interest rates declined, fund managers added relatively illiquid assets (such as corporate bonds) to their portfolios both to get a higher yield and to reduce the volatility of the NAV. When the interest rate cycle reversed in mid-August 2003, with the yield on the 10-year bond rising 260 basis points by November, the NAVs of the bond funds began to decline; massive redemptions by retail investors occurred.[55] To meet these redemptions, bond mutual funds were forced to engage in large sales of bonds. This selling was seen to have increased bond market volatility and accelerated the rise in interest rates.

In Korea, the reaction of retail investors to the SK Group accounting scandal in March 2003 exposed the vulnerability of local investment trust companies (ITCs)—which typically invest in a range of corporate bonds and stocks—to developments in the corporate sector. Total redemptions from ITCs in the days following the reporting of SK Group difficulties exceeded $13 billion (out of assets of more than $140 billion), leading the ITCs to contemplate a temporary freeze on withdrawals. After liquidating most of their government debt holdings to cover the redemptions, the ITCs reportedly faced difficulties raising cash to meet further redemptions, as they could not find buyers for higher-risk corporate bonds, such as those issued by credit card firms, of which ITCs are major holders.

In contrast to Asia and Latin America, the recent turbulence in fixed-income markets in

[54]Requirements for mutual funds to mark-to-market on a daily basis pose a challenge in markets where assets are not frequently traded. In Thailand, "liquid" instruments are marked-to-market on a daily basis, while illiquid instruments are allowed to be marked-to-market every 15 days.

[55]Total redemptions in the three months to November amounted to an estimated 40 billion baht ($1 billion)—or 20 percent of total bond fund assets.

central Europe, while causing substantial redemption pressures on the mutual fund industry, resulted in relatively little "panic." Episodes of large sell-offs in fixed-income markets in Hungary (June 2003) and Poland (October 2003) led to redemptions amounting to more than 10 percent of assets under management for some mutual funds. However, mutual funds in Hungary are accustomed to investors shifting funds often since they do not levy up-front fees. In Poland, high levels of liquid reserves meant that funds were able to weather redemptions without huge sell-offs of their holdings.

Policy Conclusions

The increasing institutionalization of the investor base for emerging market securities has implications for both the volatility of capital flows to emerging markets and the policy measures needed to cope with such volatility and to further develop local securities markets. With regard to the volatility of capital flows, Box 4.1 notes that, in principle, the share of mature market assets under management that should be allocated to emerging market securities in an optimally diversified portfolio varies sharply over time; and, in particular, falls by half from the 1991–97 period to the 1997–2002 period. This, combined with the enormous scale of institutional investor assets under management in mature markets, suggests the potential for huge capital flow volatility even in the absence of any distortions. Moreover, many of the new crossover institutional investors have not experienced a major systemic emerging market crisis so the jury is out regarding the stability of their demand for emerging market securities during such periods. As a result of this uncertainty and previous experiences of sudden loss of access to international markets, many emerging markets have begun to adopt policies that provide a degree of "self-insurance" against volatility in capital flows.[56] In part, these policies have included measures to improve macroeconomic performance, develop local securities markets, and strengthen domestic financial institutions—including institutional investors.

The changing composition of the investor base in mature markets has some important implications for debt management policies and practices in emerging markets. In particular, both official debt managers and market participants have argued that a number of policy measures can play an important role in broadening and diversifying both the international and domestic institutional investor bases. An important policy step is to ensure that there is transparency and adequate disclosure about both government policies and corporate developments. In particular, the official sector needs to keep investors informed about economic developments and prospects and to provide investors with a predictable schedule for local debt issues.[57] Investor relations programs can be particularly useful in this regard, as well as with gauging the potential segments of the investor base that have an interest in a particular issue.

In addition to ensuring an adequate degree of transparency, countries need to facilitate the development of market infrastructure. This would involve, for example, such steps as establishing a good clearing and settlement system potentially in conjunction with other countries (one example of recent efforts to develop bond markets infrastructure in Asia is

[56]The various policies were discussed more extensively in Chapter IV of the March 2003 GFSR.

[57]Some observers have questioned whether countries should indeed be predictable in managing the public external debt. They have argued that countries can take advantage of favorable circumstances to carry out certain operations that could lower the cost of the debt. Therefore, there might be some arguments in favor of countries not being predictable from the point of view of the *timing* of their transactions, but certainly this should not preclude countries from being predictable on their objective of net borrowing for the period or periods ahead.

described in Appendix II of Chapter II). Another important step is to help develop a liquid secondary market for debt instruments that will facilitate the management of institutional investor portfolios. Market liquidity in the government bond market can often be improved by creating benchmark issues at various maturities. Moreover, steps need to be taken to bring about the development of a market-maker system. In this context, it will be necessary to sell debt instruments to institutions, including hedge funds, that are willing to actively trade these instruments to help improve the liquidity of these instruments in the secondary market. Finally, in order to help diversify the investor base, the authorities should encourage the inclusion of a country's bonds in major bond indices, since investors that measure their performance against indices are likely to add the bonds of the countries included in the indices to their portfolios.

The rapid growth of emerging market pension funds'—and, to a lesser extent, insurance companies'—assets under management has highlighted the importance of updating and improving the regulatory framework of local institutional investors. In particular, countries need to ease limits on investments in foreign securities to achieve an appropriate degree of diversification of local institutional investors' portfolios. Despite the positive impact of institutional demand on the development of local securities markets, in many countries the growth of assets under management is outpacing the volume and variety of available local securities. Although there is room for a further loosening of restrictions on pension funds' equity allocations in some countries, it is unclear whether local markets would be able to grow accordingly. Thus, adequate diversification of pension fund portfolios requires an increase in the funds' allocations to foreign securities. Failure to open up opportunities for diversification abroad may lead to local market bubbles and to excessive exposure to sovereign risk.

The growing imbalance between local pension funds' assets under management and the available securities, and the associated risks, thus calls for a close coordination between changes in the regulatory framework for institutional investors, local capital market development, and macroeconomic policies (see Roldos, 2003, for the case of pension funds). The easing of limits on foreign investments by local pension funds amounts to a removal of capital controls on outflows, and care should be taken about the macroeconomic consequences. Experiences in mature and emerging markets show that they are usually accompanied with large exchange rate depreciations. Moreover, authorities should note that even if a gradual approach is followed, actual portfolio shifts may happen suddenly and be magnified by herding behavior.

These issues are relevant not only for local pension funds but also for insurance companies. Developing local securities markets is critical for the insurance industry to properly manage its risks and grow without threatening financial stability. The lack of long-dated bonds and derivatives presents challenges to insurers in managing the mismatch between the duration of their assets and liabilities across the emerging markets. In some countries, governments have yet to begin issuance of bonds beyond mid-range maturities. Moreover, analysts have suggested that insurance regulations should incorporate measures of investment risk and duration, or alternatively, a risk-based capital regime should be adopted with "prudent man" rules guiding investments (Kwon, 2001). With appropriate regulation that safeguards the solvency of insurers and provides enough flexibility to manage their balance sheet risks, insurance companies could become a stable long-term investor in local instruments. Moreover, as mentioned in Chapter III, life insurers can and should take advantage of a variety of credit products to match their long-term liabilities. When local markets cannot deliver these products, local insurers ought to be

allowed to invest in credit products abroad, as well as have access to foreign currency derivative products to hedge the associated foreign exchange exposure.

The increasing importance of local institutional investors in both local and international markets has to be accompanied by a strengthening of risk management skills to ensure financial stability. Rapid growth of assets under management will require increasing sophistication among local institutional investors that will face increasingly more complex instruments and opportunities. At the same time, regulators will need to step up their risk management skills to be able to adjust regulations to the idiosyncrasies of rapidly growing local markets and to monitor the behavior of increasingly complex investment strategies. Active participation in international fora, to exchange experiences and lessons, would help not just in speeding up the learning process but also in harmonizing regulations across countries.

Authorities in charge of supervision and regulation of mutual funds must ensure that retail investors are fully informed and appropriately educated about the types of market risks associated with different investments. Indeed, the recent experience with runs on local bond mutual funds as the interest rate cycle reversed (with interest rates beginning to rise) has generated concerns about how well the customers of institutional investors understand the market risks they bear and how well these customers manage these risks, especially in an environment where interest rates have fallen to levels at near historical lows.[58] Market analysts have argued that retail investors often moved into bonds in search of higher yields but had the misperception that the market risks associated with these bonds were "similar" to those associated with term bank deposits. As bond prices began to fall, and investors saw the value of bond funds decline, retail investors reacted to this newly discovered market risk by quickly withdrawing from the bond funds and shifting to a "cash" (bank deposit) position. Bond funds were forced to sell assets to meet these redemptions, putting additional upward pressure on already rising interest rates.

Finally, the stability of the asset allocations of institutional investors will also be influenced by the stability of their liability structures and/or the funds placed with them. As institutional investors have come to dominate mature financial markets and have become increasingly important in emerging markets, there has also been an ongoing shift in the incidence of who ultimately bears market risk (the risks associated with fluctuations in asset prices and returns). In particular, the period since the early 1990s has witnessed a gradual shift in the incidence of market risks from the institutional investors themselves to their customers. For example, in many countries, there has been a shift from defined benefit to defined contribution pension systems, which generally shift market risk to pensioners. Similarly, life insurance companies have increasingly marketed variable rate and index-linked products as opposed to fixed guaranteed return products. Mutual funds and hedge funds by their very structure ultimately transfer market risk to their shareholders. This transfer of risk to less sophisticated

[58]The experience with retail investor runs on bond funds in emerging markets may have implications for mature markets. For example, some market participants have argued that retail investors in Europe and Japan, which have traditionally held emerging market bonds directly, would be better served to hold them indirectly through bond mutual funds. These retail investors have been seen as holding emerging market bonds directly in order to obtain a pickup in yields but seriously underestimating the default risk associated with these instruments. If these investors instead held these bonds indirectly through bond funds, it has been suggested that they would receive better diversification benefits and professional portfolio management services. However, it still could be the case that a bond fund with large holdings of the bonds of a country that unexpectedly defaults could face large scale redemptions. Bond fund managers would naturally have to take this risk into account when structuring their portfolios.

investors, and its potential implications for financial stability, has become apparent with the recent experience of some emerging markets and is an issue that will be taken up in future issues of the GFSR.

Appendix: Hedge Funds and Recent Emerging Market Currency Crises

This appendix presents an empirical analysis of the market positions taken by hedge funds in several recent emerging market currency crises (e.g., devaluations or the widening of currency trading bands). In particular, these episodes include the Brazilian *real* devaluation (January 13, 1999), the floatation of the Turkish lira (February 22, 2001), the Argentine peso devaluation (January 7, 2002), and the recent pressures in the Hungarian fixed-income and currency markets, which forced the central bank to lower the central Forint-Euro parity rate from 276.1 forint per euro to 282.36 forint per euro (June 4, 2003). In all these episodes, the main pre-conditions for the hedge funds' involvement—sufficiently deep and liquid local markets plus macroeconomic imbalances—were present.

One of the key problems is that information on actual hedge funds' portfolio exposures is not publicly available. Therefore, the hedge funds' positions during the crises episodes are estimated using the Sharpe investment style approach, which provides indirect estimates of their portfolio exposures. This approach assumes that the return that a hedge fund earns during any given period is a linear combination of the returns on the relevant investments and that the estimated "weights" in the linear combination are a proxy of the actual portfolio weights of the hedge fund. Thus, the estimation of the hedge fund portfolio exposures can be carried out in two steps. The first step is to estimate how sensitive the hedge funds' portfolio returns have been to changes in the local emerging market returns in each of the crisis countries, while controlling for other factors that may have influenced the hedge fund's performance as well. The second step is to multiply these sensitivities by the hedge funds' total asset values to obtain the estimated value of the hedge funds' positions in these emerging markets. Since previous research indicated that the types of hedge funds that tend to maintain exposure to emerging market assets include the dedicated emerging market hedge funds, macro hedge funds, and event-driven hedge funds, the approach described above is applied to a sample containing these three groups of funds.

The two-step methodology used to estimate the hedge funds' exposures to local emerging markets is implemented as follows:

Step 1

For each group of hedge funds *I* (where *I* refers to macro, dedicated emerging market, or event-driven groups of funds), and for each local emerging market *EM* (where *EM* refers to local markets in Brazil, Argentina, Turkey, and Hungary), the estimates of sensitivities ($\beta^I_{EM,t}$) of the hedge fund portfolio returns to the returns on a particular local emerging market *EM* are obtained by estimating the following rolling regression equation (using a 20-month window):

$$R^I_t = \alpha^I_t + \beta^I_{EM,t} R_{EM,t} + \sum_{k=1}^{3} \beta^I_{K,t} R_{K,t} + \varepsilon^I_t$$

where R^I_t is the series of monthly returns on the portfolio of hedge funds in group *I;* $R_{EM,t}$ is the series of monthly returns on the J.P. Morgan ELMI (local market) country index. The three additional factors (the $R_{K,t}$'s) included in each regression equation—the MSCI Emerging Markets Free Index (proxy for emerging equity markets), the Merrill Lynch High Yield Corporate Bond Index (proxy for credit market), and the Federal Reserve's Trade-Weighted U.S. Dollar Index—have been shown to have high explanatory power in the previous research on hedge funds' performance. All indices are U.S. dollar denominated.

Step 2

The estimated U.S. dollar exposure of the hedge fund group *I* to a local market *EM* in period *k* is obtained as $E_k^{I,EM} = \beta_{EM,k}^I * A_k^I$, where A_k^I is the total asset value of hedge funds in group *I* and $\beta_{EM,k}^I$ is the estimated sensitivity of the returns on the portfolio of hedge funds in group *I* to the returns on a particular local emerging market *EM*.

The data sample consists of the dedicated emerging market, macro, and event-driven hedge funds that have at least $100 million in assets under management (as of end-2003), were set up on or before January 1998, and have been regularly reporting their monthly returns and assets under management either to the CISDM (formerly, MAR/Hedge) or HFR.[59] Thus, the estimated portfolio exposures based on the CISDM/HFR data should be a reasonably good proxy of the positions taken by the medium-size hedge funds that typically invest in emerging market assets. However, these exposures may not necessarily be a good proxy for the positions that could have been taken by some of the largest macro hedge funds, such as Tudor Investment Corporation or Moore Capital Management, which do not report to any hedge fund data providers, and whose assets under management are somewhere in the range of $5 billion–$10 billion, compared to only about $2.4 billion of the largest hedge fund in the CISDM/HFR sample(see footnote 20 earlier in this chapter).

The total estimated exposures of all three groups of hedge funds are presented in Figure 4.2, along with the local market indices of Argentina, Brazil, Turkey, and Hungary. The series labeled CISDM& HFR represents the estimated exposures based on betas obtained from the regression analysis that uses the average returns on the portfolios of dedicated emerging market, macro, and event-driven hedge funds from the CISDM/HFR sample described above. The series labeled CSFB are based on the regression analysis that uses the Credit Swiss First Boston (CSFB)/Tremont indices, which are asset-weighted indices of large hedge funds from the Tremont TASS database, and are more representative of the performance of larger hedge funds.[60]

The main conclusions derived from the analysis of returns and estimated exposures are as follows:

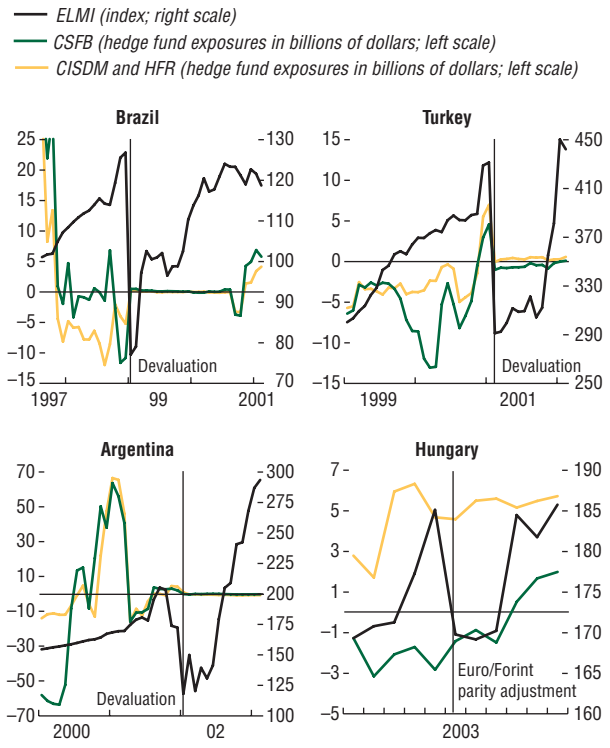
- Monthly returns provide little evidence that medium-size hedge funds (as a group) earned abnormal profits following the exchange rate adjustment in each of these episodes.
- Estimated exposures indicate that during the recent currency crises episodes hedge funds had indeed built extensive short positions vis-à-vis emerging market currencies in the run-up to the devaluations, but failed to maintain them long enough to benefit from the change in the exchange rate regime. This unwinding of the hedge funds' short positions before the devaluations may have been in part due to measures taken by the authorities of emerging market countries to discourage the shorting of local assets as they faced increasing pressures on their exchange rates (including, by raising interest rates as well as by limiting the supply of instruments that could be used for taking short positions).
- The comparison of the CISDM/HFR and CSFB exposures suggests that larger hedge funds tend to be more aggressive in shorting local markets than smaller funds, which

[59]CISDM (Center for International Securities and Derivatives Markets), formerly MAR/Hedge, and HFR (Hedge Fund Research) are the leading hedge fund data providers, which jointly cover a substantial part of the hedge fund universe. Our sample includes 18 macro hedge funds, 51 dedicated emerging market hedge funds and 36 event driven hedge funds. Smaller funds were dropped from the sample because their monthly returns and assets under management are often noisy or stale.

[60]Similar to other data providers' databases, the Tremont TASS database does not include most of the top 100 hedge funds.

may be due to the larger funds' "deeper pockets."

Figure 4.2. Estimated Portfolio Exposures of Hedge Funds and Local Emerging Markets



Sources: Bloomberg L.P.; CISDM; Hedge Fund Research (HFR); and IMF staff estimates.

References

Abdel-Motaal, Karim, 2002, "Structural Change and Yield Curve Anomalies in the Mexican Local Market," in *Fixed Income Research, Latin America* (New York: Morgan Stanley).

———, Gray Newman, and Javier Romo, 2003, "Mexico Local Markets," in *Fixed Income Research, Latin America* (New York: Morgan Stanley).

Aitken, Brian, 1998, "Have Institutional Investors Destabilized Emerging Markets?" *Contemporary Economic Policy*, Vol. 16, pp. 173–84.

Asher, Mukul, 1999, "South East Asian Provident and Pension Funds: Investment Policies and Performance" (unpublished; Singapore: National University of Singapore).

———, 2000, "Social Security Reform Imperatives: The Southeast Asian Case" (unpublished; Singapore: National University of Singapore).

———, and David Newman, 2001, "Hong Kong and Singapore: Two Approaches to the Provision of Pensions in Asia," *Journal of Pensions Management*, Vol. 7, pp. 155–166.

Association of British Insurers, 2000, "The Pension System in the United Kingdom," in *Private Pension Systems and Policy Issues*, Private Pension Series No. 1 (Paris: OECD).

Babbel, David, and Anthony Santomero, 1996, "Risk Management by Insurers: An Analysis of the Process," The Wharton Financial Institutions Center Working Paper No. 96–16 (Philadelphia: The Wharton School, University of Pennsylvania).

Blake, David, 2003, "Financial System Requirements for Successful Pension Reform," (unpublished; Pensions Institute, Birkbed College, United Kingdom).

———, Bruce N. Lehmann, and Allan Timmermann, 1999, "Asset Allocation Dynamics and Pension Fund Performance," *Journal of Business*, Vol. 72, pp. 429–61.

Borensztein, Eduardo, and Gaston Gelos, 2003a, "A Panic-Prone Pack? The Behavior of Emerging Market Mutual Funds," *IMF Staff Papers*, International Monetary Fund, Vol. 50, pp. 43–63.

———, 2003b, "Leaders and Followers: Emerging Market Fund Behavior During Tranquil and Turbulent Times," *Emerging Markets Review*, Vol. 4, pp. 25–38.

Brainard, Larry, 2001, "Pension Reforms Altering Market Dynamics for Emerging Debt," in *Emerging Markets Research* (New York: J.P. Morgan, December).

Briys, E., and F. de Varenne, 1996, "On the Risk of Life Insurance Liabilities: Debunking Some Common Pitfalls," The Wharton Financial Institutions Center Working Paper No. 96–29 (Philadelphia: The Wharton School, University of Pennsylvania).

Brown, S., W. Goetzmann, and J. Park, 1998, "Hedge Funds and the Asian Currency Crisis of 1997," NBER Working Paper No. 6427 (Cambridge, Mass.: National Bureau of Economic Research).

Campbell, John Y., and Luis M. Viceira, 2002, *Strategic Asset Allocation: Portfolio Choice for Long-Term Investors* (New York: Oxford University Press).

Cifuentes, Rodrigo, Jorge Desormeaux, and Claudio Gonzalez, 2002, "Capital Markets in Chile: From Financial Repression to Financial Deepening," in *BIS Papers No. 11, The Development of Bond Markets in Emerging Markets* (Basel: Bank for International Settlements, June).

Corsetti G., A. Dasgupta, S. Morris, and H. S. Shin, 2004, "Does One Soros Make a Difference? The Role of a Large Trader in Currency Crises," *Review of Economic Studies*, Vol. 71, pp. 87–114.

Davis, Philip E., 2002, "Pension Fund Management and International Investment—A Global Perspective," Discussion Paper No. PI–0206 (London: The Pensions Institute, Birbeck College, London).

———, and Benn Steil, 2001, *Institutional Investors* (Cambridge, Massachusetts: MIT Press).

Dickinson, Gerry, 2002, "The Search for an International Accounting Standard for Insurance: Report to the Accounting Task Force of the Geneva Association," *The Geneva Papers on Risk and Insurance*, Vol. 28, No. 2, pp. 151–175.

Dorfman, Mark, and Karl Ennsfellner, 2002, "Insurance in Transition Economies: Poland, Czech Republic, and Hungary," International Insurance Foundation Occasional Paper No. 5 (Washington).

Eichengreen, Barry, and Donald Mathieson, 1998, "Hedge Funds and Financial Market Dynamics," Occasional Paper No. 166 (Washington: International Monetary Fund).

El-Erian, Mohamed, 2003, "The Emerging Markets Heavyweight," *Euromoney*, pp. 44–49.

Federacion Internacional de Administradoras de Fondos de Pensiones (FIAP), 2003, *Informe Semestral Numero 14* (Santiago de Chile).

FinanceAsia, 2000, "Korea Raises Money from Pensions for Market Stabilization Fund" (October).

Financial Stability Forum, 2000, *Report of the Financial Stability Forum Report Working Group on Highly Leveraged Institutions*, Annex E, "Report of the Market Dynamics Study Group" and Annex C, "Background Note on the Hedge Fund Industry" (March).

Fung, William, and David A. Hsieh, 2000, "Measuring the Market Impact of Hedge Funds," *Journal of Empirical Finance*, Vol. 7, pp. 1–36.

———, and Konstantinos Tsatsaronis, 1999, "Do Hedge Funds Disrupt Emerging Markets?" *Brookings-Wharton Papers on Financial Services*, Brookings Institution Press.

Garcia-Cantera, Jose, Steve Faucher, Flavia Montoro, and Laura Molina, 2002, "Private Pension Funds in Latin America," in *Equity Research: Latin America,* Salomon Smith Barney (December).

Garcia-Cantera, Jose, Ramon Portillo, Steve Faucher, and Laura Molina, 2001, "Latin America Insurance," in *Equity Research: Latin America,* Salomon Smith Barney (June).

Graham, Kathy, 2003, "Alternative Investments from A to Z," *Financial Engineering News,* November/December.

Grauer, Robert R., and Nils Hakansson, 1987, "Gains from International Diversification: 1968–1985 Returns on Portfolios of Stocks and Bonds," *Journal of Finance*, Vol. 42 (July), pp. 721–39.

Greenwich Associates, 2002, "Alternative Investment Becomes New Choice," Greenwich, CT.

———, 2003, *Asset Allocation: U.S. Portfolios Adjust to Difficult Markets in 2002*, Greenwich, CT.

Hinz, Richard, 2000, "Overview of the United States Pension System," in *Private Pension Systems and Policy Issues*, Private Pension Series No. 1 (Paris: OECD).

Holzmann, Robert, 1999, "The World Bank Approach to Pension Reform," Social Protection Discussion Paper Series No. 9807 (Washington: World Bank, September).

———, Ian W. MacArthur, and Yvonne Sin, 2000, "Pension Systems in East Asia and the Pacific: Challenges and Opportunities," Social

Protection Discussion Paper Series No. 0014 (Washington: World Bank).

International Monetary Fund, 2000, *International Capital Markets: Developments, Prospects, and Key Policy Issues,* World Economic and Financial Surveys (Washington).

———, 2002, *Global Financial Stability Report*, World Economic and Financial Surveys (Washington: IMF, September).

———, 2003, *Global Financial Stability Report*, World Economic and Financial Surveys, (Washington: IMF, September).

Kaminsky, Graciela, Richard Lyons, and Sergio Schmukler, 2001, "Mutual Fund Investment in Emerging Markets: An Overview," *The World Bank Economic Review*, Vol. 15, No. 2, pp. 315–40.

Kim, Woochan, and Shang-Jin Wei, 2002, "Foreign Portfolio Investors Before and During a Crisis," *Journal of International Economics*, Vol. 56, pp. 75–96.

Kimmis, Jenny, Ricardo Gottschalk, Edna Armendariz, and Stephany Griffith-Jones, 2002, "UK Pension Fund Investment and Developing Country Assets," Working Paper (Sussex: Institute of Development Studies, University of Sussex).

Kumar, Pradeep, 2003, "Mexico—Corporate Peso Issuance and Local Markets," in *Global Fixed Income Research* (New York: Citigroup).

Kwiecinski, Piotr, and Rafal Wiatr, 2003, "Poland—Pension Fund Strategy: Leading Pension Funds Increase Exposure to Stocks," Citigroup (September).

Kwon, W., 2001, "Toward Free Trade in Services: The ASEAN Insurance Market," International Insurance Foundation Occasional Paper No. 3 (Washington).

Kyle, Albert, 1984, "A Theory of Futures Market Manipulations," in *The Industrial Organization of Futures Markets*, ed. by R.W. Anderson (Lexington, MA: Heath), pp. 141–72.

Lewis, K., 1999, "Trying to Explain the Home Bias in Equities and Consumption," *Journal of Economic Literature*, Vol. 37, pp. 571–608.

MacKenzie, Sandy, 2002, "The Role of Private Sector Annuities Markets in an Individual Accounts Reform of a Public Pension Plan," IMF Working Paper No. 02/161 (Washington: International Monetary Fund).

Mathieson, Donald J., Jorge E. Roldos, Ramana Ramaswamy, and Anna Ilyina, 2004, *Emerging Local Securities and Derivatives Markets*, World Economic and Financial Surveys (Washington: International Monetary Fund).

Merrick, J., N.Y. Naik, and P.K. Yadav, 2002, "Strategic Trading Behavior and Price Distortion in a Manipulated Market: Anatomy of a Squeeze, Working Paper, London Business School (December).

Munch Re Group, 2002, *Annual Report,* pp. 167–169.

Myners, Paul, 2001, "Institutional Investment in the United Kingdom: A Review," report prepared for HM Treasury, UK. Available on the Internet at *http://www.hm-treasury.gov.uk/media//843F0/31.pdf.*

OECD, 2000, "Institutional Investors in Latin America" (Paris: Organization for Economic Cooperation and Development).

———, 2001, "Insurance Regulation and Supervision in Asia and Latin America" (Paris: Organization for Economic Cooperation and Development).

———, 2003, "Institutional Investors Statistical Yearbook: 1992–2001" (Paris: Organization for Economic Cooperation and Development).

Oswald, William, and David Sekiguchi, 2002, "Mexico's Local Markets," in *Global Markets Research, Emerging Markets* (New York: Deutsche Bank).

Patterson, Rebecca, and John Normand, 2002, "Pension Fund Reform: Anticipating FX Implications," in *Global Foreign Exchange Research* (New York: J.P. Morgan, December).

Post, M. A., and K. Millar, 1998, "U.S. Emerging Market Equity Funds and the 1997 Crisis in Asian Financial Markets," Investment Company Institute, *Perspective*, Vol. 4.

Rea, John, 1996, "U.S. Emerging Market Funds: Hot Money or Stable Source of Investment Capital?" Investment Company Institute, *Perspective*, Vol. 2.

———, and Richard Marcis, 1996, "Mutual Fund Shareholder Activity During U.S. Stock Market Cycles," Investment Company Institute, *Perspective*, Vol. 2.

Roldos, Jorge, 2003, "Pension Reform and Capital Markets," paper prepared for the conference, "Results and Challenges of Pension Reform" (Mexico: Cancun, May).

Rother, P.C., M. Catenaro, and G. Schwab, 2003, "Ageing and Pensions in the Euro Area: Survey

and Projection Results," Social Protection Discussion Paper Series No. 307 (Washington: World Bank).

Roy, A.D., 1952, "Safety First and the Holding of Assets," *Econometrica*, Vol. 20, pp. 431–49.

Schultes, Renee, 2003, "From the Shadows," *Global Pensions* (August).

Solnik, Bruno, 1998, "Global Asset Management," *The Journal of Portfolio Management,* Vol. 24 (summer), pp. 43–51.

Srinivas, P.S., Edward Whitehouse, and Juan Yermo, 2000, "Regulating Private Pension Fund' Structure, Performance, and Investments: Cross-Country Evidence," in *World Bank Pension Primer* (Washington: World Bank).

Superintendency of Pension Funds, 2003, "El Regimen de Capitalización: A 8 Años de la Reforma" (Argentina: Buenos Aires).

Swiss Re, 2000, "Solvency of Non-Life Insurers: Balancing Security and Profitability Expectations," Publication Brief No. 1/2000.

———, 2003,"Emerging Insurance Markets: Lessons Learned from Financial Crises," Publication Brief No. 7/2003.

Targett, Simon, 2000, "Pension Fund Industry Faces Closer Scrutiny," *Financial Times*, July 3.

Thailand, 2003, Ministry of Finance, "Asian Bond Market Development."

Walker, Eduardo, and Fernando LeFort, 2000, "Pension Reform and Capital Markets: Are There Any (Hard) Links?" (unpublished; Santiago: Universidad Católica de Chile).

Wilshire Associates, 2002, *Permissible Equity Markets: Investment Analysis and Recommendations* (Santa Monica).

Wilson, Thomas, 2003, "Is ALM at European Life Insurers Broken?" *Risk* (September).

Yermo, Juan, 2000, "Institutional Investors in Latin America: Recent Trends and Regulatory Challenges," in *Institutional Investors in Latin America* (Paris: Organization for Economic Cooperation and Development).

———, 2003a, "Survey of Investment Regulation of Pension Funds" (Paris: Organization for Economic Cooperation and Development).

———, 2003b, "Pension Reform and Capital Market Development" (unpublished; Washington: World Bank).