

# IMF Policy Discussion Paper

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## Pension Reform, Investment Restrictions, and Capital Markets

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International Capital Markets Department

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#### Abstract

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Pension reform in several emerging market countries has been associated with rapid growth in assets under management and a positive impact on the development of local securities markets. However, limitations on such development may lead to asset price distortions, bubbles, and concentration of risks. Regulatory limits on pension fund investments are assessed in light of these risks and developments in modern portfolio theory. A gradual but decisive loosening of restrictions on equity and foreign investments is recommended. Changes in these regulations ought to be coordinated with measures designed to foster the development of local securities markets as well as with macroeconomic policies.

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## I. INTRODUCTION

Pension reform has generally been motivated by the need to address political and demographic pressures that threaten the financial stability of pay-as-you-go (PAYG) systems. However, the focus of reforms towards fully or partially funded, privately managed systems in several emerging market countries has led to additional benefits for the development of capital markets. These benefits have been determined, to a large extent, by regulations on pension funds' investment limits. In this paper, these benefits are reviewed and policy options on regulatory investment limits are assessed in light of recent developments in mature and emerging markets.

A number of emerging market economies have introduced pension reforms that are bolder and more ambitious than those pursued by advanced economies. Following the lead of Chile, which initiated the reform drive in Latin America, several other countries in Latin America and more recently also in central and eastern Europe, have adopted variants of a funded, privately managed, defined-contribution personal accounts retirement system.<sup>2</sup> The outcome of reforms has been broadly successful, especially in Chile, and other reformers are striving to improve the regulatory framework to achieve the most gains from a reform that has an impact on several aspects of the economic landscape.<sup>3</sup> An early assessment of the challenges facing the pension reformers (Mitchell and Barreto, 1997) identifies six critical elements, namely, whether the system has to be mandatory or voluntary, how it is to be financed and how should benefits be structured, the size and financing of the transition, and the performance and regulatory structure of the system.<sup>4</sup> This paper focuses on one aspect of the regulatory structure—investment limits—that is central to the relation between the reformed

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<sup>2</sup> Most countries still see the need to continue the 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).

<sup>3</sup> A thorough assessment of the Chilean experience can be found in Acuna and Iglesias (2001) and in Diamond and Valdes-Prieto (1994).

<sup>4</sup> A more recent assessment includes coverage and governance of the systems as two additional critical aspects (de Ferranti, Leipziger, and Srinivas, 2002).

systems and the efficiency and stability of local capital markets. The paper stresses the trade-offs between optimal portfolio diversification and the development of local securities markets, including some macroeconomic implications of regulatory changes. The paper does not cover, however, the impact of these reforms on aggregate savings, intergenerational transfers, and/or political economy aspects of these reforms.<sup>5</sup>

The growth of institutional investors in the mature markets since the 1970s—in particular, pension funds—has been associated with substantial growth and structural changes in capital markets, and several emerging markets are experiencing similar trends. In particular, Davis and Steil (2001) document an important shift away from bank deposits towards equity and bonds in households' portfolios. The early stages of pension reform in emerging markets have also shown an impressive growth in assets under management, which has contributed to the quantitative and qualitative development of local securities markets. A comparison of the mature and emerging markets experiences provides some guidance on the potential imbalances in the growth of the (mostly pension fund-driven) demand for local securities and the potential local supply, as well as on associated policy options.

A differential and critical aspect of pension reform in emerging markets has been the concentration of portfolios in domestic bonds. In most cases, this has been a deliberate result of regulatory limits imposed on the industry, driven by the desire to safeguard pension participants from a whole range of capital market risks, and to smooth the fiscal costs of the transition to a fully funded system. A key policy issue that emerges at this juncture is whether emerging markets should dismantle specific regulations on portfolio limits and move to the “prudent man rule,” self-regulatory framework, or gradually liberalize some of the tighter regulations (Iglesias, 2002). A related issue is how much weight to give to the development of local securities markets in shaping up the fund's regulations. The large differences across countries makes it difficult to draw general conclusions, and an assessment of the individual regulations is beyond the scope of this paper. Nevertheless, some of the arguments behind key regulations are revisited in light of recent developments in mature and

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<sup>5</sup> Excellent surveys of these issues are Lindbeck and Persson (2003) and Diamond (2004).

emerging markets, as well as some contributions to the academic literature that attempt to bridge the differences between traditional portfolio theory and financial practitioners' advice.

## **II. PENSION FUNDS AND CAPITAL MARKET DEVELOPMENT**

Pension funds, as well as other institutional investors, provide means of risk pooling for smaller individual investors, thus providing diversification and enhanced risk-return opportunities for end-investors. Their superior capacity to absorb and process information, and their ability to transact in large volumes, lowers the cost of intermediation and benefits investors and issuers alike. In addition to providing better risk management and lower transaction costs, their long-term liabilities allow pension funds to invest in and contribute to the development of longer-term securities markets. Finally, they also contribute to better transparency and governance, as well as to the improvement of market microstructure and the adoption of innovative financial products. However, some analysts argue that pension funds tend to follow a herding behavior and magnify volatility in asset markets. In this section, evidence on the (mostly) positive impact in capital markets is provided, with particular attention to systems that have been recently reformed.

The growing importance of institutional investors in the mature markets, and its positive impact on the development of securities has been widely documented. Davis and Steil (2001) show that institutional investors' assets in the G-7 countries increased from 23 percent in 1970 to 108 percent of GDP in 1998—with pension fund assets at approximately 43 percent of GDP (see Figure 1). Over the long term, pension funds have grown faster than other types of institutional investors, but mutual funds have recently undergone the most rapid growth—in part because that some pension funds are delegating the management of assets to mutual funds. Similar trends are taking hold in emerging markets (see IMF, 2004).

The increasing importance of institutional investors has been accompanied by an increase in the relative importance of equity and bond markets, at the expense of bank deposits (see Figure 1). Davis and Steil (2001) confirm these results with panel regressions for mature markets, splitting the sample into Anglo-Saxon countries—that have experienced a more marked growth in institutional investors—Europe and Japan. They also find that a larger

institutional sector is associated with a lower average level of capital market volatility—measured by the monthly standard deviation of share prices—in the Anglo-Saxon countries.<sup>6</sup>

A recent study that encompasses mature and emerging markets confirms these findings controlling for other determinants of bond and stock market capitalization.<sup>7</sup> In particular, the study finds that an increase in the share of total assets managed by pension funds and insurance companies has a positive impact on bond and stock market capitalization. The effect on the depth of bond and stock markets is stronger when the financial system is market-based, when international transactions in securities are not too large, and when pension contributions are mandatory.

These studies demonstrate a substantial degree of contemporaneous correlation between institutional investment—including pension funds—and securities markets development, but it could be argued that this does not imply a causal relationship. Indeed, some authors (Davis, 1995; Davis and Steil, 2001) suggest that the development of securities markets is a precondition for the growth of institutional investors. To shed some light on this issue, Catalan, Impavido, and Musalem (2000) run two-way Granger causality tests for 14 OECD countries and 5 emerging markets, with annual data from 1975 to 1997. In several cases the evidence shows that either causality does not exist or where it exists it is predominantly from institutional assets to market capitalization—and not vice versa. For the case of pension funds in emerging markets, the authors find that in Thailand and South Africa causality seems to run from pension funds to market capitalization, while in Chile causality runs both ways and in Malaysia and Singapore it seems to run in neither direction.

A number of emerging markets have introduced pension reforms that are leading to an important increase in assets under management (AUM) of private pension funds. In Latin

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<sup>6</sup> See Davies and Steil, 2001, Tables 5.5 and 5.6.

<sup>7</sup> See Impavido, Musalem and Tressel (2003). The sample includes a number of mature markets and also several emerging markets (Argentina, Chile, Hungary, Korea, Malaysia, Poland, South Africa, and Turkey).

America, Chile's AUM have reached 54 percent of GDP after 20 years of operation of the fully funded system (see Table 1). Most other countries, while in the early stages of asset accumulation, already have more than 5 percent of GDP in AUM. The growth of AUM has been particularly rapid in Mexico, Peru, Uruguay, Hungary, and Kazakhstan.

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 concentrated mostly 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.<sup>8</sup> 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 have noted that indexed bonds have been an optimal instrument for pension funds and insurance companies. In the cases of Argentina in the second half of the 1990s and Mexico in the last five years, the rapid growth in local corporate bond issuance has also been associated with an acceleration in the growth of pension funds' AUM.

Pension funds have also had a significant impact on Chile's stock market, as well as on other financial markets and institutions. Walker and LeFort (2000) find a statistically significant impact of pension funds' AUM 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 (the countries with the longest history of reform), 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

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<sup>8</sup> See Mathieson and others (2004).

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, as well as with the introduction of innovations in securities trading and custody (see also Yermo, 2003). However, some market participants have argued that the fact that pension funds are buy-and-hold investors has contributed to low liquidity in Chile's equity markets.

The growth in private pensions' AUM has contributed not just to the development of local securities markets, it has also had a significant impact on 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, but it may increase default risk if overall debt levels become unsustainable. Despite the short history of some reformed systems, the hypothesis that assets managed by pension funds offer stability to foreign debt markets seems to have empirical backing.<sup>9</sup>

### **III. OUTLOOK, RISKS, AND CHALLENGES**

The discussion in the previous section suggests that the growth in pension fund's AUM has positive implications for the quantitative and qualitative development of capital markets. The fact that most emerging market pension systems are just in their early stages of development—compared to mature market systems—also suggests that it is reasonable to assume that this positive influence will continue into the medium term. However, there may be limits to the development of local markets and whether these emerging markets could respond to the increased pension fund demand with a substantial volume and enough diversity of securities is one of the key questions in emerging markets and one of the key challenges for regulators of securities markets and the pension industry.

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<sup>9</sup> See Roldos (2004).



The growth in pension fund's AUM is likely to accelerate over the next decade, as suggested by the experience of Chile and the G-7 countries. Projections from Salomon Smith Barney (see Garcia Cantera and others, 2002) suggest that by the year 2015 most reformed systems in Latin America are going to reach a level of AUM of around 25–30 percent of GDP, roughly the level of the average of the G-7 countries in 1998.<sup>10</sup> Although the institutional, demographic, and financial structures differ across both groups of countries, a comparison of both experiences suggests that securities markets in the pension reform countries could potentially double in size (relative to GDP) by 2015. As Figure 1 shows, equity and bond market capitalization in the G-7 countries roughly doubled in *two* decades, from around 50 percent of GDP in 1980 to more than a 100 percent of GDP in 1998.<sup>11</sup> A similar figure for a sample of Latin American countries (Figure 2) suggests that it may not be feasible for these countries' bond and equity markets to grow at such pace and double in size in a little more than a decade. On top of the time needed to build the necessary infrastructure and institutions to support these markets, structural trends such as the migration of liquidity to financial centers may limit the potential growth of local equity markets.<sup>12</sup>

The growing imbalance between the demand and supply of local markets securities, combined with restrictions on pension funds' investment policies, could cause significant distortions, concentration of risk exposures, and asset price bubbles. In order to safeguard pension participants from a number of capital market risks, most countries apply stringent portfolio restrictions, in particular on holdings of stocks and international securities.

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<sup>10</sup> These estimates may appear to be somewhat conservative in light of the Chilean experience, which shows AUM of more than 50 percent of GDP after two decades of operation of the system. However, the depth of the reforms and the evolution of demographics, together with the performance of the Chilean economy over the last two decades, may underscore the different evolution of systems. Salomon Smith Barney's projections have the advantage of a common methodology across countries but are to be taken as illustrative.

<sup>11</sup> The sample in Davis and Steil (2001) ends in 1998, but market capitalization has not changed that much after the bursting of the stock market bubble in 2000.

<sup>12</sup> See, for instance, Claessens, Klingebiel, and Schmukler (2002), and Mathieson and others (2004).

Moreover, most countries have also adopted tight restrictions on the percentage of a company's capital or outstanding bonds that a pension fund can hold.<sup>13</sup> For example, in Argentina, funds can only hold at most 5 percent of a company's capital and 5 percent of its bonds. When local stock markets are small (as is particularly the case in most Latin American countries), with a limited number of qualifying companies, rapidly growing funds will quickly reach these limits, increasing the risk of price bubbles.<sup>14</sup>

Regulatory limits on investments in stocks and foreign assets could also distort asset prices and magnify price volatility. An effect of the large size of funds relative to the local markets is that price discovery is distorted, and 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.<sup>15</sup> Also, limits on foreign investments amount to controls on capital outflows that impose a wedge between the prices of local and foreign bonds. In early 2003, the spread between external (swapped to pesos through cross-currency swaps) and local bonds in Mexico was around 300 basis points, and analysts considered this difference to be caused mainly by regulations preventing local pension funds from investing abroad (see Abdel-Motaal, 2002; and IMF, 2004). Similarly, in the case of Peru, Brady bonds pay higher spreads than local corporate bonds, owing to the fact that pension funds can invest only up to 5 percent of their portfolio in sovereign external debt versus 40 percent in corporate bonds.

The growing imbalance between AUM and available securities, and the associated distortions and risks, pose a policy dilemma: whether to improve capital market regulations to speed up the development of local securities markets, or to loosen pension fund portfolio restrictions.

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<sup>13</sup> See Yermo (2000).

<sup>14</sup> See IMF (2004).

<sup>15</sup> See Srinivas, Whitehouse, and Yermo (2000).

Some of the issues related to the first policy option are dealt with in Mathieson and others (2004). In the next section, issues related to the relaxation of portfolio restrictions are discussed.

#### **IV. INVESTMENT RESTRICTIONS: RECENT DEVELOPMENTS AND ISSUES**

Most pension reforms have been accompanied by strict regulations aimed at protecting workers' future pension benefits. These regulations have included, among others, aspects of the industry structure, asset allocation, and relative performance. These constraints have important effects on the funds' asset allocations and hence on the development of local securities markets.

While restrictions on the industry structure and relative performance appear to be relatively strict, general conclusions on the tightness of portfolio restrictions are harder to establish.<sup>16</sup> A comparison between portfolio restrictions in mature and emerging markets (Table 2) reveals that there are large differences across countries. In some G-7 countries, in particular the Anglo-Saxon ones, pensions funds are required to follow "prudent man rules"—that is, assets should be invested in a manner that would be approved by a prudent investor—while in Germany and Japan there is a 30 percent ceiling on equity holdings and similar ones on foreign investments. While no emerging market is allowed to follow the prudent man rule, four of the big countries in our sample (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 30–40 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.

The differences are somewhat more striking in the actual portfolio allocations. While U.S. and 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 (see Table 2). It is interesting to note that in two small mature markets, Denmark and the Netherlands, pension funds hold around half

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<sup>16</sup> See Roldos (2003) and IMF (2001).

of their assets in equities (OECD, 2003). 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's pension funds hold 14 percent of their portfolios in shares. In Latin America, Peru's funds hold 31 percent of their portfolios in stocks, while Brazilian funds hold around 28 percent; in contrast, pension funds in Argentina, Chile, and Colombia hold less than 10 percent in stocks.<sup>17</sup>

Countries that have reformed their pension systems hold a large share of their portfolios in government bonds, with the exception of Peru and Chile. In the most recent reformer, Mexico, pension funds held almost 90 percent of their portfolio in government bonds in 2001, but that percentage had fallen to 81 percent by end-2002.<sup>18</sup> Argentina and Colombia's pension funds held around half of their portfolios in government bonds by end-2001.

Consistent information on holdings of foreign securities is more difficult to obtain, but mature markets' pension funds seem to hold slightly larger allocations in foreign assets than their emerging market counterparts. In the mature markets, pension funds' foreign asset allocations are below 10 percent for France and Germany, around 10 percent for the United States, and 23 percent for the United Kingdom and Japan.<sup>19</sup> In emerging markets, Chile has the highest share of pension fund assets in foreign securities (25 percent), followed by Argentina (9 percent) and Peru (7 percent).

In sum, emerging markets' pension funds have relatively larger holdings of domestic bonds—and smaller allocations in stocks and foreign securities—than most mature market

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<sup>17</sup> These figures exclude holdings of equity mutual funds. For most countries, data are not available as mutual fund holdings are not broken down into equity and fixed income funds.

<sup>18</sup> Smaller countries' pension funds also hold a large share of government bonds in their portfolios, with figures of 73.5 percent for Bolivia, 83.4 percent for El Salvador, and 57.6 percent for Uruguay by end-May 2002 (see Iglesias, 2002).

<sup>19</sup> Smaller countries also have relatively large foreign assets allocations. In the case of the Netherlands, the share of foreign assets in pension funds portfolios is around 70 percent.

pension funds. Thus, a key policy issue is whether emerging markets should gradually liberalize some of the tighter investment limits, and how much weight to give to the development of local securities markets in shaping up pension fund regulations.<sup>20</sup> While loosening restrictions on equity investments could contribute to the development of local securities markets, relaxing those on foreign investments could have the opposite effect. To gain some insights into the effects of the relaxation of these restrictions, the next two sections revisit some of the arguments behind the regulations in light of recent developments in the academic literature as well as the experience of mature and emerging markets. In particular, the discussion focuses on the roles of equities versus bonds and domestic versus foreign securities in an optimal portfolio.

### *Equities versus Bonds*

Modern finance theory has provided useful insights for the portfolio decisions of individuals, but some of its implications are inconsistent with the financial advice of industry practitioners. Traditional mean-variance analysis has the implication that all investors should hold the same portfolio of risky assets, a unique and optimal mix of stock and bonds; conservative investors would hold relatively more cash (and less of the same, unique portfolio of risky assets) than aggressive investors. This strong implication of a unique portfolio is the mutual fund theorem of Tobin (1958). As noted by Canner, Mankiw, and Weil (1997), this contrasts sharply with the advice given by financial planners. The authors show, using data for the United States between 1926 and 1992, that the optimal portfolio should hold stocks and bonds in a ratio of 3 to 1. In contrast, they also show that asset managers and financial planners differ sharply in their advice on asset allocation to clients, depending on investors' degree of risk aversion. On average, conservative investors tend to be advised to hold a much higher allocation in bonds than in stocks.<sup>21</sup>

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<sup>20</sup> Some analysts have asked whether emerging markets should go as far as to dismantle specific regulations on portfolio limits and move to the "prudent man rule," but have concluded that most of them are not yet ready for such option (Iglesias, 2002).

<sup>21</sup> A somewhat more sophisticated practical guideline states that the fraction of assets invested in equities should decline with age. It generally applies the rule of thumb that the  
(continued...)

In an attempt to reconcile the principles of portfolio choice with the advice of financial planners, Campbell and Viceira (2002) modify the traditional analysis of portfolio choice in several ways. In particular, they show that the optimal portfolio of long-term investors may be quite different from that of short-term investors, and that a long-horizon analysis assigns a much more important role for bonds in the optimal portfolio. For instance, cash, or more precisely money market funds or treasury bills, are assumed to be risk-free assets in the traditional analysis, while they constitute risky assets for long-term investors, as they must be rolled over at uncertain future interest rates. Conventional long-term bonds in environments of low inflation uncertainty, or inflation-index bonds, are much safer assets for the long-term investor. Also, they show that in the absence of complete financial markets—a reasonable assumption for emerging markets—the time-varying nature of the volatility of stock returns warrants a reduction in stocks (that is estimated to be around 10 percent for U.S. data, presumably more for an emerging market). Finally, the authors also show that while it is optimal for young investors to hold more stocks, this advice has to be nuanced when investors have insecure jobs and/or are close to subsistence levels of consumption—two characteristics typical of emerging market workers.

One of the main reasons behind large equity allocations in some of the mature markets is the existence of high excess returns in stocks, especially in the United States. Despite the fact that the existence of such an equity premium is not very well understood, there are a number of reasons why it may not be appropriate to extrapolate this historical evidence to the future and/or to other countries. First, historical returns may not be repeated in the future. Second, the evidence on the equity risk premium is based on long-series (covering sometimes more than a hundred years), and even if stocks outperform bonds on average, there is a significant risk that they may fail to do so over shorter periods of time relevant for pensioners. For instance, MaCurdy and Shoven (2001) show that about 25 percent of the time equity

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percentage in equities should be 100 minus one's age—a person thirty years old should invest 70 percent in equities and one aged seventy should invest 30 percent in equities (Bodie, 2001).

investments underperform twenty-year inflation-indexed bonds yielding 3.5 percent in real terms. Third, Jorion and Goetzman (1999) argue that the results for U.S. equity markets suffer from “survivorship bias,” that is, the fact that other stock markets around the world had a much worse performance owing to extreme events such as crises, wars, expropriation, or political upheaval—that led to temporary or even permanent closure of some stock markets.

Moreover, the string of emerging market crises since 1994 and the recent bursting of the technology, media and telecommunications (TMT) stock market bubble, combined with structural changes in global stock markets, have been a stark reminder of the risks associated with equity investments. The bear market in equities has shrunk trading volumes everywhere, and the combination of a drop in IPOs associated with the reduction in privatization and a spate of delistings has called into question the viability of several stock exchanges in emerging markets (see Mathieson and others, 2004). In several emerging markets, there are only a handful of stocks that have the market capitalization and liquidity that would satisfy the demands of a prudent fund manager. An illustration of this problem can be seen in the small number of shares that are part of the IFC Investible Index—compared to the total number of shares traded in some markets.<sup>22</sup> In Peru, for instance, there are 202 listed companies but only 9 are large and liquid enough to be included in the S&P/IFCI; however, these nine shares comprise 94 percent of volume traded in the country’s stock exchange.

Despite these recent arguments against a large share of equities in pension funds’ portfolios and the recent dismal performance of equities worldwide, diversification arguments suggest that local equities should definitely have a role in local pension fund portfolios.<sup>23</sup> Investors with a relatively long horizon, such as those just entering the labor force, are likely to benefit from the risk-return configuration of stocks, where the risk is measured relative to the

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<sup>22</sup> See Roldos, 2003. The S&P/IFCI constituent stocks are chosen using minimum capitalization and trading levels, as well as foreign limits (if they apply).

<sup>23</sup> Notwithstanding the large fall in equity values between September 1999 and September 2002, representative pension portfolios—with 40 percent or less equity allocations—obtained reasonable returns over a 3–5 year period (see Roldos, 2003).

existing portfolio. Moreover, the property that makes shares safer in the long run than in the short run—mean-reversion—is likely to provide some relief to equity portfolios that suffered recent losses but are held for the long run.

In sum, portfolio regulations on equity holdings in most pension reform countries appear not to be too restrictive (with the exception perhaps of Mexico and some of the smaller countries),<sup>24</sup> and currently low allocations to equities may not have been a bad decision. Going forward, there may be scope for further liberalization of restrictions on equities, perhaps with a greater role for allocations in foreign stocks or mutual funds (see below). As shown by Walker and Lefort (2000), increasing asset allocations to local stocks have contributed to support price-to-book ratios in Argentina, Chile, and Peru, and one would expect a similar support in primary equity markets. This could justify giving some weight to the market development argument in allowing for a larger share of investment in local stocks. However, it remains unclear how effective the demand from pension funds' could be in the development and growth of local stock markets that are under strong competitive pressures from regional and global markets. In particular, Claessens, Klingebiel, and Schmukler (2002) have shown that countries that follow the right policies to develop their own local stock markets also experience the highest degree of migration of capital raising, listing, and trading activity to international stock exchanges.<sup>25</sup> Nevertheless, even though it is very difficult to assess the long-term evolution of trading practices and consolidation of exchanges (see IMF, 2001), the largest emerging market stock exchanges are likely to continue to be a viable source of trading for investors and funding for corporations.

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<sup>24</sup> The legislation allowing for the investment in equities was approved last year in Mexico, but the regulatory agency (Consar) did not approve the implementation of the new portfolio rules until May 2004 (see IMF, 2003, and Cervera and Quedry, 2003). Consar estimates six to seven months for the new investment regime to become operational.

<sup>25</sup> The authors include macroeconomic and capital market variables—such as inflation, shareholder rights, and financial liberalization, but do not include explicitly the role of pension funds; one could expect a similar role from the latter (see also Mathieson and others, 2004).



The relatively large portfolio allocation in government bonds is a natural outcome of the early stages of a pension reform, but it creates an undesirable concentration of risk in the sovereign. There are three arguments that support the relatively large portfolio allocation in government bonds. First, increased government bond issuance would smooth the transition to a funded system and attenuate the problem that the transitional generation would have to “pay twice,” that is to pay contributions to the PAYG system to finance the benefits of those who are already retired while also saving for their own future retirement (Campbell and Feldstein, 2001). Second, in the early stages of reform, pension fund managers are relatively inexperienced in risk management and need to follow a learning process that would start with less-risky government bonds. Third, local bond markets are generally underdeveloped and it is appropriate for the government to take the lead and establish a yield curve that would help price corporate sector bonds, as well as contribute to the acceptance and use of indexed bonds (see Mathieson and others, 2004).

However, the recent Argentine crisis 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 Cantero and others, 2001). The subsequent default, devaluation, and pesification of deposits and local bonds has caused losses to the pension funds and has raised concerns about increased government intervention in the industry.<sup>26</sup>

Stringent requirements on minimum acceptable ratings for corporate bonds could also be relaxed, but the development of mid- and lower-tier corporate bond markets takes time and regulations should be adjusted with prudence. As noted in Section II, pension funds have contributed noticeably to the development of corporate bonds in Chile and Peru. Similarly, the lowering of the minimum rating requirement from AA to A- has contributed to an

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<sup>26</sup> The Superintendency of Pension Funds (SAFJP, 2002) 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 AUM declined substantially.

increase in the share of corporate bonds in Mexico's pension funds from 7.2 percent in 2000 to 16.2 percent in 2002. Moving down the credit ladder may take longer, as the creation of a credit culture takes substantial time to build and must be accompanied by a number of other measures of capital market development (see Mathieson and others, 2004).

### *Domestic versus Foreign Securities*

International portfolio theory suggests that there are substantial gains to be achieved by diversifying abroad, mainly because of additional diversification of nonsystematic national risks. A number of studies (for example, Grauer and Hakansson, 1987) suggest that gains from international equity-portfolio diversification are large, but the "home bias" in most mature market investors' portfolios remains a puzzle. Davis (2002) shows that international investments allow superior performance in terms of risk and return, and that pension funds are well placed to take advantage of these benefits.

A recent study on the gains from international diversification (Baxter and King, 2001) from the perspective of U.S. investors notes two important sources of benefits. First, there is the standard *diversification* benefits that improve the risk-return trade-off of the domestic portfolio by adding international stocks and bonds. Second, the authors note that human capital is a much larger fraction of wealth than financial assets and that labor income is much more correlated to domestic financial asset returns than to foreign asset returns. Hence, international investment provides also *hedging* benefits for labor income. Illustrative calculations suggest that for a degree of relative risk aversion of 5, the optimal portfolio would allocate 64 percent to risky assets, with 26 percent in international securities. The optimal portfolio allocations to risky and international assets decrease almost proportionally with the degree of risk aversion, but the allocation to foreign assets increases by 10 percentage points when one incorporates uncertain labor income.<sup>27</sup>

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<sup>27</sup> This would imply that for risk aversion in an interval of (5, 10), the optimal allocation to international assets from the perspective of U.S. investors would be 23 to 36 percent of assets; it is likely that the percentages would be higher for a small emerging market.

Despite the importance attached to the development of local securities markets, some of the pension reformers have seen the need to increase their limits on foreign investments for diversification purposes. Once 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 (see Figure 3). The limit was then increased to 9 percent in 1995, 12 percent in 1997, 20 percent in 2001 and has been at 30 percent since June 2002. Pension funds did not diversify abroad in a meaningful way in the first half of the 1990s, owing to high domestic asset returns (see Figure 3). But following two years of large negative returns in the local stock market, a strong reallocation towards foreign assets began in 1997 and the funds currently hold around 25 percent of their assets abroad. This has also been accompanied by a recovery in the funds' annual returns, aided in part by the depreciation of the local currency.

In other countries that have loosened limits to foreign investments, asset managers have at times been reluctant to increase allocations of foreign assets. For instance, in Hungary, where the limit has been set at 30 percent of total assets 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 the fear of not meeting required minimum returns—even when funds are at the maximum limit on their holdings of government bonds.<sup>28</sup>

Some analysts have considered Chilean regulations to be too stringent and suggested that other reformers could follow a somewhat less gradual approach in loosening regulations. To assess this recommendation we performed a simple counterfactual exercise that invests a larger share in foreign assets beginning in 1993. We create two synthetic portfolios that give relatively larger shares than the current portfolios to global equities and an international

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<sup>28</sup> Minimum required returns and peer-group benchmarking are the main causes of herding behavior of pension funds (see Srinivas, Whitehouse, and Yermo, 2000; and Roldos, 2003).

indexed bond (Table 3). The “theoretical” portfolio follows some of the allocations suggested by the study of Baxter and King (2001) (i.e., 52 percent in local non-risky assets, including local indexed bonds) while the “international portfolio” assigns 25 percent to international indexed bonds and a similar percentage to international stocks. The average return of the portfolio does not change much, but the “theoretical” portfolio reduces the standard deviation of ex post returns. These results are only illustrative but suggest that a higher degree of international diversification could have been achieved earlier than in the actual experience of Chilean pension funds.<sup>29</sup>

In sum, it is feasible and desirable for private pension funds to diversify abroad. Even when the development of local markets is an important policy objective, funds should be allowed to invest abroad to achieve adequate diversification levels and avoid undue pressures in local markets. A natural vehicle for this diversification abroad—one used intensively by Chilean funds—is to invest in global mutual funds.<sup>30</sup>

Two macroeconomic implications of pension fund diversification abroad are worth mentioning. First, 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.<sup>31</sup> In particular, as the Chilean and Canadian experiences have shown, a sudden shift of pension fund allocations abroad can lead to a substantial exchange rate depreciation.<sup>32</sup> In Chile, the increase in the share of foreign assets, from 2 percent by

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<sup>29</sup> These synthetic portfolios do not incorporate any hedging of currency risk, a common practice by pension funds. For a further discussion on this issue, and the impact of hedging on local derivatives markets, see Roldos (2003).

<sup>30</sup> However, Mexican regulators are reluctant to follow this route, as they argue that it would be difficult to monitor the funds’ allocations and pensioners would be paying management fees twice.

<sup>31</sup> Other things equal, this would exacerbate the position of some emerging markets as net exporters of capital (see IMF, 2003).

<sup>32</sup> See Patterson and Normand (2002) and Roldos (2003).

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 on January 2001 contributed, to some extent, to an increase in capital outflows and a 10 percent depreciation of the Canadian dollar in the period January 2000 through January 2002.<sup>33</sup> Second, pension funds' accumulation of foreign assets provides a natural supply of foreign exchange hedge for corporates that borrow abroad, contributing to the development of derivatives markets and to a more balanced aggregate international position.

## V. CONCLUDING REMARKS

As in the mature markets, pension funds' assets under management (AUM) have been growing at a rapid pace in emerging markets that have implemented pension reforms. The growth in AUM has been associated with quantitative and qualitative benefits for local securities markets. In contrast to the mature markets, benefits have been concentrated to a large extent in local bond markets, in part as a result of regulatory restrictions on portfolio choices.

The rapid growth in AUM of emerging market pension funds is likely to continue in the near term, and the response of local securities markets to the increased demand remains uncertain. The growing imbalance between the demand and supply of local securities markets could cause significant distortions in asset pricing, concentrations of risk exposures, and asset price bubbles. This increasing imbalance calls for continuous and coordinated efforts to improve the regulatory frameworks for both pension funds and securities markets.

Despite advances in portfolio theory that assign a more important role to bonds—in particular indexed bonds—diversification arguments suggest that equities should continue to

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<sup>33</sup> In both cases, however, the depreciations were also associated with a deterioration in non-energy commodity prices. Moreover, general equilibrium effects could make the depreciation transitory. Burgess and Fried (2002) argue that the changes did not have an impact on the exchange rate.

be part of optimal pension fund portfolios. Hence, limits on equity holdings and corporate bonds could be gradually relaxed as local asset managers become used to risk management techniques. As the growth in AUM is likely to outpace the growth of local securities markets, pension funds would also benefit from an increased allocation to foreign securities. A gradual relaxation of portfolio limits to investments in bonds and shares abroad, perhaps through globally diversified mutual funds, is likely to improve pension fund diversification opportunities and financial market stability—with perhaps only a minor impact on the development of local securities markets.

The large differences across countries make it difficult to draw more specific recommendations, but these broad policy measures are likely to apply to a number of reformers. There are some important caveats, however. First, as the Chilean experience demonstrates, a gradual approach to improvements in the regulatory framework is desirable. However, as suggested in this paper, followers of the Chilean model may benefit from the previous experiences and perhaps follow a less gradual path to reform. It would be essential, however, to undertake a concomitant effort to enhance the surveillance capabilities of the regulatory agencies as well as provide time for the asset management industry to understand new products and risk management techniques. Second, a relaxation of limits on investments abroad amounts to a relaxation of controls on capital outflows, and the macroeconomic consequences of such measures have to be weighed accordingly. As pension funds tend to exhibit herding behavior, a switch to foreign assets by an industry leader is likely to lead to strong pressures in the foreign exchange market, suggesting that close monitoring of funds and an appropriate timing of regulatory changes in investment limits are essential.<sup>34</sup> Finally, although it has not been an issue discussed in this paper, the fiscal costs of the transition constitute a major risk to the survival of pension reforms. An underestimation of such fiscal costs could lead to macroeconomic instability and jeopardize the multiple benefits of pension reforms for capital markets and others.

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<sup>34</sup> This herding behavior is sometimes related to the existence of industry-related minimum performance requirements. For experiences on dealing with this problem see Srinivas, Whitehouse, and Yermo (2000) and Roldos (2003).

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**Table 1. Emerging Markets Private Pension Funds: Assets Under Management**  
(In percent of GDP)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
<b>Latin America</b>										
Argentina	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.	0.8	2.5	4.0	5.8	6.3	7.3
Colombia	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.	0.7	0.8
Chile	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.	0.4	1.7	3.7	5.8	7.6
Mexico	n.a.	n.a.	n.a.	n.a.	0.2	1.4	2.4	2.9	4.4	5.0
Peru	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.	0.2	0.9	1.7	2.8	4.0	5.6	7.2
<b>Subtotal</b>	<b>1.5</b>	<b>1.9</b>	<b>3.2</b>	<b>3.6</b>	<b>4.0</b>	<b>5.2</b>	<b>6.3</b>	<b>7.0</b>	<b>8.2</b>	<b>9.2</b>
<b>Europe</b>										
Bulgaria	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.	1.3	2.1	3.1	3.9	4.5
Kazajstan	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.	1.5	2.4	3.5
<b>Subtotal</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>0.4</b>	<b>0.6</b>	<b>2.0</b>	<b>2.9</b>	<b>3.8</b>
<b>Memo Item:</b>										
Mature markets	27.7	28.4	29.4	33.2	37.1	42.2	43.6	43.0	40.0	n.a.

Sources: Federacion Internacional de Administradoras de Pensiones (FIAP); OECD, IFS; and IMF staff estimates.

**Table 2. Pension Funds Portfolio Limits and Actual Asset Allocation, 2001–02**

(In percent of total assets)

	Equities		Foreign Assets	
	Limit <sup>1</sup>	Actual <sup>2</sup>	Limit <sup>1</sup>	Actual <sup>2</sup>
<b>Mature markets</b>				
United Kingdom	P	60.9	P	22.9
United States	P	58.8	P	11.0 <sup>3</sup>
Germany	30	0.1	30 <sup>4</sup>	7.0 <sup>3</sup>
Japan	30	27.7	30 <sup>5</sup>	22.9
Canada	--	28.2	30	15.0 <sup>3</sup>
France	--		--	5.0 <sup>3</sup>
Italy	P	4.4	P <sup>6</sup>	0.0 <sup>3</sup>
<b>Emerging markets</b>				
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 <sup>7</sup>	--
Peru	35	31.3	8	7.2
Hungary	50	13.8	30	2.5
Poland	50	27.6	5 <sup>8</sup>	0.3 <sup>3</sup>

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

<sup>1</sup> Numbers refer to maximum allocation; P indicates that the prudent man rule applies.

<sup>2</sup> Data for mature markets are end of 2001 and for emerging markets are end of 2002.

<sup>3</sup> For 1998, see Davis (2002).

<sup>4</sup> In EU equity; 10 percent in foreign bonds and equities of non-EU countries. These limits are for *pensionskassen*, which are under the supervision of the insurance regulator. Other *pension funds* are not subject to investment limits.

<sup>5</sup> No investment limits for public employee funds.

<sup>6</sup> 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).

<sup>7</sup> Only sovereign and investment grade Mexican corporate debt permitted in foreign limit.

<sup>8</sup> Polish Brady Bonds do not count against this limit.

**Table 3. Chile: Pension Fund Portfolios**  
(*In percent*)

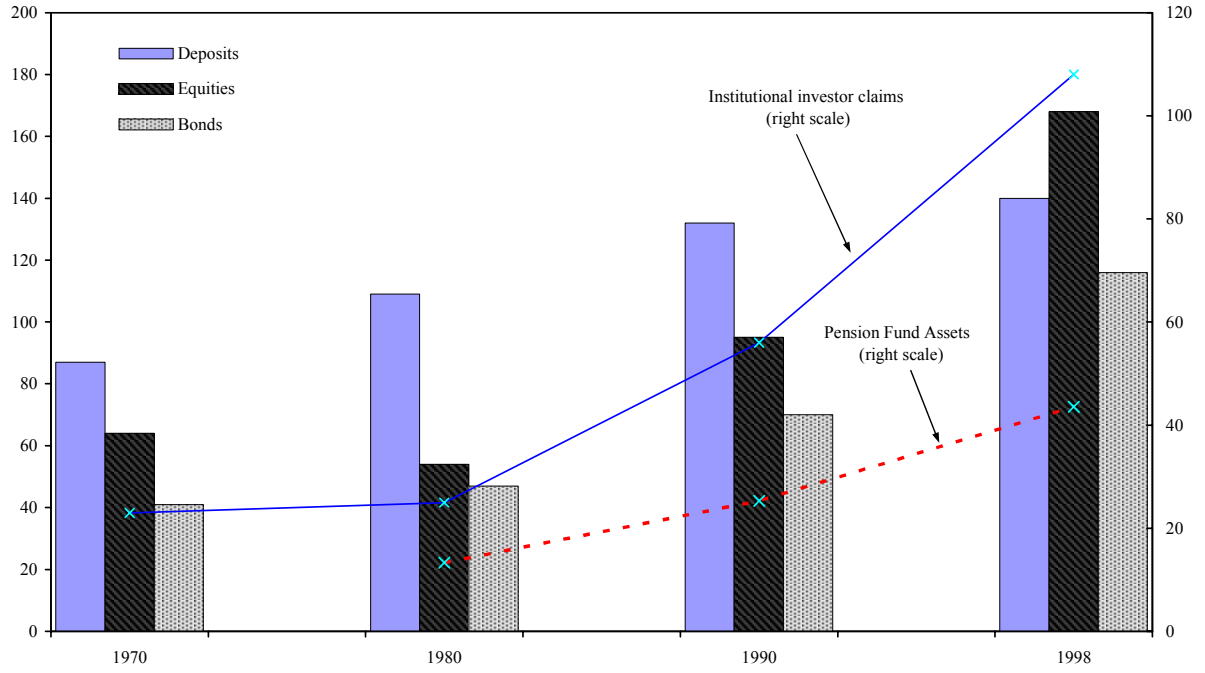
	1981-2002			1993-2002		
	Compound Real Return	Standard Deviation	Risk Adjusted Return	Average Real Return	Standard Deviation	Risk Adjusted Return
<b>Chile Pension Funds (actual)</b>	13.56	3.28	4.13	6.26	7.29	0.86
<b>Portfolio I (theoretical)</b>	13.55	3.27	4.14	6.17	6.47	0.95
<b>Portfolio II (international)</b>	13.54	3.26	4.16	6.10	7.74	0.79

Sources: PrimAmerica Consultores; and IMF staff estimates.

Portfolio I: 15% Time Deposit  
51% Inflation-linked Bond (37% Domestic, 14% Foreign)  
34% Equity (20% Domestic, 14% MSCI World)

Portfolio II: 10% Time Deposit  
50% Inflation-linked Bond (25% Domestic, 25% Foreign)  
40% Equity (15% Domestic, 25% MSCI World)

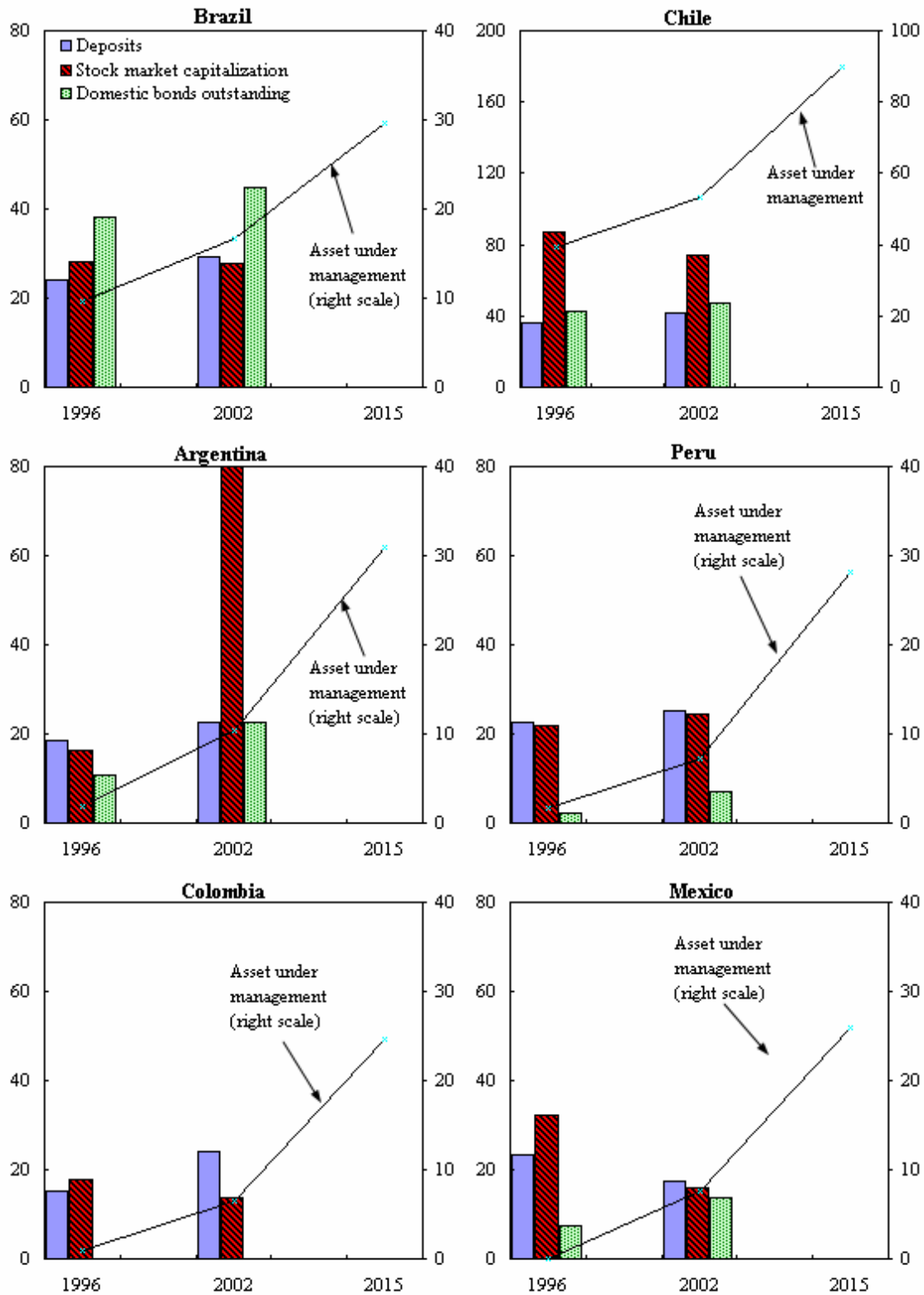
**Figure 1. G-7: Financial Instruments Outstanding and Institutional Investor Assets**  
(In percent of GDP)



Sources: Davis and Steil (2001); OECD; and International Monetary Fund, *World Economic Outlook*.

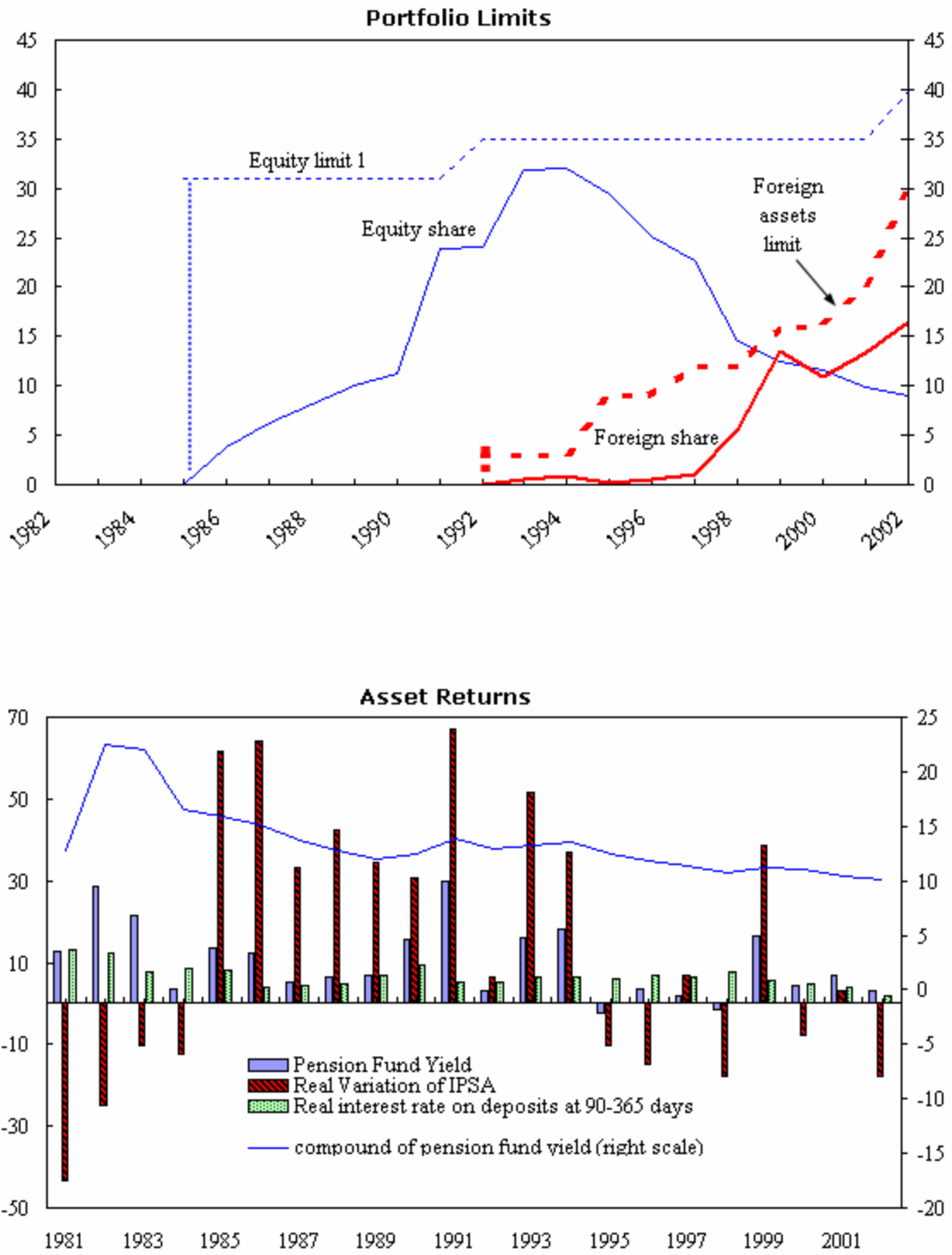
**Figure 2. Latin America: Deposits, Stock Market Capitalization, Domestic Bonds Outstanding, and Asset Under Management**

*(In percent of GDP)*



Sources: IMF, IFS and WEO; Salomon Smith Barney, and S&P IFC EMDB.

Figure 3. Chile: Pension Fund Portfolios and Returns



Source: FIAP, J.P. Morgan Chase, Salomon-Smith Barney; and PrimAmerica Consultores.