Pension Funds and Emerging Markets

BY JORGE A. CHAN-LAU

This paper focuses on the investment behavior of pension funds in developed and emerging market countries. First, it analyzes the main determinants of the emerging market asset allocation of pension funds in developed countries. Second, it assesses how pension funds in emerging markets have contributed to the development of local securities markets. Third, it analyzes the determinants of pension funds' investment performance. The paper concludes with a discussion of why the emerging market asset allocation of pension funds in developed countries is likely to increase and what the challenges faced by pension funds in emerging markets are.

Keywords: Pension funds, emerging markets, asset allocation, regulation

JEL Classification: G23

I. INTRODUCTION

The pension fund industry, in both developed and emerging market countries, has grown rapidly during the past decade. For instance, pension funds in the Group of Seven (G-7) countries accounted for 45% of these countries' GDP in 2001, up from 29% in 1991. During the same period, pension fund assets in emerging markets grew to 20% of GDP from barely 5½%. In developed countries, demographic changes are the main factor driving the growth of pension fund assets. The rapid aging of the populations in these countries has increased the fiscal burden of national pay-as-you-go systems since the support ratio, that is the ratio between those who have retired and those still working, has increased substantially. Walter (1999) estimates that in the European Union support ratios in 2040 will be at twice the levels they were in 1990.

Doubts about the sustainability of the pay-as-you-go systems have prompted governments to search for a different approach to providing retirement income rather than implementing temporary fixes such as increasing contribution rates, raising the retirement age, or cutting benefit levels. The most favored approach has been to gradually replace the pay-as-you-go system with a fully funded system so that retirement income will be fully financed by investing the pension plan members' contributions in financial assets. Among developed countries, the United Kingdom and the United States have adopted fully funded systems to a larger extent than countries in continental Europe.

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Compared to developed countries, Latin America and Eastern Europe are several steps ahead in the process of substituting their pay-as-you-go systems with fully funded systems. Large unsustainable fiscal imbalances in these countries forced governments to undertake pension reform at a relatively early stage. In terms of assets under management as percent of GDP, though, fully funded systems in Latin America and Eastern Europe still lag behind those in Canada, the United Kingdom, and the United States. Chile, which started pension reform in 1981, is the only exception with pension fund assets amounting to 50% of GDP in 2002. Pension reform in Asia is still in the nascent stage, with countries in the region relying mostly on national provident funds. Still, there is growing awareness that a better pension system should include a fully funded component.

The growth of the pension fund industry has profound potential implications for the emerging market asset class. In terms of assets under management, pension fund assets in the developed world greatly exceed the market capitalization of external and domestic emerging markets. Thus, even a small permanent allocation by pension funds to the emerging market asset class may have a stabilizing effect. In emerging market countries, the domestic pension fund industry is rapidly becoming a major source of domestic financing and has the potential to shape the future evolution of domestic markets.

This paper analyzes the investment behavior of pension funds in developed and emerging markets countries. It focuses specifically on the factors that determine the emerging market asset allocation of pension funds in developed countries, and assesses the contribution of domestic pension funds to the development of local securities markets in emerging market countries. The main factors determining the investment performance of emerging market pension funds are also analyzed. Finally, the paper discusses the prospects of emerging market investment by pension funds in developed countries, and the challenges faced by emerging markets' pension funds.

II. PENSION FUNDS IN DEVELOPED COUNTRIES

Pension funds rank among the largest institutional investors in developed countries by assets under management. Figures compiled by the Organization for Economic Cooperation and Development (OECD) show that pension fund assets in six of the largest non-emerging OECD countries amounted to $8.5 trillion in 2001.[1] More than 90% of the assets were concentrated in three countries: the United States (75%), the United Kingdom (11%), and Japan (8%).

The size of assets managed by the pension fund industry in developed countries is sizable when compared against the G-7 equity markets ($23 trillion) and bond markets ($34 trillion). Furthermore, pension funds' assets exceed the

[1] These countries include Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.

Table 1: Pension Funds Assets Under Management in Selected Mature Markets (in US$ billion)

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Canada	AUM	169.8	186.4	184.5	203.1	207.2	229.8	254.9	272.1	283.7	313.9	342.6	330.9
	percent of GDP	29.0	31.4	33.5	37.0	37.7	38.7	41.7	44.1	47.5	46.2	48.3	48.2
Germany	AUM	51.5	56.0	56.6	47.6	55.5	65.3	64.8	60.5	69.3	63.3	62.2	60.5
	percent of GDP	2.8	2.9	2.9	2.5	2.5	2.7	2.8	3.0	3.1	3.2	3.3	3.3
Italy	AUM	38.5	49.6	38.3	33.9	35.5	39.0	39.2	34.4	38.7	51.3	48.8	47.3
	percent of GDP	3.3	4.0	3.7	3.7	3.5	3.5	3.2	3.0	3.1	4.6	4.5	4.4
Japan	AUM	407.9	432.8	477.9	591.6	672.4	735.1	663.3	623.9	722.2	923.9	825.8	710.7
	percent of GDP	12.4	11.5	12.4	13.6	13.6	15.2	15.0	15.5	16.2	18.5	18.5	18.5
United Kingdom	AUM	536.6	599.5	552.4	683.2	660.5	759.7	893.2	1058.4	1136.5	1281.5	1116.3	954.0
	percent of GDP	49.9	54.7	59.8	71.8	62.0	68.2	69.0	78.9	79.3	87.8	78.7	66.4
United States	AUM	2435.1	2807.4	3011.6	3354.9	3547.9	4226.7	4745.7	5563.6	6231.9	6857.3	6805.0	6351.3
	percent of GDP	42.0	46.9	47.7	50.5	50.3	57.1	60.7	66.9	71.0	73.9	69.3	63.0
Total	AUM	3736.8	4236.1	4433.6	5042.9	5298.3	6183.8	6792.8	7757.4	8631.5	9651.4	9353.9	8595.6
	percent of GDP	27.2	29.0	30.3	32.9	31.5	35.4	38.4	44.4	46.0	49.5	48.3	45.3

Source: OECD and author's calculations.

market capitalization of emerging markets: as of end-2001, the sovereign external debt market amounted to $500 billion, local bond markets to $1.9 trillion, and local equity markets $2.7 trillion. The figures above suggest that a stable and sustained allocation to emerging market securities could be beneficial to the asset class. For example, an allocation as small as 1½% of assets accounts for 25% of total outstanding emerging market sovereign debt.

Strategic Asset Allocation vs. Tactical Asset Allocation

From an investment perspective, investing in emerging markets can be beneficial to pension funds from a long-term investment (or strategic asset allocation) perspective and from a short-term investment (or tactical asset allocation) perspective.

Strategic asset allocation to foreign securities, including emerging market securities, is justified by modern portfolio theory.[2] The theory suggests that portfolio diversification across asset classes with imperfectly correlated returns increases portfolio returns for the same level of risk or portfolio volatility. Table 2, from Morgan Stanley (2003), shows how domestic equity portfolios for investors based in the European Union, Japan, the United Kingdom, and the United States can benefit from diversifying into other domestic and international asset classes, including emerging market securities. Empirical analysis by Griffin (1998) and Davis (2002a) show that international portfolio diversification helps to protect returns from inflation.

Table 2 emphasizes returns without considering the tradeoff between return and return volatility, a measure of portfolio risk. Mean-variance portfolio analysis using average returns for the past 5 and 10 years indicates that optimal portfolio allocations should include emerging market assets (Figure 1). The optimal portfolio, though, depends crucially on the period analyzed. The 10-year investment horizon optimal portfolio does not include emerging market equities. In contrast, the 5-year investment horizon optimal portfolio does not include G-7 equities and it consists mainly of fixed income securities.

Strategic asset allocation focuses on long investment horizons, and hence, is biased towards buy-and-hold strategies. However, following buy-and-hold strategies does not rule out using short-term tactical asset allocation strategies to enhance the returns of the pension fund portfolio. For example, in 2003 a portfolio with a market-weighted strategic asset allocation of 100% in G-7 countries equities could have generated an additional return of 2% by decreasing the G-7 allocation by 10% and investing those assets into emerging market equities.[3]

Increased investment in emerging markets securities by pension funds would likely affect the volatility of the asset class. It is not clear, though, whether the

[2] Portfolio theory was initiated by Markowitz (1952) and Roy (1952).

[3] The figures are obtained using the MSCI G-7 and MSCI Emerging Markets Free Indices compiled by Morgan Stanley.

effects would be positive or negative. On the one hand, pension funds following strategic asset allocation guidelines would likely follow buy-and-hold strategies. Hence, pension funds could contribute to stabilize emerging markets as their behavior mimics the behavior of dedicated emerging market investors. On the other hand, if emerging market investment decisions are guided mainly by short-term tactical considerations, pension funds would tend to behave like other crossover investors, getting in-and-out of positions rapidly.

The overall impact on volatility thus depends on the relative share of pension funds that view emerging markets as a long-term strategic investment vis-à-vis pension funds that considered the asset class from a tactical point of view. Reportedly, large public pension funds in the United States consider emerging markets part of their strategic asset allocation, while pension funds in continental Europe follow a more opportunistic investing approach.

Asset Allocation to Emerging Markets and Its Main Determinants

Notwithstanding the analysis above, 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, their allocation to emerging market equities may be just 1% of assets.[4] In Japan, the foreign asset allocation by the government pension fund has been limited to developed countries. In the United Kingdom, Kimmis *et al*. (2002) reported that the allocation to emerging market securities represented at most 2 to 3% of pension assets.

From a strategic asset allocation perspective a number of factors determine pension funds' exposure to foreign securities, and emerging markets in particular. They include the risk aversion of pension fund trustees, whether pension plans offer defined-benefits plans rather than defined-contribution plans, the requirement to follow socially responsible investment guidelines, and investment regulation.

Pension funds in developed countries have been facing serious financing gaps in recent years, and hence, pension fund managers have been under pressure to increase the return of their portfolios. This situation may induce pension funds to increase their tactical asset allocation to emerging market securities. All these factors are reviewed in detail below.

Risk Aversion of Pension Funds' Trustees

A first factor working against increased asset allocation to emerging markets is the risk aversion of pension fund trustees. The repeated occurrence of financial crisis in emerging markets have heightened the perception that emerging

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

Table 2: Equity Returns and Pension Portfolios: An International Perspective (in % per year)

U.S. Perspective	3 months	12 months	3 years	5 years
Equity Returns				
MSCI US	2.57	24.96	–10.63	0.40
MSCI World ex–US	8.14	27.49	–8.32	1.36
MSCI Emerging Markets Free	14.23	45.97	1.81	10.65
Benchmark Pension Portfolios				
Portfolio 1	1.41	13.43	1.43	3.93
Portfolio 2	1.98	17.36	–2.51	2.79
Portfolio 3	2.55	21.28	–6.45	1.64

Portfolio 1	40 percent equity (90 percent Domestic, 10 percent EAFE) 60 percent fixed income, including 10 percent foreign
Portfolio 2	60 percent equity, including 10 percent foreign 40 percent fixed income, including 10 percent foreign
Portfolio 3	80 percent equity, including 10 percent foreign 20 percent fixed income, including 10 percent foreign

Japanese Perspective	3 months	12 months	3 years	5 years
Equity Returns				
MSCI Japan	13.40	8.73	–11.20	–0.65
MSCI ex–Japan	–3.90	16.12	–8.46	–3.56
MSCI Emerging Markets Free	14.23	45.97	1.81	10.65
Benchmark Pension Portfolios				
Portfolio 1	0.20	4.63	2.70	1.33
Portfolio 2	1.98	6.03	–0.20	0.69
Portfolio 3	3.76	7.44	–3.11	0.06

Portfolio 1	10 percent Equity (70 percent Domestic, 30 percent Rest of the World) 90 percent Fixed Income (90 percent Domestic, 10 percent Rest of the World)
Portfolio 2	30 percent Equity (70 percent Domestic, 30 percent Rest of the World) 70 percent Fixed Income (90 percent Domestic, 10 percent Rest of the World)
Portfolio 3	50 percent Equity (70 percent Domestic, 30 percent Rest of the World) 50 percent Fixed Income (90 percent Domestic, 10 percent Rest of the World)

Eurozone Perspective				
	3 months	12 months	3 years	5 years
Equity Returns				
MSCI EMU	1.43	13.94	–17.95	–1.01
MSCI World ex–EMU	3.82	4.91	–17.94	0.97
MSCI Emerging Markets Free	14.23	45.97	1.81	10.65
Benchmark Pension Portfolios				
Portfolio 1	0.44	6.65	5.35	4.91
Portfolio 2	1.00	6.93	0.35	3.83
Portfolio 3	1.57	7.21	–4.66	2.74
Portfolio 4	2.13	7.48	–9.66	1.66

United Kingdom Perspective				
	3 months	12 months	3 years	5 years
Equity Returns				
MSCI UK	2.77	14.93	–9.81	–1.98
MSCI World ex–UK	4.41	19.83	–13.45	1.48
MSCI Emerging Markets Free	14.23	45.97	1.81	10.65
Benchmark Pension Portfolios				
Portfolio 1	1.80	10.37	–2.17	2.51
Portfolio 2	2.32	12.13	–2.74	2.89
Portfolio 3	2.57	13.18	–5.58	1.34
Portfolio 4	3.30	15.65	–6.36	1.87

Portfolio 1	10 percent Equity (50 percent Europe, 50 percent Rest of the World) 90 percent EMU Fixed Income
Portfolio 2	30 percent Equity (50 percent Europe, 50 percent Rest of the World) 70 percent EMU Fixed Income
Portfolio 3	50 percent Equity (50 percent Europe, 50 percent Rest of the World) 50 percent EMU Fixed Income
Portfolio 4	70 percent Equity (50 percent EMU, 50 percent Rest of the World) 30 percent EMU Fixed Income

Portfolio 1	50 percent Equity (70 percent Domestic, 20 percent Europe, 10 percent RoW) 50 percent Domestic Fixed Income
Portfolio 2	50 percent Equity (30 percent Domestic, 50 percent Europe, 20 percent RoW) 50 percent Domestic Fixed Income
Portfolio 3	70 percent Equity (70 percent Domestic, 20 percent Europe, 10 percent RoW) 30 percent Domestic Fixed Income
Portfolio 4	70 percent Equity (30 percent Domestic, 50 percent Europe, 20 percent RoW) 30 percent Domestic Fixed Income

Source: Morgan Stanley Global Pensions Group, October 2003

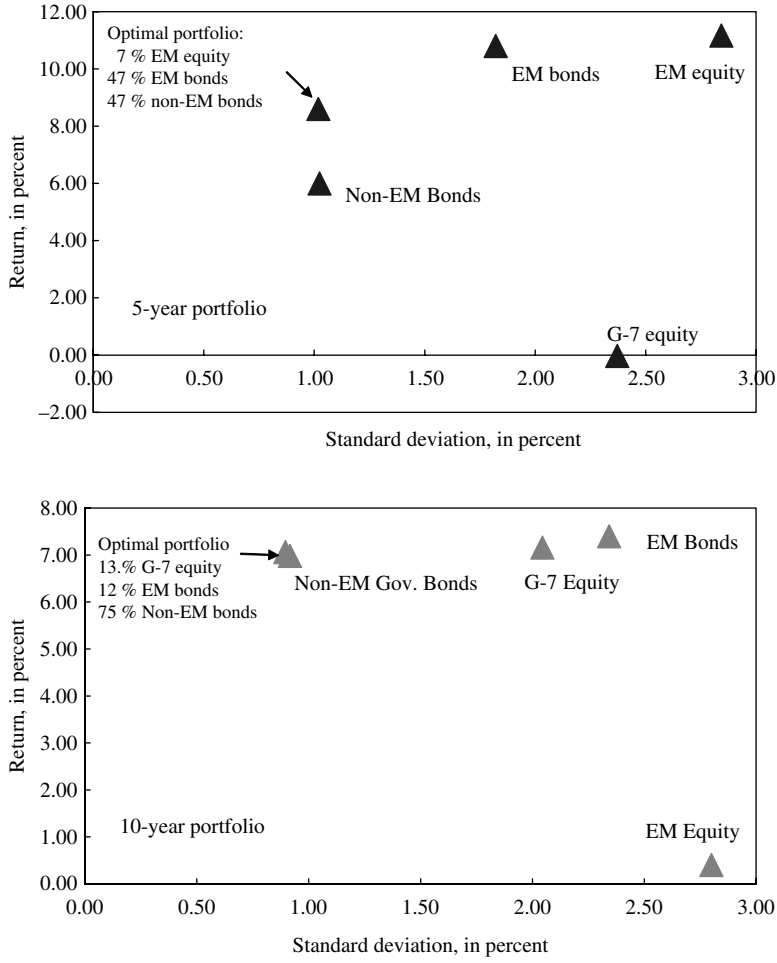

Figure 1: Optimal Portfolio Allocations: 5- and 10-year Horizons

Source: Citigroup, JPMorgan, Morgan Stanley, and author's calculations.

markets are excessively volatile. As a result, pension fund trustees may have become wary of investing in emerging markets for fear of facing substantial short-term losses (Kimmis *et al.*, 2002, and Blake, 2003). In the United States, fear of litigation in case of serious short-term underperformance increases the risk perception of pension fund managers. Furthermore, the increased importance of 401(k) retirement plans where employees are responsible for the asset allocation leads towards more conservative portfolio strategies (Davis and Steil, 2001).

Defined-Benefit Plans vs. Defined-Contribution Plans

Another factor that may bias portfolio allocations towards domestic assets is the availability of defined-benefit plans. 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 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 both the size and the volatility of the plan's liabilities. Matching the size of liabilities ensures that they would be appropriately covered by assets; matching the volatility of liabilities exactly implies that both assets and liabilities will be perfectly correlated and rules out the possibility that liabilities may exceed assets in the future. Perfect asset-liability matching both in size and volatility is not feasible. However, investments in domestic assets match better domestic liabilities than investments in foreign securities (Blake, 1999 and 2003, and 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 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 of risk, as suggested by modern portfolio theory (Blake, 2003, and Davis and Steil, 2001). Ceteris paribus, pension funds offering defined-contribution plans would invest more in foreign securities (and emerging markets) than pension funds offering defined-benefits plans.

The analysis above is supported partly by the historical evolution of asset allocation in the United States. Defined-benefit plans covered 87% of pension plan participants in 1975 but only 20% in 1999.[5] At the same time, foreign investment in 2002 increased to more than 12% from less than 3% in 1986.[6] In the United Kingdom defined-benefit plans covered up to 85% of all plan participants by 1999.[7] After the release of the Myners report in 2001, stricter regulations were introduced to encourage a closer matching of assets and liabilities. Surveys show that pension funds met the requirements by rebalancing their domestic asset allocation rather than by reducing exposure to foreign exposure. The domestic bond allocation increased to 12½% in 2003 from 9½% in 2000. At the same time, the domestic equity allocation declined to 38% from 47%. The foreign equity allocation, however, remained steady at 25%.[8]

[5] Hinz (2000).

[6] Blake and others (1999), and Greenwich and Associates (2003).

[7] The Association of British Insurers (2000).

[8] The William Mercer Company, *UK Pension Funds Universe, Quarterly Report*, various issues.

Socially Responsible Investment Guidelines

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. This requirement reduces the attractiveness of the emerging market asset class as it imposes additional constraints on the number of securities available to the pension fund manager.

A recent study by Wilshire Associates commissioned by the California Public Employees' Retirement System (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 labor practices. Socially responsible investment guidelines are also used in countries other than the United States. For example, in the United Kingdom 19% of private sector funds and 31% of public sector funds reported taking into account ethical considerations in their investment decisions.[9]

Socially responsible investment guidelines could potentially punish unfairly companies following good labor standards by the simple fact that they are headquartered in countries affected by negative country factors. Worse, the exclusion of some emerging markets from the permissible list has prompted fears that other funds in the United States would follow suit and reduce their allocations to such countries. In 1999, the exclusion of several Asian countries caused a brief selloff in these countries' stock markets as investors tried to front-run a possible sell-off by pension funds.

The inclusion or removal of a country from the "permissible" list may influence the country's stock market even though pension funds' entry and exit strategies may last up to one year. The price impact of a pension fund's decision to withdraw its investment from a specific country can be quantified using event-study analysis. In this analysis the impact is measured by the magnitude of cumulative abnormal returns, that is returns in excess of the past year average return, during a short period of time following the announcement. If the cumulative abnormal returns are negative, the announcement had a negative impact on prices and vice versa. (Brown and Warner, 1985). Event study analysis is used to examine two instances when Calpers announced its withdrawal from some emerging market countries.

In the first instance, Calpers announced it would withdraw from Indonesia, Malaysia, the Philippines, and Thailand on February 22, 2002 after these countries failed to meet its investment guidelines. Figure 2 shows the short-run impact of the announcement on local stock markets. In all countries, stock markets declined significantly for two days following the announcement. The

[9] "Pension Fund Industry Faces Closer Scrutiny," *Financial Times*, July 3, 2000.

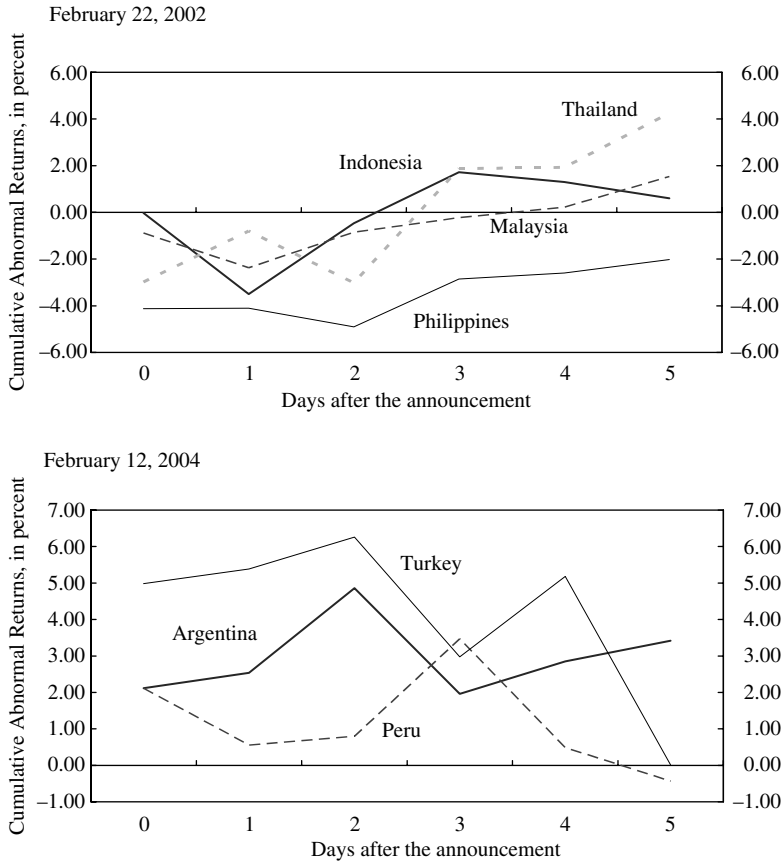

Figure 2: Stock Market Impact of Calpers' Withdrawal Announcements

Source: Morgan Stanley and author's calculations.

decline was reportedly prompted by fears that other foreign investors would follow Calpers, but stock markets in most countries recovered three days after the announcement. In the case of the Philippines, the impact of the announcement vanished after one month. More recently, Argentina, Peru, and Turkey were removed from the "permissible" list on February 12, 2004. In this instance, the announcement did not have an immediate negative impact on the countries' stock markets, as shown in Figure 2.

Investment Regulation

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, 2003). In Germany, pension funds can only invest up to 10% of assets in foreign equity and bonds from non-European Union countries. In Italy, the ceiling on foreign equity and bonds of non-OECD countries is 5% of assets. Pension funds, however, can invest up to 50% of assets under management in emerging market countries members of the OECD such as Mexico, Korea, and the EU accession countries. In contrast, there are no investment limits in Japan, the United Kingdom, and the United States, the three countries that account for most of the assets in the pension fund industry (Table 3).

Countries that do not place investment 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. This investor category includes insurers, mutual funds, and asset management companies. The prudent man rule thus provides pension funds with a wide scope of asset allocation strategies and allows them to invest across an extensive range of financial securities, including emerging market securities. The prudent person rule suggests the possibility of substantial differences in asset allocations across pension funds in any given country. In practice, the opposite holds true. Investment practices, reviewed below, may be responsible for the similarities found across pension fund portfolios.

Financing Gaps

It should be noted, though, that pension plans facing serious financing gaps may have incentives to search for yield-enhancing investment strategies, including investing in emerging market securities.[10] This situation may lead to higher asset allocations to emerging markets. In the United States, the assets in corporate and public pension funds fell by $1 trillion between 2001 and 2002. In addition, up to 30% of corporate pension plans were in deficit at the beginning of 2002.[11] In Japan, the Government Pension Fund plans to invest more in active funds and alternative investment opportunities to make up for recent portfolio losses.[12] Funds looking forward to cover their financing gaps have shown strong interest in the emerging market asset class given its strong performance during 2003 (Schultes, 2003). Also, the dismal stock market performance in Europe and the United States in the aftermath of the burst of the tech bubble coupled with a low interest rate environment has sparked the interest of pension fund trustees in emerging markets.[13] The

[10] "Property, Hedge Funds, and Foreign Currency All Have Their Merits," *Financial Times*, May 21, 2003.

[11] "Pension Pain," *The Economist*, July 3, 2003.

[12] "Japan's Pensions Seek Investments that Beat Indexes," Bloomberg, July 28, 2003; "Japan Government Pension Investment Fund may use hedge funds soon," Dow Jones, December 8, 2003.

[13] "Emerging Markets and High Yield Bonds Set to Gain from Equity Fears," *Financial Times*, September 30, 2002.

Table 3: Investment Limits in Emerging Markets, in Percent of Assets under Management

	Domestic Equities	Foreign Assets
Mature Markets		
United Kingdom	PPR	PPR
United States	PPR	PPR
Germany 1/	30	20
Japan 2/	30	30
Canada	No limit	30
France	–	–
Italy	PPR	20
Emerging Markets		
Argentina	49	10
Brazil	50	0
Chile	39	30
Colombia	30	10
Mexico	0	10
Peru	35	8
Hungary	50	5
Poland	50	30
Hong Kong SAR 3/	No limit	No limit
Singapore	P	P

Source: Asher and Newman (2001), Davis (2002), OECD (2001), and Roldos (2003).
Notes:
PPR denotes prudential person rule.
1/ 6% in foreign equities of non-EU countries, 5% in non-EU bonds.
2/ No investment limits for employee pension funds
3/ At least 30% of assets must be invested in Hong Kong dollar denominated assets.

poor performance of pension funds in developed countries may cause a tactical shift towards emerging market assets. Nevertheless, the capital flows associated with these momentum-chasing investment strategies could increase volatility in the emerging market asset class.

Investment Practices

External Consultants and External Asset Managers

Pension fund trustees 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. The reliance on third parties is explained partly by the fact that a substantial fraction of the funds' trustees lacks investment expertise. For instance,

corporate governance rules in the United Kingdom require that one third of the pension fund's trustees must be chosen from the workforce; in the United States, the number must be equal to one half.[14] Because the merits of external consultants' recommendations are measured against the recommendations made by their peers, there is a strong incentive to recommend similar asset allocations.

The herd behavior of external consultants is also present among external asset managers. Again, the manager's performance is compared to the industry average, creating an incentive to mimic the rest of the industry. The problem is more pronounced when the fund management industry is more concentrated. Indeed, Blake *et al.* (1999) find that there is less cross-sectional variation in fund performance in the United Kingdom than in the United States, a reflection of the higher concentration in the pension fund management industry in the former country. Fear of fiduciary lawsuits in case of portfolio underperformance compared to other pension funds is another factor contributing to herd behavior in the United States (Davis and Steil, 2001). The external delegation of asset allocation and security selection also has a negative impact on the buy-and-hold preference of pension funds since external asset managers tend to trade actively to avoid underperforming their peer group. The investment horizon of pension funds, then, may be closer to that of mutual funds.

To conclude, in continental Europe, asset management is usually delegated to banks with key relationships with the pension fund sponsor company. Performance measurement, if done at all, is conducted by the investment management firm itself. In consequence, there is less room for herding behavior by domestic asset managers. On the other hand, the lack of transparency creates significant scope for suboptimal asset allocation and consistent underperformance (Davis, 2002b). Regarding emerging markets investment, pension funds in continental Europe reportedly do it through external asset managers in the United Kingdom. Therefore, herd behavior may remain a problem for the emerging market portfolios of European pension funds.

Investment Strategies

Pension funds in the United Kingdom and the United States do not view emerging markets as a separate asset class or an alternative investment opportunity. Rather, the emerging market asset class is viewed as one smaller subcomponent of the continuum of traditional investment opportunities. In these countries, asset allocation to emerging market equities is based on the relative weight of emerging market equities in global equity indices such as Morgan Stanley's All Country World Index (ACWI). After the asset allocation is selected, the security selection process is usually delegated to external asset managers. Similarly, pension funds in the United Kingdom that invest in

[14] "Pension Pain," *The Economist*, July 3, 2003. In contrast, in the Netherlands, the pension fund board may decide the asset allocation itself, as board members are investment professionals (Davis, 2002b). Pension fund governance in OECD member countries is discussed extensively in Marossy and Yermo (2002).

emerging market fixed income securities use the relative weights in global bond indices, such as Citigroup's World Government Bond Index (WGBI), as an asset allocation guideline.

Reportedly, the asset allocation to emerging markets of pension funds in continental Europe is based on tactical considerations rather than strategic ones. The interest in emerging markets is partly prompted by the low interest rates and dismal stock performance experienced in the Euro zone and the United States during the past years.[15] Investing in emerging markets have been facilitated by the introduction of innovative investment vehicles such as principal-protected notes and hybrid fixed income mandates.[16] Collateralized Debt Obligations (CDOs) backed by emerging market securities have also enjoyed increased popularity recently.[17] Even more, market sources indicate that the search for excess yield has prompted some pension funds in continental Europe to start investing in local emerging market bonds.

Hedge funds also offer another investment vehicle for pension funds interested in increasing their exposure to emerging markets. For instance, Calpers and the Japanese Government Pension Fund have announced recently that they will increase their asset allocation to hedge funds. However, there are some obstacles to increase hedge funds allocations. The lack of transparency in hedge funds' investment strategies makes selecting a hedge fund difficult. In addition, the size of most hedge funds is too small for the pension fund industry's needs.[18]

The United States' Employee Retirement Income Security Act (ERISA) poses another obstacle to U.S. pension funds willing to invest in hedge funds. The Act requires hedge funds that manage assets on behalf of a U.S. pension plan to comply with ERISA fiduciary obligations if at least 25% of the hedge fund's assets correspond to pension funds, regardless of where the pension funds are domiciled. Hedge funds, hence, may be reluctant to manage money from U.S. pension funds. Some observers have even suggested pension funds investing in funds of hedge funds may breach their fiduciary responsibilities (Gradante, 2002). European pension funds are not subject to these constraints, and reportedly, have been using hedge funds to increase their emerging markets' exposure.

III. PENSION FUNDS IN EMERGING MARKETS

Pay-as-you-go social security systems in Latin America and Eastern Europe are being gradually substituted by fully funded, defined-contribution pension

[15] "Emerging Markets and High Yield Bonds Set to Gain from Equity Fears," *Financial Times*, September 30, 2002; "Dutch Metal-Workers Fund Put $250 million in Emerging Market Debt," *Bloomberg*, September 11, 2003; "ICI Pension Funds put $113 million in Emerging-Market Debt," *Bloomberg*, September 18, 2003.

[16] In its most basic form, a principal protected note consists of a zero-coupon bond plus an option offering participation in the equity or bond market. A hybrid fixed income mandate typically consist of a mixed portfolio of G-7 and emerging market fixed income securities.

[17] Humphries (2002).

[18] "For the Fortunate Few," *The Economist*, July 3, 2003.

systems. In general, affiliation to the private pension systems is mandatory for young people entering the workforce, and optional for workers already covered by the pay-as-you go system. Governments have provided incentives, however, to help workers transfer from the old system to the new one.

This reform process has driven the rapid growth of assets under management in the pension fund industry in these regions (Table 4). For instance, in Chile pension assets grew to almost 60% of GDP in 2003 from negligible levels in the early 1980s. Similarly, in Bolivia pension assets now amount to 30% of GDP after the introduction of pension reform six years ago.

By removing the government from the savings for retirement process, pension reform has contributed to raising the savings rate, fostering the growth of institutionally managed assets, and creating a strong domestic investor base.[19] The strengthening of the domestic investor base in turn has fostered the development of securities markets. The growth of pension assets, however, has outpaced the growth of securities markets in Latin America and Eastern Europe. This situation poses a significant challenge for pension funds that must deal with portfolio risk concentrated in a few corporate names and government securities.

In Asia retirement income is provided mainly through national provident funds. For example, in Malaysia and Singapore, the government sponsors a fully funded, defined contribution system for civilian workers. In Korea, the national pension system is fully funded but offers defined-benefits. The main challenge to these systems is that the performance of pension funds' portfolios may be affected by government intervention in the funds' investment decisions, as suggested by Asher (1999, 2000), and Holzmann and others (2000). The exception in the region is Hong Kong SAR, where the Mandatory Provident Fund allows citizens to select their investment plans from a large number of private investment funds. Governments in Asia have started to encourage individual saving plans by adopting measures such as favorable tax treatment to individual pension plans as in Korea (World Bank, 2000). Individual saving plan assets, however, remain small throughout the region.

Below we analyze the impact of pension funds in the development of local securities markets, the determinants of pension fund investment performance, and the prospects for pension funds in emerging markets.

Impact on the Development of Local Markets

The rapid growth of assets under management has been a major driver in the development of local securities markets.[20] The growth of these markets parallels the growth of securities markets in developed countries. Walter (1999) and

[19] Reisen (2000) found that pension reform contributed to raise the savings rate in Chile, Malaysia, Singapore, and Korea. Mackenzie and others (1997) analyze conditions under which pension reform can increase a country's savings rate.

[20] See IMF (2003a), Chapter IV, and references therein for a comprehensive discussion of local securities markets.

Table 4: Pension Funds in Emerging Markets, Assets under Management

Pension Fund Assets in million USD	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Latin America												
Argentina				525	2497	5326	8827	11526	16787	20381	20786	11409
Bolivia							98	333	535	842	936	1144
Brazil			32600	55100	59100	69000	77800	75100	64400	66500	51200	44300
Colombia				38	266	802	1367	2110	2887	3584	4355	5482
Costa Rica											121	136
Chile	6658	10064	12395	15942	22296	25143	27198	30525	30805	34501	35866	35515
El Salvador								47	213	482	800	1088
Mexico							615	5801	11412	17012	27146	31748
Peru			29	260	583	949	1510	1734	2406	2752	3622	4527
Uruguay						50	191	374	591	811	1045	893
Subtotal	6658	10064	45024	71865	84742	101270	117606	127550	130036	146865	145877	136242
Europe												
Bulgaria										41	44	121
Czech Republic				30	246	857	623	979	1014	1133	1487	
Hungary								601	986	1420	2085	3435
Kazakhstan								280	467	774	1204	1432
Poland										2481	4454	6674
Subtotal								1860	2467	5849	9274	11662
Asia												
Hong Kong SAR										639	677	677
Malaysia	18908	23822	27788	31746	38572	45795	45991	36852	42647	47118	50421	54419
Singapore	26656	31631	32389	37742	46590	51464	53648	50954	52153	55125	54111	56429
Korea	8620	9895	11260	12731	14360	15090	8703	13322	13487	11510	13290	
Subtotal	54184	65348	71437	82219	99521	112349	108342	101128	108287	113752	117822	110847
Total	60842	75412	116461	154084	184263	213619	225948	230538	240790	266466	272973	258751

Table 4: *Continued*

Pension Fund Assets, as percent of GDP	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Latin America												
Argentina				0.2	1.0	2.0	3.0	3.9	5.9	7.2	7.7	11.2
Brazil			7.6	10.1	8.4	8.9	9.7	9.7	11.6	11.8	10.2	9.1
Bolivia							0.8	2.5	4.0	5.8	6.3	7.3
Colombia				0.0	0.3	0.8	1.3	2.1	3.3	4.3	5.3	6.7
Costa Rica											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								0.4	1.7	3.7	5.8	7.6
Mexico							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						0.2	0.9	1.7	2.8	4.0	5.6	7.2
Subtotal	0.7	0.9	3.6	5.0	5.6	6.1	6.5	7.1	8.2	8.6	8.8	9.2
Europe												
Bulgaria										0.3	0.3	0.8
Czech Republic				0.1	0.5	1.5	1.3	1.6	1.9	2.2	2.5	
Hungary								1.3	2.1	3.1	3.9	4.5
Kazakhstan								1.3	2.7	4.2	5.6	6.0
Poland										1.5	2.4	3.5
Subtotal								0.4	0.6	2.0	2.9	3.8
Asia												
Hong Kong SAR										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	57.3	57.3
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
Korea	3.0	3.2	3.2	3.1	2.9	3.1	3.3	3.6	3.2	2.8	3.2	
Subtotal	10.1	11.2	10.8	10.7	11.1	12.1	14.9	11.8	11.7	11.8	12.3	21.5
Total	5.5	6.3	8.8	10.2	11.6	12.3	12.4	13.8	16.9	18.1	20.3	20.3

Sources:
1. Latin America, excluding Brazil, FIAP (2003); Brazil, private closed-end funds only, Garcia Cantera (2003); Bulgaria, Kazajstan, and Poland, FIAP (2003); Bulgaria, Kazakhstan, and Poland, FIAP (2003); Czech Republic, OECD, Hungary, Financial Supervisory Authority; Asia, National Pensions Systems; Hong Kong SAR, Mandatory Provident Fund Annual Reports; Malaysia, Employee Pension Scheme Annual Reports; Singapore, Central Provident Fund Annual Reports and Asher (1999); Korea, OECD.

Davis and Steil (2001) argue that this growth is driven by increased institutionalization of the asset management functions.

Pension funds in Latin America and Eastern Europe hold sizable fixed income positions, mostly local currency-denominated government bonds.[21] As of June 2003, bond holdings comprised the dominant share of pension funds' portfolios in many countries: 70% in Malaysia and Poland, 80% in Argentina, India, and Mexico, and 90% in Hungary.[22] In Malaysia and the Philippines the average government bond holding during the past decade was 40%.[23]

Increased depth and liquidity in the local government bond markets has helped to establish local currency-denominated yield curves. These benchmark yield curves, in turn, has fostered the development of the local corporate bond market. Indeed, issuance of domestic corporate bonds has exceeded external corporate issuance since 1997. The amounts issued, however, are small compared to the size of the local government bond markets (IMF, 2002). Low liquidity, inadequate credit risk assessment, and expensive underwriting procedures have hampered the growth of the corporate bond market. Low local bank lending costs, as is the case in Hungary and Poland, have also contributed to make corporate bond issuance unattractive.

Government bond issuance may have also contributed to crowd out corporate bond issuance in some countries like Brazil (IMF, 2002). From the point of view of domestic investors, government bonds linked to inflation and foreign currency indices offered better risk-adjusted returns than corporate bonds. These linked bonds not only offer high returns to investors, as is the case in countries with high public financing needs, but inflation and foreign currency hedge as well.

Pension funds have had a limited role in the broad development of local equity markets. Two main factors may explain this limited role. First, pension funds manage relatively large assets compared to the typical equity flotation of local companies. In most emerging markets, only few blue-chip companies have equity issues large enough to meet pension funds' regulatory ownership concentration limits on a single issuer. In Poland, for example, 75% of equity holdings are concentrated on 15 companies.[24] Second, in some countries investment regulation requires minimum exposure to equities as in Mexico, where pension funds cannot invest in equities.

Low volumes of corporate bond and equity issuance have created a problem for pension funds in Eastern Europe and Latin America: the growth of pension fund assets has outpaced the supply of local private securities. As a result, pension funds may find difficult to achieve optimal asset diversification.

[21] See Federacion Internacional de Administradoras de Fondos de Pensiones (2003) for a details on pension fund allocations in Latin America and Eastern Europe.

[22] The asset allocation in India corresponds to the Employees Provident Fund Organization, and includes government securities and bond issues by public institutions (Asher, 2003).

[23] Asher (1999). Recent data suggest that government bond holdings in the Philippines Social Security System has declined to 13% as of March 2004.

[24] Citigroup Smith Barney, *Poland – Pension Fund Strategy* (January 20, 2004).

In particular, the pension portfolios would tend to be over weighted in government assets at the expense of private securities.

The rapid growth of assets under management has also affected equity markets negatively. These markets may have become prone to asset price bubbles, as increased assets chase a limited number of securities. Also, trading volume may have declined substantially since pension fund purchases reduce the amount of free floating issues in the market.

Conjunctural factors have compounded the problem by working against increased supply of local securities. For example, in the European accession countries the supply of government securities will decline in the medium term as governments reduce their fiscal deficits to adopt the Euro. Major privatizations in Eastern Europe and Latin America have already been concluded draining the equity market from sizable initial public offerings. The development of asset-backed securities markets, especially mortgage-backed securities, could provide additional investable instruments. Their development, however, may be hindered by excessive government intervention as has been reported by market participants in Colombia.

In East Asia, national mandatory provident funds have not contributed substantially to the development of local capital markets in spite of managing sizable assets. Fund management in these countries is very conservative, with the result that assets are heavily concentrated in government securities. Furthermore, Holzmann and others (2000) have suggested that centralized fund management may have hurt the development of a competitive fund management industry.

Determinants of Investment Performance

The main determinants of the investment performance of the pension fund industry can be grouped into three main categories: investment regulations, investment practices, and the ability of pension funds managers to diversify their portfolios abroad. These three determinants are reviewed in detail below.

Investment Regulations

In most emerging market countries, the regulation of private pension funds is based on quantitative investment limits. Regulators in emerging markets consider investment limits to protect pensioners' rights better than regulations based on the prudent man rule. This argument can be defended on the basis that the underdevelopment and lack of transparency of local securities markets make them susceptible to manipulation and excess volatility; and that the general public, pension fund board of trustees, and pension managers lack financial sophistication.

Investment restrictions aim at ensuring minimum portfolio diversification, diluting ownership concentration limits, and avoiding self-investment in the pension fund's sponsoring company. Investment limits in assets regarded more volatile, like equity, are tighter (Table 3). Also, pension funds may be required to invest only in high credit quality paper. For example, Mexican funds cannot

invest more than 5% of assets in securities rated single A, and investments in high yield assets are prohibited.

Investment in derivatives products is not allowed in many countries as they are considered excessively risky and complex. Chile is a notable exception, with active participation of pension funds in the foreign exchange and interest rate derivatives markets. The Chilean example is being followed by Mexico, where recent regulatory changes would allow pension funds to use derivatives in 2004. Similar measures are under study in Poland and Hungary.

Table 3 also shows significant restrictions to investment on foreign securities. Reasons advanced supporting these restrictions include the assumption that pension fund managers cannot properly manage the currency risk involved in investing abroad. More importantly, in many countries there is a widespread belief among the government, and sometimes shared by the public, that scarce domestic capital should be invested domestically. For example, most pension funds in Asia do not invest at all in foreign securities (Holzmann *et al*., 2000).

There are a number of convincing arguments, however, against using investment limits as a regulatory tool (Davis, 2001). In particular, investment limits may lead to suboptimal portfolio holdings by restricting portfolios choices unnecessarily. Investment limits also imply that assets are evaluated by their individual risk level rather than by their contribution to the overall portfolio risk. In addition, investment limits are inflexible and cannot accommodate rapid changes in financial conditions or structural changes in financial markets.

Another argument against using investment limits is that they are applied asymmetrically to securities issued by the private institutions and those issued by governmental and quasi-governmental institutions. As a result, pension funds may be biased to overweight government securities beyond what an optimal asset allocation rule will dictate. The asymmetric treatment of private and public securities has boosted the deepening and development of local government bond markets. This development may have been achieved at the expense of excessive risk concentration and lower portfolio returns to pension funds, and the underdevelopment of the local corporate bond market, as explained above.

Besides investment limits, additional measures aimed at safeguarding pensioners' life savings have been enacted in Latin America and Eastern Europe. Foremost among them are the imposition of minimum required returns, and the obligation of pension fund management companies to disclose the market value of their assets and portfolio returns on a frequent basis.[25] Failure to meet the minimum required returns demand cash injections into the fund from the pension sponsor or pension fund's portfolio management company. In addition, underperforming funds face the risk of substantial assets outflows as

[25] For example, in Colombia the minimum required return is derived from a weighted average of the industry returns (50% weight), a synthetic portfolio calculated by the regulator (45%), and 5% from actual stock market returns, over a 3-year window. In Poland, the minimum return is calculated every quarter as the minimum of half the industry average for the past two years or minus 4%.

pension funds' affiliates can switch plans easily. Regulations requiring frequent mark-to-market also increase the risk of asset outflows since affiliates tend to shift their assets to funds with better than average past returns.

Investment Practices

In contrast to pension funds in mature markets, pension funds in emerging markets make their decisions on asset allocation and equity selection internally without the help of external consultants. Furthermore, in pension funds managed by private financial institutions there are strict Chinese walls between pension fund managers and other asset managers in the institution.

In Eastern Europe and Latin America, the mark-to-market and minimum guaranteed return requirements discussed above may have encouraged herd behavior among pension fund managers. Managers have an incentive to choose similar portfolio allocations to minimize their chances of underperforming their peer group. Increased focus on short-term results induce managers to attempt to retain contributors by "playing the market." In consequence, there is excessive turnover in pension fund portfolios since pension fund managers tend to behave like mutual fund managers as in Hungary and Poland. Portfolio diversification is also affected by mark-to-market and minimum guaranteed return requirements. These requirements induce pension fund managers to avoid volatile assets with favorable risk-adjusted returns since they increase the return volatility of the portfolio.

Herd behavior is not a problem for provident funds in Asia, as the national provident fund is the sole provider of pension benefits. National provident funds in Asia are centrally managed, and in general, follow very conservative investment strategies. Overall, investment portfolios in these countries are concentrated on government securities (Holzmann *et al.*, 2000, and Asher, 2000).

One major concern in Asia is the absence of explicit mechanisms to hold national provident fund managers accountable for poor pension fund performance. For instance, Asher and Newman (2001) report that in Singapore, the investment decisions on behalf of the Central Provident Fund are taken by the Government of Singapore Investment Corporation. The corporation enjoys the legal status of a private limited company, and hence, is not subject to public scrutiny.

Empirical studies by Holzmann *et al.* (2000), Asher (1999, 2000), and Asher and Newman (2001) have found that Asian provident funds have performed poorly. For instance, provident funds in Malaysia and Singapore have performed marginally better than bank deposits. In addition, the allocation of pension funds' assets may also be excessively influenced by political interests that do not necessarily benefit contributors. Pension funds in Korea have been asked repeatedly to contribute to stock market stabilization plans in recent years, according to press reports.[26] It should be noted, though, that the

[26] "Korea Raises Money from Pensions for Market Stabilization Fund," *FinanceAsia*, October 2000; "President Kim Calls for Tripling Pension Funds' Stock Investments," *Korean Overseas Information Services*, February 8, 2001.

increased asset allocation to equities has mainly been guided by efficiency and diversification considerations (IMF, 2003b). In Malaysia, Holzmann *et al.* (2000) reported that provident fund assets have been used to recapitalize banks and finance housing construction.

Foreign Investment

Limitations on the supply of local market instruments, and their negative impact on pension funds' portfolio diversification highlight the need to raise foreign investment limits. Roldos (2003) has suggested that increased investment in foreign securities can be achieved through global diversified fixed income and equity mutual funds. Bodie and Merton (2002) argue that pension funds can diversify internationally using asset swaps without hurting the development of local capital markets.

National authorities, however, may be reluctant to promote foreign investment because of concerns about the risk management skills of the local pension fund management industry. Reportedly, in Mexico regulators do not favor allowing pension funds to invest in global mutual funds since it would add mutual fund management fees on top of the pension funds' own fees. Likewise, monitoring pension funds' positions would become harder since it would require knowing also mutual funds' investment positions.

National authorities may also be interested in keeping scarce local capital invested domestically, according to Holzmann and others (2000). This stance is also supported by segments of the population such as trade unions (Ciampi, 2001). For instance, although investment regulations in Singapore are based on the prudent person rule, the mandatory provident fund invests exclusively in non-marketable government bonds. This situation may raise issues of transparency and accountability with respect to investment decisions. In Hong Kong SAR, funds are required to invest 30% of their assets under management in local currency-denominated assets. Therefore, even though funds do not face restrictions on foreign investment, the end result of this regulation rule is to ensure a minimum allocation to domestic assets (Asher and Newman, 2001).

The recent experience in Colombia suggests that even lifting foreign investment restrictions may not ensure adequate portfolio diversification in the absence of complementary measures. On April 2002, pension funds in Colombia were allowed to invest up to 10% of their assets in international equity mutual funds. Reportedly, fear of not meeting the required minimum returns have caused most funds not to invest in foreign equities.

Market participants also indicate that lack of financial sophistication among pension fund managers works against higher foreign investment limits. For instance, the investment limit of 30% of AUM in Hungary is one of the largest among emerging market countries. Despite this high limit, the actual asset allocation is under 5%. The low asset allocation to foreign equities is explained partly by the disastrous portfolio performance of Hungarian pension funds, that started investing on foreign equity just before the bursting of the technology

bubble in 2000. Arguably, these pension funds used trend-following investment strategies whose risks they did not fully understand.

IV. CONCLUSIONS

Going forward, three factors could increase developed countries' pension fund allocations to emerging markets. First, there is a trend to shift corporate defined-benefit plans to defined-contribution plans. The trend has been prompted by the increased underfunding of defined-benefit pensions due to the sharp decline of equity prices in the late 1990s. As a result, pension plan sponsors have been shifting the investment risk to their employees. As more pension plans become defined-contribution plans, there may be more emphasis on investment strategies based on maximizing risk-adjusted returns rather than on asset-liability immunization. The United States experience reviewed above suggests that the shift from defined-benefits plans towards defined-contribution plans could increase foreign asset allocations and potentially benefit the emerging market asset class.

Second, government sponsored pay-as-you-go systems in Europe and Japan are under duress because of declining fertility rates and longer life expectancies.[27] Early retirement policies implemented within OECD member countries have compounded the underfunding problem faced by their pension systems.[28] Therefore, there is increased pressure to reform the current pay-as-you-go systems and move towards fully funded systems. This move would increase demand for financial assets that may benefit emerging markets.

Finally, corporate pension funds are facing substantial funding gaps caused by their asset allocations to developed countries' equity markets during the second half of the 1990s. In consequence, pension fund managers are looking into emerging markets as a potential source of yield pickup. The downside of this development is that capital flows to emerging markets may become more volatile as tactical asset allocations increase.

The challenges faced by pension funds in Latin America and Eastern Europe are caused mainly by the rapid growth of assets under management in the industry. Local securities markets do not have the capacity to absorb the ever increasing flow of pension funds' assets. As a result, local securities markets have become more vulnerable to asset price bubbles, as increased assets chase few securities. Pension funds' portfolio vulnerabilities have also increased, as their portfolios' exposure is concentrated in government securities and securities from a limited number of local companies.

Furthermore, the limited choice of available investable securities implies similar portfolios across the pension fund industry. The herd behavior so induced, together with the high degree of concentration in pension fund

[27] Patterson and Normand (2002), Rother *et al.* (2003).
[28] Rabouh (2003).

portfolios, tend to magnify asset price swings. In this context, insufficient risk management experience could contribute to further financial volatility. Restrictive regulations such as minimum guaranteed returns reinforce the herding behavior among pension fund managers. These regulations also induce short-term investment behavior and excessive securities trading, two characteristics incompatible with the behavior of a long-term investor.

The problems faced by pension funds in Asia are more related to the heavy government participation in the provision of retirement income. Foremost among them is the poor investment performance of the national provident funds. Academic and policy studies suggest that the investment performance can be linked to government intervention in the asset allocation and investment decisions of the pension funds. In addition, there are no adequate mechanisms to oversee pension fund managers in these countries. Efforts are currently underway to foster the growth of private pension and individual savings plans. These plans remain relatively small, however, compared with government-sponsored plans.

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