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AGEING, PENSION REFORM, AND FINANCIAL MARKET IMPLICATIONS IN THE OECD AEREA

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I. Introduction

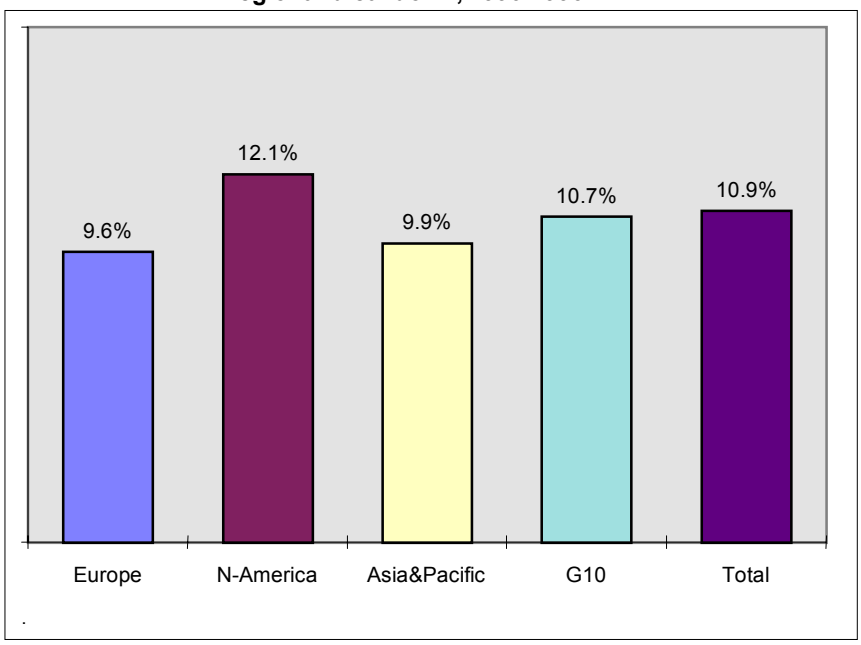
This paper examines the probable effects that the rapid growth of pension funds (short for pre-funded pension systems) will have on financial markets and their implications for financial policy. OECD countries are facing a pension time bomb as a result of the ageing of the baby boom bubble. Pension reform in the form of a shift from pay-as-you-go pension systems towards pre-funded pension systems is seen by many analysts as an essential response to this looming pension crisis. The first part of the report details the recent growth of pension funds and the future implications of continued pension fund growth on financial markets. The second part lists some of the key issues and challenges resulting from these developments. The last part then provides general guidelines for financial market policy to ensure that the adverse consequences are avoided and that financial markets are instrumental in allocating retirement assets and risks efficiently.

II. Recent trends in the growth of OECD pension fund assets

The past decade has witnessed a pronounced expansion of pension fund assets in the OECD area. In this section, we shall take a look at key trends mostly for the period 1990-96, although we also provide data for the most recent period that consistent cross-country data are available. Over the period 1990-96, the average annual growth of these assets was 10.9% (Chart 1). As a result, total pension assets in the OECD area rose from almost 29% of GDP in 1987, to almost 38% of GDP, or around $ 7 trillion, in 1996. Total financial assets of OECD pension funds amounted to almost *$10 trillion at the end of 1998,* up from $3.7 trillion at the end of 1990. Even this near tripling of assets understates, however, the financial importance of financial retirement assets as life-insurance companies and mutual funds are also involved in the provision of retirement income products. Unfortunately, since reliable data across countries is not available, it is not possible to assess their aggregate importance for financial markets. A very rough indication of the (potential) financial importance can be gauged, however, from the estimates available for some countries. For example, in the USA the mutual fund

business forms a cornerstone of the retirement market, holding an estimated 15 percent of the retirement sector's total assets at year-end 1995.

Chart 1. **Average annual growth rate of total asset holdings by pension**
Regional breakdown, 1990-1996



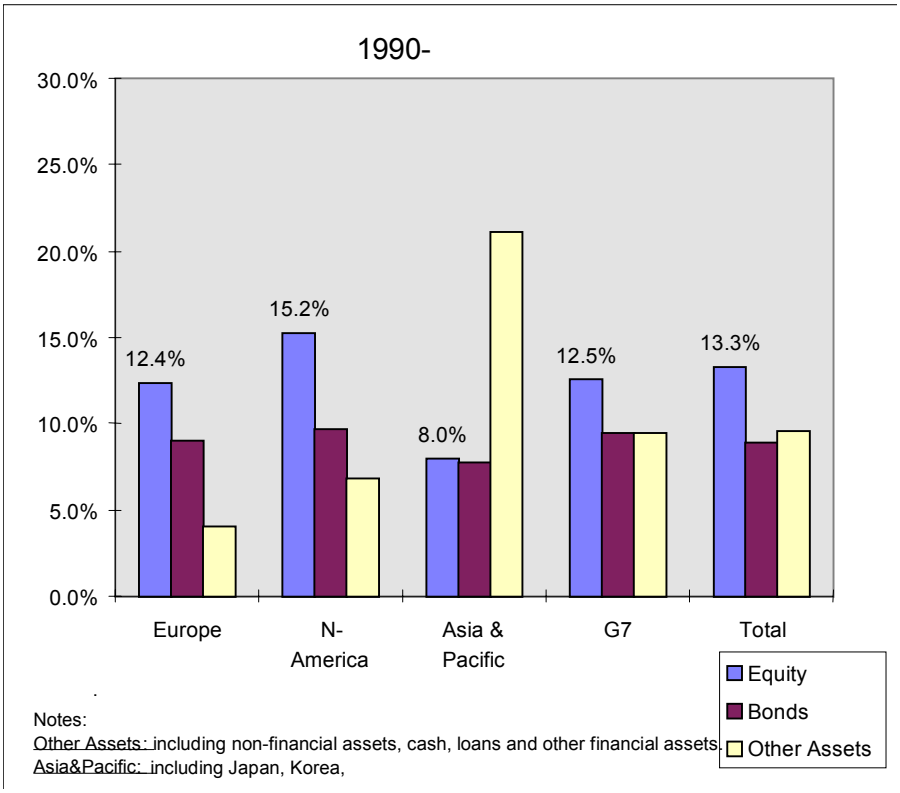
These aggregate figures conceal a great variation among individual OECD countries. Pension fund assets total more than 110% of GDP in Switzerland, nearly 90% in the Netherlands and around 60% in the US but only 2-5% of GDP in France, Germany and Italy [Table 1]. An important reason for this variation is the dominant role of PAYG financing in ageing countries with a relatively small pre-funded pension sector. *This range provides, therefore, a broad indication of the scope for further growth of pension fund assets in these countries*. Clearly, a sustained move toward a more fully funded pension system in the latter group of countries would have an enormous effect on the *size* and *structure* of their individual capital markets.

Table 1. **Total Assets of G10 Pension Funds as percent of GDP**

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Belgium	2.4%	2.4%	2.7%	2.5%	2.7%	2.5%	2.8%	3.1%	3.7%	4.1%
Canada	26.4%	26.8%	28.7%	30.0%	32.0%	32.8%	35.7%	37.7%	41.0%	43.0%
France	0.0%	0.0%	0.0%	3.4%	3.5%	3.2%	3.3%	3.8%	4.3%	5.6%
Germany	3.4%	3.1%	3.4%	3.3%	3.5%	5.1%	5.5%	5.4%	5.2%	5.8%
Italy	-	-	-	-	0.6%	1.1%	1.7%	2.2%	2.6%	3.0%
Japan	38.0%	33.7%	31.8%	37.4%	37.9%	37.3%	41.0%	49.4%	40.6%	41.8%
Netherlands	45.5%	72.7%	81.6%	78.4%	81.1%	72.1%	83.5%	85.0%	86.6%	87.3%
Sweden	33.4%	30.9%	30.6%	31.0%	38.6%	29.6%	27.1%	25.7%	30.5%	32.6%
Switzerland	74.7%	64.5%	71.3%	72.5%	75.5%	74.7%	82.2%	86.5%	104.3%	117.1%
United Kingdom	62.3%	58.2%	65.0%	59.7%	64.1%	58.2%	72.4%	69.2%	73.2%	74.7%
United States	35.7%	36.8%	36.3%	38.1%	48.0%	48.2%	53.4%	50.6%	58.9%	58.2%

Along with the growth in total pension assets in recent years, there has been a shift in the investment allocation of pension funds toward higher-yielding, riskier assets (in terms of short-term volatility). For example, equity holdings of pension funds increased remarkably in the period 1990-1996. The increase in equity holdings was largest in North America, while Asian-Pacific pension funds recorded the lowest increase (Chart 2).

Chart 2: Pension funds' annual average growth rate of equities, bonds and other assets, regional breakdown, 1990-1996



Notes:
Other Assets: including non-financial assets, cash, loans and other financial assets.
Asia&Pacific: including Japan, Korea,

Pension funds have begun to diversify across borders, although only relatively small portions of pension funds' assets are currently invested in foreign assets. In G-10 countries with significant pension fund holdings, the share of foreign assets increased from 12% in 1990 to 17% in 1996. Among G-10 countries, only pension funds in Belgium, the Netherlands and the United Kingdom have very significant foreign asset holdings [Table 2]. Furthermore, little of this international exposure is in emerging markets.[1] All the evidence indicates that all types of institutional investors are much less internationally diversified than the world market portfolio. Pension fund portfolios display a strong home bias.

Table 2: G10 Pension Funds Holdings of securities issued by non-residents (in per cent of total assets)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Pension funds										
Belgium	34.1%	37.4%	33.4%	30.0%	29.4%	29.2%	34.3%	33.0%	35.8%	35.4%
Canada	-	5.9%	-	7.0%	9.0%	11.0%	12.0%	14.0%	14.0%	-
France	-	-	-	-	-	2.0%	2.0%	5.0%	4.4%	-
Germany	-	-	-	4.5%	4.5%	4.3%	4.5%	7.0%	5.3%	7.7%
Italy	-	-	-	-	-	4.0%	4.0%	5.0%	-	-
Japan	14.3%	14.8%	14.3%	16.0%	14.8%	14.4%	14.0%	10.8%	12.5%	14.9%
Netherlands	12.8%	13.3%	15.2%	15.8%	14.9%	17.1%	19.7%	22.0%	21.0%	30.2%
Sweden	-	-	-	-	-	-	-	11.0%	9.1%	14.8%
Switzerland	4.0%	4.0%	4.0%	4.2%	6.0%	6.0%	6.0%	13.0%	16.0%	18.6%
United Kingdom	14.0%	17.0%	22.0%	20.0%	23.0%	24.0%	27.0%	27.0%	26.8%	29.2%
USA	2.5%	2.9%	3.7%	3.5%	3.9%	4.3%	8.1%	8.1%	9.1%	10.4%

III. Comparative analysis of the portfolio distribution of pension funds in a sample of OECD countries

In this section, we shall take a look at the portfolio distribution of pension funds in a sample of OECD countries for the period 1990-1998. The objective is to assess the *aggregate* impact of portfolio regulations, funding rules, taxation, accounting standards and other key determinants at the country level. For illustrative purposes, we shall study the patterns of portfolios distributed in the G10 countries in the period 1990-1998. It shows at the aggregate level how policy-related factors influence asset allocations by

1 Surveys suggest that US pension funds and mutual funds currently have about 2% of their assets invested in emerging markets. Emerging market exposure of UK pension funds and mutual funds is somewhat higher (3-4%) but Japanese and continental European institutional investors have negligible emerging market assets in their portfolios.

pension funds. Additional quantitative studies would be needed, however, to strengthen the conclusions and to identify more precisely the separate influences of these factors.

Table 3 shows that the patterns of portfolio distribution differ markedly across the G10 countries. For example, *equity holdings* of pension funds in 1995 varied from almost 71 per cent in the United Kingdom to very low or insignificant shares in Italy and Germany. Although at the end of 1998 equity holdings of pension funds had increased in most OECD countries, the distribution of the portfolios remained very uneven (Table 3). An important determinant of pension fund holdings of equity is *maturity*. Some analysts argue that it is rational for immature funds, having liabilities linked to earnings, to invest mainly in equities (long duration), while mature funds should invest a larger fraction in fixed-income securities. However, the majority of the pension schemes in the US have an equity/debt mixture of around 60/40, despite very different liability structures associated with differences in maturity. Similar behaviour can be observed in the United Kingdom. Surveys show that there is remarkably little difference in the asset mix of mature and immature pension funds in the United Kingdom. However other factors than maturity structure have changed this ratio during the last couple of years (see below).

A second determinant of equity holdings is the *regulation of the funding of benefits*, both by influencing asset holdings and the degree of volatility that can be accepted. For example, the introduction in the United Kingdom of market value based minimum funding requirements has altered the portfolio distribution of pension funds toward less volatile assets such as bonds. Indeed, there is supporting evidence that already by March 1996, pension funds had doubled their holdings of government bonds since 1991, while they had *reduced* their domestic and foreign equity holdings. It is also of interest to note that pension funds have also begun to increase their holdings of *index-linked* government securities.

Many other OECD countries – including Germany, Canada, The Netherlands, Belgium, Sweden and Switzerland – have funding rules. Their aggregate impact on asset allocation decisions can best be assessed by focusing at the same time on the associated *accounting rules*, *tax factors* and *indexation provisions*. For example, in Germany the combination of minimum funding standards and inflation indexing, while

no tax relief is provided for assets held to cover inflation risk, inhibits the growth of externally funded private pension plans (the so-called *Pensionskassen*). Moreover, German accounting conventions determine that shortfalls of pension of pension funds' assets relative to liabilities (with asset values defined at the lower of cost and market value) are included in the company accounts. It has been suggested that this accounts for the large share of bond holdings (almost 56 per cent at the end of 1998; Table 3), independently of portfolio regulations discussed below, despite the fact that the funding of "real" liabilities should make equities attractive. Switzerland has similar accounting conventions and this, together with rules forcing employers to credit a fixed nominal return (i.e., 4 per cent) to pension accounts annually, may have a similar effect.

Table 1: **Portfolio Composition of Pension Funds' Financial Assets in Selected OECD Countries**

In per cent of b

illion (end of year)

		1990	1991	1992	1993	1994	1995	1996	YR97	YR98
BELGIUM	Financial assets (Bn)	3.9	5.6	5.7	6.2	6.8	10.1	11.0	11.6	-
	Cash and deposits	7%	6%	5%	5%	6%	4%	4%	5%	-
	Bills and bonds	43%	33%	29%	28%	29%	40%	33%	30%	-
	Loans	5%	3%	3%	2%	2%	2%	1%	1%	-
	Shares	41%	54%	59%	61%	59%	49%	57%	59%	-
	Others	4%	4%	4%	4%	5%	5%	5%	6%	-
CANADA (1)	Financial assets (Bn)	164.6	180.1	177.9	187.8	197.3	221.3	240.8	263.0	277.5
	Cash and deposits	1%	1%	1%	1%	1%	1%	1%	1%	1%
	Bills and bonds	58%	55%	52%	51%	49%	47%	45%	44%	43%
	Loans	5%	4%	4%	4%	3%	3%	3%	3%	3%
	Shares	26%	28%	28%	29%	29%	30%	30%	28%	28%
	Others	3%	3%	4%	3%	4%	5%	6%	10%	10%
	Holding of foreign securities	7%	9%	11%	12%	14%	14%	15%	15%	15%
FRANCE	Financial assets (Bn)	41.0	42.2	42.0	41.0	50.0	66.2	-	-	-
	Cash and deposits	-	-	-	-	-	-	-	-	-
	Bills and bonds	48.0 %	30.0 %	30.0 %	39.0 %	39.0 %	38.0 %	-	-	-
	Loans	-	-	-	-	-	-	-	-	-
	Shares	20.0 %	20.0 %	20.0 %	20.0 %	14.0 %	14.0 %	-	-	-
	Others	50.0 %	50.0 %	50.0 %	41.0 %	47.0 %	48.0 %	-	-	-
GERMANY	Financial assets (Bn)	51.5	56.0	56.6	47.6	55.5	65.3	64.8	60.6	69.5
	Cash and deposits	2%	1%	1%	2%	1%	2%	1%	1%	2%
	Bills and bonds	48%	48%	49%	52%	54%	55%	55%	55%	56%
	Loans	49%	49%	48%	45%	44%	43%	43%	43%	42%
	Shares	0%	0%	0%	0%	0%	0%	0%	0%	0%

	Others	1%	2%	1%	1%	1%	0%	0%	0%	0%
ITALY	Financial assets (Bn)	38.5	49.6	38.3	33.9	35.5	39.0	39.2	34.4	37.4
	Cash and deposits	31%	25%	25%	25%	24%	27%	25%	26%	25%
	Bills and bonds	64%	53%	52%	52%	53%	49%	50%	46%	47%
	Loans	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Shares	3%	3%	2%	3%	3%	5%	4%	4%	5%
	Others	2%	19%	20%	20%	20%	19%	21%	24%	24%
JAPAN	Financial assets (Bn)	-	342.6	378.4	460.5	555.4	579.6	-	611.7	714.8
	Cash and deposits	-	-	-	-	-	-	-	5%	5%
	Bills and bonds	-	61.0 %	61.0 %	54.9 %	61.0 %	67.1 %	-	53%	53%
	Loans	-	-	-	-	-	-	-	15%	14%
	Shares	-	29.7 %	29.7 %	29.7 %	27.0 %	24.6 %	-	22%	23%
	Others	-	9.3 %	9.3 %	15.4 %	12.0 %	8.4 %	-	5%	6%
NETHERLANDS	Financial assets (Bn)	229.7	242.7	244.8	260.1	293.8	352.1	370.7	367.7	323.0
	Cash and deposits	2%	2%	2%	2%	2%	2%	2%	2%	1%
	Bills and bonds	18%	20%	23%	24%	25%	27%	30%	32%	33%
	Loans	57%	53%	48%	42%	41%	36%	29%	24%	19%
	Shares	13%	15%	17%	22%	23%	27%	32%	36%	40%
	Others	10%	10%	10%	9%	9%	8%	8%	7%	6%
SWEDEN (2)	Financial assets (Bn)	3.8	4.2	3.9	3.7	4.4	5.6	6.1	6.0	-
	Cash and deposits	0%	0%	0%	0%	0%	0%	0%	0%	-
	Bills and bonds	45%	59%	66%	66%	66%	70%	69%	59%	-
	Loans	42%	31%	26%	26%	26%	15%	13%	14%	-
	Shares	13%	10%	8%	8%	8%	15%	18%	27%	-
	Others	0%	0%	0%	0%	0%	0%	0%	0%	-
SWITZERLAND	Financial assets (Bn)	137.7	-	147.6	-	189.4	-	221.6	-	-
	Cash and deposits	0%	-	0%	-	0%	-	0%	-	-
	Bills and bonds	35%	-	35%	-	33%	-	31%	-	-

	Loans	54%	-	52%	-	49%	-	49%	-	-
	Shares	10%	-	12%	-	16%	-	19%	-	-
	Others	1%	-	1%	-	1%	-	1%	-	-
UNITED KINGDOM	Financial assets (Bn)	536.6	599.4	552.4	683.2	660.5	759.7	893.2	1066.6	1136.5
	Cash and deposits	7%	5%	4%	3%	4%	4%	5%	4%	4%
	Bills and bonds	12%	10%	10%	10%	13%	13%	13%	15%	16%
	Loans	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Shares	71%	76%	75%	74%	71%	71%	71%	71%	67%
	Others	9%	8%	12%	12%	12%	12%	11%	10%	13%
UNITED STATES	Financial assets (Bn)	2492.9	2794.2	3013.3	3354.8	3537.0	4219.7	4944.3	6013.2	7110.5
	Cash and deposits	5%	5%	4%	3%	3%	3%	2%	1%	1%
	Bills and bonds	36%	32%	32%	31%	32%	29%	26%	24%	23%
	Loans	3%	3%	3%	3%	3%	3%	2%	2%	2%
	Shares	36%	43%	46%	49%	48%	53%	58%	62%	64%
	Others	20%	17%	15%	14%	14%	13%	12%	11%	10%

Source: OECD

Notes: (1) Data on Canadian holdings of foreign loans, bonds and shares are not available separately, herein as ‘Others’

(2) Autonomous pension funds only.

Accounting rules for calculating pension liabilities have an important impact on fund management since they determine *shortfall risk*, i.e., the chance that pension assets will fall below liabilities (measured as ABO, PBO or IBO). For example, shortfall risk is much lower with the combination of no minimum funding and returns-based accounting than with the combination of minimum funding and market-value based accounting. The *lower* the shortfall risk, the *greater* the incentive to invest in more volatile, "risky" assets such as equities. This explains in part the relatively high share of equities in UK pension portfolios in the recent past, because until a few years ago there was no minimum funding rule, while current and projected cash flows (i.e., income) from assets were used to determine the adequacy of funding.

Financing projected future liabilities using the *PBO concept* (which allows for future wage growth) together with an element of indexation, encourages an investment policy based on the minimisation of the risk of longer-term shortfall of assets relative to liabilities by investing in fixed-income instruments as well as a significant fraction in equity and real estate. UK pension funds are an example: at the end of 1998, they had invested around 16 per cent in bonds, 64 per cent in equity, and almost 27 per cent in real estate and in other assets.

Financing accumulated benefit obligations on the basis of the *ABO concept*, while the obligation is purely nominal provides the plan sponsor with a strong incentive to hedge the ABO by investing in fixed-income securities with matching duration. As mentioned above, the US Financial Accounting Standards Board has adopted the ABO as the appropriate measure of defined-benefit liabilities. This is a major reason why the equity share of US pension funds is lower than UK pension funds, i.e., at the end of 1998, 64 per cent and 67 per cent, respectively.

More in general, the OECD countries that are using the PBO or IBO concepts tend to have higher equity holdings by pension funds. Also valuation techniques based on projected revenues from assets and other interest accrual methods smooth fluctuations in asset prices and may enable funds to hold a larger share of equity in their portfolios. This is one of the reasons why British funds generally held more equity and obtained higher returns. However, the introduction of the minimum funding rule (MFR)

in 1997 has encouraged many UK pension funds to allocate more funds into fixed-income securities. This allocation shift would continue if the basis for MFR calculations were to change by adopting a key proposal by the UK Accounting Standards Board. This proposal envisages measuring pension assets at market value and liabilities at the prevailing yield on high quality corporate bonds. If this accounting standard were adopted, corporate bonds would become a prominent feature in pension fund portfolios.[2] Moreover, *tax discrimination* against equity holdings, compulsory *indexation of pension* and the regulation of the *discount rate* for calculating future liabilities are other incentives to invest in fixed-income securities, thereby weakening the "equity bias" of PBO and IBO accounting rules.

Portfolio regulations (or investment rules) are in place in all OECD countries. Two types of portfolio regulations can be distinguished: (i) quantitative regulation of portfolio holdings and (ii) so-called prudent man rules.

Quantitative regulations of portfolio holdings apply in quite a few OECD countries. Relatively strict limits are imposed in Japan, Switzerland, Germany, Sweden, Denmark, Portugal and Belgium. Less severe limits are imposed in Italy and Spain. Other OECD countries (including the United States, Canada, Australia, United Kingdom, Ireland and The Netherlands) do not impose quantitative limits but use more flexible guidelines based on the so-called *prudent man concept*. Under the prudent man rule, fiduciaries, trustees, and bank trust departments are expected to behave as careful professionals in making investment decisions. In comparison to countries with quantitative investment limits, "prudent man rule" countries are – on average – characterised by higher equity and foreign asset holdings and lower fixed-income asset holdings. Equity holdings by pension funds with a "prudent man regime" are more than three times as high (on average) than pension funds that operate under a "quantitative asset restrictions regime", while foreign asset holdings are almost twice as high.

2 This accounting rule for calculating liabilities is already used in the USA, with around 70% of bond allocation invested in non-government debt in 1999.

A comparison of "actual" holdings with the regulatory investment limits shows that they have rarely been binding. Reasons include a desire for a safety margin (to avoid overstepping the limits in periods of high asset price turbulence), risk aversion of trustees and the structure (including sophistication) of the asset management industry. In addition, the other dimensions of the regulatory and tax structure discussed above (i.e., minimum funding rules, indexation provisions, accounting standards and tax factors) exert also an important influence on asset allocation decisions.

IV. The implications of pension fund growth for the financial sector

One implication of the ageing of populations in the OECD area and the associated growth of pension fund and other institutional assets is the increased demand for professional fund management services. Professional portfolio managers, in turn, have an important influence on financial markets through investment and trading strategies. Countries with large funded pension schemes tend to have highly developed securities markets, while equity markets are relatively underdeveloped in countries with small pension-fund sectors. The growth of a dynamic pension sector can be expected to contribute to a stronger role of capital market intermediation. In particular, pension funds that are investing significant parts of their portfolios in equities would pressure for changes in laws and regulations of companies that usually can be found in "bank dominated" financial systems. Modernisation of the capital market infrastructure, in turn, would promote the growth of securities markets because they become more attractive for investment by pension funds. In other words, there is a virtuous cycle between an expanding pension fund sector and the development of domestic capital markets.

The growth of the pension fund sector has not only had an impact on the size of capital markets but also on their structure. The latter effect stems from the increased institutionalisation of savings, which means that securities are increasingly being held by large, informed investors whose investment decisions are driven by relative asset returns. Institutional investors make rapid portfolios adjustments to changes in relative

returns, which aids price efficiency and contributes to a more efficient allocation of funds and risks. This can only be done when the capital market infrastructure is efficient. This increase in institutional savings also implies a shift in the composition of the portfolios of the household sector toward long-term assets and correspondingly higher returns.

As a consequence of the increased demand for long-term assets by institutional asset managers and households, the increased institutionalisation of savings has, in turn, led to an increased supply of long-term funds, including risk capital. This increase in the supply of risk capital has stimulated new businesses and job growth. Increasingly pension funds have been investing in blue chips and small caps. In addition, a part of their huge portfolios has been allocated to so-called “alternative “investment projects such as venture capital operations, including *dot.com* projects. Reportedly, pension funds have also become significant investors in *hedge fund* operations by allocating part of their portfolio in a range of hedge funds. In sum, the increase in demand for long-term assets on the one hand, and the increase in the supply of risk capital on the other, have been important factors in changing the structure of capital markets.

The trend toward more investment in foreign assets, especially in emerging markets, can also be expected to continue. The scale of flows from the ‘ageing’ mature industrial countries to the "younger" emerging markets and the broadening of market access constitute evidence that in the 1990s, global financial market integration is rapidly increasing [3]. With continued efforts to liberalise cross-border financial flows and to strengthen capital markets in developing countries, this trend is likely to persist as pension funds and other institutional investors continue to seek to achieve greater diversification of portfolios.

All of these developments serve to increase the breadth and depth of financial markets across the world. They also facilitate greater diversification of pension fund portfolios. Fund managers thus can improve the return-to-risk ratio of the portfolios, which would help ensure that there are sufficient funds to pay the benefits to retirees.

These structural changes should also facilitate the flow of funds from savers to investors, leading to a more efficient allocation of resources and risks in the economy. As such, these developments would have a positive impact on growth and living standards.

There have been concerns that the growing demand for high-quality private securities (equity and corporate bonds) associated with the growth of advance-funded pension systems and decreasing public sector borrowing requirements in many OECD jurisdictions would put strong upward pressure on financial asset prices. The current boom situation in financial markets, in particular the stock markets in many OECD countries, may in part be driven by population ageing and pension reform and the associated growth in pension fund assets.

Another channel that would influence changes in asset prices is the shift from government securities to private debt and equity instruments; for example, in the context of the privatisation of social security systems. Critics have argued that allowing the US and other social security trust funds to invest in equities would primarily represent a reallocation of assets between those held in trust funds and those held -- either directly or indirectly -- by households. It could improve the financial position of the trust funds, because of equities' historically higher average returns, but for a given level of saving it would not increase the returns for the country as a whole. Investing a portion of the trust funds in equities would *raise the price and lower the return on equities, and lower the price and raise the return on Treasury securities.* Higher Treasury yields would raise the interest costs and, all things being equal the non-Social Security portion of the deficit. The analysis becomes even more complicated when one allows the possibility that the initial effects on rates of return could be moderated as corporations restructured their finances to take advantage of cheaper equity financing, and as international buyers increased their purchases of now higher yielding Treasury securities.

In order to mitigate these possible price pressures, it has been proposed by some analysts to undertake pension reform (leading to an increase in demand for equity) and

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3 During 1996, net private capital flows increased by 22 per cent to a record level of $ 235 billion.

privatisation (leading to an increase in supply) at the same time. This would permit, at least over the medium-term, a somewhat more balanced development in private and public securities markets, although the impact of privatisations in the OECD area should not be exaggerated.

In a somewhat *longer-term perspective*, population ageing and pension reform have an impact on the risk-premium (that is, the difference between the returns on stocks and the yield on bonds). Because asset preferences vary across age-groups, the ageing of the baby-boom generation could affect both absolute and relative positions of stock and bond prices. On average, middle age is the portion of the life cycle when saving rates are highest. (This type of saving behaviour is a feature of both a theoretical life-cycle model and, more importantly, the type of saving behaviour seen empirically in household data.)

Moreover, middle-aged workers generally are more able and willing to hold a riskier portfolio; that is, one weighted more heavily towards stocks than bonds. (The real return on United States stocks, for example, averaged 9% over the period 1947–96 with a standard deviation of 17%. This implies that there is about a 30% probability of a decline bigger than minus 8% or a rise bigger than 26% in any given year. The average real return on long-term United States government bonds over 1953–96, however, is much lower – 3% – but also less volatile – these returns have a standard deviation of 2%.)

This is a consequence of two factors: first, while still working, a stockholder is better able to make up for any bad equity returns; second, middle-aged workers have a longer time-horizon and thus are willing to accept more risk in exchange for the expectation of higher returns. In this case, the ageing of OECD populations will tend to increase the price of stocks and bonds, decreasing their rates of return. Moreover, higher demand for stocks relative to bonds should increase the price of stocks relative to bonds, thus *decreasing* the equity premium. It is generally held that risk aversion increases with age (holding length of life constant). Thus, some have hypothesised that an ageing population would cause the equity premium to increase. But if the age of the population is increasing at least in part because life span is increasing, and thus time horizons are

lengthening, then the ageing of the population does not necessarily imply that average risk aversion should be increasing and risk premium on stocks should be rising. In addition it has been argued that bringing savings under the control of pension funds and other institutional investors would also reduce the risk premium because these professional investors have a longer-term horizon and a better capacity to absorb and manage risks than individuals.

After the baby-boomers begin to retire en masse in the period 2010-2030, saving rates would tend to *fall*, stock and bond prices to *decline*, and the equity premium to *rise* as baby-boom retirees shift their portfolios away from stocks toward bonds.

V. Key issues and challenges

Although the positive aspects of pension reform and the associated growth of retirement assets will help countries to manage the problems associated with population ageing, there are a number of key issues and challenges that need to be taken into account in order to fully reap the benefits.

Solvency risk, inadequate pensions and government intervention

Effective regulation and supervisory oversight of the financial situation of pension funds is indispensable for the development of sound private systems. The primary objective is to protect beneficiaries from the effect of sponsor's insolvency, insufficient funding of the plans reflecting improper technical and/or investment decisions, misappropriations by managers or the risk of default by other operators involved in the provision of pensions. Appropriate criteria should guide the licensing of pension operators and plans; proper funding, actuarial, accounting and disclosure requirements as well as limits on self-investment should be set in place. Fair competition among private operators should also be ensured. Continued attention needs to be paid to the evolution of market practices so as to ensure that supervisory methods are adapted to the realities of the marketplace.

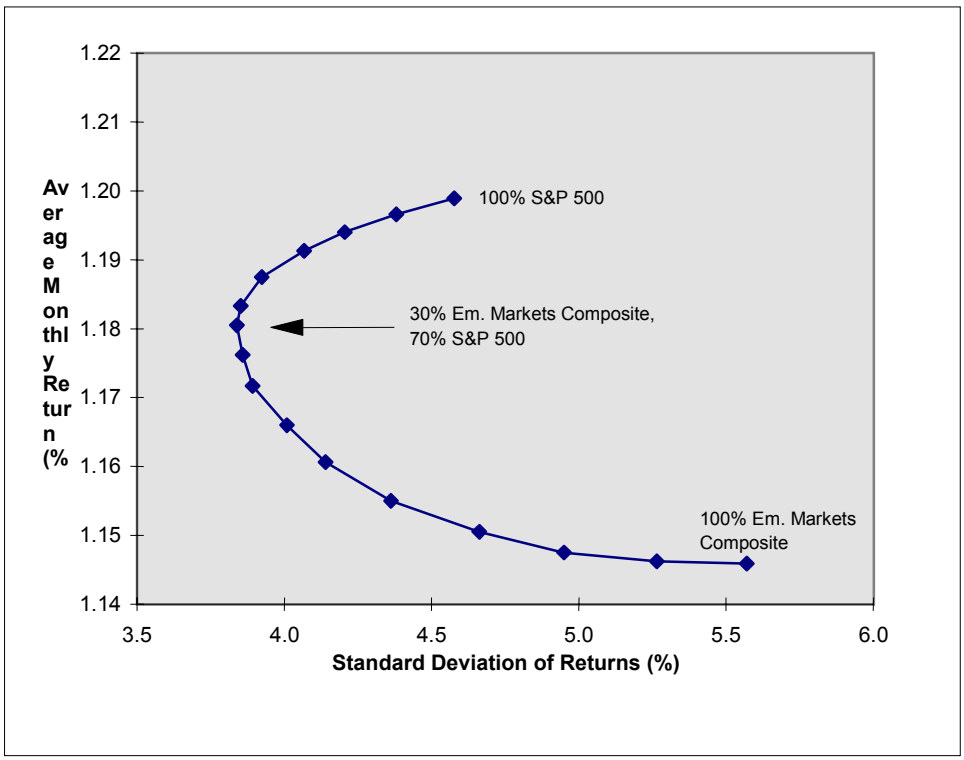
It cannot be excluded, however, that even a well and prudently managed pension fund would find itself in financial difficulties in conditions of a general and protected period of depressed asset prices and returns. And not all funds have been well or prudently managed in the past. The spectacle of many citizens finding themselves bereft of adequate income on retirement in case of the insolvency of pension funds would generate pressure on governments to intervene in future, as in the past. There is a delicate trade-off here between individual and collective interests because of potential moral hazard problems. Setting up an explicit system of government pension guarantees might inadvertently encourage excessive risk taking or inadequate funding by private pension sponsors. The experience of financial policy makers in the design and operation of bank deposit guarantee systems seem especially relevant in this context. In particular, that the likelihood of a government "bailout " in extreme circumstances points to the need for carefully structured government oversight.

The shift from defined-benefit towards defined-contribution systems has put the spotlight on the investment risks of employees and retirees. A related risk is whether to-day's workers will have a decent retirement income. A recent study for the UK warned for a future pension crunch. It was argued that the current low inflation environment is likely to depress future investment returns on pension funds. In one scenario it was estimated that a 30-year old worker contributing 10 per cent of salary would retire aged 60 on just 24 per cent of final salary. This compares with 66 per cent for those retired now and who had the same contribution pattern. This would argue for (much) higher contribution than 10 per cent for people with defined-contribution arrangements. This in turn would also require a much faster expansion of pension fund assets. Failure to do so would create the risk that large segments of the population would have inadequate retirement income, and, also in this case, the government would be pressured to intervene in the future.

The benefits of investments in emerging markets need to be carefully assessed against risks

Studies indicate that *international portfolio diversification* strongly enhances the power of portfolio diversification. Nevertheless, increased international diversification, may not be a beneficial as they first appear. For example, over the last ten years, the G-7 stock markets have given better returns than the emerging markets. Taking a 20-year period shows that although investments in the US equity market over the 1975-1995 period would have given US pension funds both *higher* returns and *lower* risks than the emerging markets as a group [Chart 4], there are still benefits from diversification. Naturally, the future might bring better news in terms of higher expected returns and/or lower risks, especially in the light of further improvements in the financial infrastructure in emerging securities markets as well as a strengthening of the domestic institutional investor base in emerging markets.

Chart 4. Risk vs. Return: Emerging Market and US Stocks
December 1975 - June 1995



At the same time, however, analysts have pointed out that the benefits of international diversification may be decreasing. It is argued that increasing financial integration is leading to an increase in correlation of returns, which reduces the potential for reducing risk through international diversification. Moreover, the fact that an increasing amount of institutional money is managed using diversification is causing the benefits of diversification to become smaller. The potential benefits of international diversification are also reduced by the fact that downside market movements occur much more in parallel than upside ones. A recent study shows that shocks in volatility are closely linked with rising correlations, in particular in the case of stock markets. Unfortunately, the fact that most assets seem to move uniformly during market crash situations reduces the benefits of controlling downside risks using investment strategies based on diversified benchmarks. Although there is evidence that the risk-reducing benefits of international investments have become less powerful, studies show that they are still positive, even during sharp downside moves of securities markets.

High correlation of returns between countries has in some cases led to a restructuring of portfolios by diversifying across sectors. For example, studies found that diversifying across countries, but staying within a single industry, reduces volatility more than diversifying across industries in a single country, even though both portfolios carry the same average return.

VI. Implications for policy

The guiding principle for government policy should be to facilitate the development of the proper infrastructure (in particular by providing an efficient regulatory and supervisory framework) that will enable pension funds to efficiently allocate retirement savings and risks.

The first implication is that it necessary for those making the risk-return trade-off decisions on behalf of pension beneficiaries to be well-informed, to have the proper incentives and to be adequately supervised. A supervisory framework based on

prudent-man principles and sound risk management standards, is better adapted to this purpose than an approach with "blunt" quantitative restrictions on asset allocations

Although it is difficult to isolate the impact of different aspects of the regulatory structure on the investment performance of pension funds, comparing the aggregate returns on pension fund portfolios in countries with "prudent man" investment rules[4] with those of countries with quantitative restrictions can give us a rough idea. Since 1984, returns on pension fund portfolios in countries using prudent man principles have been 2.5 to 4% higher than returns in countries using quantitative limits (Table 4).

Table 4: Returns on pension fund portfolios 1984-98
(mean of real total return in local currency)

Percent domestic currency	1984-1993	1984-1996	1984-1998
Belgium*	8.8	9.0	10.33
Denmark	6.3	6.0	6.14
Germany	7.2	7.0	6.72
Ireland*	10.3	11.0	12.54
Japan	6.5	0.0	--
The Netherlands*	7.7	8.0	9.64
Spain	7.0	--	--
Sweden	8.1	-	--
Switzerland	4.4	4.0	4.90
United Kingdom*	10.2	10.0	10.35
United States*	9.7	9.0	10.49
Prudent Man	**9.5**	**9.5**	**10.7**
Asset Limits	**6.9**	**5.2**	**6.0**

* Countries with the prudent man rule.

4 A number of countries do not impose quantitative limits on investments but instead impose guidelines such as the so-called “prudent man rule” or “prudent man principle”. Under the prudent man rule,

The evidence examining longer periods confirms this conclusion[5]. Over 1967-1990, pension funds' portfolio returns exceeded real wage growth in prudent man rule countries while the difference between returns and wage growth was on average zero in countries with quantitative limits. Since differences of 1 or 2 percentage points on the return of pension fund assets can make an enormous difference to both contribution rates and retirement benefits over a life-time, it is important that governments not unnecessarily hamper the investment policies of pension funds. The worst situation is when regulations would impede both investment performance and the adequate management of risks.

A second implication for policy is to recognise that financial innovations can improve the functioning of financial markets. Government regulatory actions can do much to either mitigate or aggravate the dysfunctional aspects of financial innovations. The "correct" policy response to financial innovations will enhance financial stability without hampering the entrepreneurial activities of financial market participants. The process of financial innovation has been driven strongly by the growth of pension funds and other institutions involved in the retirement sector (mutual funds and life insurance companies). The role of public policy in "optimal" pension plan design is to support -- or in some cases act as a catalyst for -- the development of new and better retirement products by the private sector. Of particular importance is the inflation proofing of private pension plans. From a public policy standpoint, consideration should be given to promoting the growth of markets in inflation-indexed or consumption-indexed government bonds, which would facilitate the development of retirement products that are indexed to inflation (i.e., cost-of-living protection) or to aggregate per capita consumption (i.e., standard-of-living protection), respectively. Public policy should also

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fiduciaries, trustees, and bank trust departments are expected to behave as careful professionals in making investment decisions.

[5] Several caveats are in order when interpreting these aggregate performance results. First, it is not possible to control for important *other* determinants of investment performance such as macroeconomic policies, structural factors that influence economic growth (e.g., capital market segmentation, discoveries of mineral wealth, etc.), and features of the regulatory regime other than portfolio investment restrictions. Second, to get more conclusive answers it would also be necessary to take into account the details of the institutional investment infrastructure such as the structure of the asset management industry, the "style " of investment, and the dominant investment strategy (e.g., passive versus active).

correct market failures. For example, annuity markets are vulnerable to adverse selection problems, leading to the nonavailability of annuities at an actuarially fair price for "good risks. Although recent evidence for the United States indicates that the expected pay out on annuity policies has increased significantly there seems to be still a need, in view of the growing importance of these markets for managing longevity risks, to investigate further what public policy role there is (if any) in improving annuity markets.

The third implication is that financial market infrastructure influences the ability of pension funds to implement asset investment strategies in accordance with planned or desired risk-return profiles. A well-functioning funded pension system requires a stable and efficient financial market infrastructure consisting of the legal framework, the financial accounting system, the regulatory and supervisory framework, clearing and settlement systems, and the micro-structure for trading securities. Most industrial countries have made considerable progress in the development of a solid regulatory and supervisory framework, although much still needs to be done. For example, several countries (e.g. in Europe) have not established the proper legal and regulatory basis for dealing with take-overs, minority shareholders protection, insider trading and institutional investor operations.

Differences in disclosure requirements among advanced and emerging financial markets are marked, partly due to different legal systems. Weaknesses in the infrastructure of emerging financial markets need to be addressed urgently. For example, recent financial turmoil in Asia demonstrate that lack of transparency and inadequate disclosure standards can prolong or exacerbate a confidence crisis.

The role and scope of regulations on pension funds should be scrutinised, taking account of the extent to which the implementation of sound *risk management* standards for pension funds can be linked to a relaxation of regulatory constraints concerning asset allocation. The implementation of risk-management systems, in turn, requires the adoption of a proper *risk-accounting* framework. Analysts have suggested that financial

accounting requires a fundamental overhaul to allow the inclusion of various aspects of risk. Indeed, in practical terms financial risk-accounting is already being under-taken. Financial firms that deal extensively in complex securities have developed risk-accounting protocols as part of their internal management systems. With the benefits of real-world experience, these protocols could serve as prototypes for a new branch of standardised risk-accounting.

A related point concerns accounting and auditing *standards*. They are important to the effective management of risk because disclosure will be effective only if the financial information provided by the company is based on reliable accounting principles and practices. Internationally accepted accounting standards are essential for pension funds to be able to assess accurately the "value" of investments. An important deterrent for equity investments by pension funds in emerging markets is, therefore, the non-transparency of the balance sheet of companies in these countries. Investments in venture capital operations (especially in high tech companies such as dot-com projects) may be hampered by the fact that information about future projects are dubious. Auditing standards and practices also need to be high enough to ensure the reliability of disclosed information.

The last implication of global ageing and pension reform for policy is that the scale for a possible international systemic crises will become more important as pension funds and other institutional investors continue to diversify into international markets. One lesson from recent events is that the abrupt loss of access by individual countries to the global capital market may continue to occur. This is due to two factors: divergent macroeconomic conditions in capital-exporting and capital importing countries and crises in individual capital-importing countries. In such cases, the currency of the capital-importing country will be "tested" through a sustained speculative attack, leading to a sudden drying-up of capital inflows and major capital outflows. The growing participation of institutional investors in international markets and improved access of emerging markets to the international capital market have led to the growth of highly leveraged hedge funds and proprietary traders who are prepared to tolerate significant risk in their search for weaknesses in foreign exchange arrangements.

The globalisation of financial markets, driven in part by population ageing, pension reform and other structural factors, is reflected in the quicker international transmission of short-term price movements in financial markets, as occurred in the Mexican crisis in 1994-95 and the Asian crisis in 1997-98. Financial integration has also increased the potential intensity and duration of speculative attacks. There is evidence that pension funds and other institutional investors have played a crucial role at times in determining asset prices in emerging and advanced financial markets, with shifts in institutional investor sentiment occasionally contributing to increased volatility in markets. The LTCM crisis demonstrated that also advanced markets are not immune to serious financial turmoil.

In this context, the key challenge for financial policymakers is how to effectively deal with periods of financial turmoil without creating moral hazard situations. Bailing-out investors should be avoided because it would encourage excessive risk-taking. Capital-importing countries should implement sound macroeconomic and structural policies (a modern financial securities market infrastructure, a healthy banks sector, high accounting and disclosure standards, etc.) so as to restore confidence to investors and to curb unnecessary volatility. It is fair to say that much work has been done in strengthening financial systems in both advanced and emerging markets during the last two years. Nonetheless, the financial sector reform agenda remains full.

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