

# Committee on the Global Financial System

## CGFS Papers

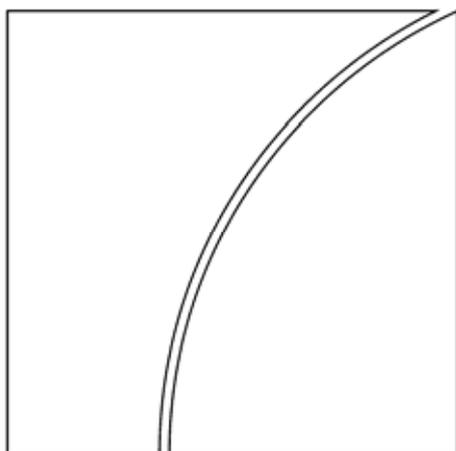
No 27

### Institutional investors, global savings and asset allocation

Report submitted by a Working Group  
established by the Committee on the Global  
Financial System

February 2007

JEL Classification numbers: G11, G22, G23, G28



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ISBN 92-9131-666-0 (print)

ISBN 92-9197-666-0 (online)



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## Executive summary

### ***Observed trends in institutional investors' behaviour***

*Institutional investors are becoming more important* in global financial markets, with their assets under management rapidly catching up with those of the banking system. Institutional investors help to ensure deeper and better functioning markets, thus contributing to a more efficient allocation of savings, and their growth may help to counter the decline of household saving ratios associated with ageing populations. Some of this growth will be stimulated by public pension reform, including moves to funded occupational pension systems. The growth in turn is likely to be concentrated in the defined contribution (DC) pension sector because the majority of countries that are moving to funded pension systems are adopting a structure based on a DC arrangement. Global institutional investors have also substantially increased their exposure to emerging market economies (EMEs) in recent years. Domestic institutional investors in EMEs, although small in an absolute sense, are significant relative to the size of local markets and have considerable growth potential.

*Different objectives and strategies determine the investment behaviour of different institutional investors.* The asset allocation of insurance companies or defined benefit (DB) pension schemes that bear investment risk could be expected to be different from that of mutual funds or DC pension schemes, in which the risk is directly borne by the individual. Asset-liability management strategies or a need to close funding gaps may be characteristic of the investment behaviour of the first group of investors, but not of the second.

*Alternative investments* have become increasingly popular among traditional institutional investors such as life insurance companies and pension funds, but still represent only a small proportion of total assets. However, from the hedge fund viewpoint, these investments constitute a significant source of growth for the industry.

### ***Effect of regulatory and accounting changes***

*Regulatory developments* have long been a factor in the development of institutional investors and their asset allocation strategies. The Working Group was mandated to assess the effect on investment behaviour and financial markets of specific regulatory and accounting changes affecting pension funds and insurance companies. These regulatory changes were motivated, at least partially, by the 2000-02 equity downturn, which exposed some serious weaknesses in the regulatory frameworks affecting traditional institutional investors with long-term liabilities and offering guaranteed returns in many countries.

These regulatory policy changes are of a *global nature*. However, their *consequences are likely to differ between countries*, partially as a result of differences in national conditions, as well as across different types of institutional investor.

The main effect of reforms will be to provide incentives for DB pension funds and insurance companies to reduce their risk profile, in part by making risks more visible. This process can take many forms, but generally involves either the transfer of investment risk to households or the adoption of investment strategies that directly incorporate liabilities into asset allocation decisions. Underfunded DB pension funds and insurance companies selling guaranteed products will be encouraged to reduce their risk profiles. Overfunded DB pension funds or well capitalised insurance companies will be less constrained by regulatory reforms in the risks they take. However, even if a DB plan is currently overfunded, the sponsoring firm's concerns about the risk of becoming underfunded in the future may encourage greater asset-liability matching (ALM). The adoption of ALM techniques by institutional investors may involve shifts in asset portfolios from equities to long-term conventional and index-linked

bonds, whose financial characteristics more closely resemble liabilities in terms of duration and the cash flow of obligations.

Institutional investors may also seek to transfer risk to the household sector. *In shedding risk from their balance sheets*, they will be following a similar strategy to the banking sector. Of course, households are the ultimate owners of all firms and hence the ultimate bearers of underlying risks. And households hold the largest equity buffer, which in principle could increase the resilience of the financial system to adverse shocks. But they may not be as able as institutional investors to identify, judge and manage investment risks. In particular, it is unclear how effectively households will cope with financial market volatility. If households were to prove unable to manage the risks in DC pension schemes effectively, or if they set aside inadequate savings to provide for future pensions, their future retirement income would suffer. Thus appropriate regulation and supervision as well as consumer protection remain important, as do efforts to educate households on financial issues.

In assessing influences on institutions' asset allocation decisions and on market dynamics, *it is difficult to disentangle the effect of regulatory and accounting changes, which in most cases are either recent or still under discussion, from other factors*. However, *accounting and regulatory reforms do not appear to be a major cause of the current low levels of global long-term interest rates*. Therefore, insofar as the behaviour of long-term rates may remain a puzzle, it is unlikely that a major part of the explanation will be found in the behavioural response of institutional investors to recent or prospective regulatory and accounting changes. Given the importance of assessing the equilibrium level of long-term interest rates, continuing uncertainty on this front complicates the task of policymakers.

That said, developments *in the United Kingdom, where long-term yields appear to have been affected by recent changes in institutions' asset allocation strategies*, illustrate the potential importance of regulatory policy changes affecting institutional investors. In such specific circumstances, the response of long yields to regulatory and accounting changes will importantly depend on (i) the size of potential institutional demand for long-term bonds relative to the size of the market, (ii) the extent and scope of the regulatory changes, (iii) the initial funding or solvency positions of institutional investors and (iv) their initial asset allocations. Canadian real return bonds, all of which are issued at maturities of 30 years, may also have been significantly affected.

Any assessment of the effects of regulatory and accounting changes on financial markets must be tentative, because the reforms are all recent or in the process of implementation or discussion. In addition, it is difficult to distinguish between changes that would have happened anyway (such as growing internationalisation of portfolios, asset-liability matching and shifts to alternative assets such as hedge funds and commodities) and those that may be a direct consequence of reforms. The fact that the regulatory and accounting reforms are part of a global phenomenon that is still in its early stages raises the possibility that they could eventually have a more lasting effect on financial market developments and prices.

### ***Policy implications***

The recent regulatory and accounting reforms seem likely on balance to *enhance the functioning and stability of the financial system*, and contribute to a more efficient allocation of resources. They should encourage better risk management by institutional investors, the spreading of investment risk among a larger investor base and improved transparency in corporate accounts.

In the case of emerging markets, *the growing demand from global institutional investors for emerging market assets* is likely to be positive for these economies, and should contribute to the depth of local financial markets. The growing role of global investors in emerging markets might nevertheless alter the transmission mechanism of domestic monetary policy, especially if long-term bond yields become more dependent upon global factors.

However, with the shift in the pensions sector from DB to DC plans and in the insurance sector from guaranteed to unit-linked products, *the household sector has become increasingly exposed to financial markets*, as the pooling of risk across time for workers disappears, and prospective retirement income is more subject to financial market volatility. This is also the case in emerging markets, where pension reforms are also encouraging the establishment of DC plans.

While the reforms appear *beneficial for financial stability in the long term*, the *implementation of these measures may temporarily distort prices in financial markets*, eg through feedback effects with the potential to drive long-term interest rates below the levels justified by macro fundamentals. Therefore, during the transition to the new regimes, policymakers will need to take into account the risk of triggering unnecessary market volatility or distorted valuations. That said, the degree to which a gradual approach is possible will depend on the solvency situation, balance sheet risks and financial strength of affected companies, which may well vary from country to country. Finally, while the assessment is that these effects would be temporary in those cases where they exist, only after enough time has elapsed can one ascertain how long-lasting such effect would really be. These considerations highlight the need to conduct comprehensive impact studies prior to the completion of the reforms, in order to assess their effects and address any issues that arise.

The increased interest in *alternative investment strategies* on the part of traditional institutional investors *was not perceived as a major problem for financial stability*, given that these asset classes still remain of *limited* importance in their portfolios and are mainly used to improve portfolio risk diversification. However, concerns have been expressed about the opacity of these vehicles, tail risks and untested markets.

Regulatory policy changes may also increase the transparency of the existing *links and channels of risk transfer between banks and institutional investors*. In addition, they may help to provide increased transparency on the nature and location of the risks facing *financial conglomerates*, reducing the opacity that has existed in the past within complex financial institutions.

Finally, the Working Group has encountered various limitations and challenges in using balance sheet data to study the investment behaviour of institutional investors. In particular, balance sheet data do not reflect accurately the risk exposures of institutional investors that are significant users of derivatives. If the CGFS wants to continue monitoring how pension funds and insurance companies are responding to regulatory policy changes, it needs to consider in more detail how to *improve the information and/or analytical frameworks for assessing financial stability issues*.

## 1. Introduction

In November 2005, the Committee on the Global Financial System established a Working Group on Institutional Investors, Global Savings and Asset Allocation, under the chairmanship of José Viñals, Bank of Spain. Its objective was to explore the determinants of institutional investors' asset allocation decisions, and analyse their potential implications for the financial system.<sup>1</sup> In particular, the Working Group was asked to assess how recent and prospective regulatory and accounting (henceforth regulatory policy) changes might influence the investment decisions of institutional investors, especially pension funds and insurance companies; and how such changes might impact on prices of financial assets and market dynamics (Annex A). This report provides a summary of the main findings of the Working Group and their potential implications for financial stability.

Institutional investors have become increasingly important participants in global financial markets, including emerging markets. The proportion of household savings channelled through institutional investors has grown significantly over recent decades, to the extent that today their assets challenge the traditionally dominant position of the banking system as financial intermediaries for the household sector.<sup>2</sup> This growing importance of institutional investors should lead to deeper and better functioning financial markets, thus contributing to a more efficient allocation of savings.

The Working Group analysed the effects on the behaviour of institutional investors of regulatory policy initiatives recently introduced by a number of countries, or currently under discussion in others. One of the objectives of these initiatives has been to strengthen the solvency and risk management practices of institutional investors, in particular, defined benefit (DB) pension schemes and insurance companies. Despite differences in detail and speed of implementation, reforms share common features across countries: a move towards fair value accounting of pension assets and liabilities; the adoption of risk-based solvency requirements for insurance companies; and a requirement for more transparency in the reporting in company accounts of pension commitments and funding positions. All these changes may have induced a process of risk reallocation in DB pension schemes, in the direction of better matching their long-term liabilities (with long-term bonds or other instruments) or of transferring risks to the household sector. As DB pension schemes are larger than defined contribution (DC) schemes in terms of assets under management, and insurance companies are in aggregate the largest institutional investors worldwide, changes in the regulatory policy frameworks may have an important impact on financial market prices, market dynamics and financial stability. It is not the purpose of the report, however, to undertake a fully fledged analysis of the economic effects of DB and DC pension schemes.

The report is structured as follows. Section 2 examines institutional investors' asset allocation by asset class and country of origin, and tries to identify the potential factors that might have contributed to the observed developments. Section 3 reviews key regulatory policies that might have affected the investment strategies of institutional investors, in particular DB pension funds and insurance companies. In Section 4, the potential impact of

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<sup>1</sup> Following Davis and Steil (2001), institutional investors are defined as specialised financial institutions that manage savings collectively on behalf of other investors based on specific objectives in terms of acceptable risk, return maximisation and maturity of claims. This therefore includes insurance companies, pension funds and those investment companies, such as mutual funds and hedge funds, which are investment vehicles in their own right.

<sup>2</sup> In 2003, total world assets of commercial banks amounted to USD 49 trillion, compared to USD 47 trillion of assets under management by institutional investors.

such changes on financial asset prices, including the effect on long-term interest rates and other asset prices, is examined. Section 5 discusses the implications for financial stability and market dynamics. Section 6 concludes.

## 2. Institutional investors' asset allocation<sup>3</sup>

Over the past decade, institutional investors have become the dominant saving medium for households in most of the economies under consideration.<sup>4</sup> Average household sector holdings of assets managed by institutional investors (including insurance and pension reserves and mutual fund shares) rose from 36% to 44% of total financial assets between 1995 and 2005. Against the background of ageing populations, due to declining fertility rates and rising longevity, governments will find it increasingly difficult to maintain current state pension policies. As a result, a large and increasing proportion of household savings is expected to be placed in privately funded pension schemes and life insurance policies, providing more funds to institutional investors. At the same time, the growth of institutional investors may be accompanied by an increase in the overall level of savings, *ceteris paribus*, if an increase in retirement savings is not fully offset by a decrease of other forms of saving. This may arise inasmuch as retirement savings and other financial instruments are imperfect substitutes and some households are credit-rationed (Annex B, based on Broadbent, et al (2006), provides an overview of recent trends in household savings and a more detailed assessment of the relationships between household savings and institutional investors).

Among institutional investors, insurance companies and pension funds are the main recipients of households' financial assets. A number of recent and prospective regulatory policy reforms are targeted exclusively at either the pension or the insurance sectors. Others, such as the harmonisation of global accounting standards and the associated move towards fair value accounting and greater transparency in financial reporting, affect all institutional investors. However, the liability structures and long investment horizons of life insurers and DB pension funds (see Box A) suggest that they are likely to be particularly affected by recent and prospective regulatory policy changes.<sup>5</sup>

One important investment decision of insurance companies and pension funds is the selection of an optimal asset mix that best reflects their risk-reward trade-offs. Traditionally, the investment portfolio of pension funds in particular has been heavily weighted towards publicly traded equities, with bonds and alternative assets comprising a smaller share of the asset portfolio. An equity-oriented investment strategy may be justified by the long investment horizon of certain institutional investors. In principle, this allows them to tolerate additional risk in exchange for the higher expected returns from equities relative to bonds over the longer term. In addition, equity investments may facilitate better hedging of wage growth risks. For pension funds, higher prospective returns mean lower expected plan contributions for the same level of benefits.<sup>6</sup> However, theoretical models developed since

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<sup>3</sup> For a previous review of developments in the institutional asset management industry and their potential implications for financial markets, see CGFS (2003).

<sup>4</sup> Throughout this report, the countries considered include, subject to data availability, Australia, Belgium, Canada, France, Germany, Hong Kong SAR, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States.

<sup>5</sup> Most life insurance companies provide retirement saving policies to households and therefore have long-term liability structures similar to pension funds. However, this report examines the entire insurance sector (ie including non-life insurers) due to data limitations in many of the countries.

<sup>6</sup> Urwin (2004) points out that these arguments were framed at the time when funding and solvency levels were higher and pension funds were largely regarded, at least from an accounting point of view, as separate entities

the 1970s suggest that long-term investors should focus more on long-term bonds (eg Stiglitz (1970), Sharpe (1976) and Rubinstein (1976)). More recent research suggests a number of reasons why DB pension funds should reduce their equity holdings. First, lowering pension funds' equity exposures reduces the balance sheet risk of the corporate sponsor, given that a stock market downturn could mean that higher contributions are required from the sponsor thereafter. Second, long-term bonds are more effective than equities in hedging interest rate risks. Third, tax considerations may favour issuance of and investment in bonds rather than equities. This section examines and seeks to explain trends in institutional investors' asset allocation using flow-of-funds data.

## 2.1 Recent trends in institutional investors' asset allocation<sup>7</sup>

*Insurance companies and pension funds* are the largest institutional investors in terms of financial assets. In 2005, their total assets amounted to USD 30 trillion, almost double those held by mutual funds (Table 1).<sup>8</sup> Insurance companies are in aggregate somewhat larger than pension funds, holding assets of USD 17 trillion, compared with USD 13 trillion for pension funds. However, the relative size of the two main types of institutional investor varies greatly across countries, partly reflecting the characteristics of retirement savings. In countries with well developed private corporate pension schemes (Australia, Canada, the Netherlands, Switzerland, the United Kingdom and the United States), pension funds are generally (apart from in the United Kingdom) the dominant institutional investors, and together they represent 70% of total pension assets in 2005. In contrast, in Japan, Korea and most euro area countries, insurance companies dominate. This is particularly the case in France and Germany, where life insurance policies have been the main form of retirement savings and private pension funds are relatively new or underdeveloped.

For most *insurance companies*, bonds are the most important assets in portfolios (Table 2). Notable exceptions are Australian insurers, who hold half of their assets in equities, and German insurers, who maintain substantial amounts of deposits and loans. Another feature that is almost exclusive to insurance companies in the euro area is their relatively large holdings of mutual fund shares.

Table 2 also shows that over the past 10 years, there has been no uniform trend in insurance companies' asset allocations. Whereas in Australia, Canada and the United States, insurance companies have shifted some of their assets from bonds into equities, other countries, most notably Korea and the United Kingdom, have experienced the opposite trend. Insurance companies in France and Germany have also reduced their allocations of bonds, but the reductions have been matched by increases in both equities and mutual fund shares.

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from their sponsor. They are perhaps less appropriate given the modern corporate finance view that the assets and liabilities of a pension fund are part of the plan sponsor's balance sheet.

<sup>7</sup> Some caveats apply throughout this section in the interpretation of Tables 1-3. They arise from: data limitations which did not permit the disaggregation of insurance company data between life and property and casualty insurance across countries (though most assets are managed by life insurance companies in a majority of countries); difficulties in determining whether there was a change in the asset mix or a valuation change; and, most importantly, difficulties in obtaining an accurate description of the exposure to risk from aggregate balance sheet data, given that derivatives are not included.

<sup>8</sup> Direct comparisons of assets held by insurance companies and pension funds with those of mutual funds involves double-counting given that the former group holds some of its assets in mutual funds. In addition, mutual fund data, as reported by the Investment Company Institute, are net assets under management, while pension fund and insurance company assets are total financial assets recorded in national financial accounts.

## Box A

### **Institutional investors: investment objectives and strategies**

#### **Pension funds**

Pension funds collect and invest contributions from employers and workers to provide post-retirement cash distributions to workers and their families. The pension fund is typically organised as a separate legal entity. For example, in the United States, a private pension fund is often organised as a trust legally distinct from the sponsoring employers, but to which the sponsoring employer is indebted for obligations incurred pursuant to the underlying pension plan; the trustee bears fiduciary responsibility with respect to the management of the fund. Pension plans are sponsored by both private organisations and governments.

Pension plans may be further divided into **DB** and **DC** plans. DB plan sponsors promise a specific cash benefit to a worker upon retirement – with the benefit depending upon such factors as years of service and salary. Under DC plans, the plan sponsor agrees only to make contributions to the worker's retirement fund. The ultimate value of the retirement "benefit" under a DC plan varies with the amount of contributions from the employer and worker, as well as investment performance. DC plans differ on how much control the worker has over investment policy, but the worker usually bears most of the risks and rewards associated with variable investment performance.

The distinction between DB and DC plans has important consequences for asset allocation. For DB plans, the combination of the sponsor's contribution policy and asset allocation strategy must be designed to fund benefits as they become due. For DC plans, however, there is no similar issue of asset-liability matching, because the sponsor has no obligations beyond the pre-specified contributions. Instead, the theoretically optimal investment policy for DC plans depends on the participant's preferences with respect to risk and return and the composition of assets held in other accounts.

#### **Insurance companies**

**Life insurers** sell traditional life assurance, annuities and disability insurance contracts, while **property-casualty insurers** sell insurance contracts that indemnify the policyholder for property and liability losses. In both cases, the insurer collects premiums from consumers when selling contracts, and invests the proceeds with a view to meeting the contractual obligations incurred in the future.

Life insurers are important in the retirement savings market. Some insurance policies have wealth accumulation features (eg whole life policies) and annuities to protect retirees from longevity risk. The extent to which the insurer guarantees the underlying rate of return varies, and this has consequences for asset allocation. Variable or "unit-linked" contracts - where the underlying rate of return is tied to a pre-specified index - require supporting assets that track the index, while fixed rate contracts are naturally supported with fixed rate assets. Hence, insurers with significant equity-linked business volume may have relatively high equity holdings, but they do not bear all of the associated investment risks.

#### **Investment companies**

**Investment companies** - such as mutual funds, investment trusts, hedge funds and private equity funds - pool assets for investment purposes. While companies vary in operating methods and regulation, investors typically bear the risks and rewards associated with the underlying asset performance. Hence, asset-liability matching does not concern an investment company in the same sense that it does other institutions. Investor "liabilities", such as retirement income needs, may well guide investment and thus must be considered by firms when competing for funds, but such liabilities are not typically a direct operational concern after the investment is made. Nevertheless, different redemption features dictate differences in asset allocation. For example, closed-end mutual funds do not allow direct redemption of investments, while open-end mutual funds do. As a result, closed-end funds may focus on illiquid investments, while open-end funds typically have a more liquid portfolio to meet redemption demand.

Table 1

**Total financial assets of institutional investors<sup>1</sup>**

	Total		Insurance companies and pension funds						Mutual funds <sup>3</sup>	
	1995	2005	Total <sup>2</sup>		Insurers		Pensions		1996	2005
1995			2005	1995	2005	1995	2005	1995		
Australia	321	1,507	273	807	128	241	146	566	48	700
Canada	556	1,432	402	941	172	391	230	550	155	491
Euro area <sup>4</sup>	na	10,165	na	5,858	1,871	4,664	na	1,194	1,378	4,307
Belgium	114	344	85	226	76	212	9	14	29	118
France	1,176	3,008	642	1,646	642	1,614	0	32	534	1,363
Germany	1,057	2,152	919	1,856	779	1,573	140	283	138	297
Italy	na	1,007	na	557	120	528	na	29	130	451
Luxembourg	346	1,689	8	53	8	53	na	na	338	1,636
Netherlands	562	1,282	497	1,156	162	407	335	749	65	126
Spain	246	682	102	365	84	278	18	87	144	317
Japan	4,150	4,710	3,729	4,240	2,999	3,243	731	997	420	470
Korea <sup>5</sup>	na	621	138	422	103	272	35	150	na	199
Mexico	na	132	na	84	na	21	na	63	na	47
Singapore <sup>6</sup>	226	443	95	132	21	52	74	80	131	311
Sweden	na	506	90	387	na	268	90	118	35	119
Switzerland <sup>7</sup>	na	681	na	565	na	227	na	338	48	117
United Kingdom <sup>5</sup>	1,759	4,014	1,558	3,467	798	1,979	760	1,487	201	547
United States	10,546	21,811	7,020	12,906	2,804	5,601	4,216	7,305	3,526	8,905
Total		46,021		29,808		16,960		12,849		16,213

<sup>1</sup> In billions of US dollars. <sup>2</sup> For the Netherlands and United Kingdom, individual insurance companies and pension fund data are from different sources and hence do not add up to total insurance and pensions. <sup>3</sup> Mutual fund data are from the Investment Company Institute as the definition of mutual fund data varies across national financial accounts. Funds of funds are not included except for France, Italy and Luxembourg after 2003. <sup>4</sup> Including Belgium, France, Germany, Italy, Luxembourg, the Netherlands and Spain; data are for 1995 and 2004. <sup>5</sup> Data for Korea and the United Kingdom are for 2004. <sup>6</sup> Data for Singapore are for 2000 and 2005 respectively. <sup>7</sup> Data for Switzerland are for 1999 and 2003 respectively.

Sources: Investment Company Institute (<http://www.ici.org/stats/mf/index.html>); national sources.

*Pension funds'* asset portfolios vary greatly between countries and the differences are larger than those for insurance companies (Table 3). The share of bonds in pension funds' total financial assets ranges from below 5% in Belgium to nearly 100% in Mexico, though in Belgium the mutual funds' share is large and they partly invest in bonds. One of the reasons for differences in asset allocation may be related to the degree of development of financial markets, and to the current absence of quantitative restrictions on pension fund investment. In contrast to insurance companies, pension funds are less likely to invest the bulk of their funds in bonds. In addition, apart from in Korea and Switzerland, the proportion of pension funds' bond holdings has tended to contract since the early 2000s, frequently accompanied by increased equity holdings. In the United Kingdom, there has been a continued modest shift from equities to bonds since 1995, although this trend appears to have moderated recently. However, it should be noted that some of these changes may reflect valuation effects rather than active substitution of one asset class for another.

Table 2  
Asset allocation of insurance companies<sup>1</sup>

	Bonds		Equities		Mutual funds		Deposits and loans		Other	
	1995	2005	1995	2005	1995	2005	1995	2005	1995	2005
Australia	41	30	41	53	na	na	13	11	4	6
Canada	53	51	13	26	na	na	29	15	5	7
Euro area <sup>2</sup>	44	46	14	23	7.9	17.8	25	17	11	8
Belgium	52	53	14	14	0	14	14	7	20	12
France	59	52	14	18	12	23	11	5	4	3
Germany	15	10	14	20	11	18	54	46	6	6
Italy	na	58	na	32	na	na	na	9	na	0
Netherlands	23	37	21	33	0	0	49	20	6	10
Spain	52	58	14	14	na	na	20	18	14	10
Japan <sup>3</sup>	32	52	21	24	1	2	40	20	7	3
Korea <sup>4</sup>	14	46	14	4	3	6	61	24	9	20
Mexico	na	69	na	1	na	na	na	2	na	28
Singapore <sup>6</sup>	27	55	31	32	na	na	40	12	2	1
Sweden	na	49	na	46	na	na	na	4	na	1
Switzerland <sup>5</sup>	na	43	na	28	na	na	na	29	na	na
United Kingdom <sup>4</sup>	30	41	53	33	8	10	8	11	2	6
United States	62	56	16	24	1	2	14	12	7	6
Average	41	47	22	25	2	5	29	17	6	6

<sup>1</sup> As a percentage of total financial assets. <sup>2</sup> Simple arithmetic average of ratios of Belgium, France, Germany, Italy, the Netherlands and Spain; data for Germany, Italy, the Netherlands and Spain are for 2004. <sup>3</sup> Data for 1995 in Japan are for end-financial year. <sup>4</sup> Data for Korea and the United Kingdom are for 2004. <sup>5</sup> Data for Switzerland are for 2003. <sup>6</sup> Investments in mutual funds are included in equities.

Sources: National data.

Pension funds in Belgium, Germany, the United Kingdom and the United States have continued to increase their exposure to mutual funds. In Belgium, this development largely reflects tax advantages associated with investments in mutual funds and the fact that pension funds are usually very small in terms of membership and assets, and therefore find it more efficient to invest through investment trusts. In the United States, the growing popularity of mutual funds among pension funds reflects in large part the shift in pension coverage from DB to DC plans (see Section 3.2).

Analysis based on balance sheet data has its limits, because shifts in risk exposure through the use of off-balance sheet instruments (eg interest rate swaps) or within the bond portfolio (eg towards longer-term bonds) may not be visible. Moreover, allocations to alternative investments are typically lumped together with “other investments”. For such reasons, any assessment should be supplemented by evidence drawn from additional sources such as market intelligence. This is the approach adopted in this report.

Table 3  
Asset allocation of pension funds<sup>1</sup>

	Bonds		Equities		Mutual funds		Deposits and loans		Other	
	1995	2005	1995	2005	1995	2005	1995	2005	1995	2005
Australia	17	13	44	56	na	na	10	11	29	20
Canada	46	36	48	55	na	na	4	3	2	6
Euro area <sup>2</sup>	42	34	9	15	29	56	26	20	15	16
Belgium	28	3	19	11	38	78	6	4	10	6
France	na	5	na	18	na	na	na	9	na	na
Germany	24	16	1	2	20	33	52	46	3	3
Italy	na	59	na	32	na	na	na	10	na	na
Netherlands	27	39	26	49	0	0	38	6	8	6
Spain	63	46	4	22	na	na	21	21	12	12
Japan <sup>3</sup>	46	30	38	59	0	1	12	8	3	2
Korea <sup>4</sup>	18	80	8	7	10	2	62	10	3	2
Mexico	na	97	na	1	na	na	na	0	na	2
Singapore	na	92	na	6	na	2	na	0	na	0
Sweden	87	30	9	42	na	na	4	3	0	24
Switzerland <sup>5</sup>	na	35	na	22.7	na	na	na	19	na	23
United Kingdom <sup>4</sup>	15	21	69	42	10	28	4	3	2	7
United States	26	19	47	47	9	20	6	5	12	8
Average	35	25	46	48	6	12	11	7	8	7

<sup>1</sup> As a percentage of total financial assets. <sup>2</sup> Simple arithmetic average of ratios of Belgium, France, Germany, Italy, the Netherlands and Spain; data for Germany, Italy, the Netherlands and Spain are for 2004. <sup>3</sup> Data for 1995 in Japan are for end-financial year. <sup>4</sup> Data for Korea and the United Kingdom are for 2004. <sup>5</sup> Data for Switzerland are for 2003.

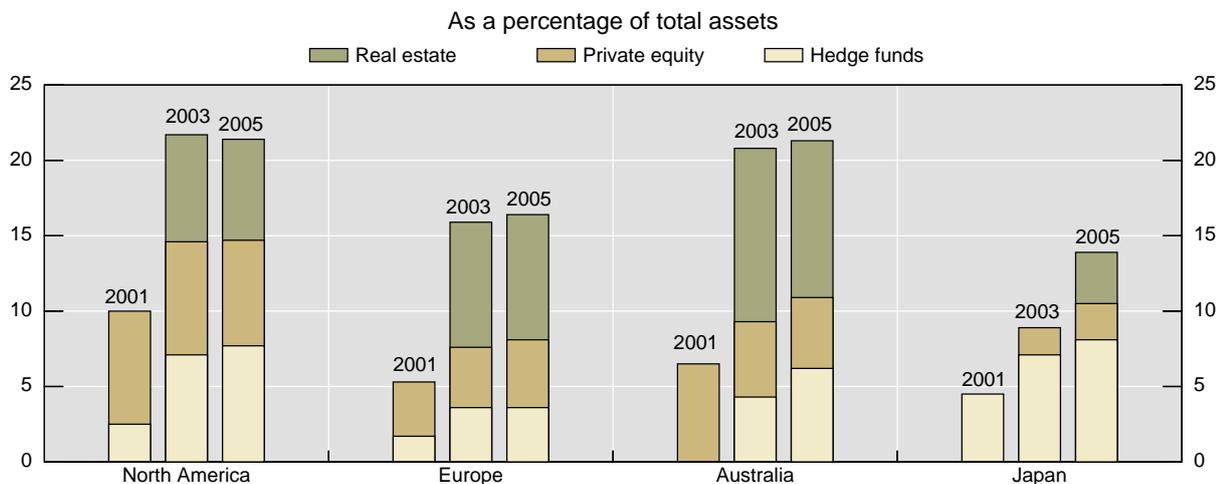
Sources: National data.

The increasing exposure of institutional investors to *alternative investments* (hedge funds, commodities, real estate, infrastructure, emerging market assets, private equity) has boosted other investment companies (Graph 1). They invest in these alternative assets for several reasons, such as to enhance returns, to obtain a better diversification of their investment portfolios and/or to hedge against inflation risk. Investors see alternative investments as a way of lowering the overall risk of their portfolios without giving up the opportunity for substantial returns. Consequently, the importance of alternative investment asset classes in their portfolios could rise further.

Market surveys confirm that it is common for large institutional investors to allocate funds to alternative assets. Russell Investment Group (2006) surveys a total of 327 large institutional investors in Australia, Europe, Japan and North America, and finds that, on average, the aggregate strategic allocations to private equity, hedge funds and real estate range from 14% of total assets in Japan to 21% in Australia and North America in 2005 (Graph 1). In North America, the allocations to all three asset classes are roughly equal, whereas in Australia, real estate commitments dominate, of which about half are in direct ownership. Since 2001, hedge funds have become increasingly popular among large institutional

investors across all regions and are forecast to account for over 10% of total assets in Japan in 2007.

**Graph 1**  
**Mean strategic allocations of large institutional investors to alternative investments**



Note: 2003 (2005 in Japan) is the first year that information on strategic allocations to real estate was collected. Hedge fund allocations in Australia and private equity allocations from Japan in 2003 were drawn from a small number of respondents.

Source: Russell Investment Group (2006).

Detailed analysis of the investment patterns of investment companies such as *mutual funds* is partly hindered by lack of data. However, according to the Investment Company Institute, net assets under management by mutual funds have grown rapidly since 1996 to reach USD 16 trillion in 2005, making them important institutional investors in their own right (Table 1). By type of funds, equity mutual funds are by far the most popular, accounting for 47% of total net assets in 2005, with bond and money market funds each representing around another 20% (see Annex C).

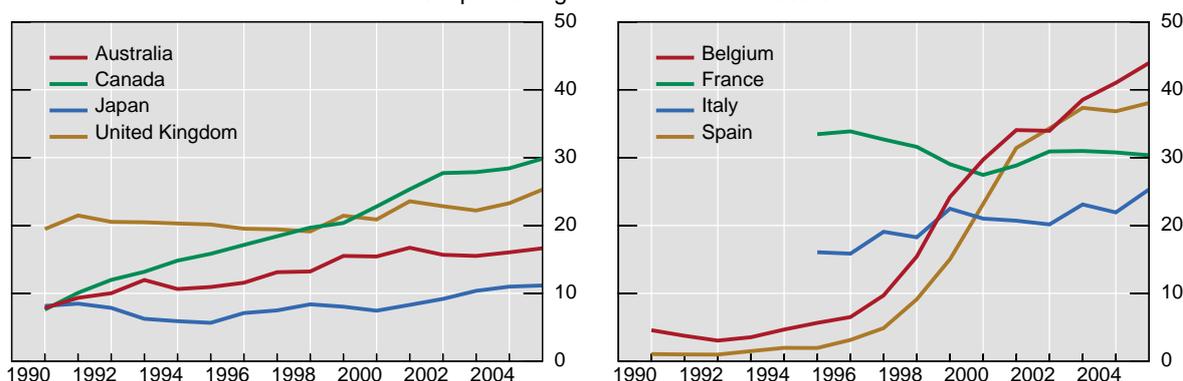
Apart from diversifying their portfolios into a wider range of asset classes, institutional investors have also increased their exposure to a broader selection of *international assets*. Again, the lack of comparable official data on institutional investors' international securities holdings forms an obstacle to any systematic study of this issue.<sup>9</sup> But available data suggest that international diversification in Australia, Japan and the United Kingdom has been a gradual process (Graph 2).<sup>10</sup> In Belgium and Spain, there was a sharp increase after the euro was launched, suggesting that currency risk may be an important component of institutional investors' home bias. By comparing the bilateral bond holdings of euro area members with those of other countries, Lane (2005) finds that part of the "euro area bias" in bond holdings can be attributed to the elimination of exchange rate volatility among member countries. He also finds strong evidence that the effects related to legislation in the European Union, such as common tax treatment and legal origin, help to explain the integration of euro area bond markets.

<sup>9</sup> For example, there are no data on foreign asset holdings in the US flow-of-funds accounts, and only aggregate foreign securities data in Japan.

<sup>10</sup> International diversification in the United Kingdom began much earlier than in most other countries. It started in the mid-1960s and reached its current level of over 20% in the mid-1980s.

**Graph 2**  
**Holdings of foreign securities by insurance companies and pension funds**

As a percentage of total financial assets



Source: National data.

The growth in international diversification in recent years is also apparent from country level data. Between 2001 and 2004, the total stock of cross-border portfolio investment originating from the Working Group economies doubled to USD 27 trillion (Annex D). During that period, all economies increased their portfolio investments abroad, in terms of both US dollars and as a proportion of GDP. This process of international diversification benefits both advanced and emerging market economies, with portfolio investment in those emerging markets with better credit risk ratings almost doubling to USD 1.4 trillion in 2004.

## 2.2 Factors affecting institutional investors' asset allocation

For long-term institutional investors, *liability structures* are key factors influencing asset allocation decisions. Life insurance companies with mainly guaranteed-return contracts would be likely to hold a large share of long-term fixed income instruments that match liability cash flows. By contrast, companies with a majority of unit-linked contracts would be expected to hold more equities to enhance returns. For individual DC pension funds, asset allocation decisions are determined, to some extent, by members' preferences. DB pension schemes, in principle, may prefer more fixed income instruments if liability management is a primary concern.<sup>11</sup> However, liability management is not the only factor influencing asset allocations. DB plan liabilities are contingent on unknown factors such as future growth in salaries and longevity. Furthermore, DB plan liabilities may be formally indexed to average changes in consumer prices or wages. These factors may encourage these funds to increase their equity allocations, which may provide a better hedge in this respect.

*Government regulations* can affect institutional investors' asset allocation directly and indirectly. In some countries, life insurance companies are required by law to match closely the duration of assets and liabilities. Their large bond holdings can also arise from the fact that regulatory capital requirements impose a greater charge on equities. In Mexico, the predominance of bonds in pension funds' portfolios was mainly a consequence of the regulation which required pension funds, when they were initially established in 1997, to invest in a special type of inflation-indexed government bond.<sup>12</sup> All these investment limits were originally introduced to help maintain the soundness of the financial system and reduce

<sup>11</sup> In DC plans, the asset allocation decision is often constrained by the choice of investments provided by the plan sponsor; investors often have limited access to alternative investment assets.

<sup>12</sup> As inflation has declined and local markets have developed, this regulation has since been relaxed and now they can invest (up to a limit) in a wider choice of assets, including equities and high-grade international securities.

the risks to the household sector. However, as financial regulators around the world move towards a more risk-based prudential regime, more investment restrictions are being lifted, resulting in more diversified institutional portfolios across the world. In this regard, the abolition of the so-called “5-3-3-2 rule” in Japan in 1997 allowed pension funds to increase their equity holdings.<sup>13</sup> The government of Canada recently removed a foreign property restriction that had placed a 30% ceiling (based on the book value of assets) on pension funds’ holdings of foreign assets.

Institutional investors’ asset allocation decisions are also responsive to *financial and macroeconomic trends*. For example, in Japan the collapse of asset prices and the prolonged stagnation of the economy in the 1990s put severe pressure on profit margins and hence on the credit ratings of insurance companies. This in turn drove Japanese insurance companies to reduce investment risks by holding more government bonds.

A *limited supply* of various types of assets can also influence the investment decisions of institutional investors. The launch of the single currency has stimulated the supply of euro-denominated bonds, which in turn has allowed institutional investors to acquire more fixed income products.<sup>14</sup> In Korea, the rapid increase in bond holdings in life insurance companies’ portfolios was made possible by the strong rise in the supply of government bonds after the 1997/98 Asian financial crisis. Since then, most emerging market economies have adopted programmes to promote domestic bond markets and to improve domestic financial infrastructure.<sup>15</sup> Not only do these reforms benefit domestic investors, but international investors have also become increasingly interested in acquiring emerging market assets to achieve better diversification.

### **3. Regulatory policy and the investment behaviour of institutional investors**

A number of regulatory and accounting initiatives have been recently introduced or are currently being discussed in many countries, which aim to strengthen the solvency and risk management practices of key institutional investors.<sup>16</sup> As described in Box B, regulatory policy initiatives share common features that, in aggregate, may strongly influence the behaviour of institutional investors globally. These include: a shift towards fair value accounting of pension scheme assets and liabilities; the adoption of risk-based solvency requirements for insurance companies; and a move to greater transparency in company accounts about pension commitments and funding positions. As a consequence, these reforms appear to have set in motion, or reinforced, a reallocation of risk within the financial system, or intensified processes that were already under way in the institutional investor

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<sup>13</sup> The 5-3-3-2 rule required Japanese corporate pension funds to comply with the following investment limits: 50% or above on secure assets (eg central and municipal government bonds); 30% or less on domestic stocks; 30% or less on foreign currency denominated assets; and 20% or less on real estate.

<sup>14</sup> For example, Belgian insurance companies are required by law to invest only in assets denominated in the currency of the contracts they are covering, which effectively imposes a “euro-denominated assets only” restriction.

<sup>15</sup> See Chan, Santaella and Suh (2006) for a review of recent financial market developments in Asia and Latin America.

<sup>16</sup> In recent years, most countries in Europe and North America, but also Australia, have moved to adopt the International Financial Reporting Standards (IFRS) of the International Accounting Standards Board (IASB). This agreement to work together towards one set of high-quality international reporting standards is also a reflection of a general agreement to move towards fair value accounting, which the IASB has also recently endorsed. The IASB has put pension accounting reform on its active projects list.

industry, resulting from factors such as the ageing of the population and increased longevity. In particular, in several countries changes in regulatory policies have reinforced the shift from DB to DC pension schemes, where investment, longevity and other risks are transferred to the household sector. At the same time, while some DB pension funds may have decreased their exposure to equities and increased their holdings of bonds or interest rate swaps, in part encouraged by new regulations, others may have focused on increasing the duration of their assets to better match their liabilities.<sup>17</sup>

The theoretical rationale for DB pension funds to shift their equity allocations into bonds has been extensively documented in previous work, and will not be discussed here.<sup>18</sup> Instead, this section focuses on the experience of the United Kingdom, where changes in the accounting and regulatory regimes governing DB pension funds have been implemented ahead of most other countries, and evaluates the effects on the investment strategies of UK DB pension funds. By comparing the effects in the United Kingdom with other countries' experiences, this section examines whether the UK experience should be viewed as a country-specific development or a leading example with broader implications. Furthermore, as pension sponsors in some countries have accelerated the closure of their existing DB pension funds and started offering DC pensions to employees, the asset allocation and risk management implications of this shift are also discussed. Finally, regulatory policy changes in the insurance sector in the European Union are also examined to assess whether these changes may introduce incentives for insurance companies similar to those presently affecting DB pension funds.

### **3.1 Regulatory and accounting changes affecting pension funds**

#### **3.1.1 The case of the United Kingdom<sup>19</sup>**

The asset allocation and liability management of UK pension funds, most of which were originally DB schemes, have been influenced in recent years by major regulatory policy changes. One key motivation for these reforms to the regulatory framework was the desire to address the underfunding of many DB pension schemes that became apparent following the sharp declines in equity prices in 2000-02. The accounting reforms were designed to address concerns with the previous pensions accounting standard (SSAP 24) and also reflected a worldwide trend towards fair value accounting in financial systems.

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<sup>17</sup> Asset managers have been facing a low-yield environment in recent years, whereby expected returns on publicly traded equities and bonds have been much lower than they were during the previous decade. This has also shaped investment policies, and prompted a shift into alternative assets and more active investment strategies (or less passive adherence to asset class benchmarks).

<sup>18</sup> See for instance, Visco (2005), several chapters of the IMF Global Financial Stability Report (2005a, b) or Boeri et al (2006). By investing in riskier assets that offer higher expected returns, pension funds seek to improve their funding positions, reduce the plan sponsor's long-run expected contributions to the fund, and protect against longevity, inflation and wage risk. However, this has the effect of exposing the sponsor's balance sheet to greater risk and volatility, which becomes apparent to the public under the new financial reporting framework. Pension funds can reduce their exposure to such volatility and to interest rate and inflation risks by investing in fixed income assets. In theory, full matching of interest rate and inflation risks would leave the value of the pension fund neutral to changes in interest rates or inflation. But given that many funds currently have deficits, full matching is costly because it effectively "locks in" the need for higher contributions, especially during a period when interest rates have been close to historical lows.

<sup>19</sup> For a more detailed assessment of recent regulatory and accounting changes in the United Kingdom, see Brierley (2006) and Bank of England (2006).

## Box B

### Summary of recent and prospective regulatory and accounting changes

**Australia.** From 1 January 2006 new accounting standards consistent with IAS 19, the International Financial Reporting Standards (IFRS) for employee pension benefits, apply to the reporting of company DB pension schemes. The standards imply recognising the net value (based on mark to market valuation) of the pension scheme on the company's balance sheet and changes therein in the profit and loss statement.

**Canada.** In January, 2006, the Canadian Accounting Standards Board (AcSB) announced plans to converge Canadian GAAP with IFRS for public companies over a five-year period. Insurance companies and pension funds are likely to be most affected. The IASB is currently in the process of considering major changes to reporting standards of insurance companies and recently announced its intention to begin a review of pensions accounting standards. In the interim, however, the recent changes to US GAAP relating to pension accounting (ie FAS 158) have prompted the AcSB to announce a project to converge with US GAAP in this regard. By the end of 2007, a new standard that, among other things, brings pension assets and liabilities onto the balance sheet is expected.

**Denmark.** In October 2001, the Danish Financial Supervisory Authority announced that, from January 2003, Danish pension funds were required to report the value of assets and liabilities on a mark to market basis.

**European Union.** From 1 January 2005, all companies listed on stock exchanges in the European Union have been required to report in accordance with International Financial Reporting Standards. For the insurance sector an intermediary regime, called IFRS 4, was adopted, providing for partial mark to market accounting. The Solvency II project is intended to derive new valuation rules for technical reserves and risk-based capital requirements for insurance companies. The adoption of Solvency II is currently expected in 2007, with implementation due in 2009.

**Hong Kong, SAR.** New accounting standards, derived from IAS39, have been adopted in Hong Kong from 1 January 2005. Under the new rules, financial instruments held by institutions should in principle be recorded at mark to market values.

**Netherlands.** On 1 January 2007, a new regulatory framework for DB pension funds, the FTK, will come into force which requires both assets and liabilities to be measured at fair value, and introduces risk-based solvency regulations. These regulations require pension funds to remain fully funded under an adverse market scenario with a 2.5% probability over a one-year time horizon.

**Singapore.** The Monetary Authority of Singapore introduced a risk-based capital (RBC) framework for insurers in August 2004. With effect from 2005, insurers have to comply with accounting standards FRS 39 on recognition and measurement of financial instruments and FRS 104 on insurance contracts, both of which are in line with international accounting standards.

**Sweden.** In 2006, the prudential supervisor introduced a traffic-light model which aims to identify insurance companies and occupational pension funds with exposures to financial risk that are excessive in relation to their capital buffers. As part of the model, all institutions under supervision must report their assets and liabilities at fair value.

**Switzerland.** On 1 January 2006, the Swiss Solvency Test (SST) came into force as part of a new insurance supervision act. Under the SST, insurance companies must report on a mark to market basis, and comply with minimum capital requirements related to market, credit and insurance risk in the balance sheet.

**United Kingdom.** From 1 January 2005, Financial Reporting Standard 17 (FRS 17) has become mandatory. Under this standard, listed companies are required to measure both DB pension scheme assets and liabilities at fair value, and to recognise pension scheme deficits or surpluses, and changes therein, in the company accounts. In December 2005, new funding regulations for DB pension schemes were introduced, requiring company sponsors to address underfunded pension plans and eliminate deficits within 10 years. In addition, in April 2005 a Pension Protection Fund (PPF) was launched, providing compensation for DB scheme members if their employer becomes insolvent and the pension scheme is underfunded.

**United States.** In August 2006, the Pension Protection Act of 2006 was enacted, closing loopholes that previously allowed some underfunded DB plans to avoid making pension contributions, tightening contribution formulas generally, and restricting the ability of companies with significantly underfunded plans to expand benefits without paying for them upfront. In September 2006, the Financial Accounting Standards Board (FASB) issued Statement No 158 to improve disclosure of DB pension assets and obligations in the balance sheets of corporate sponsors. DB sponsors will now be required to recognise an asset or a liability for their DB plans' over- or underfunded position, to measure plan assets at fair market value and plan liabilities as the projected benefit obligation at fiscal year-end, and to record in "comprehensive income" (but not in "net operating income") changes in the funding status of their DB plans during the year.

The key accounting change has been the introduction of standard FRS 17 "Retirement Benefits" on 1 January 2005. This standard requires pension scheme assets to be measured at market value, and pension scheme liabilities to be discounted using the rate of return on a AA-rated corporate bond of average equivalent term. Among other things, FRS 17 also requires pension surpluses and deficits to be fully recognised on the sponsor's balance sheet, and actuarial gains and losses to be recognised immediately and in full, thereby preventing any smoothing of funding positions. Some market participants believe that these accounting changes have provided incentives for DB pension funds to improve risk management practices and to reduce their duration gaps.

The main regulatory change was the adoption of the Pensions Act in November 2004, which led to the establishment of the new Pensions Regulator and Pension Protection Fund (PPF) in April 2005.<sup>20</sup> The Pensions Act introduced new funding regulations whereby pension fund trustees were given up to 18 months from December 2005 to complete their valuation of funds on a fair value accounting basis, using a discount rate derived from long-maturity index-linked bonds (more conservative than the discount rate required by the accounting rules). In addition to completing these valuations, the new rules required corporate sponsors to address underfunding problems, with the aim of eliminating deficits within 10 years. These changes are likely to have a profound effect on many DB pension funds' asset-liability management (ALM) strategies, helping to ensure that asset allocation becomes more systematically linked to the structure of liabilities.

The regulatory policy changes are likely in particular to have increased company sponsors' concerns about pension fund shortfalls, because these have to be fully recognised and eliminated from their balance sheets over a fixed period of time (and are now linked to PPF levies). In addition, according to market participants, an increasing number of DB pension managers are starting to adopt "liability-driven" investment (LDI) strategies, under which pension funds hold more fixed income assets, especially long-maturity government bonds, and use long-maturity interest rate swaps to match more closely the cash flows of their liabilities.<sup>21</sup> Many LDI strategies involve acquisitions of index-linked products, such as

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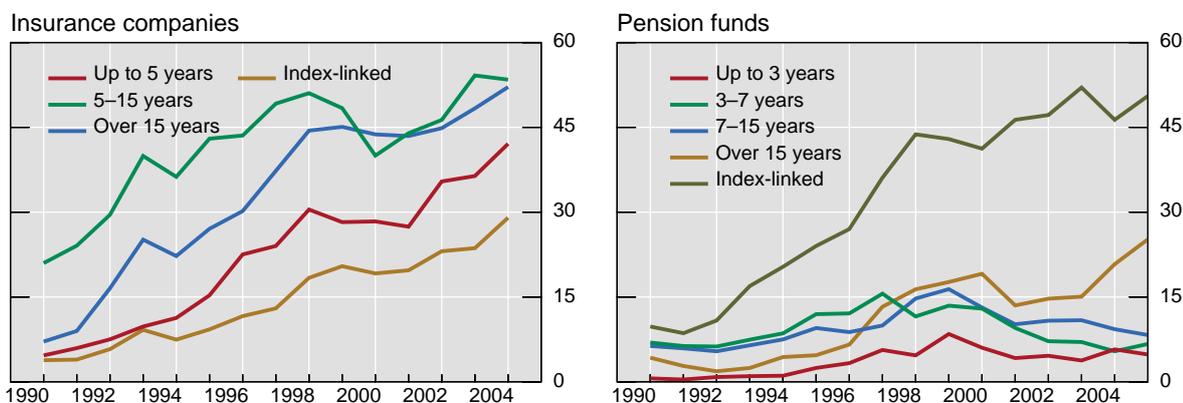
<sup>20</sup> The PPF is a statutory fund established to protect members of DB pension schemes by paying compensation if their employer becomes insolvent and the pension scheme is underfunded. The PPF is financed by charging compulsory levies on pension schemes, with 80% of a fund's levy related to the risk of it not being able to meet its liabilities. Firms with large deficits are required to make larger contributions to the PPF than those with smaller deficits, providing a financial incentive for firms to address funding shortfalls.

<sup>21</sup> LDI is generally defined as a portfolio of assets constructed to match closely a fund's expected liability cash flows and minimise investment risks. In general, an LDI portfolio comprises an underlying physical part and a swaps overlay component (Kemp (2005)). The physical component is chosen to reflect the liabilities. For example, if liabilities are linked to inflation and a stream of fixed payments in the future, index-linked bonds and other fixed interest instruments will be used. The swaps overlay component typically entails giving up one set of future cash flows, usually from the assets in the physical part, in exchange for another set of cash flows through swap contracts. The need to include a swaps component arises largely from the fact that the duration of DB pension liabilities is typically too long to be matched by just using conventional and index-linked bonds. These derivative contracts are therefore used to lengthen the duration of the assets.

inflation-linked government bonds and inflation derivatives, as funds seek to reduce or hedge inflation risks. The use of derivatives in asset-liability matching offers more precise tailoring of the cash flows to match liabilities, although some pension funds are not free to use derivatives because of restrictions in their mandates while others may lack the necessary technical capability. LDI can also involve exposure to riskier assets, such as alternative asset classes, either to diversify the portfolio or to search for better returns.

The UK DB sector is large, with almost 15 million members in nearly 10,000 schemes. Total assets under management in UK pension funds exceed GBP 800 billion (65% of GDP, respectively 60% and 30% of the market capitalisation of domestic bond and equity markets, or roughly the same as total pension assets in the euro area). Traditionally, UK pension funds have been heavily exposed to equities, with a balanced portfolio on average approximating to a 60-40% equity-bond mix. According to market participants, the shift into bonds to date associated with the adoption of LDI strategies by UK pension funds has been relatively modest, with the total equity proportion of those funds that have adopted LDI having fallen by no more than 10 percentage points and the bond proportion having risen by a similar amount. These shifts, however, are regarded by many commentators as just the beginning of a trend which is expected to accelerate. A recent survey carried out by the UK Investment Management Association suggests that the recent shift (by volume) of UK pension funds' assets from equities to bonds continued in 2005. Rising equity prices meant, however, that the proportions by value showed a rise, between 2004 and 2005, in the equity allocation (from 46% to 51%) and a fall in the bond allocation (from 37% to 33%). Also of note is the large increase in holdings of index-linked, long and ultra-long term bonds by DB pension funds attempting to match more closely their liabilities, as observed in Graph 3.

**Graph 3**  
**UK holdings of sterling-denominated British government securities**  
 In billions of pounds sterling



Memo: Total financial assets by end-2004: insurance companies = GBP 1,025 billion; pension funds = GBP 770 billion.

Source: National data.

### 3.1.2 *Developments in other major countries: is the United Kingdom a leading example?*

In *the Netherlands*, a new solvency framework, FTK, will be implemented in January 2007.<sup>22</sup> At the heart of the FTK is the valuation of both assets and liabilities at market value and the adoption of a risk-based solvency test. In the Netherlands, 97% of pension funds are DB schemes, with assets under management at approximately EUR 618 billion or 106% of GDP.

<sup>22</sup> For a detailed assessment of the effect of reforms in the Netherlands, see Van Herpt (2006).

Starting from 2007, these funds will be required to hold a sufficient financial surplus to withstand an adverse market scenario with a 2.5% probability over a one-year time horizon. Funds are allowed to correct any shortfalls in this risk-weighted surplus over a 15-year period provided that the funding ratio does not drop below 105% of liabilities (in which case it must be increased to at least the 105% level within three years). Under the new system, pension funds have in principle three ways to improve their solvency ratios: by raising contributions, reducing unconditional pension benefits or reducing the risks in their balance sheets. Given the fact that interest rate risk is relatively easy to reduce, this might give pension fund managers an incentive to extend the duration of their bond portfolios. Since the announcement of the FTK in October 2004, pension funds have gradually lengthened the modified duration of their euro bond holdings (accounting for 29% of total assets) from roughly five to six years. However, there is no evidence that the duration extension has been accompanied by a shift from equities into fixed income investment at the aggregate level.

A number of explanations have been suggested for the weak response of the investment behaviour of Dutch pension funds to regulatory policy reforms. First, given the healthy financial position of Dutch pension funds and the fact that changes in asset allocation involve significant transaction costs, many funds may not see a need to make large changes to their asset allocation. Second, funds are also generally reluctant to reduce their equity allocation because they believe they need to earn returns above those of bonds in order to be able to offer sufficient and affordable pensions and because equities are seen as a reasonably good hedge of liabilities given the high correlation with wage inflation. Third, the proposed reforms in the Netherlands allow pension funds a relatively long time frame to correct funding shortfalls. Nevertheless, one may argue that it is still too early to assess the full impact of the reforms in the Netherlands as they will only be implemented on a broad scale in 2007.

In *Sweden*, a “traffic-light” model was introduced by the securities regulator in January 2006.<sup>23</sup> The approach is similar to that in the Netherlands, aimed at achieving early identification of companies with excessively high financial risk. The system provides incentives for companies to adapt their investments and risk-taking according to their capital strength. Using the traffic-light model, the Swedish regulator is better equipped to identify at an early stage life insurance companies and occupational pension funds that could encounter problems if equity valuations, real estate prices or interest rates were to change sharply. Fair value of assets and liabilities is used as the starting point for measurement. Interviews with market participants indicate that no large changes or portfolio reallocations have taken place before or after the introduction of the traffic-light system, one reason being that the largest pension funds and life insurance companies are well capitalised. However, some smaller and less well capitalised pension funds had to increase their asset duration. In this sense, the situation in Sweden and the Netherlands differs from that in *Denmark* in 2001, where pension funds made significant portfolio reallocations in favour of euro area bonds to increase the duration of their investment assets within three months of the announced changes.

In the *United States*, the Congress, the Administration and the Financial Accounting Standards Board (FASB) have had on their respective agendas to substantially change how DB pension plans are regulated and accounted for by sponsoring firms, and recently some action has been taken.<sup>24</sup> In August 2006, the Pension Protection Act (PPA) was enacted, putting into place new rules governing the funding and administration of private DB plans. Among other provisions, the PPA closed loopholes that previously allowed some

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<sup>23</sup> The traffic-light system is a model used to identify solvency issues in insurance companies and occupational pension funds given certain changes in financial or non-financial variables. As with a traffic-light, red, yellow or green colours mean different warning levels (see Finansinspektionen (2005)).

<sup>24</sup> See Palumbo, Simpson and Zanjani (2006).

underfunded DB plans to avoid making pension contributions, and it generally tightened mandatory contribution formulas to try to improve plan funding. In addition, under the PPA, significantly underfunded plans are restricted from offering new benefits without paying for them upfront, and terminated (underfunded) pension plans and certain ongoing plans with substantial funding gaps will be required to pay extra premiums to the Pension Benefit Guaranty Corporation.<sup>25</sup> In September 2006, the FASB issued Statement No 158 to improve disclosure of pension assets and obligations in the balance sheets of sponsors' reports to the Securities and Exchange Commission (SEC).<sup>26</sup> Among the key new provisions in Statement No 158, for fiscal years ending after December 2006, DB sponsors are required to: a) recognise in the balance sheet an asset for a plan's overfunded status or a liability for a plan's underfunded status; b) measure a plan's assets at fair market value and its liabilities as projected benefit obligations as of the end of the company's fiscal year; and, c) recognise changes in the funded status of a DB plan in the year in which those changes occur - such changes will need to be reported in the company's "comprehensive" income, but will not be accounted for in net income. In a second phase of its study on the accounting for post-retirement benefits, the FASB has stated its intention to review the accounting methods used by DB sponsors to measure net pension cost as it pertains to net income. However, the FASB has not indicated what accounting rules it might consider best for representing the financial costs of operating a DB pension plan in companies' income statements, and new guidelines along this dimension are likely to be some years away. Of the two areas of reform - regulatory and accounting - changes in accounting rules are typically considered by observers to be more important in terms of their likelihood of materially changing how DB pension assets are invested. In particular, current US accounting rules for income reporting have encouraged sponsoring firms to invest pension assets in corporate equity and alternative assets, and changes in these rules could contribute to a shift into bonds.

In sum, the specific set of regulatory policies reviewed may lead corporations with DB pension plans to reduce balance sheet volatility by managing pension fund assets more conservatively. That said, the effects on asset allocation may vary. For example, for countries with a traditionally large DB pension reliance (eg Canada, the Netherlands, the United Kingdom and the United States), the potential for risk reallocation appears more important than in countries where DC pensions predominate. Similarly, the extent to which portfolio reallocations could take place depends very much on the aggregate funding ratios, the initial asset allocations of pension funds, and the scope and extent of regulatory policy changes. In this context, developments in the United Kingdom seem mainly to reflect factors peculiar to the UK DB pension sector and the precise regulatory and accounting reforms adopted in the United Kingdom, rather than necessarily a leading example of any more general shift by institutional investors from equities to fixed income assets.

Country assessments as well as interviews with market participants confirmed that there is no uniform or widespread trend involving substantial increases in pension funds' bond exposures at the expense of equities as a result or in anticipation of regulatory policy reforms. In fact, in certain countries there has been a tendency for asset allocations to become slightly more oriented towards equities rather than bonds. In most countries, market participants did not report any material changes in asset allocation in recent years, either related or unrelated to regulatory and accounting reforms. And *emerging market economies*

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<sup>25</sup> For a description, see "The Pension Protection Act (HR 4)," House Committee on Education and the Workforce, [www.edworkforce.house.gov/issues/109th/workforce/pension/pensionbillsum72806.htm](http://www.edworkforce.house.gov/issues/109th/workforce/pension/pensionbillsum72806.htm).

<sup>26</sup> See "Summary of Statement No 158: Employers' accounting for defined benefit pension and other postretirement plans – an amendment to FASB Statements No 87, 88, 106 and 132(R)," Financial Accounting Standards Board, [www.fasb.org/st/summary/stsum158.shtml](http://www.fasb.org/st/summary/stsum158.shtml).

are unlikely to experience a significant effect from these particular reforms given the relatively small size of institutional investors and private DB pension funds.

### **3.2 From DB to DC pension plans: implications for asset allocation and risk management<sup>27</sup>**

Traditionally, occupational pension systems were designed around DB pension plans; DC plans played a limited role and were typically offered by smaller employers. While in many countries DB plans remain dominant, there has been a gradual shift towards DC pensions, and towards hybrid plans and individual savings plans that are not subject to pension legislation. In some countries, DC plans now account for the majority of invested assets in private sector occupational pension plans. In the six main countries with large, mature occupational pension systems, it is estimated that on average about one third of the combined assets of public and private sector pension plans are in DC plans, though this average masks considerable differences across those countries.

The transition from DB to DC plans in private sector pensions is shifting investment risk from the corporate sector to households. Households are therefore becoming increasingly exposed to financial markets, the pooling of risks across time characteristic of DB plans disappears and thus retirement income may be subject to greater variability than before. This is not only the case in countries with a mature occupational pension system, but also interestingly in emerging markets, where pension reforms (aimed at either setting up private occupational pension schemes or funding pay-as-you-go systems) are adopting a structure predominantly based on that of DC schemes.<sup>28</sup>

A number of explanations have been offered for the shift from DB to DC pension plans. From a long-term perspective, factors such as increased workforce mobility following on from demographic and industrial changes appear to have been important drivers of the shift away from DB pension plans, which has been particularly pronounced in the United States. All else being equal, more mobile workers have less of a preference for DB pensions because traditional benefit formulas are “backloaded”, favouring long-tenured employees, and because DB benefits are not portable from one employer to another. More recently, however, the acceleration in the shift from DB pensions has reportedly also been “employer-driven”, linked to factors such as weak stock market performance, a decline in long-term interest rates, the move towards fair value accounting and improved pension disclosures in company reports, the greater financial risks posed by the increasingly large size of pension funds relative to corporate sponsors and perhaps most fundamentally the risks to DB sponsors associated with rising longevity. In theory, such longevity risk can be hedged through the annuity market. But providers of annuities (typically insurance companies) may be concerned that those demanding annuities are likely to live longer than those who do not demand them. Insurance companies may therefore offer annuities to all potential purchasers on less attractive terms. To the extent that this “adverse selection” makes it more difficult to obtain reasonably priced longevity risk insurance, it helps to accelerate the shift from DB to DC schemes (see King (2004)). Looking ahead, recent and prospective changes in the regulatory and accounting framework also have the potential to play a role in the shift from DB to DC pension funds. To the extent that these changes improve the transparency of pension funding in company reports and, perhaps, raise the reported cost of DB plans, plan sponsors may look for new ways to manage DB pension fund risk and reduce expected pension costs, and some DB plans may be closed as a result.

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<sup>27</sup> For a detailed discussion on the implications of the shift from DB to DC, see Broadbent, Palumbo and Woodman (2006).

<sup>28</sup> See Chan, Santaella and Suh (2006).

The shift towards DC pensions does have some positive aspects, both for employees and for sponsor companies. Among them, it favours labour market mobility because it decreases so-called “accrual risk”, ie the fact that pension benefits in DB plans tend to be backloaded, so that workers who change employers can lose a great portion of expected benefits if these are not transferable from one employer to another. However, such a shift also reallocates investment risk within the financial system from the corporate to the household sector, which may have implications for financial stability. The effects of the transfer of risk to the household sector can be examined along several dimensions: participation rates, contributions, asset allocations and withdrawal patterns. The effect of the shift in terms of asset allocations in Australia, Canada and the United States is examined in Box C, where it is shown, somewhat surprisingly, that on aggregate no material differences appear to exist between the asset allocations of DB and DC plans. One possible implication of this fact would be that the household sector takes a similar view to the corporate sector of the best way to maximise wealth over the long run.

Despite the similarities in aggregate asset allocations, households do not necessarily manage risks in the most appropriate way. In fact, disaggregated data, surveys and research evidence primarily from the United States suggest that there is considerable inertia and myopia regarding retirement decisions, which may ultimately threaten the capacity of DC plans to provide retirement security. For example, research has shown that in some DC plans employees are generally investing too heavily in their own company’s stock. Furthermore, employees tend to remain in a plan’s default option even if it does not provide sufficient portfolio diversification. Finally, employees in DC plans may not have a sufficient number of investment options to create a portfolio suited for their investment objectives, risk tolerance and constraints. Retirement security for some households is threatened by a lack of participation, low contribution rates, suboptimal asset allocation, early withdrawals and a failure or inability to annuitise plan assets at retirement that may reflect well documented behavioural biases and a lack of basic financial literacy. As a result of all of the above, the shift from DB to DC also implies that the pooling of financial risks over time is lost, with the implication that the retirement income of workers may be particularly sensitive to the state of financial markets at the time of retirement. Thus it is important for policymakers to address these issues, consumer protection also being a crucial matter in this regard. The experience of some institutional investors in emerging markets that created mandatory private pension funds some time ago may also be relevant for other countries moving from DB to DC schemes. For instance, after more than two decades of experience with its pension funds, Chile has started to observe that some of the first members who are retiring are doing so with relatively meagre resources. This development has created pressure to enhance the returns of pension funds, which may have some fiscal and social policy implications.

### **3.3 Changes in the insurance sector in Europe<sup>29</sup>**

In most European countries, insurers are the largest institutional investors, and changes in their investment behaviour may have an effect on financial markets. The IASB has been working on the valuation of assets and liabilities with the aim of *harmonising financial accounting rules* and enhancing the transparency and comparability of company accounts. Owing to the complexity of issues affecting insurance business, the IASB has adopted a two-phase approach. In Phase I, IFRS 4 was adopted as an interim standard to take effect from January 2005. This standard involves modest changes in comparison with the overhaul of insurance accounting which is envisaged under Phase II, to be implemented by 2009. The

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<sup>29</sup> For a full review of accounting and normative changes affecting the insurance sector in Europe, see Drudi, Rzepkowski, van Herpt and Weber (2006).

key issue with IFRS 4 is the mismatch between the method used for valuing assets (mark to market in many cases) and liabilities (amortised cost valuation). Only derivatives embedded in insurance contracts, such as life products offering a guarantee of minimum equity returns, have to be recorded at fair value.

Market participants had expected valuation asymmetries to lead to increased volatility in the equity valuations and earnings of insurance companies. Insurers could respond in several ways to an increase in volatility in their financial accounts induced by the new accounting framework. One was to reduce their equity investments in favour of fixed income securities, although in Europe they had already significantly reduced their equity exposures after the stock market decline in 2000-02, and also following improvements in ALM techniques in recent years. Another was to focus more on unit-linked contracts that enable investment risk to be transferred to the policyholder, rather than the traditional guaranteed-return contracts, where the risk is retained by the insurer.<sup>30</sup> So far, the impact of IFRS 4 on the investment behaviour of insurers appears to have been limited, but the use of full fair value in a second phase might have a greater effect, depending upon initial conditions (portfolio allocations, solvency ratios) of individual companies.

In addition to prospective accounting changes, the European Commission is currently revising the *solvency standards* for EU insurers (the so-called “Solvency II” project). Implementation is expected by 2009.<sup>31</sup> Solvency II is expected to propose new valuation rules for technical reserves and the adoption of more risk-based capital requirements to capture mortality, interest rate, credit and catastrophe risks more effectively. The basic principle of the new solvency regime is similar to Basel II for banks, and involves the adoption of a three-pillar approach. As the details of Solvency II are still under discussion, the effect on the capital needs or portfolio allocations of insurers remains uncertain. However, as the rules on the calculation of technical provisions will be consistent with IFRS, this will involve a more market-based approach to reserve valuation. Under these rules, if technical reserves are deemed insufficient, insurers will have to raise new capital or reduce the proportion of higher risk assets in their balance sheets. In addition, a risk-free interest rate is likely to be used as a discount rate to value future liabilities. As insurers typically have negative duration gaps, the use of a market-based discount rate may encourage them to acquire more long-term bonds to better match the durations of assets and liabilities. In the event that insurers are under pressure to reduce their risk profiles, they may also opt to issue more unit-linked products and fewer contracts with guaranteed returns.

All in all, some of the changes due to the introduction of IFRS and the proposed Solvency II might lead insurers in the direction of a reallocation of risk. However, the already large exposure to bonds in European insurers’ portfolios might limit the room for reallocation. In addition, the reallocation may take place within the industry to the extent that well capitalised insurance companies would at least partially meet the demand for bonds arising from poorly capitalised ones. This would reduce the overall effect.

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<sup>30</sup> In Western Europe, according to Swiss Re (2003), the share of unit-linked premiums as a percentage of total life insurance premiums increased from 21% in 1997 to 36% in 2001. In the United States, according to the Insurance Information Institute, assets supporting variable annuities grew from USD 500 billion in 1996 to USD 1.2 trillion in 2005.

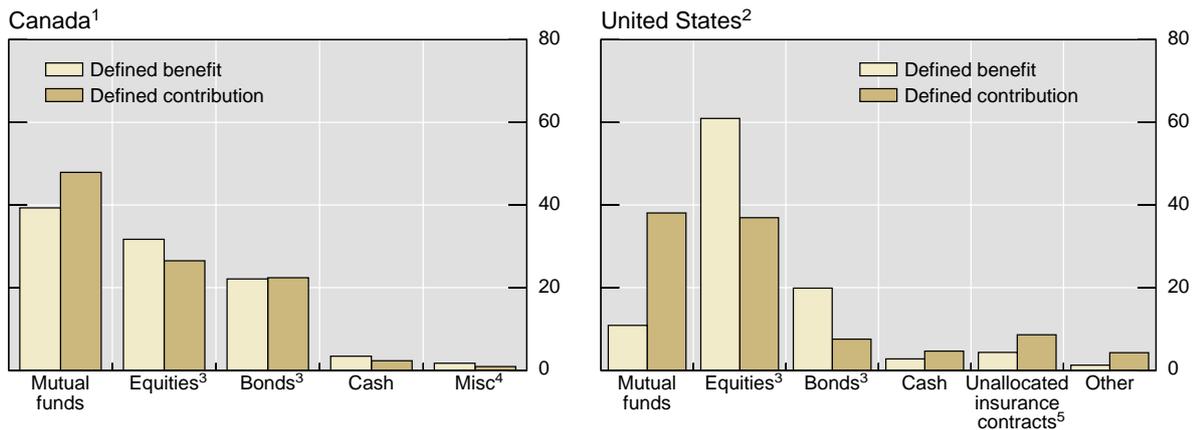
<sup>31</sup> In Canada and the United States, life insurers became subject to risk-based capital (RBC) standards in the early 1990s, as documented in Broadbent, Palumbo, Santaella and Zanjani (2006).

Box C

**Asset allocations of DB and DC pension plans in Australia, Canada and the United States**

The principle means of managing financial risk in a pension fund (DB or DC) is through the determination of its strategic asset allocation. In a DB pension plan it is the plan sponsor who determines the strategic asset allocation; in a DC pension plan it is the employee. Given the many differences in the design, structure and regulation of each type of plan, one might expect them to have different asset allocations. While there is considerable evidence to support this at a disaggregated level, the differences are less apparent in the aggregate figures. In fact, Graph C.1 shows that the majority of assets in both types of plan are invested in equities, bonds and mutual funds, and that, somewhat surprisingly, the asset mix of DC and DB plans is quite similar in Australia, Canada and the United States. In the United States, the principal difference is that DC plans tend to hold a larger share of assets in mutual funds than DB plans, while DB plans tend to have a larger share of assets in direct holdings of securities (equities and fixed income). Holden and Vanderhei (2005) show that corporate equity shares account for about two thirds of assets in US DC plans (ie taking into account direct holdings and the equity share in mutual fund holdings), similar to the share held by DB pension funds (assuming that some percentage of the mutual funds held by DB plans is invested in equities). Relative to DB plans, US DC plans tend to hold a smaller share of bonds and a larger share of cash and the guaranteed insurance contract category (GICs), which includes other “stable value” products offered by insurance companies.

**Graph C.1**  
**Asset allocation of private sector pension plans**  
 As a percentage of total financial assets



<sup>1</sup> In 2004. <sup>2</sup> In 2005. <sup>3</sup> Held directly, as opposed to mutual funds. <sup>4</sup> Including real estate, mortgages and miscellaneous assets. <sup>5</sup> Assets of private pension plans held at life insurance companies (eg guaranteed insurance contracts, variable annuities).

Sources: Federal Reserve Board; Statistics Canada.

Aggregate data for Canadian private sector pension plans exhibit a similar pattern. In Canada, DC plans tend to hold a larger share of mutual funds than DB plans, which have a greater share of assets in direct holdings of equities. Taking into account mutual fund holdings and direct investment in equities, Canadian DC plans hold around 55% of their assets in equities, similar to DB plans (53%). However, unlike US DC plans, direct holdings of fixed income securities are similar for both types of plans (about 22%), as are mutual fund holdings of fixed income securities (10-12%). Sector data also show that the aggregate equity holdings of Canadian DC pension plans are less diversified internationally (15%) than those of DB plans (23%). Comparable sector data are not available for US pension plans, but a survey by Greenwich Associates (2006) found that US DC plans allocated 8% of equities to international stocks, smaller than the 17% by DB plans.

In Australia, the asset allocations are generally quite similar for both types of plans, with the majority of assets held in equities and fixed income securities. DC and DB plans hold about 60% of their assets in equities, with the rest distributed among cash (7%), debt (20%), property (10%) and other assets. In summary, in Australia, Canada and the United States, the aggregate asset allocations of DC funds do not appear to be significantly different from those of DB schemes.

#### 4. Implications for financial asset prices<sup>32</sup>

Given the large size of institutional investors, even small changes in their investment behaviour or small shifts in asset allocations could potentially have a bearing on financial asset prices. This has been the case in some countries. One reason is that the potential demand for long-term bonds from institutional investors may be substantial compared with the outstanding supply of such bonds. Any increase in the “demand-supply” imbalance for long-term bonds has the potential to amplify movements in market prices in the short term if the demand for and the supply of bonds are relatively price-inelastic.

A second factor is that while some institutional investors may use derivatives (eg interest rate or inflation swaps) rather than the underlying fixed income securities to match the cash flows or duration of their liabilities, swap counterparties such as banks will typically hedge their positions in the cash market, which in turn could have some effect on bond prices.

It follows that even if any reallocation into bonds in institutional investors’ portfolios is limited on a global scale, a significant effect on financial asset prices, specifically bond yields, could still result. Adding to the difficulties in assessing the likely size of such an effect is the fact that in most countries the relevant regulatory policy changes are quite recent or have not yet been implemented. Furthermore, prices of financial assets are clearly influenced by many other factors, which makes it difficult to disentangle the effect of institutional investors’ behaviour from other relevant developments.

This section builds on available evidence (estimates of demand-supply imbalances, econometric decomposition of interest rates, and market intelligence gathered through numerous interviews with institutional investors) to evaluate the effect of institutional investors’ asset allocation strategies on asset prices - especially long-term interest rates. *The basic conclusion is that hard evidence of a significant effect on financial market prices, in particular bond yields, is not yet apparent, with some notable exceptions.* Therefore, insofar as the behaviour of long-term interest rates may remain a puzzle (see Box D for possible explanations of the current low level of long-term interest rates), it is unlikely that the behavioural response of institutional investors to recent or prospective regulatory and accounting changes is the main factor explaining the puzzle. Nonetheless, several qualifications to this conclusion are in order. First, there is evidence that in the United States and the euro area special factors have affected real interest rates, and consequently nominal interest rates, as the differentials between nominal and inflation-linked bonds have remained broadly stable in recent years. Second, in the United Kingdom at least, long yields do appear to have declined partly as a consequence of regulatory developments affecting institutional investors. And given that the regulatory policy reforms are at an early stage in most countries other than the United Kingdom, it is possible that the effects may eventually become larger and more global than at present. In addition, despite the lack of hard evidence that changes in institutional investor behaviour have been a main reason for the global decline in long-term interest rates, there are a number of other interesting and relevant issues arising from the response of institutional investors to regulatory policy changes that merit monitoring by central banks. This includes the resulting reallocation of risk and its implications for financial stability. In a way, the effect on financial market prices could be considered as just the “tip of the iceberg”.

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<sup>32</sup> See Brierley, González-Mota, Odonnat, Persson and van Herpt (2006).

## Box D

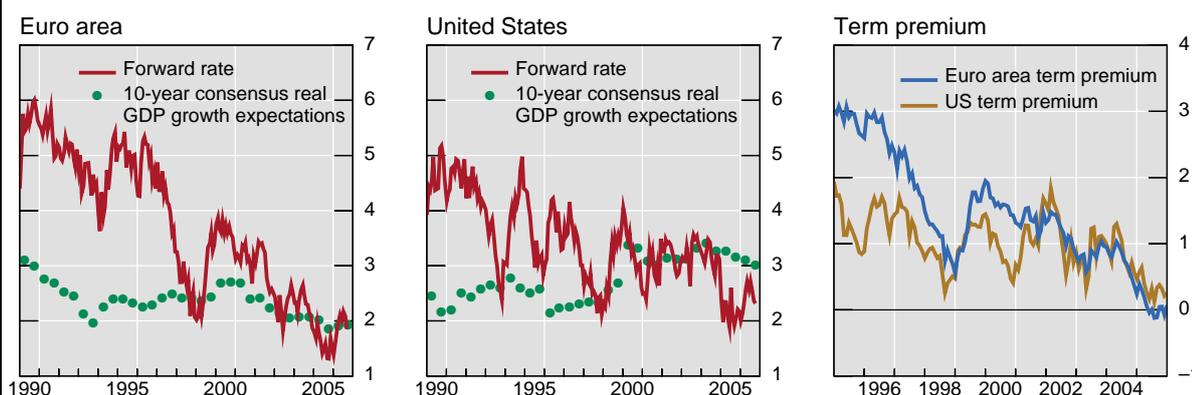
### Possible explanations for the low level of long-term interest rates

Global long-term interest rates have declined over the past 15 years, and have recently reached very low levels. During the 1990s, the decline mainly occurred against the backdrop of a significant reduction in inflation expectations and risk premia - the additional compensation required by investors for holding risky securities. More recently, especially in 2004 and 2005, the extent of the decline has been surprising to many observers, inasmuch as it appears only partially to reflect macroeconomic fundamentals. Several additional explanations have been advanced, of which most relate to a reduction in related risk premia and an abnormal increase of the demand for long-term fixed income securities relative to the available supply.

A useful way to disentangle long-term fundamental factors from shorter-term cyclical factors is to decompose a long-term real rate into a medium-term spot real rate and a corresponding long-term (implied) forward real rate. If risk premia are disregarded, and the time horizon for the implied forward rate is long enough not to be affected by cyclical monetary policy considerations, the long-term implied forward real rate should reflect market participants' expectations about long-term output growth. In principle, any decline in long-term forward real rates may suggest that market participants have revised their long-term growth expectations downwards; however, such increased growth pessimism is not generally supported by the survey data. Graph D.1 shows that, while forward real rates declined in the course of the last three to four years in the euro area and the United States, consensus real growth expectations remained broadly stable over this period.

**Graph D.1**  
Long-term real forward rates, growth expectations and term premium

In per cent



Note: Real forward rate measured by nominal five-year forward bond yield five years ahead less six- to 10-year ahead consensus inflation expectations. Growth expectations measured by six- to 10-year ahead consensus real GDP growth expectations.

Sources: ECB; Federal Reserve Board; Bloomberg; Consensus Economics; Reuters.

The decline of long-term real interest rates in 2004 and 2005, at a time of tightening monetary policy and robust economic growth, therefore remains particularly puzzling. There is, however, evidence from econometric term structure models that long-term rates, in particular long-term forward rates, declined largely because of lower risk premia (Graph D.1, right panel).<sup>1</sup> The decrease of risk premia embedded in long-term real rates could be partly a result of the improved credibility of central banks. It could also reflect a reduction in macroeconomic volatility over time. During the past two decades, the volatility of US real GDP growth and other macroeconomic variables has fallen considerably compared to previous decades. This has been termed by some observers the "Great Moderation".

Other factors may also have contributed to the decline in long-term interest rates and related risk premia. Apart from the impact of changes in pension funds' asset allocation, addressed elsewhere in this report, for the United States the most often quoted factor has been the purchase of Treasury bonds by public entities (mainly foreign central banks) and private investors from Asia and oil-exporting countries, following pronounced increases in their foreign reserves. These capital inflows to the United States could partly reflect the persistent high savings of some East Asian countries, despite the decline in investment after the East Asian crisis. In addition, large current account surpluses in some oil-exporting countries following the rise in oil prices have also contributed to the excess of savings over spending. These flows have sometimes been labelled a global "savings glut" (see Bernanke (2005)).

It has also been argued that long-term demographic trends, notably population ageing, might imply a downward shift in the equilibrium level of the real interest rate, mainly as a result of a structural increase in the capital-to-labour ratio. The higher demand for long-term bonds stemming from institutional investors might in its own right be a consequence of these demographic trends.

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<sup>1</sup> See Kim and Wright (2005) and Werner (2006).

#### 4.1 Effect on long-term interest rates

The response of long yields to regulatory and accounting changes depends critically on three factors. The first is the increase in the demand for bonds (ie the extent of the shift in the demand curve) induced by those changes when compared with the size of the market (the so-called "demand-supply imbalance"). The second is the price elasticity of institutional investors' demand for long-term bonds: demand will tend to be relatively inelastic if the combination of regulatory changes and the funding situation provides strong incentives for pension funds to shift into bonds relatively quickly regardless of movements in the price of bonds. The third is the price elasticity of the supply of government and corporate long-term bonds.<sup>33</sup> Finally, as potential effects on yields need not be confined to domestic markets, spillover effects into other markets are also possible.

Recent studies have provided estimates of *demand-supply imbalances*, as Table 4 indicates. The Visco Report (2005), for example, estimates that the potential demand of pension funds for corporate and government bonds arising from the regulatory policy changes (assuming that 75% of their portfolios are allocated in long-term conventional and index-linked bonds) would exceed the supply of these instruments in both the United Kingdom and the United States. These estimates are based on the working assumption that a large reallocation into bonds will take place from present levels, and they should therefore be regarded as upper bounds for excess demand. The OECD (2006) adds to those findings by incorporating a comparison of the cash flows that can be generated from current investments in outstanding government bonds with estimates of future payment promises made by pension schemes to their plan members. Their results suggest that pension fund demand for high-quality fixed income bonds would generally exceed current supply by a considerable margin, although the estimated potential imbalances vary noticeably across currencies and maturity segments. The excess demand would be greatest in the United States, and in the maturity segment beyond 10 years. If life insurance companies are included in the comparison, the imbalances appear particularly large in Switzerland and the United Kingdom.

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<sup>33</sup> In this regard, some market participants noted that the supply of corporate bonds may be less relevant for ALM than that of higher-quality government bonds, denominated in domestic currency, because governments tend to be much more frequent issuers, issuing into specific maturity segments at regular intervals. Moreover, government bonds are subject to less credit risk than corporate bonds.

Table 4

**Potential demand-supply imbalances of long-term bonds**

Study	Potential demand-supply imbalance	Impact on bond prices
The Visco Report (2005)	As a percentage of outstanding long-term and inflation-indexed bonds in local markets: Italy (15%), Japan (119%), United Kingdom (181%) and United States (309%)	na
IMF GSFR (2005b)	Netherlands (EUR 255 billion)	na
US Treasury - Warshawsky (2006)	United States (USD 300 billion)	Temporary 10-15 basis points
Bank of Spain calculations	As a percentage of outstanding 10-year and above bonds in local markets: Euro area (100%), United Kingdom (300%)	
Boeri et al (2006)	As a percentage of outstanding 10-year and above bonds in local markets: Euro area (102%), Japan (526%), United Kingdom (200%) and United States (597%)	na
OECD (2006)	Largest in Switzerland, followed by United Kingdom, United States, Canada and Sweden. No scarcity in Japan.	na
JP Morgan (2006)	Underfunding as a percentage of local bond markets: Euro area (less than 5%), United Kingdom (close to 35%) and United States (less than 5%)	Yield curve flattening
Goldman Sachs (2006)	United States (USD 290 billion)	Moderate
UBS (2006)	United States (USD 300 billion)	Limited, most noticeable in the over 10-year segment

Note: These studies employ very different methodologies that complicate comparability. Private sector studies usually factor in pension reform and demographics as the shock originating demand-supply imbalances while other studies by public institutions build upon different assumptions of portfolio shifts to estimate potential imbalances.

The extent to which these regulatory and accounting changes affect the *price elasticity of demand* for long-term bonds will be influenced by the urgency with which institutional investors seek to make portfolio changes. The more asset managers think they cannot delay increasing their long-term bond holdings, the more price-inelastic will be their demand and the larger will be the effect on prevailing market yields. An extreme example is the case of Boots' pension scheme in the United Kingdom, which shifted its entire GBP 2.3 billion assets into long-dated bonds by selling equities over 15 months to July 2001 (Ralfe (2002)). Under this kind of investment strategy, investors could acquire more bonds even at less favourable prices. However, apart from in the United Kingdom, evidence on such urgent portfolio changes seems limited.

How the *supply of long-term bonds* responds to increased demand is a third key factor in determining the effect of regulatory changes on long-term bond yields. In the short run, it is difficult to foresee a substantial increase in the supply of long-term bonds. However, in the medium term, there is more scope for governments, international institutions and perhaps other highly rated corporations to issue long-term bonds. The recent issuance of long-term and ultra long-term bonds by several governments and government sponsored institutions

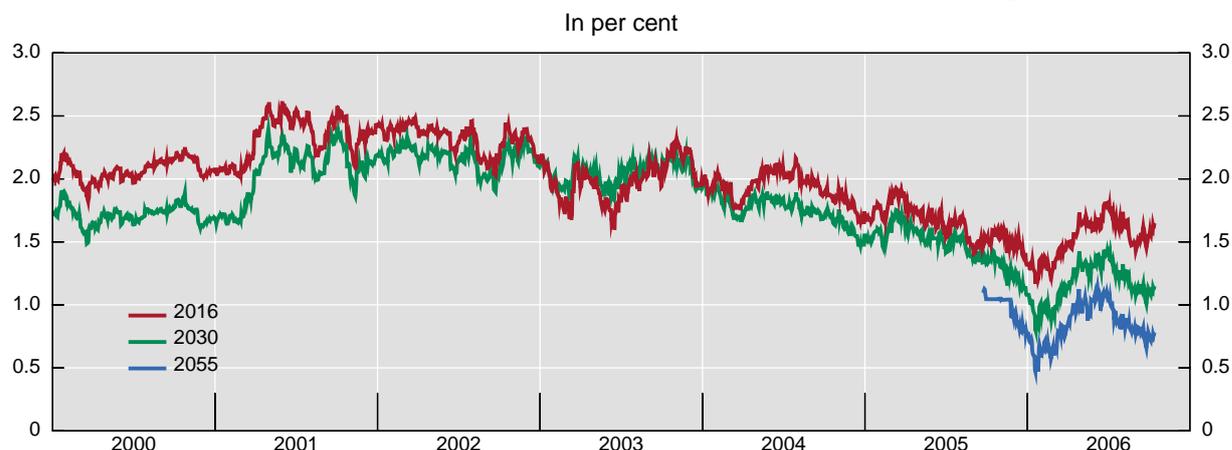
indicates that supply conditions are adjusting.<sup>34</sup> Despite this recent issuance, the outstanding supply of very long-term instruments remains small compared to potential demand. In general the widespread use of swaps, an instrument which is traded in a far more liquid market than that for long-term bonds, helps to ease these demand-supply imbalances.

In addition, the effects of greater demand for long-term bonds in one market have the potential to cause *spillover effects across countries*, as many markets tend to trade a spread product to a major market. For instance, the demand for duration by Danish pension companies from mid-September 2001 to early November 2001 as a result of changes in the tax regime in favour of bond holdings and the introduction of mark to market accounting is considered to have contributed to the tightening of the spread between Danish and euro area 10-year government bond yields, but also to some of the decline in euro area long-term interest rates (swaps and bond yields) in this period.

#### *Evidence from the United Kingdom*

Many UK market participants believe that recent imbalances between the demand for and supply of very long-dated conventional and index-linked government bonds have had significant consequences in the UK long-term bond market. Given the large DB pension sector in the United Kingdom and the limited supply of long-term conventional and index-linked government bonds, only a modest proportion of pension fund assets need to be switched into long-term government bonds for this to be likely to have an effect on bond yields. Indexed yields on 10-year government bonds fell to around 1% by January 2006, after averaging just over 2% from 2001 to late 2003. Although this fall partly mirrored a similar decline in corresponding yields in both the euro area and the United States over that period, it was greater in magnitude in the United Kingdom and associated with a significantly more inverted yield curve, especially at maturities much greater than 10 years. For example, yields on 30-year and 50-year index-linked gilts fell to 0.9% and 0.7% respectively in early 2006 (see Graph 4).

**Graph 4**  
Inflation-linked bond yields at various maturities in the United Kingdom



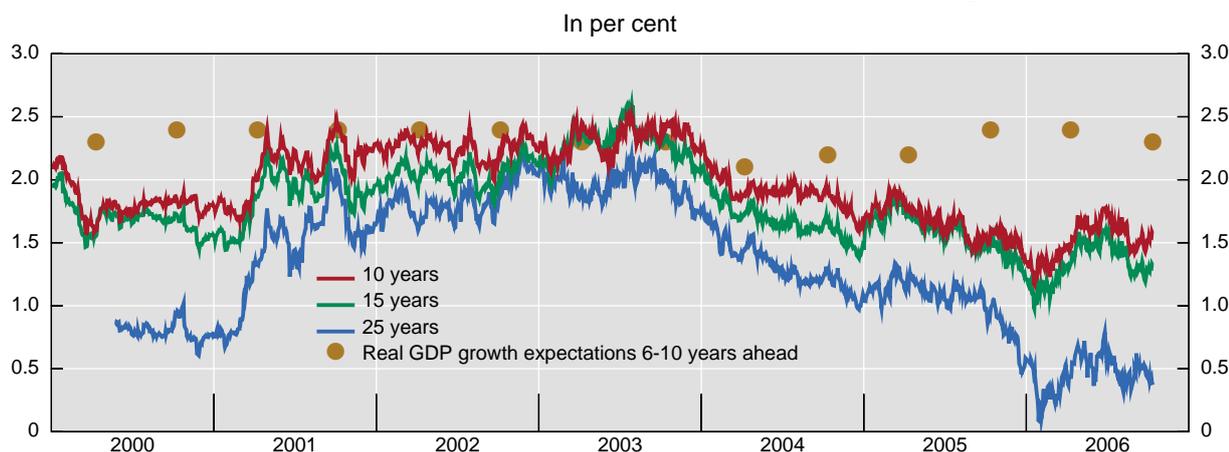
Source: Reuters.

<sup>34</sup> Recent examples include the 50-year bonds issued by the French and UK governments in 2005-06; the 40-year bonds issued by an agency sponsored by the Japanese government in December 2005; the 30-year German government bonds issued in 2005 and 2006; the Dutch Treasury agency bonds issued in April 2005; and the reintroduction of the 30-year US Treasury bonds in early 2006. All of these were well received by market participants. Even emerging markets have issued very long-term bonds: the Mexican government has recently issued a 30-year bond for the first time in its history.

As is also evident from Graph 4, the most recent decline in UK inflation-linked bond yields started in mid-2004. The subsequent adoption of the regulatory policy changes affecting UK DB pension funds has, as noted earlier, motivated a switch to LDI strategies by some UK funds, with the resulting increased demand for inflation-linked bonds contributing to the decline in real bond yields since mid-2004. Graph 5 shows that forward real UK rates have declined to very low levels in the past couple of years, a period during which market participants were expecting economic growth in the United Kingdom to remain stable.

Global bond yields have risen somewhat from their low point in mid-February 2006, with this rise roughly equally split between expected future real rates and inflation expectations. The latter may be associated with the sharp increases in the prices of oil and other commodities over the past year. As a very open economy, the United Kingdom has not been immune from this development. But UK real yields remain significantly lower than in the euro area and the United States at very long maturities, and have fallen again since June to renewed very low levels, especially at those long maturities (Graph 4). All this suggests that the earlier adoption of a market value-based accounting approach to UK pension fund valuation and the introduction of a new regulatory regime for UK DB pension schemes have indeed significantly affected market prices and dynamics in the long-term UK government bond market. This interpretation is also supported by the views of market participants.

**Graph 5**  
**Forward real rates and GDP survey results in the United Kingdom**



Sources: Bank of England; Consensus Economics.

### *Evidence from Canada*

In Canada, there is considerable anecdotal and survey evidence of a growing interest in LDI strategies, an increase in the average duration of DB pension fund portfolios and a shift into inflation-linked bonds that better match the liabilities of inflation-indexed DB plans.<sup>35</sup> Although there is no direct evidence that nominal yields have been affected, pension sector demand for inflation-linked long-term assets has been particularly strong relative to supply, and may have created distortions that influenced yields on real return bonds (RRBs). In a report examining the usefulness of the break-even inflation rate (BEIR) as a measure of inflation expectations, it was noted that a large increase in the BEIR (the difference in yield on a 30-year nominal and RRB) in the second half of 2004 may have reflected market distortions rather than increasing inflation expectations or heightened inflation uncertainty.<sup>36</sup> Strong demand for long-term inflation-linked debt relative to its fixed short-run supply was noted as a

<sup>35</sup> See, for example, Tuer and Woodman (2005).

<sup>36</sup> See Reid et al (2004).

potential source of market distortions over this period. Over the past several years, many DB pension funds have increased their allocations to RRBs to improve portfolio diversification and asset-liability matching.

#### *Evidence from the United States and Europe*

The analysis conducted by the Working Group concludes that the effect of changes in accounting and pension regulations on long-term interest rates in the United States would seem to be quite limited. An estimate from the US Department of Treasury puts this potential effect in the neighbourhood of 10-15 basis points for the 30-year bond yield, albeit on just a temporary basis.<sup>37</sup> With regard to the euro area, the review conducted by the Working Group leads to the conclusion that there is no compelling evidence that the level of long-term interest rates has been abnormally low. Moreover, in continental Europe, where regulatory reforms, especially in the largest markets, are still to be implemented, the demand for bonds is likely to be lower compared to the existing supply, because the size of the industry is relatively small compared to the euro bond market. Major regulatory changes for pension funds are to be implemented in the Netherlands in 2007. However, as the Dutch pension funds have access to a large pool of fixed income assets in the euro area, the effects on long-term nominal interest rates are likely to be muted. In Sweden, the introduction of a new regulatory model in January 2006 did not have an impact on bond prices.

#### **4.2 Effect on other financial asset prices**

The effect of institutional investors' asset reallocations on the pricing of other financial assets is even more difficult to gauge. Over the past few years, yields on *high-yield corporate* and *emerging market bonds* have declined to historically low levels. While better financial health in the corporate sector and improved fiscal and foreign exchange reserve positions in emerging markets have been important for the compression of spreads, other factors, such as low global interest rates and ample liquidity, have also played a part.

Similarly, asset reallocations could also have an effect on *equity prices*, if portfolio reallocations into bonds from equities take place. Nevertheless, the quantitative effect on equity prices would also depend, among other things, on the implications that such portfolio reallocation would have on interest rates, as these are one key factor determining the valuation of stocks. All in all, a major price impact on equities arising from regulatory policy changes is not expected, especially taking into account that so far data have not shown a major reallocation of assets from equities to bonds.

It remains an open question whether changes in institutional investors' decision-making processes and asset management strategies induced by regulatory and accounting reforms have increased the demand for *alternative assets*. On the one hand, reforms have primarily encouraged the adoption of ALM strategies, whereby managers seek to immunise their portfolios from interest rate movements. On the other hand, in the context of low interest rates, institutional investors may be tempted to deviate from pure ALM and search for yield. They may adopt core-satellite structures in portfolio management, in which they cover a large part of their liabilities with traditional portfolio allocation strategies (eg bond/equity index tracking) and try to achieve "extra" returns by investing smaller parts of portfolios in alternative assets (eg emerging market assets, hedge funds, commodities, credit derivatives and infrastructure). Industry experts emphasised that in some countries the demand for alternative investments by long-term institutional investors is severely constrained by regulations and could increase substantially if these rules were relaxed. In any case, given

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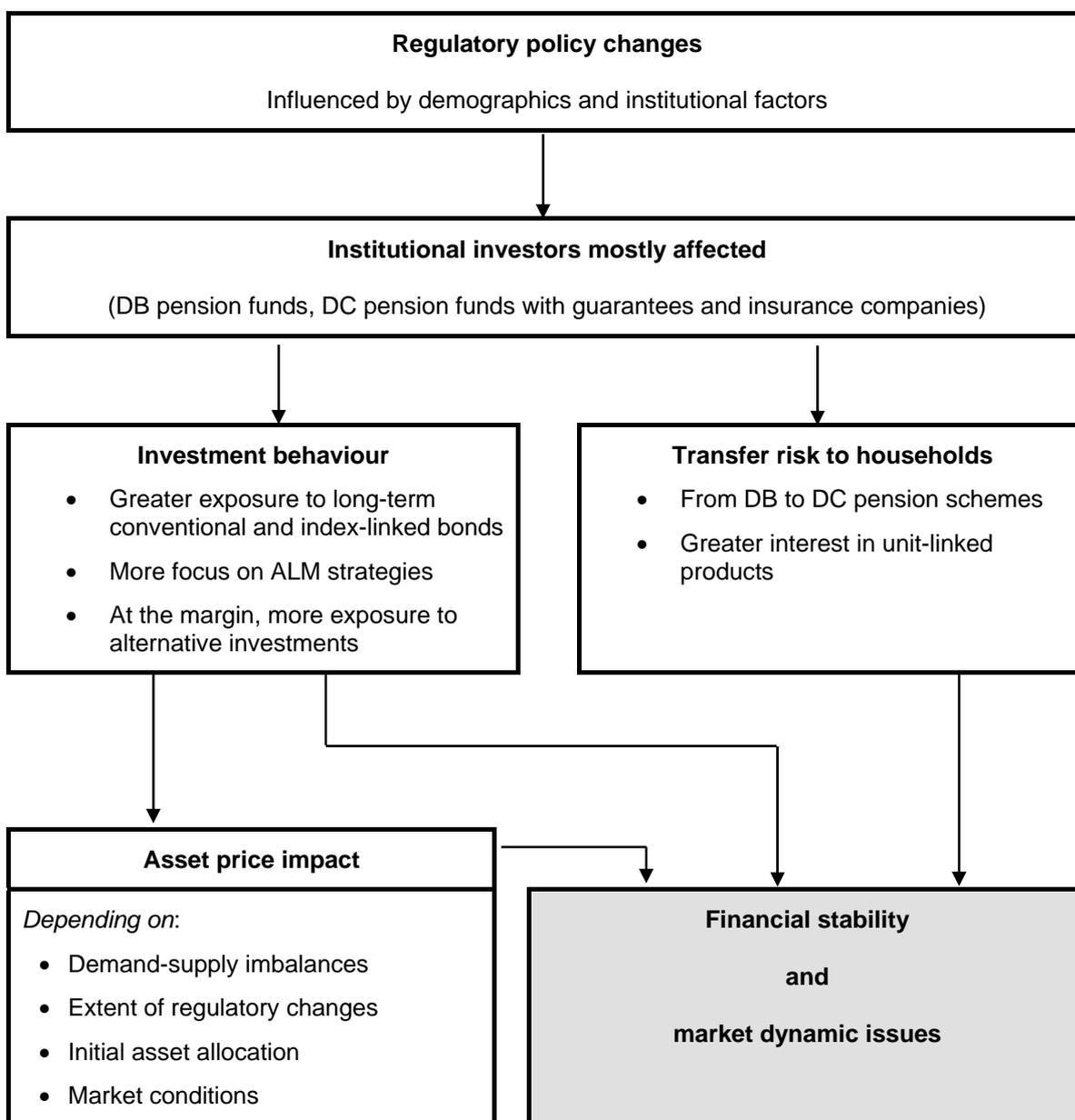
<sup>37</sup> See Warshawsky (2006).

the large size of the total assets managed by pension funds and insurance companies, a slight increase in their asset allocations in favour of hedge funds could have significant effects on the pricing of assets targeted by hedge funds, like emerging market bonds, commodities or high-yield corporate bonds. Unfortunately, empirical evidence in this regard is particularly scant.

As a summary of the discussion and analysis presented in Sections 3 and 4 of the report, Figure 1 illustrates the various channels through which regulatory policy changes affect the behaviour of institutional investors and financial asset prices.

Figure 1

**An overview of the transmission channels of regulatory policy changes**



## 5. Policy issues for central banks: financial stability and market dynamics

This section analyses policy issues for central banks arising from the recent regulatory and accounting policy changes, focusing on their impact on financial stability, potential temporary effects on market dynamics and the implications of risk transfer to households as a consequence of the ongoing shift from DB to DC pension schemes.<sup>38</sup>

Over the long term, the main regulatory policy reforms affecting the pension and insurance industries should be expected to *strengthen financial stability*. In particular, the new accounting framework will improve the transparency of the risks and underlying costs of DB pension schemes and of the risks facing insurance companies selling guaranteed-return products. The use of a more consistent and transparent set of global accounting standards should improve the comparability of firms and industries across borders, reduce duplication of reporting, make it easier for investors to make well informed decisions and contribute to more accurate valuations of firms. The regulatory reforms should provide more incentives to institutions to manage risks prudently, helping to mitigate episodes of severe pension underfunding such as that between 2000 and 2002. In addition, risk-based solvency requirements are expected to increase the resilience of insurance companies to financial shocks. These reforms may also increase the transparency of the channels of risk transfer between banks and institutional investors and reduce the opacity that has existed in the past within complex financial institutions, comprising both banks and insurance companies.

A separate issue is whether the growth of institutional investors complicates the assessment of financial stability. In this regard, the regulatory policy reforms should help analysts and market commentators to assess the financial strength of institutional investors more effectively by making their investment strategies and financial reporting more transparent. Nevertheless, if these reforms lead to risk-shedding by these investors to other parts of the financial system which are more opaque (hedge funds or others), overall risks to financial stability could become more difficult to track. Yet this would not invalidate the assessment that the regulatory changes implemented so far should be expected to benefit financial stability, notwithstanding the fact that the implementation of the reforms may in some cases have led to temporary distortions in financial market prices.

The growing demand by global institutional investors for emerging market assets should also be positive for these economies, since such investors are more likely to follow buy-and-hold strategies than other players, thereby better contributing to the long-term development of local financial markets. Nevertheless, the growing role of global investors in emerging markets might alter the transmission mechanism of monetary policy, if long-term bond yields become more dependent on global factors.

*While the reforms appear beneficial for financial stability, their implementation could temporarily distort prices in financial markets.* In particular, although shifts in institutional investors' portfolios related to regulatory policy changes have so far been limited globally, some effects have been observed in certain countries. To the extent that in such countries interest rates may have temporarily declined below levels implied by macro fundamentals, this might among other things stimulate corporate and household sector capital gearing. This may lead to excessive borrowing and distortions in the allocation of resources in these

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<sup>38</sup> This section draws on Brierley, González-Mota, Odonnat, Persson and van Herpt (2006) and on Lescrauwaet (2006) and Hui, Mori and Persson (2006).

countries, which will only be fully recognised by agents once long-term yields return closer to historical averages.

Low long-term yields could in addition intensify institutions' search for yield through over-ambitious attempts to enhance returns over market benchmark indices. The global statistics suggest that many institutional investors are already increasing their exposure to riskier assets (private equity, commodities, funds of hedge funds, commercial real estate and hybrid mutual funds), albeit from relatively small bases in most cases.

In cases where there has been an appreciable impact on the demand for long-term bonds, either directly or through the use of derivatives, "feedback effects" may have reinforced effects on market prices. One of these effects relates to the adoption of ALM strategies by pension funds in the presence of bond demand-supply imbalances. As pension funds implement such strategies by purchasing long-term conventional and index-linked bonds or interest rate swaps, they impart downward pressure to long-term interest rates. But, given that a market discount rate has to be used to value liabilities, the move towards better (but incomplete) duration matching may actually contribute to larger funding gaps as the valuation of liabilities increases with lower interest rates. This can result in renewed attempts to match assets and liabilities through further purchases of bonds, reinforcing the downward pressure on interest rates. Institutional fund managers interviewed in the United Kingdom indicated that this feedback mechanism had been an important factor in affecting market prices and dynamics in the gilts market.

Another feedback effect resulting from regulatory policy changes, which was also identified during interviews with market participants, relates to the timing of adoption of ALM strategies in a low interest rate environment. Many fund managers felt that they should shift their fixed income portfolios in the direction of increased duration in order to better match their liabilities and reduce volatility. However, they were reluctant to "lock in" current low interest rates. One potential implication of this behaviour is that a generalised rise in long-term interest rates could induce many more fund managers to try to extend duration, leading to a dampening of the upward pressure on long- and very long-maturity rates.

Finally, although it has been argued that risk-based solvency requirements may induce greater procyclicality in the behaviour of investors, especially if risk is underestimated in periods of strong economic performance and overestimated in slowdowns, risk-based solvency requirements should in principle help to reduce market volatility. Under this regime, investors hold sufficient low-risk assets to buffer their balance sheet risks against large but temporary market turbulence, which will dampen market volatility.<sup>39</sup> In addition, the adoption by all institutional investors of better risk management techniques should lead to a more accurate appreciation of risks at any time, which reduces the risks of excessive procyclicality. Furthermore, risk-based solvency requirements are expected to increase the resilience of institutions against financial shocks, thus limiting the risk of procyclical investment behaviour.

The transition from DB to DC plans in private sector pensions can also have both macro and financial stability implications as *investment risk is shifted from the corporate sector to households*. On the one hand, shifting risk to households helps to mitigate some of the principal-agent problems that can affect occupational DB schemes, as risks come directly under household control. At the same time, the transition from DB to DC schemes has substantially reduced "accrual risk" by replacing DB benefits that are "backloaded", and not portable for workers who lose their jobs, with DC plans that are "fully funded" and belong

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<sup>39</sup> As mentioned earlier in the section, these regulatory changes may have "repressed" some demand for long-term bonds during the low interest rate environment, which can subsequently dampen volatility if interest rates increase.

completely to the worker, regardless of their future employment status or the future viability of the employer.

On the other hand, households are becoming more exposed to financial markets, as the pooling of risks across time for workers in the DB pension schemes does not apply in the DC ones. Thus retirement income is subject to greater investment risk than previously. Interestingly, this is not only the case in countries with a mature occupational pension system, but also in emerging markets, where pension reforms (aimed at either setting up private occupational pension schemes or funding pay-as-you-go systems) are adopting an approach predominantly based on DC schemes. This illustrates the importance of improving households' financial literacy and at the same time emphasises the idea that appropriate regulation and supervision as well as consumer protection remain crucial. Finally, it should nevertheless be remembered that households hold the largest equity buffer, which in principle could increase the resilience of the financial system to adverse shocks, even if some uncertainties persist over how households will react to financial market volatility.

## 6. Conclusions

Institutional investors are becoming increasingly important in global finance, contributing to deeper and better functioning markets and a more efficient allocation of savings in developed countries. And while domestic institutional investors remain small in an absolute sense in emerging market economies, they are nevertheless of significance in relation to the size of local markets and in the light of their considerable growth potential. Some of this growth potential reflects reforms in public pension provision, and is likely to be concentrated in the DC pension sector, because most countries moving to funded pension systems are focusing on defined contribution arrangements.

Given the growing importance of institutional investors, regulatory and accounting policy changes that affect pension funds and insurance companies can have important implications for financial markets and stability. Currently, a number of regulatory changes are being implemented or contemplated across the world. While they have many similarities, their consequences are likely to differ between countries, as a result of national conditions, and across different types of institutional investors. This highlights the need to conduct comprehensive impact studies prior to the completion of these reforms to calibrate them appropriately.

The main effect of reforms will be to provide incentives for DB pension funds and insurance companies offering guaranteed income products to reduce their risk profiles. Investment strategies and risk management practices will become more linked to the structure of the investors' liabilities. And underfunded DB pension funds and less solvent insurance companies will be more likely to take remedial action, in particular by transferring investment risk to the household sector.

In shifting risk from their balance sheets, institutional investors are following a trend previously observed in the banking sector. Households hold the largest equity buffer, which in principle could increase the resilience of the financial system to adverse shocks. However, there is a concern that households may not be as able as institutional investors to identify, judge and manage risks. Efforts to improve households' financial literacy are therefore crucial. Moreover, some uncertainties persist over how households will react to financial market volatility, so appropriate regulation and supervision as well as consumer protection remain important.

Partly as a result of these regulatory policy changes, institutional investors may shift part of their asset portfolios from equities into long-term fixed income instruments whose financial characteristics more closely resemble the cash flow of obligations. This process of risk reduction, however, may not be readily apparent in the balance sheets of institutional

investors, to the extent that it is facilitated by increased use of derivatives such as interest rate and inflation swaps.

Furthermore, by boosting demand for long-term bonds, the policy changes discussed in the report may have had some effect in depressing long-term yields in some countries. That said, and allowing for the fact that it is difficult to discriminate between the effects of these regulatory policy changes, which in most cases are recent and in some still under discussion, and other influences, the policy changes do not appear to be a main cause of the current low level of long-term interest rates globally. Given the importance of assessing the equilibrium level of long-term interest rates, continuing uncertainty on this front complicates the task of policymakers.

Developments in the United Kingdom, where long-term yields have declined partly as a consequence of regulatory developments, illustrate the potential importance of regulatory policy changes as determinants of institutional investors' asset allocations. Furthermore, they suggest that the response of long-term yields to regulatory policy changes depends on the size of potential institutional demand for long-term bonds relative to the size of the market, the extent and scope of the regulatory changes, the initial funding or solvency positions of institutional investors and their initial asset allocations.

The recent regulatory and accounting reforms seem likely overall to enhance the functioning of the financial system. To the extent that they encourage better risk management by institutional investors, the spreading of investment risk among a larger investor base and improved transparency in corporate accounting, they may also make financial systems more resilient to shocks. While the reforms are therefore likely to promote financial stability in the long run, the implementation of these measures may temporarily distort prices in financial markets. For instance, feedback effects may arise which have the potential to drive long-term interest rates below the levels justified by macro fundamentals. In determining transition periods, policymakers will need to take into account the risk of triggering unnecessary market volatility or distorted valuations, but the degree to which a gradual approach to implementation is possible may vary from country to country. While, as mentioned above, on the basis of the available evidence the analysis leads to the conclusion that these effects on long-term rates are likely to be temporary while portfolio adjustments take place, a longer time perspective is needed on the consequences of the regulatory reforms to confirm this assessment.

In the case of emerging markets, the growing demand from global institutional investors for emerging market assets is broadly positive for these economies, especially because such investors are more likely to follow buy-and-hold strategies than other market participants, thereby better contributing to the long-term development of local financial markets. The growing role of global investors in emerging markets might also alter the transmission mechanism of monetary policy, as long-term bond yields may become more dependent on global factors.

Any assessment of the effect of regulatory policy changes on financial markets must be tentative, given that the reforms are all recent or in the process of implementation or discussion. In addition, it is difficult to distinguish between changes that would have happened anyway and those which are a consequence of reforms. The fact that these reforms represent a global trend that is still in its early stages raises the possibility that they could eventually have a more lasting effect on financial asset prices.

The increased interest in alternative investment strategies by institutional investors is not seen as a major problem for financial stability. These asset classes generally remain of limited importance in their portfolios and are mainly used to improve portfolio risk diversification. However, concerns have been expressed about the opacity of the investment vehicles, tail risks and untested markets.

Finally, in the light of the growing role of institutional investors in global markets, if the CGFS wants to continue monitoring how pension funds and insurance companies are responding to

regulatory policy changes, it needs to look at how to improve the information and/or analytical frameworks for assessing financial stability issues.

## **Annex A:**

### **Mandate of the CGFS Working Group on institutional investors, global savings and asset allocation**

The proportion of household saving that is channelled through institutional investors has grown significantly in many economies over the past decade. In turn, institutional investors have become increasingly important participants in global financial markets. Understanding the determinants of institutional investors' asset allocation decisions and their potential implications for the financial system is, therefore, an important precondition for analysing a number of phenomena. These include the low level of long-term interest rates in government bond markets, which are central to the determination of financial asset prices more generally.

To facilitate a better understanding of these issues, the Working Group is to explore how past and prospective changes in the regulatory or accounting framework, as well as differences in country-specific characteristics, might influence institutional investors' asset allocation.

More specifically, issues to be studied by the Working Group include:

- the effect of legislative changes, such as structural reforms of public pension systems, on savings behaviour and the size and composition of assets managed by different types of institutional investor (pension funds, mutual funds, hedge funds, etc);
- the influence of changing regulatory and accounting frameworks, relative to other factors, on institutional investors' asset allocation and risk-taking decisions, including the importance of country-specific attributes (ie potential limitations of financial globalisation resulting from factors such as the extent of shareholder or creditor rights, etc);
- possible consequences for saving behaviour as well as the pricing of financial assets; financial stability implications arising in this context are to be given particular emphasis.

In support of the study, the Working Group might seek to better understand and incorporate:

- existing work on global saving trends;
- information on changes in global bond holdings (taken from the IMF's annual survey, informal surveys of the major bond custodians, etc);
- flow-of-funds statistics, where aggregate data on institutional investors' portfolio allocation can be found;
- market intelligence: updating the information obtained in the context of the CGFS's *Working Group on Institutional Asset Management*; and
- specific country experience on notable shifts in asset managers' regulatory or accounting frameworks and related market reactions.

The Group would aim to report to the CGFS at its meeting in November 2006.

## **Annex B: Household savings and institutional investors**

### **B.1 Recent trends in household saving**

Over the past decade, household savings ratios in most OECD economies have declined. Graph B.1 shows that there was a clear downward trend in measured savings ratios in Australia, Canada, Japan, Korea and the United States, and the ratio also declined somewhat in most European countries.<sup>40</sup> A factor contributing to these declines has been *ageing populations*, due to the rise in longevity and the decline in fertility rates. Demographic trends, and the ensuing adjustments in social security systems, will continue to be one of the main influences on household saving over the next decades. There is a good deal of evidence to suggest that savings ratios decline as the population ages (Broadbent, Grande, Thompson and Zollino (2006)). At the same time, while governments will find it increasingly difficult to maintain state pension policies, a larger proportion of household savings is likely to be placed in privately funded pension schemes and life insurance policies, providing more funds to institutional investors.

Cross-country analysis of trends in private savings, however, may be undermined by statistical flaws. One relevant issue is the treatment of capital gains, which differs markedly across countries. For some countries where households hold a significant proportion of their assets in equities, such as Australia and the United States, this impact can be quite large.

### **B.2 Households' financial assets and allocation<sup>41</sup>**

Total financial assets held by households have risen by over 50% during the past 10 years to USD 75 trillion in 2005 (Table B.1). Among the three broad savings media (holdings with institutional investors, bank deposits and direct holdings of securities), institutional investors have become the main recipient of household financial wealth. In particular, insurance and pension reserves is the only asset class that recorded an increase in both US dollar and GDP terms in all the sample countries. Overall, households' insurance and pension reserves rose to 44% of total financial assets in 2005 from 36% in 1995. By contrast, the shares of both bank deposits and direct holdings of bonds and equities have moderated over that period.

In fact, institutional investors are now the dominant asset class in household portfolios in most countries. Within this category, insurance companies and pension funds, on average, are far more important recipients of household financial wealth than mutual funds. Belgium is an exception, with a large proportion of household assets in mutual fund shares. Another

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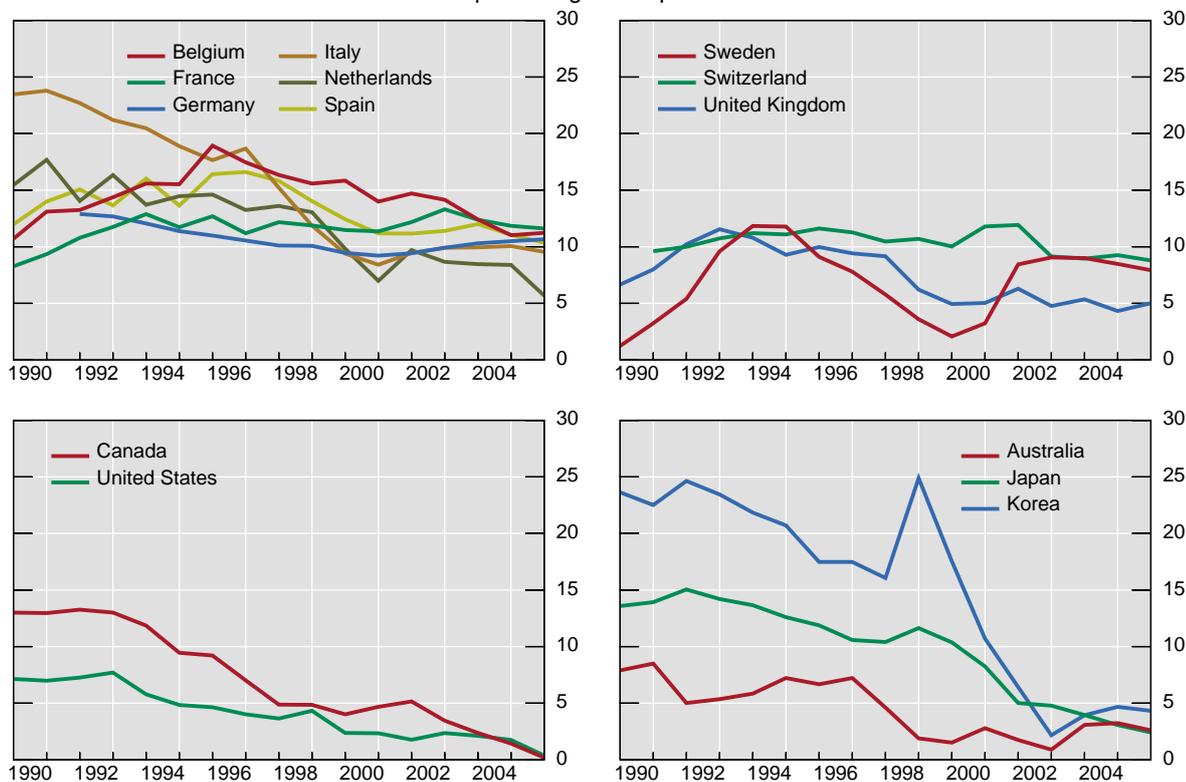
<sup>40</sup> The household savings ratio has traditionally been defined as disposable income less consumption, divided by disposable income. A comparison of this ratio across countries may be misleading given differences in compilations. For example, while most European countries include contributions and benefits relating to funded pension schemes in household income, Canada and the United States exclude these items (see Harvey (2004)).

<sup>41</sup> Non-financial assets account for a large proportion of the wealth of the household sector in some countries (eg the household sector in Spain holds more than 80% of total assets in real estate). However, despite the importance of non-financial assets, this report focuses only on financial assets for two reasons. First, apart from a few countries, data on non-financial assets are generally not available. Second, and more importantly, the aim of this report is to study the linkages between household savings and institutional investors, for which households' holdings of financial assets play a central role.

exception is Italy, where direct holdings of equities and bonds are the main savings channel, but institutional investors have still become more important as a savings channel at the expense of bank deposits and loans. Households in Japan and Korea held more than half of their financial assets in deposits and loans in 2005, perhaps reflecting their bank-based financial systems.

**Graph B.1**  
**Household savings**

As a percentage of disposable income



Source: OECD.

Several authors have recently discussed the reasons why institutional investors are becoming increasingly popular as a savings medium (Davis and Steil (2001), Guiso et al (2002a, b); and Davis (2003)). Institutional investors facilitate an efficient allocation of household resources by providing a means of pooling savings and diversifying financial risks. They also lower financial transaction costs because of economies of scale.

Social policies have also contributed to the growing importance of institutional investors. Past experience suggests that the development of private pension funds is often inversely related to the degree of generosity of the social security systems. In the Netherlands and the United Kingdom, for example, higher holdings of insurance and pension reserves may reflect their relatively basic state pensions, driving households to invest a larger part of their income in private supplementary pension schemes than households in France, Germany, Italy and Spain where state pensions are usually more generous. Current pension reforms in some European countries (eg, the supplementary pension plan introduced in Germany in 2002) that are prompted by concerns about ageing populations are likely to increase the importance of private pension funds in the euro area. The Visco Report (2005) provides a detailed analysis of how reforms in the social security system may have affected retirement savings and related capital flows in financial markets.

Table B.1  
Households' financial assets<sup>1</sup>

	Total		Institutional investors						Deposits & loans		Bonds & equities		Other	
	(USD, trillions)		Total		Ins & pensions		Mutual funds		1995	2005	1995	2005	1995	2005
	1995	2005	1995	2005	1995	2005	1995	2005						
Australia	0.6	1.3	38	46	38	46	na	na	28	22	16	20	18	12
Canada	1.3	2.3	35	41	35	41	na	na	29	26	30	32	6	1
Euro area <sup>2</sup>	10.4	17.1	31	40	23	29	8	11	41	31	27	27	2	2
Belgium	0.7	0.9	19	40	10	23	9	18	29	32	48	30	5	-2
France	2.2	3.7	37	44	24	35	13	10	43	33	17	20	3	3
Germany	3.6	5.0	34	42	27	30	7	12	42	35	23	21	1	1
Italy	2.0	3.8	14	27	10	17	4	10	42	27	43	45	1	0
Netherlands	1.0	1.8	57	61	53	59	4	2	23	21	20	18	na	na
Spain	0.9	1.8	20	28	10	15	10	13	52	38	23	31	5	3
Japan <sup>3</sup>	12.3	12.8	27	29	25	26	2	3	50	52	18	14	5	5
Korea	0.6	1.2	26	27	17	21	9	6	57	58	12	9	5	5
Singapore <sup>4</sup>	0.2	0.3	38	44	38	44	na	na	40	33	22	23	0	0
Sweden	0.3	0.5	32	46	26	33	6	13	25	19	28	35	15	0
Switzerland <sup>5</sup>	0.9	1.2	48	53	40	44	8	9	23	25	30	23	na	na
United Kingdom	3.0	6.1	55	58	51	53	4	5	24	26	18	13	3	3
United States	18.0	32.1	42	50	35	37	7	13	20	21	35	26	2	3
All countries	47.7	74.8	36	44	31	35	6	9	34	30	27	23	3	3

<sup>1</sup> In per cent, unless otherwise stated. <sup>2</sup> Including Belgium, France, Germany, Italy, the Netherlands and Spain. <sup>3</sup> Data for 1995 in Japan are for end-financial year. <sup>4</sup> Data for Singapore are for 2000 and 2005 respectively. <sup>5</sup> Data for Switzerland are for 1999 and 2003 respectively.

Sources: IMF; national sources.

Another policy decision that favours institutional investors is the adoption of mandatory private pension schemes (eg Australia, 1992; Chile, 1981; Korea, 2006; Hong Kong SAR, 2002; and Mexico, 1995).<sup>42</sup> In these schemes, both employers and employees are typically required to contribute a portion of their income to an account, which is invested on behalf of the individuals by licensed fund managers. Members of the scheme receive retirement benefits from their account after reaching retirement age. These mandatory schemes are usually required by law to be managed by specialised fund managers.

Tax incentives have also supported the growth of institutional investors. In France, the tax benefits associated with life insurance contracts have been the main reason for their popularity as savings vehicles. The national quarterly financial accounts show that, in the recent past, life insurance companies have continued to collect a substantial share of household savings, with life insurance contributions rising by more than 10% per annum. In Belgium, favourable tax treatment of dividends and interest payments on equities and bonds held through mutual funds and insurance contracts has contributed to the relatively large shares of mutual funds and insurance reserves in households' portfolios.<sup>43</sup>

Finally, country-specific factors have contributed to the growing importance of institutional investors. In Germany, for example, after reunification there was a strong need from the former East Germany to catch up in insuring personal risks and that has been a factor in the increase in households' insurance reserves.

### **B.3 Effect of institutional investors on household saving**

While institutional investors have become the dominant savings medium of households, their development may in turn *boost* the overall level of savings. In an ideal world with rational households and complete financial markets, a dollar increase in pension or insurance savings should be fully offset by a dollar decrease in households' holdings of other assets or a similar rise in borrowing, leaving no effect on the overall level of savings. However, in reality, a positive effect of institutional investors on private savings could arise for a number of reasons. First, long-term saving and other financial instruments are imperfect substitutes in the sense that a rise in wealth held in the form of illiquid insurance and pension assets may cause a less than one-to-one reduction in other forms of more liquid saving such as bank deposits.<sup>44</sup> Second, overall saving may also rise if households are credit-rationed. For example, households with uncertain future earnings (usually lower-income groups) may not be able to offset any increase in retirement savings with increased borrowing (or a decrease in other savings).

Furthermore, institutional investors may affect aggregate household saving through higher expected returns. Savings held through institutional investors may be expected to generate higher returns than direct asset holdings, given the tax incentives associated with institutional savings, institutional investors' ability to diversify financial risks and their expertise in asset management. Higher expected returns may induce higher saving as households find it more rewarding to give up part of their consumption today - a substitution effect. However, this positive effect on saving can be offset by the wealth effect of higher expected returns on

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<sup>42</sup> Another fully funded mandatory old age defined contributions scheme is the Singaporean Central Provident Fund (CPF), which was established in 1955. Over time, the CPF has evolved from a pure retirement savings scheme to one that also finances other activities, including housing, health, education and investment.

<sup>43</sup> However, as of January 2006, the Belgian authorities removed this tax exemption for mutual funds investing at least 40% of their total assets in bonds.

<sup>44</sup> Poterba, Venti and Wise (1994, 1996) and Connolly and Kohler (2004) find evidence of such positive effects on household savings for US DC pension plans and Australian private retirement savings schemes respectively.

consumption. The overall impact of this channel therefore depends on whether the substitution or wealth effect dominates.

## **Annex C: Asset allocation in the European mutual fund industry**

Mutual funds are one important recipient of household savings in the euro area, representing 11% of total financial assets in 2005. Apart from the links to households, these funds also have close ties with banks and insurance companies. On the one hand, mutual funds contribute to the refinancing of banks through their holdings of securities issued by the latter: for instance, French mutual funds held around 15% to 20% of such assets at end-2005. These close links with banks mean that mutual funds' investment behaviour could have an indirect impact on the monetary policy transmission mechanism. On the other hand, insurance corporations, and to a lesser extent banks, hold significant amounts of mutual fund units.

### **Impact of relaxed investment rules on mutual funds**

In the European Union, the Undertakings for Collective Investment in Transferable Securities (UCITS) legislation first passed in 1985 has been the basis for an integrated market facilitating the cross-border offer of collective investment funds. Under this legislation, funds that are registered with their own supervisory bodies can be "freely marketed" in all member states of the EU. The so-called UCITS III Directive (Directive 85/611/EEC as amended by Directives 2001/107/EC and 2001/108/EC) of 21 January 2002 has widened the investment objectives of UCITS in order to make explicit the eligibility of money market instruments, units of UCITS under certain conditions and short-term bank deposits (with a maturity of less than 12 months). It also authorises the use of financial derivative instruments not only for hedging purposes, but also to increase returns.

More recently, given the huge variety of complex financial instruments, which are in constant evolution, the European Commission has identified, as a short-term priority, the need to clarify the definitions of transferable securities and of money market instruments in order to ensure their even interpretation and implementation across the European Union. At the national level, over the past few years some countries have implemented new regulations authorising funds that are free to set their own debt and investment policies or to operate under streamlined investment rules.

Currently, money market funds, which developed alongside money markets throughout the 1990s, still account for 17% of the net asset value of European UCITS, slightly below their 2002 share of 20%. With investments mainly consisting of money market paper (around 60% of total assets on average), they offer a return close to money market interest rates with limited risks in capital.

Equity funds already account for a predominant share of total net assets of UCITS (39%), well above bond funds (24%). This probably reflects the current combination of relatively low long-term interest rates and equity markets that seem to have largely recovered from the bursting of the ITC bubble. The two categories were fairly similar in size in 2002 (33%).

Overall, the authorisation of funds with liberalised investment rules and the improvements in the quality of supervision and risk management systems, especially as regards the use of financial derivatives, should facilitate greater investments in complex derivatives.

The French case provides an illustration. Although still marginal, alternative funds in France have experienced very strong growth since the law came into force in 2004. Most of these funds already existed before the implementation of the law, but subsequently decided to change their classification. Their total net assets amounted to only EUR 27 million in 2003, but then increased rapidly to reach EUR 11 billion in 2004 and EUR 24 billion in 2005.

## Annex D: Cross-border portfolio investment<sup>1</sup>

Investment from	Investment to													
	Advanced economies <sup>2</sup>								Emerging markets <sup>3</sup>		Total <sup>4</sup>			
	Total		Euro area		Japan		United States				(USD, bn)		(% of GDP)	
	2001	2004	2001	2004	2001	2004	2001	2004	2001	2004	2001	2004	2001	2004
Australia	72	154	12	29	5	12	44	83	4	5	79	167	22	26
Canada	237	348	34	51	15	24	153	208	14	20	261	381	37	38
Euro area	4,003	8,505	2,403	5,526	98	242	838	1,345	146	319	4,468	9,467	71	98
Belgium	270	490	216	416	3	3	29	33	3	4	280	508	121	142
France	641	1,598	399	1,090	17	47	117	195	9	26	710	1,748	53	85
Germany	738	1,396	493	1,039	10	35	108	134	25	47	792	1,516	42	55
Italy	448	785	310	597	12	14	74	99	34	32	552	914	49	53
Luxembourg	739	1,400	402	795	27	75	178	261	36	120	821	1,616	4,059	4,803
Netherlands	451	906	229	494	12	30	142	256	22	38	486	996	121	164
Spain	151	438	109	327	4	2	17	44	3	10	173	518	28	50
Hong Kong SAR	123	232	20	51	9	10	39	60	23	59	206	401	124	242
Japan	1,044	1,554	365	596	–	–	490	694	37	42	1,290	2,010	32	44
Korea	5	23	1	7	0	1	4	13	2	1	8	28	2	4
Mexico	0	5	0	1	0	0	0	4	0	0	0	6	0	1
Singapore	75	115	17	25	11	8	18	32	23	51	105	180	123	168
Sweden	142	263	53	120	7	11	51	75	3	7	146	275	66	78
Switzerland	379	586	239	396	11	15	83	99	9	12	489	758	195	211
United Kingdom	1,064	1,679	545	824	94	129	309	534	100	172	1,304	2,110	91	98
United States	1,785	2,806	642	945	198	370	–	–	263	472	2,304	3,764	23	32
<b>Total</b>	<b>12,366</b>	<b>23,284</b>	<b>6,485</b>	<b>13,329</b>	<b>532</b>	<b>1,025</b>	<b>2,695</b>	<b>4,168</b>	<b>754</b>	<b>1,438</b>	<b>14,473</b>	<b>27,361</b>		

<sup>1</sup> In billions of US dollars. <sup>2</sup> As defined by the IMF minus the newly industrialised Asian economies. <sup>3</sup> Argentina, Brazil, Chile, China, Colombia, Czech Republic, Ecuador, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, the Philippines, Paraguay, Peru, Poland, the Russian Federation, Singapore, South Africa, Taiwan (China), Thailand, Turkey, Uruguay and Venezuela. <sup>4</sup> Total is larger than the sum of advanced and emerging economies due to the omission of others.

Sources: IMF Coordinated Portfolio Investment Survey and World Economic Outlook Databases.

## **Annex E:**

### **Questionnaire for interviews with industry representatives**

#### **E.1 Asset allocation of institutional investors: empirical regularities and explanations**

##### ***E.1.1 Domestic asset allocation***

- What is the typical strategic asset allocation of your company? What are the relative shares of money market instruments, bonds (public and private), equities and alternative investments (hedge funds, securitised assets, real estate, etc) in your overall portfolio?
- Has there been any major shift in your company's investment strategy and/or asset allocation recently? If so, why? To what extent can tactical asset allocation deviate from strategic asset allocation?
- Is your investment policy and strategy linked to the underlying structure of your liabilities? If so, how?
- To what extent are there regulatory, legislative, tax, accounting or other types of constraints/restrictions (qualitative or quantitative) on the types of assets held by your company?
- To what extent are changes in investment strategies or portfolio reallocations driven by customer demand? Are households showing increasing interest in instruments with minimum return guarantees or inflation-protected returns?
- Is the role of alternative investments growing in the asset allocation of "traditional institutional investors" such as pension funds and insurance companies? If so, what are the main reasons behind this growth? Has the use of derivatives increased in recent years?
- Does the increase in holdings of alternative assets raise any specific concerns for your company? How do you assess the return and risk involved in alternative investments in comparison with traditional asset classes?

##### ***E.1.2 International portfolio diversification***

- To what extent is your portfolio internationally diversified? Has there been a change in the degree of diversification? If so, why?
- To what extent has this process been driven by:
  - structural factors (eg incentive structures, mandates, regulation, globalisation, financial innovation, taxation, euro adoption)?
  - cyclical factors (eg macro policy environment)?
- What are the limits to the internationalisation process (eg currency denomination of liabilities or others)?

## E.2 Recent or prospective normative changes affecting the investment strategies of institutional investors and their effect

- Which have been the other key factors that shape your portfolio allocation in addition to risk-return optimisation (risk management or asset/liability management, changes in regulation, changes in accounting, competition, others)? What is the relative importance of these factors?
- Do you expect major changes in asset allocation by pension funds, life insurance companies and mutual funds in response to present or prospective regulatory and accounting changes?
- Do risk-based regulation and a greater role of fair valuation in financial reporting for pension funds and/or insurance companies appear to be converging across countries? What important differences are expected to remain? How important are these changes for determining your company's preferred asset allocation?

### *Specific issues*

- **To pension funds:** Which has been the more dominant pension scheme in your country: defined benefit (DB) or defined contribution (DC)? Is that likely to change and why? In countries where a shift is ongoing, do you expect it to continue in the future? What are the implications in terms of asset allocation and risk management arising from the move from DB to DC pension funds?
- **To insurance companies:** What types of life insurance policies are predominant in your company? What are the growth prospects for products embedding some type of minimum return guarantee or protection? Where applicable, how would you assess the effect of risk-based regulation frameworks (eg Solvency II) in terms of your asset management?
- **To European investment funds:** How important is embedding a minimum return guarantee or other return protection for the sales of your products? Is the reform of the UCITS Directive likely to have an effect on the structure of European capital markets, and on the asset allocation decisions of investment funds?

## E.3 Implications for financial asset prices

The assets discussed in this section should include: money market instruments, fixed income assets (including corporate, government, ultra-long segments of the yield curve, index-linked, interest rate swaps, etc), equities, alternative investments and foreign currencies.

- Are changes in asset allocation resulting from regulatory and accounting changes affecting financial prices? If so, what asset classes are mostly affected by these changes: long-term government bonds, corporate bonds, equities, emerging market assets or others?
- Specifically, do you think these changes are responsible for the recent decrease in term premia on some segments of the long-term government bond market?
- Furthermore, would you say that the effect on asset prices is just reinforcing the trends driven by more fundamental factors? Do you expect these regulatory and accounting-induced effects to be transitory, persistent or even permanent? Have you seen any evidence of firms "front-running" prospective changes in the hope of making windfall gains?

#### **E.4 Market dynamics**

- Regulatory and accounting changes set in motion a process of risk containment through three channels: (a) transferring risk to policyholders (eg moving from DB to DC pension schemes or drawing up unit-linked insurance contracts); (b) adopting asset-liability management (ALM) strategies and shifting to less risky assets; and (c) lowering accounting volatility by reducing the proportion of equities in the portfolios. What role do you think each of these strategies is playing?
- Is the implementation of ALM techniques inconsistent with efficient portfolio allocation? Are they sensible for companies with long-term investment horizons?
- Are the feedback effects from ALM responsible for the low long-term bond rates in some countries? To what extent is the demand for long and ultra-long bonds from institutional investors “captive” (or price-inelastic)?
- Has this extra demand been matched by an increased supply? If not, why not?
- Are the investment strategies of various institutional investors becoming more similar? Do these changes alter the capacity of institutional investors to bear financial risk and transform the risk profile of their investors’ long-term investment strategy?
- What are the foreseeable effects on financial prices and/or market dynamics arising from the use of risk-weighted capital requirements by insurance companies and/or pension funds? Will they lead to a more procyclical behaviour of asset prices?
- If regulated institutional investors (such as pension funds and insurance companies) are shifting towards lower-risk strategies, have you noticed a corresponding shift towards higher-risk/return strategies by other types of investors?
- Has your company changed or is it planning to change its risk/return structure? If so, what are the reasons for this shift?

## Annex F: List of interviewed firms<sup>45</sup>

ABN AMRO Bank N.V.	Generali Asset Management
AFA	Government Employees Pension Corporation (Korea)
Association française de la gestion financière (AFG)	Great Eastern Life Assurance Co Ltd
Afore XXI	Groupama
Alekta	Grupo Financiero Banamex (Afore)
Allianz Global Investors AG	Grupo Nacional Provincial (GNP)
American Express Bank (Hong Kong SAR)	HSBC Investment (Hong Kong SAR) Limited
AMF	HSBC Private Bank (Suisse) SA (Hong Kong SAR)
AMP Capital Investors / AMP Life	ING Investment Management (Mexico)
AXA France	Intesa Previdenza
Barclays Global Investors (Canada)	Invercaixa Gestión
BBVA (Asset Manager)	JANA
BOCG Life Assurance Co Ltd	Kairos Alternative Investment
Caifor Insurance	Kyobo Life Insurance
Commonwealth/Public Sector Superannuation Scheme	La Caixa
Crédit agricole Asset Management	Länsförsäkringar Liv
DBS Asset Management Ltd	Lyxor Asset management
Deka Investment GmbH	Macif
Deutsche Asset Management	Macquarie Investment Management
Deutscher Investment-Trust (DIT) Gesellschaft für Wertpapieranlagen mbH	MAPFRE
Duemme	Mediolanum Vita
Fondos BBVA Bancomer	MLC
Fonditel Pensiones	Nationale Nederlanden
Fonditel Gestion	Nomura Asset Management HK Limited
Fortis Investments	Ontario Teachers' Pension Plan

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<sup>45</sup> This list contains the names of institutional investors that participated in the Working Group's interview exercise and agreed to be listed. As firms did not receive a draft version of the report prior to publication, being on the list does not necessarily mean that the listed firm endorses the report or its findings.

Petercam S.A.  
PGGM  
Pioneer Investment Management  
Prudential Assurance Co (Singapore) Pte Ltd  
Qantas Superannuation Fund  
Robeco  
Samsung Life Insurance  
SanPaolo IMI Asset Management  
Schroder Investment Management (Hong Kong SAR)  
Skandia Liv  
Société Générale Asset Management (SGAM)  
State Street Global Advisors  
Stichting Pensioenfonds Hoogovens  
Sun Life Financial Inc  
TD Asset Management Inc  
Telstra Superannuation Fund  
Templeton Asset Management Ltd  
UBS Global Asset Management (Canada) Co

## References

### Central bank papers written in connection with the Working Group<sup>46</sup>

Alexopoulou, I, F Drudi and J Scheithauer (2006), "What accounts for the low level of term premium?", European Central Bank.\*

Brierley, P (2006), "Pension fund asset allocation and liability management in the United Kingdom: accounting and regulatory influences," Bank of England.

Brierley, P, Gonzalez-Mota E, I Odonnat, M Persson and I van Herpt (2006), "Implications of recent or prospective regulatory changes for financial market prices and market dynamics," Bank of England, Bank of Spain, Bank of France, Sveriges Riksbank and Netherlands Bank.\*

Broadbent, J, G Grande, C Thompson and F Zollino (2006), "Main structural drivers of private savings: a review of the available evidence," Reserve Bank of Australia, Bank of Italy, Reserve Bank of Australia and Bank of Italy.\*

Broadbent, J, M Palumbo, J A Santaella and G Zanjani (2006), "Institutional investors and asset allocations: accounting and regulation of private defined benefit pension plans and other institutional investors in the United States and Mexico," Reserve Bank of Australia, Board of Governors of the Federal Reserve System, Bank of Mexico and Federal Reserve Bank of New York.\*

Broadbent, J, M Palumbo and E Woodman (2006), "The shift from defined benefit to defined contribution pension plans – implications for asset allocation and risk management," Reserve Bank of Australia, Board of Governors of the Federal Reserve System and Bank of Canada.\*

Chan, L, J A Santaella and J E Suh (2006), "How does developing domestic financial markets affect asset allocation in emerging markets," Monetary Authority of Singapore, Bank of Mexico and Bank of Korea.\*

Drudi, F, B Rzepkowski, I van Herpt and R Weber (2006), "Changes in financial regulation and accounting standards in Europe," European Central Bank, European Central Bank, Netherlands Bank and Central Bank of Luxembourg.\*

Hui, C H, N Mori and M Persson (2006), "Growing exposure of institutional investors to alternative investments", Hong Kong Monetary Authority, Bank of Japan and Sveriges Riksbank.\*

Lescrauwaet P (2006), "Links between banks and institutional investors", National Bank of Belgium.\*

Palumbo, M, T Simpson and G Zanjani (2006), "Recent or prospective normative changes affecting the investment strategies of institutional investors – issues for the United States," Board of Governors of the Federal Reserve System, Board of Governors of the Federal Reserve System and Federal Reserve Bank of New York.

Van Herpt, I (2006), "The new financial assessment framework for pension funds in the Netherlands," Netherlands Bank.

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<sup>46</sup> The views expressed in these papers are those of the authors and do not necessarily reflect those of their respective institutions. Papers marked \* will be made available on the BIS website along with this report.

## Other references

Bank of England (2006), "Recent developments in UK pension fund regulation", *Bank of England Quarterly Bulletin*, Spring, 2006.

Bernanke, B (2005), "The global saving glut and the US current account deficit," Remarks at the Sandridge Lecture, Virginia Association of Economics, Richmond, Virginia on 10 March 2005.

Boeri, T, L Bovenberg, B Coeuré and A Roberts (2006), Dealing with the New Giants: rethinking the role of pension funds, Geneva Reports on the Global Economy, No 8, ICMB and CEPR.

Boyson, N M, C W Stahel and R M Stulz (2006), "Is there hedge fund contagion?" NBER Working Paper No 12090, Cambridge, MA.

Brown, S J, and J F Spitzer (2006), "Caught by the tail: tail risk neutrality and hedge fund returns," Stern School of Business, mimeo.

Connolly, E and M Kohler (2004), "The effect of superannuation on household saving", RDP 2004-01, Reserve Bank of Australia, March 2004.

CGFS (2003), "Incentive structures in institutional asset management and their implications for financial markets," Bank for International Settlements, Basel.

Davis E P (1996), "The role of institutional investors in the evolution of financial structure and behaviour," FMG Special Papers No 89, London School of Economics.

Davis, E P and B Steil (2001), *Institutional investors*, MIT Press, Cambridge, MA.

Davis, E P (2003), "Institutional investors, financial market efficiency and financial stability," The Pension Institute Discussion Paper, Pi-0303.

Finansinspektionen (2005), "Traffic-light and a modern supervision – proposal for referral," Swedish Financial Supervisory Authority.

Frijns J, R Kleynen and F Quix (1995), "Risk management from the perspective of the economic functions of different financial institutions," paper presented at the 1995 SUERF conference, Thun, Switzerland.

FSA (2005), "Hedge funds: a discussion of risk and regulatory engagement", UK Financial Services Authority, Discussion Paper, 05/4.

Gale, W and J Sabelhaus (1999), "Perspectives on the household saving rate," *Brooking Papers on Economic Activity*, Vol. 1999, No. 1, pp. 181-224.

Goldman Sachs (2005), "Pension reform: implications for plan sponsors and the capital markets," *Portfolio Strategy: United States*, 6 April 2005.

Guiso, L, M Haliassos, and T Jappelli (2002a), *Stockholding in Europe*, Palgrave Macmillan Press.

Guiso, L, M Haliassos, and T Jappelli (2002b), *Household Portfolios*, Cambridge, MA: MIT Press.

Harvey, R. (2004), "Comparison of household saving ratios: Euro are/United States/Japan," *OECD Statistics Brief*, June 2004, No 8.

Holden, S and J Vanderhei (2005), "The Influence of Automatic Enrolment, Catch-Up, and IRA Contributions on 401(k) Accumulations at Retirement," *Employee Benefit Research Institute Policy Brief No 283*, July 2005.

IMF (2005a), *Global Financial Stability Report*, IMF April, 2005.

IMF (2005b), *Global Financial Stability Report*, IMF September, 2005.

- IMF (2006), "Awash with cash: why are corporate savings so high?" *World Economic Outlook*, April 2006, pp. 134-59.
- JP Morgan (2006), *US fixed income markets weekly*, 10 February 2006.
- Kemp, M H D (2005), "Risk management in a fair valuation world", paper presented to the Institute of Actuaries, 25 April 2005.
- Kim D and J Wright (2005), "An arbitrage-free three-factor term structure model and the recent behaviour of long-term yields and distant-horizon forward rates," *Finance and Economics Discussion Series*, Federal Reserve Board, 2005-33.
- King, M (2004), "What fates impose: facing up to uncertainty," Speech by the Bank of England Governor at the eighth British Academy Annual Lecture, 2004 in London.
- Lane, P (2005), "Global bond portfolios and EMU," *European Central Bank Working Paper Series*, No 553, November 2005.
- OECD (2006), "Pension fund demand for high quality long-term bonds: quantifying potential scarcity of long-term bonds," OECD June 2006.
- Poterba, J M, S F Venti and D Wise, (1994), "Targeted retirement saving and the net worth of elderly American," *American Economic Review* Vol (84), pp 180-85.
- Poterba J M, S F Venti and D Wise (1996), "Personal retirement saving programmes and asset accumulation: reconciling the evidence," NBER Working Paper No 5599, Cambridge, MA.
- Ralfe, J (2002), "Why move to bonds?," *The Actuary*, March 2002, pp 28-29.
- Reid, C, F Dion and I Christensen (2004), "Real return bonds: monetary policy credibility and short-term inflation forecasting," *Bank of Canada Review* (Autumn), pp 15-26.
- Rubinstein, M (1976), "The strong case for the generalised logarithmic utility model as the premier model of financial markets," *Journal of Finance*, Vol 31, pp 551-71.
- Russell Investment Group (2006), "The 2005-2006 Russell investment survey on alternative investing: a survey of organisations in North America, Europe, Australia and Japan."
- Sharpe, W (1976), "Corporate pension funding policy," *Journal of Financial Economics*, Vol (3), pp. 183-93.
- Stiglitz, J (1970), "A consumption-oriented theory of the demand for financial assets and the term structure of interest rates," *Review of Economic Studies*, Vol 37, pp 321-51.
- Swiss Re (2003), "Unit-linked life insurance in western Europe: regaining momentum?" *Sigma*, No 3/2003.
- Tuer, E and E Woodman (2005), "Recent trends in Canadian defined-benefit pension sector investment and risk management," *Bank of Canada Review* (Summer), pp 21-35.
- Urwin R (2004), "The role of equities in pension funds," *What if? Perspective*, Watson Wyatt.
- UBS (2006), "Pension reform and impact on rates / spreads," *US Rates Perspectives*, UBS Investment Research, 30 October 2006.
- Visco, I (2005), "Ageing and pension system reform: implication for financial markets and economic policies," Report prepared at the request of the Deputies of the Group of Ten, OECD Financial Market Trends, November, Supplement I.
- Warshawsky, M J (2006), "Reforms to US pension funding and accounting rules: their potential effect on equity values and interest rates", Remarks by the US Assistant Treasury Secretary at the European Institute's Sovereign Funds Roundtable, London, England (<http://www.ustreas.gov/press/releases/js4266.htm>).
- Werner, T (2006), "An affine term structure model estimated with survey data," ECB mimeo.

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