EXECUTIVE SUMMARY

The present note and a companion note focus on issues related to asset decumulation, specifically on the asset meltdown hypothesis (developed in the companion note), recent changes in pension fund asset allocations, and the suggestion that there is scarcity of suitable investments for financial intermediaries whose liabilities consist mainly of long-term regular and fixed payment promises. In discussing the latter issues, a key proposition is that financial institutions are most willing and able to offer decumulation products with fixed payment promises to the extent they are able to invest in financial assets that allow them to hedge a considerable part of the risks associated with the payment promises they extend. Indeed, what is sometimes overlooked in discussions about shifts from asset accumulation to decumulation is that the decumulation phase also involves investment challenges, especially if specific patterns of payouts such as regular payouts of fixed amounts are aimed at.

Contrary to what one might expect based on standard life-cycle considerations and as reported anecdotally in the financial press for specific pension plans, moves from equity to bonds and especially government bonds are not yet borne out clearly in the aggregate data (even if slight moves appear to be taking place in situations where equity allocations had been previously very high). One possible explanation for this observation is that suitable bonds are scarce or too expensive. Indeed, many writers have argued for some time now that pension fund managers will have difficulty implementing asset-liability matching because there are insufficient quantities of suitable assets.

As it turns out, suitable hedging instruments are scarce. And it turns out that the shortfall in hedging instruments extends to more than just the “toxic” tail of longevity risk. The analysis in this note has shown that hedging interest rate risk is also not as straightforward as one may think. If true, this assessment would also be an explanation for the limited interest that financial intermediaries appear to show in offering annuity products. Interestingly, such products create liabilities similar to those of defined benefit funds, and the value of these liabilities can change substantially in the case of even small changes in interest rates.

But as foreshadowed in the discussions by the CMF in November 2005, private market solutions are actually forthcoming in relation to the various types of risks, such as longevity, inflation and interest rates risks. Clearly, one question is at what speed markets will develop and whether they are moving rapidly enough. Moreover, private market solutions also raise new issues, as was argued herein using the example of the markets for interest rate swaps, which could help pension funds hedge some of their interest rate risk exposure, while at the same time exposing them to counterparty credit risk. The issue raised in this context is to what extent should counterparty credit risk exposure be allowed.

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for institutions providing retirement financing, involving payment promises that extend over very long-term horizons?

The recent financial turbulence has underscored the challenges in managing credit risks and highlighted that even sophisticated credit risk managers and financial institutions whose core business includes credit risk management can get the assessment wrong. Under the circumstances, one might well question to what extent pension fund portfolios should be exposed to counterparty credit risk. The relevance of this question has been underlined by the bankruptcy of a large US investment bank in mid-September 2008. Actually, one might wonder whether exposure to significant credit risk is at all appropriate for institutions with a fiduciary duty to ensure a high degree of retirement benefit security. Indeed, the discussion herein suggests that it is difficult enough for funds to properly hedge against interest rate risk, given the shortage of suitable instruments, let alone other types of financial risks. These difficulties are a major constraint to the provision of annuity-like products.

As a consequence, any discussion of the policy options available to help ensure that retirees enjoy adequate levels of retirement income need to carefully evaluate conditions regarding the supply side of financial market instruments. Policy options may not be as plentiful as some may think. For example, for policy proposal to encourage or, perhaps, even to mandate deferred annuitisation of parts of household retirement wealth (to address longevity risk) to become operational, there must be some entity willing to take the other side of the transaction. From a risk management perspective, the willingness of prospective annuity providers to assume the associated risks would generally require the existence of sufficient quantities of suitable financial instruments to enable them to hedge considerable parts of these risks.
I Introduction

Financial institutions are most willing to offer decumulation products if they are able to hedge much of the associated risks.

- The present note and a companion note provide an update discussion of some of the issues related to population ageing and financial markets that were discussed by the Committee on Financial Markets in October 2003. This time the note focuses in particular on issues related to asset decumulation, specifically on the asset meltdown hypothesis (developed in the companion note), recent changes in pension fund asset allocations, and the suggestion that there is scarcity of suitable investments for financial intermediaries whose liabilities consist mainly of long-term regular and fixed payment promises.

- In discussing these issues, a key proposition (second section) is that financial institutions are most willing and able to offer decumulation products with fixed payment promises to the extent they are able to invest in financial assets that allow them to hedge a considerable part of the risks associated with the payment promises they extend. Indeed, what is sometimes overlooked in discussions about shifts from asset accumulation to decumulation is that the decumulation phase also involves investment challenges, especially if specific patterns of payouts such as regular payouts of fixed amounts are aimed at.

- A large share of savings for retirement is “institutionalised”, meaning professionally managed. Among the various institutions that collect and manage individual savings, pension funds are perhaps most directly linked to savings for retirement purposes. The third section focuses on the example of (defined benefit) pension funds, which promise long-term fixed payments to beneficiaries, and for which new data from the OECD’s Global Pensions Statistics Project have become available. The section discusses the supposed shift in relative asset allocations that typical life-cycle consideration would imply – i.e. from equity to bonds, in particular to public bonds, given their limited credit risk. Contrary to what one might expect based on standard life-cycle considerations and as reported anecdotally in the financial press for specific plans, such moves are not yet borne out clearly in the aggregate data collected by this project (even if slight moves appear to be taking place in situations where equity allocations had been previously very high).

- One possible explanation for this observation is that suitable bonds are scarce or too expensive. Indeed, many writers have argued for some time now that pension fund managers will have difficulty implementing asset-liability matching because there are insufficient quantities of suitable assets (Visco, 2005). The fourth section discusses this suggestion based on a simple empirical measure of “scarcity” of suitable pension fund investments to hedge interest rate risk. This type of risk is singled out for special attention here as it is considerable in the case of financial products involving long-term and very long-term payment promises. The value of these promises or, better, the value of the associated liabilities of the financial institutions (that offer such products) can change substantially in the case of even small changes in interest rates. The section concludes that, under specific assumptions, there could indeed
exist considerable scarcity of financial instruments to hedge the interest rate risk associated with long-term fixed payment promises. If true, this assessment would also be an explanation for the limited interest that financial intermediaries appear to show in offering annuity products. Interestingly, such products create liabilities similar to those of defined benefit funds.

- There are, however, private alternatives to public long-term bonds. In this context, the fifth section discusses emerging private solutions, singling out the example of swap markets for special attention. It concludes that such solutions are indeed forthcoming, but that they also raise new issues, including the question as to what extent (defined benefit) pension funds or other entities providing long-term payment promises of fixed amounts should be exposed to counterparty credit risk.

- The sixth section concludes the discussion (including the asset meltdown hypothesis, which is covered in the companion note “Revisiting the Asset-Meltdown Hypothesis”, DAF/CMF(2008)23/ADD1) and raises selected policy issues that could be addressed by participants.

- In this context, it is useful to clarify at the outset that the focus of the present note is primarily on issues related to financial markets and the supply of instruments, and less on policies aimed at ensuring a high degree of retirement benefit security.

As regards the consensus view suggests that these effects would be quantitatively limited and play out gradually rather than precipitously.

- The companion note revisits the so-called asset meltdown hypothesis, according to which retiring baby boomers would need to sell their assets to subsequent smaller cohorts, which may be expected to exert downward pressures on prices of the assets. To foreshadow the results of that discussion, there may indeed be some adverse effects on financial asset returns associated with the retirement of the baby boom generation, but the consensus view suggests that these effects would be quantitatively limited and play out gradually rather than precipitously. It also suggests that while most studies focus on financial assets when discussing the asset meltdown hypothesis, future work of this Committee could focus on real estate assets, as a considerable part of household wealth is accumulated in such assets.
II  Greater demand for asset decumulation products and related supply considerations

Asset decumulation also involves investment challenges

- The asset accumulation and decumulation phases are intrinsically linked in various ways. At the individual level the connection is readily apparent, as investments undertaken today -- capital accumulation -- to accumulate funds for retirement would be the very ones drawn down in the future (presumably) to provide regular and stable payouts -- decumulation phase. In the aggregate, the demand for asset decumulation products as compared to asset accumulation products can be expected to increase as baby boomer generations increasingly enter into retirement. In this context, various timing issues can be important.\(^5\)

- The strength of the link between accumulation and decumulation phases depends on the specific institutional and in particular pension system setting. In particular, in defined benefit schemes, decumulation products are generally automatically provided, while this is not the case for defined contributions schemes. Where decumulation products are not automatically provided, the demand for additional decumulation products providing annuity-like payments would be expected to increase.

The demand for asset decumulation products can be expected to increase.

- What is sometimes overlooked in discussions about shifts from asset accumulation to decumulation is that the decumulation phase also involves investment challenges, especially if specific patterns of payouts, such as regular payouts of fixed amounts are desired. It is not simply a matter of individuals clipping coupons and cashing them in. There are many risks associated with ensuring regular and stable flows of payments during remaining lifetimes, including the possibility that asset prices and interest rates fluctuate and that individuals outlive their accumulated resources.

The decumulation phase also involves investment challenges.

- In this context, many analysts argue that annuitisation would be an optimal strategy for ensuring adequacy of funding for the asset decumulation phase.\(^6\) Life annuities are insurance-like financial instruments, which, in exchange for an initial premium, pay beneficiaries a periodic benefit as long they live. Thus, these products also insure retirees against the risk that they outlive their expected life-spans and exhaust their assets before passing away. From the point of view of financial institutions offering such products, liabilities associated with such products are similar to those characterising benefit pension funds. Actually, the analogy is most appropriate in situations when defined benefit schemes are closed to new contributions, while the liability structure is more complex if the scheme is open to new contributions.\(^7\)

- If financial institutions are to be able financially to provide such decumulation products, they must themselves be able to invest in financial assets that allow them to hedge some of the risks that are associated with the payment promises that they extend. Actually, one...
would expect that they are more willing to offer such products to the extent that they can hedge considerable parts of the associated risks.

The example of life annuity products

- Analysts who favour annuitisation argue that to provide a high level of benefit security annuities should be offered only by entities subject to adequate prudential oversight and solvency standards. Among existing institutions, life insurance companies seem almost uniquely suited to satisfy these criteria; they are subject to stringent solvency rules and have experience with annuity products. More importantly, perhaps, is that they would work on both sides of the market for life-time-related risks, on the one hand as sellers of life insurance (mortality risk) and on the other as sellers of life annuities (longevity risk). These two types of risks work in opposite directions, which other things equal would suggest that life insurers come close to being natural providers of annuities as an offset to their other business. The glitch in this otherwise rosy scenario is that life insurance companies seem reluctant to provide deferred annuities.

Offering products that provide annuity-like payments requires financial intermediaries to be able to hedge associated risks.

- Among the probable reasons why is the lack of suitable instruments to hedge the longevity risk they would be assuming. Upon closer inspection, it turns out that the shortfall in hedging instruments extends to more than just the tail end of retirement financing. Indeed, should life insurance companies evolve into significant providers of annuity contracts, they would be exposed, in addition to longevity risk, to interest rate and inflation risks – just like some defined benefit pension funds. Interest rate risk is considerable in the case of long-term and ultra-long-term fixed payment promises, as the value of the associated liabilities of the financial institutions (that offer such products) can change substantially in the case of even small changes in interest rates.  

Hedging interest rate risk may not be as straightforward as some might think.

- To enable financial intermediaries associated with the offer to provide life-long fixed-amount payments in turn to hedge themselves against the various risks, including interest rate risk, as pointed out before, suitable hedging instruments must be available. While one may think that hedging interest rate risk is relatively straightforward, the discussion in the fourth section of this note suggests that suitable hedging instruments are scarce.

- If financial instruments to hedge against interest rate risk are not available in sufficient quantities, the relevance of inflation and longevity risks may increase, as the combination of different risks may turn out to be harder to manage than each risk in isolation. This situation complicates the provision of annuity-like products for financial intermediaries.
To the extent that some form of compulsion is considered by policy makers, appropriate financial market instruments need to be available to allow hedging of risks.

- Under those circumstances, the policy options available to help ensure that retirees enjoy adequate levels of retirement incomes may not be as ample as some may think. For example, there are policy proposals to use soft compulsion to encourage or, perhaps, even to mandate deferred annuitisation of parts of household retirement wealth to address longevity risk. But for such a proposition to become operational there must be some entity willing to take the other side of the transaction and, from a risk management perspective, the willingness of prospective annuity providers to assume said risks would generally require the existence of sufficient quantities of suitable financial instruments to enable them to hedge considerable parts of the associated risks.

- As an aside, Visco (2006) notes, however, that while annuities are the classical answer to retirement-financing related risks, they are not the only one. In fact, annuities may make sense mostly for households whose financial wealth is large enough to buy them a significant income, and these households are few and not a concern in terms of old-age poverty. Since real estate is for households both a major investment and consumption good, financial instruments that address these two functions may also have an important role to play. In this regard, financial products that allow price risk to be hedged, yet providing liquidity as well, might be useful. In this context, reverse mortgages are already offered to a limited extent in some countries, but they are not standardised, and in most countries both supply and demand remain limited. Making reverse mortgages possible, affordable and desirable however might go a long way towards enabling households to ensure against major retirement-financing related risks.

III Shifts in pension fund asset allocations?

The rationale for age-related shifts in retirement saving allocations

Demographic developments may also influence the relative demand for different types of financial assets.

- Further to any effects that demographic developments might have on the level of demand for financial or real assets (see appendix), they may also influence the relative demand for different types of financial assets. In this context, in an empirical study pooling cross-country and time-series data on age structures and various financial structure indicators, Davis (2006) provides some indirect support for the hypothesis that asset allocations may change over the life-cycle, documenting that ageing does indeed benefit bond markets as opposed to equity markets.

When approaching retirement, the investor should gradually decrease the share of low-risk assets.

- A standard advice regarding investment choices over lifetime is as follows: An investor should invest a large part of its savings early in its working life in risky assets as opposed to risk-free assets, so as to earn a relatively higher return (e.g. to profit from the so-called equity premium). When approaching retirement and during retirement, the investor should gradually decrease the share of the former, so as to reduce the vulnerability of the investor against the materialisation of large adverse investment return shocks. Such a strategy is all the more necessary as the value of the investment portfolio, and hence the
adequacy of retirement benefits, could no longer be enhanced by raising savings out of labour income.

- The results of many recent life cycle portfolio choice models (that is, models that take into account that portfolio-choice determinants may change over lifetime rather than being static) are consistent with such investment advice, although the rationale is somewhat more complex than the one described above. It typically involves the subtle interactions between various economic variables, including labour income dynamics, the pattern of wealth accumulation and age. Specific results are very sensitive to the choice of parameter values, however. In this context, the inclusion of human capital and housing in such models further complicates the analysis and it could generate different predictions.

- Lifecycle funds (also known as target retirement funds) attempt to implement investment strategies along the lines described by life-cycle portfolio choice models. Such funds were first introduced in the 1990s, but did develop very slowly until recently, and have now become part of an increasing number of defined contribution plan investment options. This development reflects that numerous pension plan sponsors, mutual fund industry executives and pension and investment experts consider a disappointing experience the way in which many participants in DC plans manage their plan investments. In particular, many plan beneficiaries appear not to be making (saving and) investment decisions conducive to maximising the probability of getting adequate retirement income (Viceira, 2007). In response to these concerns, plan sponsors have begun adopting mutual funds that try to tackle for investors the tasks of allocating their assets appropriately and rebalancing their portfolios based on typical life-time and related considerations.

- Indeed, while most life-cycle arguments are based on presumed optimal investment behaviour on the part of individual decision makers, in practice, a large part of retirement savings are in fact “institutionalized savings”, pooled and managed professionally rather than by individual households.

- The pooling of retirement savings associated with such institutionalization may modify some of the above considerations, although risk management principles suggest that the maturity of the pension beneficiary population of a pension fund should direct its choice of assets, as they imply a specific expected pattern for future payment promises (liabilities).

Pension fund institutional settings differ, but also share an important common goal

Across countries, there are noticeable differences in the relative importance of the different types of institutions collecting (and paying out) retirement savings. Considering the main types of institutions, pension funds tend to dominate in the Anglo-Saxon countries, while life insurance policies are particularly important vehicles for saving for retirement income in some other countries.
Among the different forms of institutionalised saving, the growth of pension funds has probably been most directly related to saving for retirement, although the growth of other types of institutional investors also links to a considerable degree directly or indirectly to saving for financing retirement income.

There have been large inflows into pension funds and other institutionalised forms of saving since the 1990s, reflecting the noticeable increase in saving for retirement by the baby boomer generation as well as the partial transition from pay-as-you-go to funded pension schemes. As a result, private pension assets in the OECD area have grown dramatically over the last decade, from about 6 trillion in the mid-1990s to about 25 trillion by 2006. Of this, USD 16.2 trillion was held by (autonomous) pension funds, USD 4.3 trillion was held in retirement products provided by banks or investment management companies, USD 3.5 trillion was held in pension insurance contracts and USD 0.5 trillion were book reserves.

Pension fund sectors are also large compared to the sizes of financial markets. Aggregate pension fund assets currently represent more than 20 percent of worldwide equity and 10 percent of worldwide bond market capitalizations. Thus, as these investors are large by such measures, one would expect that even gradual changes in their asset allocations -- consisting either of a draw-down of assets or a change in relative allocations -- could have significant effects on asset prices.

Private (occupational) pension plans generally can be placed into two broad categories, defined contributions (DC) and defined benefit (DB) plans, although there are many variants and some hybrid forms. The difference between DB and DC schemes notwithstanding (especially with respect to the type of guarantees extended; see Box 1), there are also important similarities, and these may be more important than it may sometimes appear.

One element that is common to both institutional settings is that attempts to invest now to generate future income streams far out in the future faces important challenges in finding suitable investments. While this challenge is perhaps most apparent in the context of defined benefit pension funds, especially in situations where the liabilities of such schemes would have to be valued using mark-to-market approaches, at least conceptually, it also applies to defined contribution schemes as long as the implicit aim is to generate a stream of adequate future retirement income.

Unlike DB schemes, DC schemes explicitly focus mostly on the accumulation phase, although some countries require annuitisation of accumulated savings (see Antolin, Pugh, and Stewart, 2008). The generation of future income streams is often not explicitly addressed. Somewhat similar, programmed deferral schemes, although providing for a sequence of future receipts, stop short of promising and delivering an explicit income stream.

Pension funds are large compared to the sizes of financial markets, so that even gradual changes in their asset allocations may matter.
All types of funded schemes have in common that they implicitly assume that accumulated assets are ultimately used to finance income during retirement.

But despite this focus on accumulation of savings in DC schemes, it is argued here, all schemes – DB, DC, or hybrid schemes – have in common that they (at least) implicitly assume that the assets accumulated during the accumulation phase are ultimately used to finance income during retirement. To the extent that the implicit assumption of a pension scheme is indeed to accumulate wealth in order to generate stable future income streams (far out in the future), investment challenges are present irrespective of the specific institutional setting, as long as the scheme involves advance funding of (future) pension incomes.

Institutional investors differ, however, in particular in terms of their liabilities and the rules determining the distribution of risk and return between these institutions and the saver. These differences have implications for who is ultimately responsible for making up for any shortfall between the actual streams of payments and those that were expected or considered adequate. Thus, while the discussions in the remaining two sub-sections focus specifically on the example of defined benefit pension funds, the specific arguments in the discussion here may need to be modified in the case of other forms of institutionalised saving. Having said that, the main arguments are valid in the case of other types of pension schemes involving advance funding, which is used to produce annuity-like stable payment streams.

**Box 1. Box 1: Developments in private-pension institutional settings**

In defined contribution (DC) plans, benefits to plan members are based solely on the amount they contribute to the plan plus the investment return thereon. In defined benefit (DB) schemes, by contrast, sponsoring employers promise plan members that they will receive retirement benefits at a certain level, typically based on a formula linked to members’ salaries and length of employment. They also promise to make contributions to a legally separate fund or to hold in reserve amounts sufficient to provide those benefits. Thus, there are important institutional differences between these plans, in particular as regards the exposure of sponsor to risks. The fixed nature of benefit promises under such plans implies that plan sponsors face risks, such as interest, longevity and (if benefits are indexed) inflation risks.

While financial market developments at the beginning of the decade have highlighted the importance of asset choices of pension funds (to be discussed in the next section), the risk management issue for such institutions is also one of the type of guarantee extended. In this context, already for quite some time, there has been a noticeable shift in employer-sponsored retirement plans in some countries from DB plans to DC plans. In parts, this shift reflects fundamental economic developments such as a trend towards greater labour market flexibility and shorter job tenures, all of which favour the use of DC plans. Nonetheless, it has been certainly reinforced by recent experiences of plan sponsors with funding gaps (see for a discussion Schich and Stewart, 2005) and has been reflecting attempts on the part of plan sponsors to reduce their pension-related costs by shifting the interest rate, inflation and longevity risk associated with pension promises away from their own balance sheets and to the beneficiaries. In the United States, employers have been shifting from DB to defined contributions (DC) schemes for some time. In some other countries, where defined benefit plans have been important, similar shifts have been more recent, but also more dramatic in some cases, such as in Australia. Nonetheless, DB schemes continue to be a very important part of the pension fund universe in terms of assets under management.

The shift from defined benefit to defined contribution plans has put the spotlight on the effect that participants’ asset allocation decisions have on their financial resources for
considerations regarding asset allocations of defined benefit pension funds

Financial market developments at the beginning of this decade have highlighted the crucial role of proper risk-management.

- Financial market developments at the beginning of this decade have highlighted the importance of asset choices of financial institutions that promise to deliver long-term annuity-like payments. As a result of falling prices for equity -- in which many pension funds had a considerable part of their assets -- and declining long-term interest rates -- which are used to calculate the current value of defined benefit pension liabilities -- at the beginning of this decade, many defined benefit pension funds experienced considerable funding difficulties. These developments have highlighted again the crucial role of proper risk-management. In the case of the allocation of (defined benefit) pension fund assets, a “fundamental” principle of risk-management is that benefit security is maximized when the maturity and unit of account of assets are completely matched to deliver promised pension benefits.

- Higher returns can be obtained only by taking on higher risk, which requires a deviation from this principle. Given a deviation from the matching principle, asset-managers of pension funds need to adopt risk-management systems that carefully define the investment risks in relation to the expected liabilities of the pension funds.

- Incidentally, such systems are also becoming increasingly important because regulatory changes over the recent past have consisted of a relaxation and or elimination of quantitative restrictions on asset choices for pension funds, so that, currently, there are no major explicit quantitative limits specified for pension fund asset choices. This situation implies that pension funds risk management systems and practices play a greater role in asset allocation decisions.

- Other developments are considered to be reinforcing this trend. Changes in accounting imply that listed firms have to incorporate pension liabilities in their financial statements. Thus, to avoid that financial losses in their pension plan adversely affect their core business activity, pension fund managers are placing on pension fund asset-liability matching. This trend is also reinforced by regulators and supervisors taking a more risk-based approach in pension regulation and supervision. An example is the setting up of a pension protection fund in
the United Kingdom, where the premiums charged to members of the protection scheme varies with risk measures. Also, changes in pension fund accounting imply that pension fund managers who wish to limit the volatility of their regulatory funding ratio should hold more assets with a high correlation to the discount rate used for liabilities.

- As a result of experiences with funding gaps and the various other developments described above, pension funds have been increasingly replacing their traditional focus on producing an asset portfolio return defined in relation to a benchmark by attempts to better match assets with liabilities. It should be mentioned however that, at the same time, some pension funds, sometimes motivated by the existence of considerable funding gaps, have also shifted parts of their asset allocations to alternative investments and other financial instruments that promise higher returns in an attempt to achieve higher average portfolio returns.

Shifting in defined benefit pension fund allocations to (public) bonds?

- There is no general agreement on the optimal bond-equity mix for pension fund portfolios. A priori, it would seem that there is no “natural” investment choice for pension fund assets and that neither bonds nor equity are perfect matches for liabilities that consist of the obligation to pay a regular income to future retirees and beneficiaries (in the case of a defined benefit pension fund liability). Consistent with this view, in practice, there is no typical bond-equity mix in portfolios of occupational pension funds across OECD countries, neither in the case of DB nor DC schemes.

- Although the debate about the “ideal” asset choice for (defined benefit) pension funds’ investments is ongoing, there seems to be growing consensus however that the sharper focus on ALM typically involves -- supply permitting -- a shift of pension fund assets away from equity to bonds (as would life cycle considerations suggest given a growing maturity of plan members) in countries where equity allocations are considerable (such as the United States and the United Kingdom).

- Indeed, conceptually, pension fund liabilities are similar to a short position in a portfolio of bonds (especially if the fund is closed to new contributions). Thus, long positions in suitable bonds would provide a better match than equity for pension fund liabilities. Moreover, the correlation between equity and pension fund liabilities is very limited in the short term and medium-term and time-varying. These aspects cannot be ignored in determining a good hedge, especially given the ongoing trend towards fair valuation of liabilities.

- Suitable investments would appear to be in particular long-term and ultra-long-term government bonds, given their limited credit risk and long duration. Against the backdrop of this assessment, it appears natural that, before current turbulence, heightened demand from pension funds for long-term government bonds was regularly cited as one of
several explanations for low levels of long-term interest rates. According to some observers, for example, the episode from 2004 and 2006 when short-term interest rates in the United States were rising, while long-term rates remained low was a clear example of this effect.

- The financial press reports anecdotal evidence in support of the hypothesis that (defined benefit) pension schemes are increasingly shifting their asset allocations towards bonds, albeit with considerable differences in trends across countries. In this context, such shifts are neither clear nor uniform across countries, although they are more plausible in countries where equity allocations in pension portfolios predominate (see also Weber, 2007).

- Judged by developments in aggregate data for pension fund assets allocations in OECD countries with major funded pension fund sectors (data includes both defined benefit and defined contributions schemes), it is not so clear however whether a very significant shift towards bonds, especially public ones, has actually already happened. Figures 1 and 2 show data collected by the OECD Global Pension Statistics on asset allocations of pension funds. The figures show that there indeed has been an increase in the absolute amount of pension fund bond and public bond investments in several countries with large pension sectors.

- Also, the situation is different in relative terms, *e.g.* as measured by the share invested in bonds (or public bonds) as of total assets. The share invested in securities issued by public administrations as a percentage of total investments has slightly increased in Canada between 2002 and 2006, but it has decreased during that period in all other OECD countries with large pension fund sectors that are included in the present sample. Actually, on an aggregate level for several countries with major pension fund sectors, the relative share invested in public bonds has even declined noticeably over the period for which data has now become available (Figure 2, dark line).
Figure 1: Pension fund investment in public and corporate bonds in selected countries

Note: Aggregate data for (autonomous private) pension funds in Australia, Canada, Japan, the Netherlands, the United Kingdom, and the United States. Data for the United Kingdom for 2007 are extrapolated from data for 2006 using the Thomson Financial bond return index for the United Kingdom.


Figure 2: Pension fund investment in public bonds in selected countries

Note: Aggregate data for (autonomous private) pension funds in Australia, Canada, Japan, the Netherlands, the United Kingdom, and the United States. Data for the United Kingdom for 2007 are extrapolated from data for 2006 using the Thomson Financial bond return index for the United Kingdom (assuming unchanged mix between public and other bonds).

IV  “Scarcity” of suitable investments for generating annuity-like payments

Government bond supply developments

One suggestion is that the lack of evidence for a shift towards bonds reflects the limited supply of suitable government bonds. In this context, note however that governments in several OECD countries have started issuing or re-introduced the issuance of very long (20 to 30 years) and ultra-long (30 years and longer) bonds in recent years. For example, 50-year nominal bonds were issued by governments in France and the United Kingdom in February and May 2005, respectively, while the latter also issued 50-year inflation-linked bonds in September 2005. In February 2006, the 30-year Treasury bond, the issuance of which had been discontinued, was reintroduced in the United States. Issuance of these various bonds has continued since then.

- As a result of these supply developments, more long-duration government securities have become available. The average term to maturity of government debt outstanding has also increased in several constituencies. Average durations have changed in some G-10 countries, but not in others.

- Moreover, they remain in the single-digit range in the case of most of these and other OECD countries, while the typical duration of pension fund liabilities in several OECD countries is estimated to lie between 10 and 20 years (Engel et. al., 2005). Similarly, the maturity of the typical liability profile of mature pension funds are estimated to extend to 50 or 60 years, while that of most bonds in the G-10 countries does not exceed 30 years (see Figure 3, showing the future cash flows to be had from investments in these bonds now). Thus, there is a considerable gap between the duration and maturity of pension liabilities and those of outstanding government bonds.
Difficulties implementing asset-liability matching

Implementing ALM may be difficult because there are insufficient quantities of suitable assets

- Indeed, these recent supply developments notwithstanding, many writers have argued for some time now that (defined benefit) pension fund managers or those of other financial institutions offering annuities will have difficulty implementing asset-liability matching because there are insufficient quantities of suitable assets (Visco, 2005).

- To obtain a sense of whether and where there is “scarcity”, one could compare the patterns over time of (estimates of) future pension fund payment promises with the cash flows that pension funds could obtain from investing in government bonds today. The diagram below compares the future cash flows implied by the current stock of outstanding G-10 government bonds (those are the white boxes above the line) to projections of aggregate payment promises from pension funds to their current plan members (the dark boxes below the line). The latter are estimated using demographic variables such as the current population age structures and mortality dynamics and assumptions about retirement entry ages in G-10 countries.

It looks indeed like there is considerable “scarcity” of such assets.

- Under these simplifying assumptions (and there were others), it looks like there is considerable “scarcity” (Figure 4). The “scarcity” measure is shown by the line; it is a measure of the limit of the capacity of pension funds to implement an asset-liability cash-flow matching strategy using government bonds. Such a strategy would allow them to
protect themselves against the materialization of interest and inflation risk (for a specific horizon), although longevity risk would remain an issue. The existence of longevity risk is likely to give added relevance to the issue that hedging interest rate risk remains difficult. It is known that the product of different risks could be greater than the simple sum of different risks (see also Box 2).

- The figure shows that estimated potential shortages vary noticeably across maturity segments. For example, if we look ahead 10-15 years (that is to the years 2018 to 2023 in the Figure) the demand for government bonds exceeds the supply by 3 times or 300 percent. Further out, at 30 years or more, the ratio could get even more extreme. Thus, the figure illustrates that, in the case of pension funds in the G-10 countries, asset-liability matching is not feasible at all for some maturity ranges, using government bonds only.

Figure 4. A simple measure of “scarcity”

This situation raises the question as to what the role of governments in providing appropriate financial instruments could be, especially as governments are in a unique position to issue long-term indexed bonds with very limited default risks, allowing investors to hedge interest and inflation risks over long term horizons, which are key risk in the context
of retirement income financing, in addition to longevity risk (see Box 2 for the latter). Should, for example, government debt managers shift the weight of their issuance toward the long-end of the maturity spectrum in order to help pension fund managers and annuity providers match assets and liabilities?

- Thus far, this proposal has not received any support among debt managers. For one, it has been argued that there would be a need to change the (relatively narrow) mandates of government debt managers. The issuance of government securities is targeted at the primary strategic objective of minimising borrowing costs of the government over the long term, subject to an acceptable level of risk. Facilitating other government objectives such as ensuring a high degree of pension benefit security is not an obvious part of these objectives in their current interpretation.\(^{14}\)

- Members of the OECD’s Committee on Financial Markets, at its meeting about two years ago, took a perspective that is broader than the one emphasised by members of its Working Party on Debt Management. They looked beyond the current interpretation of government debt management objectives and focused on prospective trends in financial markets. In particular, members of the CMF concluded that private market-based solutions should and will emerge, thus limiting to some extent the need for any specific government intervention (see also Ervin and Schich, 2007).

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**Box 2. Box 2: Additional complications arising from the existence of longevity risk and related financial market considerations**

The main text focused on financial instruments to implement a cash-flow matching strategy for given horizons of payment promises. In reality, one important risk associated with fixed benefit promises of the type provided by defined benefit schemes and annuities is longevity risk, here defined as the risk that the beneficiary outlives its expected lifetime. The cash-flow matching framework discussed before abstract from the issue of longevity risk, but there is also a general lack of financial instruments to hedge against longevity risk, which tend to further complicate any efforts of hedging the risks associated with life-long fixed payment promises.

In fact, there may be interactions between the different risks that can give rise to non-linear effects, so that adverse effects resulting from the materialisation of both risks combined exceed the sum of the adverse effects that would result from the materialisation of each risk in isolation (in technical terms risks are superadditive).

The Insurance and Private Pensions Committee’s Working Party on Private Pensions has held a series of meetings on the issue of longevity risk and the potential roles of governments in facilitating the management of this risk. One suggestion that also has been discussed by the Committee on Financial Markets (CMF) is related to the issuance of longevity-indexed bonds. In this context, delegates at the meetings of the CMF and its Working Party on Debt management (WPDM) essentially rejected the idea that governments could play a role in encouraging the development of markets by issuing longevity indexed bonds themselves. The latter argued that OECD public balance sheets are already significantly exposed to longevity risk from their public pension systems and that issuing longevity-indexed government bonds under such circumstances is not feasible as it would further increase such exposures (Antolin and Blommestein, 2007).
Nonetheless, they agreed, governments can take other steps such as helping private market participants producing longevity indices. For example, there is a lack of a common methodology to forecast improvement in mortality and life expectancy, and generally agreed indices for future life expectancies are not available. Governments could, through their national statistical institutes, support the development of reliable and widely accepted longevity indices to be used as a benchmark for pricing longevity hedging products, thus helping the development of markets for such products. CMF delegates suggested that government make the underlying data available in appropriate format so as to facilitate private market participants’ efforts in developing and refining longevity indices. They stopped short, however, of recommending that governments act as co-ordinators or supervisors for private sector efforts to develop longevity indices.\textsuperscript{15}

The results of the previous discussions by the CMF regarding the role of governments in providing suitable pension fund investments coincidentally is summarised in the following statement made by the President of the Deutsche Bundesbank in his opening address of a conference on ageing and financial markets (Weber, 2007): “This …[the scarcity of financial instruments that enable pension funds and life insurers to manage duration, inflation and longevity risks]…is the reasoning behind the occasional call for the government to act as a catalyst for the private issuance of inflation and longevity hedges. I do not object to authorities issuing ultra-long fixed and inflation-indexed bonds at market prices. But governments should refrain from issuing longevity bonds. Not only do governments lack a suitable hedge for longevity risks, but – due to national pay-as-you-go schemes – they already face a huge demographic burden which should not be exacerbated needlessly”.

V Emerging private market solutions

The example of swap markets

Private market solutions are indeed forthcoming, including long-term interest rate swaps

- Private market solutions are indeed forthcoming. For example, swaps have been advocated as appropriate solutions for pension fund managers for some time now (e.g. Capelleveen et. al, 2003, 2005) and a similar case could be made for any financial intermediaries offering fixed annuity-like products. Indeed, a variety of players are already providing liability-driven investment solutions for pension funds, often based to a considerable extent on interest rate swaps.\textsuperscript{16} As a result, markets for such instruments have been growing rapidly (Figure 5), and they are currently very large.

- The (notional values of)\textsuperscript{17} outstanding interest rate derivatives between reporting banks and other financial institutions with a maturity of five or more years exceeded USD 60 trillion by the end of 2007. Most of the derivatives have maturities between five and ten years, which could be rolled over before the end of the term, although there are also contracts that can extend to several decades. More often than not, they are not longer than ten years however.
But these solutions also raise new challenges. In this context, some lessons can be learned from the experience in Denmark. In that country, derivatives have been an essential part of the solution to risk management challenges for pension funds, especially since the beginning of this decade. The experience has shown the following (Ladekarl, et. al., 2007):

- First, through the use of derivatives, pension institutions can achieve closer matching of projected revenue and payment patterns, thus reducing their exposure to interest rate risk. But, while interest rate risks are being reduced, other risks arise, such as operational and credit risks. Operational risk can be significant in the case of those pension funds that do not have the proper risk management and governance arrangements in place, which suggests that liability-matching through the use of bonds may be preferable. Also, unless swap contracts are collateralised or guaranteed, their ultimate value also depends on the creditworthiness of the counterparties to them, thus exposing pension funds to credit risk. In this context, note that swap providers or counterparties include some of the (commercial and previously independent investment) banks that have come under significant financial pressures during the recent financial turmoil.

- Thus, at the minimum, there is a greater need for sound risk management practices on the part of pension funds. In this context, in January 2006, the OECD published its 'Guidelines on Pension Fund Asset Management'. The guidelines highlight the need for effective risk management processes for the fund's assets and liabilities and support...
the identification of a level of asset-liability matching that can be monitored by the pension fund's governing body. The revised OECD guidelines for pension fund governance, call for risk-based internal controls and in particular the implementation of appropriate risk management procedures.

- Notwithstanding the likely (further) improvements in pension fund risk management, this example of an emerging private market solution to address pension-related interest rate risk also raise new issues. For example, one question is to what extent is credit risk exposure acceptable for institutions providing retirement financing?

- Ensuring a high degree of pension benefit security is a major policy goal, however, and credit risk would seem to be inappropriate for financial institutions designed to ensure a high degree of benefit security.

- The recent financial turbulence has put a spotlight on the role of credit risk and it has highlighted that even very sophisticated credit risk managers can get its assessment wrong. Indeed, the drying up of liquidity in core financial markets during the recent turmoil reflects to a large extent the sudden drop in lack of trust on the part of banks in the creditworthiness of their peers and the difficulties in evaluating the complex interactions between liquidity and credit risk.

- Actually, the financial turbulence might have already slowed or delayed the execution of derivatives-based liability strategies at pension funds, as it has reminded pension fund managers that the possibility of a default of a major commercial or investment bank is not zero.

- On September 15, 2008, Lehman Brothers Holdings Inc. filed for Chapter 11 bankruptcy. The company was a major player in the derivatives markets, although less so in the segment of long-term interest rate swaps. The relevance of counterparty risk in the latter segment was clearly highlighted by the considerable increases during late September and early October in the credit default swap prices for the debt of the major long-term swap providers. The cost of buying protection on credit exposure to these entities suggested that market participants attached a significant probability to a default by them over the short term. Following the announcements of the various rescue packages, however, these spreads fell again to levels somewhat closer to historical norms. The question as to what extent pension funds should have exposure to credit risk through interest rate swap transactions is particularly relevant given that they have suffered on their exposures to this type of risk in the remainder of their asset portfolios.

Strategies can be costly to execute and markets may not be very liquid.

- Second, such strategies can be costly to execute, however, and markets may not be as liquid as some commentators suggest. For example, it has been reported (Ladekarl, et. al., 2007) that one contract of a Danish pension fund -- The Labor Market Supplementary Pension Fund -- was sufficiently large to have a significant impact on rates on the euro market. This example
may be seen as suggesting that liquidity is limited, although more gradual implementations of swap arrangements might avoid such price reactions. In this context, there are however also some reports suggesting that several pension funds decided to hedge only a limited percentage, e.g. only 50 per cent, of the interest rate risk on their portfolios even though they initially planned to hedge 100 per cent of such risk. These observations underline that the market may not be as liquid as some commentators have suggested.

**Lack of “natural” counterparties**

There are very few “natural” counterparties that would accept to offer fixed rate against floating rate payments.

- The major reason for the limited liquidity appears to be the fact that there are very few “natural” counterparties that would accept to offer long-term fixed rate payments in exchange for floating rate payments. Most banks are not such “natural” counterparties.
- There are some banks, however, that specialise in buying and securitising infrastructure investment assets, and sell them on to investors including pension funds in form of bonds. Such assets typically provide a regular stream of income over long periods into the future. They are thus ideal direct or indirect investment counterparties to investors interested in securing regular and stable future payments from current investments.
- To the extent that these banks own infrastructure assets, participation in the swap market as provider of long-term fixed legs is facilitated. As an aside, a case is also being increasingly made for pension funds to invest directly into infrastructure assets rather than more indirectly through investments in derivative portfolios offered by other financial intermediaries (Box 3).

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**Box 3: Direct investments of pension funds in infrastructure assets?**

Traditionally, pension fund exposure to infrastructure investments has been in the form of holdings of shares or bonds of listed utility companies or transport network companies (e.g. motorways, tunnels, ports) or via real estate investment funds with exposure to infrastructure-related property. More recently, some larger funds have begun to invest in infrastructure assets either via private-equity funds, or, although more rarely, directly. Examples include pension funds in Australia, Canada and the Netherlands.

There are a number of issues associated with such direct investments in infrastructure projects however. For one, there is a wide range of fees and costs incurred (including financial adviser and other advisory fees, finance arranger fees, fees for provision of funding, project developments fees etc) and the transparency of fee structures can be limited. Also, the lifespan of the infrastructure vehicle is often not very long, not exceeding ten years.

In any case, such direct investments also expose pension funds to significant credit risks. Such a risk could be particularly high in the case of infrastructure projects, as these projects are often highly financially geared, similar to private equity funds. Perhaps even more importantly, there is also considerable regulatory and political risk. Given the visibility of infrastructure, related licenses and regulations will be likely to be more under the scrutiny of the public than, e.g. more privately owned real estate, thus giving rise to
VI Conclusions

A rapid asset meltdown is highly unlikely

The current consensus view is that an asset meltdown is highly unlikely, …

- As developed in the companion note ("Revisiting the Asset-Meltdown Hypothesis", DAF/CMF(2008)23/ADD1), the asset meltdown hypothesis essentially implies that the volume of assets available for sale would greatly exceed the demand at book values, so much so in fact that the only way for the market to absorb the volume on offer would be through dramatic falls in price. The current consensus view is that such an outcome is unlikely, as there a number of factors that would mitigate the potential impact of demographic changes on domestic financial asset returns, including in particular international capital movements.

- In this context, a major question is to what extent are demographic developments and their implications for saving behaviour already reflected in financial asset prices and how fast might any additional pressures on financial asset prices play themselves out. Demographic developments, such as the entry of baby boom generations into retirement, are slow moving and relatively easy to predict, so that one would expect forward-looking and efficient financial markets to price these developments well before they actually occur. Another possibility, less discussed, is that financial education programmes will succeed in convincing younger generations to begin saving for their own retirement sooner than did older generations, thus adding to the potential demand for assets and limiting the chance for any rapid demographically induced asset meltdown. Having said that, financial markets are not complete and seem to provide only limited possibilities to hedge risk over long time horizons.

- Indeed, financial markets are characterised by a number of other imperfections and, in particular, they tend to overreact to changes in fundamentals. Thus, while a rapid asset meltdown is highly unlikely, such an outcome cannot be completely ruled out. It is difficult at this point in time to conceive of any specific developments related to demographics that may have the potential to trigger strong financial market reactions. But the recent financial turbulence has highlighted that financial systems are prone to occasional turmoil and that triggering events are difficult if not impossible to foresee beforehand.

Changes in pension fund relative asset allocation are more limited than one might think

There is limited evidence of a strong shift in pension fund assets from equity to (public) bonds…

- In addition to any effects that demographic developments might have on the level of demand for financial (or real) assets, they may also influence the relative demand for different types of financial assets, e.g. as would be implied by life-cycle investment considerations.

- So far, judged by relative asset allocations in (autonomous private) pension funds, there is limited evidence of a strong shift from equity to
(public) bonds, which might otherwise be expected if pension fund managers sought to minimise volatility in the returns on the portfolios accumulated to finance the retirement incomes of ageing of baby boomers.

**Limited supply of suitable investments for intermediaries offering annuity-like payment promises**

- One suggestion is that this phenomenon, rather than signalling a lack of desire on the part of fund managers to hedge, reflects in fact the limited supply of suitable government bonds. Indeed, many writers have argued for some time now that pension fund managers will have difficulty implementing ideal asset-liability matching because of insufficient quantities of suitable assets. In this context, the present note has drawn specific attention to the difficulties in hedging interest rate risk (while other key risks associated with offering such products include longevity and inflation risks).

- If true, this assessment would also help explain the limited interest that financial intermediaries appear to show in offering annuity products. Thus, the question (discussed by the CMF at its meeting in November 2005) as to what role the government should play in providing instruments that allow providers to hedge against the various risks associated with offering annuity contracts remains relevant.

- Actually, the question may even become more relevant to the extent that governments consider using soft compulsion or go further and mandate some form of (deferred) annuitisation. Indeed, if financial intermediaries are to offer such products, they need to be able to hedge themselves against the variety of risks associated with such promises. Thus, to the extent that some form of compulsion is considered, one might think it almost a necessary precondition to make sure that appropriate financial market instruments are available to allow financial service providers to hedge at least a considerable part of the risks taken on by providing annuity products.

- As it turns out, suitable hedging instruments are scarce. And it turns out that the shortfall in hedging instruments extends to more than just the “toxic” tail of longevity risk. The analysis in this note has shown that hedging interest rate risk is also not as straightforward as one may think. There is not only a difficulty in hedging longevity risk (which is what most analysts in the pension area focusing on), but there are also difficulties in hedging interest rate risk associated with long-term payment promises, given that there are very few if any “natural” counterparties that would accept to offer long-term fixed rate payments in exchange for floating rate payments.

**Emerging private market solutions and associated challenges**

- But as foreshadowed in the discussions by the CMF in November 2005, private market solutions are actually forthcoming in relation to the various types of risks, such as longevity, inflation and interest rates
risks. Clearly, one question is at what speed markets will develop and whether they are moving rapidly enough.

- Moreover, private market solutions also raise new issues, as was argued herein using the example of the markets for swaps, which could help pension funds hedge some of their interest rate risk exposure. The issue raised in this context is to what extent should counterparty credit risk exposure be allowed for institutions providing retirement financing, involving payment promises that extend over very long-term horizons?

- Ensuring a high degree of pension benefit security is a major policy goal; thus, credit risk would seem to be inappropriate for financial institutions designed to ensure a high degree of benefit security. The issue to what extent financial institutions with fiduciary duties vis-à-vis pension beneficiaries should be exposed to credit risk remains an important policy question.

- At a minimum, efforts to improve risk management at these institutions would need to be undertaken. In the case of DB pension funds, such efforts are being driven by the OECD through its guidelines on asset management and governance of pension funds (OECD, 2006 and OECD, 2008). The former highlights the role of ALM in designing pension fund investment portfolios while the latter calls for risk-based internal controls and in particular the implementation of appropriate risk management procedures.

- In addition, policy measures could be considered that would improve the infrastructure, transparency and depth of swap markets. There are also a number of policy action that have been proposed in recent discussions of ageing and financial markets that are likely to have positive effects for swap markets, even if they are occurring in indirect ways. In particular, by promoting the development of other markets, including those for infrastructure investments, reverse mortgages etc., financial institutions participating in the swap market may themselves be able to hedge themselves using a wider range of transactions and counterparties.

- The recent financial turbulence has underscored the relevance of credit risks and the difficulties in managing them. In particular, it has highlighted that even sophisticated credit risk managers and financial institutions whose core business includes credit risk management can get the assessment wrong. Indeed, the drying up of liquidity in core financial markets during the recent turmoil reflects to a large extent the sudden drop in lack of trust on the part of banks in the creditworthiness of their peers and the difficulties in evaluating the complex interactions between liquidity and credit risk. Moreover, pension funds have suffered on their exposures to this type of risk during the recent financial turmoil.

- Under the circumstances, one might well question whether exposure to significant credit risk is at all appropriate for institutions with long-term investment horizons and a fiduciary duty to ensure a high degree of retirement benefit security. Indeed, the discussion herein suggests that it
is difficult enough for funds to properly hedge against interest rate risk, given the shortage of suitable instruments, let alone other types of risks such as longevity and inflation risks. There may be interactions between these different risks that can give rise to non-linear effects, so that adverse effects resulting from the materialisation of several risks combined exceed the sum of the adverse effects that would result from the materialisation of each risk in isolation. The difficulties in hedging the combination of these risks are a major constraint to the provision of annuity-like products.

- As a consequence, the policy options available to help ensure that retirees enjoy adequate levels of retirement income may not be as plentiful as some may think. For example, there are policy proposals to use soft compulsion to encourage or, perhaps, even to mandate (deferred) annuitisation of parts of household retirement wealth to address longevity risk. But for such propositions to become operational there must be some entity willing to take the other side of the transaction and, from a risk management perspective, the willingness of prospective annuity providers to assume said risks would generally require the existence of sufficient quantities of suitable financial instruments to enable them to hedge considerable parts of the associated risks.
NOTES

1 The term ‘decumulation’ is used here bearing in mind a stylised life-cycle scenario whereby a (representative) individual accumulates assets during his working life, so as to draw on them for financing income during the retirement period. In some discussions of such issues, the term ‘payout’ phase is used instead. It is suggested here that the two terms are similar, but that there is a subtle difference as regards the perspective of the commentator. In particular, the term ‘decumulation’ is typically used in discussions that abstract from any particular institutional setting. By contrast, the term ‘payout phase’ is used more often in discussions related to specialised institutions that accumulate and decumulate retirement savings such as pension funds or (life) insurance companies.

2 At the outset, it should also be noted that, while the present note has a rather narrow focus on the link between ageing and financial markets, one needs to bear in mind the broader picture, which includes in particular the effect of demographics and related policies on real economic activity. Developments in labour productivity and income growth have important implications for financial market activity and any changes in these variables as a result of demographic developments and/or policies to address related issues are likely to have effects on financial market activity, but the scope of these measures is uncertain and they are not explicitly addressed in the current note.

3 Indeed, the question of how to improve the financial market infrastructure and (private) pension systems to ensure that they generate retirement incomes during the payout phase, the level of which can be considered adequate by some measure, is the focus of another session of the present seminar.

4 Also available as OECD Working Paper on Insurance and Private Pensions N°25 at http://www.oecd.org/findDocument/0,3354,en_2649_34853_1_119684_1_1_1,00.html.

5 First, it has been well-documented how sensitive the level of returns on capital accumulated can be to small differences in the choice of timing of liquidisation of investments. Individual asset allocation choices that seemed logical during accumulation can prove problematic in the decumulation phase if one is forced to sell into a down market. Second, in the aggregate, assets sold by one generation during its decumulation phase are likely to be acquired by subsequent generations entering their accumulation phase. But if the sizes of generations are significantly different, these inter-generational exchanges of assets could have sizable effects on asset prices, again affecting both accumulation and decumulation (see also Box 1).

6 This statement applies in particular in situations where annuity-like payments are not already automatically provided, as they generally are in the case in defined benefit schemes.

7 If the DB scheme is closed, the liability structure can be assessed with a reasonable degree of certainty (of course, abstracting from the issue of uncertainty about longevity, variations in which would tend to either lengthen or shorten the payment horizons). But when DB are open to additional contributions, several additional uncertainties involving salary projections etc. arise further to those already characterising closed defined benefit schemes.


9 See Pugh and Yermo (2008) for a description of hybrids. Note that the above definition applies to occupational pension plans, but not to personal pension plans. Thus, strictly speaking, the definition applies
to private pension funds only to the extent that the funds are occupational, rather than personal. Occupational pension plans are pension plans to which access is linked to an employment or professional relationship between the plan member and the entity that establishes the plan (the sponsor). Personal pension plans are plans that do not have to be linked to an employment relationship. Such plans are established and administered directly by a pension fund or a financial institution acting as pension provider without any intervention of employers.

The analogy is not exact however, even if it relatively close in the specific case of defined benefit schemes that are closed to new contributions. But even in the case of the latter, there is one important difference: The term of bonds is typically specified while the horizon of pension fund liabilities depends on (uncertain) lifetime of beneficiaries.

The typical reports, which draw on work conducted by investment consultants such as Mercer etc., suggest that pension funds with relatively high equity allocations, such as those in the United Kingdom, are shifting significant amounts of their portfolios into fixed income assets, while pension funds in countries where fixed-income allocations were traditionally high, are doing the opposite.

The situation generally varies across countries and the sample available at the time of writing may not be representative for the whole of the OECD. More comprehensive data and related analysis will become available in the publication OECD Private Pensions Outlook, forthcoming in November 2008.

This particular measure is not strictly speaking a direct measure of scarcity of suitable pension fund investments. Rather, it is a measure of the limit of the capacity of pension funds to implement an asset-liability matching strategy involving cash flow matching using government bonds. The link between this gap (essentially a flow concept) and the amounts of suitable investments (a stock concept) is rather straightforward, however.

The issue of interpreting the scope of current public debt management mandates is also relevant in view of the fact that OECD countries are facing a number of other significant economic risks accumulating in the medium and longer term, including those related to health care. The interaction of these risks with retirement-financing related risks could lead to strong pressures on household sectors. These, in turn, could ultimately necessitate government intervention, although in a less structured fashion. Having said, such doomsday scenarios would appear to be quite unlikely. Governments of countries with ageing populations are implementing policy measures that tend to offset the negative effects of demographic developments on their economies’ potential growth rates. These include measures that aim at raising employment rates and in particular at increasing the supply and demand for older workers. Changes in immigration policies are also considered and implemented with a view to maximising the economic benefits to countries with ageing populations. The effect of demographic developments on economic activity and financial markets depend on policies and reforms, and the policy measures mentioned above are likely to reduce the scope for any dramatic financial market reactions.

As an aside, interesting recent developments in this context, potentially supporting the growth of longevity-risk related products, are the launches of longevity indices by Credit Suisse and JPMorgan.

In an interest rate swap, each counterparty agrees to pay either a fixed or floating rate denominated in a particular currency to the other counterparty. The fixed or floating rate is multiplied by the notional principal amount. This notional amount is generally not exchanged between counterparties, but is used only for calculating the size of cashflows to be exchanged. The most common interest rate swap is one where one counterparty pays a fixed rate (the swap rate) to another counterparty, while receiving a floating rate, which is usually pegged to a reference rate such as LIBOR.

The notional value of derivatives is a standard measure used to gauge the size of markets. It should be noted, however, that the notional value in an interest rate swap is never actually changing hands but that it is a specified USD amount on which the exchanged interest rate payments and actual cash flows are based.
Pension fund consultants acknowledge this aspect in discussions of swap solutions for pension funds. For example, in an overview of institutional investments in structured products, an expert from the pensions consultant Watson Wyatt is cited as follows: “Swap solutions are only one option, but they are not suitable for every fund and we have been advisers in many cases where such transactions are not supported. Implementation of liability-driven investment using derivatives usually requires significant additional governance resources, whereas using bonds can often be effective regardless of governance capabilities.” See ‘Pension Funds Cautiously Explore Hedges’, Financial Times Fund Management (FTfm), *Structured Products*, 7 July 2008.

These guidelines were issued for public consultation in July 2008 (http://www.oecd.org/document/44/0,3343,en_2649_34853_41087276_1_1_1_1,00.html).

The pension consultant Watson Wyatt reports that the credit crisis has delayed the execution of derivatives-based liability hedging strategies. The firm says “that the International Swaps and Derivatives Association agreements and documentation required to execute such transactions are now taking longer to process because they contain more onerous legal conditions”. See ‘Pension Funds cautiously Explore Hedges’, in: Financial Times fund management (FTfm), Structured Products, 7 July 2008.

See e.g. “Pension have billions in toxic assets”, by Steve Johnson, Financial Times, 20 October 2008.

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