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The Effect of Solvency Regulations and Accounting Standards on Long-Term Investing: Implications for Insurers and Pension Funds

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ABSTRACT/RÉSUMÉ

THE EFFECT OF SOLVENCY REGULATIONS AND ACCOUNTING STANDARDS ON LONG-TERM INVESTING: IMPLICATIONS FOR INSURERS AND PENSION FUNDS

This report reviews recent as well as planned changes to accounting and solvency regulations affecting insurers and pension funds and how they may impact long-term investing by these institutions. The review of existing evidence focuses mainly on the impact of risk-based solvency requirements, identifying instances where such regulations may have driven changes in investment strategies and potentially led to pro-cyclical investment behaviour such as the fire-sale of assets in market downturns. The report concludes with a note of caution regarding the application of strict fair value and risk-based solvency rules.

JEL codes: D21, E32, G01, G15, G23, G32, J33, K20, M40, M52

Keywords: pension fund, insurer, solvency, funding, defined benefit, accounting, economic value, fair value, long-term investing

LES EFFETS DES NORMES PRUDENTIELLES ET COMPTABLES SUR L'INVESTISSEMENT À LONG TERME : CONSÉQUENCES POUR LES ASSUREURS ET LES FONDS DE PENSIONS

Ce rapport passe en revue les modifications récentes et à venir des règles prudentielles et comptables applicables aux assureurs et aux fonds de pension, ainsi que leur impact sur les stratégies d'investissement à long terme de ces institutions. L'examen des données factuelles porte principalement sur l'impact des exigences de solvabilité fondées sur les risques, met en lumière les cas où ces règles ont pu se traduire par un ajustement des stratégies d'investissement, et potentiellement déboucher sur des comportements d'investissement procycliques, comme le bradage des actifs en période de baisse des marchés. Le rapport conclut en mettant en garde contre une application trop stricte des règles prudentielles basées sur les risques et du principe de la juste valeur.

Codes JEL : D21, E32, G01, G15, G23, G32, J33, K20, M40, M52

Mots clés : fonds de pension, assureur, solvabilité, financement, prestations définies, comptabilité, valeur économique, juste valeur, investissement à long terme

THE EFFECT OF SOLVENCY REGULATIONS AND ACCOUNTING STANDARDS ON LONG-TERM INVESTING: IMPLICATIONS FOR INSURERS AND PENSION FUNDS

By Clara Severinson and Juan Yermo*

Executive summary

Pension plans, by their nature, involve long-term commitments. Life insurance contracts can equally span very long periods. The assets supporting such commitments should be invested with this long-term horizon in mind, with due consideration to the risk profile and liquidity needs of members and policy holders. Management of liabilities and assets cannot, however, be made purely based on economic considerations, but is subject to regulatory, tax and accounting constraints.

Major developments have been taking place in solvency regulation and accounting standards. These changes have had, and will continue to have, a profound impact on long-term investors such as life insurers and pension funds. Over the past decades, views on long-term investing have evolved following changes to regulations and accounting requirements, demographic shifts and lower market return expectations.

Recent developments in accounting, in particular the introduction of fair value principles, have brought greater transparency and consistency to financial statements. By applying a common valuation methodology, investors and consumers can get a better sense of the relative financial condition of different institutions.

However, the move towards fair value has also brought a greater focus on short-term market fluctuations, and some would argue that this has been to the detriment of the long-term investment horizon. It is particularly surprising to find that the strictest fair value methodology is applied to pensions, even though these have, in general, longer duration liabilities than banks and insurers, which currently benefit from other valuation techniques such as historic or book values for some of their assets.

Fair valuation is also at the heart of risk-based funding and solvency regulations as applied in certain countries to pension funds and as envisaged in the Solvency II framework for European insurers. Among other aspects, such regulations apply a different capital charge to different investments depending on their perceived riskiness and use risk-free discount rates. The low interest rate environment has led some countries to change the methodology for calculating discount rates. Some have allowed greater smoothing of interest rates while others have introduced hypothetical values for the long end of the discount yield curve based on long-term projections for growth and inflation.

This report includes a review of these accounting and regulatory changes as well as a summary of the evidence gathered to date on their impact on long-term investing. Studies reviewed conclude that:

- Changes to funding regulations and accounting standards is one of the factors that has led employer pension plan sponsors to minimise their risk by making their pension promises more contingent, insuring away their obligations, realigning the investment portfolios of their pension funds, and moving away from defined benefit to defined contribution arrangements (where permitted). Among insurers, the introduction of risk-based solvency rules in Switzerland has been

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an important factor behind the move towards government bonds observed over the last decade. Other factors, though, are also at play, such as reduced risk appetite and a reassessment of equity risk after a decade of low equity returns.

- Fair valuation principles used for accounting purposes have been a key factor behind the decline in equity allocations in pension fund portfolios in the United Kingdom. Risk-based funding regulations have also contributed to the declining equity allocation among pension funds and pension insurance companies in countries such as Denmark and the Netherlands. On the other hand, appetite for illiquid assets remains in these countries and has even increased over the last decade as pension funds have partly replaced equities with so-called alternative investments, including private equity, hedge funds, real estate and most recently, unlisted infrastructure equity. Bond allocations have increased too, particularly in Sweden and the United Kingdom. Overall, though, derisking is more evident in the growing use of interest risk hedging instruments (such as swaps and options) than in the net change in investment risk in the main asset portfolio.

- The introduction of fair valuation in accounting standards and of solvency requirements based on value-at-risk type measurements such as Solvency II for insurers could also have strong implications for risk management and asset allocations. Insurers will need to re-evaluate how they manage their risk exposure, the extent to which assets and liabilities can efficiently be matched and the risk-return profile of their investments, taking into account the solvency capital requirements associated with various asset classes. Further consideration should also be given to the calibration of the capital charges.

- Care must be taken in the design and implementation of mark-to-market valuation principles and risk-based funding rules as they could incentivise pro-cyclical investment behaviour such as the fire-sale of assets in market downturns. This could lead to price distortions in less liquid markets, as witnessed during the 2008-09 crisis in some maturity segments of derivatives markets used by pension funds and life insurers to hedge interest rate risks. This effect is compounded by a supply problem in long-term government bonds, as pension and insurance liabilities are often substantially larger than the stock of long-term government debt. Regulatory frameworks have been corrected in some countries to correct for possible pro-cyclical effects on pension funds. Solvency II also has built-in adjustment mechanisms to mitigate pro-cyclicality.

- The move to fair value accounting standards and risk-based solvency rules may also have repercussions in insurance product and pension plan design. In some countries, insurers and pension plan sponsors are already facing pressure to move away from products and promises with return or benefit guarantees in favour of those that pay out benefits to policy-holders and beneficiaries in-line with market returns (as in defined contribution plans – DC). Such a shift will also have indirect repercussions on asset allocation. In general, though, equity allocations in guaranteed insurance products and DB pension plans are lower than those in unit-linked insurance products and DC pension plans, respectively.

Further research is also needed on the implications of risk-based investment regulations and mark-to-market valuation for long-term investment in DC pension plans. Only one country in the OECD, Mexico, currently uses a value-at-risk methodology to set limits on how DC pension funds can invest their assets, but there has been no in-depth analysis on the impact of this regulation on long-term investment.

1. Introduction

This paper presents an initial review of selected literature as to the effect of recent changes to accounting standards and solvency regulations on the investment decisions of pension funds, pension plan sponsors and life insurers, and specifically on the scope for long-term investing by these institutional investors. The analysis focuses on recent changes to international accounting standards such as the greater introduction of fair value principles, and risk-based solvency and funding regulations for insurers and pension funds in some countries.

This paper does not assess the soundness of these regulatory trends from a prudential or consumer protection perspective. Such assessments, particularly in the pensions sector, have been the subject of previous research.[1] Instead, this report addresses only the implications for investment strategies, and in particular how long-term investing is affected by the new rules.

In particular, we make no attempt at explaining other possible drivers of investment strategies, and specifically of long-term investing. The (actual or perceived) changing risk-return profile of the different asset classes can drive major revisions to investment strategies, as happens for instance when economic circumstances change drastically on a structural basis.

In line with previous work, we define long-term investment as "patient" capital that allows investors to access illiquidity premia (in particular from investments in assets such as infrastructure, real estate, and venture capital), lowers turnover and its related costs, and avoids pro-cyclicality. Ultimately, therefore, long-term investment strategies, all else being equal, can improve net investment returns, strengthen financial stability, and foster economic growth.

This paper reviews the empirical evidence on the impact of regulations and accounting on asset allocation, considering in particular how they affect the balance between riskier and safer assets, and liquid and illiquid investments. It also considers whether and how regulations and accounting may drive pension funds and insurers to divest from riskier assets at times of negative investment performance, putting further downward pressure on prices and contributing to financial distress.

We also consider an indirect channel of the potential impact of regulations and accounting standards on investments, via their effect on the design of pension plans and life insurance products. Investment strategies differ markedly depending on the extent to which guarantees are being provided and whether individuals can exert any investment choice.

Some important developments in accounting and risk-based solvency requirements are considered. As this is a very broad topic, this paper focuses on the possible impact of a few key developments on the long-term investment decisions of life insurers and pension plans, as outlined in Table 1.

[1] See for instance Pugh and Yermo (2008), Yermo and Severinson (2010), and Yermo (2007).

Table 1. Main accounting standards and risk-based solvency/funding regulations

	Accounting	Solvency
Insurance	• IFRS 4, Phase 2 Insurance Contracts • IFRS 9 Financial Instruments • US GAAP for Insurance Products (FAS 60, FAS 97 and FAS 120)	• Solvency II in the European Union and similar regimes in Japan and Switzerland • Risk-based solvency framework in Canada and the United States
Pension plans	• IAS 19 for Employer DB Obligations • FAS 87 in the United States	• Risk-based funding and investment requirements such as the Dutch FTK, the Nordic traffic light system, and the Mexican VaR requirements

Each of these topics is discussed in turn in the following sections:

- developments in accounting standards for insurers;
- developments in pension accounting;
- risk-based solvency and investment requirements for insurers and pension funds.

Further work is also envisaged to extend the evidence collected in order to assess further these preliminary findings and, in particular, to attempt to quantify the potential impact of the accounting and regulatory developments under consideration.

2. Developments in accounting standards for insurance and pensions

The European Union implemented the use of International Financial Reporting Standards (IFRS) for exchange-listed companies in 2005. Since then, all major economies have committed to adopt IFRS or have made plans to work towards convergence. In 2009, G20 leaders voiced their support for convergence to a global accounting standard.[2] Furthermore, substantial convergence work has been undertaken between the IASB (the international body that develops IFRS) and its counterpart in the United States, the FASB. The decision on possible adoption of IFRS by American companies that was targeted for 2011, has been postponed by the US Securities and Exchange Commission.[3]

[2] IASB, "Global Convergence of IFRSs", *www.iasb.org/Use+around+the+world/Global+convergence/IFRS+global+convergence.htm*.

[3] This remark was made before the 2011 AICPA National Conference on Current SEC and PCAOB Developments by James L. Kroeker, Chief Accountant, Office of the Chief Accountant, U.S. Securities and Exchange Commission, Washington, D.C., 5 December 2011. Insurance contracts is one of the main joint projects of the IASB and FASB seeking convergence on international standards. In July 2012, SEC staff published their final report on its IFRS work plan. This report did not include a final policy decision as to whether

Developments for insurers

Two standards that are currently under development by the IASB will have a major impact on insurers. These two new standards are:

- **IFRS 4 Phase 2 for Insurance Contracts**: The new standard will replace the current version of IFRS 4 and covers the accounting for insurance contracts from the perspective of the insurer.

- **IFRS 9 for Financial Instruments**: This new standard (to be called IFRS 9) covers the accounting for financial instruments, and in the insurance context, will be used to measure the assets supporting insurance contracts. This standard will replace the current standards – IFRS 9 and IAS 39.

The development of a common accounting standard for insurance contracts has been a major project for the IFRS Foundation since 1997. The current accounting standard for insurance contracts, called IFRS 4, was issued in 2004 in time for the adoption of IFRS by the European Union. The original IFRS 4 allowed, to a large extent, the continuation of existing local accounting standards for the reporting of insurance contracts which means vast variations in the level of transparency, the use of fair value principles, and the extent of disclosure requirements. An exposure draft for the new international insurance accounting standard, IFRS 4 Phase 2, was published in July 2010. Once IFRS 4 Phase 2 goes into effect (the exact date is not yet known), consistent accounting treatment of insurance contracts will be required for all entities reporting under IFRS.

The added transparency and consistency that the IASB new standard is expected to introduce are welcome developments. However, the intended move towards the fair valuation of assets and liabilities on a market consistent basis (so-called "fair value accounting") will mean that balance sheets, annual profits and solvency margins will be more volatile and insurers will need to anticipate this in their asset allocation decisions, product design, and overall business decisions. Banks, which in general do not have the long-term horizons that are common to life insurers – are allowed a cost/amortized cost balance sheet which intrinsically hides mismatches. If a fair value approach is applied to insurers, who have a much greater argument for using a locked-in discount rate matched against amortized cost assets, they may be denied a level playing field with banks. Yet insurers compete with banks in the same capital markets and would be disadvantaged relative to banks with fully fair value-based balance sheets.

As a result of this and other factors, the extent to which fair value should be applied has been highly controversial. The IASB initially planned to require complete fair valuation of all financial assets and liabilities. However, at the end of 2008, critics loudly blamed fair value accounting for accelerating the financial crisis as banks, and to some extent insurance companies and pension funds, were forced to sell market-valued assets at depressed prices, further depressing the markets. Ultimately, the IASB adopted a partial fair value accounting standard called IFRS 9, which requires entities to measure financial assets basically held for the purpose of collecting interest and principal cash flows on an amortised cost basis. The partial fair value model has met with broader acceptance than the requirement for full fair valuation, although the European Union has yet to adopt this new standard.

The new IFRS accounting standards for insurance contracts are expected to require a fair value approach when valuing liabilities. However, a mixed approach is used for the valuation of the assets supporting the insurance contracts depending on certain classifications of the assets. Broadly speaking, IFRS 9 requires the assets supporting insurance contracts to be measured as follows:

IFRS should be incorporated into the US financial reporting system, or how or when such incorporation should occur.

- Debt instruments that are held within a business model whose objective is to hold assets in order to collect contractual cash flows on specified dates of principal and interest on the principal amount outstanding are measured on an amortised cost basis. (Although, a fair value option exists to reduce accounting mismatches.)

- Financial assets should be measured at fair value through other comprehensive income (FVOCI) if they are eligible debt instruments (that is, they pass the contractual cash flow characteristics assessment) and are managed and held within a business model whose objective is both to hold the financial assets to collect contractual cash flows and to sell the financial assets.

- Otherwise, debt instruments are measured at fair value through profit and loss.

- Equity instruments are measured at fair value. If the equity instrument is held for trading, changes in the fair value are taken through the insurer's statement of profit and loss. If the equity instrument is not held for trading, changes in the fair value may be taken through other comprehensive income and do not affect the insurers bottom line.

The precursor to IFRS 9 allowed equity instruments with no quoted market price to be valued at cost if there was no reliable way to measure fair value. IFRS 9 eliminated this exception and requires fair value measurement to be made based on modelling and any available market data. Furthermore, in response to the financial crisis, the IASB and FASB standard setters issued identical requirements for determining fair value in declining or inactive markets. They also enhanced the disclosure requirements surrounding the valuation methods used, the inputs, and the sensitivity of the significant unobservable inputs used to determine fair value in declining or inactive markets (IFRS, 2011a).

This new IFRS insurance accounting standard is still under development and the final details as well as how the IASB and the FASB will resolve their differences are as yet unclear. The Chairman of the FASB has said that she regards convergence of the insurance contracts standards as unlikely.

Implications of the new accounting rules for insurers' investment strategies

Given that developments in the insurance accounting project are ongoing, it is difficult at this point to pinpoint specific implications for insurers' asset allocations, but some general observations can be made. In particular, the move towards fair value is expected to encourage insurers to duration match their assets and liabilities. The extent that the introduction of fair value principles will change existing practice will differ depending on the extent to which current local accounting practice require fair valuation. It should be noted that in November 2011, the IASB Chairman expressed the possibility of the changes to IFRS 9 being limited, basically in response to insurers' concerns regarding mismatching accounting treatment between assets and liabilities (IFRS, 2011b).

A 2011 report by Ernst & Young highlights that insurance companies generally attempt to match the characteristics of their assets with their liabilities in order to minimise economic mismatches between the two. This asset and liability matching is restricted by the availability of assets of sufficient duration, uncertainty as to when payouts will be required, transaction costs, local regulations, as well as the risk appetite of the insurer and his/her desire to generate higher returns, which can cause volatility in the level of assets versus the level of liabilities.

Accounting rules can also introduce volatility into the level of assets versus the level of liabilities, reflected in the insurer's balance sheet and statement of profit and loss. This so-called accounting volatility can arise when assets and liabilities are treated differently; for example, if assets are valued on an amortised cost basis, but liabilities are measured at fair value. Insurers often attempt to manage such

accounting volatility by aligning the accounting treatment of their assets with the accounting treatment of their liabilities. This means that if an insurer wishes to minimise accounting volatility, if the accounting rules require liabilities to be measured at fair value, then the insurer would support these liabilities with duration-matched assets also measured at fair value. If the accounting rules do not require liabilities to be fair valued, then the insurer could attempt to minimise accounting volatility by supporting the liabilities with duration-matched assets accounted for on an amortised cost basis.

The 2011 Ernst & Young report states that current accounting practice in continental Europe, Japan and the United States tends not to call for fair value as the discount rate used to value an insurance contract's liabilities is locked in at the inception of the insurance contract such that they are not later updated to reflect changes in market conditions. Historically, insurers in these jurisdictions have been incentivised to support their liabilities with debt instruments reported on an amortised cost basis. Given the fair value requirements of the new IFRS and US GAAP standards, insurers affected by this change may need to realign their accounting and investment strategies for dealing with accounting volatility in profits.

In Australia, Canada, South Africa and the United Kingdom, current accounting practice tends to measure liabilities on a fair value basis. Therefore, the change to fair value IFRS requirements may not require as much of a shift in accounting and investment practices in order to manage accounting volatility.

Developments in pensions accounting

The introduction of new pension accounting principles, including a market-related discount rate in the United States in the late 1980s, brought the costs and risks of pension obligations into greater focus. For the first time, pension obligations were measured in a standardised manner. Several mechanisms for smoothing the effect of market fluctuations were, however, in place and served to mitigate volatility in the balance sheet and in the statement of profit and loss, and sometimes allowed large obligations to be kept off company balance sheets.

The IASB Board introduced the retirement benefits reporting standard IAS 19 in 1983, which has since been modified several times. The introduction of IFRS in the European Union in 2005 brought European accounting broadly in line with existing US accounting practices. Since then, IFRS (and IAS 19) has spread to most major economies.

Fair valuation of pension obligations were first introduced in the United Kingdom in 2003 and in the United States in 2006, which meant the elimination of much of the volatility smoothing mechanisms that had historically been in place. Fair valuation of pension obligations was allowed as an option as of 2004 for companies reporting under IFRS and will be required as of 2013.

Upcoming changes to international pension accounting (IAS 19) and implications for pension fund investments

Major changes were recently made to IAS 19 which will go into effect in 2013. Past accounting practice for DB obligations was criticised for being obscure and, in some cases, for falsely inflating corporate profits. The new version of IAS 19 addresses these short-comings to a certain extent, although the changes are not as sweeping as the IASB had originally intended.

It should be noted, however, that DB pension accounting reform has been on-going and anticipated for a longer time than the current developments in insurance accounting. It should also be noted that many of the changes to IAS 19 came as little surprise, in particular the requirement for complete fair valuation of DB pension obligations. As described in the previous section, the fair value requirement has already been adopted by the UK and American standards, and the change was publicly supported by the IASB in advance of the reform.

The new IAS 19 is expected to improve readability, transparency, and international comparability of company accounts. There is, however, concern that by focusing managers and shareholders on the short-term, market-consistent value of what are often very long-term obligations, the attractiveness of important guarantee-type promises such as those found in DB plans could be further eroded.

The requirement in the new IAS 19 for the complete fair valuation of assets and liabilities is stricter than the fair valuation requirements for other types of company assets and liabilities under IFRS (see the discussion on IFRS 9, fair value accounting for insurers and banks discussed earlier in this paper).

Fair valuation of DB pensions means that all smoothing of actuarial gains and losses due to differences between assumptions and experience will be eliminated. There is no doubt that the fair valuation requirement will introduce significantly greater volatility into the balance sheets of corporate plan sponsors. Some argue that the volatility introduced by the new standard will incentivise plan sponsors to decrease their exposure to riskier assets such as equities. Others, however, say that since most of the volatility is recognised outside of the profit and loss statement (through "other comprehensive income"), plan sponsors may actually be encouraged to increase their risk exposure.

As for the annual profit and loss of corporate DB plan sponsors, under the old version of IAS 19, actuarial gains and losses (including investment gains and losses) were typically recognised to some extent over a number of future years, and therefore would impact corporate profits, but their effect would be spread out over the long-term. However, under the new IAS 19, any such gains and losses must be recognised in full each year through "other comprehensive income", but will not affect firms' headline profits.

Furthermore, the changes to IAS 19 will also eliminate the ability to book an income item based on the expected investment return in the pension plan, which in essence rewarded plans for holding equities and other risky assets because under the old version of IAS 19, firms could book a profit in the pension plan due to high expected returns, even in years when pension fund assets performed poorly. The modified IAS 19 will allow firms to only book a profit item equal to an annual notional investment return determined as the pension fund assets multiplied by the yields available on high-quality, long-term corporate or sovereign bonds. As with actuarial gains and losses, any annual investment return that is in excess or less than this notional investment return would be recognised outside of the firm's profit and loss in "other comprehensive income".

The latest changes to IAS 19 could lead firms that are concerned about balance sheet volatility to derisk, by, for instance, moving their investments from equities to bonds. However, firms that are not concerned with balance sheet volatility but are driven foremost by their profit and loss considerations, may actually have a greater incentive under the new IAS 19 to invest in equities and other risky investments. The reason for this is that under the old version of IAS 19, gains and losses affected profits, but the effect was spread out over future years. Under the new IAS 19, investment losses and other types of actuarial gains and losses will never directly affect the firm's profits.

3. Existing risk-based solvency and investment requirements for life insurers and pension funds

Solvency regimes and funding regulations protect against the risk of underfunded guarantees, as offered in the insurance and pensions sectors. Life insurers have traditionally offered guaranteed products, such as participating or with-profits insurance policies and annuities. Occupational pension plans, whether operated by pension funds or insurance companies, may also involve benefit guarantees or promises. A risk-based solvency or funding regime has two main features. First, it relies on a particular subset of an economic value approach, using fair value as far as possible on a market-consistent basis. Second,

solvency or funding requirements are set in line with the nature and size of risks to which the institution is exposed.

Risk-based solvency in the insurance sector

Traditionally, solvency regimes for insurers were based on smoothed or long-term valuations – often using fixed discount rates – and a fixed solvency margin set in relation to premiums. Over the last decade, however, some countries have introduced risk-based capital requirements. The European Union has also been working on a new risk-based solvency regime, Solvency II, which is to be implemented in 2014.

Currently, the main countries outside Europe with some features of risk-based solvency regulations for insurers are Australia, Canada, Japan, Switzerland and the United States. Canada and the United States were among the first to introduce risk-based capital standards, in 1992 and 1994, respectively. However, for the most part, the current Canadian and US valuation practices of assets and liabilities are not consistent with a fully market-based economic valuation approach (fair value) as envisaged under the European solvency regime for insurers, known as Solvency II.

In order to fulfil its mandate of solvency supervision of the life insurance industry, Canada's federal regulator (OSFI) uses the audited financial statements of insurers that have been prepared in accordance with Canadian GAAP. Canadian GAAP life insurance liabilities are measured using the Canadian Asset Liability Method (CALM), which requires the actuary to project asset and liability cash flows under alternative interest rate scenarios at the valuation date. The valuation of invested assets under Canadian GAAP depends on their classification as either held-for-trading or available-for-sale. A life insurer's minimum capital requirement is the sum of the capital requirements for each of five different risk components.

The United States' capital framework is based on high-level principles set out by the NAIC. An insurance company's capital is calculated by applying factors to various assets, premium, claims, expenses and reserve items. The principles, however, do not set a specific overall certainty level. Rather different approaches to setting a certainty level are possible (VaR, conditional tail expectation, etc.). Generally, the risk-based capital formula determines regulatory capital for a given risk by applying an RBC factor to an exposure amount obtained from the annual statement. If the risk-based capital falls below one of five predefined levels, a certain regulatory action will be triggered. For example, if the ratio falls below 70%, the state insurance commissioner must take control of the insurer. The maximum valuation interest rates are based on the monthly average of the composite yield on seasoned corporate bonds, Asset valuations vary by state. The methods that are primarily employed to value assets are market value, amortised cost, equity method, and book value (cost).

The Japanese solvency margin ratio was introduced in 1996 and takes into account various risk factors. However, asset and liability valuations are not made on a fully market-based economic value basis (fair value). This is an issue that is being addressed in the review that started in 2005. In June 2010, the Japanese Financial Supervisory Authority announced the implementation of field tests of the economic value-based solvency regime and requested financial institutions to implement them. The new standards are expected to be refined and implemented over the course of 2012-13.

The Australian risk-based solvency test was introduced in 2001 with the General Insurance Reform Act. It is based on the principle of ensuring that the probability of ruin within one year does not exceed 0.5%. The capital charge for listed equity is 8%, for property investment is 10%, and for government bonds is 0.5%.

In Switzerland, risk-based solvency standards for insurance companies, the so-called Swiss Solvency Test (SST), were introduced in 2006. The SST is a principle-based, stochastic risk model that includes scenarios for market risk, underwriting risk, and credit risk.

The implementation of Solvency II will also lead to a risk-based solvency regime for insurers based in the European Union. Denmark and Sweden were among the first countries to implement fair value for regulatory purposes and to introduce a stress test for supervisory monitoring of insurers' solvency position.

In 2001, Denmark introduced the first risk-based supervisory regime for industry-wide pension funds and insurance companies called the traffic light system. This stress test complements the basic solvency margin requirement, which is currently based on the European Directive, Solvency I. Danish industry-wide pension funds and life insurance companies are subject to identical solvency rules.[4] Both provide guaranteed returns, bonuses, and risk-sharing among members, although there has been a move to products without guarantees in recent years (see Section IV).

Under the Danish traffic light system, the supervisor models the different market and biometric risks to which a pension fund or insurer is exposed using stress tests to determine the likely solvency position of the pension fund in the coming year on a fair value basis, based on pre-defined financial scenarios. The test defines three scenarios: green, yellow, and red, each determined by adverse market and biometric (longevity) shocks (Pugh and Yermo, 2008). An important change took place in the Danish regulation in June 2012, when the government announced that the long end (over 20 years) of the discount rate would be calculated using long-term assumptions for growth and inflation ("ultimate forward rate"). The change was undertaken in order to avoid unjustified short-term pressures on the solvency of Danish insurers and pension funds as a result of the perceived abnormally low interest rates (less than 1%).

Sweden has had a similar traffic light system since 2006 to assess solvency levels, but only for insurance companies (including insurance companies with an occupational pension business) and the insurance-like "*pensionskassor*", but not for employer-sponsored pension funds which have very flexible solvency rules. The stress-test is based on various adverse scenarios, such as a 40% decline in the Swedish stock market, a 37% decline in foreign equities, and a 35% decline in real estate prices. Similar to Denmark, the Swedish regulator announced a change to the regulations concerning the discount rate. In particular, it set a floor on the discount rate around its minimum value in May 2012 (applicable for one year).

[4] Danish industry-wide pension funds can provide guarantees and have no recourse to sponsoring employers for additional contributions in case of underfunding. Therefore, they are, from a regulatory perspective, akin to an insurer. The occupational pension plans they support are DC in nature from the employer's perspective. DB pension funds sponsored by individual corporations also exist, but are a relatively small part of the sector. They are subject to more flexible solvency regulations.

Risk-based funding regulations for pension funds

Funding regulations are applied to pension plans with guarantees or promises. Benefit guarantees are the defining feature of DB pension plans, where the sponsoring employer ultimately bears some responsibility for any underfunding. DC plans, where the employer only agrees to pay a fixed contribution rate, can also involve the provision of guarantees by the pension fund[5] itself or other pension providers. In some countries, the guarantees offered are "soft"; they may be renegotiated by the social partners and adjusted depending on the pension fund's solvency status, as in the collective DC plans in Iceland and the Netherlands.

While the insurance world is moving inexorably towards risk-based solvency regimes, such rules are rare in the pensions sector. There are the two cases of risk-based solvency supervision in Denmark and Sweden, the traffic light system described above, which applies to insurance-like pension entities that underwrite return and benefit guarantees. Germany also introduced a similar stress test to its *Pensionskassen*[6] in 2005. But only Finland and the Netherlands apply a specific risk-based funding regulation to pension funds, where minimum funding requirements directly take into account the riskiness of the pension funds' investment portfolio. DB pension funds in Ireland will also soon be required to hold risk reserves able to counteract market volatility in addition to fulfilling minimum funding requirements.

The Dutch and Finnish solvency regimes use a value-at-risk measurement to protect against underfunding, similar in principle (although not in the actual risk levels, confidence requirements, or other design features) to that used under Solvency II for insurers. Dutch pension funds are required to have funding levels such that liabilities will be fully funded with at least a 97.5% probability over the following year. Pension funds can use the standardised approach determined by the regulator or their own internal model. Either way, higher buffers are assigned to the riskier asset classes.[7] The pension funds have 15 years to fund shortfalls based on this funding test, subject to a funding level floor. There is also a minimum funding ratio of 105%, with a recovery period of five years (extended from three years in 2008). Currently, the Dutch government is reviewing the regulation on pension funds and further changes to the solvency regime are expected. In particular, a change in the long end of the discount rate has been announced, similar to that in Denmark, introducing the "ultimate forward rate".

Finnish pension entities (pension funds and pension insurance companies) are subject to a risk-based solvency regime.[8] Like in the Netherlands, the solvency margin is calculated such that the pension plan will be fully-funded with at least a 97.5% probability over one year. Different risk factors are included in the calculation, so that the higher the allocation to risky assets such as equities, the greater the solvency buffer required. A bill passed in December 2008 allowed pension providers to access certain reserve buffer funds in order to improve their solvency levels. The purpose of this change was to avoid fire-sales of equities in a disadvantageous market position. These legal provisions will remain in place until the end of 2012.

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[5] Where the pension fund itself underwrites any guarantees, it is often the case that, for regulatory purposes, it is treated as an insurance undertaking.

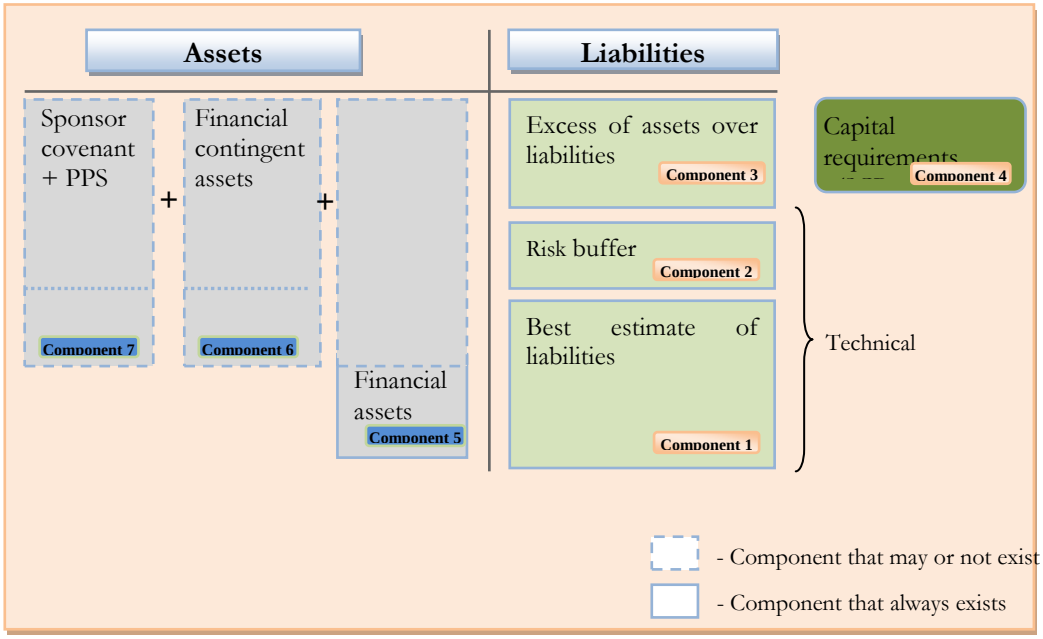
[6] *Pensionskassen* also provide insurance-like promises.

[7] The FTK's standardised approach considers that the following shocks have a 2.5% probability over a one-year horizon: a 25% decline in mature markets' equities, a 35% decline in emerging market equities, a 30% decline in private equity, and a 15% decline in real estate. Unlisted infrastructure equity is normally treated under the private equity category.

[8] The Finnish statutory, occupational pension plans are part of the social security system and are therefore excluded from both the European IORP and Solvency II Directives.

The European Commission is currently reviewing the regulatory framework for European institutions for occupational retirement provision, called the IORP[9] Directive. The European Commission sent a call for advice on the review of the IORP Directive to EIOPA in April 2011 that EIOPA answered on 15 February 2012. In its advice, EIOPA mentions a "holistic balance sheet approach … which will enable IORPs to take into account the various adjustment mechanisms (conditional indexation, reduction of accrued rights) and security mechanisms (regulatory own funds, sponsor support, pension protection schemes) in an explicit way." (EIOPA, 2012). The conceptual presentation is depicted in Figure 1 below.

Figure 1. Representation of the "holistic balance sheet" approach to IORPs



Source: EIOPA.

Whether and to what extent a harmonised solvency requirement will emerge in the European Union, and its final formulation, are unclear and under heated debate at the moment. A concern that has been raised is that a harmonised solvency regime may raise the cost to employers of providing defined benefit pensions for employers and that such schemes would therefore be further abandoned in favour of defined contribution arrangements, further shifting risk to individual employees (Kortleve et al, 2011).

Broadly speaking, there appears to be a more general level of support for applying a harmonised risk-based funding regime to IORPs that incorporates elements of Solvency II in those countries where industry-wide pension funds or insurance companies dominate the occupational pensions market such as in Denmark and France. In countries where there is a tradition of occupational pension funds backed by individual employers, such as in Germany, Ireland, the Netherlands and the United Kingdom, support for such a harmonised solvency regime appears to be weak.

[9] Member states may choose to apply provisions of particular articles of the IORP Directive to the occupational-retirement-provision businesses of insurance companies. In this case, certain requirements have to be met.

Stress testing in DC pension funds

Risk-based stress tests can also be applied to pure defined contribution pension plans, as in Mexico, where there are no investment return guarantees. Mexican pension fund management companies (called AFOREs) must comply with a daily value-at-risk measurement. AFOREs must have stop-loss measures in place should losses be incurred above a specific level. They must have a reserve fund of 0.8% of assets under management which is used to compensate violations of the investment limits.

4. Evidence on the impact of accounting standards and risk-based rules on investment strategies and product design

This section evaluates the existing empirical evidence on the possible impact that changes in accounting rules and solvency and funding regulations may have had on the investment strategies of insurers and pension funds. It also looks at the implications for pension plan design and insurance products. In particular, the potential replacement of products with guarantees by products where risks are borne by the member means a radical change in the way investment decisions are made and hence on asset allocations.

Derisking among insurers and DB pension funds

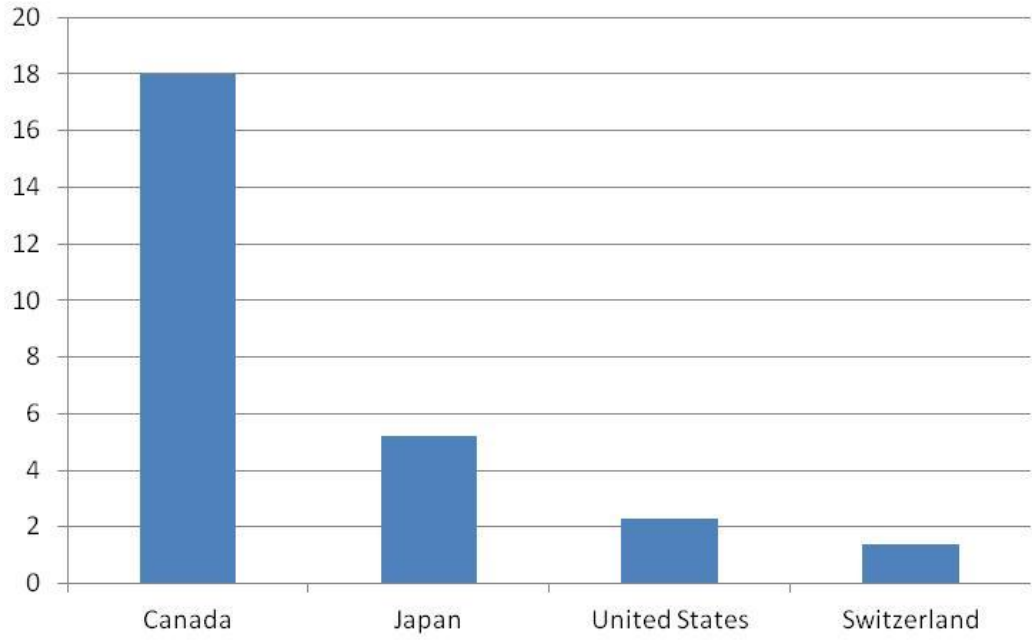
The move to fair value accounting and the implementation of risk-based solvency and funding regulations may affect investment strategies in two main ways. First, tying discount rates to market interest rates creates a higher sensitivity of liabilities – and hence of solvency or funding levels – to market conditions. In order to reduce the volatility of solvency or funding levels, insurers and pension funds may shift their investment portfolios towards fixed income securities and engage in transactions to hedge interest rate risk such as swaps and other derivatives. These institutions may also adjust the duration of their fixed income investment portfolios to better reflect the discount rate being used. The second main channel occurs via the specific capital charges or reserving applied to different asset classes. Typically, under a risk-based solvency framework, asset classes that show higher volatility are subject to a higher capital charge. As a result, insurers and pension funds may reduce their exposure to such assets.

Figure 2 below shows the equity allocation among insurers (excluding unit-linked products) as of December 2010 in three OECD countries that have introduced a risk-based solvency regime, as well as in Japan, where risk-based solvency regulations and economic value-based accounting standards are being considered and the industry has been asked to carry out quantitative impact assessments. While there are many factors driving changes in investment strategies (including risk appetite and an institution's perception of the risks faced by the different asset classes), the low levels of equity exposure are remarkable.[10] The actual evolution for the equity and bond portfolio for Japanese life insurers is shown in Figure 3a, demonstrating the extent of equity derisking. There has also been a marked growth in long-term bond purchases in recent years (see Figure 3b).

[10] Unfortunately, the official data collected by the OECD does not allow for a precise calculation of the actual change in asset allocation over the last decade as the calculation method changed in 2008.

Figure 2. Life insurers' equity allocations

% total assets (2010)



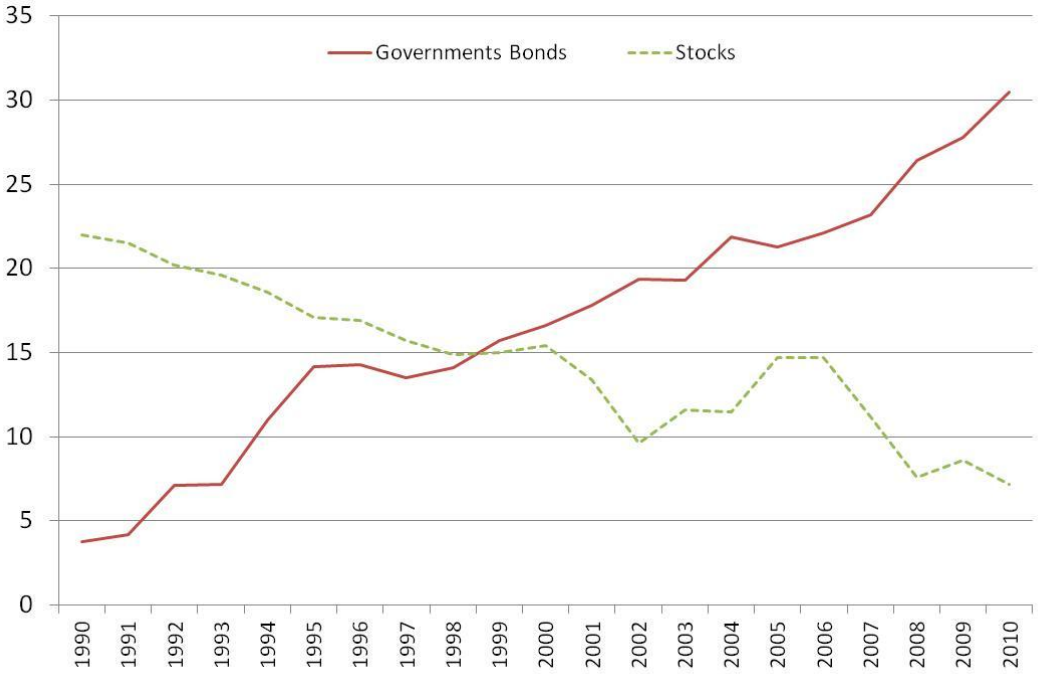
Source: OECD statistics.

Major explanations for this trend in Japan are the promotion of ALM strategies among life insurers, the introduction of the Japanese solvency margin ratio, and the revision of the accounting standard for financial instruments, as well as the development of ultra long-term bonds market. The discussions over fair value accounting standards and economic value and risk-based solvency rules may have also contributed to this trend. The introduction of the Swiss Solvency Test is also part of the explanation behind growing demand among Swiss insurers for long-term government bonds, swaps and covered bonds.[11]

[11] See BIS (2011).

Figure 3a. Asset allocation among Japanese life insurers

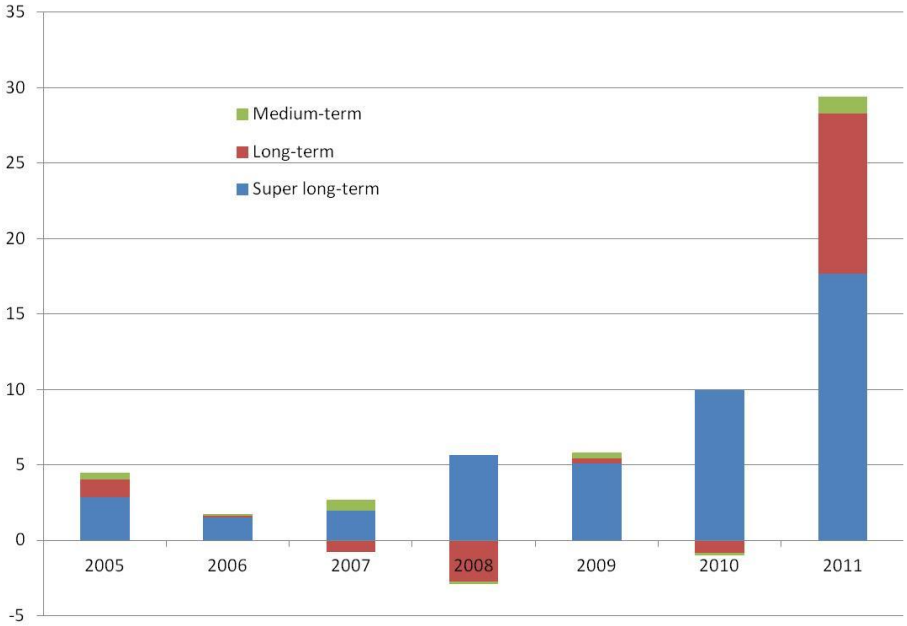
% total assets (1990-2010)



Note: Data exclude Japan Post Insurance.

Source: The Life Insurance Association of Japan.

Figure 3b. Japanese life and non-life insurers' net purchases of domestic government bonds

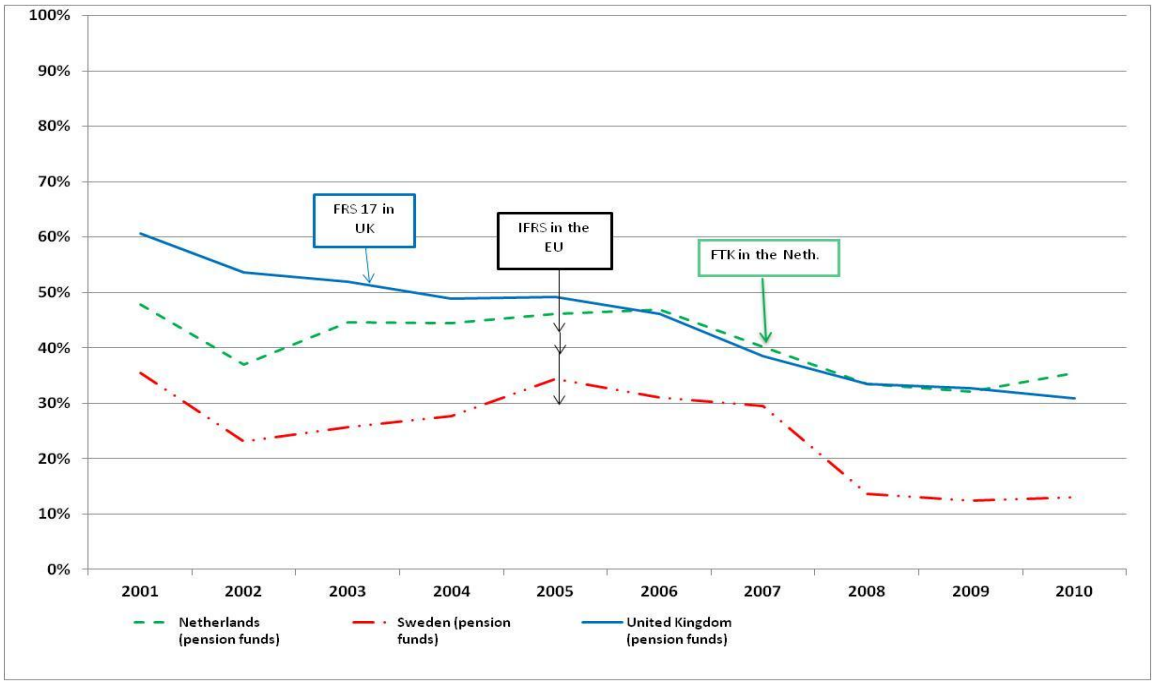


Source: Japanese Securities Dealers' Association.

We turn next to the evidence in the pensions sector for those countries discussed earlier that were first to introduce fair value accounting (the United Kingdom) and risk-based funding regulations or stress tests (Denmark, Finland, Germany, the Netherlands, and Sweden). Derisking of pension fund portfolios has taken place in all of these countries except Finland, with a marked shift away from listed equities and increased allocations to fixed income assets. Figure 4a shows the decrease in the actual equity allocation by pension funds since 2001 in the Netherlands, Sweden and the United Kingdom. UK pension funds have shown the most dramatic drop in equity allocation, from around 30% in December 2010 to 60% in December 2011. In addition, Figure 5a shows the timeline of some major regulatory changes in these countries which may have accelerated the derisking trend: the introduction of fair value accounting for pensions in the United Kingdom (FRS 17) in 2003, IFRS in the European Union in 2005, and the risk-based solvency regime FTK in the Netherlands in 2007. However, as shown in Figure 4b, the decline in equity allocations has not been fully offset by growth in fixed income exposures. In fact, in the Netherlands, the bond allocation has been relatively stable over the last decade, the decline in equity investment being largely compensated by an increase in alternative investments. Pension funds have also experienced major derisking in Germany. By December 2010, German pension funds had one of the lowest equity allocations in the OECD, at less than 5% of total assets.[12] In contrast, the equity allocation among Finnish pension funds was nearly 48% in December 2010, compared to 28% in December 2001.

Figure 4a. Pension fund equity allocations,

% total assets (2001-10)

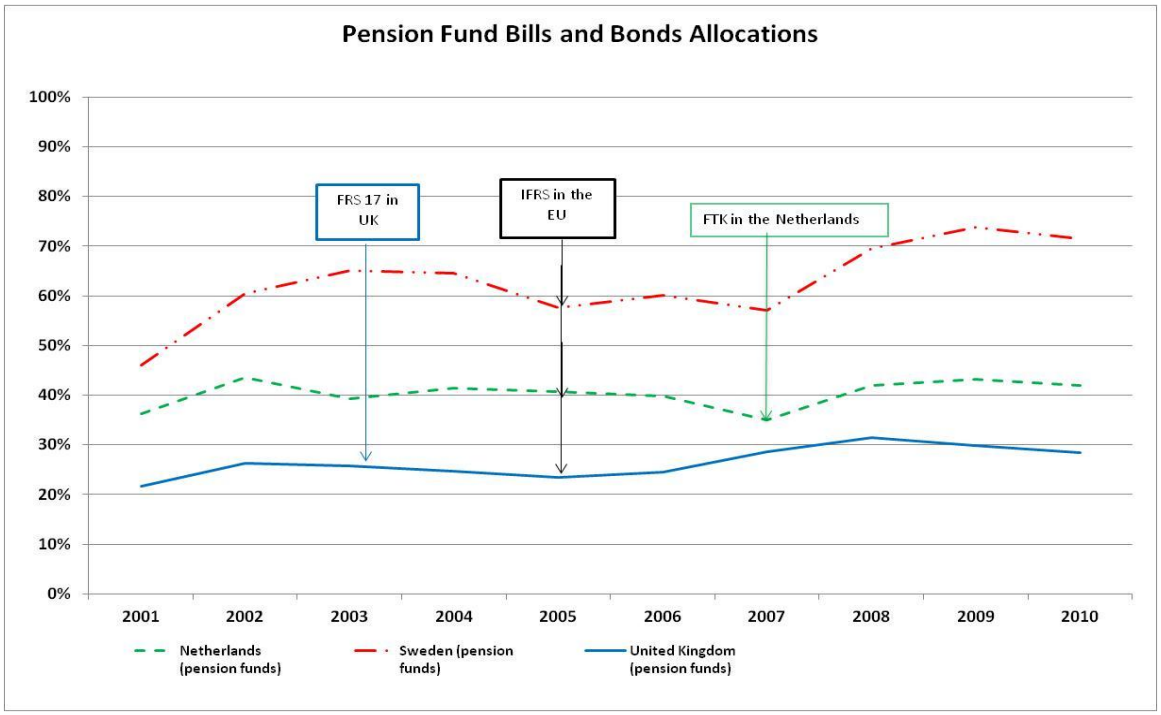


Source: OECD Global Pension Statistics.

[12] Data on the equity allocation before 2007 is not available. In 2007, German pension funds invested approximately 12% of their assets in equities.

Figure 4b. Pension fund bond allocations,

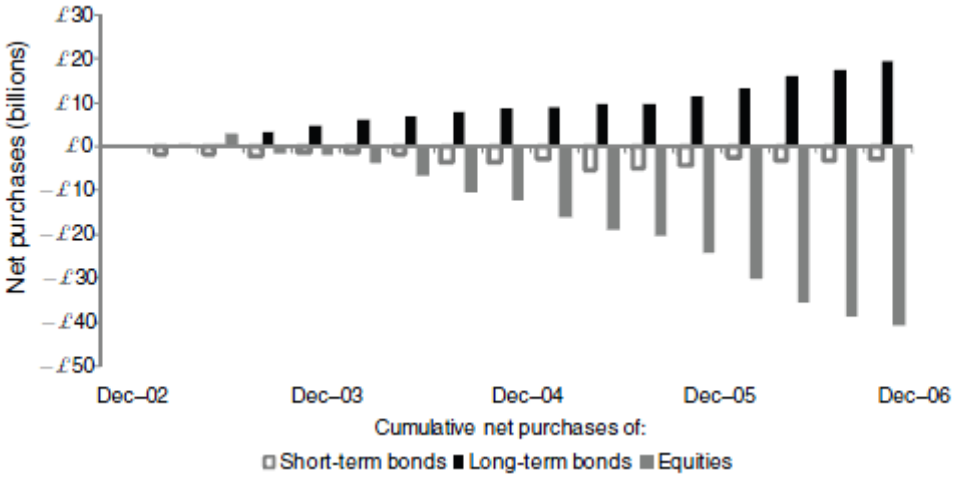
% total assets (2001-10)



Source: OECD Global Pension Statistics.

The changes in equity allocations described above reflect both valuation differences and net purchases of different asset classes. In order to better identify changes in investment policy, it is necessary to calculate the extent of net purchases of different assets. For the United Kingdom, a 2010 study by Greenwood and Vayanos found that between 2003 and 2006, British pension funds had made cumulative net sales of equities on the order of GBP 50 billion (see Figure 5), or about 5% of total assets as compared to net purchases of just under GBP 20 billion of long-term bonds (which include bonds with over 15 years' maturity and index-linked bonds). The study links much of this activity to the pension reforms in the United Kingdom in 2004 which introduced the Pension Protection Fund and the introduction of the new fair value accounting requirements. Furthermore, this increased demand in long-term bonds put downward pressure on yields, termed the "pension fund driven bubble", and in 2005, the government agreed to issue nominal and inflation-linked bonds with up to 50-year maturities.

Figure 5. Cumulative net purchases of equities and bonds by UK pension funds



Source: Greenwood and Vayanos (2010).

While fair value accounting for pension plan sponsors has also been introduced in the United States, it seems to have had little impact on investments. A 2009 paper by Amir et al. examined the shift from equities to bonds due to the introduction of fair value accounting in the United Kingdom (FRS 17 around 2003) and in the United States (SFAS 158 in 2006). While a shift around the time period of the introduction of fair value was noticeable in the United Kingdom, any such effect was much less pronounced in the United States.

In Denmark, asset allocation among pension funds and pension insurance companies has also changed dramatically since the introduction of the traffic light system. Table 2 below shows the shift away from equities and the increase in foreign bonds in the years immediately after the introduction of the traffic light system in 2001. As discussed above for Dutch and UK pension funds, part of the drop in the equity allocation in 2000-01 is due to the collapse in the stock market. However, the decline in the equity allocation observed over the period 2001-04 is driven by portfolio reallocation, as equities outperformed bonds over this period.

Table 2. Asset allocation by Danish pension funds and insurers

	Domestic Bonds	Foreign Bonds	Domestic Equities	Foreign Equities	Investment Trusts	Other Assets
1998	54.4	1.3	13.4	12.3	1.9	16.7
1999	46.6	2.1	12.6	18.3	3.5	17.0
2000	44.7	4.8	11.3	18.5	4.6	16.1
2001	45.1	10.7	8.6	12.5	6.3	16.8
2002	53.0	13.6	4.6	6.9	6.2	15.7
2003	51.3	12.4	4.4	8.0	8.1	15.8
2004	43.2	14.6	4.6	8.3	12.3	17.1

Source: Andersen and Skjodt (2007).

To some extent, the derisking observed in these countries' pension fund portfolios may be explained by other factors, such as an increase in risk aversion after the collapse of the stock market bubble in 2001.

However, if that was the main reason, derisking should have also occurred in other OECD countries. This is, however, not the case. In fact, in most other countries, equity allocations have remained roughly stable or have even increased slightly.

Another feature of derisking has been the increasing use of interest rate derivatives and other risk hedging methods to reduce the volatility in the funding ratio. Together with changes in portfolio allocation, this constitutes the so-called liability-driven investment (LDI) approach that has gained popularity in recent years among both pension funds and insurers. For many investors, interest rate swaps have been a preferred derisking tool to raising government bond allocations as they have offered better liquidity at long maturities.

Risk transfer activity has also taken off between pension funds and insurers, particularly reinsurers, in some countries like the United Kingdom. Three types of transactions have been observed: buy-ins, where the plan sponsor purchases a bulk annuity from an insurer to cover some of its pension liabilities; buy-outs, where the plan sponsor fully transfers the pension liabilities (and assets) to an insurer; and longevity swaps, where the pension fund enters into a derivative contract with an insurer (usually reinsurer) to exchange the estimated future longevity against the actual observed longevity.

Impact on illiquid, long-term assets

While investments in public equities have been declining among pension funds in the countries considered, allocations to so-called alternative investment have increased. This includes real estate and infrastructure investments, which tend to be by nature long-term and highly illiquid. However, most of the increase in allocations observed in alternatives has been hedge funds and to a lesser extent private equity. Take-up of infrastructure investment has only been notable among Canadian pension funds, with allocations as high as 10-20% among the large, public sector pension funds.

Infrastructure bonds have been traditionally a popular investment among insurers and pension funds in the Nordic countries. In Denmark, appetite for infrastructure assets has been growing in recent years. For instance, the EUR 16 billion industry-wide pension fund PensionDanmark recently increased its target asset allocation to infrastructure and energy to 10%, while dedicating a further 13% to real estate and 3% to private equity in the portfolio targeting younger members (41 years and under). Danish pension funds have also been in discussions with the government to gain access to domestic PPPs.

In the Netherlands, infrastructure investments are also relatively novel. On the other hand, other illiquid assets such as real estate have a long tradition with recent allocations at around 10% of total assets while allocations to private equity are around 5%. The first pension fund to have invested in infrastructure projects was PFZW, the second largest in the country. Currently, it has a 2% allocation to unlisted infrastructure equity. As in Denmark, there is little evidence that the risk-based solvency regime in place is dissuading pension funds from investing in the asset class. However, it remains to be seen whether the high allocations to infrastructure observed in Canada could be reached by Dutch pension funds. In Canada, the rather flexible valuation and funding rules in place have allowed pension funds to delve heavily into illiquid assets. Under the Dutch FTK, very high allocations to infrastructure and other illiquid assets could expose pension funds to major solvency risk. On the other hand, pension funds face some flexibility when modelling infrastructure shocks and can treat such investments as listed equity for the purposes of the solvency test. As listed equities have a lower shock (25%) than private equity (30%), and to the extent that they provide diversification value, they can be an attractive investment for pension funds.

In Mexico, the main country that applies stress tests to pure DC pension plans, the main driver of investment allocations are the quantitative investment ceilings that are in place. While the VaR may have affected investment decisions, assets such as private equity, real estate and infrastructure are out of the

reach of pension funds in their illiquid, unlisted form. Instead, pension funds may invest in infrastructure structured products (CKDs) and Mexican Real Estate Investment Trusts (FIBRAs), each up to 10% of total assets. As of December 2010, Mexican pension funds had 3.3% of their assets invested in these asset classes.

Procyclicality in investment strategies

Another potential side effect of risk-based solvency regulations is that they may aggravate pro-cyclical investment behaviour such as the forced sale of assets during market downturns, especially if market valuation is used to calculate assets and liabilities. There were many examples of procyclicality during the recent financial crisis. Many of the countries with risk-based solvency and funding regulations made changes to their regulations to protect against fire-sales of assets which could have worsened market conditions.

The introduction of the Danish traffic light system and financial market turmoil in the beginning of the 2000s put the guarantees in the Danish pension and insurance sectors into focus. Fair valuation exposed mismatches between assets and liabilities and several pension providers found themselves with severe capital shortages (Andersen and Dam, 2008). In worsening market conditions, pension providers and life insurers were pushed to sell equities in order to remain compliant with the traffic light system. However, lower levels of equities made it more difficult to support their high-level of guarantees and the switch to more conservative assets would have limited investment growth at the expense of future pensioners (Andersen and Skjodt, 2007).

The situation worsened dramatically in 2008. At the time, Danish industry-wide pension funds and life insurers had to discount their liabilities using the prevailing euro swap rate plus the spread between Danish and German government bonds. On the asset side, however, they were heavily invested in mortgage bonds. As euro swap rates declined, this caused liabilities to increase, but mortgage bond prices were hit badly by the crisis. Due to the simultaneous increase in liabilities and decrease in assets, solvency positions plummeted. The Danish government intervened and changed the discount rate measure to include an additional load for changes in mortgage bonds yields in order to protect against massive divestments (Holland, 2009). In December 2011, the Danish Financial Supervisory Authority announced a further change to the discount rate due to pro-cyclical pressure and high demand, both foreign and domestic, on Danish government bonds. For purposes of discounting pension liabilities, pension funds and life insurers can choose to base their discount rate on a 12-month moving average of the Danish-German government bond spread, rather than the daily spread (Finanstilsynet, 2011).

In September 2011, a series of articles in major Swedish newspapers questioned the solvency positions of the main insurance company pension providers, and for several of these "the warning light was blinking red".[13] In a September 2011 letter to the insurance industry, the Swedish financial supervisory authority stated that the combination of current market turmoil and low interest rates could incentivise insurance companies to sell equities and purchase bonds which could cause a "negative spiral of continuing falling equity prices and interest rates" which could further worsen insurers' solvency positions. The financial supervisory authority requested the industry examine their products to make sure any guaranteed returns were sustainable over the long term, and they stated their willingness to allow insurance companies a long recovery period to improve their solvency positions.[14]

[13] Svenska Dagbladet (2011), "Pensionsbolagen i en ond cirkel", 27 September, *www.svd.se/naringsliv/pensionsbolagen-i-en-ond-cirkel_6503476.svd*.

[14] Finansinspektionen (2011), "Letter to the insurance industry", 27 September, *www.fi.se/upload/43_Utredningar/40_Skrivelser/2011/brev_till_livbolagen_110927.pdf*.

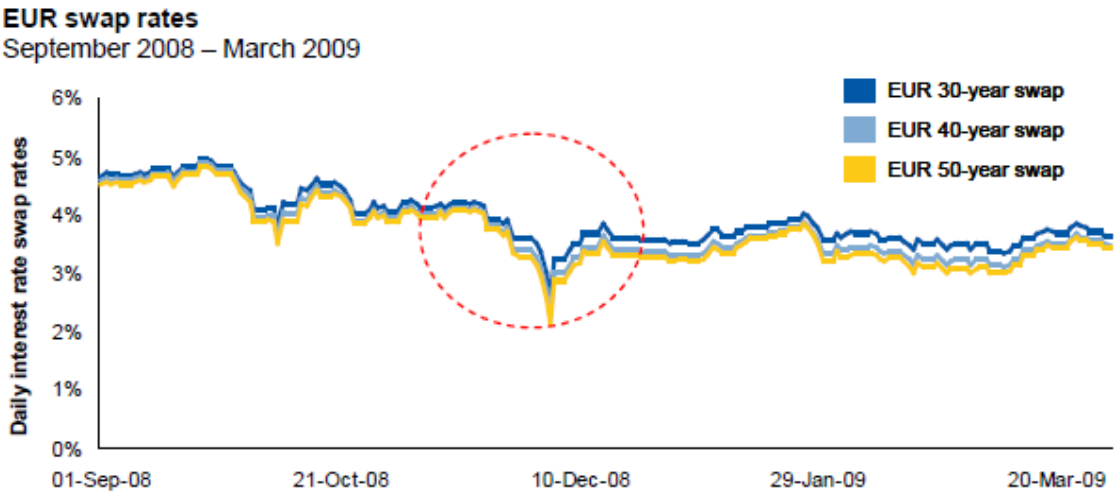
According to BIS (2011), in Switzerland, the introduction of the Swiss Solvency Test contributed to the observed inverted yield curve between maturities of 15 and 30 years.

In the United Kingdom, the introduction of fair value accounting standards and the minimum funding requirement (which was later eliminated) also contributed to pricing anomalies in the long maturity end of the government bond market, both in nominal and particularly in inflation-indexed bonds. As in Switzerland, the yield curve inverted in the 10-30 year maturity range, in part as a result of heavy buying by pension funds. Feedback loops via discount rates reinforced this effect.[15]

Other examples of procyclicality aggravated by solvency rules can be found in Finland and the Netherlands. In December 2008, the Finnish Parliament enacted a bill aimed at securing the solvency position of pension funds and at stemming the forced sale of equities during the extreme market downturn. These measures are to remain in effect until the end of 2012.

At the same tumultuous time at the end of 2008, Dutch pension funds were caught by a sharp plunge in the spot rate. Dutch pension funds are required to use a discount rate based on the daily euro swap curve to value their liabilities. When the swap rate fell abruptly at the end of 2008, several funds attempted to hedge their interest rate risk positions by purchasing long-term swaps. The increased demand, combined with short supply, made swap rates drop even further. As shown in Figure 6, this particular shock to the spot rate was severe, but lasted only a few days.

Figure 6. Euro swap rates (September 2008-March 2009)



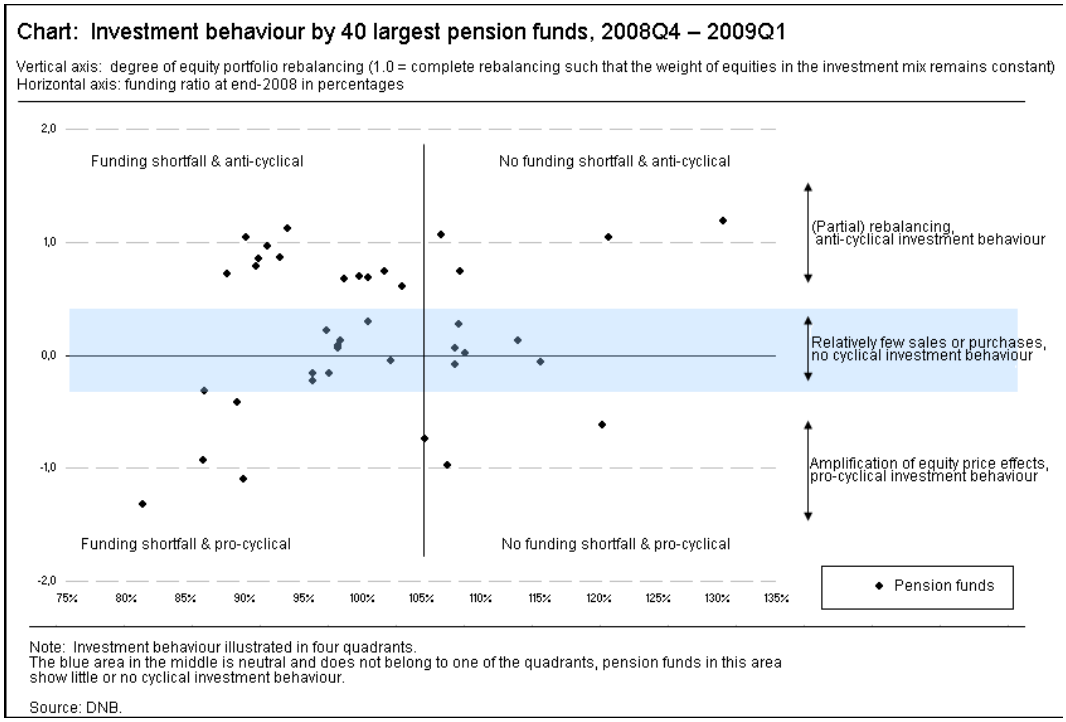
Source: Special Report of the Geneva Association Systemic Risk Working Group (2010).

As illustrated by the Dutch scenario at the end of 2008, the fair valuation of assets and liabilities inherent in risk-based funding regulations, as well as fair value accounting standards, can put short-term pressure on yields. However, the fair valuation principles built into risk-based funding regulations and fair value accounting standards may also put downward pressure on yields over the long-term due to the implicit reward inherent in such regulations and standards of hedging exposure to risks such as interest rate volatility. Nonetheless, over the period October 2008 to March 2009, an analysis by the Dutch Central Bank found that the 40 largest Dutch pension funds were net purchasers of equities (see Figure 7). In particular, the majority of these funds that were in a shortfall position at year-end 2008, re-balanced their

[15] See BIS (2011).

portfolios to maintain their equity position, which implies a level of counter-cyclical behavior (De Nederlandsche Bank, 2011).

Figure 7. Investment behavior by the 40 largest Dutch pension funds (2008Q4-2009Q1)



Concerns over procyclicality also arose in Mexico during the financial crisis. In 2010, regulations were changed to mitigate the pro-cyclical behaviour among pension funds that the value-at-risk limits could encourage. Under the new rules, if market volatility were to increase significantly, then the value-at-risk limitations would be temporarily loosened. As such, pension fund management companies would not be forced into asset fire-sales, they could maintain their broad investment strategies, yet an overall degree of downside protection would still be afforded to plan members (CONSAR, 2010).

Changes in pension plan design and insurance policies

A second, indirect channel through which fair value accounting and risk-based solvency and funding rules may affect investment strategies is via the incentives they create on pension and insurance providers to change the products they offer. Specifically, these valuation and regulatory changes have been credited with contributing to the move away from products involving guarantees or promises. To the extent that investment strategies differ across products, which they inevitably do, asset holdings in aggregate will be affected.

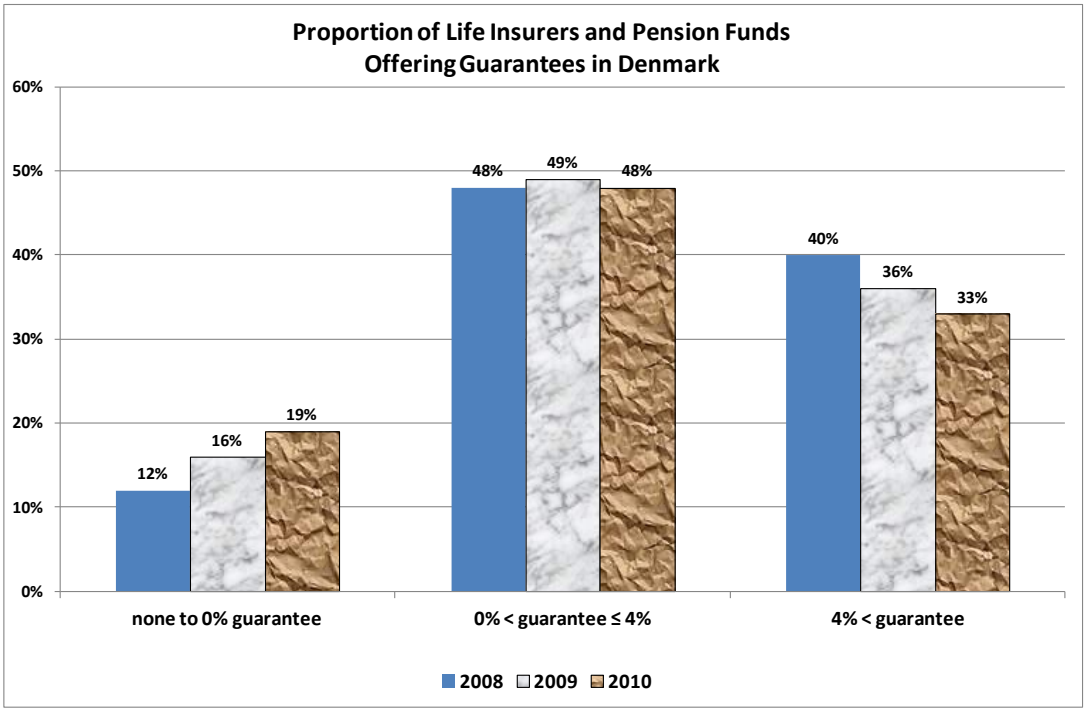
Under fair value accounting, insurance products and pension plans carrying any form of guarantee (e.g. an investment return or a benefit guarantee) are priced using market discount rates. The investment portfolio is also priced at market values. Hence, changes in market prices can cause wide swings in solvency levels. Furthermore, under risk-based solvency rules, additional capital requirements are applied to institutions depending on their asset allocation and other risks they face. By contrast, unit-linked insurance products and DC pension plans do not normally carry any guarantee, effectively removing insolvency risk. They also have much lower capital requirements under a risk-based framework. Such requirements are normally only linked to operational risks, as market risk is transferred to the

policyholder/member. In turn, insurers and pension providers are able to offer more flexible investment strategies in the products they offer.

Traditional products including some form of guarantee account for the vast share of insurers' assets in most European countries.[16] In recent years, a trend away from guaranteed products towards unit-linked products has been observed in many countries, such as Denmark and the United Kingdom. Several Danish pension providers and insurers have offered incentives for members to move from products with high guarantees to products with no or low guarantees, or providers have outright required such moves (Coats, 2011a). In October 2008 during the most recent financial crisis, the Danish Ministry of Finance issued a caution against pension providers making too high guarantees.

Between 2008, the percentage of Danish providers offering return guarantees above 4% per annum declined from 40% to 33%, whereas the percentage of providers offering no to 0% guarantees increased from 12% to 19% (see Figure 8). The introduction of the traffic light system and market-based valuation requirements have played an important role in this development. But even in the absence of such policy changes, a reduction in the level of guarantees would have occurred as a result of declining interest rates.

Figure 8. Proportion of life insurers and pensions funds offering guarantees in Denmark (2008-10)



Source: Finanstilsynet.

In general, the growth in unit-linked products is likely to result in an increase in equity allocations compared to the rather low values observed among traditional guaranteed products. Currently, in countries like Denmark, the Netherlands and the United Kingdom, equity allocations are higher among unit-linked productsthan among guaranteed ones.

[16] About 70% according to JP Morgan (2010).

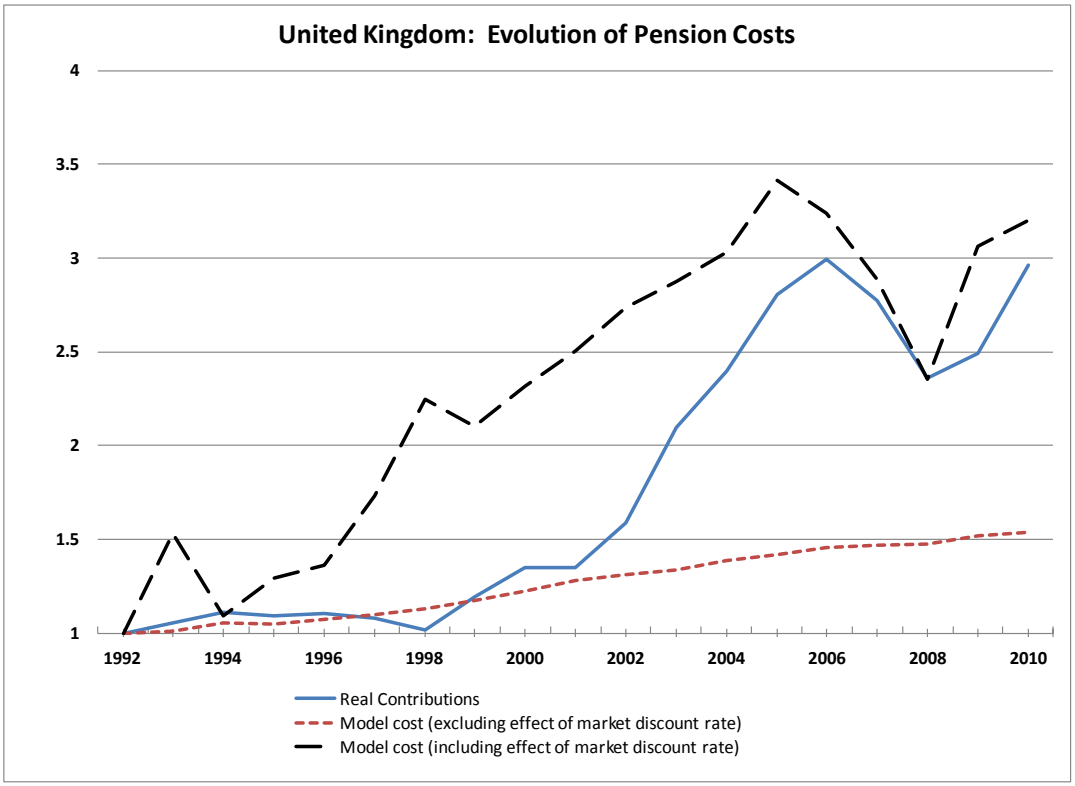
The situation is similar in the pensions sector. In most countries that have both DB and DC systems, equity allocations tend to be higher in the latter. For instance, US corporate DB pension funds invested about 40% of their assets in equities at the end of 2010, while DC funds (401ks) had over 60% of their assets in equities. The move away from employer-provided DB to DC is therefore, in itself, affecting asset allocations. This shift is well-documented, with major industry-wide shifts having occurred in countries such as Australia, Israel, Sweden, the United Kingdom, and the United States over the last two decades. In Australia, Israel, and Sweden, as well as other countries such as Mexico and Poland, DC pension systems are actually mandatory, requiring the participation of all employees. The main exceptions to this trend are Canada, Finland, the Netherlands, and Switzerland, where DB or hybrid pension arrangements remain dominant, as well as in Germany, where only DB plans are permitted.

The reasons for the shift from DB to DC provision are numerous and beyond the scope of this paper. The popularity of DC plans can be explained to a large extent by their relative simplicity and low regulatory burden in comparison to traditional DB plans. Also, DC plans are seen by some as more appropriate for a modern, mobile workforce and may be more easily appreciated and understood by employees. However, DC plans transfer risks and responsibilities to members, which they often have a hard time managing. Plan sponsors appreciate the predictability of costs in DC plans. Negative publicity appears to have made some employers wary of DB plans. For example, in some highly publicised cases, large and improperly managed DB obligations have led to deteriorating company finances and bankruptcy.

Some studies conclude that regulation and accounting have helped motivate the shift from DB to DC pensions. However, the relative impact of these interrelated factors is difficult to determine and disentangle. For example, Kiosse and Peasnell (2009) found that US and UK employers' decisions to freeze, terminate, or convert DB plans have been driven by the employer's desire to foremost limit their contribution requirements; however, accounting considerations have also been a factor. Also, according to a 2011 article by KPMG, pension buy-ins which involve the re-insurance of a portion of a plan sponsor's obligations reached a record level of GPB 3 billion in 2010 in the United Kingdom due to favourable pricing conditions and uncertainty as to how the implementation of Solvency II would affect future pricing conditions.

A study by Keating (2011) compares the relative change between: *i)* the total level of inflation-adjusted contributions made to defined benefit pension schemes in the United Kingdom between 1992 and 2010 to *ii)* the hypothetical total level of contributions required for defined benefit pension schemes based on a modelled pension cost inclusive of wage and longevity increases, but exclusive of a market discount rate and *iii)* the same hypothetical total level of defined benefit contributions, but also including the effect of changing AA corporate bond yield rates (see Figure 9). The study finds that with the introduction of FRS 17 in the United Kingdom in 2003 (although earlier adoption was permitted), pension contributions to defined benefit pension schemes increased significantly to reflect market discount rates.

Figure 9. Evolution of pension costs in the United Kingdom

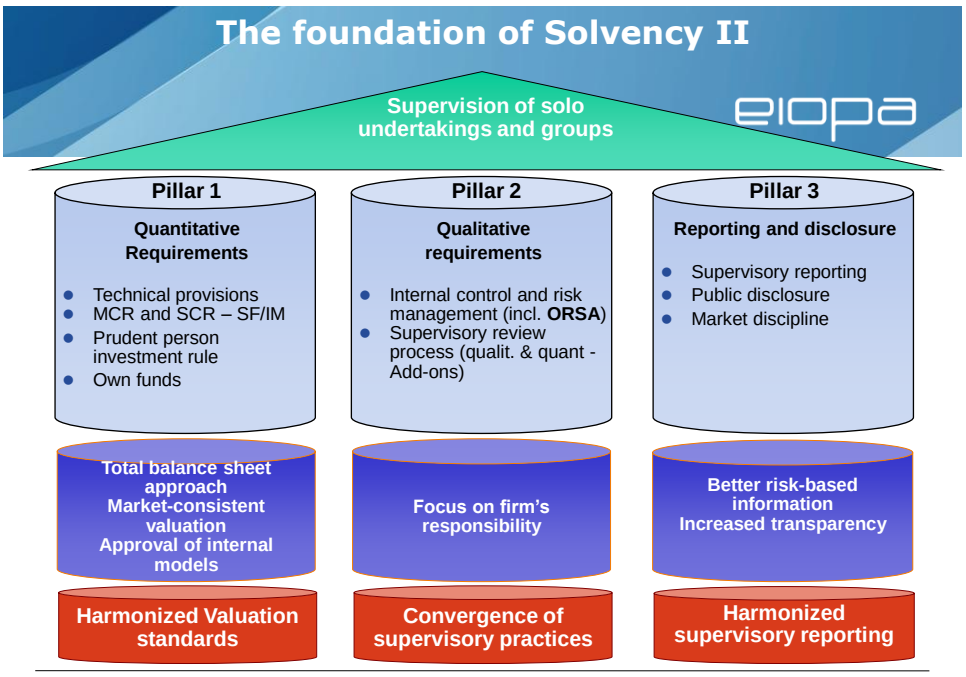


Source: Con Keating, Portfolio International.

5. Solvency II: An example of a risk-based solvency framework for insurers

Solvency II is a risk-based solvency framework that covers quantitative financial requirements, supervision, and disclosure for both solo and group-wide solvency assessment. Its design follows a similar three-pillar approach as is used by the Basel III regulatory framework for banking. The three pillars have been summarised in Figure 10 below, prepared by EIOPA.

Figure 10. The three-pillar framework of Solvency II



Source: EIOPA.

According to the Solvency II Directive, its valuation principles follow a market-consistent approach and are intended, to the extent possible, to be in line with developments in international accounting (European Parliament, 2009). However, both Solvency II and international accounting standards are still evolving and are meant for very different purposes. This would imply that although both standards may have similar guiding principles, when it comes to practical implementation the similarities are likely to be only on a very broad level.

Potential impact on investment strategies and risk management

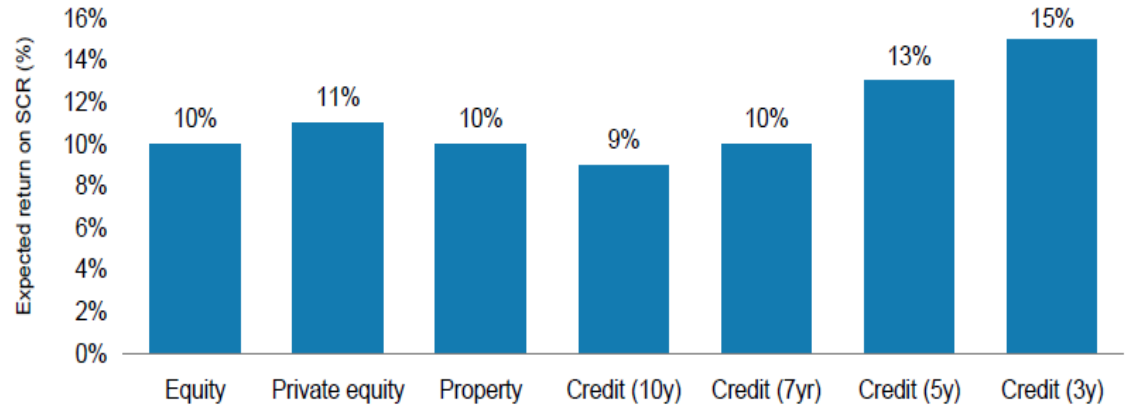
Based on the results of QIS 5 and the earlier QIS assessments, industry experts have reviewed the potential impact of Solvency II and what it may mean for the industry. Some of their main points are summarised below. It is important to keep in mind, however, that the European Commission is currently reviewing the implementation details of Solvency II taking the results of QIS 5 into account, so that it is likely that a number of these findings will be revisited as the regulations are finalised.

- **Reconsider the risk-return trade-off:** Insurers will need to re-consider what the risk-return trade-off is of their investments, taking into account the relative capital charges for each type of asset under Solvency II. Insurers will need to decide if the expected investment returns for a particular type of asset are sufficient to support the related capital charges. The most capital efficient assets for insurers to hold are EEA government bonds and swaps, as they have a zero direct capital requirement. On the other hand, long-term bonds will be among the least capital-efficient assets. The relative capital-adjusted return for different risky assets is shown in Figure 11 below, reproduced from Morgan Stanley and Oliver Wyman (2010), and based on the QIS 5 standard formula. Figure 12 shows that short-term debt appears relatively attractive compared to other risky assets. A similar analysis was made by JP Morgan Asset Management (2011) showing the shift in

the risk-return trade-off that could take place in the United Kingdom as a result of Solvency II (see Figure 12). The drawing is not to scale, but it shows that capital charges will be particularly higher for asset classes such as emerging equity and infrastructure compared to the trade-off under the existing UK solvency regime.

In interpreting such studies, the following limitations need to be considered: Firstly, those studies are based on the QIS5 design of the standard formula – which differs from the current design, where the Commission already introduced measures to reduce the charges for long-term fixed income investments. Secondly, the Solvency II standard formula charges for market risk may have a more limited impact on insurers' actual investment strategies and decisions, especially in cases where insurers use internal models or where such decisions are based on an insurer's own assessment of its economic solvency needs.

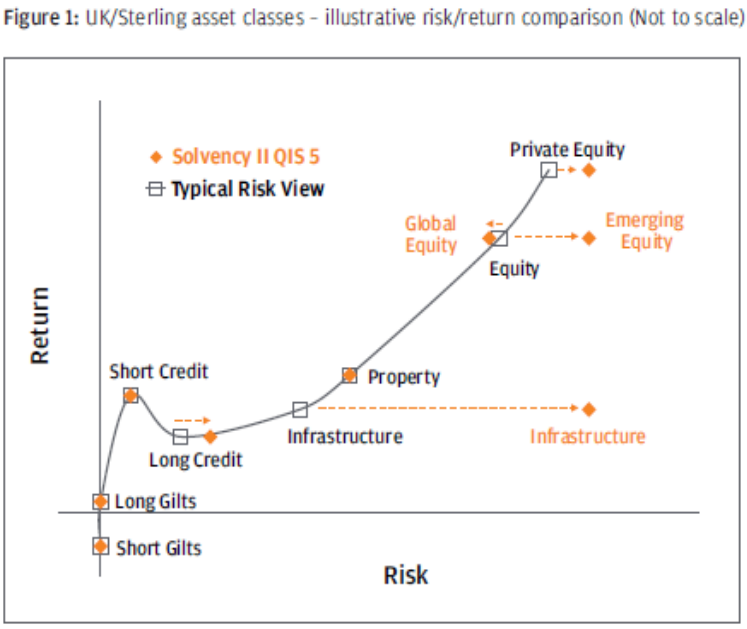
Figure 11. Capital-adjusted return from different risky asset classes under Solvency II



	Equity	Private equity	Property	Credit (10y)	Credit (7yr)	Credit (5y)	Credit (3y)
Standalone capital requirement (%)	39.0	49.0	25.0	16.5	11.5	8.2	4.9
Expected excess return (%)	3.3	4.3	1.9	1.3	1.2	1.1	0.9

Source: Morgan Stanley and Oliver Wyman (2010).

Figure 12. Illustrative risk/return trade-off (not to scale) for UK insurers under Solvency II



Source: JP Morgan Asset Management.

- **Move to assets with lower capital charges:** Solvency II will be a determining factor of insurers' investment strategies. However, the extent to which insurers actually need to change their current strategy will depend on their solvency level and their existing asset allocation. Insurers with lower solvency capital buffers will be pressured to move to investments that give rise to lower Solvency II's capital requirements such as long-term European-issued government bonds and short-term corporate bonds. Insurers with a greater solvency buffer can be more aggressive in their investments. Recent estimates of solvency levels among European insurers under Solvency II suggest that there will be very limited scope for allocations to assets other than swaps, government bonds and short-term credit instruments. Insurers with high allocations to other assets may therefore decrease their direct exposure to such investments over the coming years (see Box 1). Allocations to long-duration private sector bonds are also likely to suffer as such bonds have a high capital charge under Solvency II. Although asset-liability mismatch risk charges should, in principle, make such bonds attractive, insurers will have a strong preference for swaps and government bonds to meet their matching objectives, as these instruments have no capital charge.[17] Infrastructure bonds would also be negatively affected from the relatively high default rates assumed under the current proposal.

Box 1. Derisking in the European insurance sector: How much more can be expected?

Significant changes in asset allocation have been taking place over the last decade across the European insurance industry. Reductions in equity and real estate allocations have been observed among insurers in countries such as France and the Netherlands. With the forthcoming implementation of Solvency II, there is likely to be a further decrease in equity in EU countries where equity investments still remain high, such as in Finland (25%) and Sweden (37%). In these countries, life insurance products are still dominated by guaranteed products, so that such equity exposures imply relatively high capital charges.

The specific reaction of each insurer will depend on many factors, including their solvency level under Solvency II, the extent to which they use an internal model, the structure of their liabilities and hence the type of insurance products on offer, and the initial asset allocation. As for solvency levels, QIS 5 showed that most companies surveyed had sufficient capital (own funds) to cover the new solvency requirements, and the industry average showed a comfortable Solvency Capital Requirement (SCR) of 165%. However, some 15% of insurers fell short of the 100% SCR threshold, and another 8.3% fell in the range of 100-125%. Low solvency levels may force these insurers to intensify their derisking.

The initial asset allocation will also affect the subsequent adjustment. In the United Kingdom, where annuities are a major part of the life insurance business, insurers may be forced to reduce their low-rated corporate bond allocations because of their high capital charge under Solvency II. On the other hand, there may be less of a shift in asset allocations in French and German insurers' bond portfolios because they invest predominantly in highly rated corporate and sovereign debt which carry low capital charges. However, durations for corporate bond exposure may be shortened.

- **Reconsider exposure to unlisted and illiquid assets:** There has been some debate as to whether insurers will invest more or less in less liquid assets such as private equity and infrastructure under Solvency II. Under the standardised approach, for simplicity, unlisted infrastructure equity investments and private equity are subject to the same capital requirements as other types of equity exposure. For insurers with sufficient buffers, unlisted infrastructure equity may be more attractive than infrastructure project debt, which usually has a long-duration and is therefore penalised by Solvency II. According to a 2011 Fitch Ratings report, insurers who have typically supported long-term infrastructure debt may no longer find these types of investments attractive. Some insurers are instead planning to avoid unlisted infrastructure equity, but maintain some exposure to infrastructure bonds.[18] The ultimate effect on these investments will also depend on diversification benefits, cash flow expectations and the risk-return characteristics of these long-term investments. There may be some scope to better reflect these benefits in the capital charges if an internal (and supervisory-approved) capital charge model is used.

- **Minimise duration mismatch between assets and liabilities:** Insurers will attempt to minimise the duration mismatch between assets and liabilities as it is the net difference between assets and liabilities that drives the capital charges under Solvency II. It is therefore expected that long-term government bonds from EEA countries and from other high-rated countries may be especially favoured. To support long-term obligations, insurers may need to increase their use of long-term derivatives (such as swaps), which could also increase their exposure to counter-party risk (IIF and Oliver Wyman, 2011). A 2010 study by van Bragt et. al. finds that one of the most efficient ways to ensure that the solvency requirement is not breached for an insurer with long-term liabilities is to increase the duration of the bond portion of the investment portfolio.

- **Enhance diversification:** Diversification is one of the main ways to reduce the amount of solvency capital required under Solvency II, and can be particularly beneficial for insurance groups and composite insurers. Activities that improve diversification such as internal capital

transfers, acquisitions, or sales could pick up at least in the initial period of Solvency II. However, diversification of investments across different asset classes could diminish as certain types of asset classes require lower capital charges than others (Morgan Stanley and Oliver Wyman, 2010).

- **Risk transfer:** Insurers may look to transfer their risk and thereby reduce their capital requirements by using reinsurance, securitisation of liabilities, or increased use of derivatives for hedging purposes (BIS, 2011). A report by Morgan Stanley and Oliver Wyman (2010) predicts that due to the pressure placed on insurers by Solvency II, the volume of European reinsurance could expand by 10-20%.

Two concerns arising from the implementation of Solvency II are the potential for pro-cyclical investment behaviour and regulatory arbitrage. As discussed earlier, various counter-cyclical features are being introduced, such as the equity buffer and the counter-cyclical premium on discount rates at times of market distress. Such adjustments should be sufficient to avoid fire-sale of risky assets during a market downturn. However, concerns over procyclicality remain, especially as Solvency II will lead to more homogeneous investment strategies across the European insurance sector. As argued by BIS (2011), insurers' investment strategies "*may become more synchronised under a common regulatory framework. Where they used to exhibit contrarian or stabilising behaviour, they may henceforth move in the same direction as markets and the economy, leading to procyclical effects*".

Proper calibration will also be essential to mitigate regulatory arbitrage. In particular, capital charges must be properly aligned against the credit risks introduced by the use of reinsurance. Otherwise, insurers could reduce their solvency capital requirements by hedging risks and reinsuring their liabilities with reinsurers in jurisdictions with less-stringent capital requirements. Other factors such as taxes could, however, have a greater significance for regulatory arbitrage considerations than differences in solvency regimes (Al-Darwish et al, 2011).

Potential impact on insurance products

Several studies have concluded that an important potential impact of Solvency II is that insurers will change the type of products they offer. In particular, life insurers could move away from products offering long-term guarantees to those types of products that better reflect changing market conditions such as unit-linked products or possibly variable annuities. Such products, particularly unit-linked products, will be generally subject to lower capital requirements than traditional participating or with-profits products. The European Commission is keenly aware of this possible impact on long-term products and has indicated that it will address this issue as the Solvency II regulatory framework is finalised.

From a Solvency II perspective, long-term products with guarantees can be difficult to match with appropriate assets and can therefore contribute to solvency capital volatility. There may also be an increase in product-embedded mechanisms that pass risk from insurers to policyholders, such as an option in annuity products allowing insurers to re-price on a periodic basis in order to reflect mortality experience (Al-Darwish et al, 2011).

A report by Morgan Stanley and Oliver Wyman (2010) finds that one of the biggest sources of market risk for European insurers is in traditional with-profit life insurance products. The report states that "in many continental European countries, the traditional participating life product is designed, managed and regulated around the principle of 'book investment yield' and cost accounting… A move to mark-to-market regulatory balance sheets could therefore be completely inconsistent with the way these products work."

The impact of Solvency II on insurance companies' product offerings will vary by country, depending on the extent to which it differs from local solvency regimes currently in place, the types of products local insurers tend to offer, and the current asset allocations of local insurers. A trend away from guaranteed products has already been observed in some Scandinavian countries, in particular Denmark and more recently in Sweden. In Denmark, insurers (including pension insurance companies) have been subject to a risk-based solvency regime called the traffic light system since 2001. Many providers have since reduced the guarantees for new policies or offer only market-rate products. Since 2010, providers have also introduced incentives to persuade older clients to move from guarantees to market-rate products.

According to a 2010 article by Towers Watson, the annuity market in the United Kingdom is likely to be particularly affected as this business has been typically supported by low-rated corporate bonds. As the capital charge for these types of instruments can be up to 60%, insurers could be pressured towards safer investments which would drive up the cost of annuities and negatively impact this market (which will already be hit by the removal of the obligation to buy annuities in pension plans). On the other hand, as explained above, French and German insurers' traditional life insurance products tend to be supported more by highly rated bond instruments in comparison to the United Kingdom and such instruments carry low capital charges. Hence, there should be a smaller impact on life insurance products in these countries.

The European Commission has reacted to the critique that the currently proposed implementing measures could work to limit insurers' willingness to offer products with long-term guarantees. In a June 2011 letter to the insurance industry, the European Commissioner for Internal Market and Services stated that the European Commission takes "very seriously the issue of the ongoing viability of insurance products with long-term guarantees… Necessary measures will be taken in order to ensure that the characteristics and risks of these products are adequately reflected in the implementing measures".[19] It could, therefore, be expected that future revisions to Solvency II's implementing measures will limit the potential impact on long-term insurance products. In particular, various counter-cyclical regulatory measures and valuation adjustments are being considered that would ease the capital charge on insurers. .

Ultimately, however, the ongoing risk transfer to households that has been taking place over the last decade is unlikely to be reversed. Even if Solvency II rules are adjusted to lower the capital charge of such products, they will remain more capital expensive than products without any underlying options or guarantees. As a result, the investment allocation of insurers will become increasingly determined by investors' choices. Allocations to riskier assets, such as equity, may therefore grow over time if individual European investors follow the trend observed in the United Kingdom, where insurance products without guarantees typically generate high equity allocations.

6. Conclusion

Major regulatory and accounting changes are underway that could have a profound impact on the long-term investment decisions of life insurers and pension plans. Life insurers and pension plans may respond to these developments by moving further away from products and promises with return guarantees in favour of those that pay out benefits to policyholders and beneficiaries in line with market returns, thus further shifting the risk onto individuals. This shift of risk towards individuals further heightens the need to put robust financial consumer protection measures in place.

For insurers, new international accounting standards are being developed that will for the first time require standardised accounting practices across countries all over the world. The move towards fair value accounting principles will have major impacts on life insurers and pension plans as they will need to consider to what extent they wish to minimise accounting volatility, for example by transferring risk from

sponsors to members and policyholders or by matching the characteristics of their assets with their liabilities, and what level of volatility is acceptable given the search for excess investment returns.

In the case of risk-based solvency requirements, the long-term nature of the obligations supported by life insurers and pension funds' investment portfolios must be kept in mind. Care should be taken in the design of risk-based solvency regulations so that they do not encourage pro-cyclical behaviour such as the fire-sale of assets in market downturns or knee-jerk asset reallocations given this long-term horizon. The different asset classes also need to be treated appropriately under risk-based standards, considering their long-term features, such as any potential benefits from diversification and alignment with the liability's cash flows.

Finally, regulators should be aware of what effects solvency requirements and accounting standards may have on the behaviour of sponsoring entities, and any built-in incentives that may skew investment decisions or have other side-effects. They will need to decide to what extent such behaviour or side-effects are acceptable. Given the overall regulatory framework within countries, regulators may also take into consideration the interplay between the need for secure benefits, the nature of the sponsor covenant, and other security mechanisms, and the level of appropriate risk given the long-term nature of the promises made to plan members and policyholders.

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