Procyclicality and structural trends in investment allocation by insurance companies and pension funds:

A Discussion Paper by the Bank of England and the Procyclicality Working Group

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Any views expressed in this paper are those of the authors and the Procyclicality Working Group and do not necessarily represent the views of the Bank of England

Foreword

1. In early 2013, the Bank established the Procyclicality Working Group (the membership of which is set out overleaf) to examine the question of whether, and if so why, insurance companies and pension funds invest procyclically.

2. The group defined procyclicality as follows:

- First, in the short term, as the tendency to invest in a way that exacerbates market movements and contributes to asset price volatility, which can in turn contribute to asset price feedback loops. Asset price volatility has the potential to affect participants across financial markets, as well as to have longer-term macroeconomic effects; and

- Second, in the medium term, as a tendency to invest in line with asset price and economic cycles, so that willingness to bear risk diminishes in periods of stress and increases in upturns. A tendency by insurance companies and pension funds to invest procyclically in the medium term might deepen the troughs and exaggerate the peaks of asset price or economic cycles in a way that is potentially detrimental to financial stability and long-term economic growth.

3. In the course of its analysis, the group also examined a number of longer-term structural issues and trends in the asset allocation behaviour of insurance companies and pension funds, going beyond procyclicality. These trends are also relevant for the willingness of insurance companies and pension funds to bear risk in the longer term, and are therefore significant for the appropriate allocation of capital in the real economy.

4. This paper sets out the results of that work. It includes analysis of some of the possible drivers of asset allocation behaviour by insurance companies and pension funds, as well as examining evidence from academic literature and a number of case studies undertaken by Bank of England staff.

5. The analysis presented here suggests that the behaviour of these investors—whether as a result of liability characteristics, regulation, accounting and valuation methodologies, or industry practices (including the tendency for similar investment strategies or 'herding')—could have important consequences for the economy as a whole.

6. The findings of this work are indicative rather than definitive, and the intention of this publication is to stimulate further research and debate in this area, rather than to present a diagnosis of, or prescription for, a particular problem. Further examination of the investment behaviour of insurance companies and pension funds—which are set to play an increasingly significant role in the financial system given expected trends in wealth and demographics—is important from both a macroeconomic and macroprudential perspective.

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Executive Summary

7. Life insurance companies and pension funds (ICPFs) are important financial intermediaries, managing the long-term savings of individuals and providing investment to the real economy.[2] Globally, ICPFs manage over $50 trillion (c.£30 trillion) of assets. In the United Kingdom alone, they manage nearly £3 trillion of assets. The way in which they manage the investments that they make on behalf of individuals is critical both for those individuals and for the wider economy.

8. Given their long-term liabilities, ICPFs have the potential to provide important long-term investment to the economy—for example in infrastructure and other long-term assets. In principle, by being better placed to look through short-term market volatility than many other types of investor, they also have the potential to be a stabilising influence on the financial system. ICPFs could therefore play a crucial role in supporting both financial stability and long-term economic growth, which are in turn mutually reinforcing.

9. This paper examines the determinants of the asset allocation decisions of ICPFs—whether related to liability characteristics (that is the types of products offered to individuals, including where the investment risk of those products resides), regulation, valuation and accounting methodologies, or industry practices. It also seeks to establish whether there is evidence of procyclicality in the investment decisions of ICPFs, and to examine longer-term structural trends in asset allocation.

10. Procyclicality is defined as investing in the short term in a way that could exacerbate market movements and contribute to asset price volatility (including through asset price feedback loops), or investing in the medium term in a way that might exaggerate the peaks and troughs of asset price or economic cycles. Procyclicality in the short or medium term has implications for how ICPFs bear risk across the cycle, and how these important investors contribute to financial stability and long-term economic growth. Although asset price volatility does not necessarily equate to financial instability, it can decrease the resilience of the financial system, and thereby potentially contribute to serious interruptions in the vital functions which the financial system as a whole performs in our economy, notably: provision of payment and settlement services, intermediating between savers and borrowers, and insuring against risk.

11. The paper largely considers procyclicality in terms of shifts in asset allocation between asset classes, for example between what are considered to be higher-risk to lower-risk asset classes (e.g. from equity to fixed income). But procyclicality could also be evident in shifts in allocation within asset classes, for example from higher-risk to lower-risk bonds (e.g. from low-rated corporate bonds to high-rated government bonds).

12. We find some evidence of procyclical investment behaviour by insurance companies both internationally and in the UK. In the UK, there is some evidence of procyclical shifts in asset allocation following the dotcom crash of the early 2000s, and to a lesser extent during the recent financial crisis. There also appear to be important structural shifts in asset allocation occurring during this period, which make identifying procyclical behaviour more difficult. In addition, a lack of data regarding certain aspects of insurer investment behaviour, for example their use of derivatives, means it is difficult to confirm anecdotal evidence of procyclical behaviour. In particularly stressed markets, regulators in many countries have employed a variety of forms of regulatory flexibility, which may also have tempered procyclical responses.

13. Evidence on the procyclicality of pension funds internationally is mixed. While pension funds in some countries appear to have behaved countercyclically during 2008–09, engaging in large net

[2] This paper considers those insurance products which act primarily as long-term savings products, including defined contribution pensions, that is life rather than general insurance products.

equity purchases as markets fell, others engaged in net sales of equity during the crisis. This arguably reflected structural shifts in these countries towards more conservative asset allocations, rather than being a reaction to market conditions, but nonetheless may have been destabilising in the context of market developments at that time.

14. In the UK, defined benefit pension funds (both corporate and local authority) appear to have behaved countercyclically in the short term (i.e. monthly–quarterly) including during the financial crisis. That is, they appear to have increased their purchases of particular asset classes in periods when prices were falling, and sold in periods when prices were rising. This appears to be a function of essentially mechanical portfolio rebalancing in order to meet long-run strategic asset allocation targets.

15. In the medium term, the asset allocation of corporate defined benefit schemes to UK equity seems largely to have been dictated by a longer-term structural shift away from equity holding, rather than cyclical considerations per se. Although consistent with longer-term structural shifts in asset allocation, the continued selling of UK equities during the financial crisis by corporate defined benefit pension funds may have been destabilising in the context of wider market moves at that time, and if taken in isolation, could be viewed as procyclical. Moreover, the largest corporate pension funds in the sample we analysed do appear to have accelerated the pace of longer-term shifts in asset allocation during the financial crisis in a way that could be considered modestly procyclical.

16. Funded local authority defined benefit pension funds, which are subject to different pressures and a different regulatory regime (and are often still open to new entrants, in contrast to corporate schemes, which are increasingly closed to new entrants), appear to have behaved countercyclically in the medium term, including during the financial crisis.

17. Internationally and in the UK, pension fund regulators have introduced elements of regulatory flexibility in periods of stress to avoid incentivising procyclical behaviour and to limit the impact of periods of market volatility or stress on pension fund sponsors. This may also have discouraged procyclical responses to periods of stress.

18. Despite limited evidence of procyclicality in the aggregate behaviour of UK pension funds in the recent past, there are elements of current industry practice which result in a tendency for pension funds to herd—that is, invest in the same assets at the same time. If this tendency to herd were to coincide with, rather than offset, wider market trends, such behaviour could contribute to procyclicality, potentially amplifying asset price or economic cycles.

19. For example, there have been instances where regulatory change has incentivised large correlated movements of pension funds into certain asset classes. An example of this is given by the strong movement of pension funds into index-linked gilts in the mid-1990s, following changes to pension fund regulation, which exerted considerable downward pressure on the yields on these securities.

20. In the longer term, UK ICPFs have undertaken a structural shift in asset allocation over the past 15 or so years, reducing their holdings of UK equities, largely in favour of fixed income instruments. This process, widely considered “de-risking”, has at least in part been a response to a variety of regulatory, valuation and accounting changes that have happened during this period. It also reflects a change in risk appetite amongst ICPFs, perhaps as a result of the dotcom crash of the early 2000s and an increasing focus on asset and liability matching in investment strategies, as well as other factors such as the increasing longevity of policyholders. Many of these factors are intertwined and mutually reinforcing. Evidence suggests that stronger corporate defined benefit pension funds, as measured by funding position, have used their strength to “de-risk” more rapidly than their weaker

counterparts. Local authority defined benefit pension funds have not “de-risked” to the same extent as their corporate counterparts.

21. Because equity does a better job than debt of sharing risk between borrowers and lenders, and—because it is perpetual—is better able to support long-term investment projects, this transition away from equity holding by ICPFs may leave the system as a whole with poorer risk-sharing and weaker long-term investment.

22. More broadly, it is possible that the combination of factors that drive the asset allocation decisions of ICPFs may lead to outcomes that are suboptimal from the perspective of financial stability (through procyclicality) and long-term investment and economic growth (through an unwillingness to bear risk). Ultimately this may to lead to worse outcomes for individual policyholders as well. These are the issues that this paper explores.

23. Given the importance of these issues, and reflecting the challenges in undertaking this work, it is the intention of this paper to present indicative findings for debate and to highlight areas for further research. Any further research would greatly benefit from an improvement in the granularity, quality, frequency, timeliness and availability of data on the asset allocations of ICPFs.

24. Whilst not presenting policy conclusions, there are two clear high-level implications of this work relevant to the future design of policy relating to the provision of long-term savings products, whether by insurance companies or pension funds.

25. First, in relation to the structure of long-term savings provision, policies primarily designed to deliver the appropriate degree of policyholder protection might have consequences at an aggregate level for long-term economic growth and financial stability. Policymakers are obliged to ensure the appropriate degree of policyholder protection is delivered, and may be compelled by statutory objectives, regulation and legislation to behave in a particular way. However, it is important that in addition policymakers are able to consider financial stability and the impact on the real economy as well. At times there may need to be a balance struck between these objectives.

26. Second, in relation to cyclical incentives, whilst regulatory flexibility applied in previous periods of stress may have tempered procyclical behaviour, it has often been applied on an ad hoc basis and therefore asymmetrically across firms and over time. Because it is ad hoc, regulatory flexibility may occur after a delay during which procyclical forced selling could already have taken place. Moreover, asymmetry may imply perverse incentives; by benefitting weak firms or funds more than strong, and by easing requirements in times of stress but not requiring buffers to be built in more benign environments. Failing to provide benefit to stronger firms means that those firms are not encouraged to act countercyclically, which could otherwise further minimise aggregate procyclicality. Similarly, while the application of regulatory flexibility might put a brake on, for example, damaging forced asset sales, it does not necessarily restore the ability of ICPFs to undertake risk in a way that might be systemically stabilising in periods of stress.

27. For both insurers and pension funds, consideration could be given to countercyclical regimes that ensure that resilience is built up in benign economic circumstances, in order that regulatory constraints can be relaxed safely in periods of stress. In the absence of countercyclical regimes, ICPFs are obliged to position themselves assuming that ad hoc regulatory flexibility will not occur. A clearly defined countercyclical framework could provide greater clarity to firms and funds about the conditions under which—or the set of principles according to which—regulatory action would be taken, reducing undesirable uncertainty. While countercyclical regimes might be beneficial for both insurance companies and pension funds, this does not necessarily imply that the same regulatory regime should be applied to both.

28. Industry, policymakers and consumer groups all have a role in ensuring that long-term savings products provide the combination of security, affordability, risk-sharing and flexibility that is appropriate to the long-term interests of individuals. At the same time, policy needs to ensure that while it satisfies the interests of individual policyholders, it also supports the system at a macroprudential and macroeconomic level. These important issues merit both further research and debate.

Introduction

29. Life insurance companies and pension funds (ICPFs) play a key role in intermediating household savings. That is, they receive money from households, in the form of premiums or contributions, which they invest in a variety of assets. These assets are then used to make payments to those households in the future, in the form of, for example, pension or annuity payments.

30. Pensions and long-term savings products provided by ICPFs are important for adequately providing for policyholders in later life, but they are also crucial for supplying long-term finance to the economy. Globally, ICPFs manage over $50 trillion (£30 trillion) of assets (G30 (2013)). In the UK alone, they manage nearly £3 trillion of assets (ONS). What ICPFs decide to invest in and how they make those investments can have significant implications for both financial stability and economic growth. In turn, strong and sustainable economic growth can, by increasing the return on investments made by ICPFs, provide a better outcome for policyholders.

31. ICPFs have long-term liabilities, meaning they are well-suited to play a role as long-term investors, for example in infrastructure and other long-term assets that are important for economic growth. Where long-term investors have less need for short-term liquidity, they may be able to invest in less liquid assets, earning a higher rate of return for doing so. Where the ability of a policyholder or pension scheme member to withdraw funds is limited (as with fixed annuities and defined benefit pensions), and ICPFs therefore have limited short-term liquidity needs, they may be more inclined to buy and hold assets across the economic cycle. They may also be less subject to pressure to respond to short-term market movements, or they may be more willing and able to take advantage of market movements by buying assets at the bottom of the cycle and selling at the top. As such, they might have the potential to play a stabilising, or even countercyclical role in the financial system.

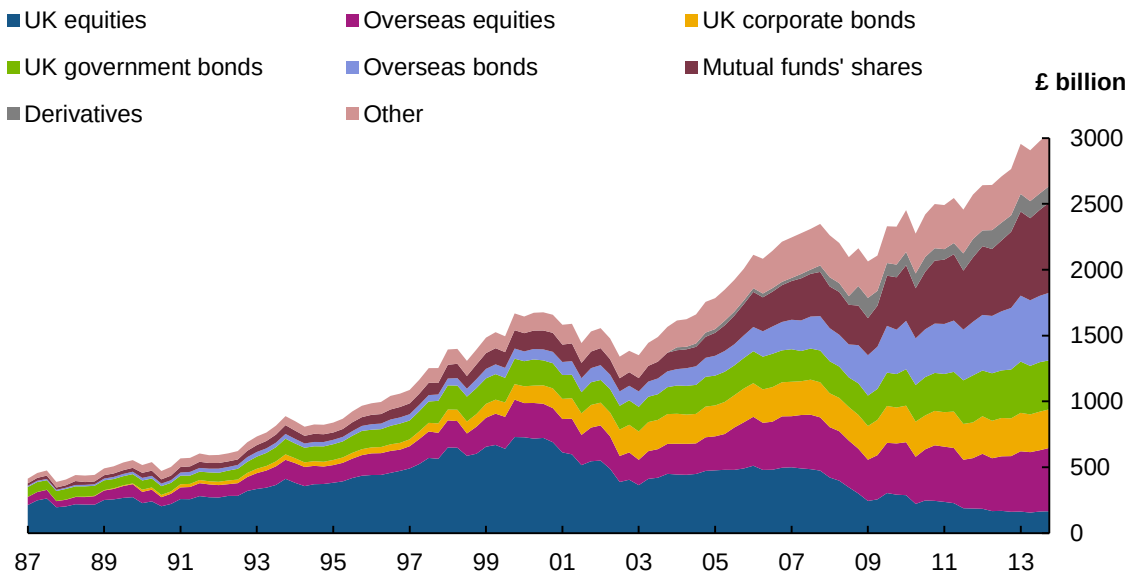
32. There are concerns, however, that potential long-term investors are increasingly unable to invest in line with their long-term horizons. The G30 has noted that “potential long-term investors are increasingly constrained in their ability to provide financing” (G30 (2013)). Regarding defined benefit pension funds, it notes that funding shortfalls have intensified short-term performance pressures, while pension fund accounting has incentivised risk-mitigation strategies that have encouraged a shift from higher-risk, higher-return equity investment to investment in lower-risk fixed income securities. For insurers it argues that in Europe in particular, management led risk-reduction strategies, in part in anticipation of the introduction of Solvency II for European insurers, may similarly have triggered a shift away from asset classes such as equities. In general, it notes that performance measurement is increasingly tied to benchmarks that are measured quarterly, penalising those who ride out periods of market volatility. Concerns about short-termism in equity investment generally were also raised by the Kay Review of UK equity markets (Kay (2012)). There are both structural and cyclical aspects to this problem. While some elements of observed trends reflect a reaction in particular to the financial crisis and may therefore be reversed in due course, other aspects appear to represent a more permanent shift in investment preferences and behaviours.

33. These observations on the shift from higher-risk, higher-return equity investment to investment in lower-risk fixed income securities are supported by aggregate asset allocation data for ICPFs in the UK, which demonstrate that the nature of ICPF investment in the UK has changed markedly over the last 15 or so years. Chart 1 shows the nominal asset allocation of ICPFs since 1987, while Chart 2 shows the varying proportion of total UK ICPF assets allocated to various asset types for the same period.

34. Particularly striking has been the decreasing allocation of assets to UK equities. It should be noted, however, that the categories of mutual funds and derivatives are not asset-class specific. So, for example, some of the assets captured in the category mutual funds’ shares in Charts 1 and 2, which has increased significantly over this period, are likely to be UK equities. Figures from the

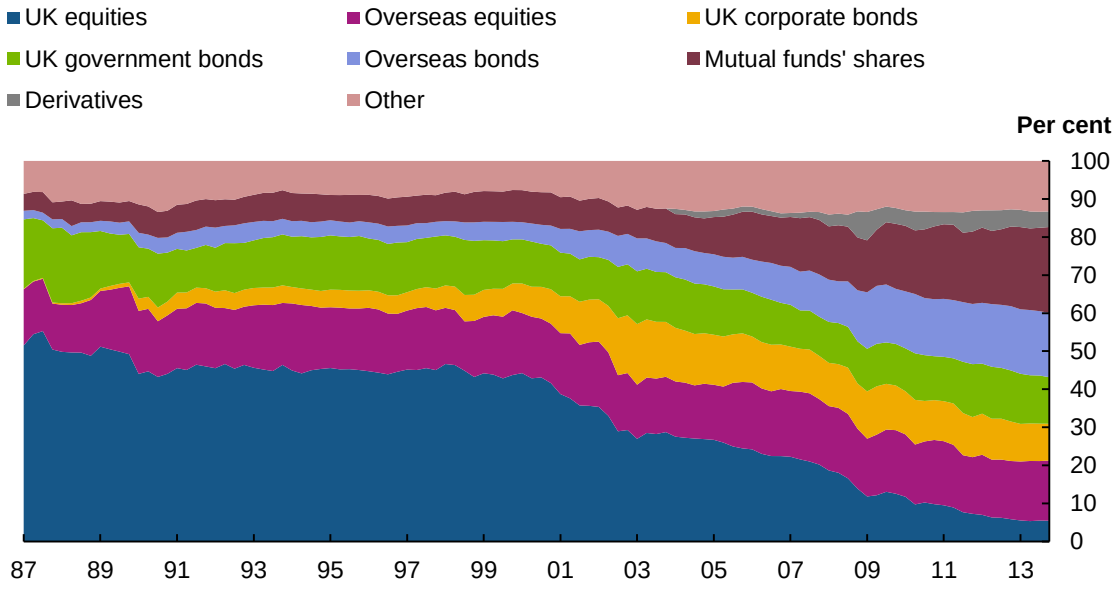
Investment Management Association (IMA) suggest that around 70% of UK mutual funds are allocated to equities[3], but a considerable proportion of this is likely to be allocated to overseas equities. Even allowing for this, the fall in allocation to UK equities by ICPFs has been significant.

Chart 1: Asset allocation of UK ICPFs (nominal)[(a)(b)(c)]



Source: ONS and Bank calculations
(a) Bonds includes money market instruments, medium- and long-term bonds. The split of overseas bonds by issuer is not available.
(b) Other includes currency, deposits, loans, other accounts receivable and insurance technical reserves.
(c) Derivatives data are shown separately from 2004, but prior to this are included in corporate bonds.

Chart 2: Allocation of UK ICPF assets to different asset classes (nominal)[(a)(b)(c)]

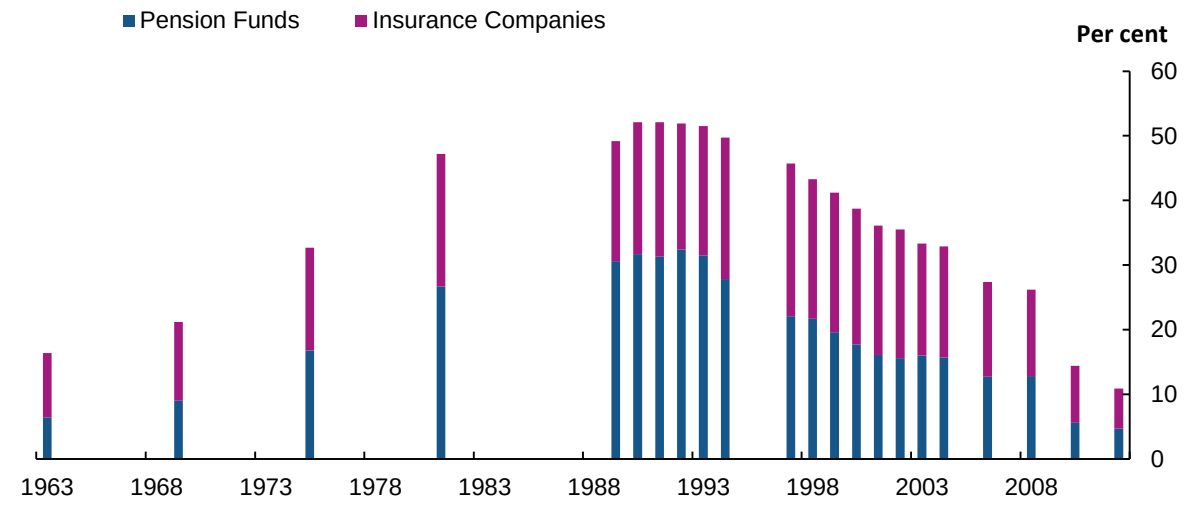


Source: ONS and Bank calculations
(a) Bonds includes money market instruments, medium- and long-term bonds. The split of overseas bonds by issuer is not available.
(b) Other includes currency, deposits, loans, other accounts receivable and insurance technical reserves.
(c) Derivatives data are shown separately from 2004, but prior to this are included in corporate bonds.

[3] http://www.investmentfunds.org.uk/fund-statistics/

35. This has been reflected in the decreasing proportion of total UK shares owned by UK ICPFs, which has decreased from over 50% in the early 1990s to just over 10% in 2012 (Chart 3). Clearly this shift from equity to fixed income instruments is only one aspect of the investment decision made by ICPFs, and while this may reflect a decrease in risk appetite in one respect, it is possible that this could be being offset by ICPFs expressing risk appetite in other ways—for example through investment in other assets, such as infrastructure—which are not evident from the aggregate asset allocation data.

Chart 3: Percentage of UK shares beneficially owned by UK ICPFs



Source: ONS and Bank calculations

36. If—as suggested by, for example, the G30—some of the change in asset allocation in the UK and elsewhere results from a general shift towards increasingly short-term considerations driving the investment decisions of long-term investors, we might expect that the asset allocation decisions of ICPFs would also be increasingly procyclical.

37. This paper investigates a number of these issues. It:

I. Outlines the possible consequences of procyclical ICPF investment behaviour for financial stability and the real economy (pages 11–12);

II. Examines how liability characteristics, accounting and valuation methodologies, regulation, and industry practices might influence asset allocation decisions (pages 13–20);

III. Sets out some available evidence on the cyclicality of, and longer-term trends in, investment by insurers (pages 21–32);

IV. Sets out some available evidence on the cyclicality of, and longer-term trends in, investment by pension funds (pages 33–46);

V. Outlines some conclusions and possible considerations for future policy (pages 47–48).

I. The macroeconomic significance of the investment decisions of insurance companies and pension funds

38. The investment decisions of ICPFs are important because changes in asset allocation have the potential to amplify asset price volatility and/or exacerbate business cycle fluctuations, that is, to be procyclical. Although procyclicality does not necessarily equate to financial instability, it could decrease the resilience of the financial system and therefore contribute to interruptions in the vital functions which the financial system as a whole performs in our economy such as providing payment and settlement services, intermediating between savers and borrowers, and insuring against risk. In turn, this may affect economic growth in the long term. In addition to this, the level of investment in different types and tenors of assets is important for the appropriate allocation of capital and risk in the economy.

39. ICPF procyclicality can affect both financial markets and the real economy via several channels, in both the short and long term. On the financial market side, short-term asset price dynamics have implications for all financial market participants who rely on market prices to value their assets and/or liabilities. These include banks (via trading books) as well as insurers and pension funds (on both the asset and liability sides of their balance sheets), counterparties in repo and securities lending transactions (via collateral values), and counterparties of derivative contracts. Increased asset price volatility could for example increase margin requirements, and thereby reduce market liquidity if some market participants are close to being capital constrained (Brunnermeier and Pedersen (2009)).

40. The 'financial accelerator', which suggests that adverse real or monetary shocks to the economy can be amplified or propagated by worsening credit market conditions, is also important in this context. Bernanke et al. (1996) argue that because there is a tendency for households and firms to be overextended at cyclical peaks, an adverse shock or the end of an economic expansion may worsen financial conditions significantly, impairing households' and firms' access to credit at the same time as their need for credit may be rising (perhaps because the initial negative shock has reduced the net worth of the borrowers, and possibly reduced the value of collateral that they are able to borrow against). In response to this, households and firms may reduce spending or production, thus exacerbating the economic downturn that initially triggered the tightening of credit conditions. They also argue that there will be a differential impact on borrowers of different credit quality (i.e. a so-called 'flight to quality' by lenders). Borrowers that are more credit constrained are likely to reduce their spending or production earlier and/or more sharply than borrowers with greater access to credit, which will exacerbate the effect of recessionary shocks. The existence of the financial accelerator highlights the possibility of a feedback loop between the real economy and financial markets that might exacerbate the impact of procyclical behaviour in asset markets.

41. On the real economy side, procyclicality can have implications for business and household borrowing, as well as investment and consumption. These effects could work through at least four distinct mechanisms:

- *Uncertainty effects:* Increased uncertainty due to higher asset price volatility may affect firms' willingness to invest. For example, investors may prefer to wait for more information if investment projects are irreversible (Dixit and Pindyck (1994)), and this delay may eventually cause a reduction in aggregate investment. On the other hand, Hartman (1972) argues that investment might *increase* with uncertainty when firms face perfectly inelastic demand. This is because uncertainty may augment the marginal profitability of capital under specific conditions. Caballero (1991) considers the direction of the relationship under more general conditions and suggests a negative direction is more plausible. Empirical evidence on the effect of uncertainty on investment points to a

negative correlation between uncertainty and investment (Davis (2010) and Carruth et al. (2000)). Uncertainty may also cause households to increase precautionary savings.

- *Wealth effects on consumption:* Changes in asset prices can affect the net worth of households and hence have implications for spending and saving decisions. The role of wealth as a consumption determinant was formalised in, for example, Ando and Modigliani (1963). In this model, wealth allows for consumption smoothing over the life-cycle, with households accumulating wealth when income is relatively high, and running it down when income is relatively low. Changes in asset prices can affect consumption by directly affecting total resources available over the lifetime, and by changing the value of collateral available for borrowing, as in the financial accelerator described above. There is considerable empirical evidence supporting the effects of wealth on consumption (see e.g. Davis (2010)). As an example, Aron et al. (2012) find that illiquid financial asset values affect consumer spending both in the short and long term.

- *Market value effects on investment:* Firms' market value can affect investment by changing the cost of raising equity capital to finance investment. A key model formalising this idea is the Tobin's Q investment model, which suggests that investment is a function only of Tobin's Q, measured by the market value of the firm and the replacement cost of capital. The model hence implies a direct link between share prices and investment. Empirical studies have shown mixed support for the strict version of the model (Davis (2010), Altissimo et al. (2005)), though there is little disagreement that Tobin's Q has some relevance.

- *Balance sheets effects:* Falls in asset prices might affect the capital position of banks and other financial institutions such as insurers, which might in turn reduce the amount of lending to the real economy they are willing or able to undertake (e.g. for banks see Peek and Rosengren (1997)). This effect may also be one of the channels through which the financial accelerator, described above, operates.

42. The asset allocation decisions of ICPFs can affect the cost and availability of capital for the real economy, with potential implications for investment decisions and lending behaviour. ICPFs intermediate a substantial amount of funds between savers and borrowers, both directly and indirectly via the banking system, and hence their behaviour can have a bearing on the proportion of debt and equity in corporate funding structures and the duration of debt available to households and corporates. Impavido et al. (2003) find a positive impact on bond and stock market depth when the assets of pension funds and life insurance companies increase relative to domestic financial assets.

43. Regardless of its root cause, procyclical behaviour by ICPFs can also directly reduce pensioner and policyholder returns as ICPFs capture less of the extra returns available when investing in long-term illiquid assets. There are at least two reasons why returns might be lower. The first is higher transaction costs due to more frequent trading, especially if some of the assets are illiquid. The second is that procyclical ICPFs might buy when prices are high and sell when they are low (Papaioannou et al. (2013)).

II. What drives the asset allocation decisions of insurance companies and pension funds?

Liability characteristics influence asset allocation decisions

44. The nature of the liabilities of ICPFs—that is, their obligations to policyholders or pension scheme members, which arise from the products that they offer—are a key driver of their investment decisions, not least because they are one of the main determinants of how these products are regulated, accounted for and valued. To some extent, ICPFs also tend to want to match their liabilities with assets that have similar risk, liquidity and maturity characteristics.

Pension products

45. UK funded pensions (i.e. excluding the State pension, and some public sector employees' pensions which are funded from current taxation) can be broadly categorised as being either defined benefit (DB) or defined contribution (DC). In DB pensions a sponsor (generally the employer) promises a specified monthly/annual benefit on retirement that is predetermined by a formula based on some element of the employee's earnings history (for example, their final salary, or career average salary), length of service and age. From the perspective of the pension provider, the provision of a DB pension entails taking the contributions made over time by the employer and/or employees in the scheme, pooling them and investing in a variety of assets, the proceeds of which must be sufficient to meet the level of payment that has been agreed for those employees once they retire. Individual employees who have DB pensions have no choice over the assets that the pension provider chooses to invest in.[4] The asset allocation of DB schemes is determined by pension scheme trustees, with input from the scheme sponsor, investment consultants and asset managers. In a DB scheme the investment risk is borne by the sponsor of the scheme, rather than the member, whose pension payments are guaranteed by the sponsor.[5] DB pension schemes' deficits or surpluses, as measured under the relevant accounting standards, appear on the balance sheet of the sponsor.

46. DC pensions specify the amount of contribution that is made by an employee and/or employer. These contributions are then invested and accumulate over time to create a lump sum pension pot which is available to the policyholder at retirement. In the UK historically, this pension pot has then generally been used to provide a tax-free lump sum, with the remainder invested in a fixed annuity, which pays out a fixed amount per year from the point of retirement or the point of annuitisation.[6] In contrast to DB pensions, the amount that will be received in retirement is not known with certainty until the point of an annuity being purchased, and is at least in part a function of the performance over time of the investments made with the contributions. Unlike in a DB scheme, individual holders of DC pensions have a degree of choice over the investments that their contributions purchase. Usually, DC schemes allow individuals to alter asset allocations periodically. In practice, in the UK, the majority of DC pension holders opt to leave the asset allocation decision to the pension provider by remaining with the 'default fund'. In a DC scheme, the investment risk is borne by the policyholder. The majority of DC pensions are currently managed by insurers and therefore appear on the balance sheets of insurance companies.

47. All funded pensions (whether DB or DC) have an accumulation phase pre-retirement, in which contributions are being made and assets accumulated, and a decumulation phase post-retirement in which pension payments are being made. Assets held during the accumulation and decumulation

[4] Although individual members generally have no choice over the assets their pension fund invests in, employees are generally represented amongst the trustees of pension funds.
[5] However, active members in an open DB scheme may share some risk in the level of their contributions, and all members share in the risk that the sponsor of the scheme may default.
[6] Announcements in the 2014 Budget removing annuitisation requirements, which previously affected the majority of those with DC pensions, are likely to change this picture significantly.

phases may have different risk and liquidity profiles. For example, trustees/pension providers tend to reflect the shift from the accumulation to decumulation phases by gradually shifting asset allocations from more volatile assets, such as equities, to assets with more certain income streams, such as fixed income instruments. For DB schemes, because assets are pooled, these 'life-cycle' shifts in assets will be reflected at the aggregate level, whereas for DC schemes they will be reflected in the assets associated with an individual's pension.

48. There may also be differences in the types of assets—in terms of risk and liquidity—held as a result of the type of scheme being operated. For example, DC policyholders, who bear the risk of investment decisions, actively choosing their asset allocation might be more (or less) risk averse in aggregate than the trustees/pension providers deciding the asset allocation of the default fund, or than the trustees of a DB fund. The assets backing a DB pension holder's liability at the beginning of the accumulation phase may be more genuinely illiquid because they will not be drawn or changed for a long period of time. DC pensions are generally invested through traded funds, meaning that they are likely to be more liquid. So the different contractual features of these two types of pension liabilities might give rise to different asset allocations, even though the characteristics of the underlying policyholders might be quite similar.

49. In the UK in 2013, 72% of existing pensions (by assets) were DB, and 28% were DC (Towers Watson (2014)). However, the UK, along with a number of other countries, is seeing a shift away from DB pension schemes and towards DC schemes. DB schemes, particularly corporate DB schemes, are increasingly closed to new entrants. Only 14% of 6,150 PPF-eligible[7] UK DB schemes were still open to new entrants in 2013 (PPF and tPR (2013)). The UK government recently introduced auto-enrolment, whereby companies are obliged to automatically enrol employees in occupational pension schemes. The vast majority of new contributions arising from auto-enrolment will flow into DC rather than DB schemes. Blake et al. (2014a) predict that the occupational DC scheme market will increase from £276 billion assets under management pre-auto-enrolment (2012) to about £1.7 trillion by 2030. There is therefore a significant shift occurring in the contractual nature of pension liabilities, which will see a gradual shift of pension liabilities from the balance sheets of employers (as scheme sponsors) to, if current trends persist, the balance sheets of insurance companies, who currently manage the majority of DC occupational schemes. This shift may also have implications for aggregate asset allocation.

Life insurance products

50. As noted above, the UK life insurance industry plays a significant role in the provision of UK pensions. Some DB pension schemes and the majority of DC pension schemes are managed by insurance companies and sit on their balance sheets. In addition to this, some DB pension schemes purchase bulk annuities[8] from insurers which transfer investment, inflation and longevity risk from the pension scheme to the insurer in the decumulation phase. Alongside pension products (including products generally purchased at the point of retirement, like annuities or income drawdown[9] products), the UK life insurance industry offers life, income and illness insurance, and non-pensions savings products.

[7] The Pension Protection Fund (PPF) covers certain defined benefit occupational pension schemes and defined benefit elements of hybrid schemes. Schemes eligible for protection by the PPF pay levies and the scheme members may be entitled to compensation if the scheme's sponsor becomes insolvent. Unfunded public service schemes and public sector schemes providing pensions to local government employees are not eligible for the PPF.

[8] In return for a premium, bulk annuities transfer the obligation to pay pensions to retirees from a pension fund to an insurer. This transfers investment, inflation and longevity risk—i.e. the risk that pensioners live longer than expected—from the pension fund to the insurer.

[9] Income drawdown products allow policyholders to continue to keep their retirement savings invested, while taking an income from these savings each year. This differs from an annuity because investment, inflation and longevity risk remain with the policyholder, rather than being transferred to an insurer.

51. Within these broad categories, products can be broken down to reflect where the risk of the product resides:

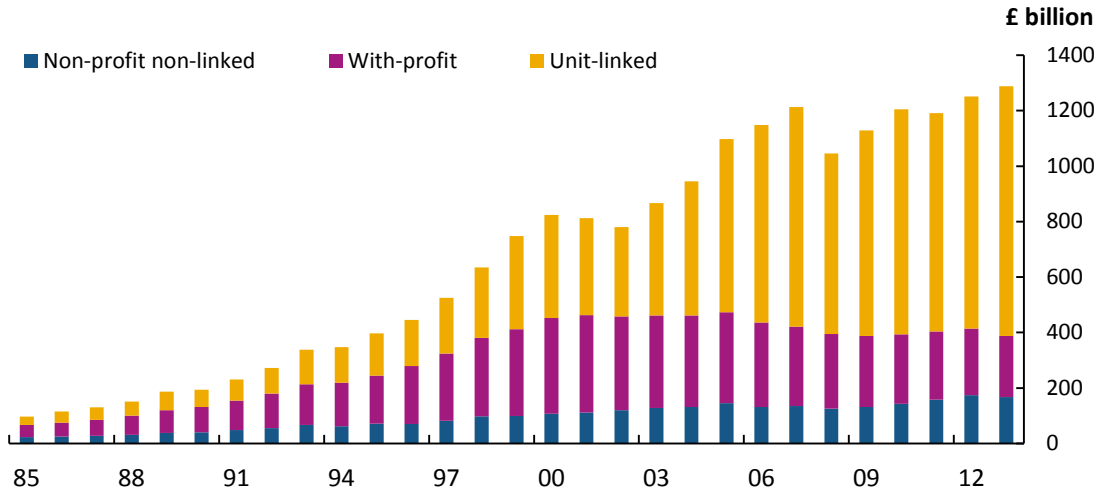
- Unit-linked products – where the value of the end product fluctuates with the value of the underlying investment. In these products the policyholder bears all the investment risk (this includes DC pensions);

- With-profits products – pooled investment products where policyholders receive some form of insurance and protection from market fluctuations but also additional discretionary bonuses which vary according to investment performance. In these products investment risk is shared between the policyholder and the insurance company; and,

- Non-profit non-linked products – products where the benefits are fixed at the outset and neither increase by the addition of bonuses nor fluctuate in accordance with the value of an investment link (e.g. fixed annuities). In these products the insurance company bears the investment risk.

In line with the shift from DB to DC pensions, the trend in insurance products in the UK is increasingly towards products in which the policyholder bears all of the risk (Chart 4).

Chart 4: UK life insurance liabilities[(a)(b)]



Source: S&P SynThesys (regulatory returns) and Bank calculations
(a) Measured as technical reserves net of reinsurance.
(b) The chart does not include non-linked liabilities from Form 53 and Form 55 and indexed-linked liabilities from Form 54, as they could not be split into any of the three categories. However, the sum of the liabilities excluded from the chart is less than 3% of total UK insurance liabilities.

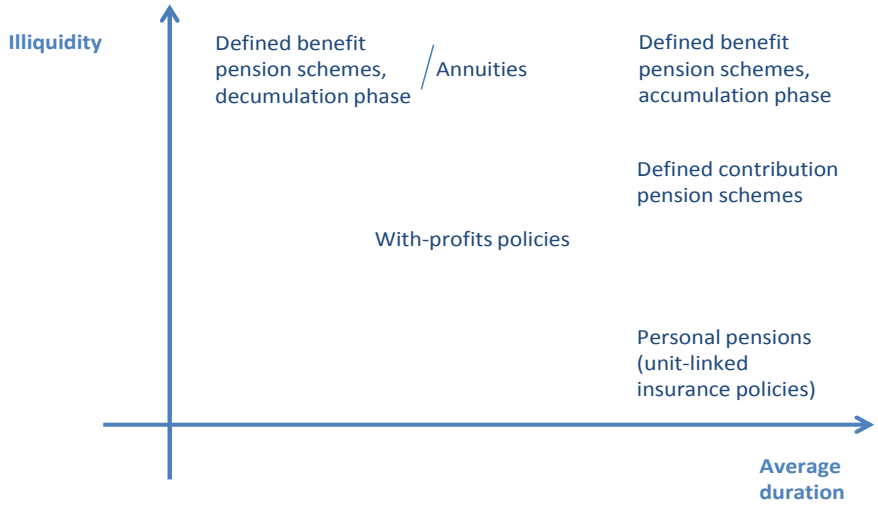
52. This shift in where risk resides, from the insurer to the policyholder, may have implications for asset allocations and how these change in response to particular events. It is likely that individuals might display different preferences for particular types of assets than we would expect an insurance company to exhibit. This might, for example, result from: individuals having lower levels of understanding of different types of financial assets than insurance companies—and therefore less understanding of risk/return trade-offs; individuals displaying a lower risk appetite than an insurance company—possibly as a result of the inability to pool risk with other policyholders as would happen if the insurance company bore the risk of the product; insurance companies being better at accurately judging an individual's risk capacity (as distinct from risk appetite).

53. It is also possible that individual policyholders might be more or less reactive to exogenous events than an insurer. In products where policyholders bear investment risk and have some discretion over asset allocation it is possible that individuals could be either more reactive to 'headlines', or alternatively that they are less likely to react in concert to market stresses. There is some evidence from the financial crisis that households, including in the UK, exhibited significant risk-sensitivity and risk-aversion (Haldane (2014)), which might imply a tendency towards procyclical behaviour by individuals when faced with investment risk.

54. Because the policyholder bears the investment risk in unit-linked products, insurers have to hold relatively less capital against these liabilities. To the extent that capital regulation might incentivise procyclicality (discussed further below), this will therefore be less relevant for insurer incentives in relation to unit-linked products.

55. Alongside where the investment risk of an insurance policy resides, the contractual maturity (including the ability of the policyholder to surrender the policy or switch to another provider) may have an impact on what type of assets are used to back insurance liabilities. Although ICPF liabilities are generally considered to be long-term, they actually have different contractual maturities, and elements of product design may render what could be thought of as a long-term liability, less long-term in reality.

Figure 1: 'Long-termness'—average duration and contractual liquidity—of ICPF liabilities



56. Figure 1 above attempts to set out different ICPF products in terms of their 'long-termness', as defined by their underlying duration, and their contractual liquidity. For example, a DB pension liability in the accumulation phase is particularly 'illiquid', because very few holders redeem their DB pensions[10] and individual holders have no choice over the allocation of assets within the fund, while a DC pension in the accumulation phase is somewhat less illiquid because although the policyholder cannot redeem it, they are able to alter the asset allocation associated with it, or to switch providers. Although the underlying duration of a unit-linked personal pension is long, it is relatively easy to switch the provider of this product, so its contractual maturity can be considered to be low (i.e. its contractual liquidity is high). In contrast, once a fixed annuity is purchased, it cannot be surrendered or the terms of the payments altered, so this can be considered a genuinely long-term and 'illiquid' liability.[11] We

[10] Holders of DB pensions do currently have a statutory right to take a 'cash equivalent transfer value' from their pension fund, but historically, few individuals have exercised this right.
[11] While this is true of fixed annuities, some types of variable annuities (which are not widely offered in the UK) are accessible/able to be surrendered.

might expect genuinely 'long-term' liabilities such as DB pensions and annuities to be backed by more illiquid assets, because their provider is unlikely to have unanticipated short-term liquidity needs.

How ICPF assets and liabilities are valued, and how that that interacts with capital or other regulation may also affect asset allocation

57. How ICPF assets and liabilities are valued and to what capital or other regulatory requirements they are subject will, along with liability characteristics, affect investment decisions. The assets and liabilities of ICPFs can theoretically be valued in a variety of different ways and different countries use different approaches to valuation.

58. The way in which valuation methods interact with other aspects of the regulatory regime may incentivise different approaches to asset allocation, including potentially procyclical investment behaviour, particularly if the valuation method(s) for assets and liabilities cause their valuations to move in an uncorrelated way. If assets and liabilities move together, asset price shocks are likely to have a lower impact on the overall financial position than if the valuation approach causes large discrepancies between the values of assets and liabilities.

59. In and of itself, divergence in the calculated value of assets and liabilities may not incentivise ICPFs to alter their asset allocation. The extent to which it might do is likely to be a function of how these valuations interact with other aspects of the regulatory regime, for example capital requirements. Risk-based capital or funding requirements may interact with mark-to-market valuation regimes in a way that encourages procyclicality, because sudden falls in the value of assets may reduce measured solvency due to marking to market, at the same time as they increase risk-based capital or funding requirements. It is possible that the shift towards market consistent valuation and risk-based capital requirements—both elements of a mark-to-market regime—that has occurred in both insurance and pension industries in a number of countries may exacerbate volatility and encourage procyclicality. Box 1 below sets out a stylised example of how the combination of fixed, risk-sensitive capital requirements and mark-to-market valuation might incentivise procyclicality in asset allocation.

Box 1: Stylised example of how a risk-sensitive capital regime and mark-to-market valuation might incentivise procyclicality in theory

For this stylised example, we assume a valuation and capital regime for insurers operating a market consistent, risk-sensitive regulatory framework, under which assets are marked to market, and liabilities are valued as the sum of expected cash flows (i.e. policy pay-outs) discounted with a market-based risk-free rate.

Under this stylised regime, insurers' holdings of risky assets will increase (decrease) in value relative to risk-free liabilities in upturns (downturns). This means that calculations of capital will vary procyclically—that is, the capital resources of an insurer (an analogous measure would be the funding level for pension funds) will increase during periods of rising risky asset prices, and decrease during periods of falling risky asset prices.*

If capital requirements do not move to absorb fully changes in capital resources during upturns, when risky asset prices and capital resources are increasing, insurers may feel 'capital rich'. As such, they may face less incentive to build capital buffers in a more fundamental way (e.g. by raising external capital, reducing dividends or decreasing investment in new business). Whilst this increase in buffers can be maintained to absorb future losses, insurers may be incentivised to use them in other ways. For example, they may choose to increase allocations to risky assets in order to increase profitability or be able to offer more competitively-priced products. This may serve to push up prices for risky assets, thereby amplifying credit procyclicality and/or contributing to the overheating of real economy

activities. Alternatively, or in parallel with this, they might be incentivised to pay out higher buffers via increased dividends to investors or seek to expand market share, which could entail writing more high-risk or low-premium business.

Pursuing any of these options could mean that when a stress hits, insurers may find themselves capital constrained. In response, they may try to preserve capital by selling risky assets, and moving into less risky or risk-free assets. This would allow them both to reduce capital requirements but also to hedge against further falls in the risk-free rate (which feed through to the valuation of their liabilities, as described above) which might result from large numbers of investors purchasing risk-free assets in a period of stress (a 'flight to safety'). In a downturn, this could trigger or amplify fire sale-like conditions, including through triggering a negative feedback loop as:

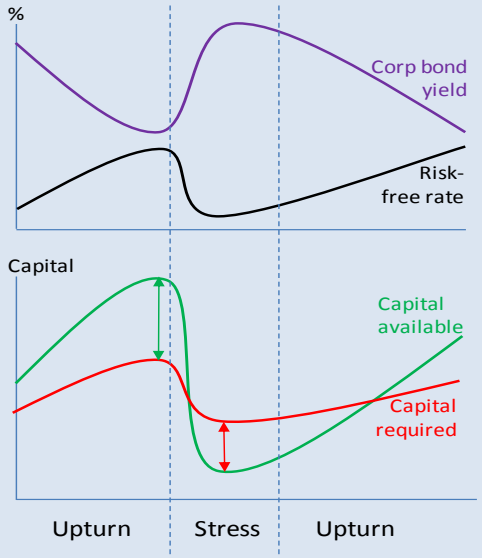
- → Insurers sell risky assets and buy more risk-free assets (often where the market is relatively illiquid or small, e.g. index-linked gilts);
- → Which lowers risk-free rates further;
- → Which feeds through to their liability valuation;
- → Prompting further purchases of risk-free assets and sales of risky assets.

In turn this could reduce the supply of finance to the real economy, exacerbating procyclicality of the real economy funding/credit cycle.

A simplified example of how this process might work is illustrated in Figure A below. In an upturn, or 'boom' period, corporate bond yields are likely to decrease, and risk-free rates may increase, as shown in the top panel of Figure A below. In this 'boom' scenario, capital resources increase as assets increase in value relative to liabilities, as shown in the bottom panel of Figure A. But crucially, capital requirements may not move to offset fully this increase in capital resources, for example if capital requirements are calculated as a fixed proportion of asset values.

This means that while assets and capital required increase by the same proportion, the nominal value of assets increases more than the nominal value of capital requirements.

Figure A: Movement in capital resources



In a stylised stress, or 'downturn', scenario corporate bond yields may jump, and the risk-free rate may fall, consistent with a flight to safety. Here capital resources fall as assets fall in value relative to liabilities. But, again, capital requirements may not move fully to offset the change in capital available. In this stylised example, the fall in capital resources is sufficient to breach requirements, but even in the event that capital requirements are not breached, insurers may still face incentives to sell risky assets in falling markets to try and avoid breaching capital requirements.

In practice, regulatory regimes are generally more complex than this stylised example, and typically have a number of features that can (deliberately or otherwise) act to mitigate the incentives for procyclicality implied by a 'pure' application of market consistency and risk-sensitive capital requirements, as set out here.

*Note that this example only considers the incentives implied by *changes* in the valuations of *existing* assets and liabilities. Incentives for procyclicality around new assets and liabilities may differ if they can be valued at the prevailing market prices when taken on.

60. In the UK, movement towards a mark-to-market regime for insurers began in 1974 with the Insurance Companies Act 1974, which introduced market consistent valuation of assets. A more complete mark-to-market regime was put in place in 2005, when ICAS, which is largely market consistent, was introduced. For pension funds, the key shift towards a mark-to-market regime occurred in 2001 with the introduction of the accounting standard FRS 17, although compliance with this standard was not made mandatory until 2005. FRS 17 changed the way that corporates accounted for their pension obligations. In particular, corporates were required to mark pension assets to market, and liabilities were typically discounted using a market consistent rate. FRS 17 also introduced the requirement that pension fund surpluses or deficits, as measured under the relevant accounting standards, had to be recorded on the balance sheet of the sponsor. The impact of these changes in the UK is discussed further in Section IV below. In the US, the introduction of Statement of Financial Accounting Standard (SFAS) 158 in 2006 put in place similar changes for US companies.

Industry practices are likely to be significant for asset allocation and might exacerbate procyclicality

61. Combinations of the above factors—liability design, and valuation and capital regimes—are all likely to have an impact on asset allocation. The tendency for ICPFs to be procyclical in aggregate will depend on the speed with which they make changes to asset allocation decisions and the extent to which those changes are coordinated or correlated. Neither pension funds nor insurance companies predicate their business models on making profits from short-term market movements, which should limit the extent to which they contribute to very short-term market volatility. However, there is considerable anecdotal evidence that ICPFs exhibit a strong degree of herding—that is, a tendency to change investment or asset allocation strategies at the same time. A tendency to herd has the potential to be a significant factor contributing to aggregate procyclicality, and could be the result of a variety of factors, for example:

- ICPFs have, to some extent, similar liabilities. If they are focused on matching their liabilities with assets that have similar risk, maturity and cash flow profiles, this similarity between their liabilities may lead to similar investment strategies;

- ICPFs use asset managers who manage ICPF assets as agents according to specific mandates. These mandates may include benchmarks which reference either others in the industry, or industry-wide indices. There is also evidence that investors adjust their portfolios on the basis of these relative metrics, for example with stronger inflows into funds whose relative performance has been stronger (Chevalier and Ellison (1997) and Feroli et al. (2014)). The use of benchmarks and the reliance of investors on these relative metrics incentivises asset managers to be concerned with their performance relative to peers, which may result in herding. Separately, mandates may also include ratings-based trigger points for selling or buying assets, which might encourage similar responses to market or other events;

- The investment decisions of ICPFs are also influenced by investment consultants. Jenkinson et al. (2013) find that in the United States investment consultants' recommendations have a large and significant effect on institutional asset allocation. A concentration in the provision of investment advice might also increase the likelihood of similar investment strategies being employed. A survey by the National Association of Pension Funds (NAPF) undertaken in early 2014 found that 50% of UK workplace pension funds surveyed were advised by the three largest investment consultancies, and the top six consultancies accounted for around 70% of the schemes surveyed[12];

[12] http://www.napf.co.uk/PressCentre/Press_releases/0389-Schemes-satisfaction-with-investment-consultants-remains-steady.aspx

- ICPFs may also face similar regulatory constraints. To the extent that these are a driver of asset allocation decisions, the fact that they are uniform across firms and funds may incentivise similar investment strategies, or similar responses to market-wide events. For example, risk-based capital requirements for UK insurers are one influence on the relative attractiveness of different asset classes. Moves to harmonise regulation across jurisdictions—for example the harmonisation of insurance regulation across Europe being implemented through Solvency II—may contribute to this.

62. Perhaps reflecting these factors, investment philosophies and trends appear to be industry-wide, rather than idiosyncratic, which is more likely to lead to common asset allocation for a given set of liabilities across firms. For example, ICPF investment strategies appear to have shifted in concert towards liability driven investment strategies (i.e. primarily investing in assets that will best match expected liability cash flows and profiles, so that asset and liability valuations move in concert) since around 2000 (BIS (2007)).

63. There also appears to have been a transition towards defining risk in terms of volatility rather than amount of potential loss or the expected return on investments for a given level of risk. This means that assets with high valuation (and often correspondingly low risk premia and low volatility) are viewed as the safest. However volatility is not necessarily a good indicator of risk, as it tends to decrease in market upswings when valuations rise before increasing significantly in periods of stress. For example, in 2009 volatility was high across financial markets, but the risk of potential loss was in fact lower than it had been in 2007, when volatility across financial markets was low. Low volatility can in fact be a sign of increasing risk at the macro level. This tendency to rely on volatility as a measure of risk may in itself lay the foundation for procyclical investment behavior in response to market events.

64. Differences in regulation and valuation methodologies between pension funds and insurance companies may incentivise different reactions between these two types of investors. In addition to this, the obligations of the two groups may mean they have different incentives. For example, the trustees of a DB pension fund have the obligation to meet a level of benefits agreed with pensioners. There is a considerable downside to them failing to meet this target, but there is limited benefit to them exceeding it. Other things being equal, they are therefore incentivised to invest to meet the level of benefits agreed in the least risky manner possible. In contrast, insurers (for non-linked products, where they bear some/all of the risk) may have greater incentives to maximise returns to increase profits or attract additional customers. Because they are able to benefit more from the upside of any additional risk taken, they might be expected to have a somewhat less conservative investment approach than their pension funds counterparts.

65. Liability characteristics, accounting and valuation methodologies, capital or funding regulation and industry practices are of course intertwined and often mutually reinforcing. For example, between the early 1990s and 2000s there was a significant change in view on the obligations of DB pensions and with-profits insurance policies. In the early 2000s both products were perceived to have become a heavier burden for their providers reflecting, for example, exogenous factors such as increasing longevity, but also the fact that the dotcom crash had highlighted the vulnerability to sharp asset price falls of products with embedded guarantees. This change in perception was reflected in the shift in investment philosophy mentioned above, but also in the gradual change of regulatory and accounting regimes. Similarly, by changing the cost of offering certain products, regulation may also affect liability design and characteristics, as insurers in particular adapt their product offering to reflect changes in the profitability of different products.

III. Evidence on the asset allocation of insurers and some possible drivers

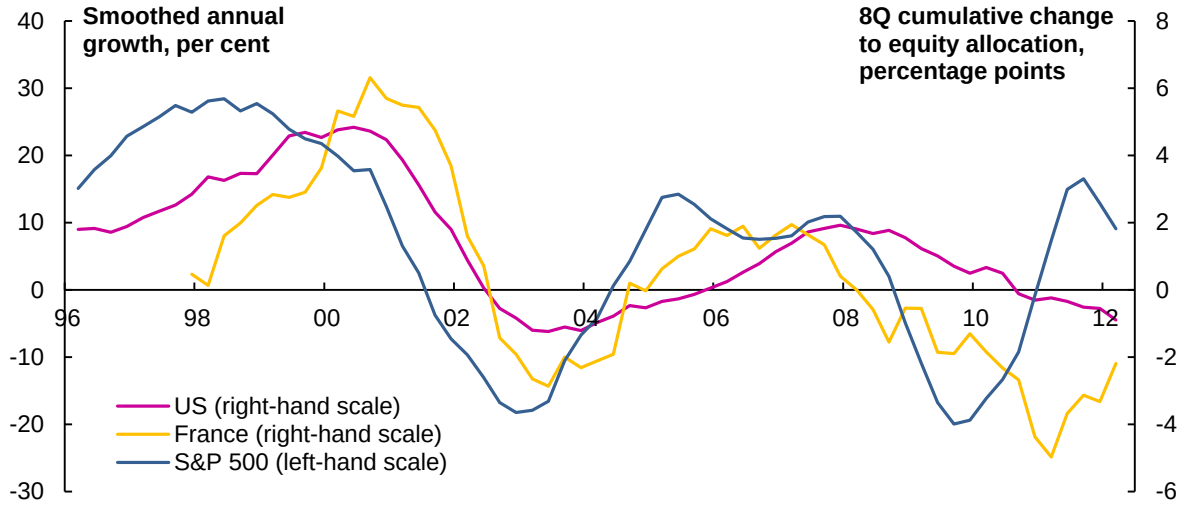
66. There are a number of obstacles to precisely defining what drives the asset allocation decisions of insurers. In part this relates to the lack of sufficiently granular data, but perhaps more importantly it flows from the difficulty of disentangling the variety of factors set out in Section II that play a role in the asset allocation decisions of insurers, and how they alter these in response to exogenous events. Nonetheless aggregate asset allocation data, alongside a closer look at more detailed case studies, can provide some indicative evidence.

There is some evidence of procyclicality in the behaviour of international insurers

67. International evidence of procyclical asset allocation behaviour by life insurers is mixed and varies between countries. Impavido and Tower (2009) note that during the equity market fall of 2001–03, "life insurance companies contributed to a downward spiral in markets when limited equity disposals by major insurers seeking to bolster balance sheets led to further declines in the market requiring further disposals to prevent solvency margins from coming under pressure." They further note that sales of equities and other instruments by life insurers were more widespread in the recent financial crisis.

68. Examining aggregate flow of funds data for the US and France, it is possible to observe apparently procyclical behaviour in relation to equity holdings in the period from 1996–2012. Chart 5 shows that the allocation to equity (calculated as cumulative net flows, so valuation effects should not be affecting this picture) by US and French insurers during this period appear to have been correlated with the performance of the equity market (as proxied by the S&P 500). Although this is indicative of procyclical behaviour, this correlation is not particularly informative about what might be driving these allocation decisions. Some possible drivers of procyclical behaviour, in the UK context, are examined in more detail below.

Chart 5: Change in equity allocation of US and French life insurers over time[(a)]



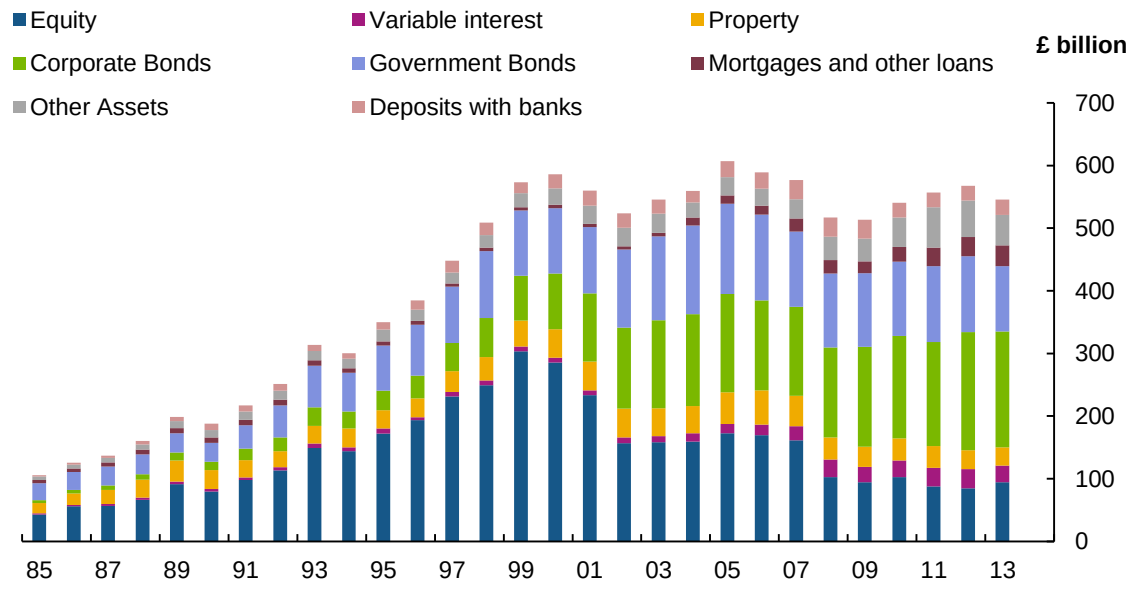
Source: National flow of funds

(a) The 8Q cumulative change to equity allocation is calculated using an 8 quarter moving sum. Reallocation into equities is calculated as the difference between the allocation to equities at time t and allocation to equities at time t-1, measured in percentage points. Thus a negative number indicates a reduction in percentage allocation to equities, and may not indicate a reduction in total exposure to equities (if total flows have been large). Reallocation is calculated using data on quarterly flows into (or out of) equities in order to adjust for the impact of revaluation effects. The S&P 500 is smoothed by taking the growth of the 8 quarter average on the 8 quarter average a year earlier.

Evidence of procyclicality by UK insurers is more mixed

69. In the UK, aggregate asset allocation data is more difficult to interpret. Chart 6 seems to support anecdotal evidence that there was a significant reduction in equity holding for non-linked (i.e. with-profit and non-profit) products in the early 2000s. It also appears that there may have been a further reduction in equity holdings in 2008. Given that these were periods in which the equity market fell considerably, this could support the idea that insurers behaved procyclically during these periods, but it should be noted that they did not increase holdings of equities during market upswings, for example in the run-up to 2007, which suggests that some of the change to asset allocation may have reflected a structural shift out of equities, rather than being a purely cyclical response. However, conclusions should be drawn cautiously as values shown are market values and so will reflect changes in asset prices as well as volume changes in allocation. Also, annual data (such as those shown here) will miss changes within the year. Given the potential for substantial volatility in markets over much shorter periods, this could be material.

Chart 6: Assets backing non-linked liabilities of UK life insurers

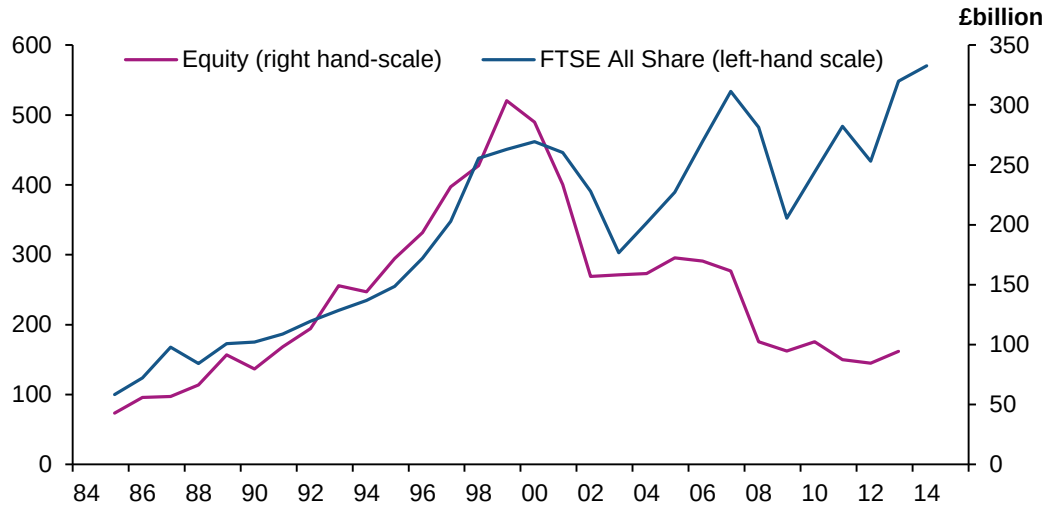


Source: S&P SynThesys (regulatory returns) and Bank calculations

70. Chart 7 shows the nominal holdings of equities by UK insurers plotted against the FTSE all-share index (as a rough proxy for equity prices). Although these results should be treated with caution because they reflect valuation changes, they are indicative of a close correlation between equity holdings and prices from 1985 to c.2002, implying possible procyclicality during this period. After 2002 holdings of equities continue to trend downwards, while the index increased before decreasing sharply in 2007/8 and recovering from 2009. This suggests that after 2002, structural rather than cyclical trends may have dominated.

71. Although these data appear to show less evidence of procyclical asset allocation behaviour by UK insurers during the financial crisis, it is important to note that these data do not capture use of derivatives, which market intelligence suggests has the potential to be significant too. Such hedging behaviour by UK insurance companies might have been procyclical, but would not be captured here.

Chart 7: Nominal holdings of equities vs FTSE All Share Index[(a)]



Source: S&P SynThesys (regulatory returns), Datastream and Bank calculations
(a) Index: 1985 = 100.

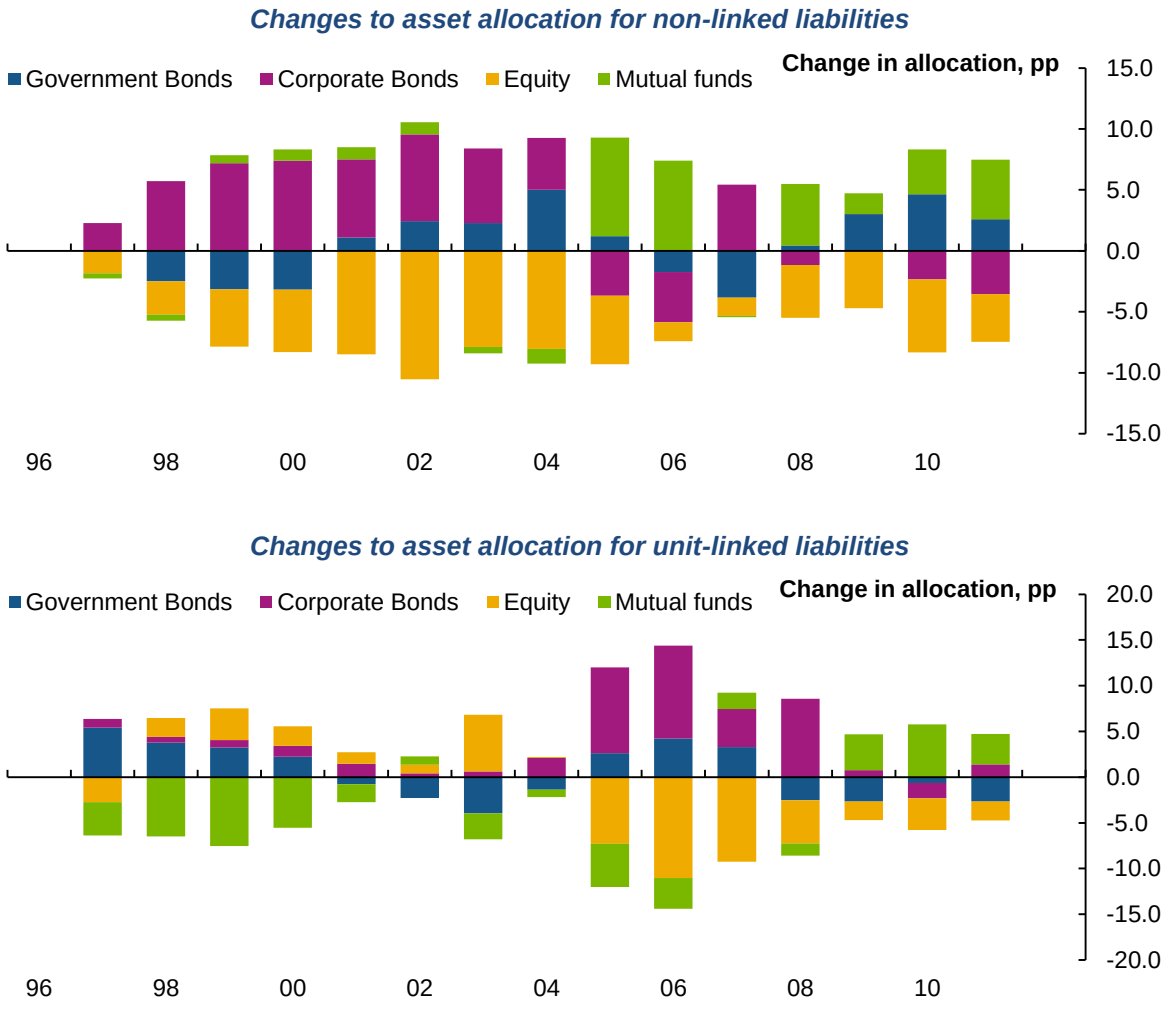
The structure of liabilities is a key determinant of asset allocation decisions

72. Looking more closely at how asset allocation varies across liability types suggests that this is an important determinant of changes to asset allocation. Chart 8 shows changes to overall asset allocation by UK life insurers for non-linked—with-profit and non-profit—products (top panel), and unit-linked (bottom panel) products and confirms that, in the UK, these products do display different asset allocation dynamics.

73. These data could suggest greater procyclicality in the asset allocation of non-linked than unit-linked liabilities. Although non-linked liabilities show a fairly steady net flow out of equities throughout the period from 1997, this seems to increase after 2000 and again after 2008, in periods following equity market stress. In contrast, unit-linked liabilities show a slight net increase in purchases of equities after 2000, and while there is still a net flow out of equities after 2008, it decreases in size compared to previous years. Holdings of UK government debt also appear to be broadly countercyclical for unit-linked products, with net decreases in allocations after 2000 and 2008, when we might otherwise have expected to see a 'flight to safety' occurring after the dotcom crash and financial crisis, while the reverse is true for non-linked funds. It is important to note that some asset flows in these data represent flows into and out of mutual funds, which undertake investment on behalf of the insurer. Such shifts into and out of mutual funds may therefore largely represent a shift in intermediation rather than a shift in allocations to or from certain asset classes, as mutual funds are not asset-class specific. So, for example, in 2005, where non-linked funds appear to show a large change in net allocation away from equity and corporate bonds at the same time as a similarly large increase in allocation to mutual funds, it is possible that this may not reflect a particularly large change in allocation to these underlying asset classes.

74. The different asset allocation dynamics shown in Chart 8 suggest that liability design and the location of risk-bearing (which also determines whether the policyholder or the insurer is the key decision-maker) is important for asset allocation. However, it is important to note that different types of liabilities also attract different regulatory treatment—for example, insurers have to hold relatively less capital against unit-linked funds than non-linked products—so it is not necessarily possible to disentangle the effects of liability characteristics from those of regulation.

Chart 8: UK life insurers - changes to asset allocation for linked and non-linked liabilities[(a)]



Source: Association of British Insurers and Bank calculations

(a) Changes to allocations are calculated as the difference between the allocations at time t and the allocations at time t-1, measured in percentage points. Thus the values in each column will always sum to zero and a negative number indicates a reduction in percentage allocation, which may not indicate a reduction in total exposures. Data on flows, available for the combined portfolio only, have been used to make an estimated adjustment for the impact of revaluation effects.

Regulation can also affect asset allocation and may create incentives for procyclicality

75. As set out in Box 1 above, it is theoretically possible that regulation of insurance companies—in particular the combination of mark-to-market valuation methods and risk-based capital requirements—might, in some instances, encourage procyclicality. A study by Merrill et al. (2012) supports this suggestion. Using a sample of 5,014 repeat transactions of non-agency RMBS by US insurance companies from 2006 to 2009, they show that insurance companies that became more capital-constrained because of operating losses (uncorrelated with RMBS credit quality) and recognized fair value losses, sold comparable RMBS at much lower prices than other insurance companies during the crisis.

76. The UK regulatory architecture also highlights the importance of the implementation of the capital/regulatory regime. We examined the impact of changes to insurance regulation in the UK over the past 15 years to try and discern whether different regulatory regimes have incentivised changes to asset allocations. In looking at the influence of regulation on asset allocation, we focused on non-

linked products (i.e. with-profits products and non-profit products), where regulatory factors, and in particular capital requirements, were more likely to be binding constraints than they were for unit-linked products (which are relatively less capital-intensive).

77. In the UK, solvency margin requirements (i.e. a requirement that an insurer hold an amount of regulatory capital against unforeseen events) have been in place since the 1970s. The series of European directives dictating solvency margin requirements—collectively known as Solvency I—mandate a capital regime that is not risk-based. From 2002 elements of a risk-based regime were introduced for reporting related to with-profits funds and in 2005, the UK regulator (the FSA) introduced a more complete risk-based, mark-to-market regime—Individual Capital Adequacy Standards (ICAS)—to overlay the existing Solvency I regime. The requirements of the pre-2005 regime are generally referred to as the Pillar I requirements, and the requirements introduced by the ICAS regime from 2005 are referred to as the Pillar II requirements.

78. Under ICAS, the capital held by an insurer has to be sufficient to withstand a range of possible adverse events within the broad categories of market, insurance, credit, liquidity and operational risk. Firms must hold enough capital in order to withstand a stress event that is likely to occur once in every 200 years (normally translated as a 99.5% confidence interval over one year for life insurance). Detailed regulatory reviews of a firm's own calculation of capital take place at least every three years, and where the regulator deems that the firm has under-calibrated risk or where there are governance risks, the regulator can issue guidance as to the appropriate amount of financial resources (by giving the firm Individual Capital Guidance).

79. The changes made to the regulatory regime in 2005 may have reduced at least one incentive for procyclicality. Table 1 below shows changes in the valuations of assets and liabilities for non-linked products during the dotcom crash in 2001–02 compared to those during the recent financial crisis. It suggests that asset and liability values diverged to a lesser degree during the financial crisis than they had in the earlier period of market volatility. This may have meant that insurers were less incentivised to behave procyclically during the financial crisis than they had been during the dotcom crash.

Table 1: Year-on-year percentage change in asset and liability values during the dotcom crash and financial crisis, for non-linked products

	Assets	Liabilities	Divergence in asset and liability values
2001–02	-7%	-1%	6 percentage points
2007–08	-10%	-6%	4 percentage points
2008–09	-1%	-2%	1 percentage point

Source: S&P SynThesys (regulatory returns) and Bank calculations

80. This change may reflect the difference in regulation, but it is likely also to reflect differences in asset allocation between the two periods, for example that UK life insurers had reduced their allocation to equity and increased their allocation to bonds for non-linked products. In turn, structural shifts in asset allocation between the two periods may have reflected altered incentives presented by regulation after 2005 (and changes to reporting requirements for with-profits funds from 2002). For example, under the ICAS regime, FSA analysis of data on individual capital assessment submissions by life insurers between January 2005 and June 2007 suggested that, during that period, 48% of capital in the life insurance sector was allocated to market risk, of which equity risk was a significant proportion (FSA (2007)). Given this, reducing equity holdings in favour of less volatile assets might reduce the capital requirements faced by insurers. The risk-based regime introduced by the FSA in

2005, and presaged from 2002 for with-profits funds, may therefore have incentivised some insurers to shift asset allocations away from equities.

81. It is difficult, however, to disentangle the effects of regulatory changes on the investment behaviour of UK insurance firms from other effects. For instance, firms' own experience and losses after the dotcom crash and the increasing focus on matching assets and liabilities also contributed to a re-consideration of their investment strategy. Ex post, it is unclear to what extent the new regulation introduced from 2002–2005 was simply reinforcing changes that firms may already have had in train.

82. During the financial crisis, ICAS risk-based capital requirements (i.e. the Pillar II requirements, rather than the non-risk based solvency requirements under Pillar I) came closer to becoming binding for many UK life insurers as asset prices fell. It was therefore possible in principle that the procyclical behaviour described in Box 1 above might have been incentivised. However, there was considerable flexibility built into the ICAS regime, which may have helped to mitigate procyclicality during the financial crisis. In 2009, the FSA officially re-affirmed that a breach of the risk-based capital requirements would not lead to automatic consequences where breaches were a result of exceptional market movements rather than poor management. This would have, other things being equal, reduced external pressure on insurers to react to asset price falls by selling those assets. It is important to note, however, that procyclicality is clearly not the only consideration for regulators. The primary purpose of capital requirements in existing regimes, and in the prospective Solvency II regime which will come into force for European insurers from the beginning of 2016, is the protection of policyholders. In the pursuit of that objective there may be times when a balance has to be struck between trying to avoid procyclicality whilst ensuring the appropriate degree of policyholder protection is delivered.

83. Other changes to the regulatory approach introduced during the 2000s may, in theory, also have altered incentives for asset allocation—for example, the changing approach to calculating the allowance for default risk on corporate bonds. Before 2006, common practice was to use fixed values for default risk assumptions based on historical data. In 2006, the FSA adjusted its guidance on credit risk to require that provision for credit risk must also be forward looking.[13] The change in regulatory approach was the consequence of regulators concluding (before the financial crisis hit) that the calibration of these calculations was imprudently low. Subsequently, insurers (in response to this change in guidance) began to use 'forward-looking' metrics that calculated the default risk allowance as a proportion of the spread at that point in time. This had the effect of building in provisions for higher default risk as spreads were widening due to liquidity problems caused by the overall economic uncertainty and market nervousness during the crisis.

Table 2: Average default adjustment (bps) for investment-grade bonds

	2007	2008	2009	2010	2011
AAA/Aaa	12	81	46	26	36
AA/Aa	26	111	51	61	44
A/A	36	124	86	71	80
BBB/Baa	81	189	123	92	139

Source: Towers Watson – based on analysis of UK annuity writers' regulatory returns

84. Table 2 shows analysis by Towers Watson of how the average default adjustment for investment-grade bonds held for the non-linked business of a sample of insurers changed from 2007 to 2011. This suggests that the default adjustments increased significantly in 2008 at the height of the financial crisis; they also increased across most ratings of bonds in 2011 in response to the Euro crisis.

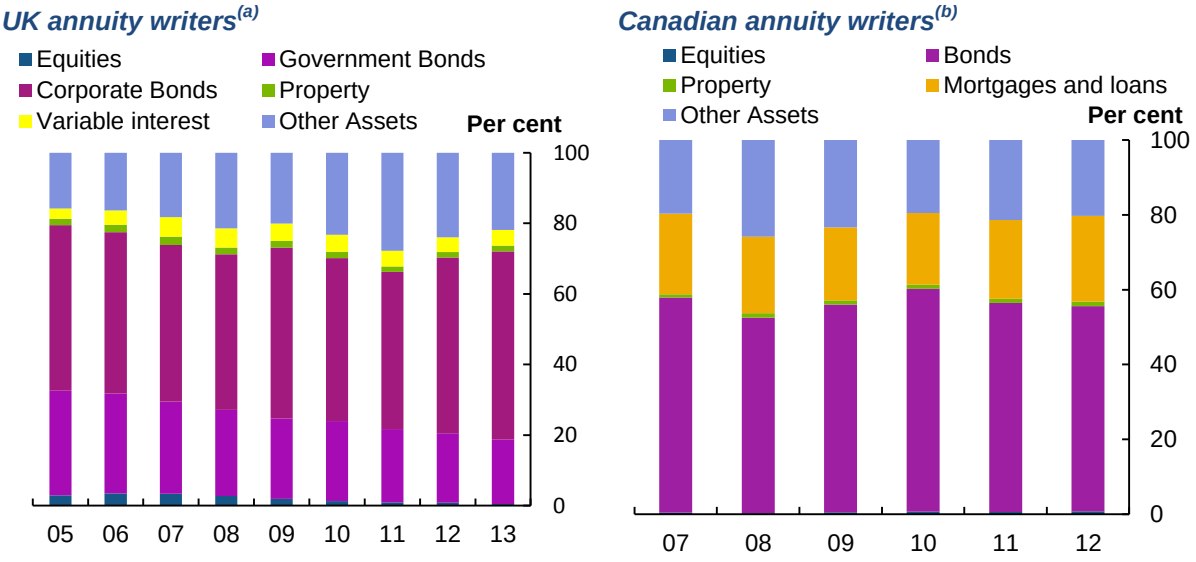
[13] FSA Handbook, INSPRU 2.1.43 G

85. This is an example of how the perception and assessment of risk, by both firms and regulators, can change in response to adverse events. This is likely to be reflected in a tendency for both firms and regulators to seek to reduce risk in the face of market stresses. In itself, this is likely to be procyclical.

The combination of liability structure and regulation might also be significant in disincentivising procyclicality

86. It is clear that liability structure and regulation are not independent. To illustrate this we examined Canadian and UK annuity writers—which have similar liabilities and comparable regulatory regimes, but slightly different approaches to liability valuation. Both regimes value assets on a market consistent—i.e. mark-to-market—basis. Chart 9 shows that, despite the differences in the regulatory rules for liability valuation and capital calculation, both had similar asset allocation, and that it remained fairly constant over the course of the last economic cycle. The UK operates a market consistent liability valuation regime, but also—for annuities—applies a 'liquidity premium' which has the effect of muting balance sheet volatility and dampening incentives for procyclical shifts in asset allocation. This encourages annuity writers to buy-and-hold assets in line with their long-term investment horizons, which are determined by the genuinely long term and illiquid nature of their liabilities. The Canadian liability valuation approach (which is based on best estimate cash-flows projected under various different scenarios) similarly encourages closely matching assets and liabilities, which promotes stable long term asset allocations and dampens procyclicality.

Chart 9: Asset allocation of UK and Canadian annuity writers over the latest asset price cycle



Source: S&P SynThesys (regulatory returns) and Bank calculations
(a) Includes assets backing all non-profit liabilities, of which assets backing annuities represent approximately 2/3 of the total. A pure split of assets backing annuities is not available from the regulatory returns.

Source: Firms' financial accounts and Bank calculations
(b) Includes investments by SunLife and ManuLife only.

87. To complement the empirical analysis presented above, Towers Watson developed a stylised model of a standalone UK annuity writer to illustrate the theoretical impact of the different elements of the UK regulatory regime that applied before and after 2005. The findings of their analysis are set out in Box 2 below.

Box 2: Stylised example of the effect of regulatory regimes on the investment strategy of annuity writers

Towers Watson developed a stylised model of a simple UK insurance company, writing only annuity business, with closely matched asset and liability cash flows. This demonstrates the impact of different regulatory regimes and investment strategies on the solvency position of such a company, and illustrates the reactions that might be incentivised under stressed market conditions. It should be noted that this is a stylised model, based on a number of underlying assumptions. The numbers shown in the tables below should therefore be seen as indicative of general trends only.

Because bonds make up the majority of annuity writers' asset holdings, the model highlights the effects of regulatory changes on holdings of bonds, and therefore any inferences that can be drawn about procyclicality relate to procyclical asset allocation within the bond market, rather than between asset classes.

Table A shows the effect of different investment strategies on the capital requirements and solvency position of a simplified annuity writer 'AnnuityCo', under the pre-2005 (i.e. Pillar I) Solvency I regime.

Table A: pre-2005 Solvency I (Pillar I) regime, solvency position under different investment strategies

Market value of assets is 1125	**Valuation of liabilities**	**Capital requirement**	**Capital buffer**[1]
AnnuityCo baseline[2]	1000	40	85
100% Gilts	1134	46	-55
100% AAA rated corporate bonds	1042	42	41
100% AA rated corporate bonds	1027	41	57
100% A rated corporate bonds	979	39	106
100% BBB rated corporate bonds	963	39	123

Table A demonstrates that under the pre-2005 Solvency I regime, AnnuityCo could improve its measured solvency position—as indicated by the increase in its capital buffer—by investing in less highly-rated assets. This is because the discount rate used to value the liabilities is based on the yields available on the assets held (and so the value of liabilities decreases when lower-rated, higher-yielding assets are held), and the higher credit risk of lower-rated bonds is not fully reflected in the capital requirement.

Table B illustrates the impact of three different stress scenarios under the pre-2005 (i.e. Pillar I) Solvency I regime. It demonstrates that under the pre-2005 Solvency I regime, in all the stress scenarios the capital buffer of AnnuityCo decreases significantly. In the credit crunch scenario, this is sufficient to cause a breach of capital requirements.

Because the credit risk of lower-rated bonds is not reflected in capital requirements, and there is an incentive to sell higher-rated bonds in favour of lower-rated bonds in all states of the world, this model suggests that the Pillar I regime would be unlikely to incentivise a procyclical 'flight to safety' reaction—i.e. the sale of lower-rated bonds and purchase of higher-rated bonds—in the event of spreads widening in the face of a credit stress.

Table B: pre-2005 Solvency I (Pillar I) regime, solvency position under various stress scenarios using the AnnuityCo baseline investment strategy

Stress	Market value of assets	Valuation of liabilities	Capital requirement	Capital buffer[1]
AnnuityCo baseline[2]	1125	1000	40	85
Interest rate rise[3]	1009	907	41	62
Eurozone crisis[4]	1034	963	40	31
Credit crunch[5]	897	915	39	-58

Tables C and D set out the same scenarios under the post-2005 regime, after Pillar II/ICAS was introduced.

Table C: post-2005 Pillar II regime, solvency position under different investment strategies

Market value of assets is 1125	Valuation of liabilities	Capital requirement	Capital buffer[1]
AnnuityCo baseline[2]	834	176	115
100% Gilts	943	87	95
100% AAA rated corporate bonds	868	131	126
100% AA rated corporate bonds	856	158	111
100% A rated corporate bonds	818	194	113
100% BBB rated corporate bonds	805	246	75

Table C demonstrates a number of features of the Pillar II regime. First, the valuation of liabilities is much lower, as these do not include margins for prudence that were included in calculation of Pillar I liabilities. Second, whilst capital requirements are higher than under Pillar I, the resulting capital buffer is still higher under Pillar II because of the lower valuation of liabilities. Third, although holding lower-rated bonds reduces the valuation of liabilities, this is more than offset by the increase in capital requirements (as can be seen by the reduction in the capital buffer) so, unlike under the Pillar I requirements, there is no incentive to shift allocations to lower rated bonds.

Table D: post-2005 Pillar II regime, solvency position under various stress scenarios using the AnnuityCo baseline investment strategy

Stress	Market value of assets	Valuation of liabilities	Capital requirement	Capital buffer[1]
AnnuityCo baseline[2]	1125	834	176	116
Interest rate rise[3]	1009	768	174	67
Eurozone crisis[4]	1034	805	174	56
Credit crunch[5]	897	766	167	-36

Table D demonstrates that capital buffers decrease in all of the stress scenarios, and again, under the credit crunch scenario, this is sufficient to fall below capital requirements. However, because under the Pillar II regime selling lower-rated bonds and buying higher-rated bonds might reduce capital requirements by more than it increases liability valuations, there could be an incentive under this

regime for a procyclical 'flight to safety'. (Note that the results in Table D rely on AnnuityCo not changing the assumptions underlying its capital calculations in the face of market stress. In practice this is unlikely to be the case, though it is hard to predict what would happen, as it would depend upon the nature and circumstances of the market stress.)

In practice, there has been limited evidence of a 'flight to safety' by annuity writers during the financial crisis. This may be partly because markets for lower-rated corporate bonds became less liquid during the crisis, and it would have been difficult for annuity writers to sell these assets at that point. Selling lower-rated bonds and purchasing higher-rated bonds also has implications for an annuity provider's profitability and its ability to offer competitive rates on its annuities, which may also have disincentivised such behaviour.

[1] The capital buffer is the amount of additional capital held over and above the capital requirement, and is calculated as: (assets – liabilities – capital requirement) = capital buffer.
[2] In the baseline scenario 'AnnuityCo' holds: 10% Gilts; 10% AAA rated corporate bonds; 10% AA rated corporate bonds; 45% A rated corporate bonds; and, 25% BBB rated corporate bonds.
[3] Interest rate rise: An upward parallel shift of the yield curve by 100bps.
[4] Eurozone crisis: An increase in credit spreads of 82bps (AAA), 56bps (AA), 110bps (A), 63bps (BBB). This is calibrated to the widening of the Annual Benchmark Spread of iBoxx GBP Corporates Benchmark Indices 10+ over the period 31 December 2009 to 31 December 2011.
[5] Credit crunch: An increase in credit spreads of 157bps (AAA), 131 bps (AA), 224bps (A), 278 bps (BBB). This is calibrated to the widening of the Annual Benchmark Spread of iBoxx GBP Corporates Benchmark Indices 10+ over the period 30 June 2008 to 31 December 2008.

Regulatory flexibility may also be a determinant of asset allocation behaviour, particularly in periods of stress

88. To the extent that regulation might be a motivating factor for procyclicality, it is important to consider regulatory responses to periods of market stress. In many instances of market stress, regulators across a wide variety of jurisdictions have exercised regulatory flexibility, which may have limited the degree of procyclicality observed as a result of regulatory factors.[14] We classify regulatory flexibility broadly here, to include any change in the regulatory framework in response to stress, even if that change is a permanent one.

89. Typical measures extended to insurance companies in recent periods of stress have included:

- Relaxing rules related to solvency requirements, such as the rules for calculating capital charges;
- Relaxing the valuation methods that insurance companies have to follow when valuing assets and liabilities;
- Extending the length of any proposed plan to restore solvency, following adverse shocks (though this measure has not been widely used).

A number of countries have applied various of these measures in three recent episodes: i) in the early 2000s, in response to a fall in asset, especially equity, prices; ii) in 2007–2009 in response to the initial impact of the financial crisis on asset prices; and iii) in 2011–2013, broadly in response to the low rates environment. Table 3 sets out a summary of which countries have applied which measures and the reasons given by regulators for doing so.

[14] In some cases/regulatory regimes, there may be features which more 'automatically' dampen balance sheet volatility, for example the illiquidity premium applied to annuities business in the UK as outlined above.

Table 3: Summary table of use of regulatory flexibility for insurers in a number of countries

Measure	Countries where measure was used						Reason given
	Denmark	Netherlands	Sweden	Switzerland	UK	US	
Changes to solvency requirements				2013	2001–2004; 2008–2009	2007–2009	To avoid the sale of assets and manage temporary volatility in capital resources (UK); to mitigate the impacts of crisis on insurers and policyholders (US); to manage low rates and reduce competitive disadvantages in the European market (Switzerland).
Changes to valuation methods					2001–2004	2007–2009	To reduce the sale of equities (UK); to mitigate impacts of crisis on insurers and policyholders (US).
Changes to discount rates	2008; 2012	2012	2001–2012		2001–2004		To reduce the sale of equities (UK); to prevent large scale sales of mortgage bonds and alleviate pressure on government bonds (DK, 2008); to manage low rates (DK, 2012); to ease the burden of low rates (Sweden); to reduce fluctuations in solvency positions (NL).
Extension of solvency restoration plan			2011				To reduce the impact of low rates and falling equity prices on asset allocation.

Source: BaFin (2012); BBC (2003); DNB (2012); The Economist (2001); FINMA (2012); FSA (2003a); FSA (2003b); FSA (2009); The Geneva Association (2013); IAIS (2011); Investment and Pensions Europe (2012); Money Marketing (2003); Mulrooney (2003); Severinson and Yermo (2012); Telegraph (2003); United States Government Accountability Office (2013)

Conclusions for Insurers

90. The analysis outlined above suggests that liability characteristics, valuation methods and capital regulation all influence the asset allocation of insurance companies. Changes in the risk appetite and the investment philosophy of insurers themselves—for example the shift towards asset and liability matching and liability-driven investment since the 2000s—are also important. It is not necessarily possible to determine which factors dominate, because they tend to interact. For example, liability characteristics are a key determinant of regulation, but in turn regulation may affect the type of products that insurers are willing to offer policyholders. Regulation and liability characteristics can be interrelated and influence asset allocation in other ways as well—for annuities, for example, the genuine 'long-termness' of the liability tends to encourage buy-and-hold asset allocation strategies, but in turn this is supported by the regulatory treatment of those liabilities. For unit-linked policies, which are becoming increasingly dominant in the UK market (see Chart 4 above), regulation is less likely to be the key determinant of asset allocation.

91. There is some evidence of procyclical investment behaviour by insurance companies in a number of countries, including the UK, at various points. Aggregate asset allocation data for the UK seem to support anecdotal evidence that insurers were sellers of equities during the dotcom crash of the early 2000s. Data for the financial crisis are less conclusive, and the absence of data on the use of derivatives might mean that some procyclical behaviour is not visible. The aggregate asset allocation data also highlight the structural shift out of equities by UK insurers from the early 2000s, which may have been driven by regulatory changes, but may also have reflected a change of risk appetite and investment strategies within the industry itself. In most cases it is not possible to draw a direct causal link between procyclical investment behaviour or structural shifts in asset allocation and a singular driving force because of the difficulty of disentangling the multiple factors at work.

92. Procyclicality can be an inherent feature of regulation—for example in the use of market-consistent valuation and risk-based capital, although many regulatory regimes also have features that 'automatically' offset some of these tendencies to procyclicality. It is also possible that there is a tendency for the assessment of risk by both insurers and regulators to change in response to stressed conditions, leading to changes to investment strategies or regulation that tend to reduce risk-taking during downturns.

93. During periods of stress it seems that regulatory flexibility has been applied across a number of jurisdictions. Whilst regulatory flexibility may have tempered procyclical behaviour, it has often been applied on an ad-hoc basis, and asymmetrically across firms and over time. Asymmetry across firms can benefit weaker firms and so prevent procyclical actions by those firms (for example, in 2009 confirmation by the FSA that there would be no automatic consequences from a breach of the risk-based capital requirements may have helped weaker firms to avoid selling equities into a falling market). But by failing to provide benefit to stronger firms such asymmetry does nothing to encourage such firms to act countercyclically, which could otherwise reduce aggregate procyclicality. Asymmetry over time can arise, for example, when capital requirements are relaxed in stressed conditions, but not necessarily tightened in upturns.

94. Such asymmetry may imply perverse incentives; by benefitting weak firms more than strong firms, and by easing requirements in times of stress but not requiring buffers to be built in benign environments. The absence of a clearly defined countercyclical framework can result in a lack of clarity for firms about the conditions under which, or the principles according to which, regulatory action will be taken (in both upturns and downturns), which may increase undesirable uncertainty. In order to be supportive of both prudential soundness at the level of individual firms and financial stability more widely, an appropriate countercyclical regime would be one in which regulation is symmetrical, that is, regulation is relaxed in periods of stress *and* strengthened during benign economic periods.

IV. Evidence on the asset allocation of defined benefit pension funds and some possible drivers

International evidence on pension fund procyclicality is mixed

95. Evidence on the procyclicality of pension funds around the world is mixed. Investment flow data from a number of OECD countries show that pension funds in several countries (e.g. Norway, Italy, Poland, and Turkey) behaved countercyclically during 2008–09, engaging in large net equity purchases as markets fell and reducing the intensity of net purchases as markets recovered. On the other hand, pension funds in the United States (DB), Portugal, and Spain engaged in net sales of equity during the crisis, which the OECD argues reflected a structural shift towards more conservative asset allocations in these countries (OECD (2010)). Although this is arguably not procyclical as such—in that it reflects a structural shift rather than a reaction to market or cyclical factors—in the context of wider equity market stress, this behaviour may nonetheless have added to instability.

Evidence suggests that defined benefit pension funds in the UK behave countercyclically in the short term

96. Blake at al. (2014b) analysed data provided to the Bank of England by State Street Investment Analytics (SSIA) on 108 corporate and 81 local authority UK DB pension funds from 1987 to 2012.[15] Detailed analysis of these schemes suggests that in the short term (monthly–quarterly) the pension funds in this sample behaved countercyclically. That is, they bought (sold) their holdings of an asset class, such as equity, in response to negative (positive) valuation changes resulting from market and liquidity shocks.

97. The observed short-term rebalancing is likely to be a consequence of having specific asset allocation targets to meet in the short term, so if the price of an asset falls, its share of the overall portfolio will decrease, and the pension fund will buy more to ensure it continues to meet the target allocation. That is, the rebalancing is the result of a more or less mechanical process. This suggests that asset allocation decisions in the short term are determined by the desire to stay in line with longer-term strategic allocations.

98. Because DB pension funds are long-term investors, and should in theory be able to hold assets for longer periods without being overly concerned about their price volatility, we might expect them to take advantage of their ability to buy and hold assets by buying ‘cheap’ as prices are falling, and possibly when investors with shorter investment horizons are being forced to sell. This happens mechanically in the short term if pension funds rebalance their portfolios as set out above, but could also result from pension funds choosing to increase the proportion of their portfolio allocated to a particular asset class at a time when the price of those assets was falling. Chart 10 shows the net asset allocation to UK equities of local authority and corporate pension funds in the SSIA sample. This appears to demonstrate that local authority funds in the sample increased net UK equity purchases for extended periods after market falls in both 2000 and 2008, and that their net allocation to UK equities appears to be inversely correlated with the FTSE 100, which could be taken as a proxy for UK equities more broadly. This suggests that in respect of UK equities they behaved countercyclically in the medium term and may have conformed to the expectation of buying ‘cheap’ in falling markets.

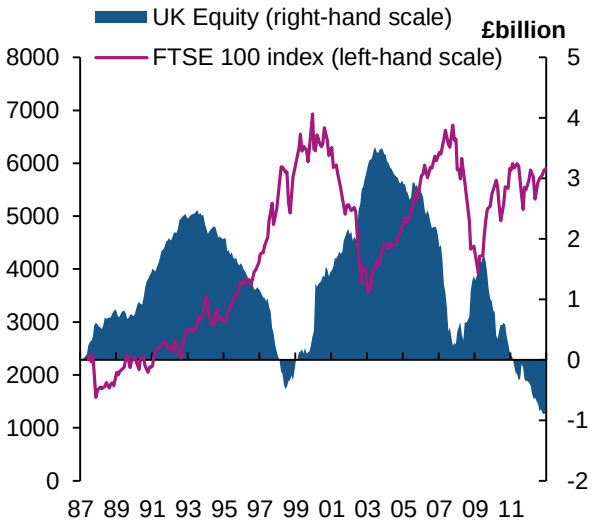
99. For UK corporate DB pension funds, a longer-term structural shift out of UK equities from the late 1990s onwards seems to have dominated any medium-term cyclical asset allocation, implying that the medium-term trend is essentially acyclical. So although in the course of this “de-risking” corporate

[15] This sample represented around one third by value of the UK pension fund industry in 2012. The funds in the sample are representative of the universe of funds operating in the UK during this period.

pension funds will have been selling UK equities at points where the market was falling (i.e. in a way that could be considered procyclical), they were also selling at points where the markets were rising (i.e. in a way that could be considered countercyclical). However, in the context of wider market moves at the time, the continued selling of UK equities by corporate DB pension funds during the financial crisis (albeit that this was consistent with a longer-term structural shift) may have further added to instability, and if that episode is viewed in isolation, could be taken as evidence of procyclicality.

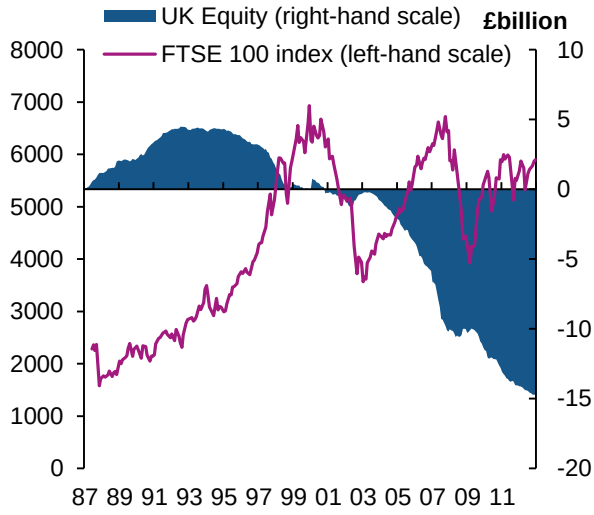
Chart 10: Cumulative net investment in UK equity by local authority and corporate defined benefit pension schemes from January 1987 to December 2012

Local authority pension funds



Source: State Street Investment Analytics and Bank calculations

Corporate pension funds



Source: State Street Investment Analytics and Bank calculations

100. Chart 10 suggests that at the aggregate level there does appear to have been some decrease in the pace of the allocation away from UK equity by corporate DB pension funds during the recent financial crisis, but analysis of different sizes of pension funds in the sample suggests that the largest corporate pension funds appear to have accelerated the pace of longer-term shifts in asset allocation during the financial crisis (Blake at al. (2014b)). This could be taken as evidence of modestly procyclical behaviour by the largest funds in the sample. The broader trend, however, suggests that the desire to meet a designated strategic allocation, which involved a decreasing allocation to equities after 2000, largely dominated any medium-term response to market conditions. As can be seen, the scale of the decrease in net equity allocations by corporate funds was much larger than the scale of the reallocations by local authority funds.

Regulation is likely to play a role in the ability of funds to behave countercyclically in the short term

101. The ability of pension funds countercyclically to rebalance in the short term suggests that, at the very least, the regulation of pension funds in the UK does not constrain their ability to do this. Sponsors of DB pension schemes are legally obliged to ensure that pensions are paid in full to members. In the event that a sponsor is unable to meet this obligation (for example, if it becomes insolvent), the schemes liabilities and assets are transferred to the Pension Protection Fund (PPF), which takes over the responsibility for making payments to policyholders. Local authority schemes are not eligible for the PPF. UK DB pension funds do not have a capital requirement, but are subject to funding requirements, with the value of assets and liabilities being assessed by the regulator every three years. Although they are subject to different regulation, it is possible for both corporate and local authority pension funds to build up deficits and maintain them over a number of years. Although they

are obliged to publish their funding status (i.e. the difference between their asset and liability valuations), and have in place a plan for reducing deficits, they have a considerable amount of time to achieve this, which may be less likely to encourage short- or medium-term procyclicality.

Pension fund regulators have applied regulatory flexibility in a variety of ways

102. In addition to this, the UK pension fund regulator (the Pensions Regulator (tPR)), which regulates the majority of corporate DB schemes, has applied regulatory flexibility at a number of points during the financial crisis. This is also true of pensions regulators internationally, which may help to explain why there is not more evidence of procyclical asset allocation during the financial crisis.

103. Regulatory flexibility has taken a variety of forms including:

- Relaxing funding requirements (i.e. the amount of assets that a pension fund is required to hold against its liabilities);
- Reducing the deficit size by altering the way that assets and/or liabilities are valued (including by 'smoothing' the value of assets/liabilities over a period of time to reduce the impact of temporary price shocks);
- Reducing the value of liabilities by altering the benefits of beneficiaries;
- Expanding the range of eligible assets that the corporate sponsor can use, in addition to cash, to cover the deficit of its pension fund; and,
- Extending the length of the recovery plan which sets out how a pension fund's sponsor expects to close a deficit.

104. Table 4 below summarises how a number of countries have applied these measures since 2006 in response to asset price shocks or the low rates environment, and the reasons given by regulators for doing so.

Table 4: Summary table of use of regulatory flexibility for pension funds in a number of countries

Measure	Countries where measure was used								Reasons given by regulators
	Canada	Denmark	Finland	Ireland	Japan	Netherlands	Switzerland	UK	
Changes to funding requirements	2010		2008		2009				To avoid procyclical behaviour (Can, Fin); to avoid pressure on corporates (Japan).
Changes to discount rates		2008				2010			To avoid fire sales of risky assets (DK); to change mark-to-market requirements (NL).
Changes to pension benefits							2008		No reason provided.
Increased range of assets eligible to be used in place of cash contributions								From 2006	To increase the pension fund's security when the corporate is under pressure and to decrease PPF levy.
Extension of recovery plan	2008			2012		2009		2009	To reduce pressure on sponsors (Can, Ireland, UK); to prevent reduction of benefits (NL).

Source: Canadian Department of Finance (2009); HMT (2013); Høj (2011); Investment and Pensions Europe (2010; 2012a, 2012b); Norton Rose Fulbright (2012); Pensions Insight (2013); Pensions and Investments (2012); Professional Pensions (2008); PPF and tPR (2012); tPR (2009; 2010; 2012a; 2012b; 2013); Severinson and Yermo (2010; 2012)

Industry practices may encourage herding by pension funds, which could result in procyclicality

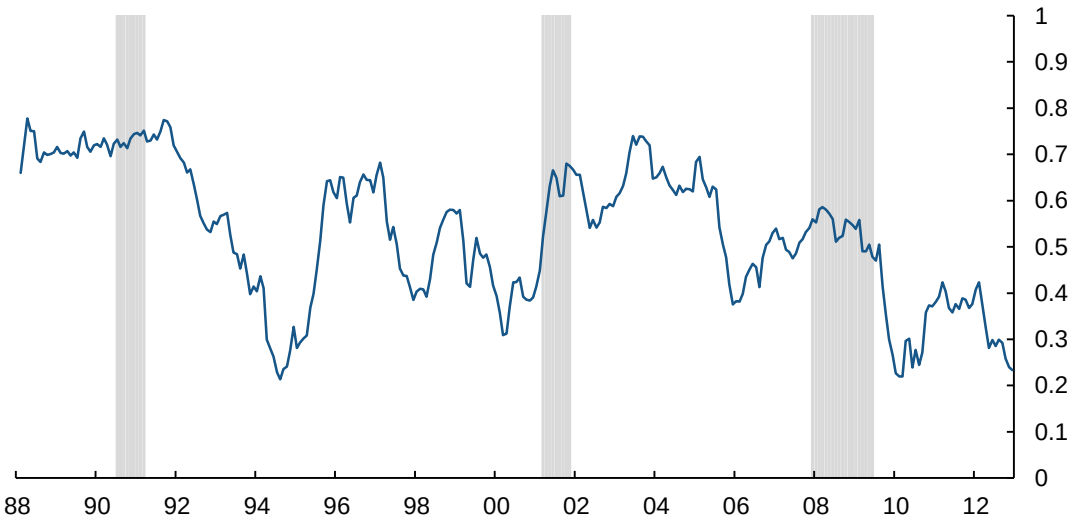
105. Although in the sample we have examined, there is limited evidence of short-term procyclicality by pension funds, a number of industry practices may encourage herding by pension funds—that is, the tendency for pension funds to follow each other into and out of certain asset classes—which has the potential to lead to, or amplify the impact of, procyclical investment behaviour. DB pension funds' asset allocation is determined by the fund's trustees, with input from the sponsoring company, investment consultants, asset managers and tPR. UK pension funds make use of both investment consultants as advisors on investment strategy and asset managers who are provided with a mandate within which to undertake investment activity. Section II above sets out how the use of investment consultants and asset managers might theoretically encourage herding behaviour.

There is some evidence that UK defined benefit pension funds engage in reputational herding

106. Blake et al. (2014b) argue that there is some evidence that UK DB pension funds engage in reputational herding in the very short term. They define reputational herding as being driven by fear of underperformance relative to their peer group to invest in the same assets at the same time as their peers. They also argue that pension funds tend to herd most with other funds with similar characteristics, such as size and whether they are public or private sector schemes.

107. Chart 11 shows the 12-month moving average of the herding component defined by Blake et al. (2014b) and represents the tendency for pension funds in this sample to herd over time, where 1 indicates strong herding and 0 indicates weak herding. This indicates that herding is high towards the start of the sample, but decreases significantly around 1994. Thereafter, herding seems to be somewhat cyclical, appearing to increase ahead of business cycle contractions and decrease immediately thereafter. The degree of herding appears to have changed over time, being as high as 0.7 around 2003, before decreasing to reach its sample minimum of 0.2 at the end of the sample in 2012. Chart 11 also seems to suggest that herding decreased before 1995, possibly reflecting an increased focus on asset and liability matching in anticipation of the key regulatory change in the form of the Pensions Act 1995 (see below), rather than on what other pension funds were doing.

Chart 11: Degree of herding amongst defined benefit pension funds (local authority and corporate)[(a)]



Source: State Street Investment Analytics and Bank calculations
(a) Grey shaded areas indicate NBER business cycle contraction dates.

Regulatory changes have also triggered strong correlated movements into certain asset classes

108. There is also evidence that changes in regulation have resulted in large correlated movements into particular asset classes at certain points, and that this has impacted prices in those asset classes. One example is the strong flow of investment into UK index-linked gilts after regulatory changes introduced in the mid-1990s. Zinna (2014) investigates the impact of ICPFs' demand for inflation-linked UK gilts over the period 1987–2012 and argues that demand pressure by these investors contributed to a fall in real rates over the period. In particular, the fall in rates prior to 2000 was largely caused by increased demand by UK pension funds (See Box 3).

Box 3: Price pressures in the UK index-linked gilt market

Zinna (2014) investigates the impact of long-term investors' demand for UK index-linked gilts on real rates for the period from 1987 to 2012. Examining data on holdings by long-term investors, issuance by the UK Debt Management Office and average maturity of outstanding index-linked gilts, he finds that demand pressures by long-term investors contributed to the decline of real rates during this period, particularly at longer maturities. He also finds that demand pressure increased as the average maturity of index-linked gilts outstanding decreased. That is, as the supply of the longest-dated index-linked gilts decreased, demand pressures increased.

Zinna finds that the cumulative impact of demand by pension funds for index-linked gilts lowered the two-year real yield by around 70 basis points and the 20-year real yield by around 165 basis points. The impact of UK pension funds on rates was concentrated in the period prior to 2000, and was particularly pronounced around the introduction of the Pensions Act in 1995. In part, this reflects the fact that at this time demand for index-linked gilts was strong, and issuance was relatively limited. The reduction of the impact of pension funds on rates after 2000 may reflect the fact that although pension funds purchased index-linked gilts throughout the period, issuance increased from 2000, which lessened the impact of their demand on rates.

The empirical evidence examined by Zinna does not appear to support anecdotal evidence which suggests that the Pensions Act of 2004 also led to increased demand for index-linked gilts and price pressure in the market. This may be because 2004 was characterised by higher issuance of index-linked gilts than the earlier period, and because the average maturity of inflation-linked gilts was decreasing before 2000, but increasing thereafter. In addition to this, the data examined do not include the use by pension funds of inflation derivatives, and so may underestimate actual demand pressures exerted by pension funds.

The impact of demand from life insurers is somewhat smaller, ranging from -30 bps on the 2 year rate to -74 bps on the 20 year rate, and the period of most acute demand pressure was from the late 1990s to 2005. It is notable that this also coincides with the period in which a number of regulatory changes for insurers were introduced or in prospect, as set out in Section III.

In theory, the potential impact of ICPFs on real rates combined with the use of risk-free rates to value ICPF liabilities could create a procyclical feedback loop, in which the fall in yields caused by ICPF demand feeds through to the rates used to discount ICPF liabilities, further increasing incentives for ICPFs to hedge, increasing demand and compressing yields even further.

109. Although there is limited evidence of procyclicality in the behaviour of the sample of UK DB pension funds that we have examined, the underlying industry structure and tendency to herd might contribute to procyclicality, potentially amplifying asset price or economic cycles, if herding coincides with, rather than offsets, wider market trends.

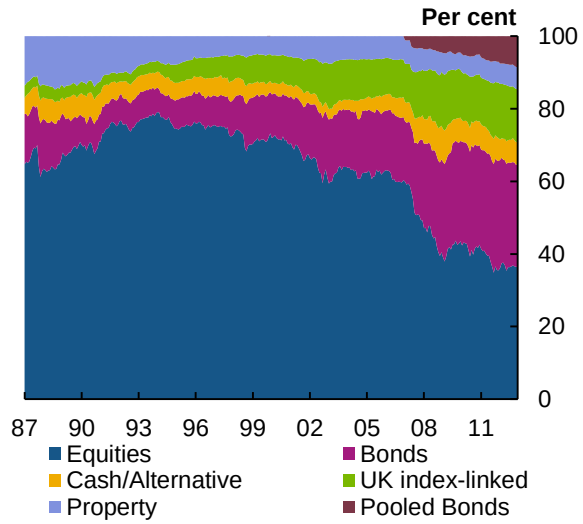
In the longer term, UK pension funds have been "de-risking" their asset portfolios

110. Cyclicality is not the only aspect of pension fund investment behaviour that is worth investigating. Longer-term structural trends are also important. Chart 12 shows the aggregate asset allocation for the schemes in the SSIA sample analysed above, from 1987 to 2012. It demonstrates that both corporate and, to a lesser extent, local authority schemes have been reducing their allocation to equities over the last c.15 years. This process of shifting portfolio holdings from equities to fixed income, including index-linked instruments, is commonly referred to as "de-risking". Although the shift does reduce market risk, it effectively 'locks-in' current market rates, which particularly in the current low-rates environment, can be costly. It may also be reflective of a decreased structural willingness of

pension funds to bear risk across the cycle, which has the potential to be detrimental to the financial and economic system more broadly.

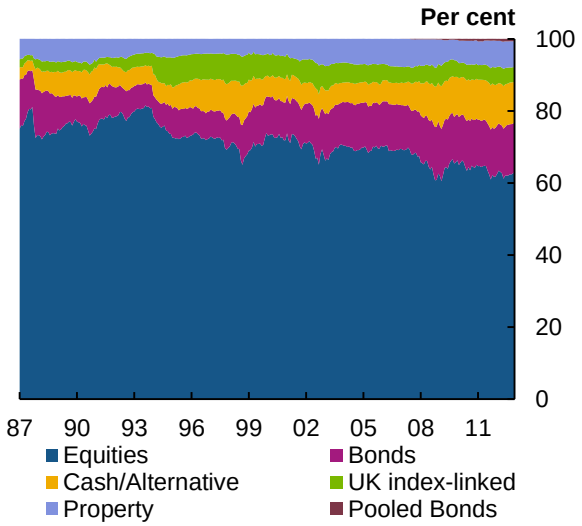
Chart 12: UK defined benefit scheme asset allocation (nominal)

Corporate DB schemes



Source: State Street Investment Analytics and Bank calculations

Local authority DB schemes



Source: State Street Investment Analytics and Bank calculations

111. Corporate DB pension funds in the sample significantly decreased their allocation to equities from the early 1990s. Allocation to equities increased from 65% at the start of the period in 1987 to a peak of 79% in 1994, before decreasing to 37% at the end of the period in 2012. During the same period, their allocation to index-linked bonds increased from 3% in 1987 to 14% in 2012, and their allocation to conventional bonds increased from 14% in 1987 to 28% in 2012. In contrast, the portfolios of local authorities displayed rather more gentle shifts in allocations, but nonetheless equity holdings decreased from 75% of total asset allocation 1987 to 63% in 2012. Interestingly, equities generated on average the highest mean return of any asset class during this period, and this was driven largely by the return on domestic rather than international equities (Blake et al. (2014b)).

Shifts in asset allocation can partly be explained by shifting maturity profiles—i.e. liability characteristics

112. The longer-term trends in asset allocation shown in Chart 12 can be partly explained by the changing maturity profiles of DB pension funds. The much greater degree of “de-risking” by the corporate pension funds as compared to the local authority pension funds can at least partly be explained by the different liability profiles of the two sets of schemes. The majority of corporate DB pension schemes are no longer open to new entrants, and therefore have a greater, and increasing, proportion of retirees (i.e. members in the decumulation phase) and a smaller, and decreasing, proportion of employees paying in (i.e. members in the accumulation phase). Given the tendency for schemes to shift from equities to fixed income products as members approach retirement, the shift shown in the corporate DB asset allocations is in part reflecting this trend. In contrast, most local government DB pension schemes are still open, and therefore have a larger proportion of younger scheme members, still in the accumulation phase.

113. If maturity of schemes is one factor driving the long-term structural shift out of equities that can be observed in the aggregate ICPF statistics (as shown in Charts 1 and 2 above), we might expect to see part of this aggregate trend reverse as auto-enrolment increases the proportion of younger people paying in to pensions. This may incentivise an increase in equity holding at the aggregate level

(although this may largely show up as an increase in the proportion of equities held on insurers' balance sheets, as they are the currently the main providers of occupational DC schemes).

Regulation has an influence on both asset allocation and underlying liability characteristics in the longer term

114. Although scheme maturity can explain some of the longer-term structural trends in asset allocation shown in Chart 12, regulation and changing accounting and valuation methods are clearly also significant, and indeed have driven some of the change in maturity profiles.

115. Differences in asset allocation trends for corporate and local authority schemes (as well as reflecting different underlying maturity profiles) may reflect different regulation and other factors. The National Association of Pension Funds notes that differences in the regulatory framework applied to local authority schemes compared to private sector schemes means that local authority funds are under less pressure to hedge away movements in the value of their liabilities and "de-risk" (NAPF (2013)). Other factors, such as the ability of local authorities to raise taxes, may also mean they are more willing to take risk than corporate DB funds.

116. The idea that differences in regulation and valuation methodology might drive different asset allocation outcomes is supported by Andonov et al. (2013) who studied a large number of US, Canadian and European public and private pension funds. They found that US public pension funds behaved very differently to the other funds studied as a result of the fact that US public pension plans discount their liabilities using a discount rate linked to the expected return on assets in their investment portfolios. They demonstrate that this has incentivised US public funds to increase allocations to higher-yielding risky assets, because this improves their calculated funding position. In contrast, European, Canadian and US private pension funds are required to use discount rates based on high-quality or risk-free rates and as a consequence behaved significantly differently over the period studied.

Changes to pension fund regulation and to tax and corporate accounting regulations have incentivised a shift away from equities as well as encouraging the closure of corporate DB schemes

117. In the UK, changes in pension regulation seem likely to have encouraged the shift away from equity holding shown in Chart 12. A particularly significant piece of regulation was the Pensions Act of 1995, which introduced the Minimum Funding Requirement (MFR), which specified that pension funds had to meet a funding rate—i.e. the ratio of assets to liabilities—of 90% in their triennial valuation. Pension funds which failed to meet the MFR on their valuation date were given one year to reach 90% funding and five years to reach full funding. Although the MFR did not specify assets that pension funds should invest in, some key discount rates used to calculate liabilities for the MFR were based on UK government bond yields. As a result, pension fund managers may have been incentivised to invest in gilts as a natural matching asset for their liabilities, because they were more likely to meet the MFR if their assets and liabilities changed value in a correlated way. The MFR also encouraged a movement away from holding volatile assets (including equities) to the extent that they did not match liabilities as prescribed by the MFR, because their relatively higher volatility might make meeting the MFR more difficult (Blake (2003)).

118. The Pensions Act of 1995 also introduced, from 1997, a general requirement that DB schemes had to increase pensions in payment in line with inflation up to a cap of 5% (this cap was later reduced to 2.5% by the Pensions Act 2004). Although many DB pension schemes already applied some form of inflation protection to pensions in payment, this 'limited price indexation' encouraged pension funds to seek inflation protection through increased purchases of index-linked gilts. This is likely to have been one of the drivers for the increased demand for index-linked gilts from pension funds at this time, as set out in Box 3 above.

119. The Pensions Act 2004 established the Pensions Regulator (tPR) and an industry compensation scheme (the Pensions Protection Fund (PPF)) which covers most private sector DB schemes (but not, for example, local authority DB schemes). Like the previous MFR, tPR requires remedial action for funding deficits, measured as the ratio of the market values of a pension fund's assets to its liabilities. Greenwood and Vayanos (2010) argue that this change in regulation provided strong incentives to further increase exposure to long-dated inflation-linked gilts, which most pension funds did by reducing their exposure to equities.

120. Changes in tax and corporate accounting regulation are also significant. Changes to the taxation of dividends in 1997 made UK equities less attractive as it removed a 20% tax credit for pension funds on dividends they received from their equity investments. Amir et al. (2010) argue that changes to accounting standards for corporates in the UK (FRS 17 and IAS 19) and US (SFAS 158) introduced in the 2000s, which increased disclosure requirements relating to pension funds—for example by requiring companies to recognise pension fund surpluses or deficits on their balance sheets—and changed the valuation method used in pension fund accounting for corporates, were one cause of a subsequent shift in pension asset allocation away from equities and into bonds.

121. As well as encouraging the shift in asset allocation for corporate DB schemes outlined above, the combination of these pieces of pensions funding, tax and accounting regulation (in combination with a number of non-regulatory factors) made it less attractive for corporates to offer DB schemes at all, thus encouraging scheme closure, which in turn has contributed to the changing maturity profile outlined above.

Non-regulatory changes have also decreased the appetite of corporates to offer defined benefit pension schemes to their employees

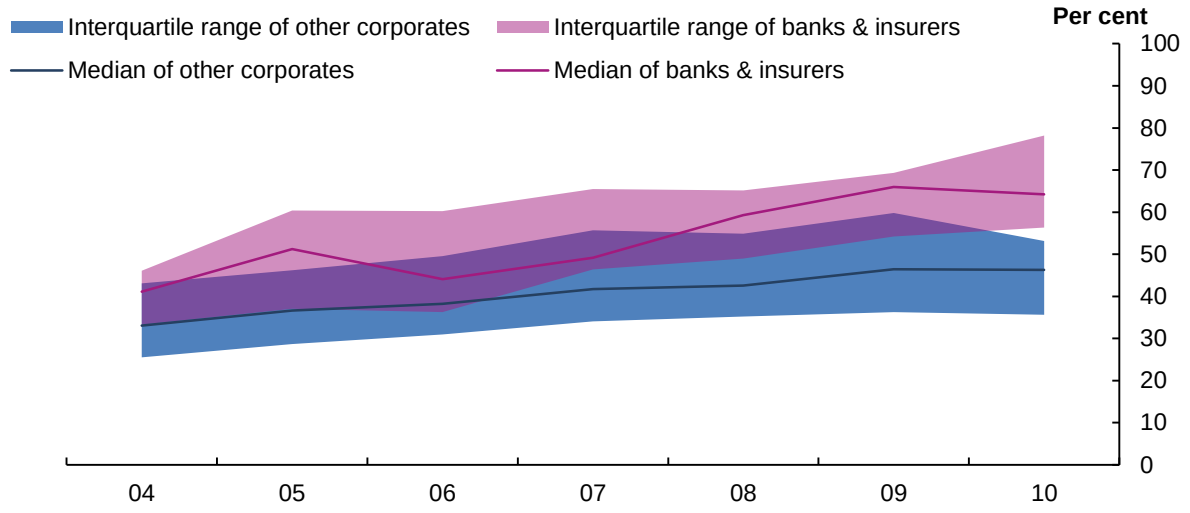
122. Non-regulatory factors have also been significant in increasing the perceived (and actual) burden of DB pension schemes and are therefore also a driver of the closure of schemes, and so associated asset allocations. For example, longevity has significantly increased over recent decades. Life expectancy at birth increased from around 71 to 79 years for men and 77 to 83 years for women between 1980–82 and 2010–12.[16] There has also been a decreasing appetite amongst corporates to fund a benefit that is perceived to be undervalued by employees relative to its actual cost for employers. More recently, the low rates environment and the prospective end of contracting out (which previously had the benefit of reducing National Insurance payments for both employers and employees) have further reduced the appeal of offering DB schemes for corporates.

Differences in the regulation of pension fund sponsors may also have an impact on asset allocation

123. There may also be other dimensions along which regulation has an impact on asset allocation for pension funds. Chart 13 below shows the allocation to bonds in the pension funds of FTSE 100 financial companies (i.e. banks and insurance companies) and non-financial companies from 2004 to 2010. Pension fund assets and liabilities have capital implications for banks and insurers that do not apply to non-financial companies. This may be one factor leading to the observed pattern of asset allocation shown, in which, while the pension funds of both financial and non-financial companies were "de-risking" in the period from 2004 to 2010, financial companies consistently had a higher share of assets allocated to bonds. There may be some other factors driving differences in asset allocation (for example, it is not clear from the data available whether there are underlying differences in the maturity profiles of the two groups), but this is suggestive of the fact that differences in the regulation of sponsors, even within the private sector, may be an important determinant of asset allocation behaviour.

[16] ONS, National Life Tables, 2010–2012 Release

Chart 13: Allocation to bonds by pension funds of banks and insurers versus those of non-financial corporates[(a)(b)]

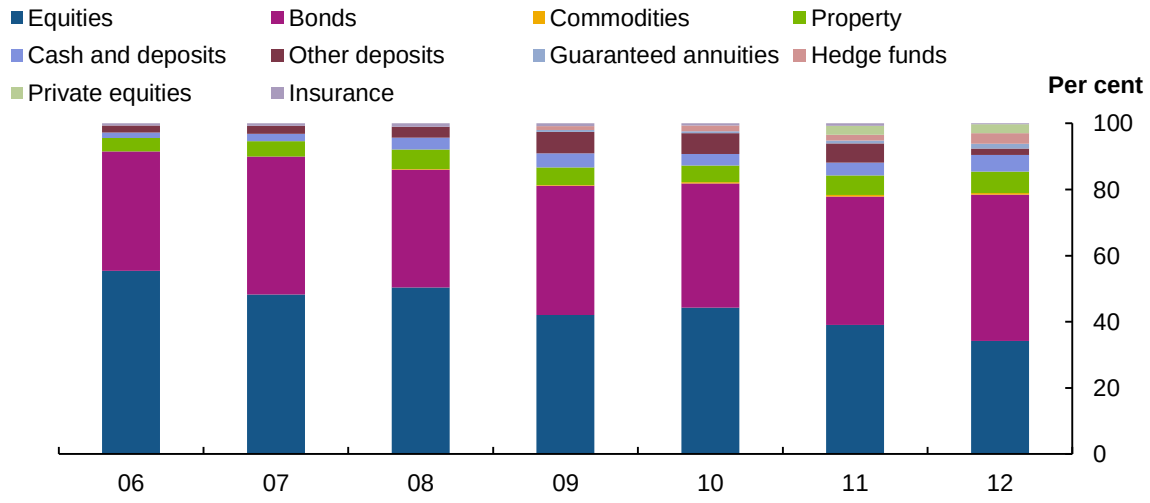


Source: Jardine Lloyd Thomson and Bank calculations
(a) The sample includes all FTSE 100 companies over the period, with 17 banks and insurers and 143 other corporates in the sample at various points.
(b) All asset values were deflated to try and minimise changes in results due to valuation changes.

Stronger pension funds appear to have undertaken more rapid "de-risking"

124. Pension fund strength may also have an impact on the asset allocation decisions of pension funds. We conducted an empirical analysis to examine whether pension scheme investment behaviour depends on the scheme's funding position and/or on the strength of their sponsor.

Chart 14: Aggregate asset allocations of UK corporate defined benefit pension schemes[(a)]



Source: Pension Protection Fund and Bank calculations
(a) All 5240 schemes from the PPF dataset are included.

125. The dataset for this analysis was supplied by the PPF and contains information on 5240 UK corporate DB pension funds between 2006 and 2012. Aggregate data for this group suggest that they displayed similar "de-risking" trends to other corporate pension funds during this period (Chart 14). At the aggregate level there is no clear evidence of procyclicality during the recent financial crisis.

126. Analysis of these data demonstrated that strength of sponsor (measured by their probability of insolvency as calculated for the PPF by Dun & Bradstreet), did not appear to be a key determinant of asset allocation (Chart 15), with pension funds of both the top quartile of strongest and bottom quartile of weakest sponsors in the sample displaying very similar asset allocations throughout the period. At first this conclusion seems counter-intuitive, and may reflect the fact that the probability of insolvency measure used here is not a good proxy for sponsor strength.

Chart 15: Sponsor strength as a determinant of asset allocation[(a)]

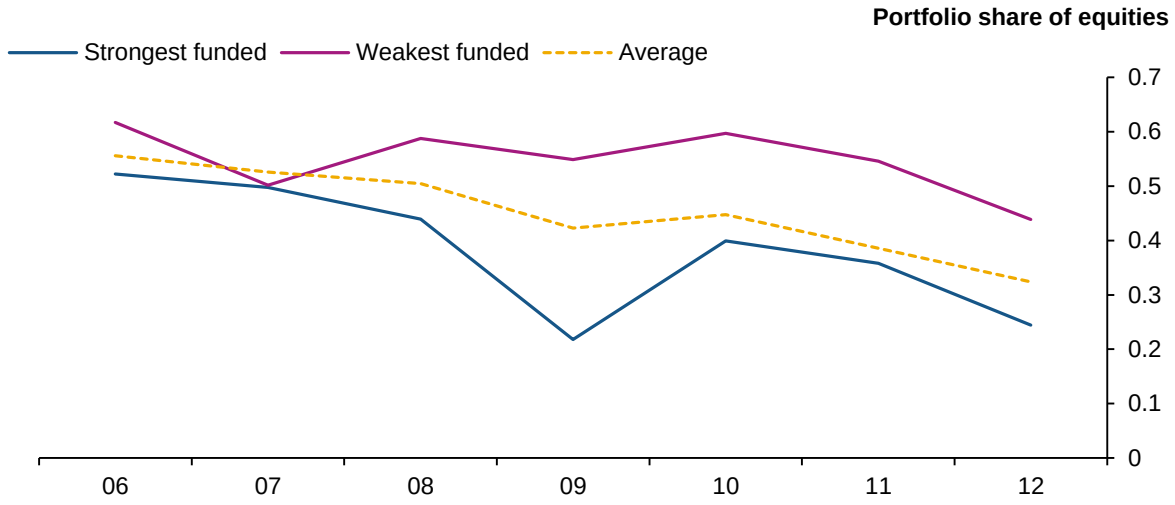
Source: Pension Protection Fund and Bank calculations

(a) The chart plots the top 25% and bottom 25% of funds each year given the strength of sponsor as determined by their probability of insolvency, calculated for the PPF by Dun & Bradstreet. The sample includes all observations from the PPF dataset for which the asset allocation reported was calculated in the reporting year or no earlier than 13 months prior to that. The values of asset holdings have been deflated using appropriate price indices for each asset class to try and illustrate changes in asset allocation due to active reallocation decisions rather than valuation changes. However the deflators are not precise matches for the underlying assets, so changes in results due to valuation changes have been reduced, but not eliminated.

127. In contrast, fund strength as measured by funding position—i.e. the ratio of measured assets to liabilities—does seem to have had a significant impact on the asset allocation decisions of the funds in the sample during the period. Chart 16 shows that although both strong and weak schemes reduced their allocation to equities during this period, the top quartile of most well-funded schemes reduced their allocation to equities from 52% in 2006 to 24% in 2012 compared with bottom quartile of schemes, which reduced the proportion of the assets allocated to equities from 62% to 44%. This may be because less well funded schemes are less willing to “de-risk” in a low rates environment when there are relatively low returns on less risky assets, perhaps because they are more reliant on their investment strategy to narrow their funding deficit. Note that although these data are deflated in order to try and highlight active changes in asset allocation, rather than valuation changes, it seems likely that some of the large decrease in allocation to equities by the strongest funds in 2009 shown in Chart 16 is reflecting valuation changes rather than large-scale sales of equities in 2009, which the other evidence we have suggests did not happen to any great degree.

128. While these portfolio reallocations may make sense from the perspective of the individual funds—with the strongest funds protecting their funding positions by continuing to de-risk, regardless of the wider market context, while weaker funds try to improve their position by maintaining higher levels of risk—at a systemic level, this pattern may not be optimal. It implies that stronger pension funds were not taking advantage of their ability to purchase risk when it was cheap, which might have played a stabilising or countercyclical role.

Chart 16: Funding position as a determinant of asset allocation[(a)]



Source: Pension Protection Fund and Bank calculations

(a) The chart plots the top 25% and bottom 25% of funds each year given the strength of their funding positions. The funding position is calculated as the ratio of assets to liabilities, with higher ratio indicating a stronger funding position. The sample includes all observations from the PPF dataset for which the asset allocation reported was calculated in the reporting year or no earlier than 13 months prior to that. The values of asset holdings have been deflated using appropriate price indices for each asset class to try and illustrate changes in asset allocation due to active reallocation decisions rather than valuation changes. However the deflators used are not precise matches for the underlying assets, so changes in results due to valuation changes have been reduced, but not eliminated.

Conclusions for Pension Funds

129. Evidence on the procyclicality of pension funds internationally is mixed. While some countries appear to have behaved countercyclically during 2008–09, engaging in large net equity purchases as markets fell, others engaged in net sales of equity during the crisis. This arguably reflected structural shifts in these countries towards more conservative asset allocations, rather than being a reaction to market conditions, but nonetheless may have added to instability in the context of widespread equity market stress.

130. In the UK, DB pension funds in the sample we examined appear to have behaved countercyclically in the short term (i.e. monthly–quarterly). This is likely to be the consequence of a more or less mechanical process of portfolio rebalancing to meet target asset allocations. Funded local authority pension funds appear to have behaved broadly countercyclically even in the medium term.

131. The medium-term asset allocations of UK corporate DB schemes seem largely to have been dictated by longer-term structural shifts rather than cyclical considerations, although the largest corporate schemes in the sample we analysed do appear to have accelerated the pace of longer-term shifts in asset allocation during the financial crisis in a way that could be considered modestly procyclical (although this trend is not apparent at the aggregate level, when all sizes of scheme are considered). Although consistent with longer-term structural shifts in asset allocation, the continued selling of UK equities during the financial crisis by corporate DB pension funds may have further added to instability in the context of wider market moves at that time, and if taken in isolation, could be viewed as procyclical.

132. Regulatory flexibility has been applied in a number of countries during periods of stress, and may have muted procyclical behaviour. As with insurers, this is unlikely to be optimal, as it is asymmetric across pension funds, and relaxation of regulation in periods of stress does not follow a build-up of resilience as asset values rise in more benign circumstances, nor can it be relied upon by pension funds when determining asset allocation.

133. There is some evidence that DB pension funds engage in reputational herding—that is, they are driven by fear of underperformance relative to their peer group to invest in the same assets at the same time as their peers. If this tendency to herd coincides with, rather than offsets, wider market trends, such behaviour could also contribute to procyclicality, potentially amplifying asset price or economic cycles.

134. For example, there have been instances where regulatory change appears to have encouraged large correlated movements of pension funds into certain asset classes, such as the strong movement of pension funds into index-linked gilts after the introduction of the Pensions Act in 1995, which exerted considerable downward pressure on yields.

135. Over the longer term both corporate and local authority schemes have decreased their allocation to equity, though not to the same extent, with corporate schemes “de-risking” to a much greater degree. Some of the difference in asset allocation observed between the two groups can be attributed to the different underlying maturity profiles of the two types of schemes—with corporate schemes having a relatively ‘older’ maturity profile—but regulatory and other factors are also important.

136. Both short-term countercyclicality and longer-term structural trends have been shaped by regulation, with differences in regulation between local authority and corporate schemes likely being one part of the explanation for the different patterns of asset allocation of these two groups. For corporate schemes in particular, changes in funding requirements and valuation methodologies, accounting for corporates, and tax treatment of equities have played a role in the “de-risking” trend, as

well as being one factor incentivising the closure of large numbers of corporate DB schemes. Differences in the regulation of sponsors (e.g. financial versus non-financial companies) may also have an impact on asset allocation. Non-regulatory factors, such as increasing longevity, perceptions that employees undervalue pensions, and more recently, the low rates environment and the end of contracting out have also contributed to a decreasing appetite amongst corporates to offer DB schemes.

137. Analysis of a sample of corporate DB schemes suggests that schemes with larger funding deficits hold more risky assets, and have “de-risked” more slowly, while better-funded pension funds have used their relative strength to “de-risk” more rapidly. While this may have been understandable from the perspective of individual funds, it may not be optimal from a systemic perspective, as it implies that stronger pension funds were not taking advantage of their ability to purchase risk when it was cheap, which might otherwise have played a stabilising or countercyclical role during periods of stress.

V. Conclusions and Considerations for Future Policy

138. Life insurance companies and pension funds (ICPFs) are key providers of long-term savings products to individuals, and as a consequence key investors in the financial assets that support the growth of the real economy. Because many of their liabilities are long term, ICPFs have the potential to be significant providers of long-term investment. Long-term investment is crucial not only to long-term economic growth, but also has the potential to improve the resilience of the financial system and provide support to financial stability—that is, the ability of the financial system continuously to perform vital functions in the economy such as providing payment and settlement services, intermediating between savers and borrowers, and insuring against risk.

139. There are a number of factors that influence the asset allocation behaviour of ICPFs, including:

- Liability characteristics/design (which in turn are moulded by legislation, regulation, tax incentives, and consumer demand);
- Regulation, accounting, and valuation methodologies, and the use of regulatory flexibility in periods of stress (which can mitigate procyclical incentives at that point in time); and,
- Industry practices.

140. There is some evidence of insurers both internationally and in the UK behaving procyclically. In contrast, it appears that UK DB pension funds have behaved countercyclically in the short term. However, longer-term structural shifts in asset allocation may have meant that the behaviour of UK corporate DB pension funds did not act as a stabilising force during the financial crisis. Moreover, a tendency to herd by pension funds may mean that, should this behaviour coincide with, rather than offset market trends, the potential impact of correlated investment decisions could be large. In very stressed times, regulatory flexibility has been introduced for both insurance companies and pension funds, which may have helped dampen procyclicality during crises.

141. In the longer term there has been a structural trend away from holding equities by both insurers and pension funds. For pension funds, it appears that the strongest (i.e. most well-funded) have shown their strength through accepting lower returns rather than taking additional risk, which might otherwise have played a stabilising or countercyclical role during periods of stress.

142. Although it is difficult to disentangle which factors are most dominant in driving asset allocation, all the factors outlined above play a role, and are often mutually reinforcing. The asset allocation decisions of individual insurance companies or pension funds may represent a rational response to the combined constraints represented by these factors. But this may lead to outcomes that are suboptimal from the perspective of financial stability (through procyclicality) and long-term investment and economic growth (through an unwillingness to bear risk). Ultimately this may to lead to worse outcomes for individual policyholders as well.

143. Given the challenges in undertaking this analysis it would not be appropriate to make specific policy recommendations. However it does point to a number of considerations that should be taken into account when choices are being made in relation to ICPFs, whether by policymakers or by firms.

144. As a matter of immediate practical significance, the analysis of the investment behaviour of ICPFs would be greatly improved by increasing the granularity, quality, frequency and timeliness of data on asset allocation.

145. Policy on the provision of long-term savings is complex because it needs to provide the combination of security, affordability, risk-sharing, and flexibility that is appropriate to the long-term interests of individuals. But at the same time, it is important to consider the implications of long-term savings provision for financial stability and long-term economic growth. Industry, policymakers and

consumer groups all have a role to play in ensuring that the right balance is struck between these objectives.

146. In the UK, the prevalence of DC pensions is set to increase significantly. Design of these products and the regulatory regime would be better informed by further research on how these products meet the requirements not only of individuals but also the wider economy and financial stability.

147. In considering policy or regulatory initiatives, decision-makers should consider not just the micro impacts of any proposed changes, but also how the reactions they incentivise will play out at a macro level. This includes what steady-state asset allocations might be incentivised by any changes (which will have direct consequences for the levels and types of capital provided to the real economy), but also whether any changes are likely to make ICPFs more or less reactive to any future exogenous events (i.e. whether they are likely to encourage more procyclical reactions in future).

148. Whilst regulatory flexibility applied in previous periods of stress may have tempered procyclical behaviour, it has often been applied on an ad hoc basis and therefore asymmetrically across firms and over time. Such asymmetry may imply perverse incentives; by benefitting weak firms or funds more than strong, and by easing requirements in times of stress but not requiring buffers to be built in more benign environments.

149. For both insurers and pension funds, consideration could be given to countercyclical regimes that enable resilience to be built up in benign economic circumstances, in order that regulatory constraints can be safely relaxed in periods of stress. Such symmetry might help to constrain exuberance in boom periods, as well as providing support in periods of stress. A clearly defined countercyclical framework could also provide greater clarity to firms and funds about the conditions under which—or the set of principles according to which—regulatory action would be taken, reducing undesirable uncertainty. While countercyclical regimes might be beneficial for both insurance companies and pension funds, this does not necessarily imply that the same regulatory regime should be applied to both.

150. The range of issues that affect the asset allocation decisions of ICPFs is wide—including the design of pensions and savings products (in particular the degree of risk-sharing between firms and individuals), industry structures, accounting and valuation methods, capital and funding regimes and the type and availability of assets that are suitable for, and eligible to be held by, these investors. The consequences of these asset allocation decisions can be significant not only for individual investors and policyholders but also for the economy as a whole. In consequence, the issues raised in this paper merit further research and debate.

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