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PENSION SCHEME GOVERNANCE IN A RISK- FOCUSED WORLD

Proposals for improving
the governance framework



EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

In our roles as trustees we are all too aware that pension portfolios have become increasingly complex since the turn of the century. Today, the incorporation of many new asset classes and the use of derivatives have all added to the governance burden of trustee boards. Life was far simpler in the 1990s when trustees often only had to choose and monitor the performance of a manager of a balanced fund. Those days are definitely gone for good. Complexity is here to stay and, as a consequence, so is the associated need for a high level of trustee knowledge and understanding and the need for robust governance structures.

Life was far simpler in the 1990s when trustees often only had to choose and monitor the performance of a manager of a balanced fund. Those days are definitely gone for good.

In this paper we have tried to explain the complexity of today's DB landscape in a way that we hope is easy to digest. We have avoided unnecessary jargon where possible, but not the use of the language of risk, a language which trustees must become conversant with, if not fluent. But in the end, to quote an investment consultant who was responding to trustee criticism that their explanation of a particular derivatives strategy was too complicated, "*My explanation was complicated, because it is a complicated issue!*"

By considering today's investment landscape we have put forward a number of suggestions in this paper which we believe should help improve the governance of pension schemes. Our main proposals are that:

- i. Schemes should adopt a transparent, performance monitoring framework that encompasses both sides of the balance sheet and that makes clear the relative importance of the multitude of associated risks. In adopting this approach, trustees should be able to allocate their time more efficiently by devoting most time to the biggest risks. Our proposal is that the Value at Risk (VaR) approach to risk measurement, applied and interpreted with full awareness of its weaknesses, should be at the heart of this framework.
- ii. The widespread use of derivatives in pension scheme portfolios warrants the inclusion of an additional, independent pair of eyes in the governance structure. To this end and wherever possible, we believe that trustee boards should establish a direct relationship with the custodian of their derivatives portfolios to gain an independent view of the health of these complex exposures. This proposal is similar in its aim to Myners proposal in 2001 that schemes should establish a direct relationship with the custodian of their traditional assets, a proposal that has since been widely adopted.
- iii. Where possible, trustees should adopt a dual approach to the valuation of its bond-like and less liquid assets and asset classes. The approach that we propose in this paper would be consistent with the VaR-based performance monitoring framework that we also propose.
- iv. Schemes should adopt not only a simple checklist for monitoring the investment risks inherent in the scheme's balance sheet, but also a checklist to help trustees keep on top of the operational risks that arise with derivative investments, risks which we believe most trustees are currently unaware of. The regular completion of an operational risk checklist would help to focus trustees' attention on the operational 'plumbing' that is vital to the health of their derivatives portfolios. The establishment of a direct relationship with their custodian will help in this regard.

We believe that these proposals, along with other proposals contained in this paper, could all help to strengthen scheme governance. Finally, in coming to a view about how governance structures might be enhanced in this risk-conscious world, we were also able to define the minimum level of investment knowledge and understanding that we believe trustee boards require today to monitor the vast array of risks efficiently.

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1. INTRODUCTION

Since the turn of this century the UK's defined benefit pensions industry has gone through some tough times. Many schemes began this century believing that their asset base was more than sufficient to cover all future benefits. However, following, a collapse in global equity markets, a realisation that longevity assumptions were out-dated, the widespread adoption of mark-to-market accounting practices and a steep fall in bond yields – apparent surpluses turned out to be just that – apparent. The industry experienced its own version of a perfect storm. Surpluses gave way to deficits and scheme sponsors found themselves pouring millions of their earnings into their financially stricken schemes, earnings that would otherwise have gone to shareholders. Many sponsors closed their schemes to new entrants and some to future accrual too.

And as if this were not enough, eight years into the new millennium some seemingly impossible, unthinkable things happened, beginning with the collapse of the blue chip investment bank, Lehman Brothers. With this collapse, financial market liquidity – a feature of the markets taken largely for granted before – dried up. Other, seemingly invincible, major financial institutions also failed. The UK experienced its first bank run in over 150 years. Private sector debt became public sector debt and with this transference of risk from private to public balance sheets went the assumption that developed economy government debt was risk free.

But many schemes faced this second crisis better prepared than they were for the first one, although it still led to a generalised deterioration in scheme finances. This is because many schemes along with their advisers had had an epiphany following the collapse in equity markets at the start of this century. They came to the view that the risk characteristics of their assets were not well suited to generating the bond-like cashflows of their liabilities. Indeed they came to the view that far too little attention had been paid in the past to the nature of these liabilities. This epiphany was followed by the widespread appreciation and adoption of a new credo known as liability driven investment (LDI).

1.1 LIABILITY DRIVEN INVESTMENT – THE NEW RELIGION

Although the practice of LDI can vary substantially, the basic principle of LDI is simple enough: *invest scheme assets in such a way that it maximises the probability of meeting all scheme liabilities on time and in full*¹. But of course before a scheme can start managing assets along these lines they must first embark on a thorough evaluation of their liabilities. Many schemes, along with their advisers, began this process in the early noughties. Prior to this re-evaluation most trustees had assumed that their major balance sheet risk emanated from their equity portfolios, and of course this was the big risk on the asset side of the balance sheet for many. However, the forensic analysis of scheme liabilities revealed that the interest rate and inflation risk inherent on the liability side of the balance sheet was in many cases larger than the risk posed by equities. Furthermore, inflation and interest rate risks were quickly characterised by advisers as being unrewarded. That is, over the long term exposure to them would not bring a reward. By contrast the not insubstantial risk associated with equity investment, was viewed as being a long-run rewarded risk, where the reward was expected to materialise through the equity risk premium eventually!

¹ See Clare, A. and C. Wagstaff, *The Trustee Guide to Investment*, Palgrave MacMillan, London, 2011.

In reshaping their asset portfolios in this way, schemes have often traded liquidity and simplicity for illiquidity and complexity.

1.2 THE INCREASE IN ILLIQUIDITY AND COMPLEXITY

Ten years ago there was only a limited range of fixed income asset classes available for investment. However, as the yields on developed economy government bonds fell, the demand for bond-like assets grew. This demand has, to some extent, been satisfied by the fund management industry which has launched funds comprising quasi fixed income assets that were previously difficult for schemes to access. In many cases, the launch of many of these funds has in turn been made possible by the fact that banks, which were previously the principal investors in these assets, have been forced to reduce the size of their balance sheets. The range of quasi fixed income asset classes that now often form part of scheme portfolios range from infrastructure debt to long-dated real estate leases, and from bank loans to aircraft leases. But as well as these new debt asset classes, schemes have considered and embraced other new asset classes too, such as hedge funds and insurance-linked securities.

In reshaping their asset portfolios in this way, schemes have often traded liquidity and simplicity for illiquidity and complexity. The increased use of less familiar, less liquid, more complex asset classes has clearly placed additional burdens on trustees.

But for many schemes this realignment of the asset side of their balance sheet has been accompanied by a significant increase in the use of derivative contracts in an effort to further reduce the long-run unrewarded inflation and interest rate risks embedded in their liabilities. In particular, many schemes have integrated into their asset mix, either on a segregated or pooled basis, interest rate and inflation swaps. There has also been an increase in the use of other derivatives too, including swaptions, total return swaps and futures contracts. Most schemes have only a limited experience of these instruments and so their integration has also put strains on their ability to perform the necessary due diligence.

Life for trustees was certainly much simpler when pension portfolios mainly comprised gilts and UK equities.

1.3 AN INCREASE IN OPERATIONAL RISKS

This broad shift in asset allocation and the integration of derivative strategies, has helped to bring the risk characteristics of scheme assets more in line with those of scheme liabilities. But, as already indicated, it has added complexity and illiquidity. In addition, it has almost certainly increased the operational risks that schemes run. But what is operational risk, as opposed to investment risk? Investment risk relates to the risk that an investor might experience a loss from the change in the market price of that investment. The Basel II committee defined operational risk as being:

“The risk of loss resulting from inadequate or failed internal processes, people and systems or from external events.” (2001).

Investment risk and operational risk can be related. For example, investors may experience a loss from their investments as a result of an internal process that identified an inappropriate investment strategy. Sound familiar? But on the whole operational risks stem from the way in which a process is implemented rather than from the process itself.

So how has the implementation of LDI strategies changed the operational risks for pension schemes?

First, the more illiquid a portfolio, the more difficult it may be to meet an unexpected, or unplanned call on it without incurring a significant and unwelcome loss. One of the main lessons of the crisis of 2008 was that financial market liquidity can disappear very quickly. When it does, it threatens the operational

infrastructure of all financial market participants, including pension schemes. Now being well aware of the costs and benefits of liquidity, schemes often set themselves an illiquidity budget expressed as a maximum proportion of their portfolio that they can afford to allocate to illiquid asset classes. However, financial market illiquidity is an unpredictable phenomenon, the only asset class that remained truly liquid during the financial crisis was cash.

Second, the widespread integration of derivatives has brought with it operational risks that did not previously exist. Perhaps the biggest operational risk related to derivatives is counterparty risk. That is, the risk that the counterparty to one side of the derivatives transaction is unable to meet their contingent obligation under the terms of the contract, exposing the other counterparty to a loss. For those derivatives traded on regulated exchanges, this counterparty risk is managed through a system of margining by a well-capitalised clearing house that essentially becomes the counterparty to all trades on its exchange. Schemes using exchange traded derivatives therefore need to have enough capital set aside to pay an initial margin and to meet any variation margin calls.

However, when a derivative is not cleared on such an exchange the two counterparties to the derivatives transaction are exposed directly to the creditworthiness of one another. The vast majority of swaps currently held by UK pension schemes are not exchange cleared and are instead *over-the-counter* (OTC) contracts. That is, private contracts between, say, a bank on the one hand and a pension scheme on the other. To manage this counterparty risk, collateral flows between the two counterparties. When collateral is exchanged on a daily basis, which has become the norm, the value of the collateral account should be large enough to compensate either counterparty in the event that the other fails. Lehman Brothers' failure was a good test of this system, since the investment bank was the counterparty to many derivatives transactions. Because collateral accounts are ring-fenced, when Lehman's failed, any pension scheme with a positive collateral position with Lehman's was able to claim this value, thereby experiencing only minimal price losses in comparison to the scale of the wider financial catastrophe when re-establishing their swap positions with the remaining swap counterparties.

The appropriate management of collateral is therefore crucial for minimising the operational risks that might arise from engaging in OTC derivatives, but it raises many additional questions. For example, what form should the collateral take? How frequently should it be revalued and by whom? How many counterparty banks should pension schemes engage with? How should the credit standing of these banks be monitored, and how frequently? How frequently should the underlying legal documentation – the Credit Support Annexes (CSAs) and ISDA Master Agreements and Schedules – be reviewed? And perhaps most importantly, how can the trustees determine whether they have sufficiently liquid assets to meet possible collateral requirements?

Many schemes rely on their asset managers and investment consultants to manage these issues, but the ultimate responsibility for the stewardship of pension assets rests with the trustee body, which means that trustees need to be aware of the issues and need to be in a position to ask their managers and consultants appropriate questions. While trustees are accustomed to quizzing a manager of a blue chip equity portfolio, they need to be equally accustomed to asking similar, searching questions about these operational risks of those to whom the monitoring of these risks has been delegated.

1.4 NEW REGULATIONS

And if all of this were not enough, the financial crisis spawned a period of soul-searching amongst regulators. The result of all this introspection (and self doubt), unsurprisingly, has been a raft of new regulations that will not only affect banks, but their clients too, including pension schemes. For the UK's DB pension industry the most significant of these new financial market regulations is the European Markets Infrastructure Regulation (EMIR). Essentially this set of EU regulations is aimed at reducing the systemic risks associated with the OTC derivatives markets that arise from the related counterparty risks. The European Commission hopes that these regulations will also increase the transparency of the market, making it easier for regulators to identify where the risks lie, and where they may be approaching dangerous levels. Overall, most agree that the benefit of making the system more robust will almost certainly be higher costs for market participants, including pension schemes.

New more complex, more illiquid asset classes, the incorporation of derivative overlays and new regulations have all combined to increase the governance burden on trustee boards.

Although, EMIR seeks to foster a more robust structure for OTC derivatives, the clear underlying desire of regulators is that as much OTC derivatives trading as possible should be cleared through regulated exchanges. This desire was expressed most clearly one year after the collapse of Lehman's at the G20 summit in Pittsburgh in September 2009:

"All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at latest. ... Non-centrally cleared contracts should be subject to higher capital requirements."

Although pension schemes will be exempted from the EMIR central clearing obligation until 15 August 2015 the difficult decisions relating to complying with the new rules need to be made ahead of this date. An assessment of the likely costs of maintaining OTC derivatives positions against transitioning these positions which can be cleared via a regulated exchange needs to be made. New legal documentation may need to be in place, credit support annexes may need to be reviewed and possibly changed and liquidity requirements may also need to be reviewed. And perhaps most importantly, trustees may need to evaluate the impact of this new regulatory regime on their investment strategies.

1.5 SUMMARY: THE INCREASING BURDEN ON SCHEME GOVERNANCE

New more complex, more illiquid asset classes, the incorporation of derivative overlays and new regulations have all combined to increase the governance burden on trustee boards. This paper develops arguments for five main proposals.

- First, in Section 3 of this paper we outline and propose a transparent framework for a risk-based performance monitoring process which, in our view, would greatly enhance and strengthen scheme governance.
- Second, given the now widespread use of derivatives in pension scheme portfolios, in Section 6 of this paper we propose an alternative, more robust governance structure for monitoring derivatives portfolios which envisages the establishment of a direct relationship between the scheme and the custodian of its derivative assets. This proposal is very much in the spirit of Myners' original recommendations for strengthening governance standards².
- Third, in Section 7 of the paper we describe trustees' motives for investing in less liquid and often more complex, *bond-like* asset classes and propose a valuation approach that could be integrated into the monitoring framework proposed in Section 3 of the paper.
- Fourth, in Section 8 of this paper we argue that it is possible to improve scheme governance by making use of simple checklists that should enable trustees to monitor all the key investment *and* operational risks of the scheme.

² Institutional investment in the UK: A review, Paul Myners, March 2001.

– Finally, in constructing the investment and operational risk checklists, in Section 8 we identify the related minimum levels of knowledge and understanding that trustees require today to monitor the vast array of scheme risks efficiently. In our view the widespread attainment of this minimum level of knowledge and understanding would greatly improve scheme governance.

The rest of this paper is organised as follows. In Section 2 we review the high level principles for investment governance, beginning with the principles established in the Myners Report (2001) and also contrast the UK's current DB governance model with that of the Netherlands' which is often held up as best practice. In Section 3 we explain why we believe that the widespread adoption of LDI's key principles has enhanced scheme governance since the turn of the century and also define a transparent framework for a risk-based performance monitoring process that simultaneously complements these principles and further strengthens the related governance structure. In Section 4 we explore the additional complexities that investment in a derivatives portfolio brings, and in particular the largely unappreciated operational risks relating to the management of this portfolio. In section 5 we describe how new financial market regulations will have an impact on all those schemes that use derivatives, particularly OTC derivatives, to implement their LDI programmes. In Section 6 we propose an alternative, more robust governance structure for the monitoring of derivatives portfolios. Section 7 focuses on the governance challenges that often illiquid, liability-linked asset classes bring, and propose a process for dealing with these investments. In Section 8 we bring all these issues together and, by drawing on inspiration from recent medical research, we propose two simple checklists to help trustee boards keep on top of the key investment and operational risks that they now face. In doing so we also establish the minimum level of investment knowledge that trustees would require in order to interpret the information on the checklists and therefore, the minimum level of investment knowledge that we believe they need to be able to perform their roles effectively.

We identify the related minimum levels of knowledge and understanding that trustees require today to monitor the vast array of scheme risks efficiently. In our view the widespread attainment of this minimum level of knowledge and understanding would greatly improve scheme governance.



2. PENSION SCHEME GOVERNANCE AND INVESTMENT DECISION MAKING

The first serious attempt to agree a set of common investment governance standards for the operation of pension schemes came with the Myners Review which was published in 2001.

The governance burden on pension scheme trustees has clearly been growing over the past ten years or so. This burden is often the source of much discussion at conferences and seminars.

2.1 MYNERS 2001

The first serious attempt to agree a set of common investment governance standards for the operation of pension schemes came with the Myners Review which was published in 2001. The review outlined ten basic governance principles for the management of pension scheme assets, to be voluntarily applied on a comply or explain basis. These were:

- i. Effective decision making – Trustees should ensure they have the necessary skills, resources and ability to evaluate any advice given when making decisions. They should usually be paid.
- ii. Clear objectives – Investment objectives should be designed to meet the fund's liabilities, not relative performance targets.
- iii. Focus on asset allocation – Asset allocation decisions and associated fees should receive the most attention. Investments should include private equity.
- iv. Expert advice – Actuarial services and investment advice should be open to competition. Fees should be set at a level that would attract a range of providers.
- v. Explicit mandates – Fund manager mandates should have appropriate objectives, benchmarks, permitting the use of a broad range of financial instruments. Trustees should retain managers for the length of an agreement. Fees should be scrutinised.
- vi. Activism – The mandate should require fund managers to engage with companies.
- vii. Appropriate benchmarks – Trustees should be wary of benchmarks that encourage sub-optimal investment strategies. If they use active managers, trustees should let them pursue genuinely active strategies.
- viii. Performance measurement – Trustees should measure the performance of the fund, of their advisers and their own performance.
- ix. Transparency – The Statement of Investment Principles (SIP) should set out who is taking which decisions and why.
- x. Regular reporting – Trustees should publish their SIP and performance measurement resulting from principle (viii) annually.

However, these principles were developed well before most trustees and the wider pensions community had considered, or had even heard of the phrase Liability Driven Investment. In 2007 the National Association of Pension Funds (NAPF) carried out a review of the Myners principles with a view to establishing whether, and if so how, they were being complied with and whether they were having a positive effect on investment decision-making.

2.2 MYNERS UPDATED: 2010

The result of the 2010 NAPF review was a set of six, condensed, high level principles, which were also to be voluntarily applied by schemes on a comply or explain code of best practice. In addition, a new industry-led Investment Governance Group (IGG) was established. The IGG, which comprises pensions industry professionals, was charged with looking at ways in which investment governance standards could be improved across all scheme types, without any requirement for statutory regulation. It was intended that these revised principles would be applicable to large and small defined benefit schemes, and to defined contribution arrangements. The latter was an important issue since many defined benefit schemes had closed to new members since the publication of the Myners Report. These higher level principles related to:

- i. Effective decision-making;
- ii. Clear objectives;
- iii. Risk and liabilities;
- iv. Performance assessment – formal processes for managers and trustees;
- v. Responsible ownership – established policy to discharge responsibilities as an investor including monitoring, voting and, if necessary, intervention; and
- vi. Transparency and reporting – keeping the scheme members and other stakeholders informed.

Principle (i) is meant to ensure that investment decisions are taken by people with the skills, knowledge, advice and resources necessary to make them. Furthermore, it is intended that these people also have the necessary skills and resources to challenge investment advice effectively when they receive it.

Principle (ii) encourages trustees to develop and then focus on an overall investment objective(s) for the scheme *and* for them to consider their liabilities, the strength of the scheme covenant and that these be communicated clearly to their advisers and fund managers. This principle is a clear differentiator between the two sets of guidance; it encourages a LDI mindset.

Principle (iii) is closely related to principle (ii) and encourages an awareness and understanding of the risks associated with longevity projections and the scheme's covenant, as well as encouraging schemes to be aware of their tolerance for these risks.

Principle (iv) relates fairly straightforwardly with one of the original Myners principles (principle (viii)), encouraging trustees to measure all performance appropriately, including their own.

Principle (v) encourages trustees to engage with the companies in which they invest. Its principal aim is to address the common criticism that institutional investors behave like 'absentee landlords' by failing to hold company management to account.

Finally, principle (vi) promotes a transparent approach to the management of the scheme, recognising that trustees, in exercising their fiduciary duty, have an obligation to be transparent and to communicate frequently and effectively with their members.

The Mercer Global Pensions Index 2012 awarded the Dutch pension system a B+ against the UK's C+ on the basis of its adequacy, sustainability and integrity. So why do the Dutch score higher than us?

2.3 THE GOVERNANCE STRUCTURE IN THE NETHERLANDS

Myners 1.0 and 2.0 were important initiatives, aimed at improving the governance structure of UK pension schemes. In our minds' at least, these two sets of principles have certainly helped to foster a governance culture which is far more robust than that which existed in the 1980s and 1990s. But is it as good as it could be? The Mercer Global Pensions Index 2012 awarded the Dutch pension system a B+ against the UK's C+ on the basis of its adequacy, sustainability and integrity. So why do the Dutch score higher than us? How does the level of investment governance for UK DB pension scheme trustees differ from that for Dutch schemes and why?

2.3.1 The Dutch system

The Dutch pension system is often held up as an exemplar for the UK's pensions industry. With assets of around £1tn in aggregate, the [private] Dutch pensions industry is about the same size as the UK's private sector defined benefit (DB) industry. However, that's where the similarity ends. Dutch pension schemes are far fewer in number, having recently consolidated from around 500 to about 400, principally industry-wide schemes, compared to the UK's 6,000 or so private sector DB schemes. These giant schemes came about as a consequence of scheme mergers, largely motivated by the perceived need for Dutch schemes to retain their size and countervailing power relative to the investment banks and asset managers, which had also experienced a considerable amount of M&A. Indeed, smaller Dutch schemes are continuing to consolidate as they focus on trying to reduce costs and because of onerous regulation. The health of these large schemes is important because the Netherlands does not have a PPF-style safety net to pick up the pieces in the event of a scheme sponsor going into liquidation.

2.3.2 So how does the governance differ?

Dutch pension scheme trustees can make investment decisions without seeking professional advice and have the power to redistribute nominal pension scheme benefits between current and future pensioners. Yes, you did read this correctly – trustees have the power to cut current benefits in payment to subsidise payments to future pensioners in the interests of intergenerational equality. This in turn means the degree of regulatory oversight for Dutch schemes and therefore the associated level of trustee investment governance is that much greater than it is for UK schemes.

Dutch pension scheme trustees can make investment decisions without seeking professional advice and have the power to redistribute nominal pension scheme benefits between current and future pensioners.

For instance, in 2007 the Dutch regulator, the De Nederlandsche Bank (DNB - which is also the Dutch central bank) introduced the financial assessment framework, or FTK, a risk-based regulation that requires trustees to understand, monitor and proactively manage the risks that the scheme is running, taking account of current and potential market conditions and the extent to which a change in contribution strategy and investment strategy would be material in relation to achieving a critical funding ratio. Indeed, post-financial crisis, there has been a considerable amount of regulatory change focused on Dutch schemes, following accusations of poor risk management. For instance, a call for dramatically improved risk management was the centre piece of the Frijns committee's 2010 investigation into the extent to which investment policy, risk management and governance of Dutch pension schemes had changed since 1990.

The most visible result of this focus on risk management has been greater scrutiny of the composition of trustee boards, which, unlike most UK schemes, [have traditionally been] heavily unionised and largely comprising active scheme members. This scrutiny of trustee boards has led to a considerable trustee turnover as union officials have been replaced by independent experts and independent risk management professionals to strengthen boards' oversight function – the latter appointments being advocated by the DNB in 2011.

The advanced level of investment governance employed by Dutch schemes is also a function of greater use of fiduciary management than is the case in the UK. In the name of good governance, many large Dutch schemes have split their CIO-led in-house investment teams – the scheme’s investment decision making and implementation function – from the scheme itself. Thus leaving the investment decision making to those with investment experience and, at the same time, helping to streamline the investment decision-making process itself.

This de-coupling trend has led to the development of a Dutch fiduciary management industry. The typical model is for the scheme’s CIO to have oversight of the fiduciary manager. It is argued that this framework is a more forward thinking, proactive and responsive investment governance model than one where investment decision making sits firmly with the trustee board, as it does in most cases in the UK. Overall this governance structure should make risk control more efficient and lead to lower investment costs because of the size and negotiating experience of the fiduciary manager vis-à-vis fund managers and other investment service providers.

Finally, Dutch schemes are far less likely to delegate to investment service providers, in sharp contrast to the UK model. However, when tasks and functions are delegated, the terms of the outsourcing are very strictly defined and very tightly monitored.

2.4 SUMMARY

The intention of Myners’ high level principles is that they should help to improve the effectiveness of investment decision making. But of course the principles are not an end in themselves. An advanced level of investment governance is essentially the mechanism by which trustees can turn risk into reward. However, the level of investment governance employed by a trustee board will ultimately be commensurate with its collective capabilities and how it organises itself. The Dutch system, with its far greater use of fiduciary management allied with independent oversight, offers one alternative way of organising the governance framework. However, without wider consolidation in the UK’s DB industry, it is probably only the very large UK DB schemes that would be in a position to adopt the ‘Dutch model’, should they wish to.

Ultimately however, good investment governance requires that trustees are suitably trained and unless sufficient time and effort is devoted to continually improving the knowledge and skill sets of the trustees, a more advanced level of investment governance will never be achieved. The adequacy, or otherwise of trustee knowledge and understanding of complex investment issues is a subject that we will return to in Section 8 of this report.

For the moment we will conclude this section of the paper with the following thought: there is not much point giving someone a job as a test driver for McLaren if they do not know how to drive and if they are unable to spare the time to learn!



3. WHAT IS LDI AND HOW HAS IT CHANGED THE GOVERNANCE LANDSCAPE?

In the likely absence of wide scale industry consolidation, the Dutch model is unlikely to be adopted widely across the UK. Does this mean that the governance structure of UK Defined Benefit pension schemes has failed to evolve? In our view the answer to this question is a resounding “no”. Arguably the governance structure of many trustee boards has not just experienced evolution over the last ten years, but revolution. This revolution has involved the widespread adoption of the main principles of Liability Driven Investment (LDI).

Arguably the governance structure of many trustee boards has not just experienced evolution over the last ten years, but revolution. This revolution has involved the widespread adoption of the main principles of Liability Driven Investment (LDI).

3.1 WHAT IS MEANT BY LIABILITY DRIVEN INVESTMENT (LDI)

The principal aim of the trustees of any defined benefit (DB) pension scheme should be to make sure that the scheme’s liabilities are met in full as they fall due. However, today most schemes are less than fully funded, principally as a result of the unmatched asset/liability positions of the past. Therefore, since the outbreak of the great ‘deficit pandemic’ of the early-noughties, many trustee boards have been seeking to address this mismatch as they try to prevent any further deterioration of their scheme’s funding position and as they try to plug these deficits. One way of plugging the deficit would be to ask the scheme sponsor to provide the additional contributions needed. However, those pension scheme trustees whose only response to widening DB scheme deficits is to go, begging bowl in hand, like Oliver Twist, to their sponsoring employer are likely to meet their own Mr Bumble and to receive a similar response! Indeed, the long term objective of any trustee board should be to reduce its reliance upon the sponsor. So why have trustees and their advisers turned to LDI as a way of achieving their objectives?

LDI is not a new idea, and the principle behind LDI is rather simple. Over the 1980s and 1990s pension schemes became accustomed to benchmarking the performance of their assets against either financial market indices, or against the performance of the asset portfolios of other pension schemes. But is matching or even beating the performance of financial market indices and/or other pension schemes a suitable objective? Myners’ 1.0, principle (ii) gives a clear indication that they may not be. Of course, these are not irrelevant benchmarks, but the basic principle behind LDI is that the scheme’s liabilities become the benchmark to beat, or to remain ahead of. And since every scheme faces a different set of liabilities, with an LDI approach, each scheme’s benchmark is different. To some extent this is how the problem was viewed and approached in the 1950s and 1960s. With the benefit of hindsight, this approach now seems blindingly obvious. We can summarise the philosophy underpinning LDI as follows:

the assets are there to fund future liabilities, therefore the assets should be managed so that their performance maximises the likelihood that the liabilities will be met on time and in full.

Designing an asset portfolio that will perform this task will require a clear understanding of the risk and return characteristics of the assets, but also the same comprehensive understanding of the characteristics of the liabilities. That is, the assets and liabilities must be viewed as one, not in isolation. Some people do not understand why, but it is quite simple: a liability can be viewed as a negative asset. A pension scheme’s liability is just someone else’s asset (actually that of the members). Assets and liabilities are therefore just two sides of the same coin.

Constructing an asset portfolio without a clear understanding of the characteristics of the liabilities that they are meant to meet would be rather like a cobbler designing and making a shoe for a client before they had measured their client's feet! The chances are that the shoes won't fit. Arguably the pensions industry designed asset portfolios over the 1990s that paid too little attention to the measurements of their scheme's liabilities. When risky asset prices fell in the early part of the noughties, and as pension liabilities soared, it became very clear that the assets did not "fit" the liabilities. The consequence was the subsequent deficit pandemic which the DB pensions industry is still living with today.

3.2 A RISK-BASED PERFORMANCE MONITORING PROCESS

Since the early noughties it is probably fair to say that trustees have dedicated a significant amount of their time and effort to assessing the performance of their fund managers, usually against a pre-defined and objective benchmark. Although, it is usually fairly easy to identify whether a fund manager has under or outperformed their benchmark, the real time consuming element of this process involves trying to understand *why* they may have under or outperformed, whether it was due to good or bad luck and/or good or bad skill. After all, good managers can be unlucky, while bad managers can get lucky. Trying to distinguish luck from skill is the first task. The second time consuming task involves trying to come to a decision about whether they should stick with a manager for the future, usually after a period of underperformance (trustees rarely sack outperforming managers!). But as indicated above, the LDI revolution means that trustees have become increasingly aware of the bigger picture, that is, both sides of the balance sheet. The LDI revolution has taught trustee boards that it is no longer sufficient to focus on the performance of the various asset classes and managers that manage them. Indeed, in the interests of good governance we would argue that when considering the financial position of the scheme the trustees should begin with an assessment of the funding position of the scheme (assets minus liabilities), before moving on to an assessment of the evolution of the value of their liabilities. After all, in the case where a scheme is fully funded the liabilities alone are equal in size to all of the smaller component parts of the asset side of the balance sheet that trustee boards normally focus on. And of course in those instances where the scheme is less than fully funded the liabilities are larger than the sum of the assets. Because time is a valuable and scarce commodity for any trustee board, it makes sense to us that investment agendas should begin with the big picture – an assessment of the funding ratio and liabilities – before moving on to smaller components of the pension problem.

3.3 VALUING THE LIABILITIES

However, if trustee boards are to begin their assessments of the financial position of their scheme with a review of the funding position, followed by an assessment of the change in value of liabilities, they must first identify a process for valuing their liabilities. But unfortunately, there is not a liquid, secondary market in any scheme's liabilities, so attributing a regular value to them requires that the trustees agree on a 'funding basis', that is, usually a fixed income market-derived discount rate. But there is quite literally an infinite set of discount rates that might be chosen.

Figure 1 shows a typical set of payments that a scheme might face, where each bar represents the total estimated amount of cash that the scheme will have to pay to its members in five-year periods, or 'buckets'. Each of these future payments can be discounted. It is the sum of these discounted liabilities that represents the present value of the scheme's liabilities. This gives trustees an idea of the value of the liabilities in today's money.

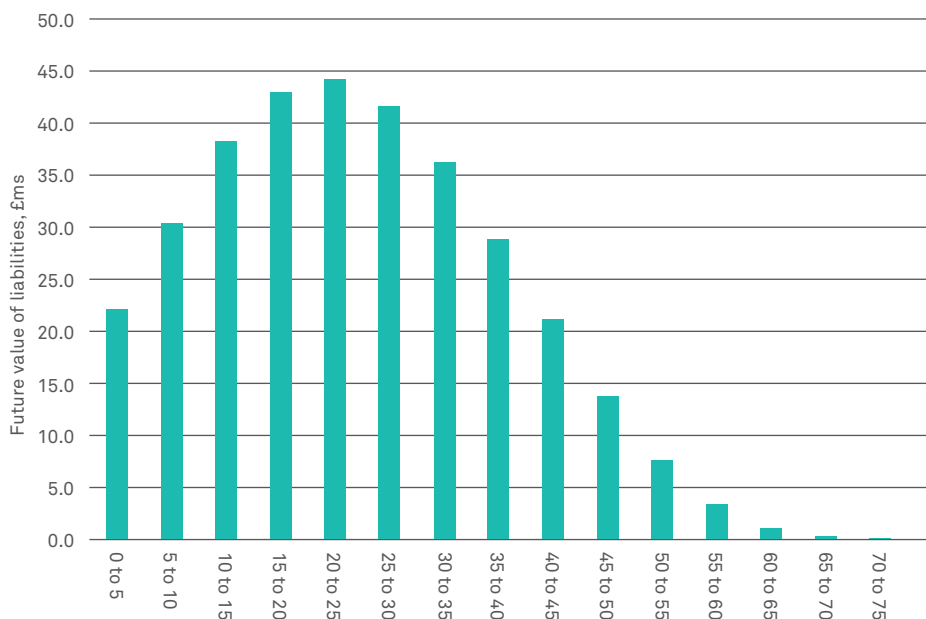
The total liabilities represented in Figure 1 – the sum of all those bars – is a whopping £332,376,010. Suppose we were to use a single discount rate of 5 per cent to arrive at the present value of the liabilities shown in the exhibit. If we were to use this discount rate the present value of these liabilities would be £107,029,378. In turn, this implies the following conclusion:

Constructing an asset portfolio without a clear understanding of the characteristics of the liabilities that they are meant to meet would be rather like a cobbler designing and making a shoe for a client before they had measured their client's feet! The chances are that the shoes won't fit.

Because time is a valuable and scarce commodity for any trustee board, it makes sense to us that investment agendas should begin with the big picture – an assessment of the funding ratio and liabilities – before moving on to smaller components of the pension problem.

if the scheme can generate a 5 per cent return on its assets over this period then it will need to invest £107,029,378 today to meet the future payments.

Figure 1: A typical set of pension liabilities



However, suppose that we used a discount rate of 4 per cent instead of 5 per cent. In this case the present value of the liabilities shown in the exhibit would rise to £128,440,461. You should note that the present value of the liabilities rises even though their future values are unchanged. So the present value of the scheme's liabilities will be sensitive to changes in the discount rate applied to them, just as the price of a bond will be sensitive to a change in the required yield on that bond. This sensitivity will be determined by the duration of the liabilities, just as the sensitivity of a bond to changes in the discount rate will be determined by its duration.

It is very easy to calculate the duration of any set of liabilities. This duration number is just a summary of the interest rate sensitivity of all of the scheme's liabilities. In this case the duration of the liabilities is just over 16 per cent. This means that a one per cent change in interest rates will change the value of the liabilities by (approximately) 16 per cent. However, the duration of a typical scheme's liabilities is often much higher than this, often well over 20 per cent. This is because the payments promised are generally promised for a very long time indeed.

The appropriate discount rate by which to value liabilities is a highly contentious issue. As this simple example illustrates, small differences in the discount rate applied can alter dramatically the liability present value. The choice of discount rate will be influenced by a number of interrelated factors including:

- the goal of the trustees which may be, for example, to become self sufficient from the scheme sponsor, or to reach a position to have the scheme bought out by an insurer;
- whether the scheme is open or closed to new entrants, or to future accrual;
- the investment strategy of the scheme; and
- the strength of the scheme covenant

Agreeing on the basis for valuing the liabilities is a critical issue; it is the first step necessary for applying LDI principles to the governance of any DB scheme.

However, once it has been agreed upon, trustees can monitor the value of these liabilities in much the same way that they might monitor the value of a large holding of bonds. The value of the liabilities will rise and fall with market interest rates, just as the value of bond portfolio would. Of course the value of the liabilities will also change if the nature of the liabilities changes too, for example, if the longevity assumption embedded in the liabilities is changed by the scheme actuary.

Once the liabilities are viewed as being just a large, negative, bond-like asset, this negative asset can be brought together with the scheme's asset holdings to give regular view of not only the scheme's funding position, but also the risks inherent in the scheme. Such a step should therefore help to strengthen the governance framework of the scheme. But before this can be achieved, the trustees need to make another important choice, this time with regard to the appropriate risk metric for giving a unified, and risk-focussed view of the assets and liabilities. Therefore before describing this uniform framework in Section 3.5, in the next section of this paper we will introduce a useful (though by no means perfect) risk measure that we believe should form the core of any modern performance monitoring process, that is, Value at Risk.

3.4 INTRODUCING VALUE AT RISK

Value at Risk (VaR) is in widespread use as a risk metric across the whole of the financial industry. In many cases its use is mandated by regulatory bodies. Although the establishment of a VaR value requires often quite complex mathematical modelling based upon the historic performance of relevant asset classes and instruments, including their expected returns, the expected dispersion of these returns around the return expectations and the correlations between their expected returns, once calculated it provides investors with a monetary value to the question: *"how much could be lost if the worst came to the worst?"*

Financial experts often talk about a 'VaR 95' value. By this they mean that they expect that 95 per cent of the time the likely financial market outcome, over a specific time period, will not be as bad as this. When they talk about 'VaR 99' they mean that they expect that 99 times out of 100 the likely financial market outcome will not be as bad as this, again over a specific period of time. The corollary of these statements is that on five per cent of occasions, in the case of a VaR95 number, the outcome will be worse, while in the case of a VaR99 value, on one per cent of occasions the outcome will be worse.

As a measure of risk it has two key flaws, one which is relevant to all risk metrics and one which is specific to VaR:

- like all risk measures it relies on sensible inputs; remember, garbage in, equals garbage out;
- and although VaR can be used to establish that, say, X% of the time the outcome will be worse than the calculated VaR value, it does not tell us how much worse.

But despite its flaws, the great strength of VaR is that it focuses on potential losses. Arguably this is easier to grasp as a measure of risk than saying, for example, that the expected standard deviation of a scheme's asset portfolio is six per cent. While few people understand the concept of standard deviation, let alone what it would mean to have portfolio standard deviation of six per cent versus one with eight per cent, everyone understands what a loss is and can compare one loss with another easily. VaR also focuses investors' minds on the element of uncertainty in which they are most interested – losses. We could just as easily calculate a VaR value indicating the likelihood and magnitude of a possible gain, but this is not what is typically done. Instead VaR focuses on the likelihood of a bad event occurring. VaR focuses on potential loss and can be expressed as a percentage figure or in pounds, dollars, etc. Its flexibility as a measure of risk means that it is now applied to a whole host of financial phenomena. In the pensions world, VaR can be used to quantify the downside risk attached to a particular asset, the scheme's asset portfolio, its liabilities, and importantly for our discussion here, its funding position.

Once the liabilities are viewed as being just a large, negative, bond-like asset, this negative asset can be brought together with the scheme's asset holdings to give regular view of not only the scheme's funding position, but also the risks inherent in the scheme.

VaR focuses on potential loss and can be expressed as a percentage figure or in pounds, dollars, etc. Its flexibility as a measure of risk means that it is now applied to a whole host of financial phenomena.

3.5 USING VAR TO DEVELOP A MORE COMPLETE VIEW OF SCHEME RISK

The beauty – yes, beauty – of VaR is that the simplicity of its message is equally relevant for a scheme’s liability position as it is for the asset position, and for any component parts of either. The use of this risk metric is probably best illustrated by way of a diagram that is used by investment consultants and LDI managers today as a way of monitoring the overall risks of the scheme.

In Figure 2 we present each of the VaR elements for an example DB scheme, for a one year time horizon. The equity risk bar shows that there is a five per cent chance, other things being equal, that a nasty equity market event could cause the funding ratio to fall by at least 13 percentage points within the next 12 months. So, for example, if the scheme’s funding ratio is 90 per cent today, because of the risk represented by the scheme’s equity portfolio, this analysis suggests that over the next year there is five per cent chance that the funding ratio will fall below 77 per cent.

Each major component of risk can be captured with this one chart and this unifying risk framework.

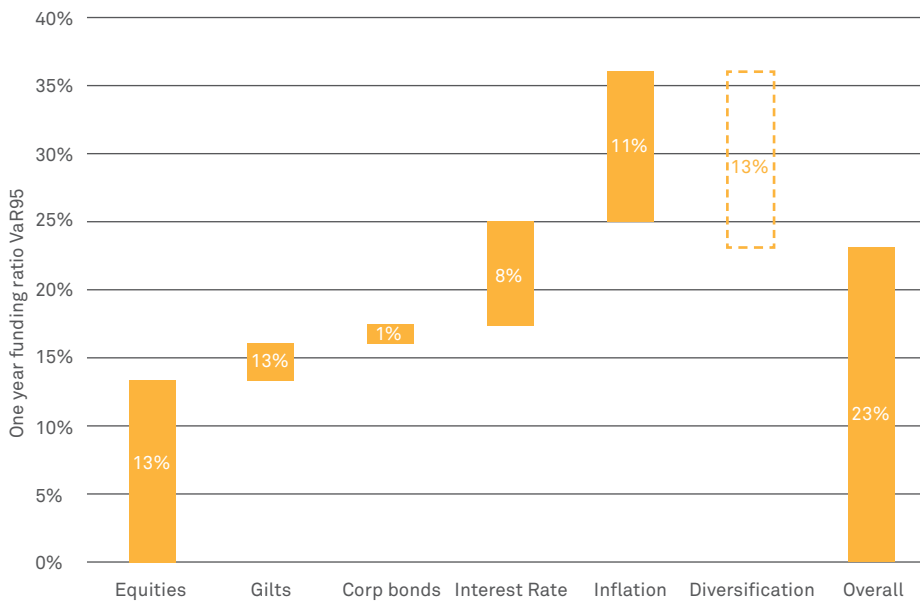
The risks represented by the scheme’s liabilities are also represented on the diagram. Because the liabilities can be viewed as just a large bond portfolio, it will be exposed to changes in the interest rate used to discount their value (see above). The chart shows that because of the exposure of the scheme’s liabilities to interest rate movements, other things equal, there is a five per cent chance that the scheme’s funding ratio could fall by eight percentage points, or more over the next year. Similarly, because the pension promise made by many schemes is linked to inflation, the scheme’s liabilities are also exposed to a change (or expected change) in the inflation environment. In our example, because of the exposure of the liabilities to future inflation the chart shows that, other things equal, there is a five per cent chance over the next 12 months that the scheme’s funding ratio could fall by 11 percentage points, or more. As can be seen from the chart, the scheme’s exposure to interest rate and inflation risk combined is 19 percentage points, larger than the risk represented by the equity portfolio³.

Each major component of risk can be captured with this one chart and this unifying risk framework. We have only presented a simplified version, which includes, in addition to the risk exposures discussed above, the VaR95 risk that this scheme also runs with respect to its gilt and corporate bond holdings. But the framework can be adapted very easily to accommodate a scheme with more diverse, and more complex asset holdings.

All summed, the one year VaR95 of the scheme is 36 per cent. But the sum is not so relevant here. These risks are not independent of one another; in other words, these risks are correlated, sometimes to the benefit of the scheme. For example, as interest rates fall, although liability values will rise, bond prices will also rise (and so too should equity prices). The relationships that exist between all of these risks are shown by the diversification bar, which equals 13 per cent of the deficit. It represents the offsetting elements of the scheme’s risks. The overall position of the scheme, taking into account the risks embodied in all of the assets and liabilities, is a one year VaR95 of 23 per cent. That is: *there is estimated to be a five per cent chance that the scheme could experience a 23 percentage point deterioration, or worse, in its funding position within the next year.*

³ This scheme is a hypothetical one which had an asset portfolio consisting of 50% equities, 30% corporate bonds, 15% gilts and 5% cash. For more information on this scheme see The Trustee Guide to Investment, pp8-9, 400 – 412, 2011.

Figure 2: Example one year VaR95 components for an example DB scheme



Source: *The Trustee Guide to Investment*, Clare and Wagstaff, 2011.

The value of this framework is that it puts all the main risks in one place, represented on the same basis. It therefore allows for a fairly comprehensive, holistic view of the financial risks run by the scheme and, crucially, their relative scale which should help to focus most trustee attention on the biggest risks – which in this example stems from the liabilities, not the equity portfolio.

The other main benefit of adopting a risk-based performance monitoring system like this is that trustees can focus on reducing risks where they believe them to be too large, and to experiment allowing them, for example, to see what the impact on the net VaR of the scheme would be with the introduction of a new asset class – *before* they take the plunge and invest.

The value of this framework is that it puts all the main risks in one place, represented on the same basis.

3.6 OTHER VAR METRICS

But VaR does not have to be couched in terms of the funding ratio, it is versatile enough to shed light on other aspects of the financial risks facing the scheme. Another way of looking at Figure 2 is that it suggests that on 95 per cent of all occasions the funding ratio will deteriorate by less than 23 percentage points. But on the five per cent of occasions when this deterioration happens, what would this imply for how much additional return the scheme's assets have to generate to reach the same funding target? Or, asked yet another way, on the five per cent of occasions when this deterioration happens, what would this imply for how much longer it would take for the scheme to reach its funding target, if the scheme's assets do not generate any additional return?

To answer the first question, it is relatively easy to calculate a VaR measure linked to expected return, that is, an 'expected return at risk' measure. This analysis could generate conclusions such as:

Over the next year there is estimated to be a five per cent chance that the scheme's assets will need to generate an extra X% of return, or more, above what is currently expected to meet its funding target on time.

By calculating the impact of a worst case scenario on the time it takes to reach a particular funding target (full funding, for example), trustees could be presented with an answer to the second question in the following format:

Making use of 'VaR technology' in the way that we suggest above, and putting it at the core of a performance monitoring framework would, in our view, improve transparency dramatically and help to improve the governance of the financial position of the scheme.

Over the next year there is estimated to be a five per cent chance that the scheme's funding target will have to be extended by x years, or more, assuming no change in the expected return on the scheme's assets.

Of course these different views of the scheme's risks are not independent of one another, but they can be presented in the same framework and in the same language, giving answers to the following important questions:

- i. in a worst case scenario, how much additional contribution might we need to ask our sponsor for? ('Funding ratio at risk');
- ii. in a worst case scenario, how much harder will our asset have to work? ('Expected return at risk'); and
- iii. in a worst case scenario, how many more years will it be before we reach our funding target? ('Funding target at risk').

3.7 SUMMARY

Making use of 'VaR technology' in the way that we suggest above, and putting it at the core of a performance monitoring framework would, in our view, improve transparency dramatically and help to improve the governance of the financial position of the scheme. However, it is not the answer to the problem of effective performance monitoring, nor is it the only way to look at the problem. In practice a framework that generates the sort of analysis that we have described above would need to be interpreted and applied with intelligence. Equally, it does not tell us how to reach our full funding objectives, just the possible consequences – in terms of risk – that certain decisions might have on achieving that goal. In Section 8 we briefly review a scenario-based approach to monitoring scheme risks which we suggest should be used in conjunction with the VaR framework discussed in this section.

The discussion in this section of our paper has focussed on Liability Driven Investment and has offered a consistent, risk-based framework for monitoring the scheme's liabilities and its assets, while at the same time taking into account the interaction of the two. In fact we have got through an entire discussion on LDI without mentioning the dreaded "D" word – derivatives!

Having embraced a LDI approach for the governance of a scheme, many have sought to use derivatives to help manage the inherent risks – often having first implemented a risk-based performance monitoring governance structure similar to the one described here. The next section of this paper explains why trustee boards have chosen to use derivatives to help manage the risks inherent in the large negative asset which is their liabilities before moving on to explain the additional, operational complexities that the use of derivatives involve, while Section 5 will consider the impact that new regulations may have on the management of derivatives portfolios.



4. DERIVATIVES AS PART OF A LDI APPROACH TO SCHEME MANAGEMENT

For many in the pensions industry the term LDI is synonymous with the use of particular types of derivatives instruments – interest rate and inflation swaps. Schemes have integrated these derivative instruments into their strategies as a way of reducing their exposure to falling interest rates and to higher than expected future inflation (remember that these bars were very large in Figure 2). But it is important to remember that these risks can also be reduced by investing in bonds and other asset classes that generate bond-like cashflows such as commercial property. So why use swaps?

There are perhaps two main reasons why schemes might use swaps to help bring the risk characteristics of their assets into line with those of their liabilities.

- First, and possibly foremost, swaps can be easily tailored to help reduce long-run *unrewarded risks*, that is the interest rate and inflation risks inherent in their liabilities and so prominent in Figure 2. Inflation and interest rate risk inherent in scheme liabilities are seen as being unrewarded in the long-run since, for example, a rise in interest rates will generally cause the value of liabilities to fall, while a fall in interest rates will cause them to rise. So schemes bear the risk of this fluctuating value but for no reward. By contrast, exposure to equities or corporate bonds, are generally seen as representing *rewarded risks*, where the reward comes in the form of the equity risk premium and credit risk premiums over time.
- Second, the swaps used in most LDI programmes require no upfront investment at their outset – so in this sense they are zero cost to apply. Matching the same risks with assets like bonds, if these bonds were available, would require an upfront investment equivalent to 100 per cent of the value of the bonds purchased. Swaps therefore do not tie up assets that might otherwise be invested in investments with a higher potential return.

4.1 THE REQUIRED INCREASE IN TRUSTEE KNOWLEDGE AND UNDERSTANDING

It is by no means compulsory to use swaps as part of a LDI investment programme, but the convenience and the lower impact on the rest of the asset portfolio compared with using physical assets has meant that they have become an integral part of such programmes.

However, the use of swaps, either in a pooled or in a segregated context⁴, has increased the governance burden on trustees. First, for those without a background in economics or finance, the concept of swapping a set of regular payments defined on one basis for ones based on another, at no apparent upfront cost, is difficult. Second, the notion that entering into a swapping arrangement of this kind can help to hedge interest rate and inflation risk is also a difficult one to grasp. And third, the language used by professionals to describe swap exposures and positions is often heavily jargon-laden and therefore can be very intimidating for the uninitiated. Many trustees have had to go through quite extensive training programmes so that they can feel ‘comfortable’ with these new instruments.

It is by no means compulsory to use swaps as part of a LDI investment programme, but the convenience and the lower impact on the rest of the asset portfolio compared with using physical assets has meant that they have become an integral part of such programmes.

⁴ We return to this point later in section 5.

4.2 THE ROLE OF COLLATERAL

But the need to educate trustees about these instruments is only one way in which their use has changed the governance burden for trustee bodies. The majority of interest rate and inflation swaps used by schemes are over the counter (OTC) contracts. This means that they are bilateral arrangements between the scheme on the one hand and a counterparty bank on the other. Each OTC contract therefore brings with it counterparty risk – for both sides of the swap. Counterparty risk refers to the risk that a counterparty will not be able to meet its obligations under the terms of the contract. With an interest rate or inflation swap, the terms of the contract will specify a process for managing counterparty risk through the regular exchange of collateral.

So why is collateral needed at all? The answer is that the value of both ‘legs’ of the swap – the floating rate leg and the fixed rate leg – will change over time as interest rates change, but not in unison.

Collateral is used in many financial transactions as a way of protecting the counterparties from each other’s possible default. At the simplest level, when a bank grants a mortgage to someone to buy a house, the property acts as the collateral for the bank. In the event that the mortgage holder fails to keep up their mortgage payments the ownership of the property can be transferred from the mortgagee to the bank. Collateral plays the same role in a swap agreement. The main difference is that at the outset of the swap both counterparties must stand ready to pay into a collateral account.

Figure 3

PENSION SCHEME		BANK	
Receives	Pays	Pays	Receives
Fixed rate on £100m	Floating rate on £100m	Fixed rate on £100m	Floating rate on £100m

The fact that both parties need to stand ready to ‘post’ collateral stems from the structure of all swaps. For example, suppose a pension scheme enters into a swap where it commits to paying a cashflow to a counterparty bank based upon a floating rate of interest on a notional sum of £100m for ten years. In return, the counterparty bank commits to paying the scheme a fixed rate of interest – in this case the ten year swap rate – on £100m for ten years. In this case, there are only two sets of payments to consider: a set of payments based on a floating rate of interest; and a set based on a fixed rate of interest. Figure 3 illustrates the starting point of this swap.

Both sets of payments have a value at the outset of the swap. For example, if one forgets for the moment that the two sets of payments are linked, investors would be willing to pay a price today to receive either one of these sets of payments for the next ten years, in the same way that they would be willing to buy a bond today on the basis of the future payments that that bond would generate. Via the ‘magic’ of fixed income mathematics the ten year swap rate is set by market participants in such a way that at the point when the swap is struck, the present value of the fixed payments is equal to the present value of the future floating rate payments over the same ten year period. This means that at the start of the swap the scheme and the bank both enter into the contract with an upfront cost of zero (ignoring any advisory fees etc).

So why is collateral needed at all? The answer is that the value of both ‘legs’ of the swap – the floating rate leg and the fixed rate leg – will change over time as interest rates change, but not in unison.

Suppose that after the swap has been executed that short-term interest rates fall, perhaps following a nasty economic shock. This means that:

- the floating rate payments that the scheme is notionally committed to fall and, at the same time, the present value of the fixed payments to which the scheme is notionally entitled rises since the present value of any set of fixed future payments rises as interest rates fall i.e. the discount rate falls;
- effectively, the payments that the scheme ‘owns’ rises relative to those that it is committed to making;
- the scheme therefore has a net positive position, while the bank has a net negative position;
- so that the scheme does not suffer a loss in the event that the bank should fail, the bank will post collateral into the scheme’s collateral account equal to the difference in the value of the two legs of the swap.

But suppose that short-term interest rates had risen rather than fallen. In this case:

- the floating rate payments that the scheme is notionally committed to make rise and, at the same time, the present value of the fixed payments to which the scheme is notionally entitled falls since the present value of any set of fixed future payments rises as interest rates rise;
- effectively, the payments that the scheme ‘owns’ falls in value relative to those that it is committed to making;
- the scheme therefore has a net negative position, while the bank has a net positive position;
- the bank is now exposed to the possibility that the scheme will default. So that the bank does not suffer a loss in this event, the scheme will post collateral into the bank’s collateral account equal to the difference in the value of the two legs of the swap.

And so, over the ten year course of the swap’s life, collateral will flow backwards and forwards into and out of the collateral accounts as interest rates rise and fall over time. In fact, although the two counterparties enter into a contract to swap interest rate payments, neither side actually makes net interest payments to the other, instead what they exchange over time is the offsetting amounts of collateral.

4.3 COLLATERAL AND SCHEME GOVERNANCE

The flow of collateral between swap counterparties protects each counterparty from the default of the other. But the implementation and operation of the process raises some important questions.

- i. **What form should the collateral take?** The higher the quality of the collateral the better for those in receipt of it. For example, suppose that a scheme was willing to receive equities as collateral. In the event that the counterparty bank failed it is likely that equity markets would fall sharply too. Think of the events that followed Lehman’s collapse. In this case the equity collateral, that would now belong to the scheme, would be falling in value too, reducing its compensating value. When market participants talk of ‘high quality collateral’ they generally mean cash, and short-dated gilts or equivalent developed economy government bonds. When lower quality collateral is to be posted normally the counterparty posting the collateral will have to post a higher amount than would be the case if they posted, say, cash instead. This additional amount is meant to act as an additional cushion in the event of a possible fall in the price of the collateral, and it is known as a ‘haircut’.

BUT THE IMPLEMENTATION AND OPERATION OF THE PROCESS RAISES SOME IMPORTANT QUESTIONS.

What form should the collateral take?

How frequently should collateral be exchanged?

How much collateral should be kept in reserve?

- ii. **How frequently should collateral be exchanged?** Suppose that a scheme and a bank agree to exchange collateral at the end of every month. Suppose now that over the course of the month interest rates move substantially in the scheme's favour, so that by the end of the month the bank is due to pay a significant sum into the scheme's collateral account. At this point, the scheme is very exposed to the bank's failure, and the benefit that the scheme thought it was deriving from the swap over that month would vanish. The longer the interval between collateral exchanges, the greater can be the movements in interest rates and therefore the greater the potential for loss in the event of the failure of one of the two counterparties. The more frequently collateral is exchanged the less time there is for interest rate changes to affect the relative values of the two sides of the swap.
- iii. **How much collateral should be kept in reserve?** As we explained above, one of the advantages of using swaps for a scheme is the zero upfront cost, but this does not mean that the remaining assets can be invested without regard to the swap positions. The requirement to post collateral when necessary means that schemes need to set aside some part of their asset portfolio to meet possible collateral calls. If the scheme does not have sufficient assets that can be posted directly as collateral under the terms of the swap, then it may need to sell other assets in order to meet a collateral call. Given that most investors would prefer never to be forced to sell assets, most schemes will hold a pool of eligible collateral sufficient to meet collateral calls resulting from extreme movements in interest rates.

To summarise, the more frequently collateral is exchanged and the higher the quality, the less exposed each counterparty is to the other's potential default, while the more eligible collateral a scheme holds the less likely it will be to have to sell other assets to meet collateral calls.

One final point to bear in mind is that what might constitute high quality collateral one day, may not be seen as such the next. Prior to the recent financial market crisis bonds issued by G10 governments were seen as being 'risk free'. The G10 comprises, amongst others, the US and the UK. Bonds issued by both of these governments have been downgraded from AAA since the crisis. Also, Italy is part of the G10 – and yet nobody today would class Italian government debt as being risk free. The fact that perceptions about what constitutes high quality collateral can change is yet another item to be added to the trustee's governance burden.

4.4 USING COLLATERAL EFFICIENTLY

For most schemes the collateral that they hold to support their swap positions is of a high quality. But this high quality, eligible collateral, cash or gilts for example, has a relatively low expected return. At the time of writing, with a sustained economic recovery yet to take hold, the return on cash is very low, while gilt yields are also very low by historic standards. However, a reversal of economic fortunes could result in a dramatic rise in yields with gilt portfolios experiencing significant losses. This means that it makes sense to hold as much eligible collateral as is necessary, but certainly no more.

The big question then is; *how much is enough?*

Since the collateral flows for interest rate and inflation swaps are determined by movements in interest rates and bond yields, one simple way of determining how much eligible collateral might be needed at any one time would be to imagine an extreme, adverse move in interest rates that would require the scheme to post collateral, and then to calculate how much collateral the scheme would need to post under these circumstances. This amount could therefore represent the minimum amount of capital that the scheme would need to hold.

Normally this ‘extreme’ movement in interest rates and bond yields would be determined with reference to the historic behaviour of these rates and yields. For example, if bond yields had never moved by more than $\pm X\%$ over any particular period, it may not be deemed necessary to hold collateral against this sort of movement. But there is no hard and fast rule that can be applied. In the end trustees must use judgment to determine the appropriate level of eligible collateral that they wish to hold. They must then monitor this level over time.

It is difficult to overstate the importance of monitoring the level of eligible collateral because the potential costs of having too much are high in terms of ‘lost’ return, while the potential cost of having too little are arguably higher if other assets, that may be falling in value, need to be sold to meet the collateral calls. The efficient management of collateral, that is, the process by which the ‘correct’ amount of eligible collateral is held, is therefore an additional, critical governance challenge for trustees that arises from entering into swap contracts.

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4.5 USING VALUE AT RISK (VaR) TO ESTABLISH COLLATERAL REQUIREMENTS

One of the most common methods for establishing whether a scheme has enough collateral to support its OTC and other derivative positions is to rely on Value at Risk (VaR) – yes, VaR again. The appeal of VaR in this context is again the simplicity of its conclusions. VaR techniques can be used to establish whether the scheme’s collateral is sufficient or not. To do this, a number of steps are required.

- First the financial market phenomena that can require the scheme to post collateral need to be identified. For example, schemes with interest and inflation swaps will generally be required to post collateral when nominal and real interest rates rise.
- The volatility of these financial market phenomena need to be analysed. For example the more volatile nominal interest rates are, the more likely the scheme will be required to post collateral in the future.
- The simulations should take account of all of the financial market events that could affect the flow of the scheme’s collateral position. Once completed, it is a fairly simple task to identify, for example, the scheme’s ‘One year Collateral VaR 95’. This would be the amount of available collateral required to meet 95 per cent of all expected collateral calls likely in a year. Another way of putting it is to say that it is the collateral required to meet all but a one in 20 year collateral call event.
- This one year collateral VaR can then be expressed in cash terms, or as a proportion of total assets, etc.

If the events that followed the collapse of Lehman’s have taught us anything, to quote Henry Ford out of context, it is that “History is more or less bunk”.

While the simulation process is complex, the answer is relatively straightforward and fairly easy to interpret. But the trustees are still left with one important question: what VaR level to use? 90%? 95%? 99%? 99.5%? Also, remember that the simulations will be based on historic experience. Many hedge funds and investment banks were using VaR to establish the risks in their portfolios ahead of the 2008/2009 financial crisis. To determine these levels, they often used only very recent history to establish VaR levels which led them in turn, to vastly underestimate the risks that they were taking. If the events that followed the collapse of Lehman’s have taught us anything, to quote Henry Ford out of context, it is that “History is more or less bunk”. Many events happened that had, up until that point, been seen as being either extremely unlikely or were not even considered at all. In other words, history may be a misleading master in determining the appropriate level of eligible collateral.

Trustees therefore need to make sure that the simulations used to generate their collateral VaR values are conservative, which means that they need to understand the basic principles behind this approach very well indeed, though not necessarily the computational aspects of it.

4.6 WAYS OF IMPROVING LIQUIDITY

To some extent this particular governance challenge can be made easier with the implementation of other strategies that can be called upon to increase eligible collateral without necessarily having a negative impact on the expected return on the portfolio. These strategies might include:

- i. **Establishing lines of credit with banks.** This is a common way for companies to manage their liquidity requirements. Effectively a bank can pre-commit to providing cash to a company on pre-agreed terms. The company will pay a fee for the establishment of this facility, a facility that they may never need. A pension scheme could enter into a similar agreement with a bank. However, it is very possible that when the scheme needs to call on this facility, perhaps following some wider financial shock, the bank itself may be facing a liquidity crisis of its own!
- ii. **Synthesising equity holdings using equity index futures.** Many schemes invest in equities, but a very similar exposure can be achieved with the use of exchange-traded equity index futures. Suppose that a scheme has £100m invested in a portfolio of UK equities that tracks closely the performance of the FTSE-100. The scheme could instead 'buy' £100m worth of FTSE-100 equity index futures contracts, giving the scheme almost the same economic exposure to the UK equity market.

However, because these are exchange traded derivatives contracts, to obtain this exposure the scheme has to post a deposit, or initial margin, comprising cash and/or gilts, with the exchange, usually equivalent to between three per cent and five per cent of the exposure (in this case £3m to £5m). The remainder of the £100m can then be held in the form of eligible collateral such as short-dated gilts. This collateral could then be used to support collateral calls on the swap portfolio, although some portion of this additional collateral would also be needed to meet variation margin calls that could arise from adverse movements in the price of the equity futures contract. The variation margin calls made by exchanges on holders of futures contracts, which must be paid in cash, are analogous to the collateral calls that are related to OTC swaps contracts, and are made for the same reason, to protect against the risk that a counterparty might default. However, the overall result of synthesising equity holdings in this way should be an increase in available, eligible collateral.

- iii. **Synthesising equity holdings using total return swaps (TRS).** Another way to obtain synthetic exposure to equities, thereby freeing up the capital devoted to a cash portfolio of equities, is to use equity total return swaps (TRS). Unlike equity index futures these contracts are OTC contracts, that is, bilateral contracts between a bank and its client. With this strategy, a scheme enters into the TRS and agrees to make a payment to the bank, usually based upon a variable interest rate. In return the bank agrees to make payments to the scheme based upon the return on an underlying portfolio of equities, which includes both the income it generates and any capital gains. This total return swap allows the scheme to retain, or gain exposure to the equity market without having to commit the capital to buying equities.

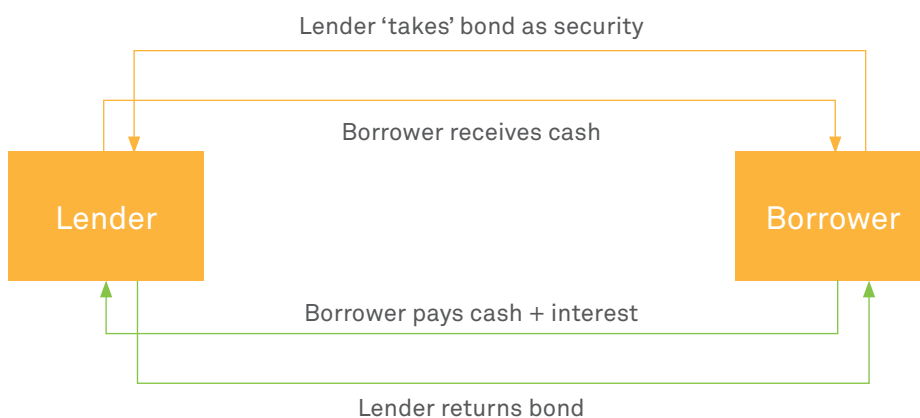
TRSs have two advantages over the use of equity index futures used for the same purpose. First, the scheme receives the total return on the reference equity portfolio – capital gain/loss plus dividend income; equity index futures contracts only provide exposure to capital gains/losses. Second, because TRSs are OTC contracts, no initial margin needs to be posted, although variations in the relative value of the two sides of the swap cause collateral to flow between the two counterparties.

But the TRS contracts have two disadvantages relative to using equity index futures contracts. First, these are OTC contracts, meaning they will be less liquid than the exchange traded equity index futures contracts. Second, although there will be transactions costs involved in rolling equity index futures positions from the contract about to expire to a contract with a later expiry date, these will generally be lower than the fees charged for a TRS. However, overall, once again, the result of synthesising equity holdings in this way should be an increase in available, eligible collateral.

- iv. **Accessing gilt returns using gilt total return swaps (GTRSs).** Just as exposure to specific equity returns can be accessed via TRS so can exposure to gilt returns. Indeed, gilt TRS are often seen as a viable and, in many cases, less expensive alternative to using interest rate swaps as a means of reducing a scheme's interest rate risk. This is because the floating interest rate paid by the pension scheme to the counterparty bank is often lower than that paid on an interest rate swaps contract. In addition, if gilt yields exceed swap yields, as they sometimes do, then the pension scheme will receive a higher payment from the bank than would have been received from a swaps contract. However, gilt TRS, unlike interest rate swaps, are usually quite short-dated, with terms typically ranging between one and three years, and therefore must be rolled over, if it is still advantageous for the scheme, that is, if gilt yields are still higher than swap yields at the maturity of the GTRS contract.
- v. **Access to the gilt repo market.** Finally, many financial market participants use the repo markets (the market for sale and repurchase agreements) to raise cash when they need it. This is a market for secured lending, where the security is gilts. Effectively a market participant can borrow cash in the repo market, usually for a short period. The lender of the cash accepts a gilt, or portfolio of gilts, as security against the loan. When the loan term expires the borrower returns the cash, plus interest, and the lender returns the gilt to the borrower. The interest paid by the borrower is known as the repo rate. The repo transaction is shown in Figure 4.

Before introducing new derivatives instruments trustees will need to be confident that they understand how these contracts work, and in particular, they will need to understand their risk characteristics.

Figure 4: A repo transaction



Pension schemes can access the repo market to raise cash to purchase additional gilts, in addition to the gilts sold and ultimately repurchased. This creates a 'geared' or 'leveraged' exposure to the gilt market.

The above are just five ways in which a scheme can manage its collateral efficiently. But with these solutions come further governance challenges. For example, before introducing new derivatives instruments trustees will need to be confident that they understand how these contracts work, and in particular, they will need to understand their risk characteristics.

So far we have focussed on why schemes might wish to use swaps, futures, total return swaps and repos and have highlighted some of the governance issues that their use brings. But schemes may also use other derivatives, such as Credit Default Swaps (CDS) and options contracts. However, we will not review the specific governance challenge of every derivative type that a scheme might choose to use. Instead, it should be clear from the discussion above that the use of derivatives brings many, significant new challenges for the effective governance of investment strategies. The two main challenges discussed so far, arise from:

- the complexity of derivative instruments and the commensurate need for trustee education; and
- the need to manage efficiently the assets set aside to meet collateral calls on OTC derivative instruments and to meet variation margin calls from exchanges related to exchange traded derivatives contracts.

In the interests of good governance, before the trustees enter into a derivative contract they should review both their own documentation and make sure other legal documents are also put into place to their satisfaction.

But there is a further challenge that comes once trustees have put in the time to understand the new derivative instruments that they propose to use, before the scheme can enter into any derivative contracts. This challenge relates to the legal documentation that defines the obligations between the scheme on the one hand and the counterparty to the derivatives trade, which is usually a bank, on the other.

4.7 THE LEGAL FRAMEWORK FOR INVESTING IN DERIVATIVES

In the interests of good governance, before the trustees enter into a derivative contract they should review both their own documentation and make sure other legal documents are also put into place to their satisfaction.

i. The Statement of Investment Principles (SIP)

Before embarking on an investment programme that incorporates derivatives, trustees should make sure that their intentions are described clearly in the Statement of Investment Principles (SIP). Trustees are required under the Occupational Pension Schemes (Investment) Regulations (2005) to produce and maintain a SIP⁵, which is a statement of the scheme's investment strategy, the parameters that govern the conduct and aims of that strategy and the means by which the strategy is to be implemented. With regard to this latter point, the SIP should make clear what instruments the trustees aim to make use of in implementing the stated strategy. At the outset of implementing a derivatives strategy, almost all schemes will have to review and amend this document to make sure it explains the purpose of the derivatives strategy and the instruments that will be used. The scheme sponsor must also be consulted on the change in investment policy.

ii. The ISDA agreement

Amending a SIP to reflect a new derivatives strategy is an important though a fairly simple exercise. If the trustees only intend to use exchange-traded derivatives then a change to the SIP should be sufficient to allow the trustees to mandate a fund manager to trade the derivative on behalf of the scheme.

However, by sharp contrast, OTC contracts are a bilateral agreement between the scheme on the one hand and a bank on the other. This means that legal documentation which governs the obligations of both parties to the derivative to be traded needs to be negotiated and agreed before any trading in that derivative can take place. The good news is that the International Swap Dealers Association (ISDA), which is the global trade association for OTC derivatives, which maintains industry standards relating to all aspects of the operations of the OTC derivatives market, has developed a standardised contract that needs to be signed by both the pension scheme and the bank. Once this standardised contract, known as the ISDA Master Agreement is signed, all OTC transactions between the pension scheme and bank can be executed very rapidly, once a contract amount and price have been agreed.

⁵ The SIP must be made available to scheme beneficiaries and potential beneficiaries within two months of it being requested.

The Master agreement establishes processes for dealing with all aspects of any OTC transaction between the scheme and bank from then on, including:

- what happens in the event that one of the counterparties defaults;
- how the contract may be terminated;
- how terminal values are to be calculated;
- issues relating to any tax liabilities;
- the process for dealing with valuation disputes;
- details of when and how collateral is to be exchanged between the two parties and so on.

So the good news is that a standardised agreement exists to establish procedures for dealing with all of these and many other issues. The bad news is that despite the fact that this agreement is standardised it still often takes lengthy negotiation before it can be signed. Indeed, weighty tomes have been written to help with ISDA negotiations. One useful book in this regard is: *Mastering the ISDA Master Agreements: A Practical Guide for Negotiation (The Mastering Series)*, by Paul Harding ... this book is over 800 pages long!

One of the most important areas of negotiation is over an annex that is usually attached to the ISDA Master Agreement, known as the Credit Support Annex (CSA). It is this annex that deals with the management of the credit, or default risk that arises from all OTC derivatives contracts. The CSA will contain information on the:

- list of eligible collateral;
- terms determining when collateral will need to be posted;
- frequency of collateral exchanges;
- required currency of the collateral;
- mechanism for valuing collateral;
- action to be taken if the counterparty bank's credit rating suffers a downgrade; and
- the process for resolving disputes over collateral valuations, along with many other important aspects of the collateral process.

Once the ISDA agreement is in place between the scheme and the bank, the two parties can then transact OTC derivatives. But just as one would normally wish to diversify an equity portfolio across many holdings rather than just a few, it makes sense to transact OTC derivatives contracts with more than one bank. As such a scheme wishing to diversify its counterparty exposure would need to set up ISDA agreements with a range of suitable banks, rather than just one.

By diversifying across a range of counterparties, pension schemes reduce the possibility of experiencing a loss that might arise from the failure of one of the counterparties as a result of an adverse price movement on the day that one of the counterparties fails (assuming that collateral is exchanged daily, which it usually is). But it is not only the possible loss that might occur from one day's price movement that the scheme reduces by spreading their OTC derivatives trades across a range of counterparties, it also reduces the potential cost of having to replace all of its now defunct contracts with new ones, very possibly on worse terms.

By diversifying across a range of counterparties, pension schemes reduce the possibility of experiencing a loss that might arise from the failure of one of the counterparties as a result of an adverse price movement.

iii. Global Master Repo Agreements (GMRAs)

We explained in Section 4.6 above that pension schemes may wish to put in place a means of increasing their cash to meet collateral requirements if necessary. One means of increasing available cash at short notice is to lend, or 'to repo' the scheme's gilts in the repo markets. However, before a scheme can transact in this market (borrow or lend) trustees must first put in place a standardised legal agreement known as a Global Master Repo Agreement (GMRA). Like an ISDA this agreement allows the scheme to enter into repo agreements with those banks with which they have signed a GMRA.

As with an ISDA agreement, a GMRA is a standardised, pre-printed contract, though in this case it is published by the International Capital Market Association (ICMA), which is the trade body representing the bond and repo markets in Europe. As such it contains standard provisions which should not need to be amended. But the parties to the agreement still need to negotiate certain elements of their repo arrangements, such as minimum delivery periods and the inclusion (via annexes) of supplemental terms and conditions should the parties wish to customise the contract.

4.8 THE KNOTTY ISSUE OF VALUATION

The ongoing valuation of derivatives positions, which determines the flow of collateral, is a particularly knotty issue. It is very possible for two parties to arrive at different values for the same underlying derivatives position. This is in part due to the fact that these values often depend upon the specification of a yield curve, which in turn must be constructed from other, underlying interest rates and bond prices. Even small variations in the curve due to equally small variations in the way two banks may construct the yield curves can lead to relatively large differences in the value of the derivatives position. Because of this, trustees may wish to appoint an independent body, which could be another bank, an independent fund manager or a global custodian, to provide a regular, independent assessment of the value of the derivatives positions⁶.

The ongoing valuation of derivatives positions, which determines the flow of collateral, is a particularly knotty issue. It is very possible for two parties to arrive at different values for the same underlying derivatives position.

But the governance burden does not end with the signing of the ISDAs, GMRAs etc, and the implementation of the derivatives programme. All of the above issues need to be kept under constant review. The creditworthiness of banks changes over time; what might have been perceived as high quality collateral yesterday may not be perceived as such today and, similarly, what might have been perceived as being the 'optimum' amount of collateral to be held against derivatives positions today, may not be perceived as being optimal tomorrow.

From the above it should be clear that the governance strain on the trustees from implementing a derivatives-based LDI strategy is very high.

4.9 UMBRELLA AGREEMENTS

The process outlined above is an arduous one for any scheme wishing to negotiate and set up several ISDA agreements with a range of counterparties in order to implement a derivatives strategy. Asset managers appreciate this and offer a relatively straightforward solution to some of the issues raised above. Most asset managers that implement derivatives-based strategies to help their pension scheme clients meet their LDI objectives offer schemes the opportunity of operating under the manager's umbrella ISDA and GMRA agreements.

These umbrella agreements are fairly straightforward conceptually. The manager, wishing to engage in OTC derivatives on behalf of their clients, negotiates ISDAs and GMRAs with a range of counterparties. Each pension scheme then signs up to the manager's umbrella agreement, so that rather than undertaking the due diligence associated with signing up to several ISDA agreements, they sign up to one. This means that the manager can then enter into OTC contracts, on behalf of their clients, with one or all of the counterparty banks that comprise the manager's umbrella agreements.

⁶ We will return to this issue in more detail in Section 6 of this report.

The manager is clearly responsible for negotiating all the other aspects that go in to setting up these agreements. On an ongoing basis, they will:

- monitor the credit quality of the counterparty banks;
- value the derivatives positions; and
- ensure that the appropriate amount and type of collateral is being posted by counterparties.

Engaging a manager that offers an umbrella ISDA or GMRA clearly makes life easier, but the ultimate responsibility for all of these issues remains with the trustee body. We can characterise the trustee's responsibility here into two broad categories. They must ensure that:

- i. the trustee body itself, has the necessary knowledge and understanding of all these issues; and
- ii. they receive the appropriate information about all of these issues in a sufficiently timely and succinct format from their managers and advisers, so that they can ask the appropriate questions of them.

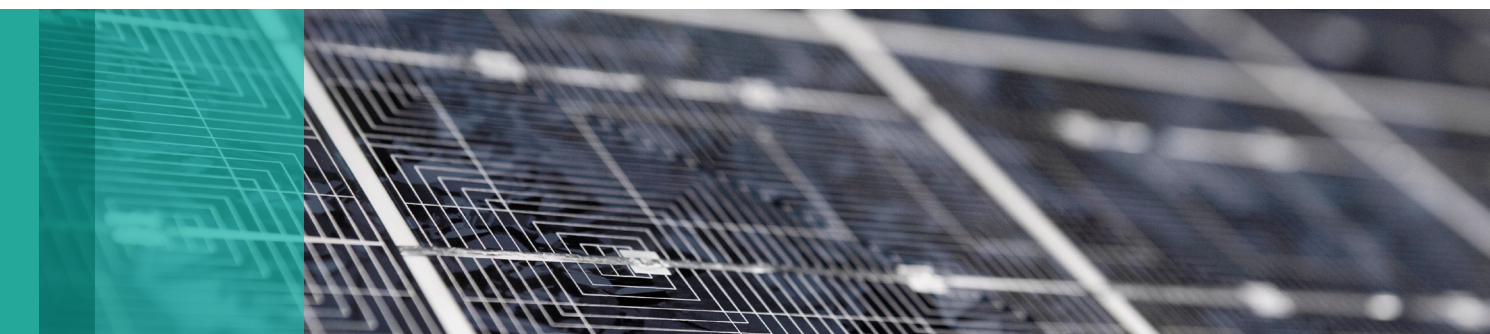
4.10 SUMMARY

It should be clear that the governance burden associated with transacting in derivatives contracts, both OTC and exchange traded, is quite significant. Before integrating these contracts into their portfolios, trustees must:

- i. review their SIPs and other scheme documentation, as well as negotiate and agree the legal documentation that underpins the terms and conditions for trading OTC derivative contracts;
- ii. ensure that they understand how these contracts work and their inherent risks;
- iii. make sure that they are satisfied with the credit quality of the proposed counterparties;
- iv. ensure that they are content with the collateral processes, and in particular the list of eligible collateral;
- v. ensure that they have undertaken analysis to determine the 'optimal' amount of collateral to be held;
- vi. review procedures for increasing their eligible collateral; and
- vii. be satisfied with the proposed process for valuing derivatives and collateral positions.

Arguably, the main challenge has been to raise the knowledge and understanding of trustees about how these derivative instruments work and why they might play a useful role in helping trustees achieve their ultimate goal of designing an investment strategy that maximises the possibility that all scheme benefits will be met in full and on time.

It should be clear that the governance burden associated with transacting in derivatives contracts, both OTC and exchange traded, is quite significant.



5. HOW WILL NEW REGULATIONS AFFECT LDI PROGRAMMES?

In section 4 of this paper we outlined the governance challenges that arise with the use of derivatives, and in particular the use of OTC derivatives. Many trustees have been willing to accept the additional governance burden that these instruments bring because the benefits, in terms of reducing long-run unrewarded risks, has been seen as being worth this cost. However, new financial market regulations are likely to change the cost of trading and holding OTC derivatives. In this section of the paper we will provide a brief review of the likely impact of these new regulations.

5.1 THE REGULATORY LEGACY OF THE LEHMAN'S COLLAPSE

The financial crisis of 2008 and 2009 highlighted to regulators the many deficiencies in the operational structures of today's financial markets. One of the key concerns was that financial institutions had enough capital to support their activities. Since the crisis, banks have been asked to raise their levels of capital, both by national and supranational regulatory bodies. Regulators have also been working to increase the transparency of financial market transactions, to reduce the risks that one counterparty – such as another failed Lehman Brothers – might pose to another and with it the entire financial system.

Often G20 commitments are not worth the paper that they are written on. However, in this case the regulatory bodies have worked hard to implement this desire. In September 2010 the EU launched a proposal inelegantly entitled the European Markets Infrastructure Regulation (EMIR).

Following on from what we noted earlier in section 1, the G20, in Pittsburgh in September 2009, made the following commitment:

“All standardised OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivatives contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements.”

Why did the G20 leaders feel that this commitment was necessary? What did they believe it would achieve?

Regulators came to the view that there were serious deficiencies in the OTC derivatives market which were highlighted, not just with the collapse of Lehman Brothers in September 2008, but also with the near collapse of Bear Stearns earlier in the same year, and during the subsequent bailout of the insurance giant AIG. As such they came to the view that these markets needed to become more transparent and better supported with capital.

Often G20 commitments are not worth the paper that they are written on. However, in this case the regulatory bodies have worked hard to implement this desire. In September 2010 the EU launched a proposal inelegantly entitled the *European Markets Infrastructure Regulation* (EMIR). This proposal was formally adopted in March 2012. EMIR focuses on the clearing and reporting of OTC derivatives contracts in the EU. Another new set of EU regulations – the *Markets in Financial Instruments Directive* (MiFID) – in part deals with the regulation of the electronic trading of OTC instruments in the EU. Meanwhile, in the US the Dodd-Frank Act 2010 covers all three aspects of the OTC market. Finally, these efforts to strengthen the OTC market will be complemented by the forthcoming Basel III rules that will increase the capital requirements for banks and that will be implemented in the EU via yet another set of regulations – *Capital Requirements Directive IV* (CRD IV).

How will all this affect the UK's DB pension industry?

In the case where a pension scheme has no exposure to OTC derivatives, either in a pooled fund or on a segregated basis⁷, there should be no direct impact on the scheme, although so much new regulation is almost bound to affect everyone via its impact on wider economic activity. However, for those schemes that already have exposure to these contracts the impact could be quite significant. And perhaps more importantly, trustees will need to make a series of important decisions with regard to dealing with this impact.

5.2 INTRODUCING EMIR

The set of regulations that will have the biggest, direct impact on UK pension schemes with exposure to OTC derivative instruments, or indeed for those wishing to have exposure to them in the future is EMIR.

EMIR has introduced a number of key changes to the operation of the OTC derivatives market in the EU, which are:

- **A reporting obligation for OTC derivatives.** Under EMIR all OTC and exchange traded derivatives will need to be reported to trade repositories. A Trade Repository is an entity that centrally collects and maintains the records of OTC derivatives. These electronic platforms, acting as authoritative registries of key information regarding open OTC derivatives trades, provide an effective tool for mitigating the inherent opacity of OTC derivatives markets. This market infrastructure is defined and supervised in Europe by the European Securities and Markets Authority (ESMA) under the EMIR regulations.
- **A clearing obligation for eligible OTC derivatives.** Under EMIR all standardised OTC derivatives will be cleared through a central counterparty (CCP), otherwise known as a clearing house. A CCP is an organisation that helps facilitate trading in derivatives and equities markets. The clearing house's prime responsibility is to provide efficiency and stability to the financial markets in which they operate. There are two main processes that are carried out by CCPs: clearing and settlement of market transactions. Clearing relates to identifying the obligations of both parties on either side of a transaction. Settlement occurs when the final transfer of securities and funds occur. CCPs benefit both parties in a transaction because they bear most of the credit risk. If two individuals deal with one another, the buyer bears the credit risk of the seller, and vice versa. When a CCP is used, the credit risk that is held against both buyer and seller is coming from the CCP, which, as a well-capitalised institution, is likely to be considerably less than in the previous situation.
- **The establishment of common rules for central counterparties and for trade repositories.** EMIR provides a harmonised framework for the provision of clearing services within Europe.
- **Measures to reduce counterparty credit risk and operational risk for bilaterally cleared OTC derivatives.** For example, OTC derivatives will be subject to additional risk mitigation techniques, such as the use of initial margin.

The main change then is that all eligible OTC contracts (that will include interest rate and eventually inflation swaps) will be reported to and cleared by a CCP such as *LCH Clearnet*, a London-based clearing house.

⁷ Please see section 6: Pooled versus segregated approaches to LDI.

So what is it that a CCP does? The main activities that a clearing house undertakes include the:

- settling of trading accounts;
- clearing of trades;
 - collecting and maintenance of margin monies; and
 - reporting of trading data.

This is why regulators want the OTC derivatives market to involve a clearing house. Having all the activity cleared in this way will make it easier in future for regulators to monitor the market and to make sure that there is sufficient collateral backing the positions.

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5.3 A NEW COUNTERPARTY

One of the attractions of having a clearing house involved in the market is that the clearing house effectively becomes the counterparty to each and every counterparty trading in that market. In other words, once the OTC contract is registered and cleared by the CCP, variation margin (equivalent to the collateral flows described in Section 4 above) flows from each counterparty to and from the clearing house. Since the clearing house is effectively the counterparty to all trades under this system it needs to have enough capital to cover any losses in the event that one of the counterparties fails. One way of ensuring that there is enough capital to cover such an event is to have both counterparties to any OTC derivatives trade post initial margin at the outset of the trade.

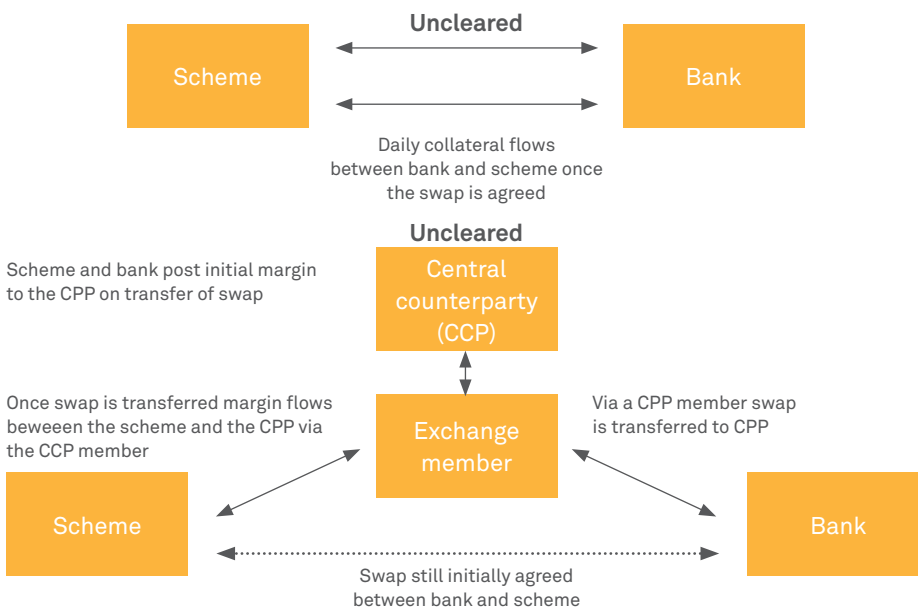
Sufficient initial margin is put up by both counterparties to cover the losses that might occur from the contract over the course of one trading day. This initial margin is paid into an account in the form of cash or gilts. While in the account the assets belong to the counterparty which has deposited them. However, if the value of the contract has moved adversely by the end of the trading day, the clearing house will demand that the counterparty in deficit ‘tops up’ their margin account with variation margin before trading starts the next day. The counterparty that has experienced a positive movement in the contract’s value effectively receives this variation margin, and can withdraw it if they wish. It is important to note that the variation margin, unlike initial margin, is paid to the clearing house only in the form of cash.

The margining process will take account of all of each counterparty’s derivatives positions cleared by the same CCP. This means that counterparties should benefit from the netting of positions, that is, where a loss on one contract is offset or partially offset by a gain on another. This makes the most efficient use of cash and gilts set aside to support multiple derivative positions.

The margining process will take account of all of each counterparty’s derivatives positions cleared by the same CCP. This means that counterparties should benefit from the netting of positions, that is, where a loss on one contract is offset or partially offset by a gain on another.

Figure 5 shows the relationship between a pension scheme and a bank in an OTC swap transaction which is uncleared and the same relationship under clearing. The swap would still be agreed initially between the bank and the scheme. But once it is transacted the swap is novated (legally transferred) to the CCP via one of the CCP’s exchange clearing members. To do this both the bank and scheme have to post initial margin which they pay to the exchange via the CCP exchange clearing member. From this point on the scheme and bank post variation margin in the form of cash, not to one another, but instead to the CCP via the CCP exchange clearing member, based on the CCP’s value of the swap position at the end of each trading day.

Figure 5: Uncleared v cleared OTC swaps transactions



5.4 THE IMPACT ON PENSION SCHEMES

The benefits of having OTC contracts cleared via an exchange should be clear for regulators and market participants. But what impact will all this have on the UK's DB pension industry?

For UK pension schemes, all existing OTC derivatives positions can remain outside the clearing arrangements, it is only new contracts, those agreed after August 2015, that will have to comply with EMIR. But recall the G20 statement:

“Non-centrally cleared contracts should be subject to higher capital requirements.”

That is, banks will be forced to hold more capital against these positions. This means that the costs of trading these instruments could rise in the future. Because these are OTC agreements it may not always be possible to offset collateral between positions. Hence, the cash and gilts set aside to support multiple OTC derivative positions may not be used as efficiently as might be the case if they were all cleared by the same clearing house.

Most of these benefits arise because cash is being posted to support variation margin calls.

5.4.1 The benefits of clearing

The benefits of a scheme having its swaps cleared by an exchange include:

- the netting of different contract positions, which means that the capital allocated to these derivatives will be used more efficiently, that is, losses on one contract can be offset against gains on another, so that only the net amount of variation margin has to be posted;
- a reduction in counterparty credit exposure as a result of initial margin being paid and as a result of having a well-capitalised clearing house as the counterparty to the scheme's trades;
- the independent valuation of the swap positions by the clearing house, which should lead to less disputes about the value of swap positions; and
- since variation margin is posted as cash, it would be much easier and cheaper for a scheme to access the gains on any swap position, simply by withdrawing money from their margin account, rather than by 're-couponsing' the swaps, as is currently required if swaps are traded outside of clearing. It might then be possible to invest these gains in higher yielding assets.

Most of these benefits arise because cash is being posted to support variation margin calls.

5.4.2 The costs of clearing

The main costs of clearing swaps through a clearing house relate to the capital needed to support the initial margins and in particular the variation margin which must be in the form of cash:

- initial margin has to be posted in the form of cash or gilts which means that schemes may need to hold more of these low returning assets than would otherwise be the case;
- variation margin has to be in the form of cash only, so schemes will almost certainly have to hold more cash than they otherwise would do and/or will need to make sure that they have access to cash, e.g. via the repo market, should they need it; and
- taken together, the need to hold more, higher quality, liquid assets (particularly cash) for these purposes will have an impact on the asset allocation and expected return of the scheme.

One of the obstacles to moving existing swaps into clearing might be the counterparties CSA terms. If the acceptable collateral on a scheme's swap contract allows for both parties to post, say, corporate bonds, then these CSAs will need to be changed, since the clearing house will only accept cash and gilts for initial margin, and only cash for variation margin.

5.5. REPORTING

Finally, EMIR's reporting requirements are probably an issue that most trustees are even less aware of than EMIR's clearing requirements. The reporting requirements under EMIR for uncleared trades is fairly onerous. EMIR will eventually require the daily reporting of OTC contract turnover, collateral values and even details on trades that have been cancelled. This information will need to be reported to a regulated trade repository. Fund managers will be able to help with these reporting obligations, but in the event that the manager fails in their reporting duties, the regulator will come knocking on the doors of trustees, because it will ultimately be their responsibility to ensure this information is reported properly.

5.6 SUMMARY

The regulatory pressure on banks to have legacy OTC instruments (OTC contracts struck before March 2012) cleared via an exchange is likely to build. If any legacy swap or other OTC derivative contract is changed in any way it will count as a new swap and initial margin will have to be posted by both counterparties. And, in addition, will have to decide whether they would wish any new OTC derivatives to remain outside clearing, given that they would still have to post initial margin on these contracts, without having the benefit of the additional counterparty protection which comes with having the contract cleared through a regulated exchange.

The good news is that the OTC derivatives positions of pension schemes have been given exemption from the EMIR's clearing rules in that they will not have to clear (new) trades until 15 August 2015. The bad news is that they must comply with EMIR's other elements, known as the business conduct rules. In particular, trustees will become directly responsible for complying with the fairly onerous reporting rules described briefly in Section 5.5. But even the good news is only temporarily good news, since they will may have to clear their OTC derivatives trades eventually. This means that trustees and their advisers will need to weigh up very carefully the costs and benefits of moving their swaps into the clearing process against the costs and benefits of leaving them uncleared in the interim period. In making this decision they must also bear in mind that although regulators cannot force two counterparties to an OTC swap to have it cleared via an exchange, it seems very likely to us that they will make the environment for uncleared OTC derivatives so unpleasant that eventually most market participants will feel compelled to clean up their CSAs and to have them cleared on an exchange.

The reporting requirements under EMIR for uncleared trades is fairly onerous.

6. ADDING ANOTHER PAIR OF EYES TO THE LDI GOVERNANCE STRUCTURE

Back in the 1990s when the pension world was much simpler, trustees often outsourced not only the management of their scheme's assets but also the strategic asset allocation by investing in 'balanced funds'. The scheme's assets were naturally held by a global custodian, but typically schemes did not have a direct relationship with the global custodian. Instead the investment manager took responsibility for making sure that the scheme's assets were secure and that there were no discrepancies between the values assigned to them by the scheme and manager on the one hand and within the custodian's accounts on the other. However, in his 2001 report, Paul Myners argued that since the assets were owned by the scheme and not the manager, that scheme's should establish a relationship with the custodian and take responsibility for reconciling the values of the holdings, as reported by investment managers to the trustees, with their values according to the custodian.

Delegating the task of liaising with the custodian to the investment manager would be a bit like giving one's IFA exclusive access to one's bank accounts. Most people would not find this to be a satisfactory arrangement for their personal finances. And in the sphere of pension scheme governance, many schemes accepted this guidance from Myners and have established a direct relationship with their custodian, often through their investment consultant. This does not mean that the investment manager now has no relationship with the custodian on behalf of the client. Instead, the change in the structure effectively adds another pair of eyes are focused on the issue and, crucially, a pair of eyes with the most to lose in the event of any problems.

6.1 IS IT TIME FOR A NEW GOVERNANCE STRUCTURE FOR DERIVATIVES ASSETS?

We have moved therefore from a world where trustee bodies had little or no relationship with their custodian (analogous to a world where people have no relationship with the bank that manages their personal bank accounts), to a world where trustee bodies either directly, or via their investment consultant, are performing an independent check on the values of assets held. This is a far more robust governance structure than the one that dominated in the 1990s. However, the typical focus of this engagement between the trustees and the custodian today relates to the 'traditional assets' – the equity and bond holdings. This is understandable. First, in the early noughties when trustees began to engage more directly with their custodians these assets represented the majority, if not 100%, of scheme assets. Second, reconciling the values of assets where there are independent and publicly available price quotes, in particular for publicly traded equities, is a relatively simple process, or at least it is easy to spot when valuation differences arise and to identify why they may have arisen. Subsequently these differences are also relatively simple to resolve.

Today, having embarked on LDI-focussed, de-risking programmes, the derivatives exposures of many pension schemes can be quite substantial. Many schemes have more than 50% of their liabilities hedged with derivative instruments, while some have 100% of their liabilities hedged. One of the key questions which we wish to pose for the industry in this paper is the following: *who is best placed to manage this exposure?*

Delegating the task of liaising with the custodian to the investment manager would be a bit like giving one's IFA exclusive access to one's bank accounts. Most people would not find this to be a satisfactory arrangement for their personal finances.

The efficient management of a derivatives portfolio requires the execution of often very complex derivative strategies, where the derivatives themselves are of course also more complex than physical assets.

At the moment the preeminent, or typical governance model is one where trustees have effectively (though not necessarily deliberately) delegated not only the management of derivative portfolios to the investment managers, but also the relationship with the custodian of these derivatives.

Hopefully sections 4 and 5 of this paper have emphasised how much more complex the world becomes when derivatives are integrated into a pension portfolio. The efficient management of a derivatives portfolio requires the execution of often very complex derivative strategies, where the derivatives themselves are of course also more complex than physical assets. This aspect of the process clearly requires fund management expertise which all but the very largest, self-managed schemes delegate to a specialist investment manager.

But the ongoing management of these complex derivatives portfolios also requires that some entity takes responsibility for other equally complicated processes, including:

- i. **the confirmation of all new trades.** This involves making sure that the details of the trade that the investment manager has executed on behalf of the scheme match with those of the counterparty to the trade. This is a more complex process than confirming a trade involving publicly traded equities.
- ii. **the ongoing valuation of all positions in the derivatives portfolio.** Again, hopefully we have already convinced readers of the additional complexity involved in valuing derivatives. Two independent valuations of the same OTC derivatives position nearly always results in two values. These differences have to be understood and reconciled. Their source may be due to the different models used to value the position, or because details of the position in the counterparty's books do not tally with those of the scheme. However, as noted in Section 5, once brought into clearing OTC derivatives are independently valued by the CCP to the exchange, which will greatly reduce the potential for valuation differences.
- iii. **the collateralisation of the derivatives positions.** The need for collateral management is perhaps the biggest differentiating factor between investing in physical assets and investing in derivatives. Once derivatives positions have been valued and reconciled, collateral needs to be received or posted typically on a daily basis, ideally on a fully netted basis across the counterparties. This netting down of exposures to counterparties can be achieved easily when a pension scheme executes their derivatives trades via one central CSA. In addition, the collateral itself needs to be valued on a daily basis. Given the issues related to valuing OTC derivatives positions, it would clearly constitute good governance to have more than one body value the positions.
- iv. **the provision of accurate accounts.** Every scheme needs to produce audited annual accounts, and will therefore need accurate internal accounts that summarise the derivatives positions. These accounts should provide the necessary transparency to allow trustees to perform another cross check to ensure that the derivatives positions that they believe they have accord with the records of their counterparties.
- v. **EMIR compliant reporting.** Although, as we pointed out in Section 5, pension schemes are exempt from clearing until 15 August 2015, they are not exempt from the business conduct rules, which include requirements for the confirmation and reporting of trades to trade repositories. Under EMIR it will be the trustee that is responsible for this function and liable if the reporting procedures are not adhered to.

OTC derivatives involve considerable additional operational issues and therefore operational risks compared with trading physical assets such as publicly traded equities. Most schemes have delegated these responsibilities, along with the associated relationship with the global custodian, to their LDI manager. So today the investment manager is not only responsible for executing the derivatives strategy, but also for the confirmation and reconciliation of derivatives trades, their valuation, the management of the associated collateral flows and is also responsible for making sure that the related accounting and reporting are compliant with industry regulations.

It is our contention that just as schemes have established a direct relationship with their custodian with regard to their physical assets to improve governance and transparency, as recommended by Myners, establishing the same relationship with the custodian of their derivatives assets would greatly improve governance of LDI strategies and in particular the transparency of these strategies. The custodian is best placed to provide an independent view of the trades that have been made on behalf of the scheme by their investment manager. Establishing two lines of communication, one with the investment manager and one with the custodian would also allow schemes to unbundle these fees related to the activities, which are typically bundled into a single asset management fee.

Does this mean that the investment manager should have no role in the derivatives valuation and monitoring process? Certainly not. Just as a manager has a view of the value of an equity or bond portfolio, they will clearly continue to value their derivatives positions too. But the structure we are proposing allows for more clarity. It effectively allows the trustee body clear sight of the complex operational issues and risks that come with a derivatives portfolio. It allows a clear view of what we might call the invisible plumbing that supports derivatives positions, plumbing which today trustees are largely unaware of.

To extend the analogy a little: most of us are not that interested in the plumbing in our homes. As long as the heating works, as long as hot water comes out of the hot water tap and cold water out of the cold water tap, we are content to forget about the plumbing. But this does not mean it is unimportant. And as anyone that has suffered a burst pipe in their home will know, when it fails the consequences can be disastrous.

Like it or not, trustees are directly responsible for the plumbing which supports their derivatives portfolios. We might be able to blame a plumber for a burst water pipe, but when it comes to derivatives plumbing, the buck stops with the trustee.

6.2 Pooled versus segregated approaches to LDI

Thanks to the ingenuity of investment managers, when implementing a derivatives strategy trustees can choose the segregated route, which involves entering into derivatives contracts directly with bank counterparties, executed by their fund managers, or on a pooled fund basis, where the ownership of the derivatives assets are mutualised and where the goals of the pooled vehicle are shared by all of the participants in the fund.

As with other asset classes, larger schemes tend to prefer the more tailored, segregated route, while smaller schemes, with all the diseconomies of scale that small size brings, tend to prefer the pooled derivatives route, despite the latter being less transparent than the former. The distinction is not quite as clear cut as this of course, some fairly large schemes hold pooled LDI vehicles, while some relatively small schemes have appointed LDI managers on a segregated basis. Further, there are some schemes that combine a mixture of pooled and segregated derivative portfolios.

Like it or not, trustees are directly responsible for the plumbing which supports their derivatives portfolios. We might be able to blame a plumber for a burst water pipe, but when it comes to derivatives plumbing, the buck stops with the trustee.

We will not rehearse the usual arguments for or against segregated mandates versus pooled mandates here, since these arguments are well known. We have already put the case for stronger governance of derivative portfolios, via a separation of the management of the derivative assets, which is almost certainly best left to a specialist fund manager and the valuation of positions, management of collateral, etc, of the derivatives traded by the investment manager which we believe should be undertaken by an independent body, most likely a global custodian. The case we put forward is definitely applicable to those schemes that have chosen a segregated mandate for at least part of their derivatives portfolio. But do these arguments apply equally to those schemes that have chosen the pooled route?

The answer is no and yes!

The pooled route to investing in a portfolio of derivatives necessitates that the investment manager of the pooled LDI funds carries out the functions listed in Section 6.1 on behalf of all their pooled clients. It is the investment manager that must therefore remain the 'owner' of the relationship with the global custodian.

The logic of our argument that schemes should have a direct relationship with an independent body for the management of their derivatives portfolios is that if there were no differences in cost between the segregated and pooled LDI route, in terms of money and in terms of the trustee due diligence and 'monitoring budget', we would recommend the segregated route for all schemes.

Of course we do not doubt that the investment managers that offer the pooled LDI funds are competent to perform these tasks on behalf of their pooled clients. However, ultimately the trustee remains responsible for the operational risks and for the reporting requirements. It is therefore just as important that they, along with their investment consultant, understand the way in which the derivatives plumbing works, so that they can ask the right questions of their LDI manager and understand the answers, enabling them to discharge their duties properly.

6.3 SUMMARY

Although we said that we would not rehearse the segregated versus pooled arguments here, the logic of our argument that schemes should have a direct relationship with an independent body for the management of their derivatives portfolios is that if there were no differences in cost between the segregated and pooled LDI route, in terms of money and in terms of the trustee due diligence and 'monitoring budget', we would recommend the segregated route for all schemes. However, since there is a cost difference, schemes need to factor into their assessment of the costs and benefits of the two options, the loss in terms of direct governance (with no diminution in responsibility) that comes in the pooled form as opposed to that which could be achieved with a segregated approach.



7. WHAT CHALLENGES DO NEW ASSET CLASSES POSE TO PENSION SCHEME GOVERNANCE?

In Section 3 of this paper we explained why we think the LDI revolution has led to a dramatic improvement in scheme governance, mainly because it encourages a focus on both sides of the balance sheet. We also described a risk-focussed framework for bringing these two sides of the balance sheet together. In Section 4 we explained that many schemes had integrated derivatives in to their portfolios, largely to manage the risks embedded in their liabilities and/or to manage the associated collateral requirements. These derivatives portfolios bring with them the additional operational risks described in Section 5 and will be affected by the new international regulations discussed in Section 6.

However, after arguing that the governance of pension schemes is best served by monitoring the asset and the liability side of the balance sheet, we have so far largely ignored the LDI-inspired revolution that has been going on in the asset side of pension scheme balance sheets since the financial crisis at the start of this century. So in this section of the paper we will redress the balance and, in particular, consider the challenges to scheme governance that have arisen as trustees have invested made more and more of their assets in less traditional asset classes.

7.1 FOCUSING ON 'GROWTH ASSETS'

The derivatives used to help trustees manage the risks inherent in the liabilities of their scheme, particularly interest and inflation risks, will not in themselves be enough to generate the returns necessary to reduce scheme deficits over time. Instead, if used wisely, they should help prevent the deficit from widening further. To some extent then their use is a bit like shoring up the defence of a Premiership football team so that it stops leaking goals – and stops conceding own goals. But just as a good defence is not usually sufficient on its own to win a football match, the hedging of interest rate and inflation risks will usually only be the first step in helping trustees meet their ultimate goal of paying all pension benefits in full and on time.

Once the interest rate and inflation risks are under control, or at least where there is a plan to get them under control, trustees and their advisers can then focus on identifying how best to close the scheme deficit. Put crudely, and it is a very crude distinction, trustees invest in 'growth' assets as a way of closing the scheme deficit over time. To torture the football analogy a little further, the growth assets are the pension scheme's equivalent of the strikers that put the ball in the 'back of the onion net'!

7.2 EQUITY INVESTMENT, NEGATIVE CASHFLOW AND THE CURSE OF DEAD WEIGHT LOSS

The traditional 'growth' asset class has been publicly traded equities; principally domestic equities. The attraction of this asset class is that its expected return is generally thought to be high – which is a good thing. But it is high for a reason – the high expected return is accompanied with a high degree of risk. For example: in October 1987 the UK equity market fell by around 30% over two days; between March 2000 and March 2003 it fell by 50%; and between September 2008 and March 2009 it fell by nearly 30%. In each case the market eventually recovered, although it has never recovered from its all time peak on 31 December 1999. In fact, £100 invested in the UK stock market on 31 December 1999 would have been worth £95.40 (excluding dividend payments) at 31 December 2012⁸.

But if the equity market recovers in the end, why should long-term investors care?

First, now that the financial position of the pension scheme sits squarely on sponsors' balance sheets, depressed asset values as the result of a slump in equity prices can put significant, unwelcome pressure on the sponsor. Cashflow that might otherwise have supported investment in the sponsor's business (or been paid to shareholders) might be diverted instead, irretrievably into the pension scheme.

But just as a good defence is not usually sufficient on its own to win a football match, the hedging of interest rate and inflation risks will usually only be the first step in helping trustees meet their ultimate goal of paying all pension benefits in full and on time.

Second, many schemes are today cashflow negative, that is, the regular income derived from member and sponsor contributions is now smaller than the regular payments to pensioners. This in turn means that a sharp fall in the asset base of the scheme could result in trustees having to liquidate assets to pay benefits at depressed prices. And once sold at depressed prices, that value is never recovered. It would therefore represent a deadweight loss to the scheme. An unrecoverable loss is never welcome, but when the starting point is a shortfall this is a particular problem.

Finally, the discipline of behavioural finance has taught us that investors are loss averse. This means that they dislike losses a lot more than they like equivalent gains. Equity market crashes produce the sort of losses that most investors, including institutional investors, fear and dislike the most.

For these, and other reasons, many schemes have reduced their reliance on publicly traded equities and, as they have done so, consciously or otherwise, they have embraced two broad principles with regard to their 'growth' portfolios. These are that the portfolio should:

- i. be 'well diversified'; and
- ii. produce the highest expected, risk-adjusted return.

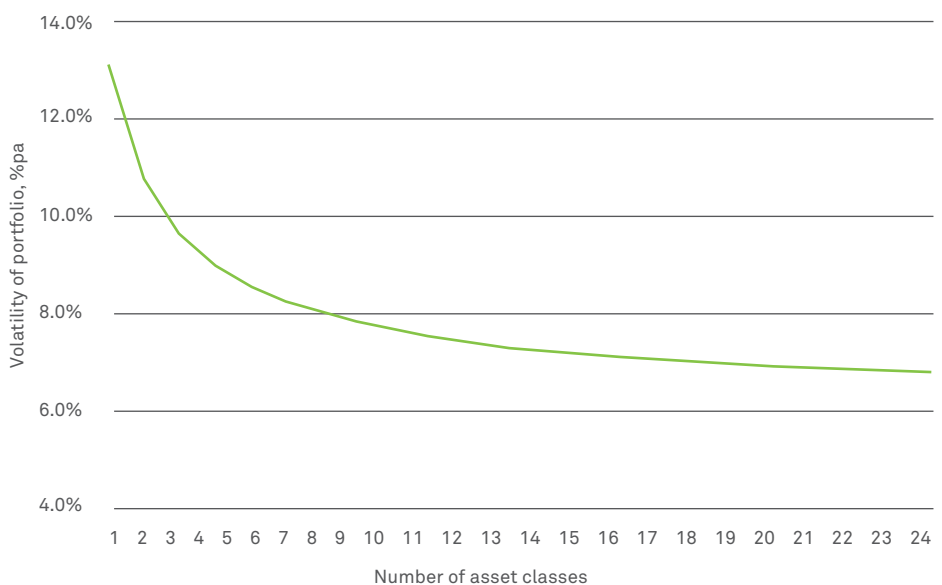
The benefits from holding a well diversified portfolio are well known⁹. As long as the asset classes that constitute the portfolio are imperfectly correlated (they don't move in perfect step with one another), the scheme should benefit from lower volatility over time.

Indeed, as the noughties progressed and as we entered the post-noughties, the focus has been very much on constructing portfolios with a view to outperforming the liability benchmark in the most risk-efficient manner, rather than simply to achieve the highest possible return. And it is in this way that LDI thinking has influenced the asset side of pension scheme balance sheets.

7.3 THE BENEFITS OF DIVERSIFICATION

The benefits from holding a well diversified portfolio are well known⁹. As long as the asset classes that constitute the portfolio are imperfectly correlated (they don't move in perfect step with one another), the scheme should benefit from lower volatility over time. When it comes to constructing an equity portfolio, back in the 1960s it was felt that it would be enough to hold eight to ten randomly selected stocks to obtain the full benefits of equity market diversification, while more recent work concluded that this number was nearer to 30 or 40 stocks¹⁰.

Figure 6: Portfolio volatility as asset class diversification increases



Source: Clare and Motson, 2008.

Figure 6 shows how the benefits of adding an additional asset class, in terms of lower realised volatility, declines¹¹. The volatility is highest for a single asset class portfolio whereas the volatility of portfolios comprising progressively larger numbers of asset classes falls, quite sharply at first, so that the volatility of an eight or ten asset portfolio is significantly lower than that for a one asset portfolio. However, the rate at which volatility declines as more asset classes are added to the portfolio reaches a kind of floor, such that the inclusion of additional assets cannot further reduce portfolio volatility by any significant degree. The sharp decline in portfolio volatility comes about from imperfect correlations among the asset classes. The volatility that can be eliminated by holding a diversifiable portfolio is called, unsurprisingly, ‘diversifiable risk’ or ‘unsystematic risk’ since it can be diversified away. The portfolio volatility that cannot be diversified away is known as ‘undiversifiable risk’, or ‘systematic risk’. Indeed, one of the great insights of the early portfolio theorists was that we can distinguish between the two types of risk:

- diversifiable, or unsystematic risk; and
- undiversifiable, or systematic risk,

where the former risk can be all but eliminated by holding a diversified portfolio of assets, while the latter cannot be eliminated from a portfolio of risky assets. In other words, by holding larger and larger numbers of individual asset classes in a portfolio the risk inherent in that portfolio might be expected to decline. However, not all risk can be eliminated. No matter how diversified investors’ portfolios were in September 2008, well diversified pension portfolios fell in value, though generally not by as much as those that were still heavily exposed to publicly traded equities.

The lesson of 2008 is that systematic risk, also known as ‘market risk’, remains even in a well diversified portfolio. This in turn means that there may come a point when additional asset class diversification brings with it only an additional burden on scheme governance and little in the way of benefit in the form of enhanced risk-adjusted returns.

7.4 THE POTENTIAL COSTS OF ASSET CLASS DIVERSIFICATION

The extra cost of holding one more stock in an equity portfolio is relatively low. But this is not true of holding an additional asset class. First, each asset class brings with it new challenges for the trustee body, in terms of knowledge and understanding. But second, there are often a whole range of difficult, practical issues involved in investing in a new asset class. Arguably, when trustees move away from the more familiar ground of publicly traded equities, investment grade corporate bonds and gilts, the two most important additional issues relate to:

- i. transparency; and
- ii. liquidity.

The governance burden will rise with the addition of each new asset class, particularly when prices are not transparent. This burden will also rise the more illiquid the asset class, because trustees will have to keep an ever closer eye on their ‘illiquidity budget’ as they use it up.

The governance burden will rise with the addition of each new asset class, particularly when prices are not transparent. This burden will also rise the more illiquid the asset class, because trustees will have to keep an ever closer eye on their ‘illiquidity budget’ as they use it up.

⁸ Source: Barclays Capital Equity Gilt Study 2013.

⁹ See ‘By How Much can a Diversified Approach to Investing Improve the Prospects of Reducing a DB Pension Deficit?’, A. Brigden, A. Clare and S. Dhar (2008), *Pensions*, p.136-150.

¹⁰ See Evans, J. and Archer, S. (1968), Diversification and the reduction of dispersion: An empirical analysis, *Journal of Finance*, Vol. 23.

Statman, M., (1987) How many stocks make a diversified portfolio?, *Journal of Financial and Quantitative Analysis*, Vol. 22.

The focus on the risk characteristics of liabilities has led many schemes to consider a set of asset classes that we can refer to as Liability Linked Investments (LLI – another acronym!). These are asset classes:

- that typically generate long-dated bond-like cashflows, which can be inflation-linked;
- where the underlying cashflow generating asset is often either commercial property or an infrastructure asset;
- which offer a high level of security either via a claim over the physical asset generating the cash flow or the provision of a government or quasi-government covenant;
- which are either being made available for sale by capitally-constrained banks, or which are normally financed by banks; and
- where the yield is normally in excess of equivalent liquid assets with the same credit risk.

These assets are attractive to schemes that wish to improve and diversify the return on their assets, without creating an avoidable mismatch between the assets and liabilities. The following asset classes are all considered to be LLIs:

- **Secured leases** – the purchase, or part purchase of commercial property, which is leased to a tenant who then pays the scheme, as landlord, regular rent which can be structured so that it is inflation-protected.
- **Infrastructure equity** – the purchase, or part purchase of assets that make up the social and economic fabric of an economy like bridges, tunnels, sewerage facilities etc.
- **Social housing** – the purchase, or part purchase of property rented to low income households, generally provided by local councils and housing associations. As such the rental income from social housing benefits from government support.
- **Ground rents** – the purchase, or part purchase of ownership of a portfolio of ground rent, which is the regular payment that a leaseholder (commercial or residential) has to pay the freeholder of the property.
- **Commercial real estate debt** – the purchase, or part purchase of debt issued by companies wishing to buy and/or build commercial property. The opportunity to buy this debt has arisen because banks are less keen to extend these loans, as they try to shrink their exposure to the property market, or to refinance past loans.
- **Infrastructure debt** – similar to commercial real estate debt, investment in this asset class involves the purchase, or part purchase of debt issued by companies wishing to finance infrastructure projects. Once again, banks are less willing to extend this finance, or to extend refinancing.

There are various ways of accessing these asset classes. Some schemes have invested via pooled investment vehicles, others have invested through limited partnership structures, while larger schemes might buy all of a secured lease or particular debt issue, or team up with perhaps one or two other large investors, often an insurance company.

However, the key point here is that even when investing via a regular, pooled vehicle (a route that is not a frequent option) these are illiquid investments that tie up capital typically for many years because there is no liquid, secondary market where these instruments can be bought and sold quickly and cheaply, as there is for gilts and developed economy equities. But the absence of a liquid secondary market also means that there is no market to provide a continuous valuation of the investments either.

7.5 THE VALUATION CHALLENGE

¹¹ How many alternative eggs should you put in your investment basket?, A. Clare and N. Motson, Centre for Asset Management Research, Cass Business School, London, 2008.

So how can the performance of the asset classes be monitored by trustees over time? There are two ways of dealing with this issue.

7.5.1 Infrequent expert valuations

The first is to make sure that an independent expert provides an estimate of the value of the assets on a regular basis. In the case of property investments this would normally be a professional surveyor. However, for infrastructure investments accessed via the formation of a limited partnership, the regular valuation would need to be carried out by an auditor. For the trustees it is important that they ensure that the chosen method of independent valuation is robust, and at times it might be necessary to obtain a second, independent opinion, particular when the trustees are looking for a buyer for their illiquid investment. One way or another, this process is far more involved and puts a much bigger burden on the due diligence and monitoring budget, compared to the issues involved with obtaining the value of a gilt or equity portfolio.

7.5.2 Cashflow-based valuations

The main problem with the first approach is that the valuations will only occur on a fairly low frequency basis. The second option is to focus on the asset's projected cashflow. This approach allows for a much more frequent assessment of value and, additionally, can give trustees an idea of the 'value' they are getting for the purchase price using their liabilities as a benchmark, or hurdle.

One way or another, this process is far more involved and puts a much bigger burden on the due diligence and monitoring budget, compared to the issues involved with obtaining the value of a gilt or equity portfolio.

The process involves a number of simple steps:

- i. First, identify the timing and size of the projected cashflows from the illiquid investment. Since these are contractual cashflows, that is, they are determined within the terms of the contract, this is often a relatively simple task.
- ii. The regular cashflows payable to the investors over the life of the asset are relatively easy to determine. But in some cases the residual value of the asset may have to be determined. For example, once the lease has expired on a piece of commercial property, ownership of the property reverts to the landlord(s). In this case, investors would need to determine the likely market price of the property/land at this point, taking into account possible redevelopment costs that might be necessary to make it attractive to other buyers, or for re-letting. Often, however, notably with social housing, the residual value of the asset is amortised (built into the regular income payment) over the term of the investment so that no residual value remains at the end of the contract term.
- iii. Next, discount the cashflows (including the estimated terminal value of the asset as appropriate) with the same yield curve used to discount the scheme's liabilities, for example, the gilt curve. This will give the present value of these cashflows, as if they were generated by a portfolio of gilts.

But the investors are not buying a portfolio of gilts, they are buying an illiquid asset which almost certainly has some credit risk, unless the asset is underpinned by a secure government covenant. Therefore the expected return should be higher. This higher expected return should be evident from the price of the illiquid asset which should be lower than the price calculated using the gilt curve.

- iv. The next step is to identify the additional return over and above the return offered by gilts with the same cashflow. This is a simple calculation that can be completed in a spreadsheet. It is referred to as the 'yield pick up' and, in this example, it is the compensation for the illiquidity and credit risk of the asset, relative to that of a portfolio of gilts.
- v. The yield pick up then needs to be compared with the additional return that the investor could obtain from a liquid asset with equivalent credit risk. The difference in the two can be interpreted crudely, as the liquidity premium offered in the sale price of the asset.

Having completed these steps investors can determine whether the additional return available is sufficient to compensate them for the illiquidity of the asset. But it also offers a way to value the asset on a much more frequent basis. In the example above this value will change as the gilt curve shifts over time.

From this analysis the trustees can make an informed decision about whether they wish to proceed with the purchase of the property. Effectively any premium return over gilts would represent compensation for the credit risk of the tenant plus compensation for the illiquidity of the investment.

7.5.3 Combining the two approaches

The focus on valuing cashflows by determining how much additional return is being offered, over and above the basis used to value liabilities, gives a transparent way of valuing an illiquid asset which ties its value in very neatly to the objectives of the pension fund. But valuing assets on this basis does not mean that we can dispense with the services of auditors, surveyors, fund managers and other professionals that will value the assets for trustees, often on an infrequent though regular basis. Instead the two processes need to be combined. The independent assessment may reveal important new information that may change the expectation about future cashflows – particularly where there is a potential residual value to the investment, which is normally the case with regard to commercial property.

7.6 NOT ALL ILLIQUID ASSETS ARE CREATED EQUAL

The LLIs pose particular problems for trustees – some more so than others. But the challenges for trustees and their advisers do not end with the establishment of a robust process for monitoring and valuing these assets. There are a number of other issues that need to be resolved. Perhaps the biggest one relates to the trustees' view of their 'illiquidity budget'. This is the maximum percentage of their assets that they feel they can risk tying up in illiquid assets. The liquidity crisis of 2008/2009 taught everyone the value of liquidity – including the banks who should have known this!

The focus on valuing cashflows by determining how much additional return is being offered, over and above the basis used to value liabilities, gives a transparent way of valuing an illiquid asset which ties its value in very neatly to the objectives of the pension fund.

But all illiquid assets are not created equal. In the event that the trustees of a scheme wish at some point to have their liabilities bought out by an insurer, some illiquid asset classes will be more attractive to these insurers than others. Before investing in an illiquid asset class, it is therefore worth trustees asking their advisers how attractive the asset class might be to an insurer that might be willing to buy out the scheme at some time in the future. Trustees should also bear in mind that if the scheme does not go to buyout, then as it becomes increasingly mature and cashflow negative, so the illiquid assets will increasingly dominate the asset portfolio, because the scheme's more liquid assets will be sold to finance pension payments.

So how can trustees judge whether they should add another asset class?

This is where the flexibility and transparency of the risk monitoring framework that we discussed in section 3 can help. By experimenting with different asset mixes, based on conservative assumptions, it should be possible to show what the addition of a new asset class along with either a reduction or complete sale of an existing asset class, will do to the scheme's:

- funding ratio at risk;
- expected return at risk; and
- funding target at risk.

The addition of new asset class, that reduces sufficiently any one or all of these risks, should warrant careful consideration for inclusion. Operating this risk-focussed framework would therefore force trustees to think about all of these important issues, in a transparent manner, before any decision is taken.

7.7 SUMMARY

To some extent the problems posed by investing in illiquid asset classes with contractual cashflows, so-called Liability Linked Investments (LLI), is not a new one. Some schemes have invested in commercial property for many years. But in a risk-focussed environment, when schemes are in deficit and often with negative cashflow, a more disciplined and rigorous process needs to be put in place.

The adoption of a liability-linked cashflow valuation approach allows schemes to identify more clearly the additional return that they are likely to receive in return for taking on illiquidity. When this approach is combined with the more traditional, infrequent valuation of illiquid assets, a robust process can be established. But the more illiquid the asset class, the more complex its cashflows, the newer and more unfamiliar it is to trustees, the greater will be the additional burden on scheme governance. An additional challenge for trustees is the need to identify an appropriate illiquidity budget. How much of the scheme's assets can the trustees risk tying up in an illiquid form? And finally the seemingly ever expanding list of available asset classes is putting an increasing burden on trustee knowledge and understanding, as trustees seek to combine these asset classes to give the scheme the best risk-adjusted expected return.

As schemes focus on reducing their deficits and reliance on their scheme sponsors, we can identify three key operational risks that require the attention of trustees, with regard to the trend towards LLIs and diversification more generally:

- i. **Identifying an illiquidity budget** – Trustees need to identify how much of their assets they can afford to tie up in illiquid assets. Committing too much to illiquid asset classes could have disastrous consequences for any scheme's finances in the event of a financial market crisis.
- ii. **Establishing a robust valuation process** – Trustees need to ensure that a robust process is established for valuing an often disparate array of asset classes, which may have no secondary market price and to establish views on the illiquidity premium offered on illiquid asset classes.
- iii. **Identifying the right asset mix** – Trustees need to make sure that they have combined a sufficiently wide range of asset classes, with differing risk characteristics, so that they achieve the expected return that they seek to outperform their liability benchmarks, but without taking any more risk than is necessary. The adoption of cashflow valuation techniques coupled with the risk-based monitoring process that we described in Section 3 of this paper, should help to make the choice of the 'optimal' asset portfolio more transparent and, as such, improve governance.

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8. DEVELOPING A 'CHECKLIST' FOR PENSION FUND TRUSTEES

Being a pension scheme trustee has never been easy. From the above it should be abundantly clear that since the turn of the last century, the job of being a trustee now brings with it a much greater burden in terms of the required knowledge and understanding for each individual trustee and a much greater governance burden on the trustee body as a whole. It is a complex and challenging role, which gets more challenging every year.

In this section of the paper we propose a simple way of making the management of this complexity simpler by drawing lessons from recent medical research.

8.1 OF CHECKLISTS AND VITAL STATISTICS

8.1.1 Checklists

In 2009 a team of researchers from the Harvard School of Public Health, led by Dr Atul Gawande published a paper in the New England Journal of Medicine¹². The paper contained some rather surprising evidence about the power of simple checklists.

For their study Dr Gawande drew inspiration from the checklists that pilots complete before takeoff. The pre-takeoff checklists are a vital, but very simple part of the takeoff process. Their careful design ensures that pilots do not take off without checking that all the controls and indicators are operational, that they have enough fuel, etc. But why give often very experienced pilots a set of simple-minded, mechanical tasks that require them to tick boxes like an over-zealous junior administrator? Surely if they are experienced they can check these things without such a list?

But why give often very experienced pilots a set of simple-minded, mechanical tasks that require them to tick boxes like an over-zealous junior administrator? Surely if they are experienced they can check these things without such a list?

The answer is that in the vast majority of cases they probably could remember to check all the vital information needed before takeoff, but pilots are human and like all humans they are prone to making mistakes. When the plane is due to fly many miles at 550mph at an altitude of 30,000ft, why take the risk that the landing gear is not working properly, or that there is not enough fuel to get to the next destination?

Having observed the important role that checklists play in aviation, Dr Gawande and his team wondered whether there was a role for a simplifying, checking process that could take place before major surgery. To test this idea, they devised a pre-surgery checklist which included a check:

- for surgeons to introduce themselves to the nursing staff before the start of the operation;
- to ensure they had the correct patient on the table;
- to make sure that they knew what surgical procedure was required;
- to check that instruments had been sterilised;
- that there was enough blood available etc.

The team introduced the checklist, which comprised only 19 items, at eight hospitals around the world. Astonishingly they discovered that by introducing this checklist average patient death rates fell by 40% and surgical complications fell by about a third.

¹² A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population, The New England Journal of Medicine, Various authors, January 2009.

The checklists ensured that all important issues had been considered before the operation could begin and may well have changed the behaviour of surgical teams. The benefits of the system in terms of patient care seemed clear and the costs were clearly negligible.

There exists the possibility that a simple checklist for trustees could help them in their governance challenges.

8.1.2 Identifying the vital statistics

Checklists can clearly play a vital role in complex processes, by minimising the possibility of human error and by systematising the monitoring of what otherwise seems like a complex problem. Checklists play a vital role in keeping us safe in the air and in many other industries. And now there is evidence to suggest that they have a role to play amongst highly skilled surgical teams. But the use of a checklist does not in itself qualify someone to fly a plane or to perform an operation. More is clearly needed.

For example, when the person running through the surgical checklist asks whether there is sufficient blood of the correct type in reserve, before that box can be ticked someone in the room needs to know what blood type is required and how much blood will be needed. This knowledge comes from the experience of the team and not from the checklist itself, since patients have different blood types and different operations will call for different amounts of blood to be kept in reserve.

Making sure that they have the right patient on the operating table is clearly just the start of the process. Once the operation begins, different members of the team will be responsible for checking vital information relating to the patient's breathing, blood pressure etc. Again, a person's ability to be able to interpret the information from the monitoring equipment will come from training and experience.

For a pension scheme trustee running through a well designed checklist would therefore not be enough in itself to improve the efficiency of the governance process. Two more elements would be required:

- a series of well defined indicators relating to the scheme's vital statistics; and
- the requisite knowledge to interpret these vital statistics.

With regard to the first requirement, if checking the equivalent of the pension scheme's blood pressure is important, then so is a reliable gauge for understanding whether it is too high or too low. The second requirement comes back, once again, to the issue of trustee knowledge and understanding. It also raises the issue of just how much knowledge is required and the question of whether there is a minimum level of knowledge to read the vital signs of a pension scheme.

At the risk of mixing up metaphors, consider the following. Before a person is awarded a driving licence they must demonstrate that they know their highway code and that they know what all the controls are for and how to combine their use in such a way that they can be deemed safe to drive a car. However, they are not expected to have Lewis Hamilton's abilities behind the wheel, or to have any knowledge about car engines, gearboxes, chassis, etc. As long as they can read the road signs, understand the main indicators like the speedometer and fuel gauge, they are deemed fit to drive.

8.1.3 Summary

To draw this metaphorical musing together, it should be possible to develop a checklist to help trustees keep on top of two key areas:

- investment risk; and
- operational risks emanating from investment and hedging.

There exists the possibility that a simple checklist for trustees could help them in their governance challenges.

In the next section of this paper we propose a template for both of these areas which we believe will help trustees keep on top of the related risks, focus on the important issues and therefore help them spend their limited governance budget more efficiently. A red, amber, green traffic light system could then be employed in the final column of each checklist to highlight whether any attention and/or action is required for a particular checklist item.

8.2 AN INVESTMENT RISK CHECKLIST

In Appendix 1 of this paper we have presented our suggestion for an investment risk checklist. It comprises seven sections:

- i. Funding
- ii. Risk
- iii. Hedging
- iv. Stress tests
- v. The master plan
- vi. Performance contribution
- vii. Asset allocation

As such, we are therefore defining a minimum level of trustee investment knowledge.

We will now outline our thinking behind the seven broad groups along with the vital statistics that comprise each one and, at the same time, identify the required knowledge that a trustee needs to have in order to understand their significance. As such, we are therefore defining a minimum level of trustee investment knowledge.

- i. **Funding.** This section focuses on the big picture. It should detail the market value of the scheme's assets and liabilities, any shortfall or surplus and the funding ratio. But as we noted in Section 3.3, there can be a number of different bases for valuing the liabilities. For example, the valuation may be derived from the gilt, or swap curve, with or without the addition of a premium. In addition, the scheme actuary may provide an estimate of the scheme liabilities on a solvency basis. This is when the liabilities are viewed from the perspective of an insurance company that might be willing to buy-out the liabilities. This would be the price the insurer would charge for taking on the liabilities. Together this means that the liabilities (unlike most of a scheme's assets) can have several values, which in turn means that the deficit/surplus and funding ratio will also be different depending upon the calculation basis. In this section, trustees may wish to see funding ratios calculated on a number of bases.

Required knowledge: First and foremost, trustees will need to have a good understanding of how the scheme's liabilities arise. In other words, they need to understand the nature of the pension promises made by the scheme to the members. Second, trustees will need to have a firm grasp of the concept of discounting and how the process can be used to produce a present value for their scheme's future liabilities. They will also need to appreciate what the different valuation bases mean and why there is not just one value for the liabilities.

- ii. **Risk.** Risk is a nebulous concept, but we can characterise it as being the perceived dispersion of future outcomes around the expected outcome. While we must acknowledge that there is no single, 'best' measure of risk, since the management of a pension scheme has essentially become an exercise in risk management, it seems appropriate to us that the next section of this checklist should focus on it.

In this section we have chosen the one year VaR95 as the metric for characterising various aspects of scheme risk. Put crudely, this metric means that there is a five per cent chance, or a one in twenty year chance that the outcome will be as bad or worse than this value. We described this approach in Section 3.4.

The first indicator, ‘funding ratio at risk’, is an estimate of the deterioration in the funding ratio that might occur as a result of the scheme experiencing a negative shock that has a five per cent probability of occurring. This is the key metric in this set, because it takes account of the risks inherent in all the asset classes and in the liabilities. The trustees may also wish to keep a check on the scheme’s expected return at risk and/or its funding target at risk values too as described in Section 3.6 of the paper. The remaining metrics show the same deterioration, other things equal, in the funding position as the result of a one in twenty year adverse shock to either inflation, interest rates or equities. This gives trustees an idea of where the biggest risks in the scheme reside. Of course a scheme may have no exposure to equities, so the choice of asset classes to be analysed in this way would therefore vary from scheme to scheme depending upon their asset allocation. Finally, we suggest that the checklist reports a one year VaR95 relating to the benefit the scheme obtains from offsetting, or diversifying, risks (see Figure 2 in Section 3). The bigger this number, the better.

Required knowledge: Value at Risk (VaR) is by no means a perfect way of representing risk, but it does focus attention on the potential for things to go wrong. It can also be represented in a number of forms. In the checklist and in Figure 2, it has been translated into ‘funding ratio units’, but it can easily be translated into cash terms if required and into other units. But one way or another, VaR is part of the language of risk management. As such, trustees MUST be conversant with the concept of VaR and must understand both its strengths and weaknesses.

- iii. **Hedging.** As Figure 2 shows, for many schemes their exposure to interest rates and inflation represent very significant risks. These risks are viewed by many as being unrewarded risks. That is, factors that can create instability in the financial position of the scheme, but for no long-term reward in terms of a return over and above the scheme’s funding basis. As a consequence many schemes have sought to hedge this risk through bond holdings and through the use of derivatives, like swaps.

Given the typical scale of the unrewarded risks, it is important for trustees to determine how much of these risks they wish to hedge and to monitor this hedge over time. It is also important to bear in mind the composition of the hedge. The more that is hedged with derivatives like swaps, the greater will be the scheme’s need for available collateral (see our proposed operational risk checklist in Appendix 2).

Required knowledge: First, trustees will need a good understanding of the source of these interest rate and inflation exposures, which will again mean that they will require an understanding of the nature of the liabilities. Next, trustees will need to understand why holding combinations of bonds, swaps and other derivatives can help mitigate these risks. For example, trustees will need to understand why the value of their bonds, and in particular their derivatives hedges, may not rise and fall at the same rate as their liabilities. This will in turn require an understanding not only of hedge ratios, but also the concepts of duration and of the break even inflation rate.

- iv. **Stress tests.** The next set of indicators relate to a simpler analysis of the risks inherent in the scheme as a whole. Each indicator shows the impact that a repeat of a particular financial market crisis might have on the scheme’s funding ratio, given its current asset allocation and liability characteristics. Of course, no two crises are alike and a future crisis is unlikely to be a

Value at Risk (VaR) is by no means a perfect way of representing risk, but it does focus attention on the potential for things to go wrong.

straightforward repeat of any past crisis, but these measures give some idea of the vulnerability of the scheme to such events. Trustees could of course conceive of other scenarios that they might wish to report on the checklist.

Required knowledge: The knowledge required to appreciate the impact of these events on the scheme's current position is not technically very challenging. The minimum requirement here would be an understanding of what happened in each of the crises that the trustees wish to use to stress test their scheme's financial position.

- v. **The master plan.** All trustee boards should have a plan for the financial position of the scheme. Remember: fail to plan, plan to fail. There may be staging posts along the way. For example, a scheme may wish to be 90 per cent funded in five years, to be 100 per cent funded in ten years, and in a position to have its liabilities bought out by an insurer in 15 years. Or something like that. However, the goal could be less ambitious. It may simply be to pay the benefits as they fall due. But most importantly the whole trustee board should be aware of the master plan, what return they need to achieve on their assets to satisfy the master plan and whether they are ahead of or behind the plan. The first value in this set should therefore be the date by which the scheme wishes to be fully funded, however that is defined. This is unlikely to change from meeting to meeting, (though it might change following the triennial valuation) but we feel that it is worthwhile having a regular reminder of the ambition. The remaining metrics in this set will tend to change over time and will help the trustees understand how likely they will be to meet the plan's main objective.

All trustee boards should have a plan for the financial position of the scheme.

The first metric, the 'Expected return on assets', should represent the Trustee's best guess of the weighted average expected return on their assets, taking into account any planned changes in asset allocation. It is important to assess this expected return against the 'Required return', that is, the return needed to pay all benefits over the life of the scheme. Clearly the expected return should be at least equal to the required return, otherwise the scheme is running the risk that not all the members' benefits will be paid.

By calculating the funding ratio today and then by comparing this with where the funding ratio should be according to the master plan, it is relatively straightforward to calculate the 'Funding ratio excess/shortfall compared to plan'. Clearly, action may need to be taken if the scheme's funding ratio has fallen well below its planned value, but action may also be required if the scheme is well ahead of plan, for example, in this circumstance the trustees may wish to de-risk their portfolio.

Required knowledge: Determining the expected return on asset classes is a very subjective problem. To come to a view on the expected return on a range of asset classes, or to express views on the investment consultant's views, requires an understanding of where the expectations come from. There is no correct way to come to these views, but investment professionals usually begin with an assessment of the underlying macroeconomic conditions – this is because all financial assets – even derivatives – are ultimately some claim on the underlying economy. Forming a view on the economic environment will normally help consultants come to a view about growth and inflation trends, as well as the direction of interest rates. Next, a view has to be formed about asset class risk premia, which may in turn include estimates of liquidity premia, and in the case of asset classes that contain credit risk, future default rates. Finally, an often overlooked element of future returns is the reinvestment rate, that is, the expected return from reinvesting investment income over time.

Any investment adviser not taking into account all of these complicated and interrelated aspects needed to project asset class returns is not doing their job properly. Equally, any trustee board without the necessary knowledge to question the multiple bases for these projections is, arguably, not doing their job properly either.

To put the importance of these projections into further context, in the late 1990s the inflated expected return projections on equities was the main reason why many schemes had very high strategic allocations to this asset class, which in turn is one of the main reasons why many DB schemes are still struggling today with deficits.

- vi. **Performance contribution.** A LDI approach to pension scheme management assigns a benchmark against which the performance of the scheme's assets can be judged. This benchmark is the liabilities and is the benchmark by which the trustees can be judged, since they are ultimately responsible for the overall performance of the investment strategy which they set. This performance is evident in section (i) of this checklist. But trustees also need to monitor the performance of the individual asset classes that they have chosen as part of their strategic investment strategy, and also the performance of their managers. For this section of the checklist we have chosen to include information of the best and worst performing asset class and also the best and worst performing manager – by contribution.
Why 'by contribution'?

All managers and asset classes need to be monitored, but in our experience trustees pay far too much attention to the underperformance of a manager managing a small proportion of the scheme's assets. For example, a scheme may have made an investment in a hedge fund, representing perhaps no more than 1% of total assets. If this manager underperforms their benchmark perhaps by 1%, this means that compared to the return expected over the monitoring period, this manager would have subtracted 0.01% from the scheme's expected performance over that period. When this underperformance is considered alongside the regular fees that a scheme pays – the management fees, advisory fees, legal fees, etc – the -0.01% contribution of this manager does not deserve to be highlighted on the checklist.

Now consider the role of a manager managing a much larger proportion of the scheme's assets or, in the case of the LDI manager, perhaps 100% of the scheme's liabilities. Were an LDI manager, managing 100% of a scheme's liabilities, to underperform by just -0.01% over the monitoring period they would have subtracted the same amount from performance as the hedge fund manager whose performance against their benchmark was 100 times worse!

Asset class, or manager underperformance should never be taken lightly. But the checklist is supposed to highlight and focus attention on the big issues. Trustees need to view these performance issues in proportion to their impact on the scheme and deal with them accordingly if they want to make efficient use of their governance budget. In our checklist we have made the suggestion of keeping track of the best and worst performing asset class and fund managers by contribution, but this list could clearly be expanded to include either all the main asset classes, or all the main managers. However, highlighting the best and worst contributors, in our view is probably enough to highlight the best and worst performers at this checklist level.

All managers and asset classes need to be monitored, but in our experience trustees pay far too much attention to the underperformance of a manager managing a small proportion of the scheme's assets.

Required knowledge: *Trustees will need a good knowledge of the purpose of benchmarks to perform their role effectively. In particular, they will need to make judgments about the appropriateness or otherwise of a particular benchmark, both for the manager and given the overall objectives of the scheme. They will therefore need to familiarise themselves with the mandates that the managers have been given to make sure that each individual manager is fulfilling their mandates, but also to make sure that the mandates are not in conflict in any way.*

- vii. **Asset class holdings.** The final category on this checklist is a simple summary of the main asset class positions, with a reminder of where they should be according to the strategic asset allocation plan. Deviations from the plan may occur for a number of reasons including delays in being able to find a suitable manager and developments in financial markets causing one asset class to outperform or underperform to such a degree that desired allocations deviate from the plan. Either way, it is worth reviewing regularly where the asset allocation is relative to where it should be, which in turn allows for a discussion about the reason for any asset class holding that is outside its planned range.

Required knowledge: The knowledge required here is relatively straightforward, particularly if the checklist includes the desired asset class ranges. But once an asset class proportion is out of its range, trustees will need to remain aware of the original reason for including the asset class and for its associated range, before any action can be decided upon.

8.3 AN OPERATIONAL RISK CHECKLIST

In Appendix 2 of this paper we have presented our suggestion for a checklist that trustees may wish to employ to keep track of the operational risks that arise from the increased complexity of investment portfolios that arise as a result of investment in a derivatives portfolio. It comprises seven sections:

- i. Collateral
- ii. Collateral stress tests
- iii. Liquidity
- iv. Counterparty interest rate and inflation exposure
- v. Counterparty credit ratings
- vi. Cashflow
- vii. Documentation for review

It is essential that trustees appreciate the crucial role that collateral plays in supporting OTC derivative positions, but also the role it will play in a world where OTC derivatives are cleared via an exchange.

Once again, we have tried to define a minimum level of trustee investment knowledge needed to interpret and make good use of the checklist.

- i. **Available collateral.** For any scheme that has introduced derivatives like inflation and interest rate swaps into its portfolio, trustees will need to set aside sufficient liquid assets to meet potential collateral and/or variation margin calls (see Section 4 and 5). The first section should be fairly self-explanatory. It is meant to highlight both the amount of available collateral in cash terms and as a proportion of total assets, as well as some indication of its composition. It is also important to monitor the flow of collateral into and out of collateral accounts to get an idea of the direction of collateral flows posted by or to the scheme.

It may also be useful for advisers to make an estimate of additional sources of collateral which they might be able to obtain via the repo market, or from bank lines of credit. In other words to identify assets that might be transformed relatively quickly into assets that could be used for collateral.

Required knowledge: It is essential that trustees appreciate the crucial role that collateral plays in supporting OTC derivative positions, but also the role it will play in a world where OTC derivatives are cleared via an exchange (See Section 5). The composition of available collateral is also important; the asset class most readily acceptable to all counterparties is cash, this will be even more the case if/when pension schemes choose to have their legacy derivatives positions cleared via an exchange and when entering into new derivatives contracts after 15 August 2015.

- ii. **Collateral stress tests.** Allocating too much of the scheme's funds to asset classes that can be used as collateral comes with the opportunity cost of not investing more in asset classes with higher expected returns. However, the potential costs of having to sell assets at distressed prices to buy assets that would be acceptable as collateral, are also very high. This is why it is important to identify an 'optimal' amount to be held in the form of assets that can be used as collateral. This section of the checklist presents vital statistics to help trustees appreciate possible collateral calls.

The first metric is the '95% Collateral VaR' (see Section 4). This figure represents the total amount of collateral that a scheme might need to post to cover all but the worst five per cent of collateral calls over a given period, so in other words it would be sufficient 95 per cent of the time. Trustees could choose to use another confidence level like 99 per cent, but the essential point is to establish how much collateral might be needed to meet most collateral eventualities. This measure represents the holistic view of potential collateral calls.

Trustees may wish to have other stress tests of the collateral position reported on the checklist too to give a better flavour of the likely source of collateral calls. For example, they may wish to monitor the amount of collateral that would be needed, other things being equal, to cover a one per cent shift up in the nominal or real yield curves, or a one per cent decline in break even inflation rates.

It is important to identify an 'optimal' amount to be held in the form of assets that can be used as collateral.

Required knowledge: Once again an understanding of VaR is necessary to interpret the first metric, because decisions will need to be taken as to whether the scheme should keep enough collateral to meet 90 per cent, 95 per cent, 99 per cent etc. of all possible collateral calls, or some other value. There is no correct answer to this problem. Equally a thorough understanding of the mechanics of swaps is necessary to understand why, for example, shifts in the yield curve or in break even inflation rates would necessitate an exchange of collateral.

- iii. **Illiquid investments.** Many schemes have diversified their portfolios away from relatively liquid asset classes like developed economy equities and gilts, to less liquid asset classes, including private equity investments and liability linked investments (LLIs) such as long-dated secured leases (see Section 7). As many schemes become increasingly cashflow negative, while many more will become cashflow negative soon, the value of being able to turn scheme assets into the cash necessary to pay scheme members and to meet collateral and variation margin calls will become increasingly important. As such tying up too high a proportion of the scheme's assets in illiquid assets becomes increasingly risky. It is therefore important for trustees wishing to earn an illiquidity premium to set themselves a limit on the amount of scheme assets to be invested in illiquid assets, that is, they should set themselves an illiquidity budget. This budget should be reviewed regularly in cash terms and relative to annual pension payments plus total collateral requirements.

Required knowledge: Trustees need to understand the concept of liquidity and why some asset classes are less liquid than others. The faster any asset class can be converted into cash and the lower the cost of that transformation, the more liquid the asset class. By definition, cash is the most liquid asset class, while treasury bills and short-dated gilts are generally agreed to be the next most liquid. They also need to understand why it might be worth investing in illiquid asset classes and how they should judge the value of any perceived illiquidity premium.

- iv. **Counterparty exposure (PV01/IE01).** Trading in OTC derivative instruments involves counterparty risk, that is, the risk that the counterparty to the trade fails and is therefore unable to fulfil their side of the contract. Much of this risk can be reduced with the regular flow of collateral. However, in the event that a scheme has many OTC contracts with one bank, the failure of that bank, even where the collateral is sufficient to cover immediate mark-to-market losses, is likely to be a major market moving event. Recall the aftermath of Lehman's collapse. In such an event, a scheme may have to replace its swaps positions on less advantageous terms with other banks. Thus, if only for this reason, schemes need to spread their OTC exposures across a range of counterparties, and monitor the amount of exposure with each counterparty.

In the language of risk management these exposures are summarised with the terms 'PV01' and 'IE01':

- PV01 is measured in cash terms and, in this context, represents the amount of collateral that a bank would have to post to the scheme as the result of a one basis point (0.01%) change (probably a fall) in interest rates.
- IE01 is also measured in cash terms and, in this context, represents the amount of collateral that a bank would have to post to the scheme as the result of a one basis point (0.01%) change (probably a rise) in the break even inflation rate.

There's no avoiding it, trustees need to be conversant in the language of risk management.

Clearly the larger these values, the larger the scheme's exposure to a particular bank. Monitoring these values gives trustees a very simple metric for assessing the degree of counterparty risk in their OTC positions.

Finally, this section could include some indication of any agreed percentage limits per counterparty, to make sure they have not been broken. Indeed, it would be good practice to make sure that limits have been set.

Required knowledge: There's no avoiding it, trustees need to be conversant in the language of risk management, and PV01 and IE01 are part of that lexicon. Trustees need to understand what this shorthand means and the factors that determine their size, which are mainly the notional value of the derivative positions and their time to maturity. For example, both the PV01 and IE01 of swaps rise with notional values and with maturity.

- v. **Counterparty creditworthiness.** Other things being equal, the better the credit standing of a bank, that is, the more creditworthy the bank, the more confidence a trustee body can have about its exposure to the bank. However, defining creditworthiness is not easy. Credit rating agencies (CRAs) such as Moody's and Standard and Poor's award banks ratings according to their view on each bank's 'ability to pay'. These are independent assessments of bank creditworthiness, which trustees could monitor. Action could then be taken when a bank's credit rating declines.

An alternative metric could be the credit spread on the bank's outstanding debt, or the credit default swap (CDS) premium on the bank's outstanding debt. These are the market's assessment of the creditworthiness of the bank and are usually available in real time, reflecting the markets' timely concerns about the banks' creditworthiness. By contrast the CRA's assessment of bank creditworthiness changes far less frequently.

Trustees could choose to monitor their counterparty banks' credit standing using CRA assessments or market-determined metrics, or a combination of both. But the main point here is to make sure that each counterparty bank's ability to pay is monitored regularly so that action can be taken when that ability is perceived to have changed.

Required knowledge: Trustees would need to be fairly familiar with the way in which CRAs rate banks and to understand the ratings scale. If they were to make use of market-determined measures instead of CRA ratings, or as well as them, such as credit spreads and CDS premia, then they would need to understand how these are calculated, what their values indicate about the implied likelihood of a bank failure and to be aware of their deficiencies in this regard.

- vi. **Cashflow.** Most trustee boards monitor their cashflow carefully. However, we believe it would be useful to have a forward-looking view (say 12 months) on some aggregated cashflow items in the checklist, so that their scale can be compared easily with the scheme's other key operational vital statistics.

The first two items detail the regular contribution that members and the scheme sponsor makes. Often the sponsor's contribution is substantial and it is worth bearing in mind that this is not risk free cash. A regular review of the sponsor's covenant should therefore be carried out, to determine how much reliance can be put on this cashflow. Any significant diminution in the reliance that the trustees believe that they can place on this cashflow, or worse, an unplanned reduction in it, could trigger a review of the investment strategy. Therefore a regular reminder of the size of this cashflow on the checklist should keep this important issue close to the top of board agendas.

The difference between member and sponsor contributions and pension payments is a useful reminder of the reliance that will be placed on the scheme's investments to meet the scheme's liabilities. The more negative this number the higher will be the reliance on investment income and, eventually, sales of assets to meet the liability commitments.

It is always worth bearing in mind how much cash the scheme will need to pay to members; this is the purpose of the investments after all. But it will also be worth bearing in mind any large upcoming commitments, such as commitments to invest in new asset classes. The regular income that the scheme's investments are producing should also be reviewed regularly, perhaps from dividends, coupons and other cashflows, while trustees need to be aware of any planned disinvestments of maturing investments that could give rise to a sharp rise in available cash.

Required knowledge: The required knowledge necessary to interpret these metrics is fairly straightforward. Trustees simply need to be aware that cashflows are rarely smooth, but are instead often very 'lumpy'. The job of the trustee board is to make sure that any lumpy cash in and outflows do not have an adverse impact on the scheme's ability to achieve its return target, or its ability to pay benefits.

- vii. **Document review.** The final category is fairly self explanatory. A schedule should be put in place to review the contracts relating to any OTC contracts such as ISDAs, CSAs and GMRA's where they exist. And it is probably good practice to review other investment-related documents too, including the SIP and fund manager IMAs. Finally, in Section 6 of this paper we argued that schemes should, where possible, establish a direct relationship with the custodian of their derivatives portfolio. This relationship should involve the custodian producing a reconciliation report, detailing all of the aspects of their derivatives portfolio and highlighting valuation issues. However, whether provided directly to the trustees by their custodian or by their LDI manager, where the trustees still prefer to delegate this relationship, this report should be reviewed regularly. Ultimately it is the trustees responsibility to make sure that the derivatives' portfolios positions are recorded and reported properly.

Required knowledge: Knowledge of the purpose of each document is clearly essential and although the review of some of these documents will need to be carried out by fund managers, investment consultants and lawyers, trustees will still need to satisfy themselves that these experts are doing their jobs properly.

Often the sponsor's contribution is substantial and it is worth bearing in mind that this is not risk free cash. A regular review of the sponsor's covenant should therefore be carried out, to determine how much reliance can be put on this cashflow.

8.4 SUMMARY

Going through the checklist should not be seen as the beginning and end point of the investment due diligence process. Instead it should act as a way of focussing attention on the big issues, such as the improvement/deterioration of the funding ratio and any changes to the credit standing of counterparty banks, highlighting those areas where more attention may be needed by using a red, amber, green traffic light system in the final column of each checklist. It should not therefore be seen as a substitute for further due diligence.

Overall, we believe that these checklists should help trustees focus on the big issues facing their schemes in these complex times and help them to make efficient use of their investment governance budget.

In addition, different trustee boards may want to use different units for the metrics. For example, representing exposures to banks as a proportion of total assets or in money terms. Trustees may also choose different scenarios to the ones we have used, which may be more relevant to their scheme. For example, the equity market crash of October 1987 may be a very relevant stress test for any scheme that has a significant exposure to equity markets, but less so for a scheme that holds very little equity.

Finally, with regard to the operational risk checklist, a number of the categories would be less relevant if a scheme moves all its OTC derivatives positions to be cleared centrally. However, moving to clearing will mean a greater emphasis on collateral stress tests.

Overall, we believe that these checklists should help trustees focus on the big issues facing their schemes in these complex times and help them to make efficient use of their investment governance budget.

9. BIOGRAPHIES

Andrew Clare is the Professor of Asset Management at Cass Business School and the Associate Dean responsible for Cass's MSc programme, which is the largest in Europe. He was a Senior Research Manager in the Monetary Analysis wing of the Bank of England which supported the work of the Monetary Policy Committee. Andrew also spent three years working as the Financial Economist for Legal and General Investment Management (LGIM). Today Andrew serves on the investment committee of the GEC Marconi pension plan, which oversees the scheme's investments and investment strategy, and is also a trustee and Chairman of the Investment Committee of the Magnox Electric Group Pension scheme.

Chris Wagstaff is a Visiting Fellow of Cass Business School and co-author of The Trustee Guide to Investment with Andrew Clare. In 2007 Chris became a Member Nominated Trustee Director of the £11bn Aviva Staff Pension Scheme and a member of its Investment Committee. In June 2012 Chris became the Investment Committee Chairman and Independent Trustee Director of the £800m Merchant Navy Ratings Pension Fund. In July 2013, Chris was awarded Trustee of the Year at the Engaged Investor Trustee Awards, having been Highly Commended in 2010. He also made the Top 100 Most Influential Institutional Asset Owners in the inaugural Asset International CIO survey 2012.

APPENDIX 1: INVESTMENT RISK CHECKLIST

	YEAR AGO	LAST QUARTER	LATEST	ATTENTION REQUIRED
1. FUNDING				
Liabilities (£s)				
Assets (£s)				
Deficit/Surplus (£s)				
Funding ratio				
Funding ratio (Alternative basis)				
2. RISK – FUNDING RATIO, 1 YEAR VAR (95)				
Funding ratio at risk				
Inflation risk				
Interest rate risk				
Equity risk				
Diversification				
3. HEDGING				
Impact on funding ratio following a re-run of:				
October 1987				
Collapse of high tech bubble				
Liquidity crisis 2008/2009				
5. THE MASTER PLAN				
Projected full funding date				
Expected return on assets				
Required return				
Funding ratio excess/shortfall compared to plan				
6. PERFORMANCE CONTRIBUTION				
Best performing asset class				
Worse performing asset class				
Best performing manager				
Worst performing manager				
7. ASSET CLASS HOLDINGS				
Proportion in asset class 1 (Range X% to Y%)				
Proportion in asset class 2 (Range X% to Y%)				
Proportion in asset class 3 (Range X% to Y%)				
Proportion in asset class 4 (Range X% to Y%)				
Proportion in asset class 5 (Range X% to Y%)				
Proportion in asset class 6 (Range X% to Y%)				

APPENDIX 2: OPERATIONAL RISK CHECKLIST

	YEAR AGO	LAST QUARTER	LATEST	ATTENTION REQUIRED
1. AVAILABLE COLLATERAL				
Available collateral (£s)				
Composition of available collateral (Cash/Gilts)				
Available collateral (% of total assets)				
Composition of available collateral (Cash/Gilts)				
Total collateral in/outflow (£)				
Potential additional collateral (£)				
Potential additional collateral (% of total assets)				
2. COLLATERAL STRESS TESTS				
95% collateral VaR				
Nominal gilt yield curve rises by 1%				
Real gilt yield curve rises by 1%				
Break even inflation rate falls by 1%				
3. ILLIQUID INVESTMENTS				
Cash terms (£)				
As % of total assets				
As % of pension payments + 95% collateral VaR				
4. COUNTERPARTY EXPOSURE (%PV01/IE01)				
Bank 1				
Bank 2				
Bank 3				
5. COUNTERPARTY CREDITWORTHINESS				
Bank 1				
Bank 2				
Bank 3				
6. CASHFLOW				
Over next 12 months:				
i. Members' contribution (£)				
ii. Sponsor contribution (£)				
iii. Total payment to members (£)				
Net = (i) + (ii) – (iii)				
Additional commitments over next year (£)				
Annual cash inflow from investments (£)				
Disinvestments & maturing investments (£)				
7. DOCUMENTATION DUE FOR REVIEW				
SIP				
IMAs				
ISDA/ GMRA/CSAs				
Derivatives portfolio reconciliation report				

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