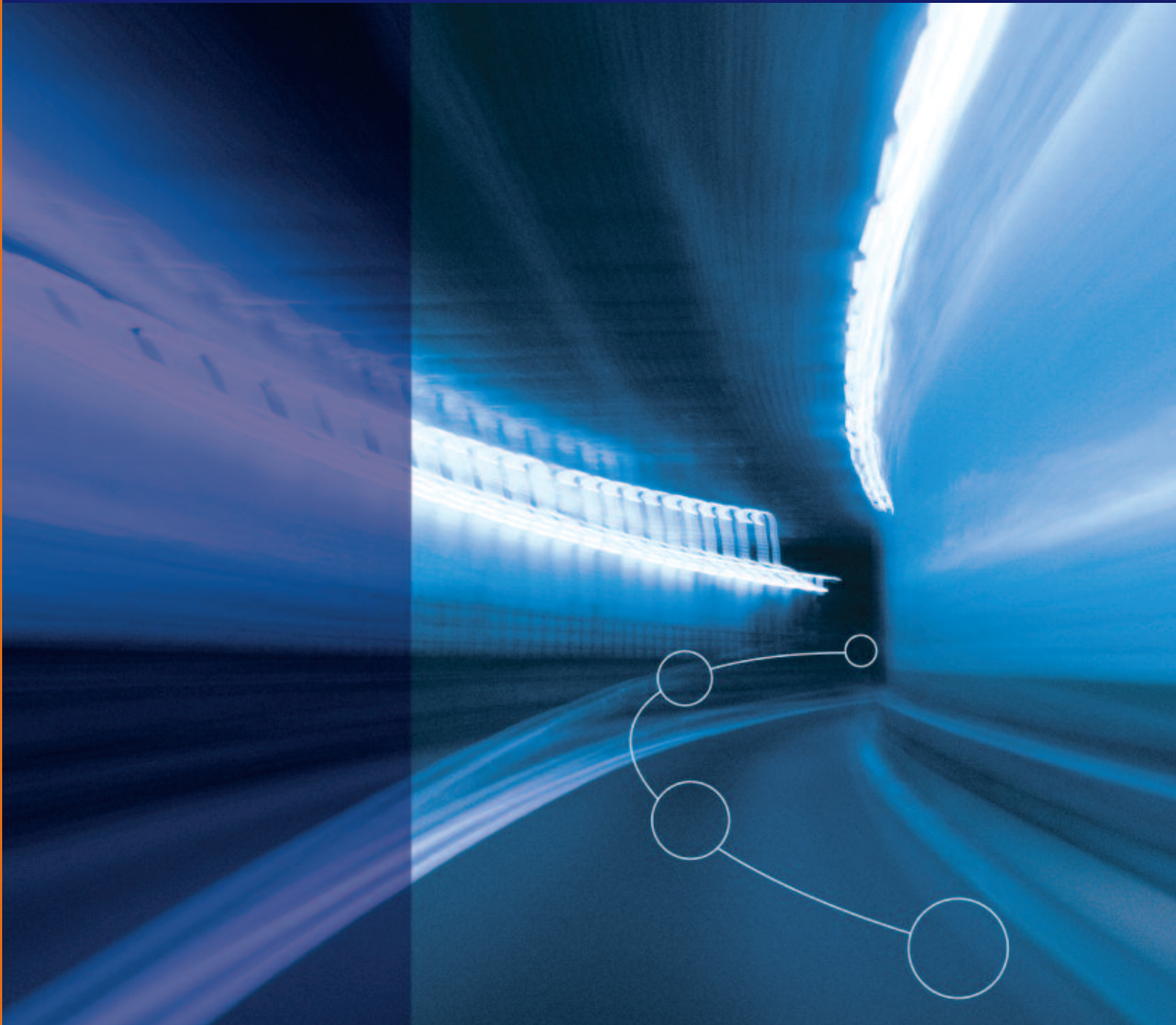


Changing lanes

December 2004

Thinking ahead – **doing risk better**



Changing lanes

doing risk better

"Take calculated risks.

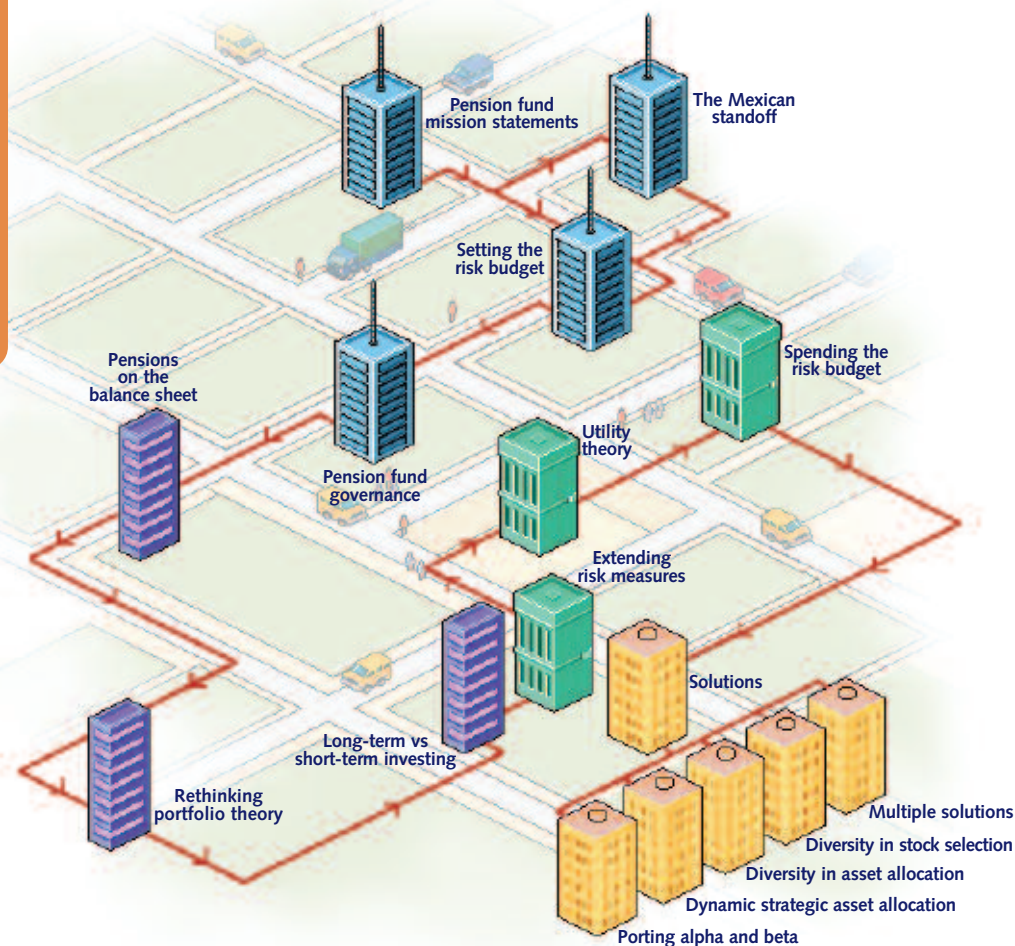
That is quite different

from being rash"

George Patton

The understanding and management of risk remains a difficult subject for both the trustees and the sponsor and, increasingly, requires significantly enhanced levels of expertise as the complexity of pension fund management increases. In the papers that follow, we argue that pension funds can position themselves significantly better for the future. *Changing lanes* challenges current views of risk-taking in pension funds, seeks to make risk management more explicit, and offers a number of suggestions as to how we might do things differently in future.

The *Changing lanes* analogy is first applied to whether risk should be taken at all in a pension fund. In broad terms, the majority of UK pension funds are travelling down the middle risk lane (we could argue about how many lanes there are, and how far over the majority of funds are) and we question whether many should not in fact switch lanes – either to a lower risk lane, or even, for some, to a higher risk lane.

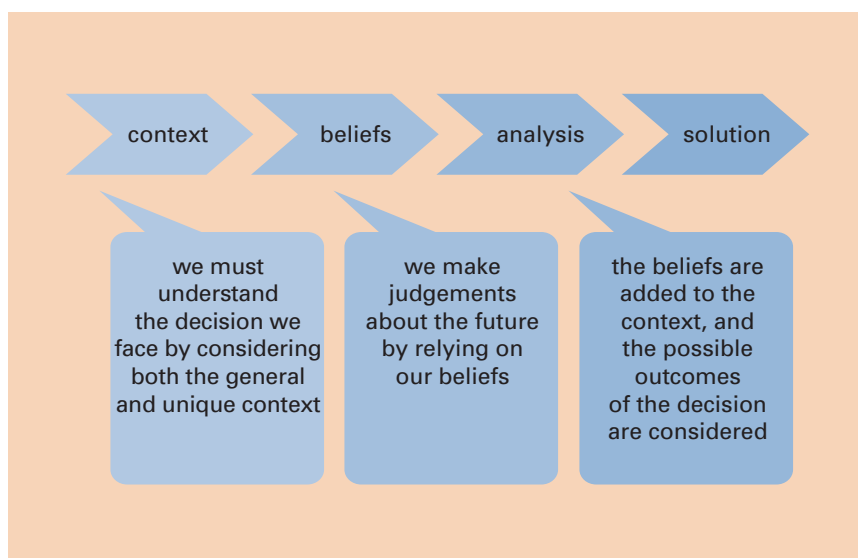


The most important aspect of this question is the extent to which the fund and its governance can be viewed as competitively positioned to exploit risk. We take the view that the investment challenge is difficult and fast-changing, and for appropriate returns to be captured, certain competencies and disciplines will be necessary. A relatively high competency hurdle is likely to be appropriate as the

returns achieved must be sufficient for the amount of risk taken.

Why take risk at all?

Changing lanes seeks to bring greater clarity to this difficult area. We will argue that risk should only be taken on the foundation of clearly understood reasons – and these should ideally be shared positions of both the trustees and the sponsor.



Where to take risk?

The majority of risk taken in pension funds today remains due to their exposure to equities despite attempts to reduce reliance on this single source of return. To stretch our analogy somewhat, do we continue to use the M1 on a Sunday night because that is what we have always done, or should we try the M42/M40 combination? We consider how we can re-organise our return-seeking assets (equities, property and others) and combine these with risk-avoiding assets (bonds and swaps). The significant challenge is to identify the appropriate mix of these two groups and manage the risk exposures accordingly.

How much risk?

The concept of risk budgeting was introduced in our 2003 publication *Remapping our investment world*. The overarching goal of risk budgeting is to maximise investment return at an appropriate level of risk.

The difficulty with this goal lies with satisfying both the members' and the sponsor's needs at the same time.

The objective of risk budgeting is to get both the trustees (representing members' interests) and the sponsor to sign up to the same strategy, in other words the same level of risk.

With respect to risk-taking, we therefore identify three main questions for a pension fund to answer: why? where? and how much? We go on to consider possible solutions.

Finding solutions

Finding a solution to a problem can be broken down into three parts: context, beliefs and analysis.

Changing lanes takes the reader on a 'doing risk better' journey, starting with context and moving through beliefs and analysis to solutions. We group the papers into these four sections:

- **Context** sets the scene in determining the goals of the pension fund through assessing the mission and setting the risk budget which, in times of difficulty, can lead to tension between the sponsor and members (*The Mexican standoff*).

It introduces governance, which leads into...

- The **Beliefs** section builds a better map of investment beliefs which will enable risk to be employed more efficiently. We explore this in considering the impact of pension funds on corporate balance sheets and the necessity for being more "joined-up". We further review developments in portfolio theory and long-term investing, and what implications these may have for funds.
- Risk budgeting has, to date, focused on a small number of risk measures. In **Analysis** we explore how alternative measures and other tools, such as a better understanding of the utility function, may assist in spending the risk budget more efficiently.
- In the final section, **Solutions**, we offer some new ideas on managing fund investments better. We suggest that investment efficiency can be improved through adopting different approaches to increase diversity in asset allocation and in stock selection. We further suggest that dynamic asset allocation and porting alpha and beta should offer funds further scope to add value.

We believe that change is likely to occur in a number of areas, with increasing attention being paid to the risk management of pension funds in the context of the sponsoring employer. Governance structures will need to adapt to optimise the risk/return payoff in the more complex times ahead.

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These research papers have been written by members of our Thinking Ahead Group (TAG) who sit within the Investment Practice at Watson Wyatt. Their role is to identify and develop new investment thinking and opportunities not naturally covered under mainstream research. They seek to encourage new ways of seeing the investment environment in ways that add value to our clients. The contents of the research papers will not necessarily reflect the opinions of Watson Wyatt. No action should be taken on the basis of any content in this publication without seeking specific advice.

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Pension fund mission statements

Building a clearer vision for pension fund investment

“Begin with the end in mind”

Stephen R. Covey

This paper examines the overarching objectives of a pension fund as contained within its mission statement. We explore the challenges to the pension mission, consider the position of the various parties and offer thoughts on how the mission may be framed in future.

Defining the mission

In challenging times, it is doubly worthwhile to restate the mission. Mission statements may vary but they always include thoughts about the core purpose and key goals of the enterprise. This paper grapples with two basic questions of what a pension fund is for and which key attributes will allow it to succeed.

Core purpose

The major stakeholders in a defined benefits pension fund are the sponsoring employer and the members, represented by the trustees.

Pension funds serve both employees and employers providing:

- An attractive form of savings to employees

- A means of attracting and retaining staff, alongside a wider range of benefits for employers.

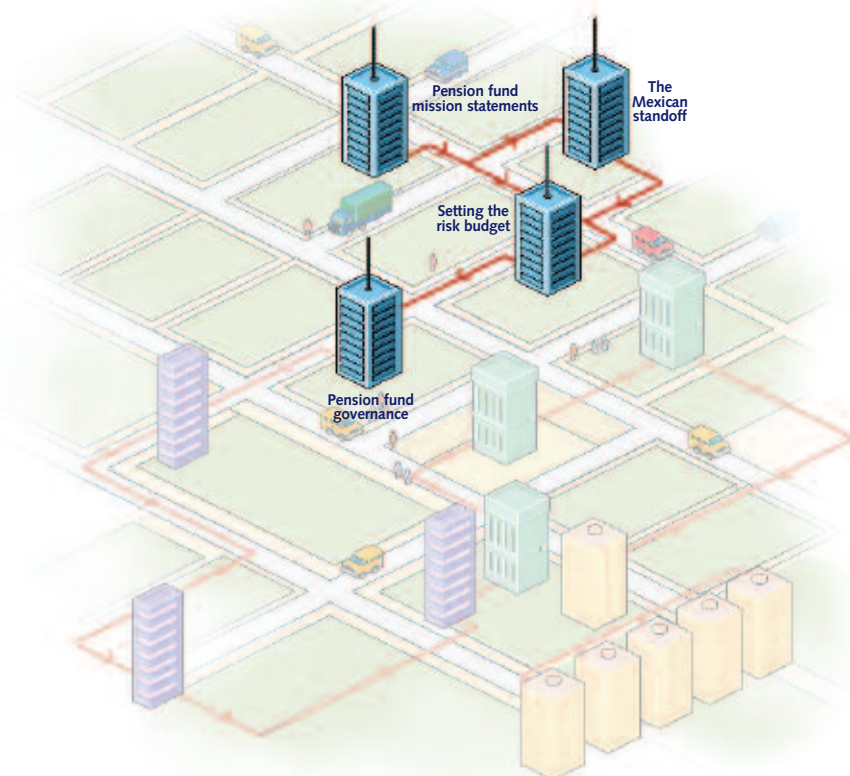
In short, the core purpose of pension funds is to produce value propositions for *both* parties. The strength of the value proposition depends critically on the effectiveness of the benefit design and the efficiency of the financing of the benefits through contributions and investment.

Central to this paper is the investment proposition which for the members, focuses on the security of promised benefits and for the sponsor, centres on attractive levels of contributions for the benefits paid. The investment goal of this proposition is often articulated as:

‘to maximise the investment return at an optimal level of risk’

The difficulty with this goal lies with satisfying both the members’ and sponsor’s needs at the same time. The risk aspect of the goal is most relevant to the members while the return part is most relevant to the company. The objective is to get both the trustees (representing the members’ interests) and the sponsor signed up to the *same* strategy. The key concept is to sign them up to the same ‘optimal level of risk’.

When the fund is broadly in balance or in surplus, there is a rough equilibrium of interests (for simplicity we ignore the possibility of contingent assets and liabilities which may affect stakeholders’ behaviour). From time to time, however, this equilibrium of interests will be challenged. In times of deficit, what is good for the members may be against the company’s interests and vice versa. Investment strategy under these conditions needs special care and we analyse this position in more detail in *The Mexican standoff*.





Set against this background of potentially fluctuating interests, we believe that two additional issues are converging to impact upon the fundamental basis of the mission:

- The growing tendency of companies to consider their pension fund as closely linked to the business and not a completely separate entity, a trend reinforced by new-style accounting (see *Pensions on the balance sheet*)
- The change in the pensions deal over time, which is now more contractual and not discretionary, which reinforces the importance of the investment return to the company.

Both these factors lead to the conclusion that the company should be involved in the mission-setting process, notwithstanding the legal position in which the trustees are unequivocally in charge (see *Pension fund governance* for how partnership governance structures might be established).

Reviewing the basis of the mission

Given the increased involvement of the sponsoring employer, the obligations of the parties need to be redefined. The fundamental objective remains the same but the balance between the parties needs to be reassessed. We believe that the mission can be honed down to one of two statements: **short-term balance sheet control** or **long-term value creation**.

Short-term balance sheet control mission

A mission statement aligned to short-term balance sheet control would be appropriate when the primary goal is to keep risk at very low levels. The investment goal of this mission statement could be similar to the following:

‘to maintain stability of returns relative to liabilities over shorter-term periods of one to three years’

Important details include how liabilities are measured (accounting basis?) and the degree of stability (specify a one-year Value at Risk?). However, the key concept here is that the trustees (hopefully in conjunction with the sponsor) are deliberately choosing to emphasise security over incremental return. Consequently, improvements to benefits, or the repair of deficits, will need to be achieved through contributions.

Long-term value creation mission

A mission statement aligned to long-term value creation would be appropriate when the primary goal is to employ risk to create value. This mission statement could be similar to:

‘to produce excess returns relative to liabilities over longer-term periods of 5 to 10 years’

Important details here are concerned with what level of excess returns would be deemed attractive and what risks would be expected. In contrast to the short-term balance sheet mission, the deliberate choice here is to embrace the risk of worsening security/widening deficits while seeking to improve matters through harvesting incremental return.

Fitting a fund and its sponsor to a mission

Which mission statement would be suited to which fund?

There are a number of considerations which we group under the headings of value creation drivers and risk tolerance factors. We explore the definitions of these in *Setting the risk budget*. By the value creation drivers we mean factors that support taking risk. The first of these is risk-sharing. Pension fund design was originally centred on the principle of sharing of risk between members and the fund sponsor. Both parties accepted the risk which they believed would work in their favour and create value. Over time, with successive layers of guarantee being provided, the risk-sharing of pension funds has grown quite indistinct. This has left funds divided into two camps: those still retaining risk-sharing in their arrangements which would have a good reason to favour a value creation mission; and those trying to minimise any risk-sharing which would have a good reason to limit risk overall and choose a balance sheet control mission.

The second value creation driver is having the governance in place to be successful with the risks being taken. For this, the governance budget requires having appropriate time, resource and expertise to identify and harvest outperformance opportunities.

The final value creation driver is to have investment beliefs to support the continuation of strategy through periods of market uncertainty. There is evidence to show that investing over the long term offers a better risk-adjusted return for those investors prepared to wait and weather the short-term volatility.

Factors and drivers appropriate for the different missions	Short-term balance sheet control mission	Long-term value creation mission
Value creation drivers		
Risk-sharing over time	Low	High
Governance budget	Low	High
Investment beliefs	Limited	Strong
Risk tolerance factors		
Covenant	Weak	Strong
Funding	Varies	Varies
Liabilities	Mature	Immature

Moving to risk tolerance factors, an assessment of the covenant strength is essential. A weak covenant, perhaps reflected in large pension liability relative to the market capitalisation of the sponsoring employer, would argue in favour of a focus on a short-term balance sheet control mission. Conversely, a scheme that has little impact upon the operations of the sponsoring employer and has the support of the sponsor is in a better position to take a longer-term view of strategy.

A weak funding position would not, of itself, tend to support either mission proposition. A weak funding position with a medium to weak covenant may suggest a balance sheet focus, whereas weak funding with a strong covenant could be consistent with long-term value creation.

Unless associated with a very strong covenant and a good funding position, we would ordinarily expect very mature schemes to have more of a focus on the balance sheet control mission.

Translating the mission into strategy

Once the mission is set, the detail of the investment strategy can be addressed.

Short-term balance sheet control missions will typically involve investment strategies with a significant focus on matching liabilities either through bonds, swaps or derivative structures. Alpha generation may generally be a lower priority, so there is limited scope for active management.

A long-term value creation mission will normally translate into an investment strategy with emphasis on growth assets. Assuming strong investment beliefs, the strategy would tend to have a large active management component.

In conclusion

Pension fund mission statements have typically been short on detail and opaque in respect of the deal between the parties. We suggest that an enhanced attention to the detail of a mission statement is particularly important given the need to meet the requirements of both principal stakeholders – members and fund sponsor. This is particularly important given that the balance between these two stakeholders has shifted.

Setting the risk budget

Successfully exploiting risk

“Either you understand your risk or you don't play the game”

Arthur Ashe

The paper on *Pension fund mission statements* introduced the concepts of value creation drivers and risk tolerance factors when considering investment risk. This paper explores, in greater detail, the influence of these drivers and factors on the amount of investment risk that is appropriate for a pension fund to take.

What's new?

The concept of risk budgeting can no longer be considered breaking news. Having written about it last year in *Remapping our investment world*, why return to it so soon? The short answer is that there is more to say. Last year we suggested that the risk budgeting process had three components:

- How much risk is my fund taking?
- Is this an appropriate amount?
- Where should we take risk?

Quantifying existing risk, and assessing whether the likely impact on the sponsor's balance sheet is acceptable, is a pragmatic place to start. However, we need to ask an additional question: even though you *can* take risk, *should* you? In this light we can adapt our three-stage risk budgeting process to the following:

- Can risk be exploited successfully?
- How much risk is appropriate?
- How can the fund optimally mix risk and return?

Setting the risk budget then becomes a matter of considering the first two lines of the diagram below.

Value creation drivers

We identify three drivers that we believe must be present for a fund to employ risk profitably. We base this reasoning on the belief that the investment world is competitive and dynamic and, consequently, returns will tend to be captured by those with a competitive advantage. There are always returns reserved for the lucky but our general stance is ‘why take risk in the absence of a competitive advantage?’.

Risk-sharing over time

This area is hard to define but to use risk effectively to generate value over the long run, we believe that a degree of continuity will be required, allowing policies or strategies to bear fruit and avoiding knee-jerk reactions. In this light we would expect successful risk-takers to be those where the managers of the company and of the fund are able to support risk-taking through time. In other words, each side is likely to see the other reap disproportionate benefit from time to time. Risk-sharing breaks down when the advantages (or costs) become one-way. We would also expect to see cross-generational risk-sharing, in other words different generations being reasonable with each other even when bargaining power shifts to favour one over the other.

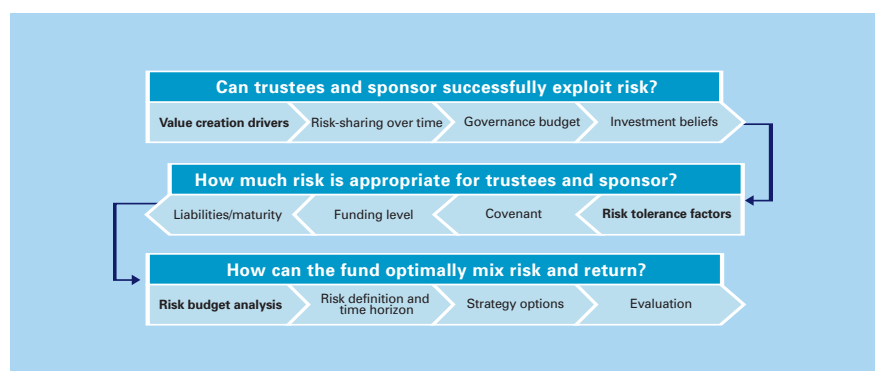
We acknowledge that this will be difficult to achieve in practice (arguably most easily achieved for cash balance or hybrid designs), but we question how wise it would be for a pension fund to pursue a risky strategy without a long-term commitment from the sponsor.

Governance budget

Taking risk effectively requires governance resources to set strategy and monitor and control progress. A governance budget is comprised of the time devoted to investment matters, the investment skill of the individuals and the organisational effectiveness with which the time and skill are brought together. If we accept that the investment world is dynamic and competitive, we will need to secure a comparative advantage by devoting more time (and/or resources) to investment, through raising the skill levels of the governing body, or through improving the organisational effectiveness (see *Pension fund governance*). It is clear that any of these actions will probably require effort and additional cost, but the potential rewards may well outweigh the cost. Again, why expect to profit from risk-taking with only an average governance budget?

Investment beliefs

The third value creation driver concerns the investment beliefs held.



The goal is to develop superior beliefs, based on sound understanding and research, to secure a competitive advantage over other investors. An important example is the extent to which beliefs can be used to position long-term investors to do better than short-term investors.

The long-term investment case is based on:

- Access to certain long-term investment styles which exploit the overshoot and undershoot of prices relative to their true fair values
- Avoiding unnecessary transaction costs through less frequent trading
- Earning a premium for investing in illiquid assets
- Engaging more successfully with companies with respect to long-term wealth creation strategies
- Exploiting mean reversion effects in equity prices, which should give long-term investors a higher return per unit of risk than those experienced by short-term investors.

In a similar way, we could develop or explore other beliefs to secure a competitive advantage over other investors. These beliefs could be market-related, such as:

- What 'regime' of inflation and corporate profitability are we in?
- Will equities outperform bonds over the long term?

They could be beliefs about fund capabilities:

- How is the fund placed to exploit investment opportunities?
- Does the fund have views about capacity and size, or the speed with which decisions need to be made?

Watson Wyatt core investment beliefs

- The trustees' first task is to decide the extent of risk to be taken, and how this can be implemented consistent with the governance structure in operation.
- Given the considerable impact of governance, the sponsor/trustees should only invest in asset classes for which they and their managers have adequate governance, a flow of useful information, sufficient alignment of interest and reasonable controls.
- Asset allocation policy is the primary driver of long-term success. Active management can add value over benchmarks but the governance has to have high competency to achieve this.

The value creation drivers address the question of whether risk can be exploited successfully. The next question is how much risk is appropriate. The risk tolerance factors seek to address this issue.

Risk tolerance factors

Covenant

We define covenant as the ability and willingness of the sponsor to make good any deficits in the fund. The events since the turn of the century have shown how fast the strength of the sponsor's covenant can change. Perhaps the silver lining to this particular cloud is the removal of any complacency concerning the sponsor's ongoing support.

We are also seeing a move away from considering the covenant in purely subjective terms towards attempts to quantify matters. Publicly available information can assist in this quantification process. An example of this would be to consider the credit rating of any corporate bonds issued. The credit rating gives a market-assessed probability of default over the remaining

life of the bond. The problems we have in applying this to the covenant include the fact that the support for the pension fund is likely to be required over a far longer time frame than any bond in issue, and that the probability tells us very little about the consequences should a default occur. Therefore, from a trustee perspective, risk might be underestimated by this measure.

We can supplement the use of the credit rating with other quantitative measures that would assess the 'drain' of the pension fund on the accounting figures (whether profits or cashflows), albeit with the caveat that these are not forward-looking measures. To get at a forward-looking measure we will ultimately need to include subjective measures. For example, can we infer that a company's willingness to stand fully behind a pension fund will decline once the fund has been closed for a number of years and the current management feels less attachment to the members?

Despite the difficulties, we believe that trustees must assess the strength of the supporting covenant, as following a high risk strategy in the light of a weak covenant may be inappropriate. A process of close engagement with the company is essential to achieve the best results, although from time to time, engagement might be difficult (see *The Mexican standoff*).

Funding level

The second risk tolerance factor is the funding level. We suggest that the appropriate level of risk will change as the funding level changes, although this is not without difficulty. As described in *Utility theory*, not everyone's reaction to a loss, for example, is the same. Some might be inclined to adopt a 'double or quits' attitude while others will seek to preserve what remains. The situation will be further complicated by the Pension Protection Fund (PPF) which may introduce a problem of moral hazard – members will be covered by the PPF anyway, so why not pile on



the risk even though underfunded? We exaggerate for effect, but the point remains. Instead we suggest that, other things being equal, risk should be appropriately constrained in underfunded situations so as not to make the matter worse, but can be raised for funds in surplus. Obviously other things are seldom equal, so we need to make a judgement here in the context of the other two risk tolerance factors.

Liabilities/maturity

The final factor relates to the liabilities and the maturity of those liabilities. The certainty of the levels of payments (size, date) for immature schemes, where the average payment is more than 20 years out, is very low due to demographic and other uncertainties. Given this low level of certainty, it might be viewed that close matching of such liabilities is less justified than where liabilities are more certain, as in mature closed pension funds. Taking these extreme examples, we can see that for a new fund with only young active members we are likely to be fairly tolerant of risk. For a long-closed scheme with only retired members we are likely to be less tolerant of risk.

Taking these three factors together, we believe that trustees and sponsors should work closely in defining how much risk it is appropriate for the pension fund to take. This may include initially developing a view of what constitutes risk in the context of the fund given that there are multiple definitions. The importance of different definitions of risk will be dependent on the sponsor's situation and on the fund's mission and investment goals. Arguably more important though, is the question of whether risk should be taken at all.

In conclusion

We believe this paper brings a new dimension to risk budgeting, namely that just because you can take risk doesn't mean you should. We accept that the issues raised may be difficult to grapple with, but we believe they are the basis for running the investments of a pension fund.

The Mexican standoff

Resolving differences when funds are in deficit

"It is not who is right,
but what is right, that
is important"

Thomas Huxley

Mexican standoff:
A confrontation in which
neither party can win

In defined benefit (DB) pension fund good times (assets at least equalling liabilities), the objectives of trustees and sponsor can co-exist peacefully, and a win-win partnership is possible. In bad times, however, when funds are in deficit, and particularly when the business conditions of the sponsor are difficult, we find potential conflict and a possible impasse. This paper analyses the position and suggests ways forward in which the impasse can be resolved amicably.

The good times: an aligned view

When the pension scheme is well funded and the corporate covenant is strong, both the sponsoring employer's and trustees' objectives can be met satisfactorily. The sponsor is able to manage its contribution costs and the pension fund impact on the balance sheet, while the members have confidence in the provision of pensions.

Surplus can complicate this picture somewhat for two reasons. First, it is often not clear who has the right to any surplus generated by favourable investment performance, at least before the event. Second, companies may find they cannot gain from surplus above a certain level. Notwithstanding this,

the objectives of the trustees and sponsor are similar. It is unlikely that there will be any unhealthy tension between these stakeholders in their preferred investment strategy.

The bad times: some disagreement

In contrast, an unhealthy tension about investment and contribution strategy can occur between the trustees and sponsor when the pension fund is in deficit. Assume in our example below that the fund in question has a significant deficit and currently has an equity-oriented policy. As the company and trustees address the dual issues of contribution rate and investment strategy, what are the views of each party? The following is a list of points commonly heard:

The company's view

1. It will cost more in contributions if the fund invests more in bonds.

The first issue is cashflow. The sponsor wishes to limit the potential harmful impact the deficit may have on the company's financial performance. In many situations, it will be facing increased contributions to reduce and clear the deficit. The overall size of the contribution commitment is often influenced by the investment strategy. Generally higher contributions are required for strategies that emphasise bond investment because less of the benefits will be expected to be ultimately paid from investment returns (it being assumed that bond returns are likely to be less than equity returns in the long term).

2. Pension costs in the company accounts will rise if the fund invests more in bonds.

The second issue for the sponsor is pension accounting. As described in *Pensions on the balance sheet*, accounting standards still act in support of equity investment in their treatment of the costs of a fund in the income statement.

3. The deficit can be eliminated with the benefit of the fund's equity policy if we think long enough into the future.

The third issue for the company to think about is linked to the previous two. Clearly the company needs a plan for dealing with the deficit. Making good a deficit can only come from two sources: additional contributions (not attractive) and investment return. The view of the company, generally, is that with the benefit of the long time horizon of the fund, and assuming a modest 2% per annum or so above what is available from bonds, the gap can be filled over a number of years.

4. Selling equities and buying bonds would lock in the losses the fund has made in equities.

Decisions of future asset allocation are also influenced, rightly or wrongly, by the current view of the market.

The trustees' view

5. Contributions are the best way to fix the deficit.

The trustees are concerned first and foremost with the security of the members' pensions. In the same way that 'a bird in the hand is worth two in the bush', the trustees would favour a higher current contribution rate from the sponsor in order to restore the funding level (particularly in the form of a large cash injection). The problem comes if this view is not shared by the company.

6. A bond-oriented policy improves short-term security by limiting the chances that the deficit will get bigger.

The second consideration turns to the investment strategy: what can be done to improve members' security? This is where we find that beliefs vary. The theoretically correct view of the position in the immediate future is to favour a reduction in the investment risk being taken in the fund and this would generally involve reducing equity exposure and increasing



holdings in bonds, particularly those which best match the liabilities. Such a strategy improves the short-term member security, particularly when the covenant is weak. It does not, however, resolve the underfunding issue. It is also likely to force higher contributions, under the reasoning outlined earlier, bringing the trustees into conflict with the sponsor. This leads the trustees down a third avenue in their thinking.

The lower contributions that might be expected through holding equities should be thought of as counter-balanced by the additional risk involved for both members and sponsor. Similarly, while it may appear attractive to repair a deficit by assuming an equity risk premium over a distant horizon, the argument often omits appropriate consideration of risk – both with respect to outcomes worse than

A better process

In our view, setting the correct amount of risk to be taken requires a lot of care by both parties and, critically, appropriate engagement between the two. The process should entail:

- Decisions on investment and funding principles should be jointly discussed (and jointly owned wherever possible)
- Decisions on contributions and investment strategy must be looked at together
- Better decisions on investment strategy can be made relative to an objective gilt-based value of the liabilities (see *Pensions on the balance sheet*), otherwise circular arguments can arise.

A partnership approach to setting investment strategy is vital and how this could be achieved is explored in *Pension fund governance* paper. In advocating this approach to strategy, we have to recognise that when there is a weak funding position and potentially weak covenant, the trustees have the key role with member security as the primary objective. They need to listen to company inputs in considering the options but they have a strong legal and moral responsibility to decide strategy based on member security considerations.

Company

1. Bonds increase contributions – *but equities increase risk*
2. Bonds increase accounting costs – *but balance sheets and pro forma accounting is more balanced*
3. Equities to rebuild funding – *but consider also downside at the horizon and outcomes along the way*
4. Unwilling to lock in equity losses – *but equities may still be fully priced*

Trustees

5. Contributions to rebuild funding – *but this may not make enough of a difference*
6. Bonds improve short-term security – *but future security will be influenced by performance and contributions*
7. Equities needed to rebuild full funding – *but the trustees may be too ready to accept the company's position*

7. We support an equity-oriented policy as the best way forward for the deficit to be eliminated.

If there is a low likelihood of increased contributions by the company, the trustees may concede that equity strategies are more likely to rebuild a fully funded position in the future. After all, bonds merely 'lock in' lower levels of return insufficient for the task at hand. This line of thinking is often adopted when the external conditions faced by the sponsor are difficult. Under such circumstances, the trustees clearly would not wish to trigger higher contributions. This thinking may seem to support an equity-oriented stance when trustees reflect on which is more in their members' interests – an extra pound paid into the fund or available to the business.

How valid are these views?

All of these views are incomplete in one way or another.

Contributions may turn out higher if the bond content is higher, but that ultimately depends on actual returns.

those expected and to the risks during the journey. Pension costs will vary by the accounting standard used. Expected returns are used as the basis of the financing cost of pensions, producing lower costs for higher expected return strategies. Balance sheet figures will in future bring in *actual* returns and analysts will also do pro forma comparisons, diminishing the accounting advantage of equity-oriented strategies.

All else being equal, bonds improve immediate security. This is because there is more downside risk to the members from a volatile strategy if the company were to be wound up, while the company retains proportionately more upside. However, security of members' benefits is always complex, particularly because of the different priorities of membership types. Some joint consideration of the investment strategy and the contributions would be needed to make sure that the security is improved overall.

In conclusion

Investment strategy has been difficult to decide during periods of deficit. The different and often conflicting views of the company and the trustees have led to a form of stalemate in changing the strategy. In most cases, very little has changed.

In a classic Mexican standoff, there is no winner. Is this inevitable? In our view, a resolution to the standoff is possible by taking a partnership approach in determining both investment and contribution strategies.

Pension fund governance

Learning from the corporate model

“That government is best which governs the least, because its people discipline themselves”

Thomas Jefferson

The purpose of this paper is to define, understand and promote a better system of governance for pension funds. We offer thoughts on future structures of governance, focusing on:

- The incorporation of higher levels of expertise for activities that require them
- The separation of the executive and governing functions
- A partnership model covering both trustees and sponsor.

We suggest overall that greater use of delegation will be desirable given the more complex elements in the present day investment challenge.

Better governance – what is it worth?

There are a number of studies that seek to place a financial sum on the loss stemming from poor governance. The results of these studies may, however, raise more debate about the applied methodology than promote an interest in the topic. Although governance may be difficult to define and hence measure we contend that, if done properly, it can add value or, if done badly, can detract from value.

What is governance?

A dictionary definition of the verb to govern provides: 1. *rule, direct or control*, 2. *to exercise restraint over, or* 3. *to decide or determine*. All of these

activities should be exercised by trustees and their use is legitimised by the authority of trustees to act in a fiduciary capacity on the beneficiaries' behalf. The trustees gain their authority through the proper interpretation and application of the terms of the trust deed and legislative provisions. Through this authority the trustees are able to provide the intended benefits, in tandem with protecting the longevity of the fund until the final payment of the last remaining member has been secured.

The problem with the authority bestowed upon trustees is, however, that for any given decision many different routes may legitimately be taken, each resulting in a different consequence and with varying ramifications for the many interested parties. Often the route followed may be influenced by the recommendations of advisers not directly accountable to the pension fund's membership.

The essence of governance thus involves *legitimacy* to act and having confidence that any given decision is formulated on a basis of sound *information*, follows adequate *deliberation* by individuals with the necessary *expertise* and is *implemented* in a manner that achieves the objective of the decision. Implementation typically implies an ongoing assessment of the success or otherwise of the decision.

There is unlikely to be a single pension fund that does not, either expressly or implicitly, undertake the steps we have detailed to reach a decision. Here lies the biggest problem with governance – everyone thinks they are doing governance and most think they are doing it well. Few trustee boards, however, actively challenge this assumption and evaluate themselves objectively, or even comparatively. Even if governance is being done well, we think that most sponsors and members would want their trustees to strive to do it even better and more efficiently.

In order to assess whether it is being done well, we suggest that it is necessary to deconstruct the components and assess whether they individually meet the requirements of good practice.

Legitimacy

The pension fund needs to be properly constituted and the individuals charged with taking the decisions must be appointed in accordance with statutory requirements and the rules of the trust deed. Continuing legitimacy resides in the proper interpretation of the rules and regulations and given the breadth of some of these provisions, it is here that trustees face one of their biggest challenges.

Information

A decision should not be taken in the absence of adequate and relevant information. The information may be generated either internally or obtained from third party advisors. The trustees need to be in a position to interrogate the accuracy of the information and assess its usefulness. To do so may require expertise beyond the collective knowledge of the trustee board and, in this instance, the trustees will either need to hire the necessary know-how or improve the skill base through training.

Deliberation

The Department for Work and Pensions review of compliance with the Myners recommendations found that on average 10.6 hours are spent in board meetings every year, with less than four hours per year spent on investment matters¹. In our experience, the investment deliberations are generally longer than this. We still feel the time spent is not sufficient to give due regard to the often complex matters facing pension funds. Furthermore, having sufficient time is, of itself, inadequate: deliberation requires a combination of enough time allocated to individuals with the necessary expertise to form the decision.



Collective decisions tend to be formed along a spectrum of coercion through to consensus, with the interplay of individual personalities determining which driver dominates. It is important for the trustees to recognise the dynamics of their decision-making and ensure that reality matches the desired position. Similarly, the level of risk-aversion for individual trustees will vary and the combination of the group's risk-aversion will form strategy. It is important to be able to identify the individual biases that exist to ensure alignment with the fund's mission. We discuss this further in *Utility theory*.

Expertise

It is a recurring theme of government and industry reviews that the level of (investment) expertise of trustees needs to be raised. The standard promoted in the Pensions Act 2004 requires trustees to have 'knowledge and understanding' of various matters. This is not in conflict with the inclusion of lay individuals in the trustee role, but it does imply a greater degree of training and financial education than currently exists. There are some activities, however, where we question whether trustee training can provide the skills necessary for trustees to be equipped to make a decision. For such activities, there is a case for specialised and experienced individuals (who will likely not be trustees) to have an influential role. We believe this will need to be an area of focus as the ever increasing demands for expertise in decision-making will not be met by training part-time trustees. Instead, trustees will need to adjust their governance models and play to their traditional strength of managing external (to the trustees) expertise as part of the 'pension fund team'.

Implementation

Whilst responsibility for all of the pension fund's operations lies with the trustees, certain activities, such as the day-to-day investment of the assets, are unlikely to be undertaken directly by the trustees. Agents tend to be appointed to carry out these activities

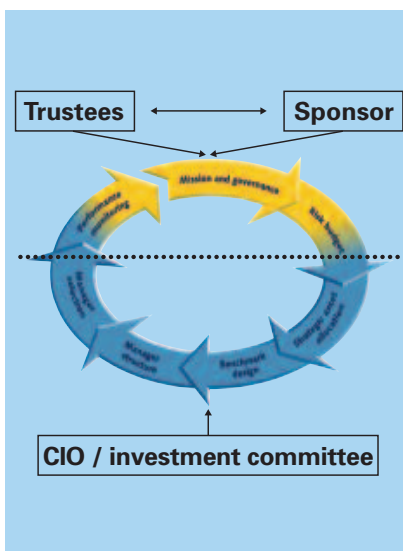
and the focus of the trustees' duty becomes one of control over the selection and monitoring of the agents.

More than the sum of the parts

In order to achieve success in the individual components described above, a sufficient level of time and expertise, both internal and externally delegated, will be required. These components are organised and combined into a governance budget. We suggest that thinking of governance as a budget facilitates a more efficient allocation of time and expertise to the activities that require it. For example, there is a tendency to spend too much of the governance budget on manager monitoring and too little on asset allocation, although the impact of getting the latter right far outweighs the impact of the former.

While incremental improvements can be made by reshuffling the governance budget across existing tasks, we believe that governance can be materially improved by separating the governing from the executive function. Separation is well established in corporate governance and we believe that the corporate experience offers much for pension schemes to replicate.

We advocate a two-tiered approach, as in the diagram, where the trustee group sets the mission and the



overarching strategy ('yellow' functions) and another body implements the strategy ('blue' functions). We also show the involvement of the sponsor, a point we develop further below.

The separation could take a number of forms:

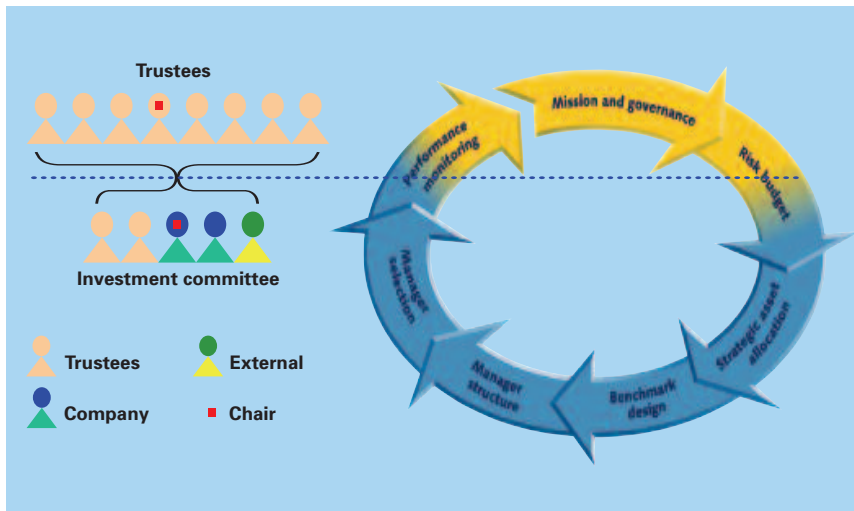
- The most straightforward would be to select a small number of appropriately skilled individuals from the trustees to form an executive investment committee
- A variation on this theme is to outsource the executive function to a resource within the sponsoring employer, perhaps within the treasury division
- A further variation is to combine the above two approaches by drawing on both sponsor and trustee resources
- The executive function could be outsourced to an external provider.

Greater inclusion

With the introduction of regulation seeking to restrict the sponsoring employer's ability to walk away from its pension obligations and the creation in the UK of the Pension Protection Fund, we expect to see a new dynamic in the decision-making process. The sponsor may wish to have a greater involvement in setting investment strategy. Given the impact of the pension fund on the well-being of the sponsoring employer, we believe that a greater partnership between the sponsor and the trustees is to be welcomed.

A discussion starter

We have outlined what we believe are the three key areas of focus – increased expertise, separation of governing and executive duties and a partnership approach with the sponsor. As usual, the devil lies in the detail and so we offer some thoughts in the spirit of opening the debate.



The diagram above illustrates a possible structure in which the governing and executive roles are separated and in which there is trustee and sponsor involvement in the investment committee. As noted above, there should be additional trustee/sponsor interaction at the strategic level, but we suggest that the sponsor could also supply investment expertise to the investment committee. There would be questions to answer regarding whether these skills were more treasury-related than investment-related, whether company committee members would have a shorter rather than longer investment time horizon and whether the situation introduced any difficult conflicts of interest. To some extent this may be balanced by the inclusion of an external member on the committee, whose role is primarily to supply strong investment expertise. The trustees on the committee should provide more than continuity between the governing and executive groups but

should also be the ones with the greatest investment skills.

Desired characteristics

In addition to the significant investment competencies, we suggest that this group should be kept small (five in our example) to allow fast and efficient decision-making amongst a (hopefully) cohesive group. While we acknowledge that some trustee representation will be necessary to increase the comfort of delegating to this group (and to represent views, context and objectives), we believe the overlap should be limited in order to increase the independence and accountability of the group (too much overlap and we will have failed to split the governing and executive functions). In a similar vein, the sponsor representation can bring the sponsor's views and provide some balance to the trustee members. The external member can then help with stakeholder balance through independence.

In conclusion

We are convinced that good governance provides the framework to offer greater financial efficiency and risk reduction in pension fund management. The potential exists to deconstruct the individual components of the governance budget and assess each element relative to desired standards.

Through an assessment of the governance necessary to undertake the efficient management of a pension fund, we believe many funds will identify either savings or more efficient methods of using the resources available.

Some funds, on critical self-examination, may feel that they lack, or are unable to acquire, the necessary resources. This discovery should prompt take-up of greater delegation to investment specialists.

¹ The Myners principles and occupational pension schemes – findings from quantitative research, July 2004

Pensions on the balance sheet

Applying corporate finance principles to the pension fund

“Theory without experience is sterile, practice without theory is blind”

George Jay Anyon

This paper considers the holding of equities within pension funds, and whether they add value after accounting for risk. It seeks to consider the views of financial economics. We conclude that the financial economics arguments are relevant, but a more pragmatic and practical application is called for.

More joined up

There is a growing tendency within business to consider the pension fund as a part of the sponsoring company, rather than the more traditional view of the fund as a separate entity. Under the latter view of the world, the company's responsibility ended once the contributions had been handed over, or at least that might have become the expectation following 20 years of good investment returns. Now, however, changes in accounting, actuarial practice and legislation support a more enterprise-wide view (although, legally, the fund remains a separate entity).

When considering the fund and company together, pension liabilities can be thought of as a partially secured debt obligation – the company borrows from pension plan members but puts up security in the form of the fund's assets.

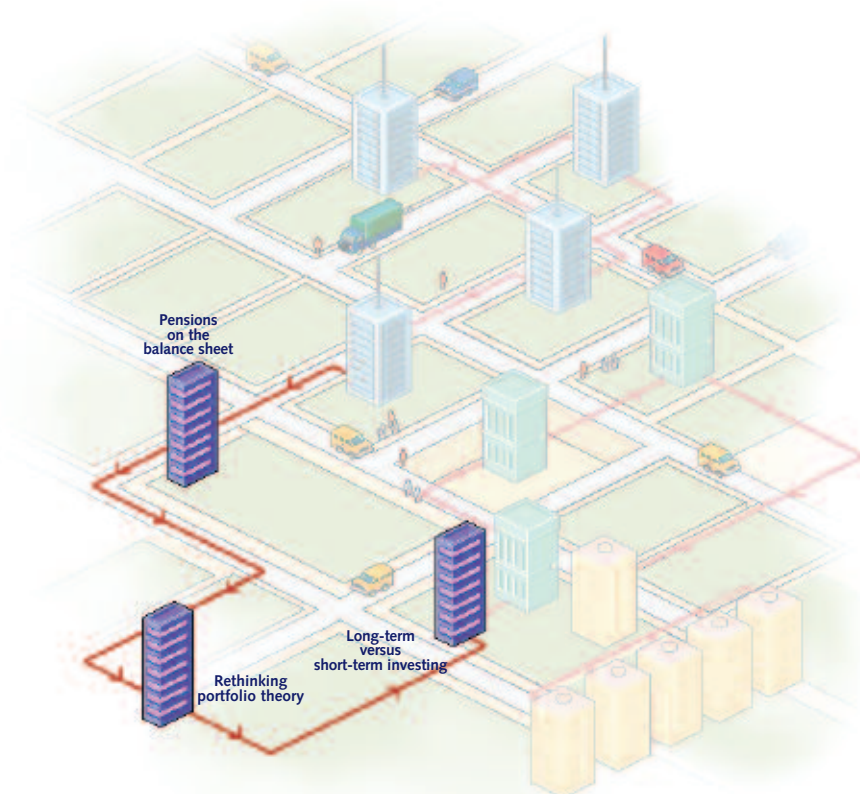
If we assume that part of the fund's assets are held as closely-matching bonds, then part of the corporate risk is immunised – the security offsets the borrowing. If the remaining portion of the fund is invested in unmatched assets, like equities, these can be considered as additional investments of the company as well as some form of security for the pension obligations. Any deficit can then be thought of as an ‘employer debt’.

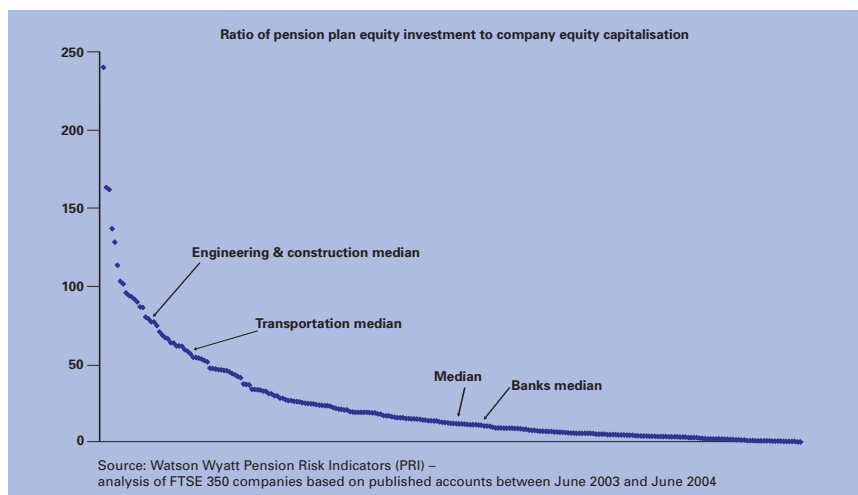
Why think of pensions this way?

As the finances of the pension fund will have an impact on those of the company, the more holistic way of thinking will allow interested parties to get a clearer view of the risk being run. For example, beneficiaries or trustees may wish to assess the likelihood of the borrowings being repaid. Analysts and shareholders will want to see how large a ‘drain’ on corporate finances the pension fund could be.

We can derive a reasonable measure of pensions gearing by comparing the sum of the unmatched assets and the deficit (or surplus) as a proportion of the company's equity capitalisation. Typical figures for the UK are that pensions gearing (assets in equities plus deficits) is of the order of 15% to 20% of corporate equity, while typical corporate gearing from other borrowings is 30% to 40% (in other words twice the pensions figure). By way of illustration, the graph below shows the ratio of pension equity investment to company equity capitalisation.

We could consider the risk of the pension fund to the company in slightly different terms, for example by considering the value at risk (VaR) against the company's market capitalisation, or against pre-tax profits. This analysis would also show that a segment of UK companies are running high levels of pension risk.





Source: Watson Wyatt Pension Risk Indicators (PRI) – analysis of FTSE 350 companies based on published accounts between June 2003 and June 2004

Risk and reward

There is a challenge facing corporate pension funds: should they continue to invest heavily in equities or move significantly into bonds. Under the traditional (separate fund) view, equities were held for their return potential. Implicit within this was the view that the additional return at least compensated for the additional risk.

Under the holistic view, we need to consider the impact on the corporate shareholder. We will examine the pure theoretical arguments and assume that we have:

- A typical balance of cost DB plan
- Largely efficient investment markets, and
- A rational investor population and corporate/trustee decision-makers.

Under these conditions, the first order effect of equity holdings in the pension fund on shareholder value is nil: the additional expected return is equal and opposite to the additional risk taken. New-style accounting, which transmits pension fund performance onto the corporate balance sheet more immediately and with greater volatility, will increasingly demonstrate this. If investors want equity risk they can achieve this for themselves. In this regard, they would prefer investment in pure enterprise risk and not have

this muddled by the pension fund investing in equities. Furthermore, there are secondary effects such as tax associated with pension funds investing in equitiesⁱⁱ, and these tend to destroy shareholder value. We would note that in times of surplus, benefit improvements represent financial leakage as far as shareholder value is concerned. It is true that shareholders can enjoy the benefits of contribution holidays, but as it is tax-inefficient to remove assets from a fund the contribution 'valve' is effectively one-way – shareholders are expected to rectify deficits, but do not benefit fully from surpluses.

From blue skies to brass tacks

Out in the real world, it will be hard for funds to reduce the aggregate exposure to equities as buyers must be found for the equities (at a price at which pension funds are willing to sell) and the supply of bonds will need to increase from the current insufficient level.

In addition, we expect three groups of factors to continue to support equity investment:

Actuarial and accounting factors

- Traditional actuarial practice has favoured the smoothing of equity returns, which supports equity investment as the true volatility is masked. This practice is being

challenged, but we believe it still has merit in applying a long-term capital budgeting discipline to pension funds

- Accounting practice has always favoured equity investment by allowing advanced credit to be taken for the expected equity risk premium (today's lower cost is favoured over tomorrow's risk). The extent of the advantage depends on which accounting standard is used:
- SSAP24 gives significant advantage to equity investment
- FRS17/FAS87/IAS19 give more limited advantage, and largely in the income statement.

Future revisions to the international accounting standards (scheduled from 2005) may attempt to remove the pro-equity bias altogether but there are doubts whether this will occur

- The direction in which accounting practice is moving is unequivocally towards increasing transparency as to the component parts of pensions accounting. Consequently analysts and investors can remove the financing elements of the pension fund cost, leaving a purer form of operating pensions cost.

Investment factors

- As there is no zero risk position for a fund, some risk-taking may appear attractive
- There may be exploitable long-term investment opportunities from market inefficiencies. This is discussed further in *Long-term versus short-term investing*
- The trustees/company may have significant expectations of generating outperformance from equity investment. However strong the normative arguments may be, they will often not align with corporate and trustee behaviour.

Benefit design factors

- Shareholders are able to 'put' the deficit onto the beneficiaries on liquidation. This is described further in *Multiple Solutions*
- The increased take-up of hybrid benefit designs with risk-sharing will encourage equity investment.

The key issue is whether value is being created by these factors. Some would argue that accounting and actuarial practice, by smoothing the risk of equities, has allowed value to be created. This flies in the face of the simple financial economics argument above, which claims that there is no value after adjusting for risk. Our stance would be sympathetic with the financial economics approach – if equities are to add value, they must do so on a transparent basis.

The problem with favourable actuarial or accounting treatment is that it could lead investors to hold the asset for the wrong reason.

As far as benefit design is concerned, we believe the evidence is more mixed. As noted above, UK shareholders had the value of the pension 'put' but the now constrained ability for the company to 'walk away' has reduced this. Instead, we believe that future benefit design could be value creating if structured as a risk-sharing arrangementⁱⁱⁱ.

It is the investment factors that have the most potential to add value, particularly investing for the long term instead of the short term. We note, however, that long-term investment is easier in theory than in practice.

ⁱValue at Risk, or VaR, measures risk in monetary terms. For a given statistical significance level, say 95% confidence, VaR shows the minimum value that would be lost in the event of the 'worst case' occurring.

ⁱⁱAny tax advantage depends on the relative treatment of equity dividends and bond interest between the company (as payer or receiver) and the pension fund (as receiver). It therefore differs between different countries but in general favours bonds.

ⁱⁱⁱSee the DB design paper in *Remapping our investment world*, Watson Wyatt, Oct 2003

In conclusion

We conclude that the financial economics arguments are relevant but that the strict application (in other words equities do not add value on a risk-adjusted basis but do add cost, so pension funds should invest in bonds) is challenged in practice in various ways. We believe we should use a more pragmatic set of principles that can be applied more broadly:

- Pension funds to be successful must fulfil the goals of the members and the sponsoring company, considering the fund and the company as one linked entity
- In assessing investment strategy, the assets, the liabilities and the risks of the fund should be assessed in market value terms
- All pension fund strategy decisions should be measured on the value that they add, allowing for risk
- All investment risk-taking should be based on some form of sustainable value creation or competitive advantage (like better governance, better investment managers, better covenant, and so on).

Rethinking portfolio theory

How subtle challenges can yield big opportunities

“All ideas share one thing in common; they need to be considered and tried”

Frank Tyger

Probably the biggest current challenge in modern investment theory is how to reconcile the theoretical foundations of modern portfolio theory (MPT) with all the anomalies in the real world that active investment managers seek to exploit. Is it possible to cover all these exceptions (or failings of MPT) with one unified theory? We believe that recent research provides the opportunity to achieve this unified position. This work carries significant implications for how institutional funds should structure themselves to achieve investment efficiency.

An MPT primer

To the extent that the investment industry has an underlying theoretical basis, MPT is ‘it’. Its history starts with Markowitzⁱ (1952) and mean-variance efficiency. Markowitz’s work implied that there was a single optimal portfolio of all possible assets and gave the computational framework to derive it. However, expanding beyond a handful of securities meant that the sums rapidly became too hard. The idea of a single efficient portfolio did not sit comfortably with advisers who noted that their clients had different risk appetites. Tobinⁱⁱ (1958) provided the solution with his separation theorem – combine the single portfolio with cash/borrowing to suit each client’s risk appetite.

The development of MPT received a large boost from Sharpeⁱⁱⁱ (1964) who proposed the capital asset pricing model (CAPM) which introduced

the concept of beta and simplified the computation necessary to derive what now came to be known as the ‘market portfolio’. Then Fama^{iv} (1970) proposed the efficient markets hypothesis, suggesting that active management could not add value over the market return. This was corroborated by various statisticians and the hypothesis became a theory – the efficient market theory (EMT).

To date, these concepts remain the core elements of the investment theory taught in universities and business schools. To develop a more effective foundation theory however we need to examine one of the underlying building blocks – that investors take decisions based on ‘rational expectations’ and how this links to the so-called ‘random walk’ in equity prices.

Rational expectations and random walks

While the phrase ‘rational expectations’ captures the general idea of investors forming sensible ideas about the future evolution of asset prices, within MPT it has a more stringent definition.

In the rational expectations world, investors use their knowledge and learning to form expectations concerning asset prices. The asset prices are assumed to vary within known bounds. As this underlying process is constant through time, outcomes do not differ systematically (in other words regularly or predictably) from what people expect them to be. An outcome could surprise an individual and they would lose out to another investor, but they learn from this and make the necessary correction – therefore forecasting errors will not persistently occur on one side or the other and investors bid prices up or down to the right level instantly. This leads us on to the random walk in equity prices.

Under the so-called ‘strong form’ of EMT, it is postulated that security prices reflect all the relevant information that is available about the fundamental value of securities. The reasoning is as follows:

- To forecast prices, investors comb all sources of information
- They then buy securities with higher-than-average expected returns and sell those with lower-than-average expected returns
- The prices of securities then adjust until all the expected returns (adjusted for risk) are equal
- Therefore, prices reflect the market’s best forecast of future discounted cashflows. In other words, price and value are the same.

In this framework, the only factors that can change the price of a security are external (technically, exogenous) events which cannot be known in advance. Examples include economic news and geopolitical events. Hence prices follow a random walk (in other words they are equally likely to move up or down) as the market adjusts to this unpredictable news.

But what does this mean?

The fact that consulting advice and investment manager products only approximate the conclusions of the theory implies that the investment industry does not entirely buy the EMT, and markets may be generally but not totally efficient. We would argue that the industry has attempted to apply the rigours of theory as best it can in a world that appears to periodically violate the predicted outcome. Perhaps this is because the theory is not a perfect description of the real world.

While many anomalies in MPT and the EMT have been identified (and at times exploited), there is one central breach of this theory that is of critical importance to long-term investors and too large to ignore: this is the problem that asset price volatility is far higher than implied by the volatility of the underlying fundamental variables^v.

Equity market volatility is typically between 15% and 20% per annum for the mature equity markets

How do the two theories cope with explaining these results?

Classic finance theory

- The complete knowledge of investors leads to relatively stable PE's as prices move quickly to reflect changes in earnings and earnings expectations
- Volatility of earnings on the market averages 5% per annum
- Volatility should be largely in line with the volatility of earnings at around 5% per annum, and no more than 10% per annum after allowing for changing discount rates
- The empirical results are at least twice what the theory suggests

Alternative finance theory

- The incomplete knowledge of investors leads to volatile PE's as prices respond in various ways to news on earnings
- Volatility of earnings contributes in a minor way to price volatility
- Volatility should vary widely depending on investor sentiment and regime state; volatility figures down to 10% and as high as 30% are likely
- The empirical results are consistent with the theory

The panel gives a more detailed description of this problem.

Rational beliefs

What is wrong? In building MPT, the capability of investors was assumed to be unrealistically all-knowing. It would be better if we could assume a more modest level of knowledge. Both Kurz (in *Endogenous Uncertainty*^{vi}) and Shiller (in *Irrational Exuberance*^{vii}) have introduced this more practical step. Rather than having rational expectations, Kurz proposes that investors have 'rational beliefs'. Individuals are permitted to have incomplete information and to be of mixed competency at processing probabilities and knowledge. In addition, as (in Kurz's work) the underlying process is unknown, investors operate in a world of uncertainty. Consequently, they form different beliefs – one investor to the next – as to how securities prices will unfold. The requirement for them to behave rationally remains. Consequently Kurz defines a rational belief as any belief that is consistent with past data (it cannot be refuted by available empirical evidence).

This allows investors to have diverse and time-varying beliefs which could, for example, reflect different degrees of optimism and pessimism about future states of the world.

The very fact that investors no longer possess a perfect map (which translates forward expectations into price) and instead react to news through beliefs means that there is no objectively 'right' price. We are now in a world of so-called 'price model uncertainty' where it is possible for investors to make misjudgements, and where there is an advantage to be gained from better information or better analysis – if only to be less wrong than the competition. So now the main cause of market volatility is the dynamic beliefs of investors as they struggle to interpret news. Consequently, the reaction of a price to a piece of news now depends on the average state of beliefs. In periods of optimism we can get price overshoot, and price undershoot in periods of pessimism – generating

asset price volatility that is 'too high' relative to the news or fundamentals.

The assumptions underlying rational beliefs theory are a much more realistic description of the real world, and it intuitively provides a much better description of how the world works. It also produces a solution to the problem of equity volatility.

Unsettling implications

The above review has built a case for the superiority of rational belief theory over rational expectations theory (in fact, rational expectations becomes a special case of the more general rational beliefs theory). However, there are at least two caveats. The first is akin to Markowitz's problem, which we can summarise as 'great insight, but needs the maths and computing power to catch up'. The fact that rational beliefs theory does not assume a stationary world (in other words a fixed range of possible outcomes, with actual out-turn determined by a probability distribution) immediately projects us into a world of unfamiliar and complex maths.

The second caveat also relates to the absence of stationarity – it is assumed that the underlying process which determines asset returns changes beneath our feet. We now need to grapple with *investment regimes* as investors shift their beliefs between optimism (bullish) and pessimism (bearish) and back. Evidence from Kurz and Brock^{viii} suggests that this often has a long cycle to it – over 10- to 20-year periods – a result of profound significance to long-term investors.

What about regimes?

New investment regimes are generated when investors shift their behaviour across a bullish to bearish spectrum.

Comparison of rational expectations and rational beliefs

Rational expectations

- Pricing model certainty – all investors are assumed to know the fixed ‘map’ of how news will translate to pricing
- Investors are assumed to take rational actions based on the map
- Equity returns are stationary – they vary around a stable mean in a random walk
- The underlying return distribution can be discovered from history
- Overshoot/undershoot of prices is unexplained prices are more volatile than their drivers would suggest
- Behavioural finance explains individual anomalies but not in a unified way

Rational beliefs

- Pricing model uncertainty – investors have partial knowledge of the map of news to prices
- Investors shift their behaviours across a bullish to bearish spectrum
- Equity returns are stable – they vary around different means but tend long term towards one mean
- The underlying distribution regime changes, hence is unknowable
- Overshoot/undershoot of prices is explained by the different pricing in regimes and behavioural shifts
- Behavioural finance is dealt with in the model

This theory of how investment markets behave carries three central beliefs which are significant:

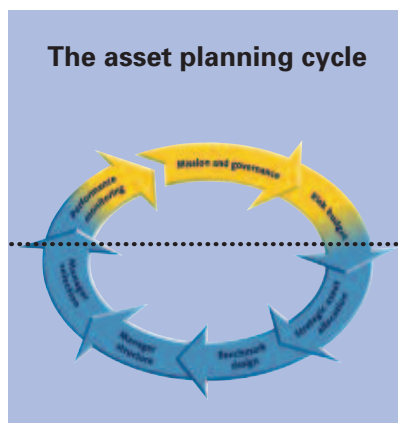
- Markets tend to trade for extended periods of time at the ‘wrong’ prices (too high or low versus fundamental valuation) and then revert towards the ‘right’ level at some point
- These wrong prices can be exploited but as the correction cycles (mean reversion) can be long, it is likely that only long time horizon investing will be able to successfully exploit this partial predictability of markets
- Investing in equities delivers a better pay-off for long-term investors than short-term (strictly long-term investing carries less risk for its reward than short-term investing).

In theory, investment opportunities are created through changes in regimes. In practice, however, turning points are difficult to predict and recognise.

Implications for funds

We noted above that current investment advice and manager products do not completely comply with a strict interpretation of modern portfolio theory – in fact in many respects they already fit better with rational beliefs theory. We believe, however, that funds should demand different products from providers to better suit their requirements.

The asset planning cycle



- **Mission:** investment advice can evolve to help clients resolve the tension between short-term balance sheet control and long-term value creation. In *Setting the risk budget* we argue that funds vary in their capacity to exploit risk. At one extreme, the mission then becomes one of risk minimisation. For those funds able to support risk, the mission becomes one of long-term value creation in the context of dynamically changing markets
- **Risk budget:** analysis may move from a static to a dynamic environment, employing a time-varying asset model of risks and returns having regard to investment regimes
- **Strategic asset allocation:** could move towards more dynamic re-setting of allocations through a regular risk budgeting process. Of equivalent importance is the introduction of greater diversity through new asset classes and mandates
- **Benchmark design:** could revise benchmarks to mitigate the price over- and under-shoots inherent in market capitalisation indices – perhaps by weighting on fundamental accounting data (for example, book value or earnings) rather than price
- **Mandate design:** could incorporate mandates that move away from market portfolio thinking, that are more targeted at long-term wealth creation like long-term absolute return mandates. See *Diversity in stock selection*
- **Manager selection:** the selection of skilful managers could evolve to identify three particular types: ‘stock-pickers’ who exploit longer term factors in a company’s or industry’s prospects, ‘traders’ who exploit short-term price overshoots and ‘new multi-asset managers’ who exploit regime and theme shifts.

In conclusion

This paper has covered a lot of theoretical ground but has done so because the academic work referred to carries significant implications for how institutional funds should structure themselves to achieve investment efficiency. Both the competing theories presented assume that investors are rational (for example seek to maximise risk-adjusted expected returns) but the rationality assumptions for the new theory are less restrictive and more realistic. Consequently, we believe the rational beliefs theory provides a better foundation for our investment work.

Arising from the application of this theory we suggest that, of all the opportunities for generating better performance in future, two are key:

- *Dynamic strategic asset allocation*: adopting a more frequent approach to asset allocation in recognition of the possibility of moving between different regimes
- *More diversity*: investing in a wide array of different investment opportunities in the light of 'price model uncertainty' (in other words recognising that we, or our models, may be wrong).

ⁱHarry M Markowitz 1952, *Portfolio selection*, Journal of Finance Vol VII, No.1

ⁱⁱJames Tobin 1958, *Liquidity preference as behaviour towards risk*, Review of Economic Studies, Vol 67

ⁱⁱⁱWilliam F Sharpe 1964, *Capital asset prices: a theory of market equilibrium under conditions of risk*, Journal of Finance Vol XIX, No. 3

^{iv}Eugene F Fama 1970, *Efficient capital markets: a review of theory and empirical work*, Journal of Finance Vol 25, No. 2

^vThe asset price volatility puzzle was first posed by Robert J Shiller in 1981 in *Do stock prices move too much to be justified by subsequent movement in dividends?*, American Economic Review 71(3). For the interested reader, three other puzzles would include the large size of the observed equity risk premium relative to prediction, GARCH behaviour in the absence of explanatory fundamentals, and the 'forward discount bias' in foreign exchange.

^{vi}*Endogenous uncertainty: a unified view of market volatility*, Mordecai Kurz, Stanford University manuscript, 9 September 1997 (updated 28 November 1998)

^{vii}*Irrational Exuberance* Robert J Shiller, Princeton University Press, 2000

^{viii}Reports of Strategic Economic Decisions Inc, September 2002, February 2003 and May 2003

Long-term versus short-term investing

Extending time horizons to create value

“Our favourite holding period is forever”

Warren Buffett

In our previous publication *Remapping our investment world*, we argued that short-termism in investing was a real, rather than an imaginary, problem. This paper explores this issue further and considers the differences between short-term and long-term investing and highlights the opportunities awaiting true ‘long-term investors’.

Definitions

It is useful to start by clarifying what is meant by short-term and long-term investing. We believe that the difference lies in one’s view about the time horizon over which investment decisions should be made.

Much has been written on this topic. In chapter 12 of his book, *The General Theory of Employment, Interest and Money* (1936), John Maynard Keynes distinguishes between short-term and long-term investing as follows:

- Short-term investing (speculation) is ‘forecasting changes in valuation a short time ahead of the general public’
- Long-term investing (enterprise) is ‘considering the long-term forecasts of the probable yield (return) of an investment over its whole life’.

Modern day examples that we would cite as being short-term investors are traders, managers practising momentum strategies and certain types of hedge funds. Long-term investors can be characterised as managers with an ‘ownership mentality’, managing low-turnover portfolios and typically having investment time horizons greater than three to five years.

Accepting that the definition is not totally clear and that there are grey areas, we nevertheless believe that both short-term and long-term approaches have merits for inclusion in a portfolio since each strategy can contribute to diversity. That said, we would argue that most institutional investors have a natural orientation towards the long term (for example, long-term liabilities, ability to share risk between different stakeholders and so on). As a result, they should have a comparative advantage with respect to long-horizon investing and therefore long-term strategies should feature prominently over short-term strategies in their portfolios. The world of short-term investing is highly competitive, and not all institutional investors can have a comparative advantage in selecting these managers.

One may ask “Isn’t the long term just a succession of short-term periods, making the distinction above unnecessary?”. We would disagree. The fundamental difference is that successful long-term investment will often result in poor short-term performance, indeed the sort of performance that would lead to manager termination in mandates that are not specifically engaged on long-term monitoring parameters. The panel below describes one such illustration of this.

How would you react to managers who:

- Underperformed their benchmarks on an annual basis for 20% to 40% of the time?
- Experienced periods of consecutive annual underperformance ranging from one to six years?

The above characteristics belonged to a group of ‘long-term’ fund managers analysed by Eugene Shahan¹ in an article for Columbia University’s alumni magazine. Whilst these managers had what some would term very poor short-term returns, long-term results saw them outperforming their benchmarks by between 7% and 16% per annum over periods ranging from 13 to 28 years.

Value creation and long-term investing

The key issue is whether investing for the long term results in value creation for stakeholders, in other words creates worthwhile excess returns from taking risk. The main arguments supporting the long-term investment case are the following:

- *Access to certain long-term investment styles which exploit the mispricing of assets:* market prices tend at times to overshoot and undershoot their true fair values. A long time horizon is often required for prices to ‘correct’ themselves and a fundamental value investment style can exploit this, provided the manager has the patience (or its clients let it have the patience)
- *Avoiding unnecessary trading costs:* long-term investors buy and sell assets less frequently than short-term investors, which results in lower overall costs in commissions, trading spreads and taxes paid
- *Earning a liquidity risk premium:* most investors value the efficiency (in terms of time and cost) at which an asset can be sold for cash. As such, there is a cost associated with liquidity that investors pay for. Long-term investors who do not require liquidity can instead earn a liquidity risk premium by investing in illiquid assets
- *Providing beneficial macro effects on corporate wealth creation:* long-term investors can engage more successfully with their investee companies and directly encourage these companies to favour long-term wealth creation strategies. One would expect to see a virtuous cycle of efficient capital deployment, profit distributions and capital reallocation developing between investors and corporations
- *Exploiting mean reversion effects:* the tendency of asset prices to move around an average value over time should give long-term investors a higher return per unit of risk than those experienced by short-term investors.

Mean reversion

The last of these points is potentially the most powerful, but is also controversial. There is an extensive list of research which has been conducted on mean reversion. The principal tests compare actual long-term volatility figures (for example 10 or 20 years) with the expected values derived from short-term volatility. Mean reversion could be seen to exist if actual volatility is lower than the expected value.

Watson Wyatt analysis

Actual volatility as a proportion of expected volatility over 5-and 10-year periods

Equities	5 years %	10 years %
UK	74	74
US	103	74
German	55	44
French	84	77
Japanese	96	90

*UK data from Barclays equity-gilt study and based on real annual returns from 1900 to 2003
Non-UK data sourced from Global Financial Data and based on nominal capital returns taken from various periods between 1800 to 2003*

If we consider UK equities over a five-year period, the table above shows that the actual risk is 26% less than we would expect. There is a similar result over 10-year periods. The results for the other countries (except for US equities over five years) seem to support a view that longer-term investors could profit more from lower risk than shorter-term investors.

UBS analysis

UBS has carried out similar analysis over longer time frames. The results below seem to support mean reversion effects.

Actual volatility as a proportion of expected volatility over 15- and 25-year periods:

Equities	15 years %	25 years %
UK	88	51
US	92	67
Japanese	81	85

*Source: UBS.
UK, US data from past 100 years; Japan data from past 50 years capital returns*

In summary, Watson Wyatt's research and other studies show some evidence of mean reversion but the results are not at statistically significant levels. Part of the problem is that there are not enough long-term periods with good data available to prove the case. Our view is that the evidence is strong enough to think that mean reversion exists but we suggest that individual investors should build their own beliefs about this.

Some implications

We have explained the value creating proposition associated with long-term investing and now turn to consider how pension funds can take advantage of it. This issue can be considered in two parts. First, what are the best long-term investing opportunities? Second, how can investors become more long-term in their management practices and outlook?

As regards opportunities, we highlight these three:

- Use of long-term '10-year' mandatesⁱⁱ and other absolute return targeted mandates
- Investment in long-term wealth creation strategies. In particular, we have in mind passive strategies with investment processes that do not take into account market prices when allocating capital between companies but use fundamental weights or risk-reducing weights instead. This is discussed in greater detail in *Diversity in stock selection*
- More investment in illiquid assets to gain from the liquidity risk premium (for example private equity and real estate).

As regards changes to management practice to encourage long-term approaches, we suggest:

- Structuring performance targets and fees to be more aligned with the long term
- Reducing the frequency of performance appraisals of fund managers (to, say, annually rather

than quarterly). A less frequent performance monitoring schedule can be supplemented by considering other measures within a balanced scorecard, including a greater reliance on assessing the more qualitative factors of a fund manager (such as business, people and investment process)

- Building better investment beliefs. We maintain that becoming more cognisant of the case for long-term investment and improving our investment beliefs generally is vital
- Strengthening the governance to be more resilient to the short-term pressure that builds up from time to time.

In order to do the above, an environment where beliefs are regularly re-examined needs to be fostered. Ways in which this could be achieved include holding an annual review of beliefs and carrying out training explicitly focused on this area.

In conclusion

We have set out what we believe is a strong case that investors who have a long time horizon can exploit that time horizon through the use of certain types of investment strategy and types of investment manager, and the adaptation of management practices to become more resilient to undue short-term pressure.

The need for pension funds to demonstrate that they are creating value to their stakeholders is likely to grow considerably in the coming years. We suggest that working to become better long-term investors is one of the most important steps for funds to take.

ⁱAre short-term performance and value investing mutually exclusive? *The Hare and the Tortoise* revisited Eugene Shahan, (1986), article in Columbia University's HERMES magazine

ⁱⁱSee Absolute return and 10-year Mandates in *Remapping our investment world*, Watson Wyatt, October 2003

Extending risk measures

How can we improve the measures we currently use?

“First weigh the considerations, then take the risks”

Helmuth Von Moltke

This paper focuses on the risk measures typically used in the risk budgeting process, namely tracking error and Value at Risk (VaR). While not an exhaustive review of alternative risk measures, we consider the shortcomings of these risk measures and explore whether additional measures could be advantageous.

Tracking error

For a given investment policy, this is the standard deviation (σ) of the returns relative to the liabilities

Risk is defined to be the uncertainty of the expected return $E(r)$; returns within $E(r) \pm \sigma$ % are expected in two years out of three

Value at Risk

At a 95% confidence level (VaR_{95}), the value at risk number shows the severity of loss relative to liabilities expected to occur in one year out of twenty

Context

The risk budgeting process was described in *Remapping our investment world* and we contribute further higher-level thoughts within *Setting the risk budget* and *Spending the risk budget*. In this paper, we go to a greater level of detail by focusing on the risk measures used within the process and consider whether we can improve on them.

The measures which we normally use to help us with spending the risk budget come in two forms: tracking error and Value at Risk (VaR). Both of these measures have important merits.

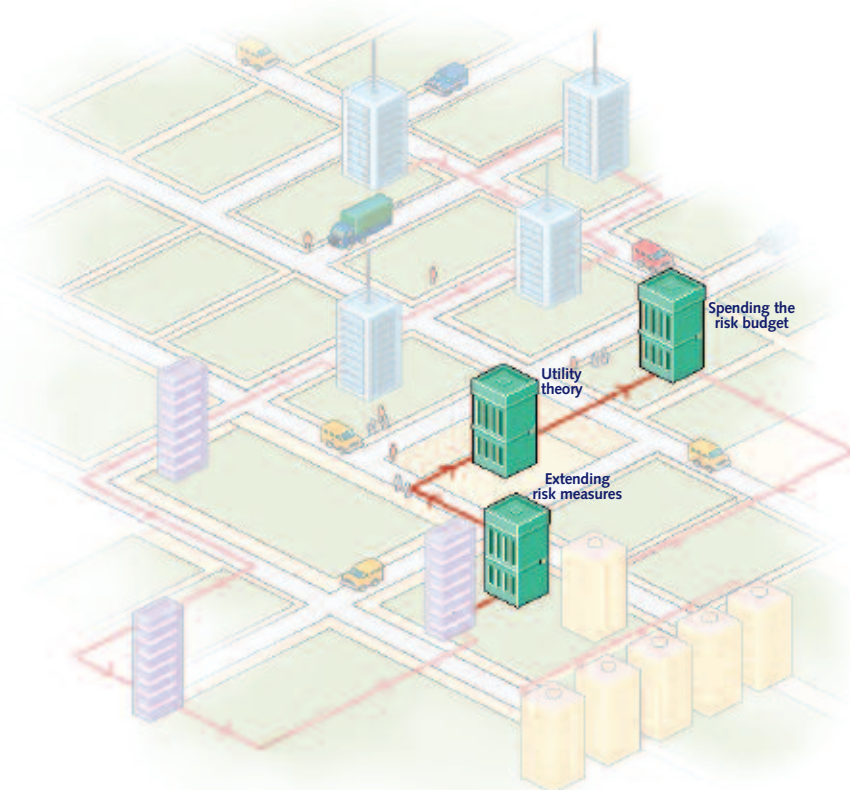
VaR was originally used as a short-term measure by corporate treasurers, but has been extended to the longer term and is becoming more widely used within the pensions industry. In most cases, the VaR is simply a restatement of the tracking error number in value rather than return percentage terms. In addition, computation and explanation of the results are straightforward. However, they are not without shortcomings.

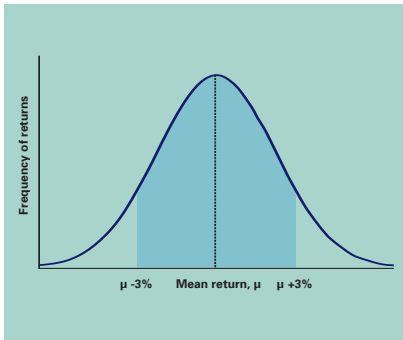
A short critique of tracking error and VaR

We consider two criticisms relating to tracking error and VaR in this paper.

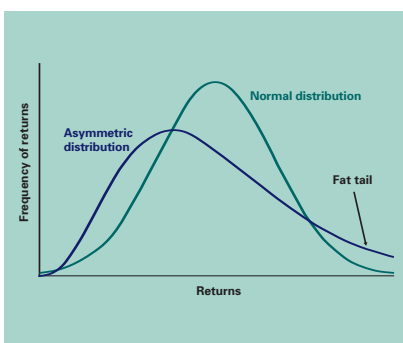
First, some criticise tracking error for its failure to differentiate between upside risk (the chance of outperforming a target) and downside risk (the risk of underperforming). Arguably, investors are really only concerned about underperformance and do not view outperformance as a risk.

The second criticism relating to tracking error and VaR deserves more consideration. Inherent in interpreting tracking error and in some methods of calculating VaR¹ is the assumption that investment returns, in statistical terms, follow a normal distribution (one property of which is that the returns are symmetric about the average or mean value). We interpret a tracking error of 3% to mean that we expect returns to be within $\pm 3\%$ of the average return for two-thirds of the observed values.





However, the problem with assuming a normal distribution of returns is that actual returns often do not adhere to such behaviour. Research has shown that actual financial return distributions are non-normal, typically 'fat-tailed' and can be 'skewed' (asymmetrical about the mean value). This is particularly true for portfolios that utilise derivative strategies, as is common among hedge funds. The problem with 'fat tails' (in other words where bad – or exceptional – returns happen more frequently than expected under a normal distribution) is that actual risk can be significantly higher than predicted by standard risk models. In addition, asymmetric return distributions will typically lead to disappointing actual returns relative to the expected average return (investment returns tend to show asymmetry in only one direction).



Use of VaR analysis can capture the fat-tailedness aspect of a return distribution somewhat but it does not give the full picture of possible losses. For example, investors may just focus on one level of VaR (for example the one in 20-year measure) and ignore events which are worse than that.

These shortcomings tend to lead to an understatement of downside risk in particular. Not taking into account such characteristics can lead investors to adopt investment policies which produce unexpected and disappointing results.

Possible solutions

One way to deal with the shortcomings identified above is to 'stress-test' the assumptions we use in our asset models. This involves varying the assumptions which we input into the models (for example changing the mean, variance or correlation inputs of the asset classes considered) and assessing the effect on the outputs. Typically, in the risk budgeting process, the inputs used are best estimates of future experience and stress-testing allows us to see the effect of more pessimistic and optimistic assumptions on the results. Stress-testing can become quite complex – deciding which inputs to vary can be tricky and the potential combinations of the inputs that could be changed are manifold.

An alternative approach is to supplement the risk measures currently used with new risk measures.

Better downside measures

A risk measure which can distinguish between upside and downside risk is the *semi-standard deviation*. This is effectively a derivative of the tracking error – it is the standard deviation of returns below a certain threshold (for example a return figure related to liabilities or an absolute value such as zero).

The semi-standard deviation is used by some in the retail investor community to rate the universe of mutual funds. In the case of Morningstar (a US-based provider of stock and mutual fund ratings), the historic semi-standard deviation of a mutual fund is calculated and compared against its peer group to see which funds have managed downside risk more effectively.

The semi-standard deviation can be used on its own or it can be combined with the return of a portfolio to derive

a risk-adjusted ratio, a 'modified information ratio' in the risk budgeting analysis.

Another development in risk budgeting is the use of what is called the 'tail conditional expectation'. This is the expected loss that a portfolio will suffer assuming that a bad scenario has occurred, for example a one in 20-year event. It looks to overcome the problem that VaR analysis does not quantify the *typical* loss amount in the left tail of the return distribution. Such a measure may help to shed light on the shape of the left tail of the distribution.

Omega

A risk measure which we believe worth considering is the *Omega function*, Ω . The Omega function was introduced by Con Keating and William Shadwick in 2002ⁱⁱ.

It is defined as the ratio of the probability of outperformance to the probability of underperformance, relative to a specified return, of an asset or portfolio.

$$\Omega = \frac{\text{Probability of return} > x}{\text{Probability of return} < x}$$

where x = investor's required return. If x coincides with the mean of the return distribution, then the Omega function will have the value of one.

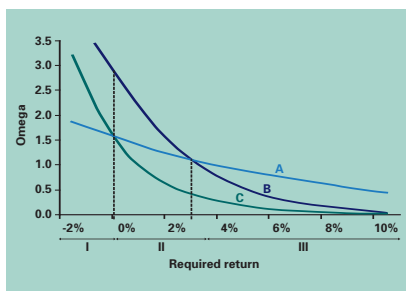
Given two portfolios and their Omega values, the portfolio with a greater value of Omega is preferable. In other words, Omega informs the investor of which portfolio has the higher chance of gains compared to losses (at the required return). It therefore enables different portfolios of assets to be ranked against each other for comparison.

However, it is not always easy for an investor to articulate a required return. In this case, we can vary the value of x to derive a whole series of Omega values which we can then plot as a curve. By repeating this for different potential portfolios we can compare the curves.

Some will show better downside protection, but at the loss of upside potential. An investor can then select the curve that best fits his return ambition and aversion to loss.

For example, the graph below shows a plot of Omega values (on the vertical axis) for three different portfolios (A, B and C) when we vary the investor's required return (on the horizontal axis).

If the investor's required return is in the range III, omega informs us that portfolio A is preferable to B, which is in turn preferable to C. If we consider the range II, the preferred portfolio would be B followed by A and then C. For range I, the order would be B, C and then A.



As the calculation of Omega uses the entire return distribution, this risk measure fully captures the distribution's characteristics such as fat-tailedness and asymmetry. To our knowledge, use of the Omega function is not generally widespread in the investment industry. However, some in the hedge fund community have embraced its use to analyse and monitor the behaviour of hedge fund returns. As the best hedge funds should be able to create asymmetric return distributions (by avoiding large losses), the use of Omega is inherently sensible. However, we believe that it can also be usefully applied to more mainstream

Risk budget	Portfolio X	Portfolio Y
1 Expected outperformance %	2.7	2.6
2 Tracking error %	8.8	8.3
Information ratio (1/2)	0.31	0.31
3 Semi-standard deviation %	4.2	3.8
'Modified' information ratio (1/3)	0.64	0.68
Tail conditional expected loss %	-15.6	-13.2

NB: Figures have been subject to rounding

asset classes and asset allocation decision-making.

Application to risk budgeting

Downside measures example

The table above shows the risk budgeting results, relative to a portfolio of bonds which acts as a proxy for the behaviour of pension liabilities, for two portfolios. Each portfolio shows similar investment efficiency (expected return per unit of risk) when we consider the information ratio, in other words 0.31. We would expect an investor to be indifferent to holding either portfolio based on these results.

If we consider the semi-standard deviation, however, it is possible to derive a 'modified' information ratio, which is the expected outperformance divided by the semi-standard deviation. This modified information ratio shows that portfolio Y is marginally more efficient than portfolio X when the downside performance is taken into account. In other words, portfolio Y gives a higher expected return for the downside risk taken.

The tail conditional expected loss figures provide further insight into the downside risks experienced by the two portfolios. Assuming that there is a one in twenty year loss event, portfolio Y provides better downside protection.

In conclusion

In this paper, we have outlined some of the shortcomings of tracking error and VaR and propose the use of further risk measures, in particular the semi-standard deviation and the Omega function. We believe that these measures have merit in supplementing the current measures we use in risk budgeting. We believe that they would be of most use when analysing portfolios which consist of diverse asset classes (as opposed to conventional equities and bonds) or portfolios which incorporate derivative strategies.

¹We are referring to delta-normal approaches. In the paper *Value at Risk* (Financial Analysts Journal March/April 2000), Linsmeier and Pearson identify three methods of computing VaR – historical simulation, Monte Carlo simulation and the delta-normal approach.

ⁱⁱA *Universal Performance Measure*, Con Keating and William Shadwick, May 2002

Utility theory

More interesting than it sounds?

"The game of push-pin [child's game] is of equal value with the arts and sciences of music and poetry"

Jeremy Bentham

The point to starting this paper with this quotation is two-fold. First, Jeremy Bentham¹ is widely considered the originator of utilitarian thought which provides the foundations of the issues we discuss here. Second, the quotation provides a useful illustration of the problem that often confronts us in the investment decision-making process. There is rarely one correct answer that can be applied objectively to a pension problem. The answer we settle upon is more usually obtained through applying preferences to a range of potential solutions and those preferences will be many and varied; as distinct as the desire to play push-pin on the one hand or listen to classical music on the other.

This paper seeks to review the basis of decision-making. In doing so, we examine a history of psychological and economic thought which has struggled to provide a mathematical framework to capture and replicate the preferences of individuals' decisions. This framework is more commonly referred to as the 'utility function'.

The concept of utility

Utility in this context is defined as a measure of satisfaction gained from a good or service. Acting rationally, one would seek to maximise utility.

In other words, an individual would prefer more of a good to less of it. This, however, is subject to the law of diminishing marginal utility. This law of economics states that the marginal utility of a good decreases as the quantity of a good consumed increases; the satisfaction earned by eating the first chocolate bar is not constant across subsequent chocolate bars eaten!

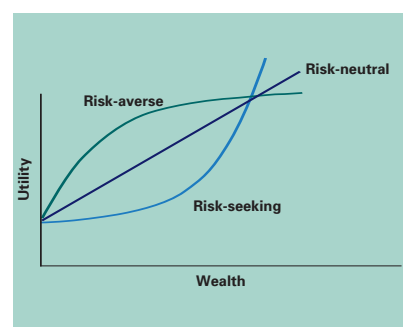
On the face of it, determining our utility should be straightforward. As an individual we can easily determine if we like something and we can also say whether we prefer one thing over another. The difficulty, however, arises when we try to assess how much we prefer one thing over another, particularly if we want to compare it with another individual's preferences. Ideally we would want to assign a number to quantify the preference of an individual to a certain commodity.

The concept of measuring the utility of a good has interesting and potentially important ramifications for taking decisions in the investment context. How many trustees have struggled to determine their own preference and the trustee board's collective preference about whether their fund should invest in equities or bonds or other asset classes? We quantify objective measures (such as risk and return) in asset liability modelling and risk budgeting, but how attractive would it be to be able to quantify our subjective preferences for asset allocation, individually and collectively, and optimise these under a series of given scenarios? To illustrate, consider adding an alternative asset class to the equity and bond mix. If we assume that the new asset class makes little difference in the majority of scenarios, but provides meaningful protection in the very worst scenarios, then we would be looking to quantify the impact of the 'disutility' of unfamiliarity

and extra effort in most scenarios on the utility provided by the downside protection.

Complexity of uncertainty

Before determining whether such an approach is possible, we have to consider a further problem which arises in the investment context – uncertainty. In the absence of a crystal ball, we do not know what actual return is going to be generated in future by a given asset class. We can examine the fundamental characteristics of an asset class and consider the returns that have historically been evident, but in the final analysis our future returns assumptions are not certain. Furthermore, in setting asset allocation, we need to overlay objective expectations of asset class returns with our own attitudes towards uncertainty – are we risk-averse or risk-seeking, as graphically demonstrated in the chart below? To provide a more robust framework for dealing with uncertainty, we need to assign probabilities to the occurrence of an event.



To start incorporating the additional dimension of uncertainty, we need to leap forward from the largely philosophical considerations of Bentham to the more practical economic applications of utility theory in the mid 1900s and, in particular, the work of John von Neumann and Oskar Morgenstern ('N-M expected utility')ⁱⁱ. N-M expected utility provides a mathematical way to predict how an individual would react to a choice of risky propositions to maximise utility.

In other words, by capturing an individual's preferences, N-M expected utility would be able to construct an index to identify how the individual would react under different circumstances which, in turn, could lead to an optimisation of the person's preferences given a new scenario.

Using utility in practice

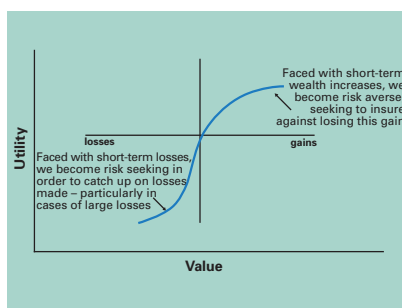
We always preface the presentation of the results of an asset liability study with the warning that the output does not provide the answer, rather it is a tool to inform the trustees' decision. Imagine the situation where the asset liability study was presented with the trustees' preferences already pre-programmed into the analysis! No more would there be a need for trustees to gather around the output of an asset liability study, contemplating the various iterations of funding levels and contribution rates and deciding upon the best strategy for them. Rather, the group's preferences could be mathematically programmed and with every change of asset class assumption, the asset liability model could be recalibrated to determine a new strategy.

The difficulty with the theory is that in practice we tend not to do as we should. Empirical studies demonstrate that we react differently to situations depending upon our current position. Does this ring true? We all agree that pension funds should invest for the long term, but how may one's attitude have changed towards equities at the height of the technology boom compared with when the FTSE All Share languished at its lows in early 2003? It is also common for investors to overweight recent data and experiences when making forecasts about future returns.

Adjusting for biases

These and other shortcomings of expected utility theory were considered and incorporated into a new idea – 'prospect theory'ⁱⁱⁱ which sought,

through empirical research, to understand how individuals really make decisions. In line with previous research discussed above, prospect theory also found that we tend to assign subjective weights to probabilities when calculating expected outcomes. The research also found that individuals are particularly concerned with the change in their wealth rather than total wealth. Most curiously the work found that individuals tend to be risk-averse for relatively small losses, but are actually risk takers for large losses, as illustrated in the chart below.



This relationship tends to be exhibited over shorter time horizons and individuals will tend towards more permanent risk-aversion or risk-taking attitudes over longer time horizons. In other words, whilst our characters may generally tend towards risk-aversion or risk-taking, faced with a specific situation requiring action we can step out of character; a risk-averse individual may become a risk-taker and vice versa.

Towards an answer

Numerous brilliant minds spanning many centuries^{iv} have sought to understand our decision-making processes and offer mathematical ways to replicate them. An all-embracing solution remains, however, elusive. Notwithstanding this, the various adaptations of the theory offer insights into how the assumed rationality of decisions is often deficient. In particular, it raises questions about the way we interpret the analysis used in formulating strategy.

For example, utility theory has ramifications for the way that we assess the probabilities of achieving a given future funding level. It also illustrates that we need to be aware of the influence of the level of the prevailing markets as a sub-conscious driver of our long-term strategy. Moreover, this research illustrates how decisions in the short-term can vary quite considerably from long-term beliefs.

So what does this all mean?

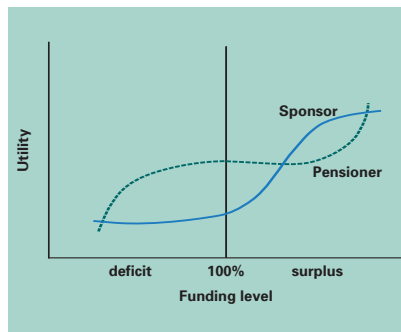
The theory outlined above can give us some interesting insights when considering pension fund decision-making. As the theory has been built around the behaviour of individuals, the most direct application is to the area of defined contribution (DC) schemes. Here we have a fixed time horizon, and a clearer link between investment outcomes and the individual's utility. In the UK, utility maximisation in DC has been addressed through the lifecycle strategy – build wealth through equities and then switch to a more defensive stance as retirement approaches. The points raised within this paper may prompt us to adjust this approach at the margin. Not all DC members will have the same utility, and so will not appreciate the lifecycle approach to the same degree. In addition, in many cases, the uncertainty of the terminal wealth is not factored in – despite this being material to an individual's utility. This line of thinking could suggest a more diverse asset mix, or even a defensive component running throughout the timeframe and not just in the immediate pre-retirement years. Space does not allow us to explore these issues meaningfully here, and so these are simply offered as food for thought.

Moving to the DB environment is more problematic as alluded to above, as here we must attempt to derive a collective utility function. This difficulty apart, we can derive some interesting insights. The first is that the utility of risk-taking can change with the size of the loss.

Applied to DB investment, this would suggest that trustees' attitudes towards risk-taking would change when faced with a more significant deficit, for example when the funding is at 60% compared with 95% – being more willing to pursue risk with the larger deficit. The second insight is that different trustee groups, with different utility functions, will have different levels of risk-aversion. Investment strategies should therefore diverge to suit these differing utility functions. At one extreme, considerable risk-aversion would suggest a strategy of constant proportion portfolio insurance (CPPI) (see *Dynamic strategic asset allocation*).

However, perhaps the most powerful application of utility theory to pension funds is the recognition that different stakeholders have different utility functions. We see this most graphically at extremes of the funding spectrum, when dealing with deficits or large surpluses. The deficit case is explored in *The Mexican standoff*. At issue here is that the trustees, acting for the members, are typically risk-averse – their utility suffers markedly from a further worsening of the situation. The sponsor however is typically risk-seeking, preferring to run investment risk in the hope that returns, rather than contributions, will rectify the deficit. This is a highly simplified account (for a start, different types of members will have markedly different utility functions) but does show how an understanding of the different parties' utility functions can provide a common basis for dialogue.

The illustration demonstrates the relationship. Here we show stylised and simplified utility functions for the sponsor and a pensioner within a DB arrangement. In underfunded situations the sponsor is likely to be risk-seeking. The pensioner is risk-averse as the security of the income stream is threatened (even the Pension Protection Fund may not fully protect it). As the situation improves beyond a fully funded position, the utility functions invert, with the sponsor becoming risk-averse as very large surpluses are effectively trapped within the fund and are of no benefit to the sponsor. Conversely, once the surplus is such that contribution holidays cannot erode it, pensioners see the possibility of benefit enhancement and so derive higher utility from risk-seeking.



ⁱ*The Rationale of Reward*, Jeremy Bentham, 1825

ⁱⁱ*The Theory of Games and Economic Behaviour*, von Neumann and Morgenstern, 1944

ⁱⁱⁱ*Prospect Theory of Decisions Under Risk*, *Econometrica*, 47:2 Kahneman and Tversky, 1979

^{iv}References to utility theory date back to an essay by Daniel Bernoulli in 1738 where he proposed a solution to the St. Petersburg Paradox

In conclusion

Utility theory helps us question what our long-term beliefs about risk are and whether these are sustained when faced with an urgent situation. Similarly, by examining the bases of our decision-making we can assess how our reactions are different when faced with a loss relative to a gain.

Perhaps the most powerful application of the theory to pension funds is that an improved understanding of the various stakeholders' utility functions will lead to better decision-making.

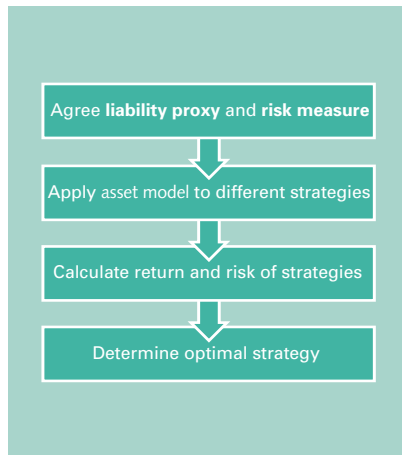
Spending the risk budget

How can we improve on what we currently do?

“Most people spend their lives doing neither what they want to be doing nor what they ought to be doing”

CS Lewis

This paper builds on *Setting the risk budget* and considers how we might apply new thinking to improving the risk and return characteristics of the asset portfolio. The practice of risk budgeting is becoming more prevalent in the UK pension fund industry and we believe that it is worth revisiting the process and examining how we can improve on certain aspects. Spending the risk budget involves the elements comprising the bottom line of the diagram, some of which are expanded upon in separate papers.



The risk budget analysis then proceeds to identify the liability proxy (an investible portfolio most closely representing the liabilities) and the risk measure. For example, if the volatility of the outcome on an FRS17 accounting measure was considered most important, then the liability portfolio would predominantly contain long-dated AA rated corporate bonds. The next step is to apply an asset model to the different strategies under consideration. We then compare the predicted risks and returns and determine our optimal strategy.

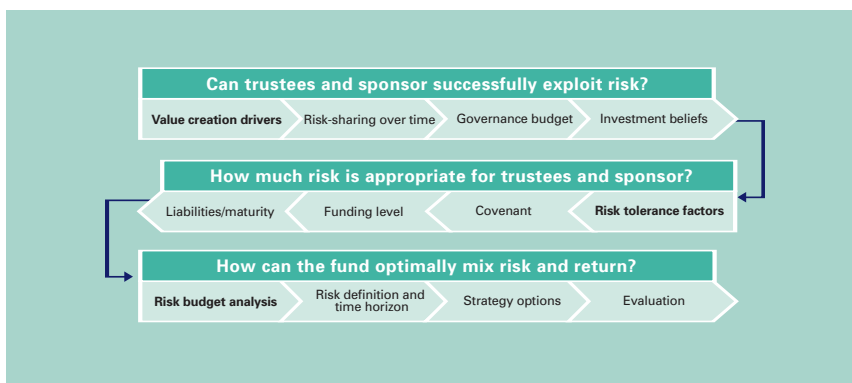
the policy plus relative return produces the optimal result. We explore this issue further in *Porting alpha and beta*. For now, however, we turn to consider whether we can bring new thinking to the risk budgeting analysis.

Three challenges

There are more than three challenges to overcome in successful risk budgeting, but we highlight what we consider to be the most important in order to provide some context.

Limited history

The use of an asset (risk) model is an intrinsic part of the risk budgeting process – we can't get far without one – but it does mean that we need to agree and use various assumptions. Even assuming that we live in a ‘stationary’ world (where the underlying process which generates asset returns and risks does not change^e) we hit a number of problems. These problems include survivorship bias (several markets ‘went to zero’ in the 19th and early 20th centuries), and the ever present problem of data mining (where we allow patterns in past data to influence our assumptions in the absence of a theoretical underpinning). In addition, almost all data in the investment world carries the issue of limited statistical inference – there is a lot of ‘noise’ and it is not conclusive enough to allow us to draw firm conclusions. All of this means that good assumption setting should not only be procedurally rigorous, but should also be influenced by qualitative insight. As an aside, we note that our current and future research efforts are increasing the attention we give to time-varying assumptions. The problems noted above in determining long-run averages are multiplied when we start to decompose a time series into sub periods and attempt to extract meaningful assumptions from them.



A recap of the risk budgeting process

The risk budgeting process was described in *Remapping our investment world*. We suggested that risk budgeting involves asking three key questions – how much risk should be taken, whether this level of risk is appropriate and where it should be taken.

The high level asset allocation strategy can then be further enhanced by considering different implementation options – in the typical case by considering how much active management, and what degree of aggressiveness, to add to the mix. This process is perfectly logical, but the key question that arises is whether

Limited capacity

Assuming we agree on the quality of the historic results, do we adjust them to reflect changed expectations for the future? Arguably we should, particularly to reflect the problem of limited

capacity where the return from some strategies will vary by the amount of money allocated to them. At the micro level it is relatively straightforward to see that an investment manager is likely to be less successful in outperforming with £10 billion than he is with £10 million. The same effect can occur at an asset class level when the entire industry changes its allocation towards it.

Limited governance

Finally we note the problem of limited governance. It is a sad fact that ‘good’ strategies derived from risk budgeting processes will turn ‘bad’ if the execution is poor. But the problem of limited governance is more pervasive than that. We also have the major issue of a macro-inconsistency in the key assumptions for skill. In clearer language, we know that, in aggregate, active skill is a zero sum game and yet we do not observe that any funds make an explicit assumption that their return from employing active managers will be negative.

Back to risk budgeting

While a pension fund should provide value for all stakeholders, we believe that the investment strategy should create value for the sponsor as ‘contributor of last resort’, albeit within joint sponsor/trustee constraints (we note that ‘value’ could be the avoidance of uncompensated risk).

So the aim of the risk budgeting process is to assess risk and return relative to a liability proxy, with a view to taking on only compensated risk. As noted above, the liability proxy is a portfolio that closely resembles the characteristics of the liabilities which are cash payments to beneficiaries in the future. As the goal of a pension fund is to meet these liabilities, the identified liability proxy portfolio can be thought of as the minimum risk portfolio. Decision-making then boils down to whether we wish to deviate from this portfolio with a view to

generating additional return (to reduce the cost of contributions) and if so, by how much.

What is the least risk portfolio?

Cash?

To the man in the street, cash is likely to be the lowest risk asset. But for long-term funds cash is not a safe asset – we do not know the future path of short-term interest rates or inflation and therefore we do not know how much interest our cash portfolio will produce and whether this will meet the future liability outflow.

Matching bonds?

We can reduce the uncertainty of the cashflows our assets will produce by holding bonds, which pay a known amount (whether a fixed amount, or one adjusted by inflation) at known dates for the life of the bond. Most liabilities can be reasonably matched by bonds, at least in theory, but there are practical issues relating to the supply of long-dated bonds and inflation-linked bonds (namely, inadequate quantity and length of maturity). Supplementing the bonds with certain types of swaps can go a long way towards addressing these issues, but the difficulty of matching uncertain liabilities due to, for example, mortality risk remains.

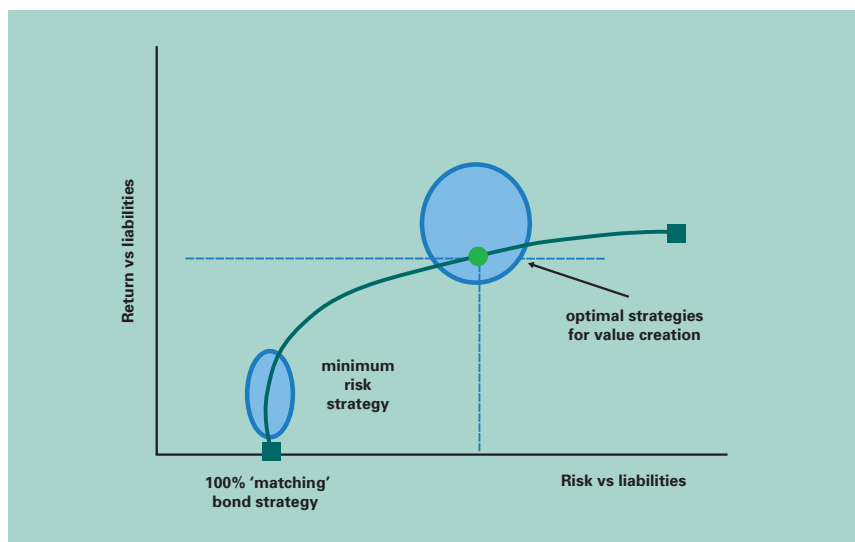
Matching bonds mixed with a small amount of equities?

The issue of the lack of sufficiently long-dated bonds can potentially be addressed by holding some equities within the portfolio to back the longer-term liabilities. Equities do not have a maturity date and, while it would be wrong to think of them as perpetual securities given that they can and do ‘die’, we can consider them as longer duration assets.

It is also possible that equities could be attractive relative to mortality risk. We are not implying that equities are a hedge in this regard, but it seems reasonable to assume that the equity and mortality risks are independent.

As such, a small holding in equities (and other risky assets) may only modestly alter the risk relative to liabilities, but at the same time provide additional expected return.

We therefore suggest that the minimum risk portfolio could include a small allocation to equities (and other risky assets), perhaps up to 10%, or even sometimes 20%. By extension, therefore, we reject the idea that a balanced portfolio of bonds and equities (for example 50:50) is suitable as a minimum risk portfolio, but this does not preclude it being adopted as the return-seeking strategy.



While we argue that a minimum risk strategy might generally contain some equities (depending on the nature of the liabilities) the risk tolerance factors discussed in *Setting the risk budget* define a wide range of appropriate strategies (see graph on previous page). The value creation drivers, if present, allow us to move up the curve rather than staying at the minimum risk position. Many would wish to move as far up the curve as the risk tolerance factors allow. Consequently we suggest that funds might focus on one end of the risk 'barbell' or the other.

What risk?

As already alluded to, there is no single satisfactory definition for risk due in part to different stakeholders having different perspectives and for other reasons. In *Utility theory* we seek to better articulate the stakeholder's 'payoff profile' (for example, highly sensitive to losses and indifferent to gains) which should enhance the discussion of the risk budgeting outputs, and hence assist in the selection of an appropriate strategy. In *Extending risk measures* we discuss the shortcomings of the standard risk measures used at present and suggest further measures which could be used to improve the risk budgeting outputs in future.

Re-setting the budget

We have noted elsewhere our belief in the dynamism of the investment world. This is supported by Peter Bernstein's recent workⁱⁱ in which he suggests that the idea of a static strategic benchmark no longer makes sense as the assumptions are too unstable to rely on. Instead he argues that it is better to use an active portfolio (in other words dynamic asset allocation). Hence, no matter how sophisticated our risk budgeting process, the results will not stand the test of time and we will need to revisit the analysis on a regular basis. The issue is then one of frequency and we are recommending that funds carry out an annual risk budget review. This is discussed further in *Dynamic strategic asset allocation*.

Evaluation

The final piece of new thinking that we believe should make its way into risk budgeting is an addition to the conventional evaluation framework where risk is allocated to asset classes or active managers. This includes a framework of risk-return drivers to provide more meaningful evaluation. These drivers would include the equity risk premium, credit risk premium, liquidity risk premium, duration, skill and so on. We can then 'map' asset classes or mandates against these drivers and get a clearer picture of the underlying risks to which the fund is exposed and the associated levels of reward. We expand upon these thoughts in *Diversity in asset allocation*.

In conclusion

In this paper, we have revisited risk budgeting analysis and suggested new ideas on how to evolve the process. We have highlighted the constraints imposed by limited history, capacity and governance, and have suggested that funds may be divided in their mission between those adopting a minimum risk strategy and those seeking to exploit risk-taking as much as their own circumstances allow. We have further suggested that risk budgeting and the consequent investment strategy should become more dynamic to reflect changing market conditions and changes in the fund's context.

ⁱWe introduce the possibility that it may be beneficial to reject the idea of stationarity in *Rethinking Portfolio theory* despite this making the choosing of assumptions considerably more complex

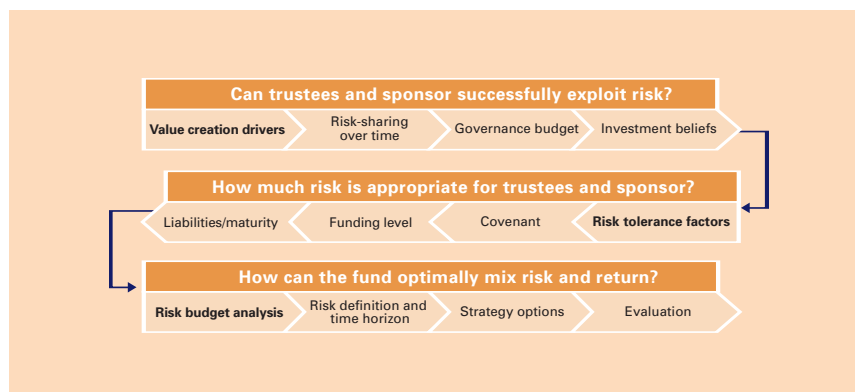
ⁱⁱPeter Bernstein is highly regarded as an investment expert. See a related article in *Points of Inflection: Investment Management Tomorrow*, Financial Analysts Journal, July/August 2003

Multiple solutions

Different asset allocations for different funds

"If you're seeking a creative answer to your problem, you must first give sufficient attention to understanding what the problem is"

Gerard Nierenberg



The issues discussed in the various papers have in large part been directed at generic corporate DB schemes. It is important, however, to consider the implications of our thoughts across the entire occupational pension fund family, covering public body funds as well as corporates and including defined contribution schemes.

This paper examines why different solutions should be necessary for different types of pension plan.

We note that these differences are principally driven by three considerations referred to in other papers: the extent to which risk can be shared between stakeholders, the strength of the sponsoring covenant and the term of the liabilities.

Recap on mission factors

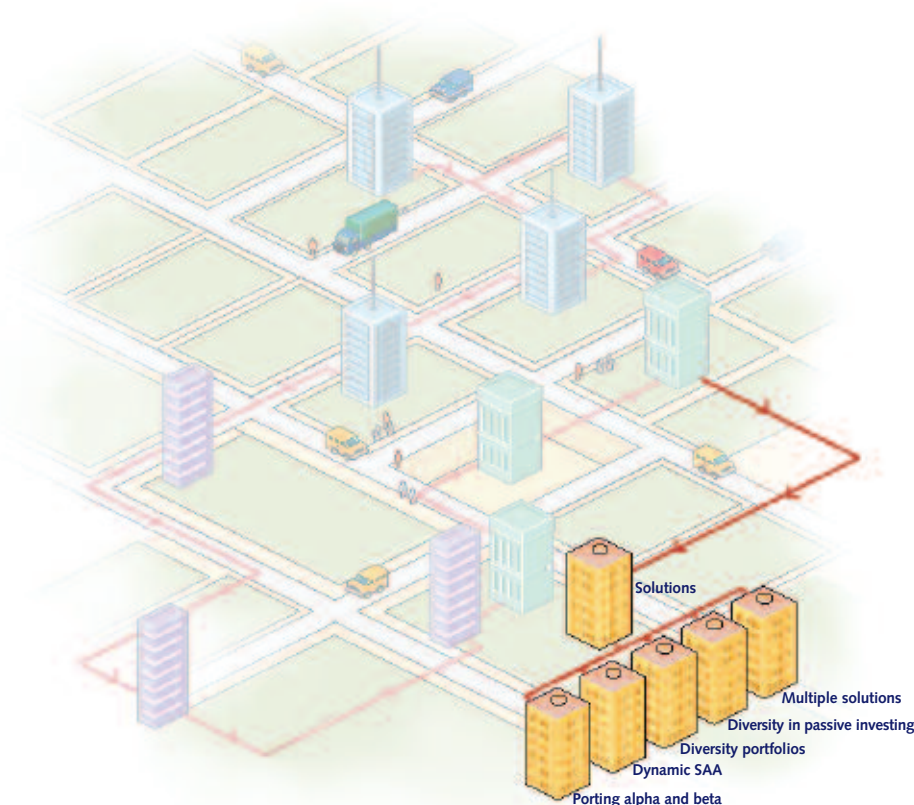
In *Setting the risk budget* we set out the key investment strategy drivers which influence the mix of risk-controlling assets (principally bonds) and return-seeking assets (equities and alternative asset classes).

Each of these drivers will be different from one fund to the next. We can, however, find certain common features when we group occupational pension schemes by type. The five types to which we refer in this paper are:

- Corporate DB final salary (open to new members)
- Corporate DB cash balance and hybrid plans (open)
- Corporate DB final salary (closed to new members)
- Public sector funded DB final salary
- Defined Contribution

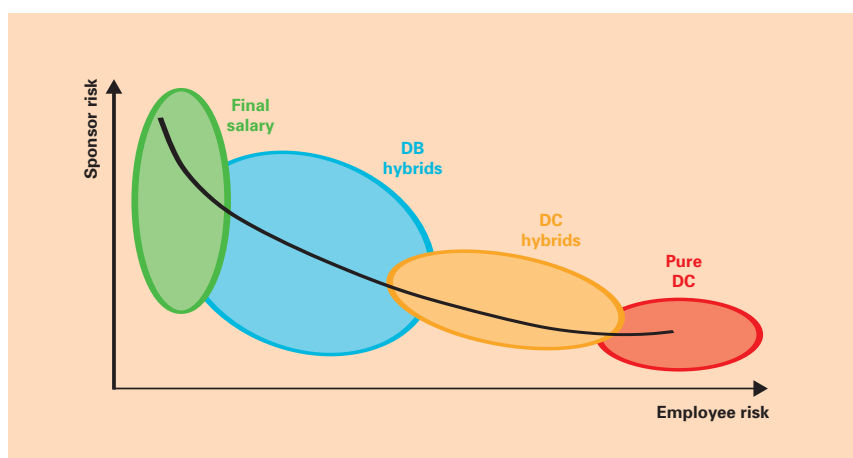
Risk-sharing between sponsor and members

Risk-sharing between different generations of pension plan members



and sponsor shareholder is one of the key areas where taking investment risk can create value, but this is only available to some types of pension plan. A rough configuration of how risk is shared is shown below. The plan design is critical to this:

- In final salary plans, some potential for risk-sharing exists, for example additional bonus accrual or discretionary pension increases
- In DB hybrids like cash balance plans, risk-sharing is fully possible through a partial shift of risk to the members, where the benefits payable are linked to investment performance
- In pure DC plans, there is no such risk-sharing.



Cash balance schemes are distinctive in this list, providing an additional layer of flexibility for the trustees and sponsor to turn up or down the risk depending upon their appetite. The sponsor can either hedge the risk by adopting an investment strategy as close as possible to the pre-defined investment return or vary the asset allocation to adopt a different risk/return profile. The exact risk profile will be very dependent upon the considerations explored in *Setting the risk budget* but in general these factors support higher allocations to return-seeking assets.

Covenant factors

In terms of covenant, funds sponsored by public sector bodies are a special case. This particularly applies to local authority funds as most other public sector employers do not fund their pension arrangements.

As with their private sector counterparts, public funds pay benefits derived through contributions and accumulated investment returns. There are three key differences between public and private funds, however. First, the covenant would be described as very strong, (although subject to an issue or two outside the scope of this paper, such as practical limits to tax-raising power). Second, public funds are established and governed by statute – the common law principles of trust have

less application. The absence of trusteeship highlights the third point. With no separation between trustees and sponsor, the risk dynamics between parties are different. There is a different type of risk-sharing between the local authority and the taxpayer. If the contributions are insufficient to make good a deficit, council-tax bills are increased. There are political implications for the elected members associated with a tax increase, but the associated impact on a company's cashflow (see *Pensions on the balance sheet*) is not present. Given the flexibility of risk-sharing and the strength of the covenant, public funds

should be in a strong position to utilise value creation drivers and invest significantly in return-seeking assets. We note that these funds have typically adopted investment strategies with high equity content, but not at levels distinctly different from corporate funds.

Term of liabilities

Both open DB plans and DC plans offer the opportunity to take a long-term view of investment strategy but it is important to recognise that not every plan and its sponsor can afford to take this opportunity.

The plans that are distinctly different in this regard are those which are closed to new members. These comprise over 70% of UK DB arrangements. Their time horizon must necessarily be shortening, and with that comes possible changes to covenant such as employers being less willing to fund future deficits. These factors suggest a progressive decline in the amounts that should be allocated to return-seeking assets.

What about DC funds?

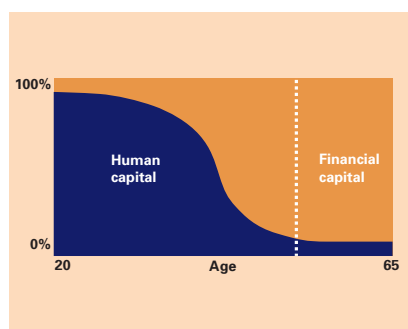
In a DC context we suggest that similar value creation drivers and risk tolerance factors can be considered when setting investment strategy.

Our papers have investigated the best ways to share risk across parties and across time. The investment risk within DC schemes is borne wholly by the individual, but risk-sharing can be achieved through consideration of the individual's human capital:

- Human capital is largely bond-like in nature – a stream of income, hopefully reasonably stable and growing. Therefore, the investment in equities/return-seeking assets at young ages complements the substantial bond investment that most people hold in their many years of future earnings. This is a simplified argument, as some individuals with volatile earnings may find their human capital looks more equity-like

- Human capital shares risk in a deal between the individual and his or her future; if the equity investment pays off at the expected return level or above, he (or she) obtains the risk premium from those risky assets at some future date
- If equities do not pay off, the human capital must take the strain, either by diverting some spending into higher saving, or by delaying retirement. Otherwise the savings will be inadequate
- All else being equal, the younger the individual the higher the risk tolerance.

We can think of the balance between an individual's human and financial capital as a line drawn on a graph over the individual's working life, as illustrated below.



In the early stages of an individual's career, human capital will be the dominant force shaping retirement potential. Conversely, as the individual nears retirement, part of the human capital should be translated into secure investment income upon which to retire. The vertical dashed line would typically be where the gradual switch from return-seeking to risk-controlling assets would begin. The path between these two points is a flexible one and can be extended beyond the individual's preferred retirement age. There will be times when the risk will need to be increased or the level of contribution varied.

Personal circumstances like job security and retirement income goals need to be factored in. Therefore an individual solution is desirable. There are a few important conclusions from this section:

- DC investment has been relatively crude and rather generic with most members in default or managed fund options
- Lifecycle DC investment strategies mimic the considerations outlined above but generally have had limited regard to personal risk tolerance factors. The theoretically correct position outlined above would need a massive change in governance to implement, but we can envisage DC strategy moving in this direction over time
- Irrespective of individual solutions, the overall allocation in DC plans to equities and other return-seeking assets should be high, arguably higher than currently, reflecting the capacity of many individuals to share risk in this way.

Other external factors influencing strategy

International accounting standards

We noted in *Pensions on the balance sheet* how accounting continues to favour equities by not fully considering risk factors and volatility of returns.

There appears to be growing pressure for accounting to be more even-handed and transparent and such considerations would tend to favour bonds at some point in the future.

Pension Protection Fund (PPF)

An additional factor that DB schemes in the corporate sector will have to consider when setting investment strategy is the impact of levies imposed by the PPF, which provides a system of mutual insurance for all corporate DB pension plans. Under the arrangement, if a company fails, leaving a pension scheme in deficit, the assets and obligations are taken over by the PPF which assumes responsibility for paying the pensions, albeit not at the full rate.

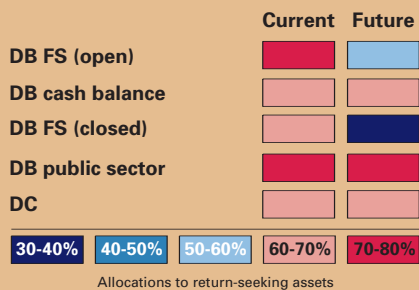
The PPF is to be financed by a levy paid by corporate DB plans and therefore ultimately by corporate employers. Exact details of the basis of calculation have not yet been finalised and so their influences on investment strategy remain unclear. The likelihood, however, is that taking risk will remain attractive to employers as the levy is unlikely to fully discount the actual strategy pursued.

	Risk-sharing employed over time	Covenant of fund sponsor	Length of liabilities
DB final salary (open)	Limited by the nature of guaranteed benefits	Variable depending on the company	Long, providing some long-term risk-taking opportunities
DB cash balance	Large depending on the design chosen	Variable depending on the company	Long, providing some long-term risk-taking opportunities
DB final salary (closed)	Becoming more limited over time	Variable depending on the company	Shortening, depending on time since closure
DB public sector	Possible inter-generational support allows some risk-sharing	Strong given government backing	Long, providing some long-term risk-taking opportunities
DC	Varying human capital produces a form of risk-sharing over time	No covenant to fall back on	Varies by individual

In conclusion

In this paper we have explored the differences that exist across the various types of pension funds and also some of the external influences on DB asset allocation.

In our view, these factors should produce an industry with a distinctly different set of average asset allocations. No single average can capture the whole. Averages that we regard as likely to apply in the next 10 years or so are set out in the diagram. The figures suggest some overall reduction in equity (and other return-seeking assets) allocations, particularly in UK equities. The scale of these reductions, however, would be considered to be only mildly bearish for UK equities.



Diversity in stock selection

Some alternatives to using capitalisation-weighted benchmarks

“If a business does well, the stock eventually follows”

Warren Buffett

Market capitalisation indices have a dominant position amongst institutional equity portfolios. In this paper, we consider the obvious advantages of these indices and then highlight some limitations. We suggest other ways of exploiting diversity and how these can be used in investment. We describe a future vision of less focus on capitalisation-weighted indices and explore the part governance and investment beliefs will play in shaping this future.

Market capitalisation indices

Over the years, market capitalisation indices have gained a significant influence on investors' equity portfolios. This has been apparent in two ways:

- Passive investing (using market capitalisation indices) offers investors an inexpensive and simple way of gaining exposure to capital markets. Currently, it is estimated that UK institutional investors have around a fifth of their equity assets in passive management following capitalisation weights
- Performance comparison – market capitalisation indices are the dominant form of benchmark used to assess the skill of active managers.

It is not difficult to see why this has been the case. Market capitalisation indices have several appealing characteristics:

- Representation – they offer broad market representation of companies that are available to invest in

- Macro-consistency – all investors could hold the market capitalisation portfolio without distorting relative prices
- Transparent and uniquely specified – the rules for inclusion in such an index are clear
- The rebalancing costs of maintaining portfolios in this framework tend to be kept low.

As a result of the above, market capitalisation indices have achieved an almost unchallenged position in the benchmark hierarchy. Our thinking and beliefs start with these indices, and there is no reason why this will change.

There are, however, criticisms of market capitalisation indices. The central issue is whether portfolios with such weighting structures are the most efficient.

Market capitalisation weights – efficient or not?

Many investors tend to think of a capitalisation-weighted index as lying on the ‘efficient frontier’ – investors cannot do better in terms of return per unit of risk (‘investment efficiency’) with any other passive portfolio. There are two problems with this position. First, the theory that supports this argument is drawn on assumptions that most would feel are unrealistic. For example, the theory assumes that all investors interpret information in the same manner – a point with which academic research is at odds. We discuss this in *Rethinking portfolio theory*. Second, a number of studies have found certain other passive-like portfolios that have outperformed it in practice.

Why would the capitalisation-weighted approach not be the most efficient? The answer lies with the way stock prices are at least as much driven by sentiment as by fundamentals.

Capitalisation weights are based on prices

Prices lie at the heart of market capitalisation indices as they determine the weighting of each company in the index. While this provides objectivity to the index construction process, it can also be problematic if these prices are not sufficiently close to true fair value.

As we noted in *Rethinking portfolio theory*, there is reasonable evidence that at times prices overshoot and undershoot as investors struggle to reach a consensus about a fair price for any security or for the whole market. The consequence for capitalisation-weighted indices is that, at some points in time, they will carry overweightings to overvalued stocks and underweightings to undervalued stocks. This often produces concentration in indices, such as the Vodafone concentration in the All-Share Index at the time of the TMT bubble.

Gaining from price volatility

Price overshoot and undershoot need not necessarily be a bad thing. In fact it can be turned to investors' advantage by making use of the benefits of diversity and rebalancing. What do we mean in practice by these two effects? The example in the panel illustrates the rebalancing concept more clearly in the narrow context of a simple two-stock portfolio.

Illustration of rebalancing gains

Annual returns	Year 1	Year 2	Total
Stock A	25%	-20%	0%
Stock B	-20%	25%	0%

Without rebalancing

	Start value £	Year 1 £	Year 2 £
A	100	125	100
B	100	80	100
Total	200	205	200

With rebalancing after first year

	Start value £	Year 1 £	Year 1 (rebalanced)	Year 2 £
A	100	125	102.50	82
B	100	80	102.50	128
Total	200	205	205	210

Instead of a two-stock portfolio, imagine that we hold a greater number of stocks, for example the FTSE 100 companies. Capitalisation-weighting approaches, as used in the FTSE 100 Index, provide a lot of diversification, but more would be possible if we simply equally weighted each stock. One of the key issues then becomes the impact of disciplined rebalancing back to this equal weighting to maintain this greater diversification. The concept which we are applying here (diversity) is to increase the sources which can contribute to the portfolio's overall return whilst reducing the risk through diversification (arguably the most powerful favourable factor available to any investor).

If we assume that the investment world is one in which individual stocks are not always priced fairly given their fundamentals, the equal-weighted portfolio will have the effect of reducing exposures to stocks that have become overpriced and increasing the exposures to stocks that have become underpriced. Future rebalancing will tend to make gains when such mispricing is unwound and stocks return to fair value. The resulting portfolio would have a better return per unit of risk than the capitalisation-weighted equivalent. The mathematics of this effect is explained in a paper by Robert Fernholz¹.

There are several caveats to be introduced at this stage. Transaction costs have to be allowed for and all the stocks have to be easily tradeable. The critical issue concerns the extent of any mispricing. Returns will be highest where there is significant mispricing, but if all the stocks trade at close to a fair price the portfolio may not outperform after transaction costs.

Equally-weighted indices can be used successfully in more liquid markets but they have disadvantages in less liquid markets where it becomes unattractive to hold large weights in small stocks. Other indices can be built to exploit these financial effects. There are two possible routes, non-price investing and diversity-weighted investing, which we consider in more detail.

Non-price investing

The principle of non-price investing is to build the portfolio using weights reflecting current fundamental data of companies.

The obvious fundamental data candidates would be weights related to book values, earnings, cashflows or dividends. Weights can vary, and a blend of the above factors could be used. Clearly this is a non-price driven investment approach which focuses on fundamental wealth-creating measures. Indices and portfolios would be built according to a defined rules-based methodology, similar to the rules with which market capitalisation indices are constructed.

The critical difference, however, would be that such portfolios would need to be rebalanced on a regular basis to reflect how prices have changed. Prices are more volatile than fundamentals so rebalancing back to the more stable fundamental weights is required. As a stock gets more expensive, its weight in the portfolio increases and this has to be trimmed to get it back to the fundamental weighting. The fundamental accounting data will change too but the impact of these effects on the portfolio will, most likely, evolve gradually.

The attraction of any investment approach depends on beliefs. The non-price investing approach is attractive if you believe that:

- In the long term, market prices eventually follow fundamentals as investors adjust their pricing models to reflect the actual wealth which companies are producing. Such beliefs suggest that these are sensible weights for long-term investors to adopt
- Rebalancing enables investors using these weights to steadily capture excess profits from the short-term mispricings of stocks, in a process analogous to value investing. Such beliefs suggest that this investment approach will outperform a capitalisation-weighted benchmark.

This process focuses on current information. The fact that factors such as forecast earnings are not incorporated does not seem to hinder the strategy materially.

Non-price strategies have certain intuitive advantages of being long-term and essentially value-creating in nature. As noted in *Long-term versus short-term investing*, we believe that such a strategy supports an efficient allocation of capital to companies and promotes long-term investing. It rewards and gives an incentive for companies to pursue genuine long-term value creating strategies as little (if any) attention is paid to company stock prices when investors allocate capital.

Drawbacks of non-price investing

What are the drawbacks of this particular approach? At first glance, they seem to be the opposite of the merits of capitalisation-weighted approaches:

- Benchmark 'brand' – they have low recognition with investors and so any differences from the capitalisation-weighted indices might be seen as active risk
- Non-unique weights – there are several ways to build such strategies (do you favour earnings or book value, or a combination?). This introduces issues of whether the chosen weightings are a form of 'data-mining' or active management
- Rebalancing – there would tend to be greater portfolio turnover compared to a market capitalisation index and the cost of such trading could be significant.

Diversity-weighted investing

The research by Fernholz referred to earlier can be applied to portfolios that employ diversity more directly. The most promising application we believe is one that builds portfolios that have consistently

lower volatility than a capitalisation-weighted approach.

This could be done using different techniques. One methodology to construct such portfolios is by building a number of smaller sub-portfolios or 'cluster' portfolios. Each sub-portfolio is constructed to have similarly correlated stocks within it but to be reasonably independent from the stocks outside it. The subsequent rebalancing involves keeping equal weights in each of these sub-portfolios. It is apparent that the reduced concentration is beneficial, and with disciplined rebalancing, these portfolios can produce attractive returns.

What beliefs are required to support this approach?

- Past correlations can be used to identify future correlations (in other words it is easier to forecast risk than return)
- The expected growth characteristics of stocks of different size do not differ significantly
- As for non-price investing, disciplined rebalancing enables investors using these weights to steadily capture excess profits from the shorter-term mispricing.

The approach appears less intuitive and more 'black box' than non-price investing, but the two methods in practice have much in common.

Drawbacks of diversity-weighted investing

The three drawbacks mentioned above for non-price investing (low recognition, non-unique weights and turnover) also apply to diversity-weighted investing. One key additional issue is that the methodology is harder to understand.

Wider considerations

The above methodologies need to be placed in a wider context. There are two critical points to be raised.

First, do we regard these methods as simply forms of 'enhanced indexation' and place them in direct comparison with such products in terms of their efficiency? Second, how difficult are these methods to take up and implement?

It is more than a matter of semantics what we call these different approaches. Investors do not require such a large governance budget to be applied to a passive approach as an enhanced indexation approach, so passive approaches have particular merit in a governance-challenged world. With respect to the two approaches under discussion, we would characterise non-price investing as essentially passive as the weights are rules-based. By contrast, the diversity approach described requires estimates of security correlations and so has more investment complexity and subjective judgement. We regard this as enhanced indexation, albeit with certain quite passive elements. Initially, however, a lack of familiarity with either approach will require a higher level of governance resources from trustees.

The second issue is how funds should consider and implement them. We note that the beliefs underlying these approaches will need to be fully understood by decision-takers. We think this is challenging and will slow down their adoption, especially as the beliefs behind capitalisation weightings have the considerable merits of simplicity and being well-established in investors' minds. In addition, there is currently a limited range of products in the market-place using these methods, although we expect this will change over time. As already mentioned, implementation of these approaches will be hampered by unfamiliarity and therefore we believe that wider discussion in the industry about these methods is warranted.

Diversity – a critical concept

Diversity should be considered as a mainstream element in investment thinking. We suggest that measurement of diversity should be undertaken as a normal part of portfolio analysis. The panel below sets out a possible measurement framework.

Diversity measures Diversity can be defined in different ways, but we think the most helpful measures are as follows:

Diversity Score is calculated as the inverse of the sum of the squares of the weights in the portfolio.

- If the largest stock in the index has 10% weight and the smallest stock 0.5%, then the calculation is $1/[(0.1)^2 + \dots + (0.005)^2]$
- With an equally-weighted index of 100 stocks the calculation is $1/[(0.01)^2 + \dots + (0.01)^2] = 100$

This methodology is similar to that of the Herfindahl-Hirschman Index, which is used to measure concentration within industry sectors.

Diversity Percentage is calculated as the diversity score divided by the number of stocks held expressed as a percentage.

- The Diversity Percentage of the FTSE100 is around 26% (at September 2004), while the equally-weighted index with its maximum diversity has a Diversity Percentage of 100%. If the top 10 stocks of the FTSE 100 were equally weighted and capitalisation-weighting applying to the remaining 90 stocks, the Diversity Percentage would be 32%. This increases to 41% if we equal weight the top 20 stocks.

In summary, the higher the Diversity Percentage, the higher the diversity of a portfolio.

¹ Diversity Weighted Indexing by Robert Fernholz, Robert Garvy and John Hannon (February 1997)

In conclusion

Diversity is an important concept in investment. We suggest that understanding and measuring the diversity in benchmarks and portfolio may help to explore the concept further.

We believe the two methods discussed that exploit diversity effects – non-price and diversity-weighted investing – have the potential, given time and patience, to provide outperformance relative to capitalisation-weighted approaches. We think they should attract both attention and subsequent capital allocations.

A reasonable vision of the future suggests that there could be two parallel moves as to how non-price methods may, in time, impact fund investment practice:

- Passive investing: we see non-price indices being used as diversification of passive approaches alongside the capitalisation-weighted approach
- Active investing: we see non-price indices as being used both explicitly and implicitly as policy benchmarks (in other words for portfolio construction purposes, not for performance comparison, although such an index can form one of the success measures on a balanced scorecard for long-term mandates.)

In our view the diversity and non-price concepts will have a significant impact on equity market allocations and behaviours going forward.

Nevertheless, we suggest the ultimate performance benchmark will remain the capitalisation-weighted index. This will remain in top spot in the performance benchmark hierarchy.

Diversity in asset allocation

Using multiple sources of risk to improve investment efficiency

“Diversity: the art of thinking independently together”

Malcolm S Forbes

Pension funds have historically relied on equities to generate most of their return and therefore equities have also been the main contributor to risk. This paper identifies the benefits that should follow from including a wider range of asset classes and the changes in thinking and practice that would be needed to accompany this.

Building portfolios

The diversity case was originally set out in *Remapping our investment world*. Traditionally pension funds have invested predominantly in two asset classes – equities and bonds. Equities were chosen to provide return, while recognising they are risky. Bonds were chosen largely to limit risks relative to liabilities. The average UK pension fund¹ is currently made up of 65% equities, 30% bonds and around 5% other assets. In this average fund, risk is dominated by the asset allocation decision – policy risk – with the majority arising from equity volatility.

There are several other asset classes that pension funds could invest in to improve diversity. The principal examples are high yield debt, emerging market debt, global small cap, private equity, real estate, hedge funds and commodities. The panel shows the returns and risks expected from these markets, based on the Watson Wyatt Global Asset Model assumptions as at 30 September 2004.



Risk return drivers

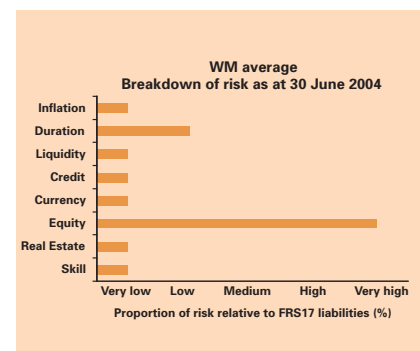
The first support for diversity comes from consideration of the different risk return drivers to which each asset class is exposed. While a more complete list is given in the panel, there are three primary drivers that pension funds have a natural appetite for:

- Liquidity risk return driver – the additional return investors require to compensate them for an asset's illiquidity
- Credit risk return driver – the additional return investors in bonds require for taking on the higher level of default risk associated with ratings lower than AAA government grade
- Skill risk return driver – the additional return expected as a result of manager skill.

In addition *market risk return drivers* reflect the economic uncertainty associated with particular asset classes. The analysis below highlights this in respect of equities and real estate, but the drivers also exist in other markets such as commodities.

Diversity principles

Diversification has a technical definition involving the reduction of specific (idiosyncratic) risk within an asset class, and is based on assumptions about risk and correlation.



Diversity involves hedging the bets that future assumptions are not accurate by maintaining, at all times, a wider range of exposures.

Further support for diversity is connected to the principle of rebalancing in which exposures to asset classes are maintained largely constant over time.

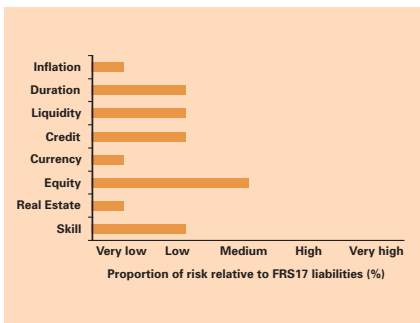
The diversity case is set out in more detail in the *Diversity in stock selection*. As with stocks, it can be applied to asset classes, based on an investment philosophy having appropriate beliefs.

How much improvement might be possible?

We analyse the improvement of investment efficiency of increased diversity by reference to a benchmark diversity portfolio (used strictly for illustration purposes) made up as follows:

	Average pension fund %	Benchmark diversity portfolio %
Core bonds	30	25
High yield		5
Emerging market debt		5
Core equities	65	40
Global small cap		5
Private equity		5
Hedge funds		5
Real estate	5	5
Commodities		5
Risk versus liabilities	11.1	10.2

The chart below illustrates an improvement in the diversity of the portfolio. It can be seen that the proportion of risk related to equity risk has reduced.



Diversification principles

By including exposures to all the asset classes considered, a pension fund will gain diversification and improve investment efficiency (as measured by expected outperformance over the liability proxy divided by risk). The extent of this improvement depends on the exact mix chosen and the assumptions selected. Typically 5% exposures to these new areas will lead to improvements of the order of 2% or 3%.

The expected figures for the benchmark diversity portfolio are in the table below. The inclusion of seven diversity positions produce an estimated improvement of 10% in efficiency from 0.38 to 0.41.

	Average pension fund	Diversity portfolio
Expected out-performance	4.2%	4.2%
Tracking error	11.1%	10.2%
Information ratio	0.38	0.41
Diversity score*		
By allocation	1.9	4.2
By risk exposure	1.0	2.3

*The diversity score is calculated as the inverse of the sum of the squares of the weights in the portfolio. A higher figure denotes a greater diversity of assets

The diversity scores are also shown (see *Diversity in stock selection* for more details). The calculation considers both the normal measure based on allocations, and then another set based on estimated risk exposures. Both measures demonstrate significant increases in diversity.

Governance

Improvements in diversity carry the disadvantage of requiring greater governance. In some cases this could be considerable. In general, governance issues tend to be the greatest in the more illiquid, least price transparent, classes.

The key governance attributes that we believe are required to be successful with approaches like this are:

- Highly developed investment competencies among the principal decision-takers who will generally be a different group from the trustee group (see *Pension fund governance*)
- Well-developed investment beliefs
- Supportive thinking and long-term staying power in the main trustee group
- Sufficient investment administration and oversight resources
- Long-term financial support and stability from the sponsor.

We note that excellent investment strategies will tend to produce poor results when they are poorly executed. This suggests that trustees and sponsors should be self-critical when considering their governance against these key attributes before committing heavily to diversity strategies.

Risk return drivers

- Duration** – the additional return investors demand to compensate them for tying up their capital for longer periods
- Credit** – the additional return investors in bonds require for taking on the higher level of default risk associated with ratings lower than AAA government grade
- Equity** – the additional return investors require for the uncertainty in future corporate earnings, dividend payments and capital values
- Currency** – the additional return investors expect from investing in currencies other than those in which the liabilities are paid
- Real estate** – the additional return investors require for taking on the uncertainty associated with rental income and capital values
- Liquidity** – the additional return investors require to compensate them for an asset's illiquidity
- Skill** – the additional return expected as a result of manager skill

In conclusion

In this paper we have suggested that pension funds can benefit from greater asset class diversity. The support for this approach is based first on the different risk return drivers that can be assembled in such a portfolio, and second, on the opportunities to exploit mispriced asset classes by maintaining asset class exposures through rebalancing.

We note, however, that the principal challenge in this approach lies in the increased governance necessary to be successful.

¹ Based on the WM universe as at 30 June 2004

Dynamic strategic asset allocation

More than glorified market timing?

"When circumstances change, I change my view. What do you do?"

JM Keynes

This paper questions whether a largely static asset allocation is the best option, and explores whether we can find a way to dynamically adjust the allocation without being accused of adopting a tactical asset allocation approach.

Why not stay static?

We are all familiar with the world of triennial actuarial valuations, and the accompanying review of contribution rates and investment strategy. Typically, time would be allocated to seriously consider the investment strategy (strategic asset allocation, or policy portfolio) in order to 'get it right'. It would then be fixed for at least three years, and often longer. In the last two decades of the 20th century this process served us well. The three-year bear market that followed was a challenge, but not necessarily a sign that the process was flawed. In fact, the whole point of a strategic allocation was to give a fixed point in navigating through choppy markets.

Working from modern portfolio theory, with its efficient market and random walks, holding a static allocation (we will assume it is efficient) and rebalancing back to it is the right thing to do. We know the expected outperformance of equities over bonds, and the risk associated with this – so when equities outperform and increase their weighting, we rebalance and take our profits; when equities underperform, we rebalance so that we are not underweight when equities next outperform. However, we are now claiming that this is not the right thing

to do for two reasons – one trite, the other more substantial.

The trite reason is that the bulk of pension fund money is currently represented by DB funds of increasing maturity. All but a few will require very low equity weightings in 20-years' time and so, in a loose sense, they will require a dynamic asset allocation to keep pace with increasing maturity.

The more substantial reason relates to our questioning of the assumptions underlying modern portfolio theory, as discussed in *Rethinking portfolio theory*. Is it true that asset returns follow a random walk (in other words after going up a lot they are just as likely to go up next period as down)? Or do they follow a mean reverting process (in other words after going up a lot they are more likely to go down next period than to go up)? Or indeed, do they experience distinct phases of high returns followed by low returns and vice versa, what we might term 'regimes'? If this is true, and we believe that it is, then it would be natural to change the strategic allocation as market conditions evolve. Opponents of this view can claim that this is nothing more than glorified market timing, and there is little evidence to suggest that market timing can be consistently successful. There is, however, some high profile support to the contrary.

Controversy among US pension plans

In the spring of 2003, the influential US investment strategy expert, Peter Bernstein, caused much debate by suggesting that strategic asset allocation was misused and often leads to an unhelpful focus on a single

measure of risk (tracking error)¹.

His concerns were broader than this but are beyond the scope of our current paper. The debate that followed his remarks took place largely in the US, but his view could be applied to any pensions market where strategic asset allocation is the dominant thinking.

For our purposes we agree with his concern that policy portfolios have become a substitute for thinking. Funds have had a false optimism that it is possible to have a policy that is designed for all weathers. The real benchmark should be the return required by the structure and timing of the liabilities. In this light it is logically better to use an active portfolio (in other words a form of dynamic strategic asset allocation) to adjust to market conditions and get the best from the opportunity set of assets rather than a fixed policy portfolio. This certainly follows if you believe as most do that equities and other asset classes are constantly changing their prospective risks and returns.

Regimes

The nature of the changes in market conditions is important. We need to differentiate between the volatility associated with random movements which can go either way – up or down – and changes that will persist in one direction only (and can be exploited). At the risk of straying into philosophy, should a random walk offer an equity risk premium? If we know that it is a random walk, then we simply need to extend our holding period to collect the premium². Where is the risk in that?

If, however, the world is subject to changing regimes each lasting a

Period	Number of years	Regime	PE ratio		Realised Equity versus bond (% pa)
			Start	End	
1916 – 25	10	Bull	–	–	5.0
1926 – 45	20	Bear	–	12.8	0.0
1946 – 68	23	Bull	12.8	22.1	11.0
1969 – 80	12	Bear	22.1	6.5	1.3
1981 – 99	19	Bull	6.5	28.6	5.2

Data source: Equity Gilt Study, Barclays, 2004

number of years in which the return difference between equities and bonds can vary markedly, then equities become genuinely risky – even for long-term investors. In this case, the concept of an equity risk premium only really makes sense over the very long run (say 100 years) as the succeeding regimes revert around the ‘true’ mean value.

In *Rethinking portfolio theory*, we reviewed the theory underlying investment regimes. Essentially, investors only have partial information about the companies and markets in which they invest and so misprice assets; cycles of optimism and pessimism push markets to overvalued and undervalued levels. It follows that if this theory is an accurate description of the world, then we will be interested in identifying regimes and altering our allocation accordingly.

How do we change?

Having argued the case for dynamic allocations being appealing in principle, we need to consider whether we can achieve this in practice. We will need to be wary of accusations of market timing, and therefore will need to find a disciplined process – one that can be implemented in largely ‘passive’ form according to predefined rules with limited need for subjective judgements. We believe two processes qualify.

Dynamic strategic asset allocation (DSAA)

Any dynamic allocation approach that seeks to enhance returns will need to follow some form of buy-low, sell-high process. This in turn requires an assessment of value to be made. Buying low requires the process to identify the asset as cheaper than ‘normal’ or average. As we have alluded to above, proceeding down this route will require us to have a belief in markets varying in their prospective pay-offs which in its turn implies some level of mean reversion. The theory of random walks embedded in classical finance theory gives us no support for such an approach.

Intuition would appear to be on our side – trees do not grow to the sky, and prices cannot stray from fundamental value indefinitely – but belief is necessary as hard evidence is in short supply. There is weak support for mean reversion in the empirical dataⁱⁱⁱ but it is not totally conclusive. We simply do not have long enough price histories to give us sufficient data points to examine. But we do have a logical theoretical underpinning that also sits comfortably with most people’s intuition and observed market behaviour.

DSAA in practice

If we can make a logical case for a more frequent approach to strategic asset allocation, how exactly should we proceed? We think there should be three distinct elements to successful practice:

- *Establishing the risk budget policy (reviewed periodically, but usually less frequently than annually):* the risk budgeting framework calls for agreement on a risk budget amount – the VaR. In our mind this target should be expressed in terms of an appropriate range, (for example a VaR of £100m to £150m) and an associated target range for principal asset groupings (for example bonds 30% to 50%, equities 40% to 60%, alternatives 10% to 20%) This step is not meant to constrain unduly, but makes the annual process more effective
- *Deciding the actual strategic asset allocation (SAA) at regular intervals (like one year):* applying market-consistent assumptions – our best information on market risks and returns likely in the next few years – we apply the risk budgeting process to develop our optimal SAA within the risk budget policy, making full allowance for the transaction costs necessary
- *Applying a rebalancing process quarterly or monthly until the next risk budgeting analysis:* rebalancing takes on board two inputs: first the degree of divergence

in actual allocations from the strategic weights; second, the extent to which the VaR has moved outside the policy range; both inputs have to be viewed together. Rebalancing asset allocation in particular is best set up as a largely automatic process based on triggers at threshold points. On the other hand, breaches of VaR budgets have to be considered individually based on context.

We accept that the above is only one version of a number of sensible approaches to the DSAA challenge, but as a tested prototype we hope it acts to stimulate further thinking.

We also believe that further automation may be possible to make this process more like passive management. This is still work in progress but incorporating a number of modern statistical techniques and broad investment beliefs about regimes and cycles would be sufficient. Such an approach would perhaps be more credible to a trustee board than methods that seem to rely too heavily on judgement. Of course, active asset allocation can be applied on top if the fund’s investment beliefs find such an approach attractive.

Constant proportion portfolio insurance (CPPI)

The second disciplined process that we believe qualifies as a ‘passive’ dynamic allocation approach is CPPI. The primary purpose of CPPI products or processes is to protect a given asset level or funding level. CPPI employs mathematical asset allocation models which adjust the fund’s asset allocation on a daily basis. Should equities fall, the models will trigger a sale of equities and move the proceeds into defensive assets to protect against further falls. As equities outperform, and the asset or funding level improves, there is a lower requirement for defensive assets and so these are sold and the proceeds reinvested into equities.

The good news is that CPPI can provide downside protection. This is particularly attractive to those who are more keen to avoid bad performance than to gain from good performance. Many investors have this type of 'utility function' (see *Utility theory*). The bad news is that CPPI effectively 'chases' markets by selling low and buying high and probably gives up some investment efficiency in the process. Capacity constraints would also limit the opportunity for large-scale commitment to CPPI products.

As such, the approach may have merit for a risk-averse investor, particularly those with fixed horizon dates in DC plans, but it is not clear that CPPI would outperform a stable allocation for a return-seeking investor.

ⁱ Peter Bernstein's original speech was given to the 2003 AIMR (now CFA Institute) Annual Conference. His comprehensive views are set out in *Points of Inflection: Investment Management Tomorrow*, Financial Analysts Journal, July/August 2003.

ⁱⁱ This is a simplification of the argument in Jeremy Seigels' *Stocks for the Long Run*.

ⁱⁱⁱ See, for example, *Time diversification*, Watson Wyatt, September 2004, or *Testing mean reversion in the S&P*, Paul Bostock, GMO working paper

In conclusion

In this paper, we have suggested that a static strategic asset allocation may not be in the best interests of investors. Instead many funds will do better to adopt an asset allocation policy that changes in the light of shifting market conditions following a disciplined investment process. This approach is most often going to be referred to as DSAA.

For the risk-averse, a CPPI strategy would appear to have merits and has the advantage of becoming more widely available.

Whatever the merits of the processes discussed in this paper, we suggest that all funds can capture some of the benefits identified through more frequent reviews of risk budgets, as discussed in *Spending the risk budget*.

Porting alpha and beta

A new approach to asset and liability management

“The only way to discover the limits of the possible is to go beyond them into the impossible”

Arthur C Clarke

Historically, pension funds have set their investment strategy by considering asset classes and manager skill separately. This paper considers the alternative approach which involves taking market exposures (beta) and manager skill exposures (alpha) together.

For a pension fund this would involve creating a liability matching portfolio and then adding an absolute return portfolio on top. We conclude that while the approach has theoretical merit, the practical issues with managing funds this way seem considerable. Nevertheless, we see such approaches becoming more mainstream over time.

The timeline

In determining investment strategy, pension funds have traditionally used a two-stage process. First, they have determined their strategic asset allocation (SAA) using asset liability modelling based on the unique liability characteristics of the fund.

This creates the allocation to various asset classes known as the policy benchmark. Managers are then appointed to implement the policy. This may involve the use of active management risk, where the manager uses skill to add return relative to the benchmark.

The SAA approach is summarised as follows:

Current arrangement = policy benchmark + relative return

1. Decide SAA
 - Based on ALM and fund characteristics
 - Determine appropriate (policy) VaR
 - Create *policy benchmark*
 - Made up of range of asset classes
2. Use range of managers for additional relative return
 - Create mandates from benchmarks
 - Managers use skill to add relative return to benchmark subject to manager VaR

With this approach, pension fund risk has historically been dominated by market risk. Manager risk has generally made a small contribution to the overall level of risk relative to the liabilities.

This approach has come in for criticism in recent times. In a sense this would inevitably be the case following a period of poor market performance, but critics are making a number of additional points:

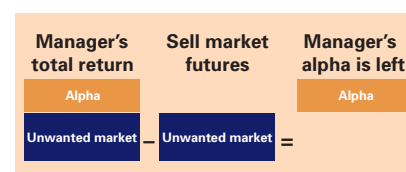
- The disciplines used to develop the market exposures (the SAA) have been relatively weak
- The SAA benchmarks have typically included a number of duration, inflation and currency risk exposures that were not expected to be rewarded
- The concentration on benchmarks implied by the approach has limited the breadth of manager skill
- The separation of asset allocation and manager skill has meant that the overall strategy has not been well joined-up
- The respective size of the (alpha and beta) risk return drivers are not seen

as well balanced; in particular, if market returns are likely to be lower in the future, many funds will want their manager skill drivers to be more influential.

There are a number of developments in the investment industry which are starting to chip away at the traditional model, and allow funds to be managed in different ways. The most prominent such development has been the growth in the hedge fund industry. Hedge funds are special types of investment vehicles which generally contain high levels of exposure to manager skill and limited exposure to markets. They also provide a good example of what ‘porting alpha’ means.

‘Porting alpha’

This term refers to any situation where a portfolio has market exposure removed, leaving behind the manager skill piece or alpha. If we think of any active mandate as comprising a combination of the market index performance plus the manager’s relative-to-index performance, by appropriate derivative transactions we can isolate the alpha. The most obvious place where this is valuable is in an asset class where the manager skill opportunities are attractive but the asset class itself is not attractive.



There are a number of examples of this in practice including:

- Enhanced bond products that have ported in specialised bond exposures from outside the benchmark universe
- Enhanced equity index products that have ported some specialised bond and credit alphas onto the equity index
- Hedge funds themselves which work to very tight risk controls and will isolate attractive alpha opportunities and hedge out the majority of market risk.

Liability-plus mandates

Using this technique to generate returns similar to liabilities with an additional alpha margin, provides a particular opportunity for pension funds. The arrangement is typically offered by one investment manager who has a combination of bond-matching skills and active skills in a number of asset classes. The process undertaken is in two parts. First, a bond-matching portfolio is created. This involves identifying the future structure and timing of liabilities and constructing a portfolio of cash, bonds and swaps that most closely matches those liabilities. Some risk will inevitably remain even in the ideal matching portfolio, given factors such as changes in mortality. Second, additional alpha exposures are ported onto the portfolio creating a mandate that has the objective of outperforming the liability benchmark.

An obvious extension to this approach is to move towards a multi-manager approach, selecting the best-in-class managers in each asset class to improve the effectiveness of these strategies. This reflects the idea that no single manager is likely to have the highest skill level in each asset class.

'Porting beta'

One other extension is for some market exposure to be included in this absolute return section. The argument would be that the risk return characteristics of certain market exposures might improve the overall mix of alpha strategies. The size of any market exposure could be scaled according to efficiency requirements (any unwanted exposures would be removed by the use of derivatives). As we are adding in market exposure this process is referred to as 'porting beta'. There are three main reasons why we would want to include a mix of betas in our return-seeking portfolio. First, betas provide a positive expected return (investors are compensated for taking on the risk of an asset class), unlike alpha which is a competitive proposition about gaining at another's expense. Second, betas increase the available investment capacity

substantially and, third, they provide additional breadth of opportunity; skilled managers can manufacture alpha from opportunistically adjusting the mix of betas.

The absolute return approach is summarised below:

Alternative arrangement = matching portfolio + absolute return

1. Decide liability-matching policy

- Uses estimated liability cashflows
- Aims to produce very small policy VaR
- Creates least risk matching portfolio largely made up of cash and swaps.

2. Use managers for additional absolute return on top (optimal risk return trade-off strategies)

- Port/transfer manager skill (alpha) and asset classes (beta), hedge out unwanted beta
- Use individual and aggregate manager VaR's.

Comparison of current and alternative

While they may seem very different, the two approaches share several key attributes:

- Both approaches involve consideration of the liabilities, although more detail with respect to the timing of future cashflow payments is required for the alternative approach
- Each approach tries to build a mix of alpha and beta exposures designed to maximise the outperformance per unit of risk relative to liabilities.

There are, however, significant differences in implementation.

The absolute return approach carries the advantage that the mix of risk return drivers can be set directly. This addresses the points raised in the introduction about SAA:

- There is likely to be more breadth
- There are limited benchmark constraints
- The duration, inflation and currency exposures can be managed more precisely
- The balance between alpha and beta drivers is set directly.

The principal disadvantage of the absolute return approach is that the implementation is very challenging.

There are also some issues of investment process and governance. The SAA approach has the merit of easier monitoring of the managers. On the other hand, this approach tends not to be as adaptable to different market conditions, whereas a more dynamic strategy is easier to achieve in the absolute return approach.

The panel below gives an example of porting alpha and beta. Clearly, implementation of a complex alternative model will demand a high governance budget.

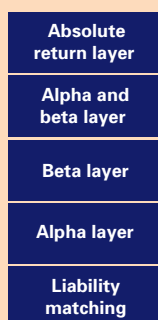
Liability-matching portfolio

A number of strategy points arise with designing the liability matching portfolio including:

- The form of the cashflow estimates: in particular these will have to deal with fixed and inflation-linked liabilities

Example of porting alpha and beta

Traditional model



Several large specialist mandates in single or multi-asset classes

Alternative model



- How precise an investment match is sought: there are obvious limits to the precision of the liability estimates and so there will be trade-offs to be made in the investment design; special liability-targeted commingled vehicles can be used to help with the problem
- How far out the liabilities are matched: it may be more pragmatic that liabilities are matched only to say 30 years; then long-term growth mandates could be used as a rough match beyond this horizon.

Absolute return portfolio

There is a considerable range of possible approaches to the absolute return portfolio. The common feature is that a risk budget (expressed generally in VaR terms) is created for each portfolio and for the whole structure.

This could involve an allocation to one manager or to a multi-manager line-up. Examples of portfolio types that could be included are hedge funds, long-short portfolios, long-only portfolios with hedging of the market and proprietary trading portfolios. The challenge lies in building a structure with the best possible risk return characteristics given a number of potential hazards. First, a wide range of possible products and breadth is an advantage in principle but carries considerable practical challenge. Second, diversification efficiency is one of the critical success factors for this approach and requires accurate estimates of alpha expectations and correlations. Finally, a challenge exists

to achieve attractive fee levels, particularly in hedge funds.

There is also the question of implementation. The use of pooled funds makes this approach easier to implement but there will still be a number of considerations to bear in mind:

- Management of investment risk, derivatives and gearing in particular
- Rebalancing of market exposure
- Choice of synthetic instrument (futures, total return swaps and so on)
- Other risk management: operational risk, risks arising from illiquidity, counterparty risk and manager selection risk (capacity)
- Currency hedging of the alpha returns
- Non-perfect (and non constant) correlation between chosen index and beta of portfolio.

In general, the more liquid the market, the easier it is to implement a portable alpha concept.

On the other hand, the potential for risk exposures to change is reasonably high in the more inefficient and immature markets, making portable alpha often a more theoretical exercise than a practical one. However, these are the markets where the alpha is expected to be highest.

We conclude that the implementation issues with portable alpha remain considerable, although we believe that, over time, more liquid and efficient derivatives in a wider range of asset classes will develop.

Monitoring

Pension funds currently invest directly in the various asset classes. Therefore in monitoring the arrangements, trustees have an understanding of where their money is invested. The new approach involves investing indirectly through swaps and other derivative arrangements. This is one of the governance considerations that the trustees will need to consider. Moving to the new approach will require a different skill set and mindset from the trustees and will involve significant monitoring requirements.

The governance would have to change to embrace change particularly as regards the degree of delegation undertaken. This may also involve changes to what the providers do, as the previous demarcations may well not be appropriate (who is accountable for the asset allocation in this structure for instance)?

In conclusion

New methods of building portfolios which more closely match liabilities are increasing in popularity. Adopting the absolute return approach as described above is one such method. We suggest that this approach is radically different from the current method used by pension funds and to be successful would require considerable change to governance.

Our view is that this will become more popular over time, and funds would do well to build an understanding of its strengths and weaknesses.

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