

London Borough of Haringey Pension Fund

Review of Strategic Asset Allocation

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For and on behalf of Hymans Robertson LLP

November 2005

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General Risk Warning

Please note the value of investments, and income from them, may fall as well as rise. This includes equities, government or corporate bonds, and property, whether held directly or in a pooled or collective investment vehicle. Further, investments in developing or emerging markets may be more volatile and less marketable than in mature markets.

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1. Introduction

This report represents the first part of the review of the strategic asset allocation of the London Borough of Haringey Pension Fund (“the Fund”); it has been prepared for the Investment Committee (“the Committee”).

This paper is a summary version of the main conclusions of a much fuller and more technical discussion of the issues described in the accompanying paper, entitled “Review of Strategic Asset Allocation - Supporting Documentation”. The processes used in the modelling, together with the reliances and limitations of the study, are described in the Supporting Documentation and apply to this paper.

The purpose of the analysis discussed in this paper is to describe and quantify some of the key investment risks associated with various strategic asset allocations. The results can then form the basis of a discussion with the Committee with a view to helping the Committee formulate an appropriate investment strategy for the Fund.

In summary, we see a review of investment strategy comprising three steps:-

- establishing the levels of matching (e.g. bonds) and non-matching (e.g. equities) assets within the benchmark so that funding objectives are met, risk tolerances are understood and the dynamic nature of the balance between the two is recognised;
- fine-tuning the above into a strategic asset allocation, including setting appropriate benchmark indices for each asset class;
- reviewing the structure of the Fund (as determined by the number and type of asset managers employed) to ensure it remains sensible in relation to any changes to the benchmark.

The analysis in this paper covers the first step. Steps 2 and 3 will be dealt with as appropriate in due course, although we comment in general terms on these matters in this report.

We use an asset liability model, incorporating randomly generated future investment returns and economic scenarios, to help us identify the implications of different investment strategies. In this way, we can measure how the funding position might change or what contributions might be required for any particular simulation of the future. We then carry out thousands of simulations to build up an overall picture of what might happen to the Fund; in this way, we can estimate the likelihood of particular variables reaching certain critical levels.

For the purposes of this analysis, we have taken the view that the administering authority is happy to treat the Fund as a single scheme, rather than taking explicit account of each participating employer. The analysis is therefore not applicable for any one employer, although the administering authority is by far the largest employer in the Fund and its position is therefore broadly representative of the Fund as a whole.

2. Background

2.1 Funding Position

The funding level of a pension scheme is a "point estimate" at a particular moment in time (31 March 2004 in this case) and changes as investment markets fluctuate. The actuary is required to set assumptions at that point in time based on an assessment of the likely future development of the Fund, both in financial and demographic terms.

It is important that in interpreting the results we understand the impact that changes in the actual asset mix have on return assumptions used in an actuarial valuation. In the formal valuation, the discount rate used to calculate the liabilities included an allowance for long-term future expected outperformance of equities over bonds. In effect, this is taking at least some of the expected future outperformance into account at the date of the valuation.

However, if the investment strategy were to be invested 100% in bonds, then the actuary is likely to use a lower discount rate based purely on bond returns, which would increase the value placed on the liabilities for funding purposes and so reduce the funding level. Unless care is taken, the very real investment consequences of adopting such a bond strategy are confused or obscured by changes in the actuary's assumptions about future returns. This is a feature of the Ongoing basis.

Therefore, in order to illustrate this and to give more objective results, we have also carried out the analysis valuing liabilities on a liability benchmark portfolio (LBP or 'gilts') basis, where the value of the liabilities is calculated using government bond yields. As a result, the liability assessment is made in a way which is independent of the actual assets held. The starting point for our analysis is the recent formal actuarial valuation carried out as at 31 March 2004. We set out below the liability profile and funding level of the Fund as at 31 March 2004:

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	Ongoing basis as in Valuation		Ongoing basis, allowing for changes ^[1]		GILT basis allowing for changes ^[1]	
	£M	% of Total liability	£M	% of Total liability	£M	% of Total liability
Liabilities Relating to:						
Employee Members	243	41%	255	45%	360	44%
Deferred Pensioners	102	17%	107	14%	151	19%
Pensioners	243	42%	251	41%	297	37%
Total Liabilities	587		612		807	
Total Assets	405		405		405	
Surplus/(Deficit)	(182)		(207)		(402)	
Funding Level		69%		66%		50%
Contribution Rates:	% of payroll		% of payroll		% of payroll	
Employer Future Service ^[3]	12.3		13.7		22.5	
Employee Contributions	6.0		6.0		-	
Deficit Correction ^[2]	10.1		11.2		-	
Net Employer Contribution Rate	22.4		24.9		-	

[1] Allows for improved life expectancy.

[2] 20 year spreading period

[3] Excluding valuation expense allowance.

The ongoing funding level has fallen since the last formal actuarial valuation carried out as at 31 March 2001. At that date, the funding level on a similar basis was 88.4%.

In line with a long-term aim of returning to 100% funding of pension liabilities, the way in which contribution rates have been set splits the burden of deficit recovery between additional contributions (an average rate of 10.1% of pensionable payroll) and a reliance on favourable investment performance (the Scheme Actuary has assumed an average outperformance of assets over liabilities of circa 1.6% per annum based on the current strategy). The deficit recovery contributions are expected to recoup the deficit on an ongoing basis (£182m) over a 20-year period, although it is highly likely that the funding plan will be reassessed at the next valuation.

The extent to which the Fund relies on the investments to outperform is illustrated by the difference between the liabilities calculated on the ongoing basis (which implicitly allows for future investment outperformance) and calculated on the minimum (investment) risk basis, which assumes that all assets are invested in a portfolio of index-linked and fixed interest gilts that represent the least risk

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investment position. This difference amounts to £195m which increases the deficit from £182m (or £207m with the projected mortality changes) to £402m.

In addition to the deficit recovery contributions, employers also pay contributions to cover future service accrued by active members. The Scheme Actuary has calculated the future service contribution rate to be 12.3%, giving a total average employer contribution rate of 22.4% of pensionable payroll (excluding expenses). In our analysis, we have assumed that the contribution rate payable from April 2005 will be in line with the Actuary's recommendation.

A final observation from the table is that, with a broadly even split of active members and pensioners, the Fund has a similar maturity profile to other local authority schemes. It remains open to new entrants, so the Fund will not be expected to mature rapidly in the future.

2.2 Maturity Profile

Based on the data supplied by the Scheme Actuary, we have projected forward an estimate of the future cash flows of the Fund (see Chart 1 below) for the current membership. We use this data as the base point for our modelling exercise. We have also used these projected cashflows to establish the 'value' of the liabilities on various bases.

Chart 1: Benefit Payments from Pension Scheme over time

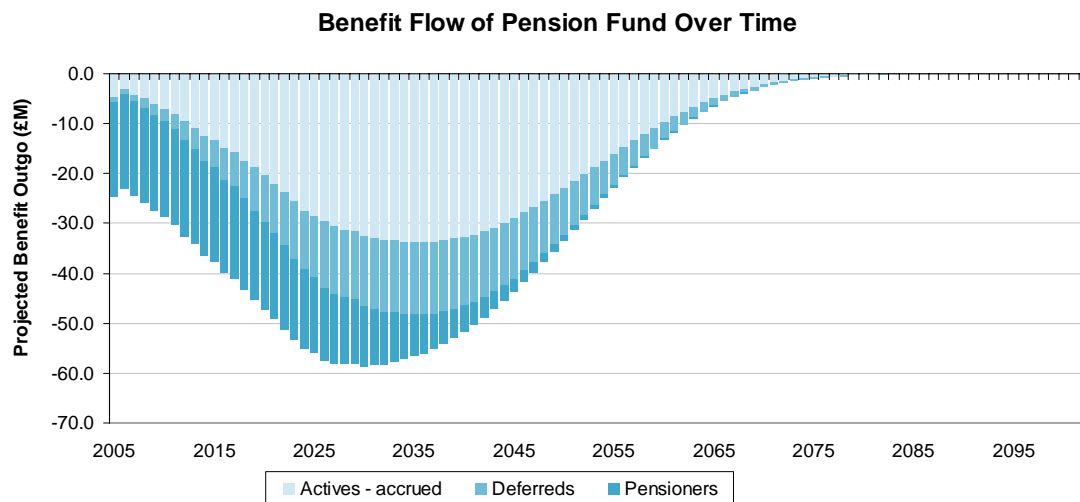


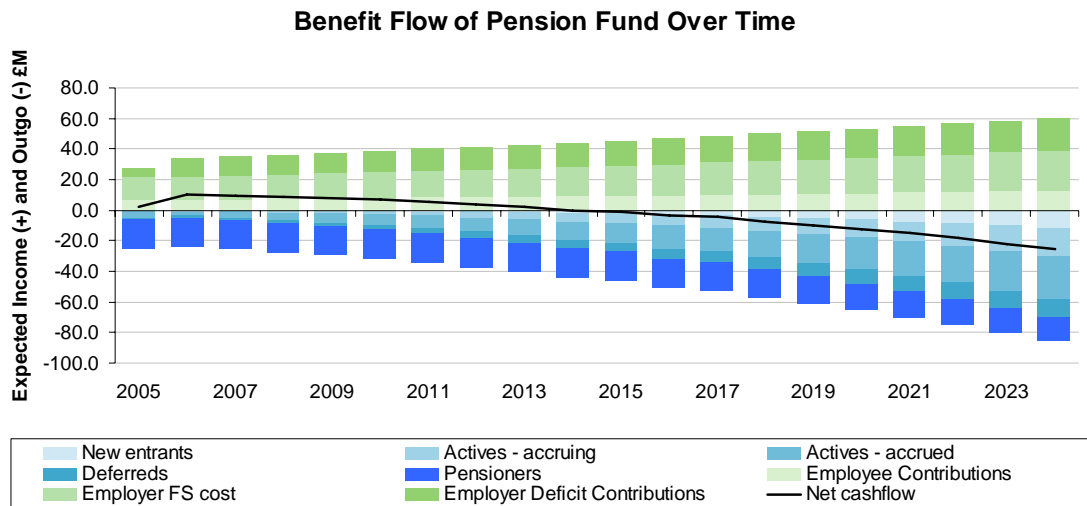
Chart 1 shows the expected annual benefit payments each year, split between actives, deferreds and pensioners, based on the 2004 valuation data. The expected benefits for actives are in respect of existing members' accrued service only, i.e. with no allowance for future benefit accrual or future new entrants.

Chart 2 shows the expected cashflow into and out of the Fund over the next 20 years (ignoring investment income). Income is received in the form of regular contributions from the employer and from employees (both existing members and new entrants) and deficiency contributions from the employer. We assume that the employer will continue to pay the total rate calculated by the Scheme Actuary (22.4% of pensionable payroll, after phasing) for the entire 20 years.

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The outgo comprises the benefit outgo (as shown in Chart 1), together with payments in respect of future benefit accrual for existing members and new entrants. We assume that the rate of new entrants into the Fund is such that the payroll remains broadly constant (in today's money) over the period of the projection.

Chart 2: Benefit Payments versus Contribution Income Over Time



The net cashflow (ignoring investment income) is positive until 2015 and thereafter the net outflow represents a relatively small proportion of total fund assets. When we consider the detail of the Fund benchmark, liquidity of asset classes will therefore not be a prime concern.

When a long term view is taken, the strength of the employer's covenant is an important consideration. The collateral damage from an employer defaulting will affect contribution rates for other employers. However, the tax raising powers of most employers in the Fund and an implicit guarantee from Government, should remove most of the concerns on this issue from the point of view of member security.

In our detailed analysis, we have used 3-year and 9-year projections. However, given the Committee's long-term approach, the 9-year projections are more helpful in demonstrating the impact of different investment strategies on funding levels. We have shown the likely distribution of contribution rates after three years.

2.3 Current Benchmark

In considering asset allocation it is important to bear in mind that the asset classes that represent the least investment risk in the context of the pension fund are likely to be inflation linked and conventional government bonds (essentially the Liability Benchmark Portfolio). Holding other asset classes such as equities and property improve expected return at the cost of introducing a 'mismatch risk' between the assets and liabilities. Demographic risks cannot be hedged using conventional asset classes.

The Fund's current benchmark asset allocation is shown below: -

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Asset Class	Percentage (%)
UK Equities	43.1
Overseas Equities	28.4
Total Equities	71.5
Property	5.7
Total Non Bond	77.2
Fixed Interest	13.4
Index Linked	4.8
Overseas Fixed Interest	3.8
Cash	0.8
Total Bonds	22.8

Broadly, the current strategy has around 26% of assets in lower risk assets such as bonds and around 74% in higher risk assets, essentially equities. We have split property roughly half and half across the two classes of assets for this purpose. Whilst this might seem a bit “broad brush”, we can demonstrate that this assumption has no significant impact on the expected return in our models. In this report we have used the shorthand ‘equities’ to refer to all the asset classes that are held primarily for investment return, rather than reducing risk.

2.4 Modelling Approach

Our analysis starts at the valuation date (31 March 2004). We then roll forward to 30 September 2005 on the basis of actual returns. We then simulate asset returns, using our model, beyond that date.

Reflecting changes in respect of mortality, the starting funding position as at 31 March 2004 was 66%. Based on market returns from 31 March 2004 to 30 September 2005, we estimate that this initial funding level would have improved to 71%, allowing also for mortality improvements.

We undertake 5,000 simulations of the future for each asset strategy. The outcomes of the simulations are ranked from “best” to “worst” and the results summarised graphically. We illustrate the spread of outcomes at a given point in time for a given strategy in charts. The analysis focuses on modelling the behaviour of the funding level and net contribution rate;

- on the on-going valuation basis;
- and, separately, on a lower investment risk basis (LBP basis).

Our initial conclusions are summarised in the next section.

3. Summary and Conclusions

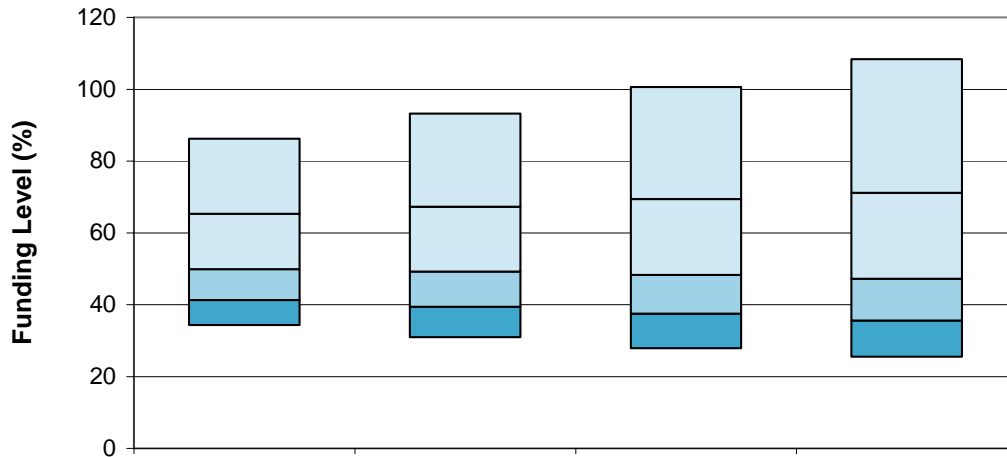
General Equity/Bond Mix

In this section, we have detailed the key results of our analysis contained in this paper. Unless there has been a change in the Committee's objectives and for tolerance to risk we see no pressing need for a change in the level of exposure to 'equities'. In particular, Members should note the following:

- As is typical in these studies, we have found that 'equity risk and reward' has the biggest impact on the progression of the Fund over time.
- However, other components also have a significant impact, including 'interest rate risk' (i.e. sensitivity to changes in yield levels). Indeed, the results of our analysis are somewhat more sensitive to interest rate risk than previous experience would lead us to expect for a number of reasons:
 - the discount rate used to calculate the liabilities and future service contribution rates is clearly linked to real interest rates;
 - the significant deficit means that changes in asset values (which are mostly linked to equities) are less significant than changes in liability values (which are linked to real interest rates), simply because the value of the liabilities is much higher than the value of the assets;
 - the deficit is being spread over 20 years. As a result, the deficit recovery contribution is less sensitive to changes in asset values than would be typical;
 - the future service rate is much more influenced by real interest rates than by the Fund's exposure to equities.
- Our analysis has been carried out at the 'whole fund' level. The projected outcomes for particular employers could be significantly different from those for the Fund as a whole.
- We have concentrated on the longer-term (9 year) projections, while recognising that much could change over that period. We have shown the impact on the distribution of contribution rates over three years.
- At this stage we have investigated the impact of a limited number of broad equity/bond splits.
- Inevitably, we have concerned ourselves more with the impact of potentially bad outcomes than the very good ones. Chart 3 below shows the distribution of the projected funding levels in nine years time, for investment strategies ranging from 50% to 80% in 'equity'. Results above the 16th percentile are excluded from the charts. A much fuller set of charts looking at strategies with more and less in 'equity' can be found in the Supporting Documentation.
- In order to compare the impact of different strategies on projected funding levels on a like for like basis, we have used a valuation basis which takes out any allowance for equity outperformance which the Scheme Actuary has included in his ongoing basis. This was described earlier as the LBP or "gilts" basis.

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Chart 3: Funding Level as at 31 March 2013



Equity %	50	60	70	80
Top 1%	121.2	138.8	158.2	178.3
Top 5%	102.2	113.0	125.0	138.0
Top 16%	86.2	93.2	100.6	108.3
Median	65.3	67.3	69.4	71.2
Bottom 16%	49.9	49.3	48.3	47.2
Bottom 5%	41.3	39.4	37.5	35.6
Bottom 1%	34.3	31.0	28.0	25.5
Risk < 50%	0.15	0.17	0.18	0.19

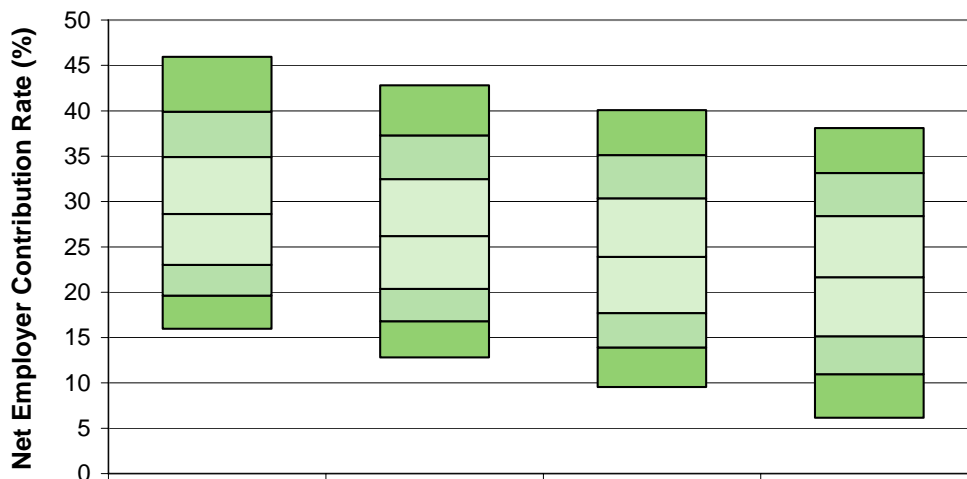
The results shown in Chart 3 illustrate that the risks inherent in the current strategy, with approximately 70% invested in 'equities', are quite high, as the range of possible outcomes is wide. To illustrate, at 70% equities, two-thirds of outcomes fall in the range 48% to 101%; 90% of outcomes fall in the much wider range 38% to 125%. Note that the charts are not 'symmetrical' in order to help focus attention on the most meaningful range of outcomes.

- It is apparent that reducing equities reduces risk. For example, the bottom 1st percentile improves from 28% to 34% as the equity allocation is cut from 70% to 50%. There are reductions (but much smaller) in the bottom 5th and 16th percentiles as equity is reduced indicating a more moderate reduction of risk at these levels.
- However, in cutting the equity exposure from 70% to 50%, the median funding position on our assumptions reduces from 69% to 65%. There is clearly a trade-off in as much as cutting equity reduces the impact of the very unfortunate outcomes, but at the cost of reducing the 'average' or expected outcome and outcomes above the median.
- In our view (and we are here making an assumption about the risk tolerance of the Committee that we will need to confirm in discussion) the reduction in expected return and hence median funding level is more significant than the level of risk reduction that would accompany a cut in 'equity' (particularly at the 16th percentile; the risk reduction at the 5th and 1st percentile is more meaningful).

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- Chart 4 shows the distribution at the time of the next valuation of the projected employer contribution rates (net of employee contributions), on an ongoing valuation basis (to mimic what the actuary might do – the Supporting Documentation contains fuller details) for investment strategies again ranging from 50% to 80% in equity. Note that the contributions required for any deficits at that point are calculated on the assumptions that they are being amortised over 20 years from that date, i.e. 22 years hence.

Chart 4: Employer Contribution Rate as at March 2007



Equity %	50	60	70	80
Top 1%	46.0	42.8	40.1	38.1
Top 5%	39.9	37.3	35.1	33.1
Top 16%	34.9	32.5	30.3	28.4
Median	28.6	26.2	23.9	21.6
Bottom 16%	23.0	20.4	17.7	15.1
Bottom 5%	19.6	16.8	13.9	10.9
Bottom 1%	16.0	12.8	9.6	6.2

- The above analysis is performed assuming lower mortality than at the last valuation. This would naturally take the future service cost from 22.4%, which is the rate recommended in the last valuation to, 24.9%.
- The Committee should note that the risk of unfavourable outcomes is quite “high”, e.g.:
 - With the current level of ‘equity’ exposure (assumed to be approximately 70%), there is a greater than 50% probability that the contribution rate will be higher in 3 years than the rate certified from the 2004 valuation (i.e. 22.4%). (If we allowed exactly for a 73% equity allocation this probability would be nearer 50%.)
 - The chance that the contribution rate will be at least 30% of payroll in 3 years time is around 17% (i.e. about a 1 in 6 chance).

However, by far the biggest impact on contribution rates (as they relate to changes in investment strategy) is the way in which the Actuary might change his chosen discount rate in setting the contribution rate at subsequent valuations. An analysis of how the contribution rate might change on a gilts basis is contained in the Supporting Documentation.

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- There does not appear to be an obvious justification in terms of the distribution of contribution rates for changing investment strategy. The Committee should note that although changing investment strategy appears to have little impact on the distribution of contribution rates, the investment strategy will affect the level of contribution rate recommended by the actuary depending on what actually happens in the markets.
- The following points argue against any increase in 'equity' exposure:
 - the level of equity exposure is in line with many other local authority funds, although we would not advise setting a benchmark solely on the basis of peer group comparisons;
 - higher equity exposure will make the catastrophic funding scenarios worse; and
 - the benefits of diversification are only apparent if there is a material allocation to diversifying asset classes. Investing too large a proportion in equities would leave insufficient headroom for material diversification.
- Dynamic asset strategy - the risks of particular adverse outcomes are very sensitive to the starting funding position. The Committee might want to consider what it might decide if the initial funding position was materially better or worse (by, say, 10 percentage points). We would therefore recommend that the funding position should be monitored regularly (our projection system will do this) and that any breach of the range for funding level as measured on the gilts basis of 50% to 70% (this broadly equates to a range of 70% to 90% on the ongoing basis) should ordinarily trigger an immediate review of strategy.
- On balance we do not see a strong argument for making any significant change to the equity weighting. However, before endorsing this view, we would suggest that the Committee satisfies itself that it is happy with the risks involved. In particular, the Committee should consider whether they wish to adopt a more risk averse stance. In doing so the Committee should be mindful of the impact on the recommended contribution rate of a more conservative investment strategy.

4. A First Look at Investment Structure

Structure Modelling

In this part of the report, we take the asset allocation decision one stage further and consider the detailed split of the equity and non-equity components of the benchmark.

The assets of the Fund are currently managed by a number of investment managers. Approximately 60% is managed by 2 managers (Capital and Fidelity) which have balanced mandates, and the remaining 40% is managed by specialist managers. A full summary of the managers and their mandates are shown in the table below. (All figures are percentages).

	Capital	Fidelity	Wellington	Bernstein	ING	Fund B'mark ^[1]
UK Equities	45.0	30.0	15.0	100.0	-	43.1
Overseas Equities	20.0	20.0	85.0	-	-	28.4
<i>North America</i>	6.5	6.5	30.0			9.7
<i>Europe ex-UK</i>	6.5	6.5	30.0			9.7
<i>Japan</i>	3.5	3.5	12.5			4.5
<i>Pacific Basin</i>	2.5	2.5	7.5			2.9
<i>Emerging Markets</i>	1.0	1.0	5.0			1.6
Total Equities	65.0	50.0	100.0	100.0	-	71.5
UK Gilts	10.0	15.0				6.7
Corporate Bonds	10.0	15.0				6.7
Overseas Bonds	8.0	6.0				3.8
Index-Linked	6.0	12.0				4.8
Total Bonds	34.0	48.0				22.0
Property	-	-			100.0	5.7
Cash	1.0	2.0				0.8
Total	100.0	100.0	100.0	100.0	100.0	100.0
Manager Allocation ^[3]	27.5	26.3	19.8	20.7	5.7	100.0
Performance Target ^[2]	+1.5	+1.5	+2.0	+2.0	+0.75	

^[1] Fund benchmark is composite of investment managers asset allocation assuming scheme invests as per the Manager Allocation.

^[2] Target based on investment managers mandate and represents excess return above benchmark per annum.

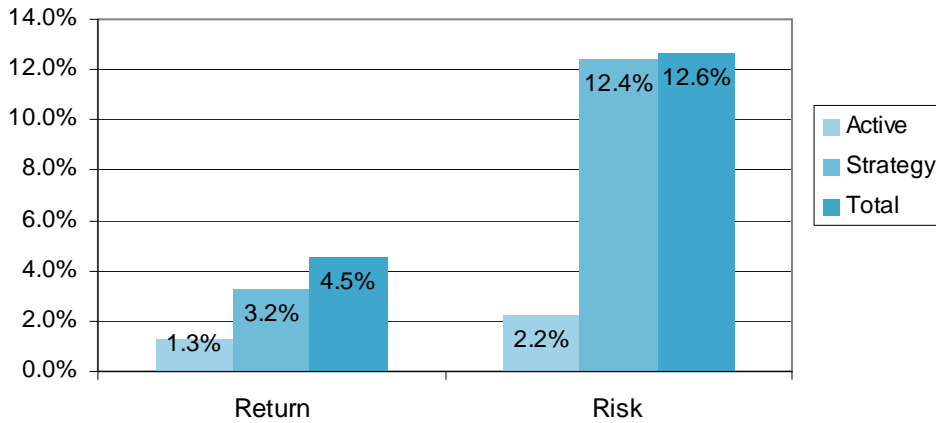
^[3] Share of Fund as at 30 September 2005.

The relationship, in terms of risk and return, between the Fund's investment strategy and the Fund's investment managers is summarised in the chart below.

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Return and Risk for the Current Investment Strategy and Structure

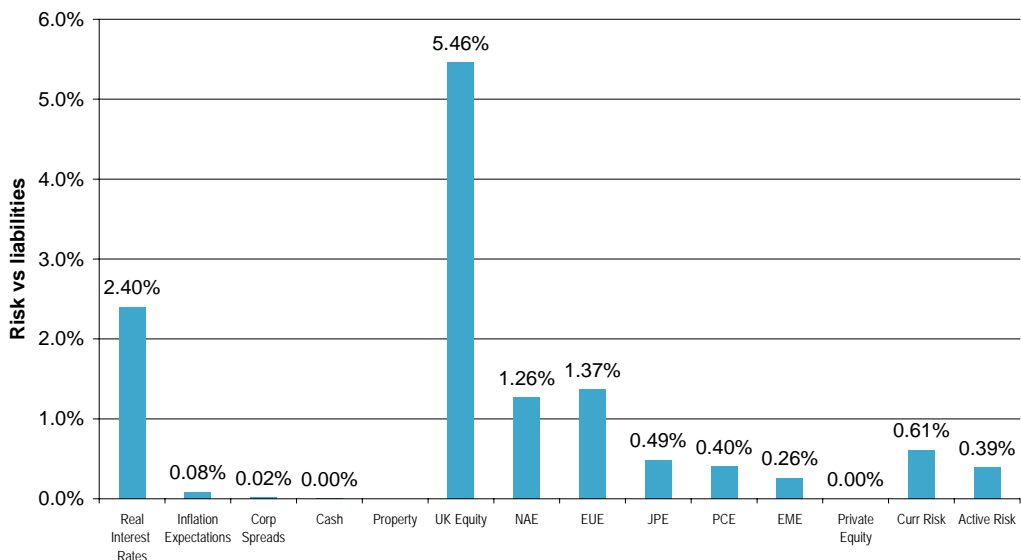
Current Strategy and Structure



The expected return shown above on the Fund's current strategy and structure comprises of a strategic return of 3.2% over the liabilities and an additional active return of 1.3% giving the total expected return in excess of the liabilities of 4.5%. The total risk corresponding to this mix of strategic and active return is 12.6%.

The following chart then sub-divides the Fund's total risk of 12.6% by source: asset class risk, currency risk and active management risk.

Current Strategy - Risk Breakdown



- The chart illustrates that almost half of the total risk results from the Fund's allocation to UK equities (UKE). Once we add in the risk from the equity allocations to North America (NAE), Europe ex-UK (EUE), Japan (JPE), Pacific ex-Japan (PCE) and Emerging Markets (EME), we can see that the equity allocation accounts for most of the Fund's total risk.

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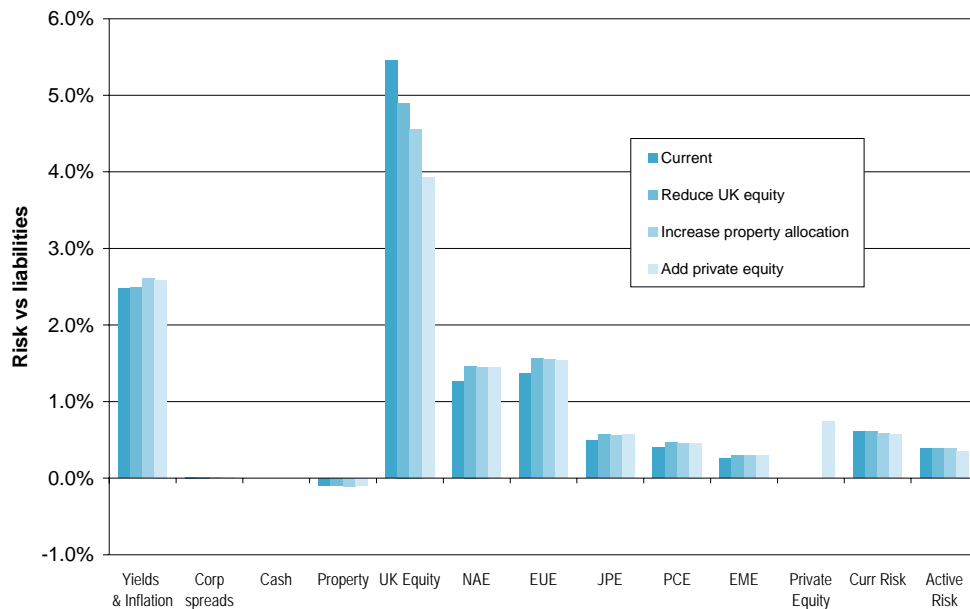
- The currency risk is a consequence of any allocation to assets not denominated in Sterling. Active risk is the risk from the active management of the Fund's assets.
- The Fund's allocation to bonds does not contribute to the total risk in any meaningful way as bonds provide a good match to the liabilities. The inflation expectations risk, which is inherent within ordinary (non-index linked) bonds is fairly low, as these bonds provide a good match to the non-inflation linked liabilities.
- The chart also illustrates the Fund's risk relative to real yields. This risk is a meaningful part of the total risk due to the value of the liabilities being largely dependent on real yields, but the value of the majority of the assets (equities) being largely independent (over short time periods) of real yields.

In the next charts we investigate the way in which a small change in the overall asset allocation and the introduction of some alternative assets classes can help to diversify the risk within the Fund and also increase the expected level of outperformance for this given level of risk.

This will be investigated fully in a separate report. However, we have examined below the impact of cumulatively:

- Reducing the proportion of the assets in UK equities. The current UK equity / overseas equity split is 60 / 40 – this is changed to 55 / 45.
- Increasing the property allocation from 6% to 10% of the scheme's assets
- Allocating 5% of the Scheme's assets to private equity, by reducing UK equities to give a 50 / 50 split between UK equities and overseas equities.

Strategy Risk by asset class

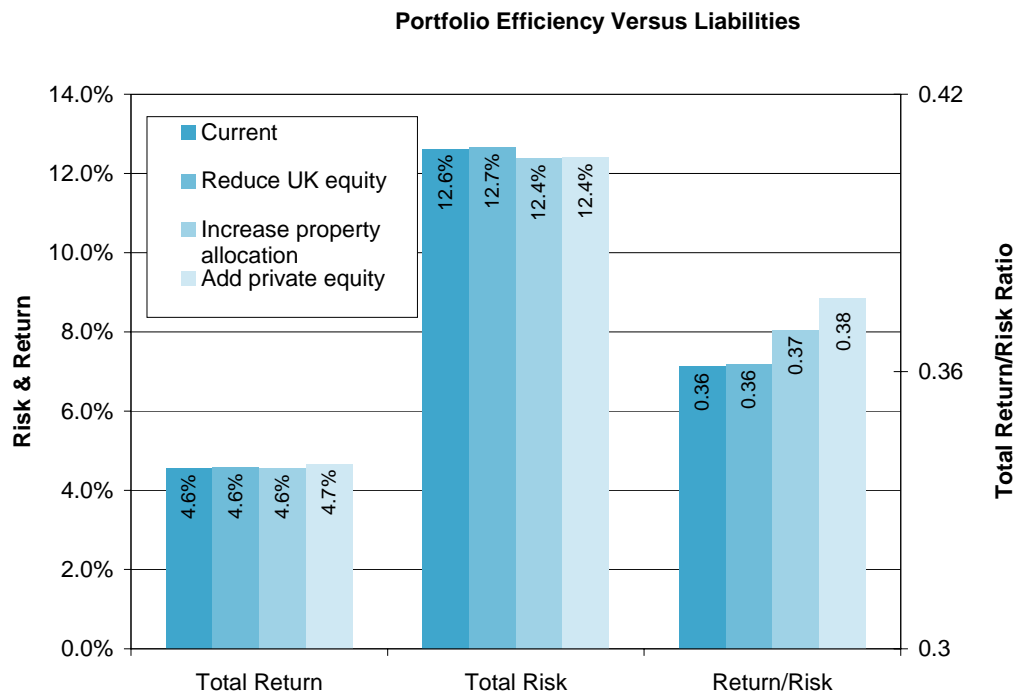


Total Risk: Current Strategy = 12.6% Reduce UK Equity = 12.7% Increase Property = 12.4% Introduce Private Equity = 12.4%

The chart shows the reduction in the risk to UK and overseas equities as the assets are switched out of these asset classes and into more property and private equity.

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Portfolio Efficiency



In the above chart:

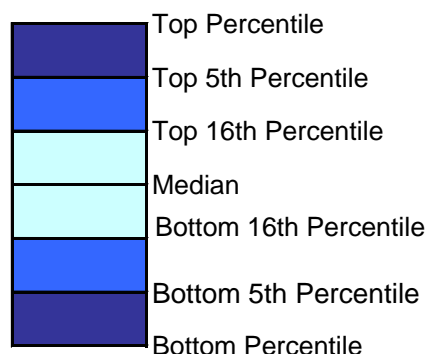
- Our analysis suggests that increasing the exposure to property can enhance the overall risk/return characteristics of the benchmark, but a 4% increase would be at the top end of our recommendations at the present time.
- The movement from UK equities to overseas equities has little implications for return expectations, as the long-term assumed return from global equities is approximately the same as UK equities. However, it does offer diversification opportunities that are not evident from the statistical analysis shown in the chart. In addition, introducing an active currency overlay in conjunction with this strategy can offer return opportunities and risk reduction.
- Introducing Private Equity as an asset class, at a 5% level, provides an additional source of outperformance, and a perhaps surprising reduction in risk that derives from its diversification properties.

We look forward to discussing these aspects in due course.

Appendix 1: Interpretation of ALM Output Charts

Modelling Results

We undertake 5,000 simulations of the future for each asset strategy. The outcomes of the simulations are ranked from 'best' to 'worst' and the results summarised graphically. We use charts to illustrate the spread of outcomes at a given point in time for a given strategy with the following colour schemes.



- The 'median' funding level can be considered to be the average outcome. We would expect that there is a 50-50 chance that the funding level will be above or below the median.
- The bottom 16th percentile – approximately 1 outcome in 6 is worse than this level.
- The top 16th percentile – approximately 5 outcomes in 6 would be expected to be below this level.
- The bottom 5th percentile can be considered a 'bad' outcome – 1 outcome in 20 of the simulations is expected to be worse than this.
- The top 5th percentile can be considered a 'good' outcome – 19 outcomes in 20 of the simulations are expected to be below this level.
- The bottom percentile can be considered an 'extremely bad' outcome, which occurs with a probability of 1 in 100.
- The top percentile can be considered an 'extremely good' outcome, which occurs with a probability of 1 in 100.

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When plotting the distribution of contribution rates, rather than funding levels, the descriptions of an outcome as 'bad' or 'good' are reversed.

For analysis where we are considering a full range of possible equity strategies, we illustrate the funding levels (or surpluses or deficits) up to a maximum of the top 16th percentile. The rationale for this approach is as follows. If a fund wishes to protect against the possibility of being below the bottom percentile funding level in the future, it may be able to buy protection in the financial markets. Due to asymmetries in the way financial markets value upside and downside risks, the cost of such protection would be approximately equivalent to the value attached to giving up (or selling) all outcomes above the 16th percentile funding level.

It is extremely unlikely that such protection would be 'bought' or such upside 'sold' in practice. However, the asymmetrical value the financial markets place on 'good' and 'bad' outcomes illustrates the risk averse nature of investors. It serves to demonstrate that risk averse investors do not attach as much significance to the potential for very good outcomes as they do to the potential for very bad ones. There are 1% of simulations that lie below the bottom percentile funding level. In ignoring them, to the extent that they are risk averse investors, the Committee should also discount the potential for funding levels above the top 16th percentile.

In all the charts we consider, there will be some outcomes above the highest level shown and some outcomes below the lowest level shown and the more extreme values can be considerably higher or lower than these levels.