

# Investment Tutor

## A structured solution to a knotty problem



### Introduction

The steep fall in equity markets between 2001 and early 2003, brought home to the UK's pension industry that equities were not a very good 'match' for scheme liabilities. The fall in equity values turned widespread scheme surpluses into deficits. These deficits were exacerbated by the concurrent fall in bond yields. This is because over the same period the introduction of FRS 17, which requires future pension payments to be discounted by the prevailing yield on AA sterling corporate bonds, meant that as yields fell, the present value of scheme liabilities rose.

The increase in liabilities resulting from the fall in corporate bond yields was partially offset by the rise in the value of any fixed income assets held in pensions portfolios. However, for the vast majority of pension schemes the rise in the value of bond holdings could not keep pace with the rising value of liabilities for two reasons. Firstly, the typical scheme's fixed income portfolio only comprised between 30% to 40% of total assets - and sometimes much less. So while 100% of the liabilities were rising in value, only 30% to 40% of the assets were doing so. Secondly, as the bond assets held were typically of a much shorter duration than the typical duration of scheme liabilities, this meant that the liabilities were rising at a much faster rate than the value of the bond holdings.

For example, consider a scheme that had liabilities valued at £100m with a duration of 18 years and which had invested in a portfolio of bonds valued at £40m, with a duration of 8 years. There were many schemes in this situation prior to the equity market collapse and rally in the bond markets. Now assume that yields fall by 1.0%. Given the durations and markets values, other things being equal, this would cause the discounted value of the liabilities to rise by around £18m and the value of bond assets held to rise by about £3.2m. The net effect of such a fall in yields on this scheme would be to worsen the funding position by £14.8m - a significant amount given that scheme liabilities only totalled £100m before the fall in yields. If instead of holding 40% of its portfolio in the form of fixed income assets, it had invested £100m in bonds with a duration equal to the duration of its liabilities of around 18 years, the value of the bond portfolio would have risen in line with the increase in the value of the liabilities, and the scheme would have been insulated from both the fall in equity prices and the rise in bond prices.

These simple mathematical facts of life for today's pension fund trustees have led to the current interest in Liability Driven Investment (LDI). The basic idea of LDI is that investment decisions should be motivated, not by a goal of return maximisation, as was more the case in the 1990s, but instead by risk reduction, given the nature and composition of the liabilities. With LDI the liabilities become the scheme's benchmark.

Under current rules and regulations, scheme liabilities behave like a portfolio of bonds. In a risk management context, the best way to hedge this risk is, therefore, to hold a portfolio of bonds with an average duration equal to the average duration of the liabilities: that is, very long-dated bonds. But in addition since the majority of



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these liabilities are real, which means that they rise with inflation, the best 'match' would be index-linked bonds. This desire to improve the match between scheme assets and liabilities, by buying long-dated bonds, and index-linked bonds in particular, has been behind the sharp fall in sterling bond yields recently.

### A possible solution?

There is no doubt that most scheme sponsors would like to restructure their assets so that their risk characteristics match that of their liabilities. Were such a solution possible, trustees would be able to sleep more easily at night and company executives could get on with running their businesses, rather than running an investment portfolio. The main problem, however, is that most schemes are currently in deficit. Using the underlying bond markets, or derivatives thereof, to create an asset portfolio that mimics the risk characteristics of the liabilities in these circumstances would simply crystallise the deficit, since, by definition, the underlying assets would not be able to grow to plug the gap. It is for this reason that many schemes, attracted by the concept of LDI, but not being in a position to implement fully it, are considering a hybrid, or 'structured' approach to the problem. More schemes could consider using some of their assets to 'match' a portion of their total liabilities - this is the LDI part - and could then adopt a more innovative approach to the management of the remainder of their assets, so that these assets would grow sufficiently to close scheme deficits. Once the assets have grown sufficiently to plug the gap, at this point the scheme could move to a 100% LDI solution, if desired. The proportion of the pension portfolio that could be dedicated to matching, or risk reduction, would clearly depend upon the size of the scheme deficit and also the financial strength of its sponsor. The smaller the deficit and the greater the scheme sponsor's ability, or willingness, to increase scheme contributions, the more LDI matching the scheme might be able to afford.

So how could an approach to LDI that combines the risk reduction elements of LDI with high alpha investing work?

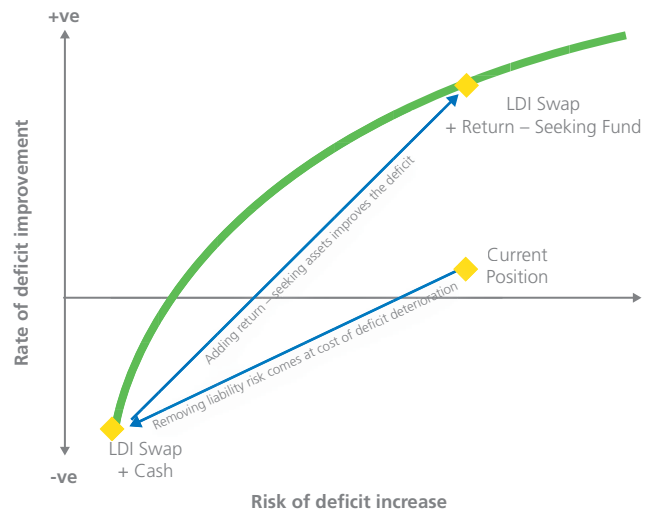
A potential solution would be to begin with a swap overlay. This overlay would be structured to achieve two things. Firstly, the swap contract would be designed so that the combination of the swap and other scheme assets matched the duration of the scheme's liabilities, thus affording the scheme protection against future interest rate risks. Secondly, the swap overlay could be refined such that the inflation risk inherent in the scheme's liabilities were hedged too. This part of the swap would be equivalent to the scheme buying an index-linked bond with payments equal to the inflation-linked pension liabilities, in return for making a fixed payment to a swap counterparty.

Though the swap overlay would minimise the volatility of the funding position, an investment strategy to ensure that the underlying scheme assets grew sufficiently, by capturing as much alpha as possible, to close the scheme's deficit over time would still be needed. Indeed, given that the Pensions Regulator has deemed that scheme deficits should be plugged as soon as is feasibly possible, and certainly within the next 10 years, finding a viable solution to this problem has become a necessary imperative. This is where a more innovative approach to investing can be applied. It is a fairly simple task to establish how quickly the scheme assets need to grow over time to reduce the deficit over any pre-specified, target period once the swap overlay had been put into place. The higher the expected return the shorter the expected period over which the scheme's deficit would be closed. We believe that pension schemes could consider using a mix of traditional and alternative asset classes to reduce the period over which the scheme deficit could be eliminated.

Careful analysis of the risk-return characteristics of these asset classes, using standard optimisation techniques, can be used to identify the lowest risk mix of assets, given the expected rate of return that the scheme wishes to target. Necessary, there would be a greater emphasis on those asset classes that act both as good diversifiers of risk and which offer the prospect of maximising return for each unit of risk assumed. Another imperative is to seek out those managers with demonstrable skill in managing these asset classes and a history of alpha generation. This solution is illustrated in the following chart. The horizontal scale represents the amount that the deficit could grow by in a worst-case scenario over a given period. The vertical scale represents expected rate of improvement of the deficit over the same period; a negative here would represent a widening of the deficit. The blue line shows the best possible set of trade-offs between these two factors. Moving from the current position to a LDI swap overlay with assets invested in cash virtually eliminates the deficit risk, but at the cost of a deterioration in the funding position. If the assets are then put to more productive use however, the deficit can be reduced and eventually eliminated, at the cost of some additional risk. The trustees can choose a preferred position along the blue line depending on their particular tolerance for risk.

### Trade-off between risk and deficit improvement

The advantage of this approach is that it utilises the risk reduction benefits of LDI - removing the combination of interest rate and inflation risk - allowing trustees to concentrate on the goal of improving the funding position by taking on an acceptable level of rewarded risk.



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