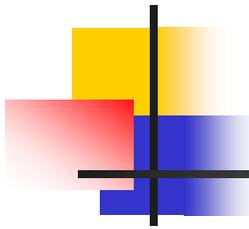


Pension fund investing – Meeting the liabilities

Modern Investment Approaches

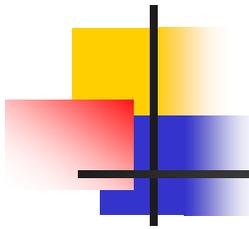
Structured solutions

January 2006



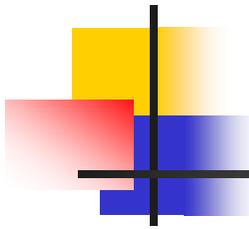
Disclaimer – these are opinions, not advice!

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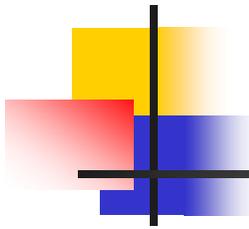
Pension fund problems

- Traditional investment approaches not working
- Over-reliance on equities for superior returns
- Assumed rewards for taking equity risk would be high enough to meet pension liabilities
- No explicit economic rationale for this assumption!
- No explicit consideration of liabilities
- No protection against sharp falls



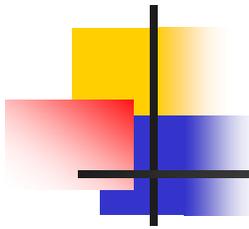
Pension fund realities

- Trustees have had dreadful constellation of events
- Deficits resulted from falling inflation and interest rates, rising longevity and increased annuity costs
- Liabilities grown faster than assets, even as equities up
- Accounting and actuarial valuation changes require more focus on liabilities now
- Investment knowledge and skill requirements rising
- Pension fund liabilities are often more sensitive to interest rate changes than its assets – mismatch risk



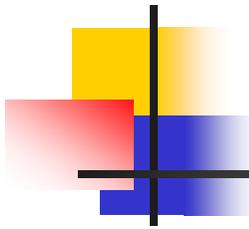
Traditional thinking

- Traditional attitude to investment was:
 - Manage returns and
 - TAKE risk (passive acceptance of risk – equity risk)
 - Almost *welcome* risk, in expectation of high returns
- Modern investment approach would be:
 - Manage returns AND
 - Manage risk (active risk control)
 - Try to reduce the risk of *not* meeting liabilities



Problems of traditional investment approach

- Focuses on returns, not enough attention to risk
- 'Expected' returns, not same as *achieved* returns
- Not enough consideration of different scenarios
 - Protecting against falling assets **or** rising liabilities
- Relies on equity risk premium to outperform liabilities
- Ignores main sources of risk in liabilities
 - inflation, duration, longevity
- Ignores modern methods of money management



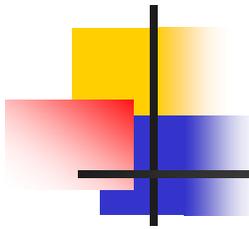
Relying on equities too 'risky'

Equity returns carry two kinds of risk

1. volatility associated with equity risk premium – trustees can hope to be rewarded for this
2. risk of not keeping up with liabilities, as interest rates, inflation and mortality change – this is unrewarded risk

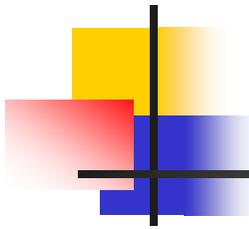
Pension investors only likely to benefit from one risk

Other risks caused damage because not been controlled



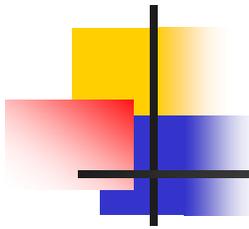
Controlling risks in 'risky' assets

- Equities are only one source of risk premium
 - There are many different sources of investment risk premium in inefficient global markets
- Trustees should aim to benefit from the risks for which they expect to be rewarded
- Try to minimise or eliminate the liability-related risks they cannot expect to be rewarded for
- Modern investment approaches can deliver returns in a risk-controlled way, aimed at outperforming liabilities
- While still preserving upside potential of riskier assets



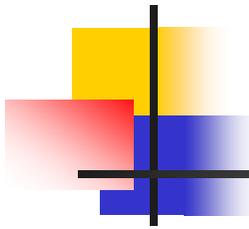
Trustees face a new environment

- Changing legislation and valuation practices
- Pensions Act 2004 – trustee knowledge requirements
 - Trustees must understand investments
- FRS17 focused finance directors onto pension liabilities
- Can't 'take credit' for future returns so easily
- Investment strategy should explicitly target meeting pension liabilities – not implicitly hope to do so



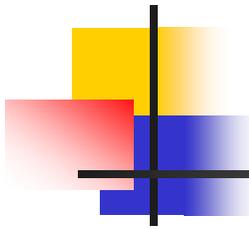
Investment reality-check

- Liabilities are rising 5% a year (bond discount rate)
- Need much more than this to reduce a big deficit
- Asymmetric risk - rising liabilities may hurt more than falling assets if scheme already in deficit
- Must have a plan to address risks and meet liabilities
- More focused investment strategies can produce better results for members – paying pensions in the long-term



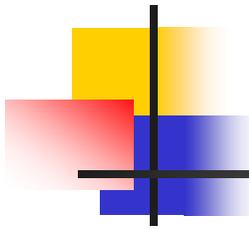
Immediate challenges

- Repair deficits
- Match liabilities over time
- Modernise investment techniques to *manage* risk
- Investment strategy more focused on liabilities
- Control returns, but still allow upside potential
- More reliable return profile, minimise downside



Need for downside protection

- Large deficit and weak employer implies downside tolerance minimal
- Essential for most schemes
 - i.e. avoiding losses valued higher than foregone *potential* returns
 - PPF entry more likely and higher risk-based levy
 - Members lose some of their pensions

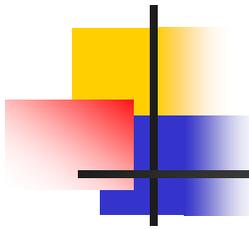


Avoiding big losses important

- Falling markets are very damaging
- If market halves then doubles, only back where started
- If can protect from severe falls, required returns lower

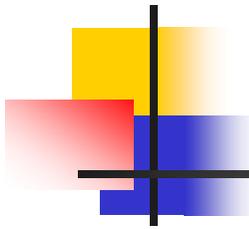
| | <u>£100 invested</u> | <u>£100 invested</u> | <u>£100 invested</u> |
|-----------|----------------------|----------------------|----------------------|
| Yr. 1 | -30% | -30% | - 3% |
| Yr. 2 | +30% | +43% | + 5% |
| End value | £91 | £100 | £101.85 |

- Is switching to bonds right way to dampen volatility?



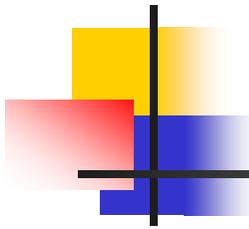
Just switching to bonds won't do

- Reason to switch to bonds is to reduce 'risk' – is this the answer?
- Bonds reduce risk in exchange for huge reduction in expected return – takes away upside potential
- Switching to bonds will still entail underperformance of liabilities and can't address a deficit
- Bond investments still contain 'unrewarded' risk
 - Salary inflation, Ipi, longevity, duration, capital loss
- Bonds are imperfect 'match' for liabilities, and reducing deficit requires *outperformance* of liabilities



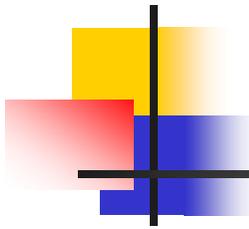
New Approach

- Focus on liabilities and search for strong added value
- Don't just rely on equity risk premium – other potential sources of investment return can add value
- Global capital market inefficiencies can deliver rewards for skill, currency, illiquidity, volatility...
- Many ways to aim for high investment returns
- But should be combined with more sophisticated risk management – control risk v. hope it will be OK!
- Holding bonds still risky – perhaps swaps better



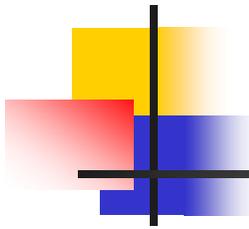
Alternative thinking

- Equities outperforming bonds is not same as outperforming liabilities
 - Equities could rise, but liabilities could rise more
- Required returns usually greater than bonds
- Therefore need non-bond diversification
- High-return-seeking assets and risk control
 - Hedge funds, private equity, real estate
 - Currency overlay, small cap, emerging markets?



Structured solutions

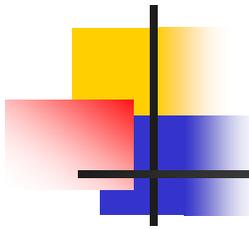
- Can use more targeted asset-liability driven approaches
- Investment banks offering passive liability driven investments (LDI)
- Swaps very useful despite cost – liquidity better than bonds – essential for trustees to understand them
- Experienced management of derivatives essential – administration of swaps can be very complex
- Protect against interest rates or inflation changes to ensure assets grow more in line with liabilities
- Still need good upside potential to *outperform* liabilities



Ideas for pension fund trustees

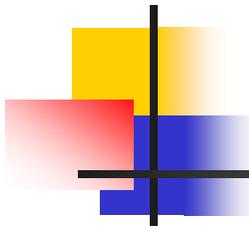
Pension protection structures

Could be designed along the following model...



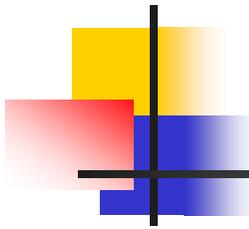
Ipi inflation and capital protected structure + more

- Can be specially designed for pension funds
- Help meet liabilities
- Offer extra return potential above Ipi matching to fund deficit and/or mortality changes
- Capital and inflation guaranteed
- No administrative hassle with derivative agreements



Features

- Return of initial investment plus Ipi
- Designed to deliver additional returns on top from portfolio of high-return-seeking assets
- Can also pay out gains during life of product
- Can structure rolling series of products with different maturities to deliver long term inflation-matching
- Product will manage derivatives, saving trustees the problems involved in administration of swaps etc.

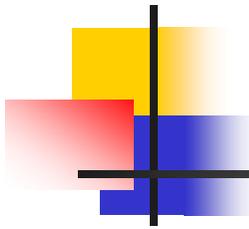


Say a pension fund invests £100m

- 3 parts to the investment – all done within the structure to minimise admin hassles for trustees
 1. Buy Ipi swap to ensure receipt of £100m plus Ipi on maturity
 2. Buy bond to deliver sufficient assets to pay for this Ipi swap at maturity – will cost £82m
 3. Invest £18m balance into high-expected return assets to deliver additional return potential on top of Ipi

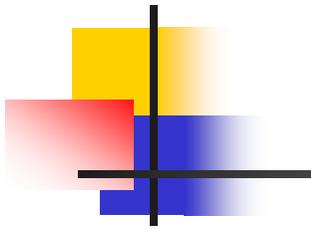
On maturity, the WORST outcome is the return of all capital plus accumulated limited price inflation

The real yield on index-linked gilts is given up in exchange for significant potential extra returns from high alpha investments



STEP 1: lpi swap

- Purchase lpi swap to ensure receipt of £100m adjusted for limited price inflation on maturity (e.g. 15 years)
- Market rates imply fixed 3% pa interest rate exchanged for lpi
- THIS IS THE **SWAP**:
 - 3% FIXED INTEREST RATE IS 'SWAPPED' FOR LPI
- 3% interest pa on £100m gives £155m on maturity
- Must commit to pay £155m in 15 years, in exchange for the £100m adjusted for lpi
- Eliminates inflation risk on the £100m invested



STEP 1

NO MONEY TRANSFERRED YET - ARRANGE SWAP AGREEMENT TO ENSURE £100M + LPI ON MATURITY

2006

ENTER SWAP AGREEMENT

BANK WILLING TO SWAP 3% FIXED FOR LPI ON MATURITY

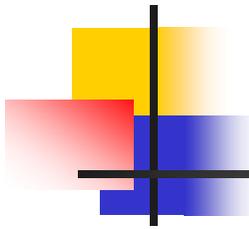
NO FUNDS PAID OVER TILL 2021

2021 MATURITY

FUND HAS TO PAY BANK £155m

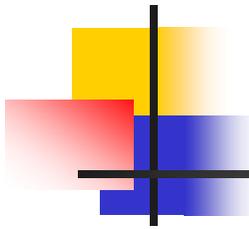
BANK PAYS FUND £100m ADJUSTED FOR LPI

TRUSTEES CAN MEET LPI INCREASE ON £100m



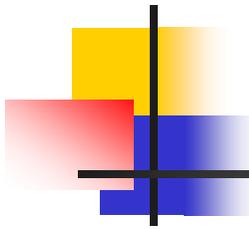
What happens in the swap?

- Swap price depends on market interest rates and inflation expectations to maturity
- Bank acts as intermediary between buyers and sellers of inflation
- Bank sets price at which it will 'swap' Ipi. Current rates suggest Ipi swapped for fixed 3% interest over 15 years
- Other investors or investment banks may want to receive fixed income, not inflation
- Trustees don't want to try and guess what inflation will be, they want to know they can match it, whatever



Why do trustees benefit?

- Trustees must pay Ipi increases on their liabilities
- They should be trying to ensure they have enough money to pay the required Ipi increases
- If inflation is above 3% they will still get Ipi
- If inflation is below 3% they still have the Ipi they need
- Worst case scenario is that trustees will have their £100m plus limited price inflation



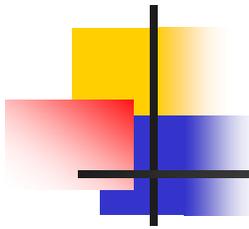
Balance of interests for lpi swap

TRUSTEES

- WANT TO PAY THE PENSIONS
- NEED TO MEET LPI INCREASES
- DO NOT WANT TO TAKE THE RISK OF NOT HAVING SUFFICIENT ASSETS TO PAY INFLATION INCREASES
- NOT EXPERTS IN FINANCIAL FORECASTING!

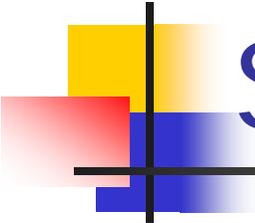
BANKS

- WANT TO FACILITATE MARKET FOR BUYERS AND SELLERS OF INFLATION
- WILL PRICE LPI SWAP ACCORDING TO MARKET INFLATION EXPECTATION
- WILL TAKE A SPREAD AS AN INTERMEDIARY
- THIS IS THEIR BUSINESS!



STEP 2: Buy a bond

- Need to ensure receipt of £155m in 15 years
- Buy zero coupon bond today with 15 yr maturity value of £155m
- This will cost around £82m which must be paid today, using 4.3% discount rate
- In 15 years, receive the £155m
- Then can pay this £155m and receive the Ipi adjusted value of the original £100m investment
- Will ensure sufficient assets to pay Ipi increase for the £100m invested in this product



STEP 2:

**INVEST £82m of
the original £100m**

2006

**BUY 15-YEAR
ZERO COUPON
BOND**

**BANK USES 4.3%
LONG YIELD DISCOUNT
RATE TO PRICE £155m
IN 15 YEARS**

**BANK REQUIRES
£82m NOW TO
PAY THE £155m
ON MATURITY**

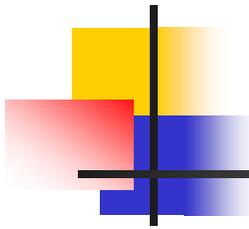
2021 MATURITY

**FUND RECEIVES
£155m FROM
MATURING ZERO
COUPON BOND**

**FUND PAYS THE
£155m TO SWAP
COUNTERPARTY**

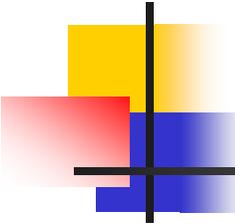
**SWAP COUNTERPARTY
PAYS FUND £100m +LPI**

**TRUSTEES CAN PAY
INFLATION INCREASE
ON £100m**



STEP 3. High performance assets

- Paid £82m for zero coupon bond - leaves £18m of original £100m investment
- This £18m can be invested to generate even more than inflation-adjusted value of original investment
- This can be used to generate high expected returns
- Can be leveraged for very high returns, but within limited liability structure to limit downside, so can't lose > £18m
- Any extra return on this portion can fund deficit reduction or mortality increases



STEP 3:

**INVEST £18m of
the original £100m**

2006

**INVEST £18m IN
HIGH EXPECTED
RETURN
PORTFOLIO**

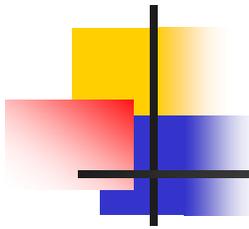
2021 MATURITY

**FUND RECEIVES THE
ADJUSTED VALUE OF
THE ORIGINAL £18m
INVESTED**

**PLUS THE VALUE
OF THE LPI SWAP
I.E. £100m + LPI**

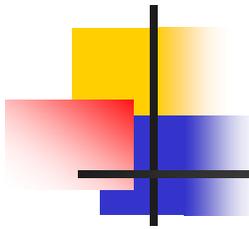
**TRUSTEES CAN PAY
INFLATION RISE ON
£100m**

**ANY GROWTH OF HIGH
RETURN PORTFOLIO CAN
REDUCE DEFICIT OR FUND
MORTALITY INCREASES**



Expected performance

- Most likely scenario:
 1. Initial £100m
 2. Plus Ipi increase
 3. Plus £18m high return investments
 4. Plus increase in value of high return portfolio

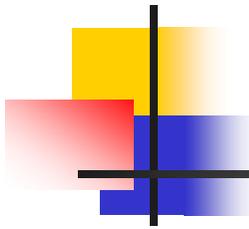


Other scenarios

- If high-return seeking portfolio achieves zero return:

On maturity, original £100m investment would be worth

1. Initial £100m
2. Plus Ipi
3. Plus £18m from high absolute return investments

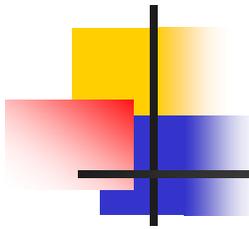


Worst case scenario

- If high-return asset portfolio becomes worthless

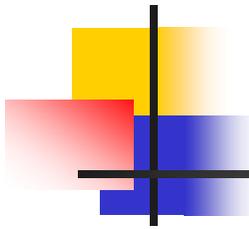
On maturity, trustees would receive capital and inflation protection i.e. would get back:

1. Initial £100m
2. Plus Ipi



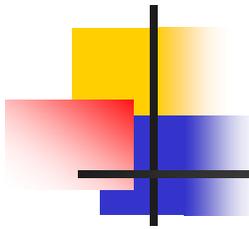
Options possible

- It would be possible to lock in the gains from this structure over time, before final maturity
 - e.g. if high return asset portfolio delivers 10%, this money can be paid out to the trustees to reduce a deficit, or locked into the capital and inflation guarantee periodically
- Maturity can be different periods, up to 50 years or so, as required or a combination of maturities
- Structure can pay out rpi or lpi, whichever needed



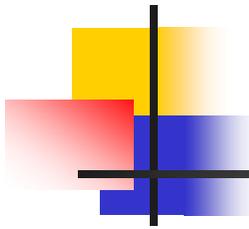
Fees

- Indicative fee for this structure would be a 1% flat fee
- Cost of the swaps would be imbedded in the pricing, so just one flat fee



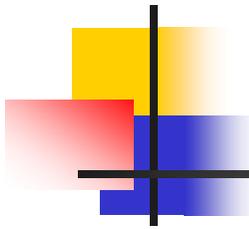
Possible disadvantages of this product

- Potentially give up real yield on index-linked gilts (currently under 1%, so not much given up!)
Effectively giving up a low real yield in exchange for high expected return – good deal for trustees?
- Interest sensitivity declines over time (this can be addressed by series of bonds with different maturities)
- Risk of bank defaulting on swaps/zero coupon bonds (this risk is mitigated by collateral posting and choosing AA banks)



Advantages of this structure

- **Full capital and inflation protection**
- **Better than trying to buy index-linked gilts or bonds**
- **Can help reduce a pension deficit over time**
- **Can help meet mortality changes over time**
- **Modern investment approach to target liabilities explicitly**
- **Extra upside potential to meet deficit/mortality**
- **Allows trustees to eliminate 'unrewarded' inflation risk**
- **So trustees take risks they expect to be rewarded for**
- **Should outperform swaps and bonds, due to upside potential**
- **No need for trustees to struggle with complex derivative administration – all in product**

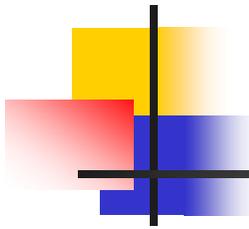


Helping the trustees

Issues for trustees

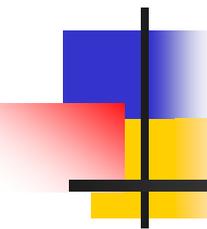
Can this approach help?

| | |
|---|-----|
| Liabilities must increase by l_{pi} | Yes |
| Liabilities will change with interest rates | Yes |
| Require extra returns above liabilities to meet mortality or deficit | Yes |
| Inexperienced with swaps and derivatives | Yes |



Conclusion

- Traditional approaches unlikely to deliver enough
- New investment approach to help trustees pay pension
- Protection of downside risk
- Risk control that still allows good upside potential
- Administratively easy for trustees
- Better chance of paying the pensions than relying on gilts or bonds – an alternative way forward?



Meeting the liabilities

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