The Problem with LDI

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Occupational DB Pensions

- A pension is a stream of cash-flows – it the income to support our retirement consumption.
- It is not some capital sum to secure or finance these pensions.
- Economically a pension is a claim on future production.
- An occupational pension is a promise made by an employer producer.
- It is direct and the most efficient form of economic design.
- DC and hybrids with limited sponsor employer commitment are inefficient and handicapped from this perspective.
- Financial assets are also claims on future production.
- The value of these claims is also sourced in employers' future production.
- But they are, and must be inefficient and incomplete.
- They are capitalisations of partial elements of the future free-cash flows arising from an employer's productive output
- The basis of this capitalisation is unobservable.
- This is the most elementary reason why we should consider employer and any fund jointly.

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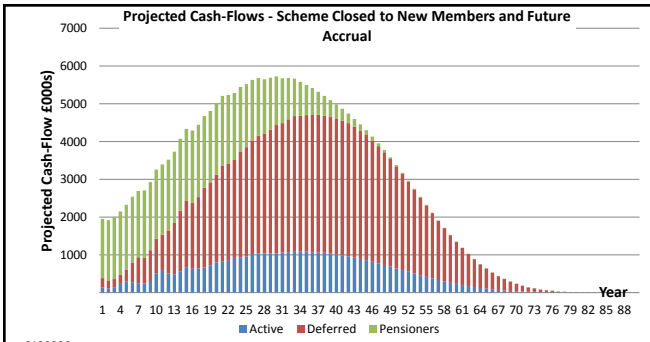

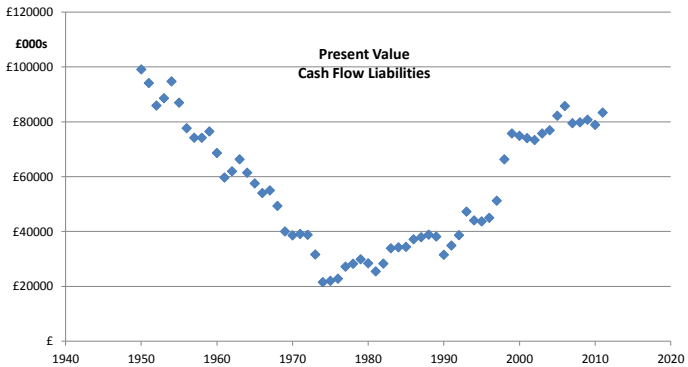

Present values

Total Pension cash flows: £247 million

Minimum Present Value Coverage 11.5%

Maximum Present Value Coverage 40.0%

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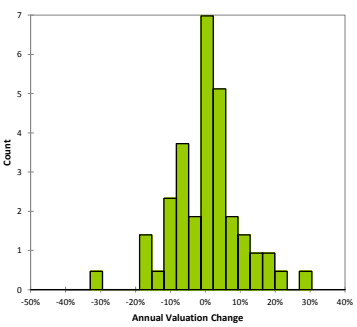

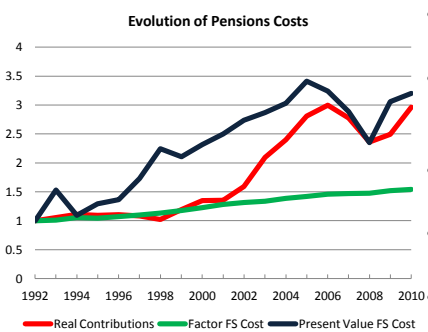

Changes in liability valuation

- The standard deviation of valuation changes is £5 million.
- This is twice the mean or mode annual cash-flow (£2.4 million, £2.5 million).
- But this volatility is spurious in the sense that the ultimate pension liabilities do not increase and decrease in this manner.
- They increase quite smoothly – the trend real increase since 1992 is a little over 60%.
- However, real contributions have increased nearly threefold.
- And the present value of the factor cost of the ultimate pensions has increased a little more than threefold
- The effects of much liability limitation activity have been minor
- Only if regulation requires action is hedging perhaps advisable
- And regulation changes often at these horizons, so the cost of unwinding hedges is a concern

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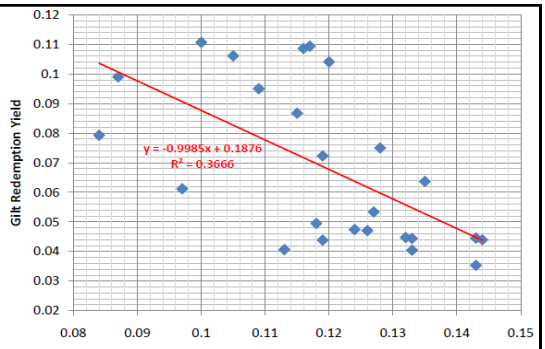
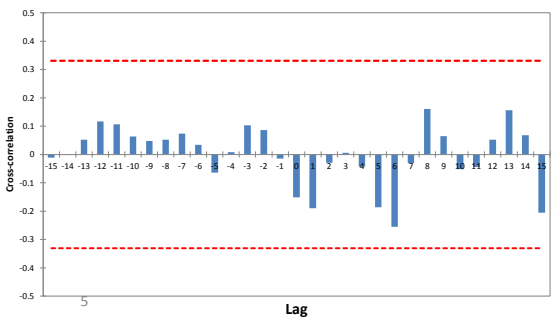
The company and scheme

- Lower interest rates raise earnings
- Hedging scheme interest rate exposure is gearing the company not de-risking it
- The relation between corporate earnings and interest rate valuation changes is negative instantaneously and at lag one
- Any appropriate hedge would considers also the relative sizes of scheme and company





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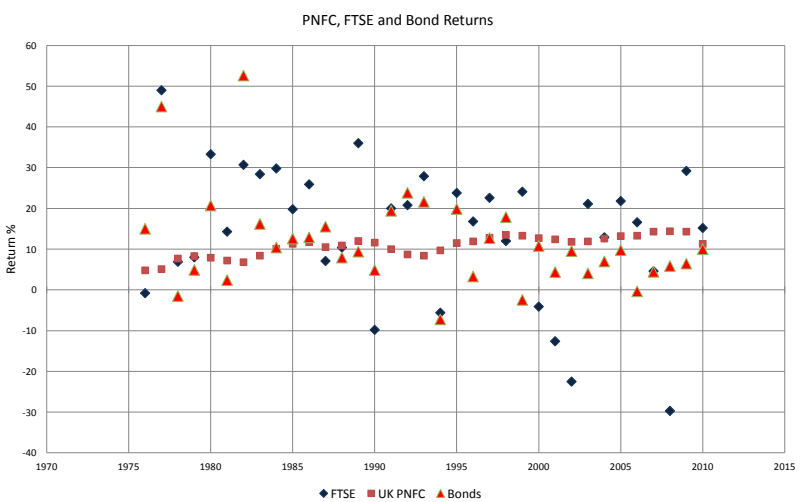
Investment and Profits

- Traded bond and equity returns do not reflect the profitability of the UK private non-financial sector



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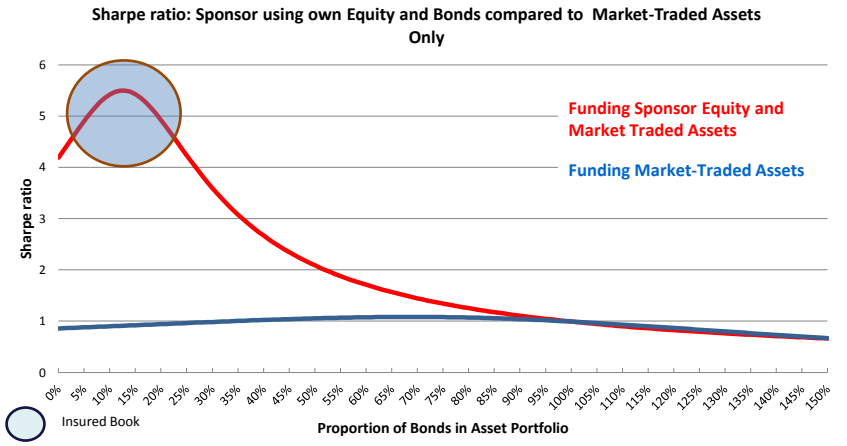
What if we allow self-investment?

Optimal Funding



The 75% allocation to bonds is optimal for traded bond and equity

But we still need 130% funding to cover post insolvency risk exposure

The optimal allocation using sponsor equity and traded bonds has just 13% in bonds

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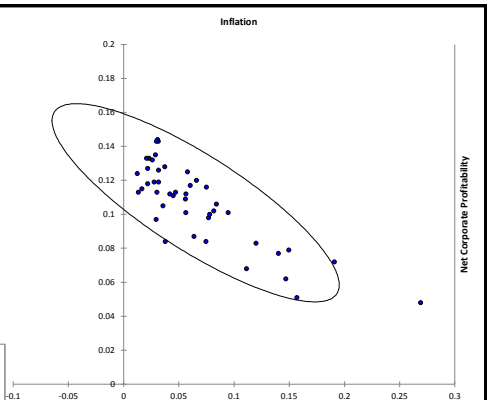
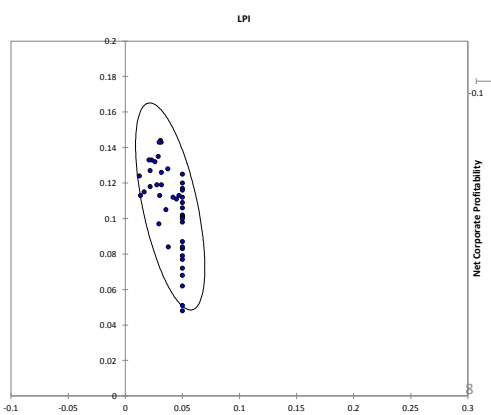
Inflation Hedges

- Inflation hedging appears sensible
- High profitability Low Inflation
- But schemes have limited price inflation





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Joint Hedging

- Hedging both interest rate and inflation exposure in both broad and LPI form
- Multicollinear
- So use partial least squares – not OLS
- We should write not hedge LPI !!

Corp Profits			
	OLS	PLS 1	PLS2
Gilt Yields	-0.71	-0.38	-0.84
Inflation		-0.2	
LPI			0.42
R^2	78%	80%	63%

	Net Corporate Profitability	Inflation	Gilt Yield	LPI
Net Corporate Profitability	1	-0.830	0.889	-0.591
Inflation	-0.830	1	0.819	0.662
Gilt Yield	-0.889	0.819	1	0.767
LPI	-0.591	0.662	0.767	1

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Covenants and Insolvency

- A DB pension is a stream of cash-flows not a capital sum
- In bond markets insolvency occurs when the obligor fails to make a payment
- This is equitable insolvency. It occurs when the company is illiquid.
- In the pension world we operate on the basis of balance sheet insolvency
- When asset estimates are below liability estimates, the company is insolvent
- There are differing times to these differing forms of insolvency
- It is critical that the estimates of asset values and liability values are accurate and consistent.
- In fact we can generalise balance sheet insolvency to financial statement insolvency – if for example we set revenue or asset coverage ratios as security devices.
- Taking security, makes the failure more imminent
- The trade-off is between our priority and the shorter horizon
- In the absence of such priority creating covenants, the market-charged interest rate will be lower as the time to insolvency lengthens.
- Few bonds have more security than negative pledge and pari-passu clauses
- In consequence, the market discount rate observed and (mis) specified in accounting rules is applicable under equitable insolvency and is lower than would apply under balance sheet insolvency.

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Risk-free rates

- The risk-free rate is a simple construct
- It is the pure liquidity preference rate of a saver
- It is subject to the technical condition that it should be a spot rate – a zero coupon rate to a defined maturity. This eliminates the uncertainty associated with interim cash-flows. It is strictly unobservable.
- Low rates tell us that liquidity **at the maturity** is expected to be plentiful
- Low rates should encourage us to borrow today
- Market observed rates, even gilts, are not pure liquidity preference rates for all
- They are the aggregate of many differing classes of market participant with their differing preferred habitats.
- They are a minimum rate and may be lower than are acceptable to some classes of saver who then will not save.
- **They are irrelevant to a debtor**
- The rate relevant to a debtor is their cost of production of the required liquidity
- This is their rate of return on equity, provided that equity covers the amount of the liability.

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Market Prices

- The price of a traded equity is lower than the price of equity to an owner-manager for two principal reasons
- 1) The separation of management from ownership and the associated principal agent frictions and problems
- 2) Liquidity – which has a cost – if it did not, all assets would be liquid

- Because of the principal-agent problem some future revenues may not be pledgeable and capitalisable today. These may be unobservable – "shirking"
- If we pass balance sheet insolvency and begin to approach equitable insolvency, it is in the interests of managers to forego some or all of their perks and to exert effort.
- This results in more cash-flow than was priced in the balance sheet view and the time to equitable insolvency is extended. The bond holder gains and the lower ex-ante rate is justified.
- Cheaper equity in the sense that little future cash-flow is pledgeable is associated with lower costs of credit

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Mark to market

- The preceding slides have raised doubts about the consistency of a mixed attribute accounting system – discounted present value for liabilities and market prices for assets, but there is a much more fundamental criticism.
- We may define the short and the long-term by reference to the source of liquidity in the security.
- If the ultimate source of liquidity is from some specific obligor - dividends or principal – this is investment.
- If the ultimate source of liquidity is sale in a market, this is speculation.
- A T Bill held to maturity by a company is investment. Equity held solely for the collection of dividends or dividends and wind-up liquidation is also investment.
- There is a relation between the holding-term and investment since interim liquidity arrives from the specific obligor not the market.
- The accountants recognise this for banking – hold to maturity assets are not market-priced.
- Do not be swayed by arguments based on efficient markets or capm theories
- They are theories of speculation not investment - as Bachelier noted in 1900.

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Holistic Balance Sheets

- Any scheme deficit is an obligation of the sponsor
- The balance sheet position is simple

Assets	
Scheme	Company
	Assets
	Assets
	Assets
Deficit	Assets
Deficit	Assets
Funds	Assets
Funds	Assets
Funds	Assets
	Assets
	Assets
	Assets

Liabilities	
Scheme	Company
	Equity
	Equity
	Equity
Pension	Equity
Pension	Equity
Pension	Liability
Pension	Liability
Pension	Liability
	Liability
	Liability
	Liability

Assets	Liabilities
Group	Group
Funds	Equity
Funds	Equity
Funds	Equity
Assets	Pension
Assets	Pension
Assets	Pension
Assets	Pension
Assets	Pension
Assets	Liability
Assets	Liability
Assets	Liability
Assets	Liability
Assets	Liability
Assets	Liability

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Credit Analysis

- The question of pension security is standard credit analysis
- But only of the ability to pay
- And the accuracy of estimates of pension liabilities is crucial
- Prudent in this context means rational and well-informed, not conservatively biased and overstated.
- In this context, it means that the wealth (equity) of the sponsor is sufficient and that the (net) returns on that wealth are positive.
- In this example we might use the scheme funds to discharge some other company liabilities and we have a book-reserve "unfunded" scheme.
- This is risk-diminishing if the cost of those liabilities exceeds the returns earned on the funding
- This should be done as a post-tax calculation
- How do we hedge in this situation? We marry the sensitivities of pension liabilities to the sensitivities of corporate assets.
- This is enterprise-wide risk management.
- But we should not forget that it is uncertainty not risk which admits the possibility of companies making profits

Assets Group	Liabilities Group
Funds	Equity
Funds	Equity
Funds	Equity
Assets	Pension
Assets	Pension
Assets	Pension
Assets	Pension
Assets	Pension
Assets	Liability
Assets	Liability
Assets	Liability
Assets	Liability
Assets	Liability
Assets	Liability

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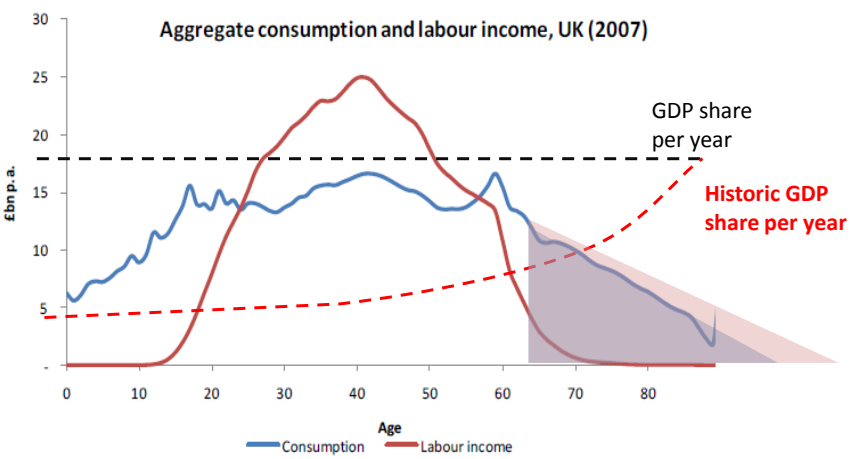
Longevity

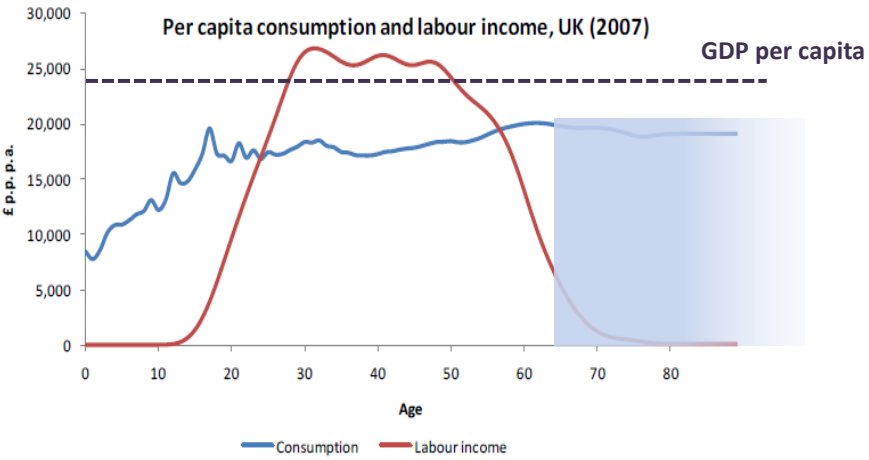


Perceptions matter. Ninety years ago, the idea that retirement income today would be more than eight times that of a 90 year-old at that time would have simply been incredible

The longevity problem is minor

One important caveat: We do not know to what extent this consumption is constrained by wealth or income.

Individual Pensions



- Replacement rates may need to be higher that 60%

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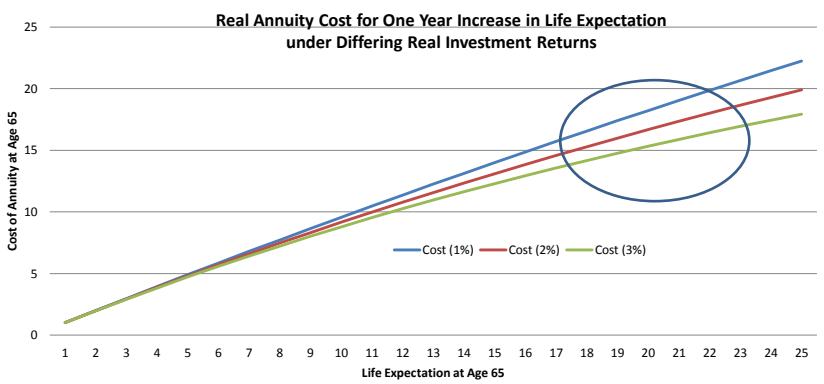
A three year error in LE over 40 years is equal to 50% of current GDP

IMF Conclusions

But in current terms the GDP over this period is 4,000% of current GDP under no growth and 6100% under 2% real growth – between 1.25% and 0.81% of total output.



The efforts to create a market in longevity risk are probably misguided

When you cannot find a natural buyer of a risk, it is most likely best positioned where it is.

And there is no doubt that sponsor producers do benefit from the increased demand for goods and services of an increased population.

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Funding

- The most simple criticism of **funding** is that it **does not resolve the insolvency issue**
- It quite often exacerbates it.
- The nature of the problem is that a scheme 100% funded at insolvency needs more capitalisation than this in order to cope with the vicissitudes of financial markets and to be able to pay all pensions in full and timely manner.
- Funding is an incomplete security mechanism
- Extension beyond 100% funding suffers the curse of risk management
- It raises costs beyond rational expectations.
- Recall that one of the few things we know about risk is that it means that more things mat happen than will.
- The obvious question: how large is private insolvency risk?

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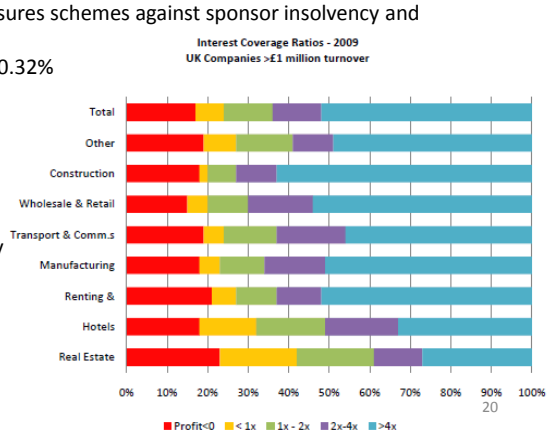
Corporate Insolvencies

- Companies are twice as likely to merge or be acquired as to become insolvent
- In the UK the insolvency rate has averaged 1.2% p.a. over the past 30 years
- But fifty percent of companies do not survive their fifth birthday
- The loss rate that prompted all of our recent legislation, at 50% funding, was less than £6 billion – rather less than special contributions in every year since 2002
- Gazelle reported cumulative failure of just 7% since 1985 – 0.3% p.a. for FTSE 100
- The Swedish PRI-Pensiongaranti insures schemes against sponsor insolvency and reports losses averaging 0.3%
- The German PSV reports losses of 0.32%
- There is evidence from Germany that companies with book-reserve schemes are 50% less likely to fail than companies at large.
- The diversity of companies admits an insurance solution to insolvency and pension security



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Savings and investment

- In any economy savers may defer some consumption
- This may have a natural time horizon – saving for school fees, retirement or bequests, or simply until we have enough to buy that Mercedes.
- Some may be precautionary in nature – savings against illness or fire or unemployment . These are probabilistic in nature.
- We can develop collective financial institutions to resolve probabilistic issues
- Investment demand in the public and private sectors may not marry to the time profile of savers.
- Individuals can also have current "investment" demands - e.g mortgages or simply more consumption – these are supported by their future income.
- We develop institutions to resolve time imbalances – banks and the maturity transform of their assets and liabilities
- If we constrain these institutions so that they do not operate and invest to their maximum term, but rather shorter, then we impose costs upon the economy.
- Investment projects that are viable do not proceed
- We can estimate the effects of these constraints on productive output
- For the UK they are of the order of 0.5% – 1.25%
- LDI and the short-termism of hedging, a form of speculation driven by price changes, are a significant part of this.

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Scheme design

- The **primary advantage** of DB over DC lies in the **sponsor guarantee:**
- The bulk buy–out funding level is the value of this aspect: 50%+ today.
- As pensions are simply a claim on future production, the sponsor employer, the producer is best positioned to make this promise.
- This is more direct and efficient than buying similar claims in financial markets
- Then there are further institutional design advantages of DB over DC which are overwhelming, and stem from:
- **Risk Pooling, Risk Sharing, Time Continuity, Economies of Scale and Scope**
- The trend to individual provision is misguided and will prove costly
- The disadvantages and costs stem from incorrect accounting and regulation
- Alan Rubenstein – CEO, PPF - **Funding trumps Covenant**
- Rephrased: **Seatbelts trump Brakes**
- **The sole risk is sponsor insolvency and that is best insured**
- Assured occupational book–reserve DB may be provided at about half the cost of funded DB, which, in turn provides, pensions at about half the cost of DC
- LDI is just a rather grave and costly mistake, at almost any level.

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The End?

"We structured the deal so it won't make any sense to you."

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