

HOW SHOULD PENSION LIABILITIES BE VALUED?

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Valuing the health of a DB pension scheme

When thinking about the health of a DB pension – and specifically the chances that all promised pension payments can be made – there is no single number called “the deficit” or “the surplus” that can reveal the state of a scheme.

What is useful is a measure of the evolution of the probability distribution of the value of the assets – this is a complicated multi dimensional object that requires stochastic simulations to create.

It is not a single number.

Yet people seek a single summary figure.

Valuing the health of a DB pension scheme

One simplification that is easier to interpret is to take the real value of existing liabilities boiled down to a single figure payable at some point in the future.

Then calculate the probability distribution of the value of current assets at that future date (assuming reinvestment of returns on those assets).

One can then calculate the probability of funds being insufficient and the probability of shortfalls of various size.

This is still not a single number.

Valuing the health of a DB pension scheme

If you insist on a single number (“the deficit/surplus today”) then it at least should be unambiguous.

It should not be misinterpreted, particularly by those who have been promised pensions and consider those as firm commitments.

It should not be subject to wishful thinking bias.

Valuing the health of a DB pension – what single number is least misleading?

The pensions are promises to pay (essentially) real amounts of money at points in the future.

The people to whom those promises have been made tend to take them at face value – that is what their employment contract says.

If the number suggests “surplus toady” people will naturally think there is enough money to cover past promises.

The single number that avoids giving bogus certainty if there is full funding would require discounting the promised payments by some measure of a safe real rate – something well approximated by an index linked bond yield of duration to match that of the liabilities.

Valuing the health of a DB pension – what single number is least misleading?

The most transparent measure of “the deficit” is one based on liabilities treated as firm commitments whose real value today must logically be based on discounting by a safe real rate.

BUT

This does NOT mean that a DB scheme has to hold only index linked bonds.

Valuing the health of a DB pension – what single number is least misleading?

If a DB pension fund's sponsors (or its sponsor's shareholders) are prepared to take risks *and* they can always top up a scheme if a deficit persists there is no reason to force it to de-risk by investing largely in indexed bonds to avoid (further) interest rate risk.

But that does not justify coming up with estimates of “the deficit” or “the surplus” based on wishful thinking .

The reality of falling bond yields – avoid wishful thinking

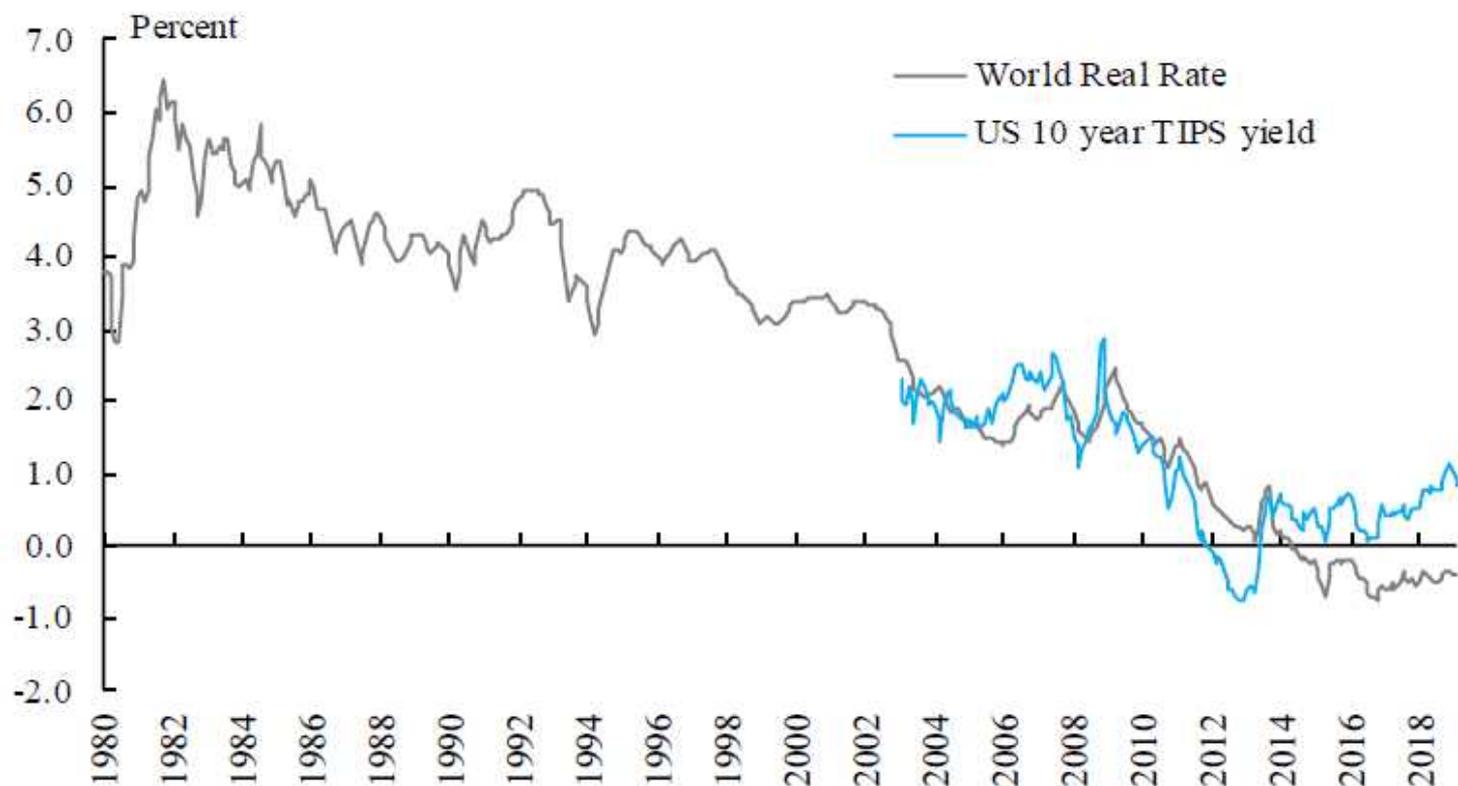
If you value pension liabilities as firm promises to pay real amounts in the future the cost of those promises will be higher when safe real rates come down.

Such costs will now be much higher than in the past because safe real rates (best approximated by index linked bond yields) have come down so much over the past 35 years.

This decline in the real yield on safe (index linked) UK government bonds has been going on since the early 1980s when such bonds were first issued.

It is NOT a recent phenomenon simply reflecting quantitative easing – in fact no indexed bonds have been bought by the Bank of England.

Figure 1: Real interest rates estimated from the inflation-linked bonds in advanced economies and in the United States



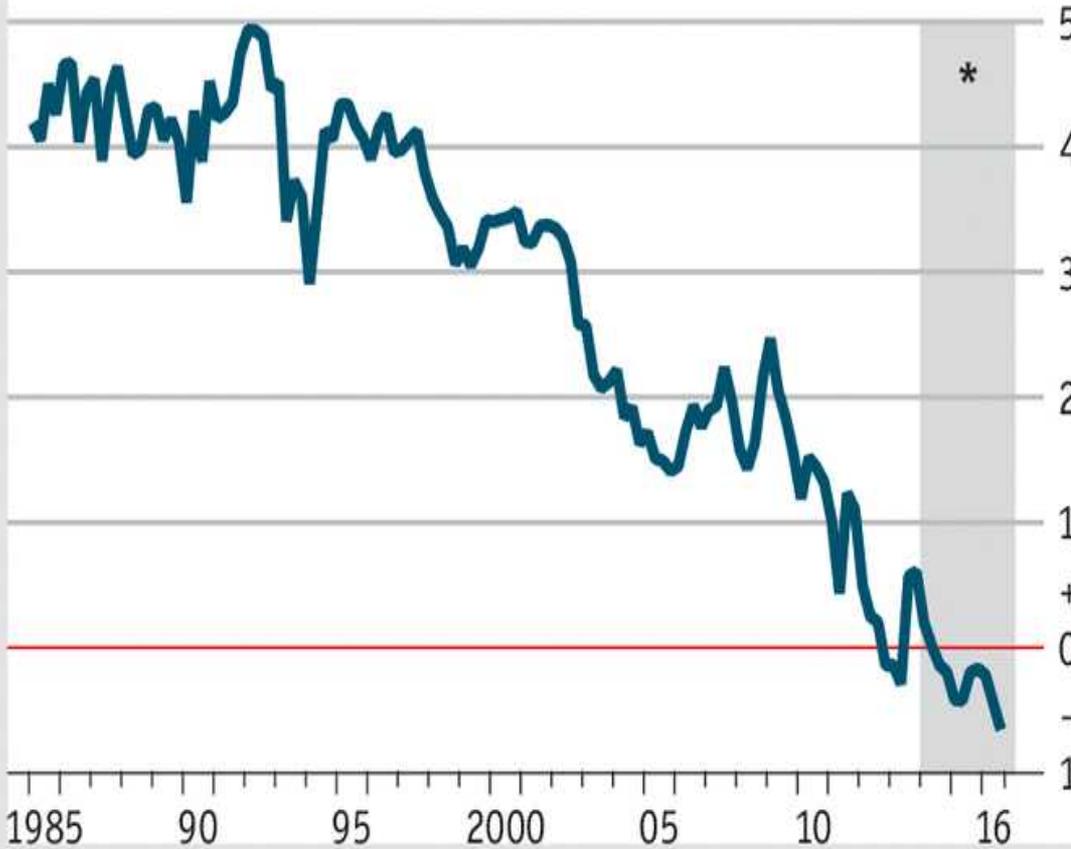
Note: The world real rate is calculated following the methodology in [King and Low \(2014\)](#): it is the average of interest rates on inflation-protected government debt securities across the G7 excluding Italy. Data are from DataStream and form an unbalanced panel. In particular, the Figure relies on the UK inflation-indexed gilts in the early part of the sample. The US TIPS yield is the yield on a constant maturity 10-year Treasury Inflation-Indexed Security, retrieved from FRED, Federal Reserve Bank of St. Louis (code DFII10).

The real deal

“World” real interest rate

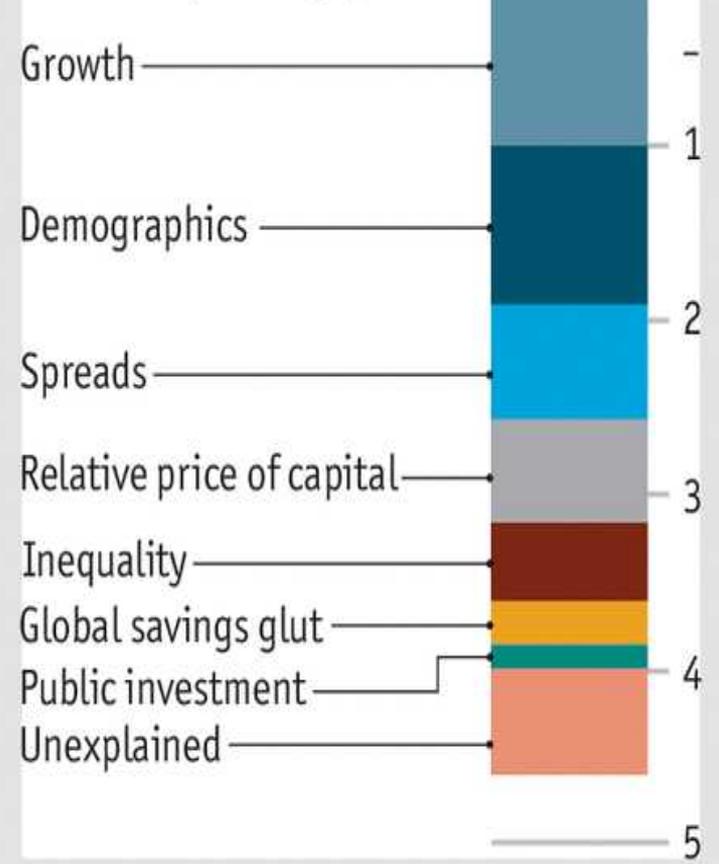
Average ten-year inflation-indexed bond yield, %

G7 countries, excluding Italy



Drivers of the change in interest rates

1980-2015, percentage points



Sources: “Measuring the ‘world’ real interest rate”, by M. King and D. Low, NBER working paper, Feb 2014; “Secular drivers of the global real interest rate” by L. Rachel and T. Smith, Bank of England working paper, Dec 2015; *The Economist*

**The Economist* estimate

Index Linked gilts: Real yields (end year)

	• 10 year	20 year
• 1981	≈4.5	≈4.5
• 1984	3.6	3.4
• 1988	3.8	4.0
• 1993	2.7	3.0
• 1998	2.0	2.1
• 2003	1.9	2.0
• 2008	1.6	1.0
• 2013	-0.1	0.1
• 2018	-1.83	-1.67

Given the steady, long-run downwards trend that has lasted for over 35 years, there is no reason to expect the current very low level of real yields to be reversed soon. Those who are anticipating this are engaged in wishful thinking.

Dangers of wishful thinking – USS assumptions versus reality

Figure 1: 20-year real gilt yield compared to the expected reversion path assumed in the 2017 valuation. (Data from 31 Mar 2017 to 14 Dec 2018)



Implications:

If part of the risk from not matching its assets to the value of its liabilities is passed on to members of the DB scheme (or to the PPF) then such risk taking becomes problematic.

The agreement of those who bear some of the risk should be sought.

This means the PFF-Pension Regulator has a legitimate role in overseeing funding decisions and in measurement of deficits.

It also means DB scheme trustees have to be sure members are happy with any risk the scheme takes which falls on them.

Implications:

There is a huge issue then of who bears the risk of the scheme turns out to be underfunded down the line.

First in line is the sponsoring company (or companies or whoever the institutions are – eg universities).

Behind them are scheme members and the PPF.

Within the group of scheme members there are three classes - people with pensions in payment; deferred members; active members.

It is very murky who bears exactly how much risk.

Wishful thinking and misleading members:

Denying that such risk exists because pension funds can take long horizons and arguing that equities outperform bonds over long horizons is more wishful thinking.

No plausible model of the evolution of bond and equity prices would imply this is valid. If it was, equities would have no more risk than bonds and would be valued like bonds.

The dividend yield on global equities is around +3%; the yield on index linked 10 year gilts is approaching -2%.

Valuing DB liabilities by reference to the expected (non-risk-adjusted) return on the assets makes no sense when those assets are risky – their expected return may well be above that of safe assets but that cannot reduce the value of liabilities. Any risk-adjustment simply brings the returns back down to the return on safe assets (indexed bonds)

Wishful thinking and misleading members:

If valuing fixed (real) liabilities by discounting them at the expected return on risky assets were valid the following is a sure way to make money.

Borrow £1 million guaranteeing to repay it in 10 years' time in inflation-proof terms at a yield matching the safe rate on index linked bonds (at, say, a real yield of 0%).

Buy a quantity of equities with a value of £1 million/ (where R_e is the average value of the annual real return on equities, say 4%). This would mean buying about £675,000 of equities.

Declare a net value for your company of £1 million - £675,000 = £325,000 which is "assurplus".

Pay £325,000 as a dividend to yourself. This leaves the company with assets equal to "fairly valued" liabilities.

What some DB schemes do is schizophrenic....

An example: What USS does for “Technical Provisions”

Discount rate

“The discount rate for liabilities is a prudent forecast investment return developed from the 33rd centile of the distribution of investment returns. This provides a 67% confidence that the discount rate will at least be achieved.”

So any “deficit” or “surplus” calculated from this has a 33% chance of being too optimistic. Someone who had been promised a real pension and was told that the scheme was fully funded is unlikely to draw the right message from this measure.

The USS does do stochastic simulations – but there is still a huge focus on “the deficit”. To use an arbitrary (small) risk adjustment to the expected return on risky assets for such a single figure is not helpful.

Conclusions

- Do not mislead people who believe pensions are firm commitments by creating a single measure of the state of the scheme that depends on risky assets not underperforming an average outcome.
- That does not preclude holding risky assets so long as:

EITHER

the scheme sponsor can make good any deficit that might arise

OR

those that would face the consequences of underperformance of risky assets understand the risk they are taking and willingly accept it.