

# Any TIPS to manage inflation?

We look at whether TIPS (Treasury Inflation Protected Securities) deserve a greater role within UK defined benefit (DB) schemes' portfolios.



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In this piece we find that TIPS offer potentially attractive returns compared with UK inflation-linked bonds. We also see how the rise of consumer price index (CPI)-linked liabilities presents a challenge to conventional assumptions about inflation hedging a DB scheme, and how TIPS could help reduce risk as well as boost returns.

## THE RISK ANGLE

It's useful to distinguish the notion of the hedging properties of an asset class from its expected return. That an asset 'is likely to beat inflation over the long term', because of a risk premium, is sometimes confused with 'inflation hedging'; separating these two notions is important.

It's often taken for granted that UK DB schemes are best inflation hedged using only UK inflation-linked bonds. We agree – perhaps combined with UK inflation swaps in an liability-driven investment (LDI) mandate – if the liabilities are linked to the retail price index (RPI). However, a significant proportion of UK scheme liabilities are now CPI-linked. And some schemes, such as the Local Government Pension Schemes, have liabilities that are 100% linked to CPI.

As we have discussed elsewhere<sup>1</sup>, the potential risk from hedging CPI with RPI may be greater than you expect. For example, if RPI assets and CPI liabilities are of similar volatility and 80% correlated, then UK inflation-linked bonds and swaps might eliminate less than half the risk.<sup>2</sup>

If UK inflation-linked bonds on their own aren't a wholly satisfactory inflation hedge for CPI liabilities, could they work better in combination with another asset? We know TIPS aren't a great inflation hedge for CPI liabilities either, but we investigated whether they could complement UK inflation-linked bonds.

<sup>1</sup> <http://www.lgim.com/uk/en/insights/our-thinking/client-solutions/cpi-liabilities-the-wedge-and-the-hedge.html>

<sup>2</sup> A calculation illustrates this idea: if the volatility of the RPI asset and the CPI liability are both  $V$  then the volatility of the difference, assuming an 80% correlation, is  $\sqrt{(V^2 + V^2 - 2V \cdot 0.8)} = 0.63V$ .

Given a lack of market data on CPI rates, the approach we took to measure risk was to look at realised inflation. From a cashflow-driven perspective this should be sufficient to help judge whether liabilities can ultimately be met. After all, once you've bought a UK inflation-linked bond or TIPS instrument the cashflows paid from it depend only on realised inflation.

Based on correlations and volatilities derived from print data covering 1988-2018 we looked to see which mix of UK inflation-linked bonds and TIPS had the potential to minimise volatility for a scheme with CPI liabilities. We found the mix was around 60% UK inflation-linked bonds and 40% TIPS. That's a very substantial allocation to TIPS!

**BEWARE OF RECENCY BIAS**

We need to be careful, however, before jumping to conclusions based on a relatively crude calculation. Figure 1 shows annual differences in realised annual inflation.

Since 1988, the gap between UK RPI and UK CPI (known as the wedge and shown in green) has exhibited low volatility. So has the gap between US CPI and UK CPI (shown in red). Before 1988, we don't have UK CPI data but the gap between UK RPI and US CPI (shown in blue) has sometimes been highly volatile. This is perhaps unsurprising given that they represent inflation for two different countries.

We don't have the data to prove it but it seems unlikely that there would, or could, be as large gaps as this between UK RPI and UK CPI (the wedge). The wedge is driven by two effects. Firstly, UK RPI and UK CPI include slightly different

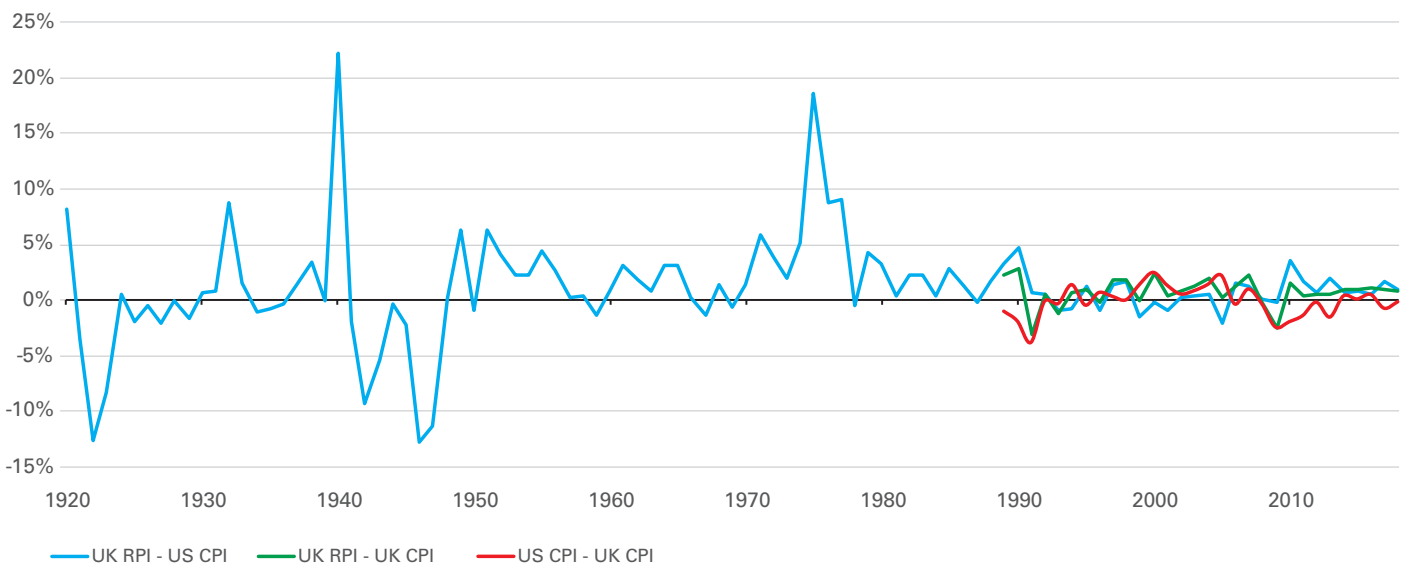
things: RPI includes the costs of housing – mortgage interest costs and council tax, for example – while CPI doesn't. Secondly, there's a so-called formula effect at play reflecting that RPI is an arithmetic measure but CPI is geometric. In our view, the combination of these two would be relatively range-bound and have limited volatility compared with what can happen to prices in the UK versus the US.

The upshot of this is that if we had been able to perform our calculations based on a longer span of data<sup>3</sup>, TIPS may not have looked so attractive as part of the hedging portfolio. We also noted that even without worrying about inflation before 1988, the exact percentage in TIPS that minimises volatility is quite sensitive to assumptions made, such as the time period chosen and whether you allow an allocation to cash.

**INFLATION TARGETING**

TIPS are unlikely to have been as good a hedge if you look further back in time, had TIPS existed back then. On the other hand, more recent data is likely to be more relevant to predicting future behaviour. In particular the introduction of inflation targeting – a move to an explicit rather than desired target, in 1992 in the UK and in 2012 in the US – means we might expect both UK and US inflation to be more contained relative to the past. This may mean that our calculations based only on post-1988 data aren't so bad, with the wedge being sizeable in context. But inflation targeting offers no guarantees: there remains a tail risk that UK inflation explodes and US inflation does not, or that the US suffers deflation but the UK doesn't.<sup>4</sup>

**Figure 1. Annual inflation differences (September-September)**



3 A larger data set would also have allowed us to explore any possible autocorrelation effects in more detail, which could change the relationship between short and long-term risk.  
 4 Although we note any caps and floors from LPI would mean the impact of this risk is also contained.

Overall, we think there is a case for including some TIPS exposure in the hedging portfolio of a scheme with 100% CPI-linked liabilities, although that allocation should not be as high as 40%. We might suggest something around the 20% mark if purely focused on volatility reduction, although the answer is scheme specific. We might also consider European inflation-linked sovereigns; we have focused only on TIPS here for illustrative purposes.

Although we believe that diversifying into TIPS may help reduce risk for schemes with CPI-linked liabilities, we would be wary of TIPS 'officially' counting towards an LDI allocation given the greater tail risks involved. Rather, trustees could use the positive correlation between TIPS and liabilities to justify a lower 'explicit' hedge ratio from UK inflation-linked bonds and swaps, topped up with an 'implicit' hedge from TIPS.<sup>5</sup> Similarly, a scheme with RPI-linked liabilities that holds some TIPS for additional return purposes may wish to reduce its explicit LDI hedge.

### THE RETURN ANGLE

It's interesting to consider the role of TIPS from the perspective of reducing volatility, but in practice most schemes are also seeking returns to help close funding gaps. If TIPS have a higher expected return than UK inflation-linked bonds, then they may deserve a role in a scheme's overall strategy, even if the liabilities are RPI linked.

Our colleague John Roe, LGIM's Head of Multi-Asset Funds, has argued that UK inflation-linked bonds look relatively expensive due to pension funds' demand for inflation protection in the UK.<sup>6</sup> Figure 2, in which we have compared breakeven inflation with central-bank targets, makes a similar case.

John believes the disparity in the figures in the right-hand column is not so much because inflation expectations are

really so different, but rather that UK DB scheme de-risking is distorting the UK market.

### SHARPE EDGE

If you assumed that about half of the return difference can be explained by mispricing, this gives TIPS an expected return over UK inflation-linked bonds of about 0.5% per annum (adding 0.7% and 0.4% then dividing by 2). Given that the volatility of the realised wedge is around 1.3% pa<sup>7</sup>, this means a scheme with RPI liabilities could swap UK inflation-linked bonds for TIPS to gain access to a return source with a Sharpe ratio of 0.4. By itself this is attractive but an important added benefit is that it is a highly diversifying source of return that can be combined with other, more traditional, risk/return trade-offs to enhance overall efficiency.

Another consideration is the buyout pricing of insurers and also the 'Pension Protection Fund (PPF) basis' (the assumptions used to estimate the cost of buying out PPF benefits with an insurer). Movements in these valuations could be linked more to RPI than to CPI due to the assumption of a fixed wedge to RPI in the calculations. For example, PPF benefits are linked to the CPI<sup>8</sup> but the basis used is derived from yields on RPI inflation-linked bonds. Only if the likely future wedge clearly changes by a substantial amount might insurance companies or the PPF alter their wedge assumptions. As such, it could be the case that investing in RPI-linked assets is not such a bad way to hedge the cost of buying out CPI benefits in the short term. However, there's a risk it could stop working when it's needed most.

Then there is the currency hedging of TIPS. This is clearly important for de-risked schemes, but if there is a fair exposure to growth assets currency hedging might not be needed or be attractive.<sup>9</sup>

**Figure 2. Comparing breakeven inflation with central-banks targets**

31/03/2019	20 year breakeven rate	Central Bank target	Difference
UK inflation – RPI	3.5%	2.0% (UK CPI) + c.0.8% wedge* = 2.8%	0.7%
US inflation - CPI	1.9%	2.0% (US price index for personal consumption expenditures) + c.0.3% gap* = 2.3%	-0.4%

\* estimated based on realised inflation from December 1999 to December 2018.

<sup>5</sup> For an explanation of this can be done, please read our piece on setting strategic hedge ratios here: [http://www.lgim.com/library/knowledge/thought-leadership-content/db-dynamics/DB\\_Dynamics\\_JUNE\\_16.pdf](http://www.lgim.com/library/knowledge/thought-leadership-content/db-dynamics/DB_Dynamics_JUNE_16.pdf)

<sup>6</sup> [http://www.lgim.com/files/\\_document-library/knowledge/thought-leadership-content/lgps-intelligence/feb-2019.pdf](http://www.lgim.com/files/_document-library/knowledge/thought-leadership-content/lgps-intelligence/feb-2019.pdf)

<sup>7</sup> Looking at cashflow risk, rather than mark-to-market risk. Based on realised wedge January 1988-December 2018.

<sup>8</sup> Pension accrued after 6 April 1997 is increased each year in line with CPI capped at 2.5%.

<sup>9</sup> See here <http://www.lgim.com/uk/en/insights/our-thinking/client-solutions/what-is-the-appropriate-level-of-currency-hedging.html> for a discussion of the currency hedging debate.

## TOPTIPS

For schemes with CPI liabilities, TIPS may help to a degree even from a pure risk-reduction perspective given that there is wedge risk between UK inflation-linked bonds and liabilities. You need to be careful, though, because recent history could overstate the relative importance of wedge risk (compared with UK versus US risk). For all schemes, TIPS offer a potentially diversifying source of extra return if you believe markets may be mispriced due to pension funds' demand for UK inflation-linked bonds.

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