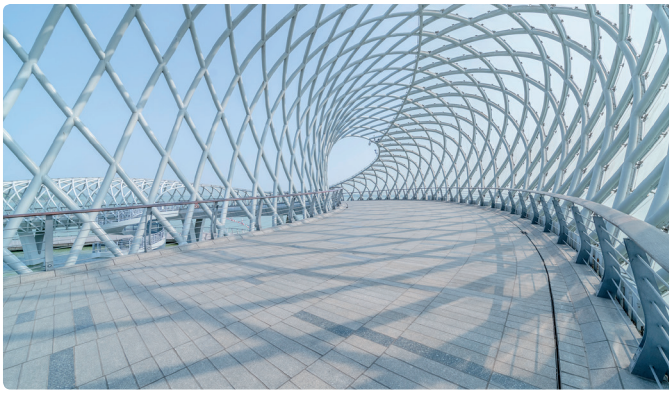
CPI liabilities: the wedge and the hedge



Running RPI-linked assets versus CPI-linked liabilities can pose material risks. But as pension schemes become better hedged – and market pricing becomes more appealing – they may seek to explore CPI-linked assets in greater detail.

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A number of factors have affected the liabilities of defined benefit (DB) pension schemes in recent years, not least transfers out[1] and changes in longevity assumptions[2]. In addition, an increasingly illiquid market for instruments that hedge limited price indexation (LPI) liabilities has led some schemes to change their approach to calculating their liability benchmarks[3].

In this note, we consider yet another important source of scheme risk: that arising from the mismatch between liabilities linked to the consumer price index (CPI) and assets linked to the retail price index (RPI). This area has received increased attention of late, after a House of Lords inquiry recently criticised the UK Statistics Authority stance with respect to RPI (describing its position as "untenable") whilst at the same time recommending that the "government should begin to issue CPI-linked gilts and stop issuing RPI-linked gilts".[4]

HOW LARGE IS THE RISK?

In general, DB pension schemes have substantial CPI exposure in their liabilities, following the government's decision to use CPI rather RPI as the measure of inflation for pension increases in both public sector and private sector occupational pension schemes from 2011. In recent evidence given to the House of Lords, the total value of CPI-linked liabilities was estimated at £100bn to £150bn[5].

1. http://www.lgim.com/uk/en/insights/our-thinking/client-solutions/cashflow-awareness-transfers-out.html
2. https://futureworldblog.lgim.com/categories/forum/the-impact-of-changing-mortality-estimates-on-pension-liabilities/
3. http://www.lgim.com/uk/en/insights/our-thinking/client-solutions/managing-lpi-linked-cashflows.html
4. https://www.parliament.uk/business/committees/committees-a-z/lords-select/economic-affairs-committee/inquiries/parliament-2017/the-use-of-rpi/
5. Sir Robert Stheeman, Chief Executive, United Kingdom Debt Management Office quoting NatWest Markets

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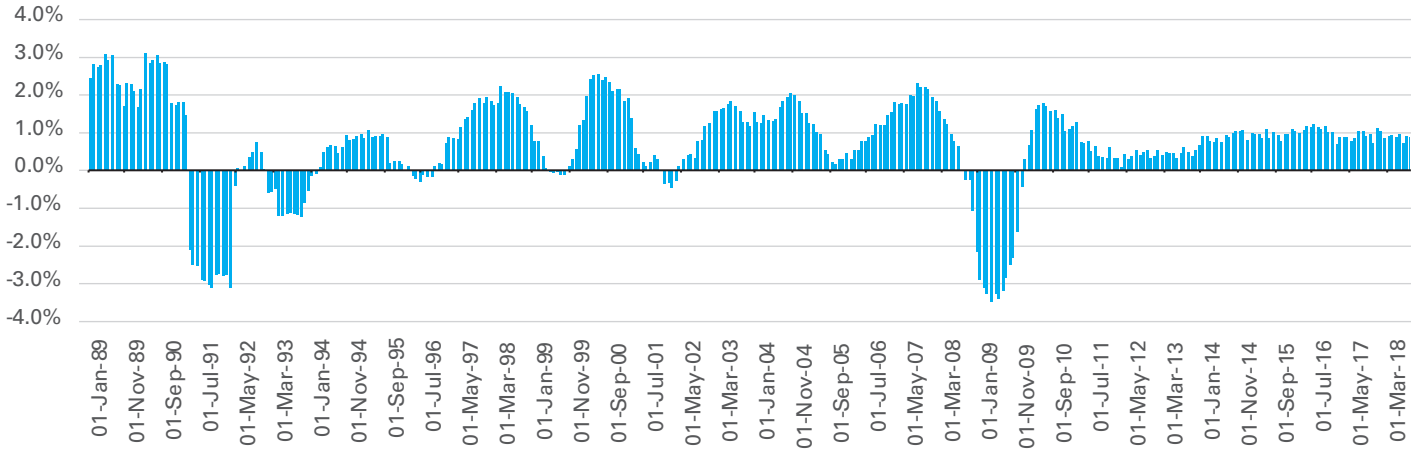
Figure 1: Yearly gaps between RPI and CPI



Source: ONS as at 30 September 2018

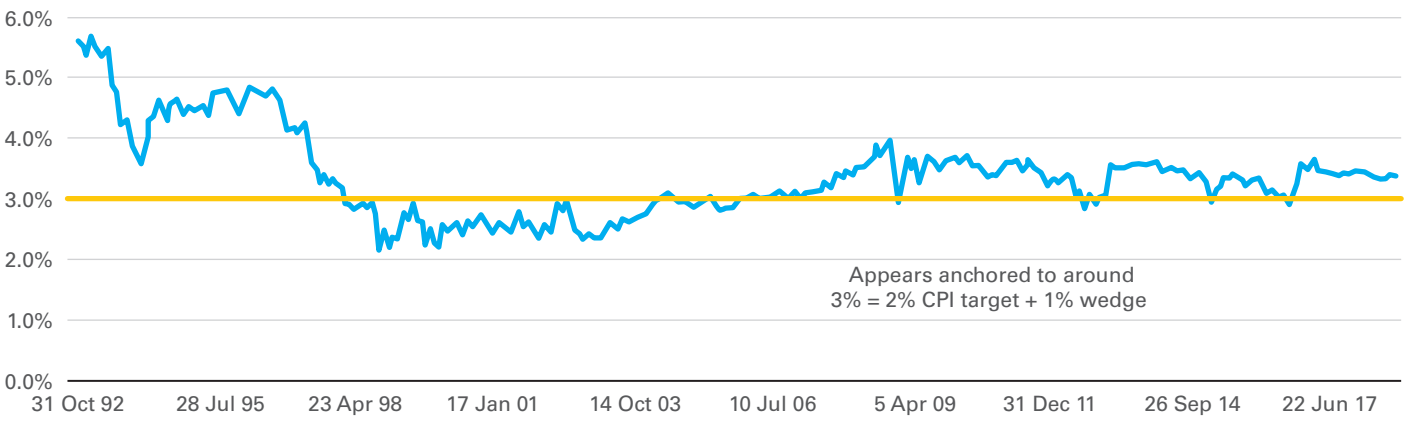
The size of the gap or 'wedge' between the monthly published realised inflation data is a key question when assessing the attractiveness of potentially switching from RPI to CPI-linked instruments to match these liabilities. The variation of this wedge has had a volatility of around 1.3% pa since 1988. Figure 1 shows these realised wedges.

This is around 60% of the volatility of RPI inflation over the same period. It's worth noting that some of this volatility has been due to changes in methodology; for example, in 2010 refinements in the way clothing prices were collected led to a larger wedge.

To understand long-term cashflow risk, it is also useful to know if the wedge behaves differently from one year to the next depending on experience. Before inflation targeting started in 1992 in the UK, inflation was 'sticky'[6] in that high/low inflation years tended to be followed by more high/low inflation years. After 1992, this stickiness appears low and not statistically distinguishable from zero. Similarly we find no evidence that the wedge between RPI and CPI behaves in a sticky way. That is, the realised wedge being high or low in one year does not appear to impact the likelihood of it being high or low in subsequent years.

Given this observation of inflation rates – consistent with inflation targeting – we would expect the long-term annualised volatility of realised inflation to broadly equal the short-term volatility of realised inflation of around 1.5%-2.0% per annum. This can be contrasted with standalone mark-to-market volatility arising from inflation of around 10% per annum[7] for a typical DB scheme. One way to think about this is that although moves in swap (or gilt breakeven) inflation rates can lead to significant mark-to-market volatility, they tend to remain anchored (or, in technical-speak, 'mean-revert' over time), as you can see in Figure 2.

Figure 2: 20-year RPI swap since inflation targeting began



Source: Bloomberg to 31 August 2018

6. Positively autocorrelated
7. A typical scheme has a duration of 20 years and at the 20 year point, breakeven inflation has a volatility of around 50bps per annum. 20 x 50bps = 10% pa.

Given a lack of historic CPI swap rate data, which we discuss later, it is difficult to estimate the volatility of the mark-to-market value of the wedge. However, the fact that the wedge seems to be about 60% as volatile in terms of realised experience of RPI, and that both RPI and the wedge both show no signs of 'stickiness', *suggests* that the mark-to-market risk of the wedge could be around 60% x 10% = 6% pa. This assumes a similar relationship between realised and mark-to-market volatility applies to the wedge as to RPI. The ratio of around 60% does seem roughly consistent with what little data we do have on CPI rates[8] (see Figure 3), although recent experience has displayed low volatility.

The upshot is a perhaps surprisingly large risk arising from using RPI instruments to hedge CPI-linked liabilities. Indeed it is broadly the same standalone funding level risk arises from investing 40% of the scheme's assets in developed market equities! However, that does assume a whole scheme is CPI-linked and that all of its assets are RPI-linked. Obviously with, say, half the mismatch, the risk would also be halved.

Also, as for realised inflation, the long-term cashflow risk from the wedge is unlikely to be as high as short-term volatility in the mark-to-market value suggests. Although we estimate the mark-to-market risk might be around 6% pa, the long-term cashflow risk is likely to be only 1-2% per annum.

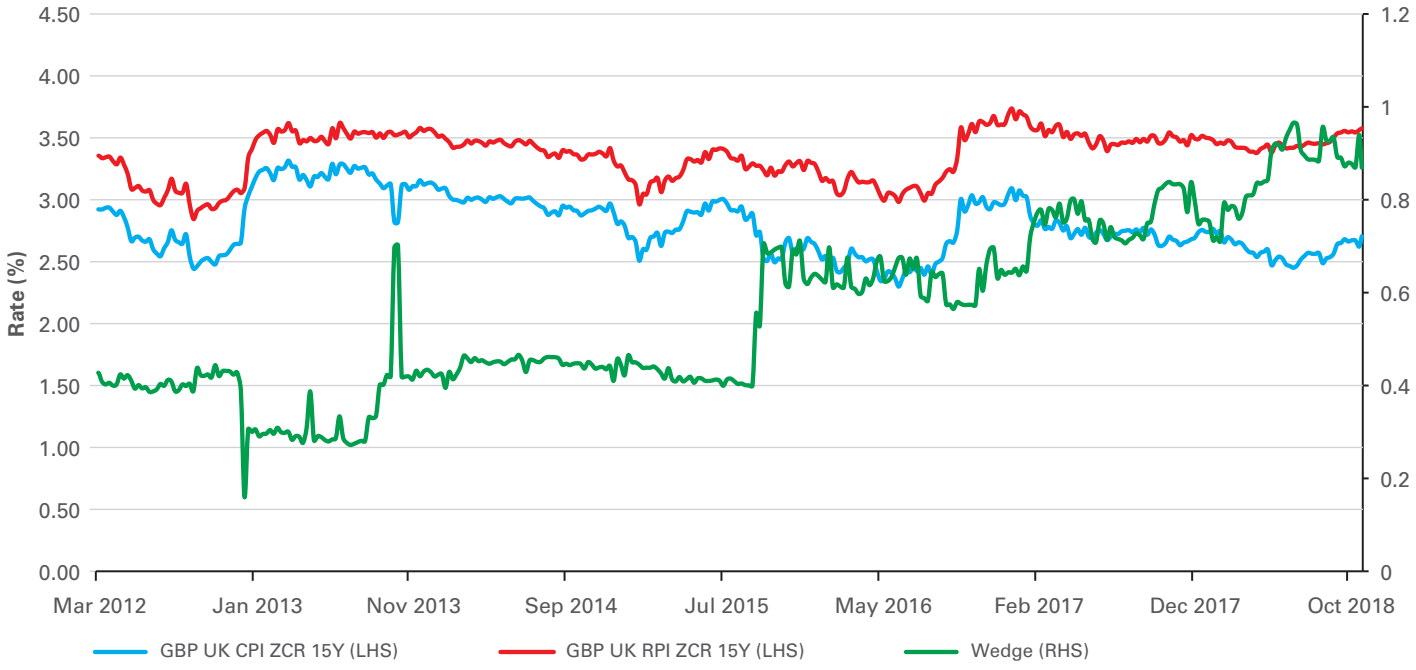
A RISK-RETURN TRADE OFF?

A crucial consideration for pension schemes will be how much risk they are running elsewhere. If they hold a substantial amount in equities, for example, the marginal impact of achieving a better hedge of CPI-linked liabilities could be relatively small. However, for schemes further along their de-risking journey, closer matching is probably more important.

This risk analysis means that for many schemes an allocation to CPI-linked assets could make sense. But the pricing also needs to be considered: if gaining CPI exposure is too expensive, then the scheme may be better off bearing the RPI-CPI risk, depending on their specific circumstances.

Fortunately, whilst the LPI market is in the doldrums, the CPI market is flourishing, with increasing issuance and more competitive pricing in swaps. In particular, pricing of CPI instruments has improved substantially over the past few years, as can be seen in Figure 3.

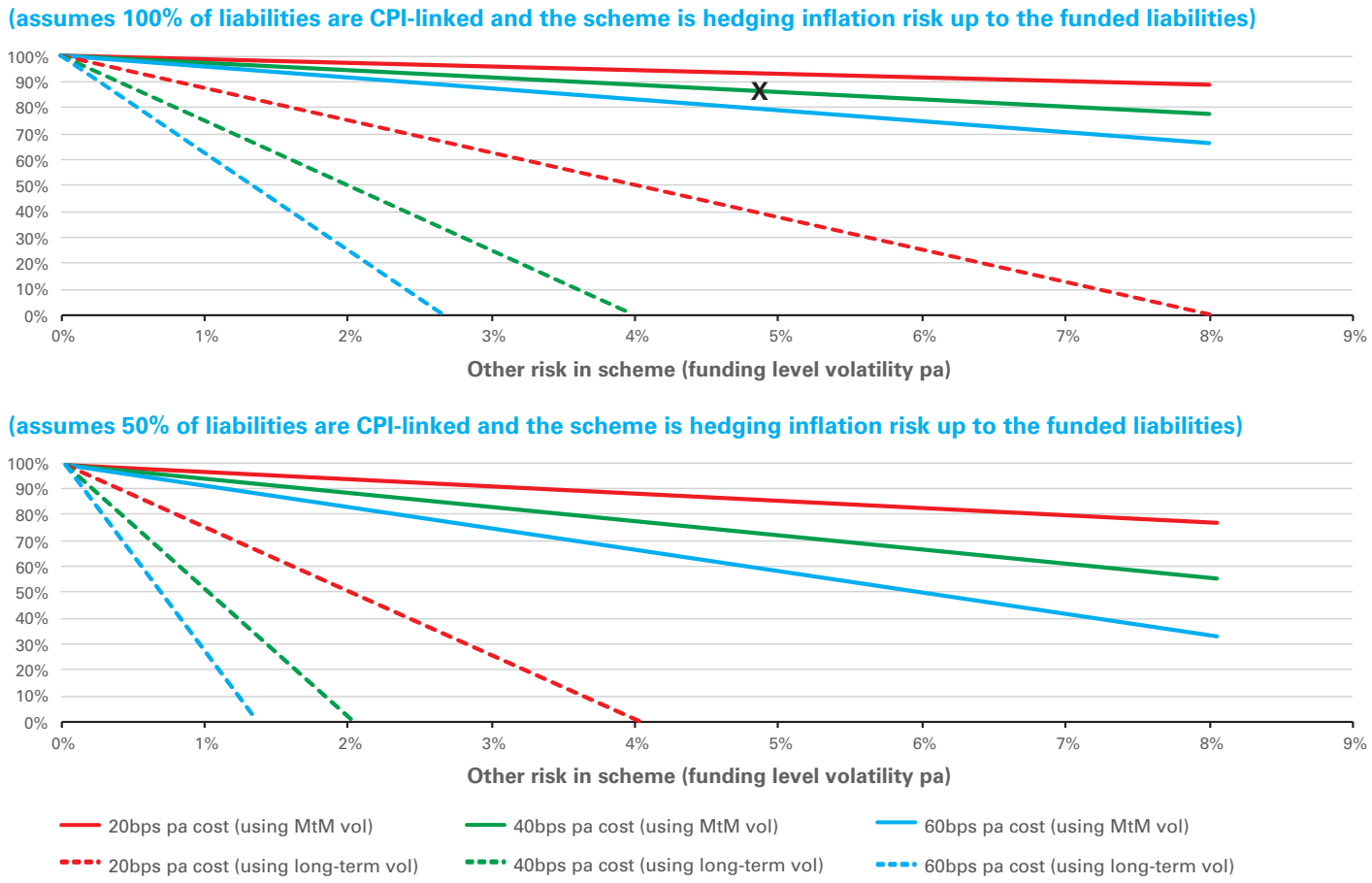
Figure 3: Recent changes in RPI and CPI swap rates



Source: Bloomberg as at 14 November 2018

8. We note that both changes in breakeven inflation have been less volatile recently than we would expect so using only recent data produces lower estimates for mark-to-market volatility for both inflation and the wedge

Figure 4: 'Optimal' proportion of hedging instruments to switch to CPI-linked



Source: LGIM calculations.

It's interesting how since about 2016 pricing seems to be more continuous, suggesting a significant improvement in liquidity, as well as tending towards 'fairer' value. Most market participants historically viewed the long-term wedge between CPI and RPI as 90bps to 110bps. The Office for Budget Responsibility's (OBR) latest estimate (as at 2015) is 100 bps[9]. With market pricing up to 15 years at around 90bps towards the end of 2018, the tradable price looked fairly close to long-term estimates of value. On this basis, the case for schemes using CPI curves in their valuation is now stronger, given more robust and sensible pricing.

The evolution of how the wedge prices will now be influenced by the recently issued House of Lords report (January 2019), which took the UK Statistics Authority to task for failing to maintain the RPI as a good measure and overstating inflation. The initial market reaction has been for the wedge to narrow, appearing to somewhat price in a 'fix' to RPI. Further moves will play out over a longer time period, as next steps regarding the use of RPI become clearer (the House of Lords report is only a recommendation).

HOW MUCH SHOULD CPI RISK BE HEDGED?

For a quantitative illustration, we consider two schemes that have 50% and 100% CPI-linked liabilities. We consider the proportion of RPI-linked hedging to switch to CPI-linked hedging at some 'cost' relative a fair estimate[10] of the wedge. We built a model[11] that optimises how much to switch to CPI, taking into account the implicit risk appetite of the scheme. We perform this calculation twice: once using the mark-to-market risk of the wedge (assumed to be 6% pa) and once using the long-term wedge risk (assumed to be 2% pa). The results are shown in Figure 4.

To understand what the graphs in Figure 4 mean, it's worth looking at an example. The top graph – which considers a scheme whose liabilities are all CPI-linked – shows that if other funding level risk in the scheme (i.e. not related to

9. https://obr.uk/box/revised-assumption-for-the-long-run-wedge-between-rpi-and-cpi-inflation/
10. We assume, for simplicity, that other scheme risks are uncorrelated with wedge risk.
11. Similar to Black-Litterman

the wedge) is 5% pa, CPI is trading at a 40bps premium to what is perceived as 'fair' value and we are focused on mark-to-market volatility, then the scheme should be looking to hedge 86% of its liabilities using CPI-linked instruments and only 14% with RPI instruments.

Figure 4, reflects several key features:

- The optimal switch to CPI-linked assets is 100% (to back CPI-linked liabilities) if those assets are perceived as fair value
- Even if CPI assets appear 'expensive', some exposure might make sense for highly de-risked schemes that implicitly have a very low appetite for risk. In particular if they are not willing to take any other rewarded risk, it makes sense that they also wouldn't want the risk-return that comes from using cheaper but imperfect RPI instruments. This argument is strengthened by the potential for RPI reform
- A higher price for CPI instruments relative to fair value discourages their use proportionately
- A focus on long-term risk, rather than mark-to-market risk, discourages using CPI-instruments as much (assuming they come at a higher price than fair value) as the long-term impact on risk of using RPI-linked instruments is judged to be lower on an annualised basis
- More 'other' risk in the scheme discourages hedging wedge risk. Funding level volatility from return-seeking assets could be around 5% pa typically, but for more closely matched schemes (which may also allow for credit spreads in their discount basis), the risk could be lower
- A smaller proportion of scheme liability CPI-exposure may be less attractive to hedge (comparing the top graph with the bottom graph)

Scheme specifics are important: in practice, there would be other considerations such as the relative availability of assets and implications for diversification. But in general we believe that clients who are well hedged, exposed to a material amount of CPI risk and enjoy a reasonable governance budget, may be best placed to explore CPI assets in greater detail.

If you would like to discuss this opportunity further or see any bespoke modelling then please speak to your Client Director.

APPENDIX: PRACTICAL CONSIDERATIONS

There are a number of factors to be aware of and consider ahead of any implementation. Some of the key issues are highlighted below.

- Funding implications: the wedge assumed by the scheme actuary for valuation versus what can be traded
- Access via the bond or swap market – as a fledgling market there is limited liquidity in secondary market. We understand that around £10m of inflation risk might come to market in 2019
- CPI corporate bond issuance is also likely to increase in coming years, for example water companies need to increase bills with CPI from 2020
- Suitability for buyout: buy-in/-out providers may not want such swaps
- The bilateral, uncleared nature of CPI swaps
- Politics: RPI is not the flavour of the month, so moving away reduces some tail risk but need to be aware that the market does not have to end up at CPI (e.g. CPIH)
- Changes to liability benchmarks on LDI mandates.