MILLIMAN REPORT

# Setting discount rates under IFRS 17: Getting the job done

## Paper 3: Some practical considerations for reference portfolios

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# Introduction

As discussed in our previous papers in the series, one of the key IFRS 17 principles related to discount rates is that they should reflect the characteristics of the liability cash flows to which they will be applied. “Characteristics” here refers to timing, currency, but also—critically—the liquidity of the underlying insurance contracts.

Different features may influence the liquidity of an insurance contract. These features can be of a contractual nature for example: the extent to which surrenders are allowed and the significance of any associated penalties. Relevant features can also be of a more general nature and define whether discontinuing an insurance contract may be attractive to customers or not. Examples of such features could include the remaining term of a contract, fear of having to be re-underwritten, enjoying a high guaranteed interest rate in the low interest rate environment, the possibility of losing certain tax advantages, and many others. In previous papers, we have already discussed ways to express a quantification of the impact of these features which are likely to drive the level of illiquidity of insurance contracts via two principal factors: exit value and inherent value.

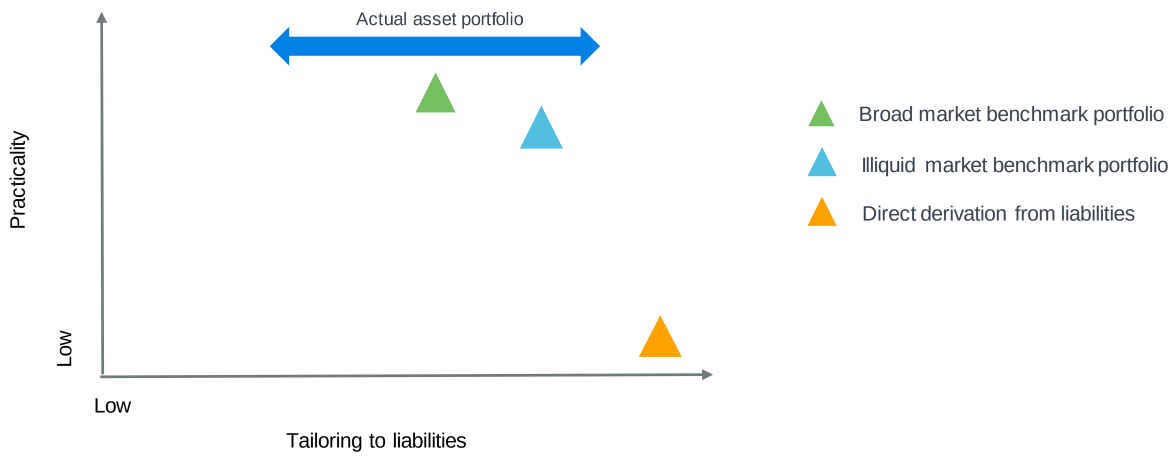
While the tools of exit value and inherent value can provide insights into the relative illiquidity of different insurance contracts, the challenge of quantifying an illiquidity premium remains. IFRS 17 espouses an approach driven by the illiquidity characteristics of the liabilities themselves. However, there is also a requirement to adopt an approach as far as possible informed by and consistent with observable market data. Unfortunately, while blocks of insurance contracts are bought and sold it is difficult to characterise this market as being deep and transparent and it is far from clear to us that there is any robust way to derive an illiquidity premium from such transactions. Consequently, by necessity, we must look to asset markets to provide a measure.

The reality of this has been recognised in other regimes, for example in MCEV as used a decade ago or Solvency II where one would focus on the illiquidity premium earned on assets (using either an actual or reference portfolio) and using an assessment of the illiquidity of the liabilities just to decide how much illiquidity should be attributed in each specific case. Recall two cases:

1. **QIS 5** - An approach considered in the pre-Solvency II QIS 5 exercise in 2010: Liabilities were divided into a few different liability segments with different application ratios (0%, 50%, 75%, and 100%, with 100% applied to annuities and similar products), with an illiquidity premium calculated based on reference assets and provided by the regulator. In this case, there is no direct link between the illiquidity premium calculated and the actual investment strategy of any particular insurer. Thus, whilst adoption of a reasonable and representative reference portfolio provides comfort that the illiquidity premium is **earnable**, the actual illiquidity premium **earned** by an insurer will be different and could be higher or lower. The same conceptual approach was taken forward in the form of the Volatility Adjustment.
2. **Matching Adjustment** – The Solvency II Matching Adjustment can be applied only for products with the strongest illiquidity characteristics (like annuities) and is calculated by estimating the illiquidity premium on the actual assets backing these insurance products. A range of tests are typically applied to verify an adequately close level of matching between the cashflows of the liabilities and backing assets. In this case, the illiquidity premium credited is that which the insurer should be capable of actually earning subject to an acceptable level of risk.

Frustratingly, this still leaves us with a considerable range of possibilities and in Figure 1 we illustrate these considering the dimensions of practicality and the degree of tailoring to the illiquidity of the liabilities.

FIGURE 1: REFERENCE PORTFOLIOS: HIGH LEVEL OPTIONS




We have touched on the advantages and disadvantages of some of these approaches in our earlier papers but, with a focus on practical options, we offer the following observations:

### BROAD MARKET BENCHMARK PORTFOLIO

The use of a broad market benchmark portfolio scores well from a practical perspective as it can be created from traded instruments for which market data is readily available facilitating a relatively easy estimation of the illiquidity premium. However, while the portfolio might represent reasonably accurately the aggregate investment holdings of insurers in a particular market it will not be tailored to the liquidity features of any particular set of liabilities. This is not an insurmountable issue as application ratios can be applied in order to flex the level of credit applied to different books of business. However, if a systematic understatement of the illiquidity premium is to be avoided it will be necessary for some blocks to be assigned an application ratio > 100% and, while this is fine in theory, we question how ready insurers and their auditors might be to accept this extrapolation.

### ILLIQUID MARKET BENCHMARK PORTFOLIO

Adoption of a benchmark portfolio of illiquid assets deemed suitable to back the most illiquid insurance liabilities scores less well from a purely pragmatic perspective, as any such index would need to be constructed. Nevertheless, if an index was generated, either directly by insurers themselves or by an external provider or even a regulator, it could offer a very useful anchor point for the illiquidity premium assessment as a maximum earnable illiquidity premium. To be useful, the index would need to be available for different currencies and for liabilities of different durations.

The broad market benchmark portfolio option is based on the actual assets held by insurers in aggregate and so should naturally embed any constraints around the assets that can be held in practice. It is then natural to consider if the same constraints should be automatically carried across to this approach where the reference portfolio is theoretical. We consider a simple example: In Economy A, annuity providers can invest in any type of government and corporate bonds, without any regulatory constraints. In Economy B, insurers have access to exactly the same pool of assets but the regulator has set out a requirement that 75% of assets must be held in local government bonds, which are very liquid. Let us consider the situation where we have identical annuity products offered in the two economies, having the same illiquidity characteristics from the perspective of an insurance contract. Should the reference portfolios be considered the same, or should the regulatory constraint be reflected in a reference portfolio for Economy B? We might view a reference portfolio from Economy A (based on unfettered asset selection) as providing a benchmark well aligned to the illiquidity of the liabilities. However, in Economy B, adoption of such a portfolio will result in an illiquidity premium higher than that which can be earned in practice. The result will be to value the illiquid liabilities in Economy B using a discount rate that contemplates a return that insurers cannot possibly earn. In the case just considered, the constraint was a systemic one—imposed by a regulator and applying to all firms in the market. Other constraints may also arise which are more idiosyncratic in nature applying differently to individual insurers.

Without adjustments, measures based on actual portfolios will embed both types of constraint. On the other hand, an advantage of a theoretical portfolio approach is that it offers a choice:

1. Reflect no practical constraints at all
2. Reflect both systemic and idiosyncratic practical constraints
3. Reflect only systemic practical constraints

We accept that a case could be made for all three approaches, though the authors' sense is that Option 3 strikes a reasonable compromise, retaining a focus on what it is practically possible to earn but without reflecting the specific influences and circumstances of individual firms. Essentially, the maximum practically earnable illiquidity premium used to value the liabilities is set by asset markets with the actual outcome (the earned illiquidity premium) driven by each insurer's asset strategy.

A further advantage of the approach is that it sets a benchmark at the illiquid end and so should avoid the need to contemplate application ratios > 100%.

### ACTUAL ASSET PORTFOLIO

The first point to note is that use of the insurer's actual asset holdings can follow either of the previous approaches, that is:

- Be based on the insurer's entire investment portfolio
- Comprise a subset of the insurer's assets, hypothecated to match a specific block (or blocks) of business

The broad portfolio approach certainly has appeal from a pragmatic perspective as it avoids the need to undertake any hypothecation of the assets. The downside is the acceptance of what may be a lower overall illiquidity premium or the use of application ratios that may be well in excess of 100% for some lines of business.

We appreciate that hypothecation of asset holdings to a specific block (or blocks) of business can be a non-trivial task if the insurer does not already manage the business this way. A pragmatic approach might focus attention on the most illiquid block of liabilities held and define a sub-portfolio of assets deemed suitable for supporting those. The quantified illiquidity premium, from the sub-portfolio, then provides the upper-end reference point enabling the results for other, more liquid blocks of business to be set relative to this using an application ratio. Clearly, this approach works best for insurers that have at least some liabilities they would classify as highly illiquid and reminds us once again that there is no "one size fits all" solution.

While scoring well in terms of practicality, the degree to which the result is closely aligned to the underlying illiquidity of the liabilities is open to variation as it depends on the investment strategy of each individual insurer. At one end of the spectrum we have insurers with significant resources to source and manage a wide range of illiquid assets to create highly bespoke portfolios offering scope to capture the liability features very closely. At the other end we may have insurers who are more constrained and adopt a far more plain vanilla approach, possibly involving only government and investment-grade corporate bonds resulting in a portfolio that is perhaps significantly more liquid than the liabilities.

Nevertheless, if sophisticated approaches delivered something approaching a consensus over the level of the illiquidity premium for similar blocks of illiquid liabilities then we might have the makings of a very useful benchmark -> essentially a maximum practically earnable illiquidity premium. Unfortunately, experience to date with the Matching Adjustment in the UK shows significant variation between insurers with results typically ranging from around 50 bps to 150 bps.

### WHAT ABOUT THE RISK?

The discussion so far has considered ways to determine a reference portfolio of assets that aligns well to the features of the underlying liabilities—currency, timing, and liquidity. However, we have yet to consider the degree to which any illiquidity premium derived from such a portfolio is subject to risk.

Structural models clearly show that the illiquidity premium for corporate bonds increases with the credit spread and has higher values for the lowest credit ratings like “CCC.” Does it mean that for the most illiquid liabilities, like annuities, the reference portfolios should include high-yield bonds? The issue with high-yield bonds is that the illiquidity premium cannot be harvested without taking significant credit risk.

Recall that any illiquidity premium added to the discount rate used to value the liabilities is being “banked” in advance. Recall also that the illiquidity premium is being added to a risk-free rate, i.e., a return that insurers should be able to earn without risk. In light of this, it feels entirely reasonable to determine that any illiquidity premium included in the discount rate should be capable of being earned in a relatively risk-free way.

Of course, there is no unique approach to this and insurers may take different views on the range of instruments included and the mechanisms used to mitigate credit risk. For example, a possible criterion is the existence of credit default swap (CDS) protection for the considered issuers with broadly similar maturities or the practical accessibility of other ways to mitigate credit risk, e.g., via strong collateralisation. Such an approach would naturally exclude instruments whose embedded credit risk cannot be readily mitigated to a level the insurer is comfortable with.

While this type of constraint would be easy to apply for theoretical reference portfolios, insurers applying approaches based on their own investment strategies should also consider it. This means that whenever insurers opt for riskier investment strategies with exposures difficult to de-risk, e.g., high-yield bonds, they should consider adjusting their portfolio for the purpose of the illiquidity premium calculation by replacing any such exposures with alternatives that can be reasonably de-risked.

To be clear, nothing here should prevent insurers pursuing reasonable investment strategies subject to the usual constraints of good governance, risk appetite, and regulation. Where additional credit risk is accepted the results will be simply that the illiquidity premium actually earned turns out to be higher (or lower) than that embedded into the liability discount rate with the differences emerging into the IFRS 17 results over time.

## A simple case study

Let us consider a simple case where the liabilities held by the insurance company can be classified into three blocks, 1, 2, and 3, backed by the actual asset portfolio of the insurer. Let us also assume the work of classifying liability blocks in terms of their degree of liquidity has been already performed, so that liability 1 (resp. liability 3) constitutes the most illiquid (resp. liquid) block held by the insurance company. Furthermore, let us consider that the insurer actually does not hold the most illiquid contracts existing on the market, so that one could find another liability block, denoted A, as the most illiquid block of the insurance liability spectrum.

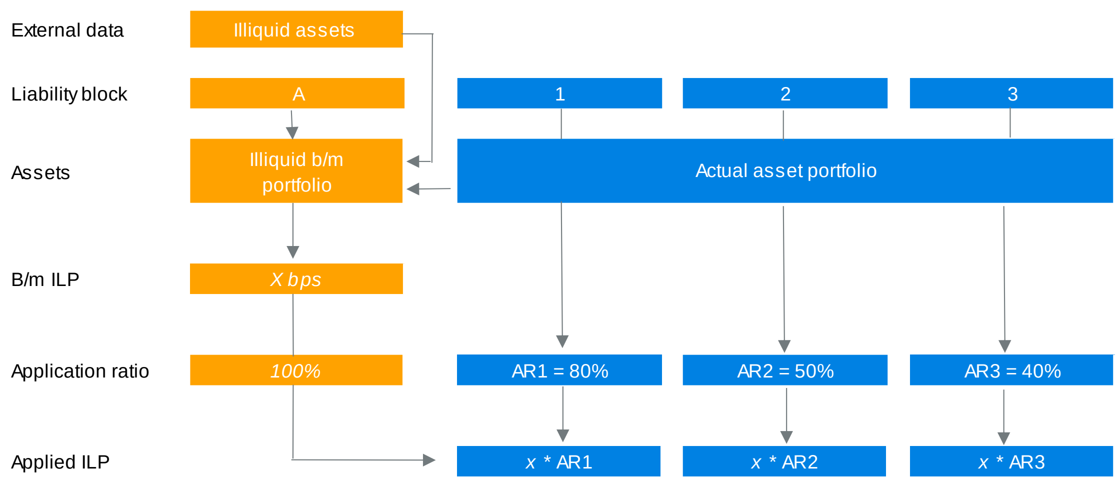
Following the “Illiquid benchmark portfolio” method described above, one practical approach to compute the illiquidity premium of each liability block, 1, 2, and 3, would be to:

1. Determine the illiquidity premium $x$ associated with the most illiquid liability block A.
2. Express the illiquidity of the liability blocks 1, 2 and 3 actually held as a combination of $x$ and an application ratio.[1]

[1] Please refer to our earlier paper (https://www.milliman.com/en/insight/Setting-discount-rates-under-IFRS-17-Getting-the-job-done-Paper-2-Setting-the-approach) for an explanation of how application ratios can be determined via a stress testing approach.

We illustrate this approach to calculation of the illiquidity premium (ILP) in Figure 2:

**FIGURE 2: EXAMPLE ILP CALCULATION APPROACH**




The first step is to determine the reference portfolio associated with liability block A. As already discussed, this could be constructed by the selection of suitable assets the insurer already holds. This approach would ensure the reference portfolio remains linked to the actual insurer portfolio. Nevertheless, as our example insurer does not actually have exposure to the most illiquid type of insurance liabilities it may be the case that the existing portfolio does not contain a sufficiently rich set of candidate illiquid assets to support a robust calculation of $x$. In that event, existing assets might be supplemented with others not actually held or the entire calculation of $x$ drawn from an external source.

In order to illustrate this framework, let us consider a simple example assuming we know the characteristics of the most illiquid liability block A.

## DESCRIPTION OF LIABILITY BLOCK A[2]

- Simple contract with a single premium paying the maximum of a return of premium and a % of the upside return on a broad equity market index after 10 years
- Benefit available only at maturity, no surrender value available
- Hence, this is a very illiquid liability
- Denominated in EUR

## IDENTIFICATION OF THE REFERENCE PORTFOLIO

In this section, we discuss the determination of the reference portfolio associated with liability block A.

The construction of a replicating portfolio is an established technique within the insurance industry. Such approaches can provide a useful starting point for the generation of the illiquid benchmark portfolio expressing the value of the liabilities in terms of a portfolio of financial instruments with the same characteristics in terms of the volume, timing, and currency of the cash-flows. Historically, since insurance applications have focused on ease of valuation and hedging, replicating portfolios usually use a combination of simple assets like zero coupon bonds or vanilla options (swaptions, puts, …). As a result, insurance replicating portfolios generally rely on liquid instruments with readily available mark-to-market valuations.

[2] We have used a deliberately simplified liability for ease of illustration. In reality, the benchmark illiquid liabilities in Block A are likely to comprise annuities in payment or similar exposures.

For the purpose of discussion, let us consider that the calibration of a replicating portfolio associated with our liability block A led to the following simple portfolio:

**Replicating portfolio = 10- year risk-free bond + 10-year European call option**

Recall that we aim at estimating the illiquidity premium of a very illiquid liability block. This example shows that, while the replicating portfolio is helpful in showing us the form of the matching financial instruments, it will not directly deliver us the ILP. So taking each component of the replicating portfolio in turn:

- The computation of the illiquidity premium of the embedded option is not straightforward. In fact, the pricing of such assets is not expected to consider an illiquidity premium explicitly and it may be challenging to estimate it. As a practical simplification, if the value of the embedded guarantee replicated by the option is a small proportion of the overall BEL, one could treat it like an equity asset with a zero illiquidity premium contribution.
- Looking now at the bond asset, we need to select an illiquid asset(s) with due regard for pragmatic constraints such as duration, currency, and credit risk in order to determine the reference portfolio. Our insurer finds its asset portfolio already contains a BBB rated corporate bond and establishes that closely matched CDS protection is available in the market to mitigate the credit risk. Our insurer considers both its own holdings and external data and concludes that this bond is the most illiquid asset available whilst meeting its selection criteria. Unfortunately, the longest duration bond available is only eight years, leaving our insurer short in terms of matching the 10-year duration of the illiquid benchmark liability.

The situation described above, where it is not possible to construct a completely matching set of highly illiquid assets, is likely to arise in practical applications. There is no single approach to address this scenario but we consider below two possibilities that we feel reside at the relatively conservative end of the spectrum in that they do not assume future reinvestment opportunities into illiquid assets or extrapolation of the ILP beyond currently observable data.

### Match Duration

The insurer starts to explore progressively more liquid assets but those available with longer durations. For simplicity, we assume the only option is to include a risk-free government bond and our insurer selects the longest duration bond consistent with constraints such as there being sufficient traded volume in the market to cover the theoretical investment required. Our insurer concludes the most suitable bond has a duration of 15 years.

Allowing for the above leads to the new reference portfolio for our liability block A aligned to a duration of 10 years as:

**Benchmark illiquid reference portfolio = 15 years risk-free bond (weight 30%)**
**+ 8 years BBB corporate bond (weight 70%)**

Based on this illiquid benchmark portfolio our insurer computes $x$ as:

**$x$ = 30% * 0 bps (ILP on risk-free bond) + 70% * 50 bps (ILP on corporate bond net of CDS protection) = 35 bps**

The ILP to be applied to each of liability blocks 1–3 can then be determined via an application ratio applied to $x$:

- Liability block 1 (duration 10, EUR) = 80% * 35 bps = 28 bps
- Liability block 2 (duration 10, EUR) = 50% * 35 bps = 17.5 bps
- Liability block 3 (duration 10, EUR) = 40% * 35 bps = 14 bps

Note that the process described above would need to be considered for liabilities of different durations and currencies with the reference portfolio refreshed at each valuation date in order to optimise the ILP available. Returning to our example above, after two years have passed, the duration of our liability has reduced to eight years and it may now be feasible to match this entirely using an illiquid BBB corporate bond, eliminating the ILP dilution arising from inclusion of the government bond.

### Pro-rata Credit

An alternative approach would be to match our illiquid liability as best we can with illiquid assets and then apply a haircut to allow for the inability to fully match the liability duration. The haircut could be calculated as the ratio of the duration of the available illiquid assets / duration of the illiquid liabilities. In our example, this approach would result in a reference portfolio comprised solely of the eight-year BBB corporate bond. The pro rata factor would be 80% (8/10) resulting in $x$ being set at the higher value of 40 bps (80% * 50 bps).

This approach is simpler in that it avoids the need to consider explicitly the assets required to bridge the gap to the duration of the liabilities. However, this “shortcut” can open up the risk that the ILP calculated exceeds the maximum earnable in practice.

Returning for the final time to our example, using the “Match Duration” approach, we need a risk-free bond of 18 years duration to shift the weights to be 20% risk-free bond and 80% BBB corporate and generate the same ILP as the “Pro rata Credit” method. However, we noted earlier that a 15-year risk-free bond was the longest suitable bond available in our theoretical market. The “Match Duration” approach recognises this constraint and limits the ILP credit accordingly while the “Pro-rata Credit” approach includes an additional 5 bps in the ILP that our insurer seems unlikely to be able to earn in practice.

## Summary

The principles-based approach adopted by IFRS 17 is both a blessing and a curse. Even the simple examples we have considered in our series of papers illustrate that there are choices of approach in setting most components of the overall IFRS 17 discount rate. This might seem a little overwhelming but insurers are now increasingly used to dealing with principles-based regulation and with some up-front investment in laying out the insurer’s own guiding principles, priorities, and constraints we feel the benefits of flexibility and adaptation can readily become the dominant factor.



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