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Setting ‘bottom-up’ discount rates under IFRS 17 for General Insurers

A collaboration between IFRS 17 for General Insurers working party and IFRS 17- Future of Discount Rates working Party

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Contents

Introduction

The aim of this paper is to present the challenges and provide practical implementation suggestions related to determining IFRS 17 discount curves for the 'bottom-up' approach which is likely to be applicable to the majority of General Insurance liability cashflows[1]. For the purposes of this note, General Insurance cashflows are assumed to be short-to medium duration and do not vary based on the returns on any underlying items.

In simple terms, under the 'bottom-up' approach requires both (a) a risk-free discount curve and (b) an adjustment for liquidity to discount insurance cashflows. On paper, this may appear to be relatively simple; however, there are a number of different technical elements that need to be considered. A process for estimating an IFRS 17 discount curve on a bottom-up basis is illustrated in the following diagram.

Each step of this process is discussed further below. Section A discusses the derivation of the risk-free rates with Section B discussing the remaining considerations. Multiple iterations of this process may be required depending on both the characteristics of the (re)insurance contract cashflows and accounting policy decisions specific to the entity. For example, if an entity has (re)insurance contract cashflows denominated in USD and EUR, both an IFRS 17 USD and an IFRS 17 EUR discount curve may be required.

Background: IFRS 17 Standard on the 'bottom-up' approach

As per IFRS 17 Insurance Contracts (with Amendments as per June 2020), the standard requires that the IFRS 17 discount curves using the 'bottom-up' approach are calculated in line with the following principles.

***Paragraph B78**: Discount rates shall include only relevant factors, i.e. factors that arise from the time value of money, the characteristics of the cash flows and the liquidity characteristics of the insurance contracts. Such discount rates may not be directly observable in the market. Hence, when observable market rates for an instrument with the same characteristics are not available, or observable market rates for similar instruments are available but do not separately identify the factors that distinguish the instrument from the insurance contracts, an entity shall estimate the appropriate rates. IFRS 17 does not require a particular estimation technique for determining discount rates. In applying an estimation technique, an entity shall:*

(a) Maximise the use of observable inputs and reflect all reasonable and supportable information on non-market variables available without undue cost or effort, both external and internal. (…)

[1] Some of the approaches presented in this note may be applicable to Life Insurance cashflows as well.

(b) Reflect current market conditions from the perspective of a market participant.
(c) Exercise judgement to assess the degree of similarity between the features of the insurance contracts being measured and the features of the instrument for which observable market prices are available and adjust those prices to reflect the differences between them. (…)

***Paragraph B79**: (...) the discount rate reflects the yield curve in the appropriate currency for instruments that expose the holder to no or negligible credit risk, adjusted to reflect the liquidity characteristics of the group of insurance contracts. (…)*

***Paragraph B80**: (…) an entity may determine discount rates by adjusting a liquid risk-free yield curve to reflect the differences between the liquidity characteristics of the financial instruments that underlie the rates observed in the market and the liquidity characteristics of the insurance contracts (a bottom-up approach).*

***Paragraph B82**: In estimating the yield curve:*
(a) if there are observable market prices in active markets for assets in the reference portfolio, an entity shall use those prices
(b) if a market is not active, an entity shall adjust observable market prices for similar assets to make them comparable to market prices for the assets being measured
(c) if there is no market for assets in the reference portfolio, an entity shall apply an estimation technique. For such assets an entity shall:
(i) develop unobservable inputs using the best information available in the circumstances. Such inputs might include the entity's own data and, in the context of IFRS 17, the entity might place more weight on long-term estimates than on short-term fluctuations; and
(ii) adjust those data to reflect all information about market participant assumptions that is reasonably available.

***Paragraph B85**: IFRS 17 does not specify restrictions on the reference portfolio of assets. However, fewer adjustments would be required to eliminate factors that are not relevant to the insurance contracts when the reference portfolio of assets has similar characteristics. For example, if the cashflows from the insurance contracts do not vary based on the returns on underlying items, fewer adjustments would be required if an entity used debt instruments as a starting point rather than equity instruments. For debt instruments, the objective would be to eliminate from the total bond yield the effect of credit risk and other factors that are not relevant to the insurance contracts. One way to estimate the effect of credit risk is to use the market price of a credit derivative as a reference point.*

Section A: Derivation of risk-free rates

The first decision point is how to derive or select appropriate risk-free rates. Risk-free rates can be set with reference to either interest rate swaps or government bonds.

Risk-free rates based on interest rate swaps

Interest rate swaps are often liquid and available for a large range of currencies and maturities so therefore can be a good starting point for risk-free rates. With this approach, there may be an opportunity to leverage the risk-free curves published by European Insurance and Occupational Pensions Authority (EIOPA); aligning the risk-free rates using for both IFRS 17 and Solvency II purposes[2]. However, there are both operational and technical considerations associated with leveraging the EIOPA process:

<table>
<tr><th>Operational considerations</th><th>Technical considerations</th></tr>
<tr><td>(1) Risk-free rates are available on a monthly basis from EIOPA; however, the publication schedule may not be compatible with internal reporting deadlines. The recalculation of risk-free rates is achievable but it increases the operational burden.
The assessment of a deep and liquid market for swaps is done by EIOPA on an annual basis. Insurers might have to perform a similar assessment for government and corporate bond markets.</td><td>(4) A credit risk adjustment, which reflects the counterparty risk of interest rate swaps, is estimated by EIOPA and is deducted from the observed swap rates, for maturities up to the last liquid point.
Under IFRS 17 this approach is not prescribed, and so other approaches may be preferred.</td></tr>
<tr><td>(2) Risk-free rates are available for a wide range of currencies therefore a single consistent source could be used for all currencies required.</td><td rowspan="2">(5) Insurers are free to choose any valid methodology for extrapolating risk-free rates. EIOPA extrapolates risk-free rates, using the Smith–Wilson[3] method, which incorporates an estimation of the Ultimate Forward Rate.
Under IFRS 17 the estimation and the incorporation of a UFR is not required, particularly for short-to-medium cashflows, but it may be acceptable.</td></tr>
<tr><td>(3) Adopting this approach links a company’s IFRS 17 reporting to EIOPA’s methodology; therefore, any future changes to EIOPA’s methodology will impact the financial results under IFRS 17.</td></tr>
</table>

Other alternative methodologies, including International Capital Standard[4], exist for the estimation of risk-free rates. According to ICS, the discounting approach is split in 3 segments:

- Segment 1: Discount rates are set based on yields from swaps (or government bonds) up to Last Observed Term, after removing credit risk.
- Segment 2: Discount rates are extrapolated using the Smith-Wilson method.
- Segment 3: Discount rates converge to a stable Long-Term Forward Rate.

At the time of writing, risk free rates based on ICS approach are not published on a monthly basis. If an entity elects to leverage sources such as EIOPA or ICS, the entity may need to evidence how such sources are compliant with the requirements of IFRS 17.

[2] An alternative source is the Bermudian Monetary Authority (BMA) which publishes monthly risk-free rates including a illiquidity premium adjustment.

[3] Yield Curve Extrapolation Methods, Society of Actuaries , March 2019. Available at : https://www.soa.org/globalassets/assets/files/resources/research-report/2019/yield-curve-report.pdf

[4] Instructions for the April 2019 Quantitative Data Collection Exercise of the Field Testing Project. Available at : https://www.iaisweb.org/page/supervisory-material/insurance-capital-standard

Risk-free rates based on government bonds

An alternative option is to derive the risk-free rates based on a reference portfolio of government bonds. The first step could be the assessment of the relevant bond market liquidity. The assessment criteria include the availability of bonds in the relevant market, the size of bid-offer spread as well as the trade frequency and volume. If the relevant bond market is not liquid or not active enough, insurers may consider using the options available in Paragraph B82 for deriving bond market prices.

Second, a risk premium including credit and liquidity risk should be deducted from the portfolio's yield to maturity (see Paragraph B79 and Section B). It is worth noting that the credit risk of government bonds is dependent on country's credit rating and that credit and liquidity risks are correlated[5]. The liquidity risk premium can be assumed to be negligible for highly rated government bonds (e.g. AAA – AA). The risk-free rates are extrapolated to estimate a full risk-free discount curve for cashflows at all time periods. Well known methods such as Smith–Wilson[5] and Nelson–Siegel[6] may be used to extrapolate risk-free rates.

Section B: Derivation of liquidity risk premium

An approach to determine the liquidity risk premium is as follows:

Liquidity risk premium = yield to maturity on a reference portfolio – risk free rate – credit risk premium

There are several decision points implicit within this formula; firstly, selecting your reference portfolio and secondly calculating the adjustment for credit risk premium. Each of these are discussed in turn below.

1. Selection of reference portfolio based on the liquidity profile of the underlying cashflows

In general terms, 'liquidity' refers to the ability to convert an asset into cash. According to IFRS 17, liquidity is assessed from the perspective of the contract's features. As a result, the characteristics of general insurance contracts which affect liquidity need to be considered.

Liability for remaining coverage vs Liability for incurred claims

The policyholder is usually able to lapse a GI contract at any time without any lapse penalties. An example of a lapse penalty would be not returning premium paid in advanced to the policyholder. This implies that the liability for remaining coverage is liquid. Under the Premium Allocation Approach, liabilities for remaining coverage may not be discounted at all, provided that the coverage period is one year or less and that there is no significant investment, service or other non-insurance component.

Conversely, policyholders are generally unable to convert the value of incurred claims into cash earlier than the corresponding settlement date. This implies that short to medium-term cashflows

[5] Yield Curve Extrapolation Methods, Society of Actuaries, March 2019. Available at : https://www.soa.org/globalassets/assets/files/resources/research-report/2019/yield-curve-report.pdf

[6] Nelson, C. R., & Siegel, A. F. (1987). Parsimonious modeling of yield curves. Journal of Business, 473-489.

relating to incurred claims are not very liquid. Similarly, long-term cashflows arising from Periodic Payment Orders (PPOs) are not very liquid.

Reinsurance recoveries

In terms of the IFRS 17 standard, the liquidity profile of reinsurance recoveries is assessed independently. In this note we cover liquidity from the perspective of the insurer (i.e. the entity with the 'reinsurance contract held'). The following factors are expected to affect the estimation of ultimate claims reinsured and implicitly the liquidity profile of a reinsurance contract:

- Termination clauses. In-force reinsurance contracts include a 'termination clause', which describes a non-exhaustive list of events which could result in a reinsurance contract termination by either insurer or reinsurer. The bigger the list of events upon which reinsurance contracts can be terminated, the more liquid the reinsurance recoveries are.
- The line of business. For example, Third Party Liability claims are expected to have longer settlement period compared to Property claims. The settlement of a portfolio of Property claims may be quicker and therefore reinsurance recoveries are more liquid.
- Type of claims. For example, the calculation of the settlement amount for judicial claims, latent claims as well as PPOs is more uncertain. Therefore, for these types of claims, the process is likely to be lengthier and more complicated, so reinsurance recoveries are less liquid. It is worth noting that for settling historical open claims complex and lengthy processes, such as a commutation, might have to be followed. This also implies that reinsurance recoveries have low liquidity.
- 'Claims made' vs 'Claims occurring' basis. Treaties on 'Claims made' basis restrict reinsurers' exposure to latent claims compared to treaties on 'Claims occurring' basis. Therefore, for contracts written on 'Claims occurring' basis, the process is likely to be lengthier and more complicated, so reinsurance recoveries are less liquid.

If the liquidity profiles of liability for incurred claims and reinsurance recoveries are similar, then the same discount curve could be used to discount the gross liability cash flows and the reinsurance asset cash flows.

Asset allocation of the reference portfolio

In general terms, it is reasonable to assume that publicly traded bonds have better liquidity profile than insurance cashflows. This is taken into account in the asset allocation of the reference portfolio[7]. Even though IFRS 17 does not specify restrictions on the reference portfolio of assets (Paragraph B85), a consideration could be to link the asset mix to the liquidity profile of the cashflows; in terms of allocation to corporate vs government bonds, duration and currency. The liquidity of the reference portfolio is expected to be similar to that of the insurance cashflows.

In terms of liquidity, government bonds are often more liquid than corporate bonds. The main drivers affecting bonds' liquidity are duration, rating, amount issued, and time to maturity[8]. Better

[7] The use of a reference portfolio is adopted by the Bermudian Monetary Authority. Available at : https://www.bma.bm/viewPDF/documents/2018-12-31-07-01-46-Determination-of-Discount-Rates-for-Economic-Balance-Sheet.pdf

[8] Galliani, C., Petrella, G., Resti, A., & Cazan, F. (2014). The liquidity of corporate and government bonds: drivers and sensitivity to different market conditions. Joint Research Centre Techinical Reports of the European Commision. https://doi. org/10.2788/70146. Javadi, S., & Mollagholamali, M. (2018). Debt market illiquidity and correlated default risk. Finance Research Letters, 26, 266-273.

liquidity is associated with lower duration, large size of bond issue and higher issuer credit rating. The asset allocation of the reference portfolio could be similar to the asset allocation of the actual investment portfolio, but this is not required by the standard.

The liquidity of insurance cashflows is assessed based on the product features of the insurance contract. As such, there is an argument that the liquidity profile of insurance cashflows is not currency specific. For example, the liquidity profile of two identical insurance contracts (and associated cashflows) denominated in different currencies can be considered equivalent. However, asset yields vary across currencies and therefore they affect the values of liquidity adjustments. This is an additional consideration when selecting the reference portfolio.

2. Estimation of credit risk premium

A range of options is available for estimating credit risk premium so that credit risk can be removed from selected reference portfolio in order to derive an estimate of the liquidity premium. These are briefly discussed below, and the key differences are highlighted. The standard does not recommend any particular method for estimating credit risk premia

Option adjusted spreads

The market value of a corporate bond is measured by its yield spread relative to a benchmark[9]. Benchmarks include interest rate swaps or government bonds. A corporate bond's spread is an indication of the relative value of a corporate bond as well as a measure of its credit risk. Option-adjusted spreads reflect the spread of a fixed-income security yield from the risk-free rate, adjusted to take into account options embedded in bonds.[10] Option-adjusted spreads as well as bond yields are available from Bloomberg on a daily basis. Research[11] highlights that credit risk, liquidity risk as well as taxation may affect the size of option-adjusted spreads. This finding implies that option-adjusted spreads may have to be adjusted further in order to reflect the pure credit risk of a corporate bond. As an approximation, the full value of option adjusted spreads could be used as a proxy for credit risk premia.

Credit default swaps spreads

A credit default swap ("CDS") contract is a financial derivative that allows an investor to "swap" or offset his or her credit risk with that of another investor[12]. The CDS spread is the cost as a percentage of the face value of the bond that an investor has to pay in order to buy this derivative. CDS are over the counter (OTC) derivatives and therefore they have their own liquidity risk. This means that CDS spreads may have to be adjusted for their own illiquidity to reflect the pure credit risk of a bond. CDS spreads are available from Bloomberg on a daily basis and according to IFRS 17 they can be used as a 'reference point' for the estimation of credit risk premia.

Credit migration rates and cumulative default rates

[9] Landuyt, G., Choudhry, M., Joannas, D., Pereira, R., & Pienaar, R. (2009). Capital Market Instruments; Analysis and Valuation. Third Edition Palgrave Macmillan. (p. 150)

[10] https://www.investopedia.com/terms/o/optionadjustedspread.asp

[11] Amato, J. D., & Remolona, E. M. (2003). The credit spread puzzle. *BIS Quarterly Review, December*

[12] https://www.investopedia.com/terms/c/creditdefaultswap.asp

Credit migration or credit transitions rates reflect the chance of an entity or a bond to move from a credit rating to another. For example, according to Standard and Poor's, the probability of an AAA government bond to be downgraded to AA in a period of 12 months is 4.25%[13]. A credit downgrade is normally reflected in the bonds' yield, which increases, and market price, which falls.

In case of a default the remaining coupon payments are lost and a small percentage of the capital invested is recovered. A credit risk premium may incorporate the impact of both credit rating downgrades and defaults. An alternative approach is to use rating-specific cumulative default rates, which reflect the expected default risk over a future time horizon, in order to assess the default risk associated with future coupon and principal payments. Under both approaches, the main steps to estimate a credit risk premium are:

i. Estimate the credit loss in monetary amount, based on estimates for the probability of default, loss given default and exposure at default
ii. Convert the credit loss from monetary amount to a risk premium (%)

Credit migration rates and cumulative default rates are estimated from historical data and are available by rating agencies on an annual basis.

Structural models

Structural models, such as the Merton model[14], can be used to infer the probability of default of a bond by valuing a put option written on a firm's assets, where the strike is the face value of debt. Structural models are used for modelling the credit risk of corporate bonds and they require inputs such as implied volatilities from options written on a firm's stock. Corporate bond spreads[15] can be split into expected default losses and non-credit related residual spreads (i.e. liquidity).

In summary, the approaches presented above have both strengths and weaknesses. A key difference is that option-adjusted spreads as well as CDS spreads are quoted daily and therefore are more volatile. Credit migration rates are based on historical data and they are less volatile. However, in certain cases they might be out of touch with current market conditions. Finally, structural models are complicated and difficult to calibrate.

Conclusion

In summary, we present an approach to estimate the bottom up IFRS 17 curve, using an approach based on the yield on a reference portfolio and removing the allowance for credit risk. In this process, several decisions are required to estimate a 'bottom-up' discount curve.

i. Select the basis for estimating risk-free rates (interest rate swaps or government bonds)
ii. Select the extrapolation basis and methodology
iii. Decide on the mix and asset allocation of reference portfolio, taking into account the cashflows' liquidity profile

[13] Sovereign Local Currency Average One-Year Transition Rates (1993-2018). Default, Transition and Recovery: 2018 Annual Sovereign Default And Rating Transition Study. S&P . March 2019.
[14] Merton, R (1974), 'On the pricing of corporate debt: the risk structure of interest rates', Journal of Finance, Vol. 29, pages 449–70.
[15] Webber, L. (2007). Decomposing corporate bond spreads. Bank of England Quarterly Bulletin.

iv. Decide on the methodology for estimating the credit risk premium, which corresponds to the reference portfolio

Given the complexity of this process, insurance companies could consider approaches aimed to simplify the process, if appropriate. Examples could include:

a) Assume that the risk-free rates, based on interest rate swaps and estimated by EIOPA, are a good approximation for the IFRS 17 risk-free discount curve with supporting rationale for IFRS 17 compliance.
b) Assume no liquidity risk adjustment is required for risk-free rates based on highly rated government bonds (i.e. AAA – AA).
c) Under the Premium Allocation Approach, liabilities for remaining coverage may not be discounted at all, provided there is no significant financing component.
d) Assume a single liquidity premium adjustment as opposed to a liquidity premium curve varying by duration, this could be based on an average duration of the cashflows
e) Assume that different liquidity characteristics of cashflows can be approximated by different [i]proportions of a single liquidity premium. For instance, a full illiquidity premium can be considered appropriate for illiquid cashflows whereas a proportion of the illiquidity premium (e.g. 50%) can be considered appropriate for more liquid cashflows.

   Points (d) and (e) are not examined in this note and will be subject to forthcoming papers.

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