Considerations for LIBOR transition and U.S. Variable Annuity Guarantee Valuations

The USD London Interbank Offered Rate (LIBOR) is likely to be discontinued in the next few years.[1] In response to concerns about market manipulation as well as a continued decline in the degree to which banks fund themselves in the London interbank market, global regulators have selected alternative reference rates to LIBOR. The Alternate Reference Rates Committee (ARRC) has selected the Secured Overnight Financing Rate (SOFR) as the recommended benchmark interest rate to replace LIBOR for U.S. dollars. However, LIBOR is still widely used for fair valuation of liabilities such as variable annuity contracts.

With the LIBOR to SOFR transition under way, it's a good time to survey fair value practices in the U.S. variable annuity market, in general. This paper discusses risk-free curve selection and setting of the discounting spread (over the risk-free rate) for variable annuity fair valuation.

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EVOLUTION OF THE INTEREST RATE MARKETS AND IMPLICATIONS FOR RISK FREE CURVE SELECTION

The "risk-free" term structure of interest rates is a key input in evaluating the cost of the portfolio that will replicate variable annuity (VA) guarantees (hedge cost). It is used for determining the expected growth rates in a risk-neutral world. The expected growth rates should typically align with the implied forward price of derivatives used to hedge the liabilities, which historically followed the swap curve (LIBOR) for most contracts. Thus, using LIBOR as a proxy for the risk-free rate for VA liability risk-neutral valuations was appropriate, at least prior to the LIBOR scandal (Hou & Skeie, 2014). In light of the planned LIBOR discontinuation, insurers are re-evaluating the use of this risk-free rate proxy for determining the cost of VA guarantee hedging. Alternatives could include SOFR, EFFR-based OIS, SOFR with a fallback spread adjustment[2], and U.S. treasury rates.

The Federal Reserve Bank of New York calculates SOFR using transaction information from the Treasury repurchase market. Although the SOFR forward rate curve is still in its infancy, market confidence in SOFR-based derivative instruments has been rising, as seen in the increased number of SOFR-based transactions ("Interest Rate Derivatives: Benchmark Data," 2020). A SOFR forward curve can be constructed by calibrating an interest rate curve that incorporates SOFR-based swap quotes.[3] SOFR's resilience[4] and recent rise in liquidity has made it a strong candidate to serve as the basis for setting risk-free rate assumptions for variable annuity valuations, especially because SOFR is the reference rate chosen by regulators to replace LIBOR for financial instruments.

The 2008 global financial crisis proved that interbank lending rates were actually not risk-free and that significant counterparty risk existed in derivatives transactions; the consequence was the emergence of a new "risk-free" benchmark, the Overnight Indexed Swaps (OIS) rate, derived from the effective federal funds rate (EFFR)[5]. EFFR-based OIS rates have been used for some time as discount rates for derivatives pricing, and it is notable that the EFFR-based OIS curve closely follows the SOFR curve at all tenors (see chart 1). However, more overnight transactions happen in the SOFR-based repurchase markets compared to the EFFR-based federal funds market.

The U.S. treasury yield market has a distinct advantage since it is extremely deep and liquid. Nonetheless, long term treasury rates have a positive spread over both LIBOR and SOFR, which brings into question their appropriateness as a basis for setting truly risk neutral growth assumptions, especially as equity derivative markets have been embracing SOFR as a risk neutral expected growth rate for risk neutral pricing. It is true that there may be some means for accessing/earning treasury spreads within hedge programs; for example, using total return swaps for rate hedging (providing at least a spread in excess of funding rates embedded in these derivatives). However, we would argue that such yield pick-up is most appropriately viewed as an aspect of discount rate assumption setting, as discussed in a section below. This approach is somewhat analogous to the use of a funding spread in derivative markets pricing.

Chart 1: Rate Curves by Tenor as of 9/30/2020

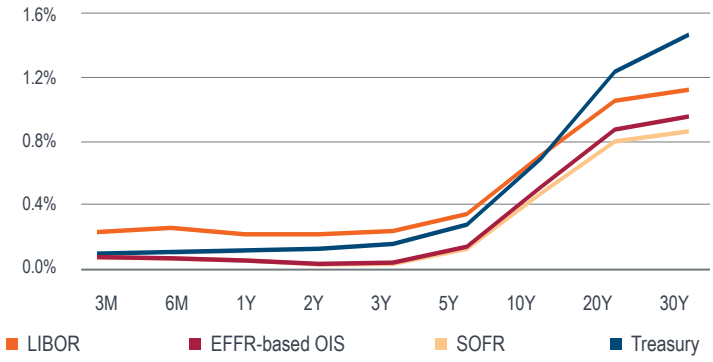


Chart 2: OIS - Treasury Spread

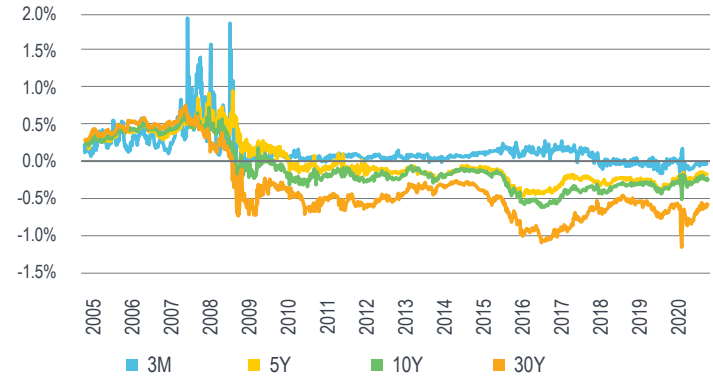
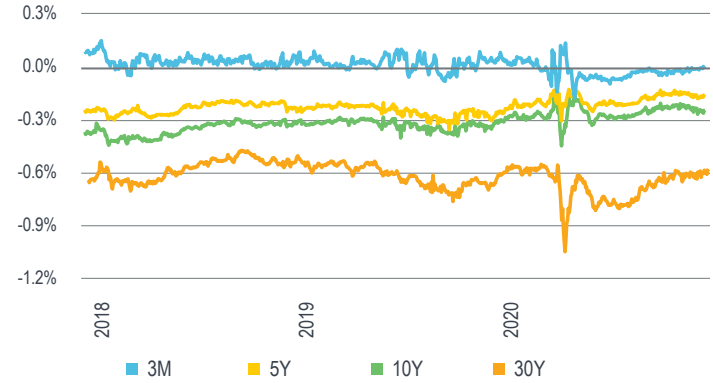


Chart 3: SOFR - Treasury Spread



Data Source: Bloomberg (EFFR-based OIS and LIBOR), Federal Reserve Bank of New York (SOFR) and U.S. Department of the Treasury (Treasury)

FAIR VALUATION PRACTICES WITH RESPECT TO APPROPRIATE DISCOUNT RATES

Insurers are typically able to earn yields on assets that are significantly higher than risk-free rates. There is precedent in fair valuation frameworks for recognizing some of this yield within the discount rates used for fair valuation, in the form of a spread over the risk-free curve. To the extent that risk-free curve assumptions are impacted by the SOFR transition, this will in turn have implications for the selection of the discount rate spread. Companies may consider various criteria when setting the spread, including illiquidity risk, credit risk, and regulatory considerations.

Illiquidity Spread

Illiquidity spreads are quite common amongst insurers. A requirement for earning an illiquidity spread is that assets backing the insurance liabilities can generally be insulated from liquidation pressures, and held either until maturity or until an attractive time of sale. Illiquidity spreads are particularly impactful for variable annuity guarantees backed by substantial asset positions since they may be considerably in the money, such that significant future claims are a virtual certainty. Here, we discuss contexts in which illiquidity spreads in discounting would be applicable.

ACTUARIAL APPRAISALS

There is precedent in actuarial appraisals of variable annuity blocks for recognizing an illiquidity spread in discount rates used for fair valuation. For in-the-money VA guarantees in particular, the asset base can provide increased opportunity to benefit from spread income. Another factor in the materiality of illiquidity premiums is the expected time until claims are paid, with longer time periods providing extra benefit from yield enhancing strategies. That said, before taking credit for illiquidity premiums, companies need to demonstrate the requisite insulation from liquidation pressures.

IMPLICIT APPROACH TO DETERMINING CDHS UNDER VM-21

Statutory financial reporting for variable annuities is conducted in accordance with the VM-21: Requirements for Principle-Based Reserves for Variable Annuities framework. One of the approaches to modeling a Clearly Defined Hedging Strategy (CDHS) is the implicit method ("Cost of Reinsurance" method)[6]. Under this approach, the effectiveness of the current rider hedging strategy on future cash flows is evaluated, in part or in whole, outside of the real world projection of the full product cash flows.

To determine the hedge cash flows implicitly, the company needs to quantify the cost and benefit of hedging. A level of hedge efficiency is assumed to represent how well the underlying hedges can cover the claims and rider fees. The cost of hedging is equated to a "fair value" of the guarantee(s), and is typically amortized over a certain period of time. Because the illiquidity spread plays a pivotal role in determining the discount rates used to calculate liability fair value, changes in the level of the spread can have significant implications on the cost of hedging which, in turn, will affect statutory reserve and capital calculations under VM-21.

ACCOUNTING STANDARDS

Another common area where illiquidity spreads appear is under accounting fair valuations. This is formally supported internationally under the new, soon-to-be-implemented IFRS 17 accounting standard for both earned rate and discounting purposes, and arguably available under the FASB Market Risk Benefit calculation for GAAP Long-Duration Targeted Improvements[7]. The IASB's guidance on IFRS 17 talks at length about the illiquidity premium that should be added to the liquid risk-free rates for discounting insurance liabilities. The degree of illiquidity premium strongly depends on the extent to which the contract holders may redeem their contract value immediately or early with limited penalty or discount. Due to liquidity preferences, a more liquid liability is more valuable than an otherwise identical less liquid one, and therefore should hold a higher value on an insurer's balance sheet. The less liquid a liability, the lower its value should be, which can be effectuated by discounting at a higher interest rate.[8] Existing methodologies for determining these spreads will likely need to be adjusted to reflect changes in the underlying risk-free curve.

Other Sources of Discount Rate Spread

Most major variable annuity writers implement hedging programs to protect their earnings and capital from market movements. Delta hedging protects against equity market movements, while rho hedging protects against interest rate movements. To the extent that treasury spreads may be accessed via rho hedging instruments (net of funding spreads), such as total return swaps, this would play an analogous role to liquidity premium, and could reasonably be reflected as an additional source of yield. As with liquidity spreads, stability of the rho or delta hedge position would be a consideration, as it concerns the ability to "lock in" yield enhancements.

Another source of discounting spread that is sometimes recognized in fair valuation contexts is credit spread. In the context of fair valuation of insurance liabilities, own-credit risk (or nonperformance risk) represents the possibility of a loss due to the company's inability to fulfill its debt obligations. Some companies may elect to set the spread based on their own credit risk, which is determined through analyzing the company's debt, credit default swaps, or institutional products. If these are not readily available or observable, spreads are estimated using instruments from similar companies. Credit spreads may also be

based on probabilities of default of policyholders' claim payment for similarly rated companies.

The swap curve remains a common reference curve for variable annuity liability valuations primarily due to its historical role as a reference rate for valuing hedge assets. The swap rate (LIBOR) is not purely risk-free as it was supposed to represent the rate at which banks would lend to one another; as such, it was traditionally believed to reflect the credit quality of AA-rated banks. Therefore, it may implicitly approximate the risk of default for most companies. Additional spread, if necessary, may be added if companies claim their credit risk is higher.

LIBOR's potential replacement, SOFR, does not include a credit adjustment, and as a result, has historically been lower than LIBOR at all tenors (see chart 1). To minimize valuation discontinuities when the transition occurs, the International Swaps and Derivatives Association (ISDA) has implemented a "fallback spread," which is calculated as the "5-year median difference between the relevant LIBOR and the compounded Risk Free Rate (RFR)" (Feeney, 2020). It is possible that some accounting or regulatory frameworks may permit use of a similar fallback spread in liability valuations, so as to avoid a point-in-time jump in liability valuations (in this case, perhaps in growth rates as well as discount rates).

Several accounting bodies have provided extensive guidance on spread selection for variable annuity fair valuation. For example, FASB's guidance on FAS 157 for variable annuities suggests reflecting a non-performance risk (NPR) adjustment on the base rates. Component parts of non-performance risk include credit risk and liquidity risk, but tend to focus more on the credit risk of the entity holding the insurance liabilities.

SUMMARY

LIBOR is currently widely used and referenced as a proxy for the risk-free curve in variable annuity liability valuations. It is, therefore, evident that the implications of LIBOR discontinuation and transition to SOFR for U.S. variable annuity liability valuations are non-trivial. Companies need to begin thinking about alternatives for the underlying risk-free curve as well as discount rate spreads used for variable annuity fair valuation, if they haven't done so already.

In this paper, we discussed SOFR, EFFR-based OIS, SOFR with a fallback spread adjustment, and treasury rates as potential proxies for the risk-free curve. SOFR is still in its infancy, but liquidity in SOFR-based instruments is increasing rapidly, and new standards for constructing the SOFR curve have been developed. EFFR-based OIS rates have been used as discount rates for derivatives pricing since the 2008 crisis, and the rate levels are proximate to SOFR, but more overnight transactions happen in the SOFR-based repurchase markets compared to the EFFR-based federal funds market. The U.S. treasury market is very deep and liquid, but higher treasury rates compared to their EFFR-based OIS and SOFR counterparts raise concerns about whether treasuries can be viewed as risk free assets for market participants broadly.

Lastly, we also discussed possible spread adjustments for discounting in liability fair valuation. For insurance contracts, due to their long-term nature, the discount rate is one of the most significant variables that affects the calculated value and its behavior over time. Thus, the decision of including a spread on discount rates is an important one, with common practice still evolving. Illiquidity spreads are growing in importance, especially in cases where significant asset portfolios back significantly in-the-money variable annuity blocks, increasing the opportunity to earn spread income insulated from liquidation pressures. This has implications in actuarial appraisal contexts as well as modeling dynamic hedging using the implicit approach under the VM-21 statutory framework. Other spreads that may be applicable to fair valuation of VA guarantees include fallback spreads, funding rates in the derivative markets, and credit spreads; credit spreads in particular may be associated with either a company's own risk of default or an estimate of this risk for similar companies.

FOOTNOTES

1 According to Business Wire (November 30, 2020), ICE Benchmark Administration Limited (IBA) intends to "cease the publication of the one week and two month USD LIBOR settings immediately following the LIBOR publication on December 31, 2021, and the remaining USD LIBOR settings immediately following the LIBOR publication on June 30, 2023."

2 The ISDA fallback spread adjustment, which we discuss later in the paper, is the difference between LIBOR and the underlying risk-free rate.

3 An alternative to using actual swaps is to construct synthetic quotes by combining SOFR basis swap quotes with other non-SOFR swap quotes.

4 SOFR has been said to be more resilient than LIBOR because of the "depth and liquidity of the markets that underlie it" ("Transition from Libor," n.d.).

5 OIS rates, in the US, are indexed to the effective federal funds rate, which in turn tracks the federal funds target rate.

6 The other approach is the explicit method, in which the projected hedge cash flows produced by the hedge program are included within the stochastic model.

7 We say arguable because accounting guidance does not explicitly mention illiquidity premiums or something analogous to it, as something separate from existing accepted spreads like own-credit risk. There is work underway to justify the use of illiquidity spreads for discounting illiquid insurance guarantees, and potentially the earned rate, as well, but such work is very much preliminary.

8 An alternative argument is that insurers can invest in more illiquid assets if their liability is similarly illiquid, and illiquid assets tend to earn a premium relative to liquid assets as compensation for the illiquidity.

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