Considerations for LIBOR transition and U.S. Annuity Valuations

BACKGROUND

In March 2021, regulators on both sides of the Atlantic announced the cessation of various London Interbank Offered Rates (LIBOR) rates. In the case of USD LIBOR ("LIBOR"), publication of LIBOR rates will cease completely as of June 2023. Furthermore, U.S. banking regulators have advised that new financial contracts, including derivatives transactions in particular, may not utilize LIBOR after Dec. 31, 2021, with certain limited exceptions. The UK Financial Conduct Authority (FCA) announcement also triggered the calculation of the spread adjustment that will be added to the new risk-free rates to approximate LIBOR ("IBOR Fallbacks," 2021). This calculation provides economic certainty to market participants as to the alternative fallback rates when LIBOR ceases to exist (The National Law Review, 2021).

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 and is often used for non-variable annuity contracts as well.

With the end of LIBOR and a transition to SOFR under way, it's a good time to survey fair value practices in the U.S. 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. Although this paper largely focuses on U.S. variable annuities, we want to note that the transition will impact fair valuation of other U.S. annuity products such as fixed-indexed and registered index-linked annuities.

LIBOR is currently widely used and referenced as a proxy for the risk-free curve in annuity liability valuations. It is, therefore, evident that there are significant implications of the impending discontinuation of LIBOR and transition to SOFR for U.S. annuity liability valuations. The importance and urgency for reviewing and selecting alternatives for the underlying risk-free curve as well as discount rate spreads used for annuity fair valuation cannot be overstated.

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In this paper, we discuss 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.

Next, we also discuss 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 (and under the VM-22 statutory framework, currently under development, for non-variable annuities, where such applicability may apply to hedge appreciation in the credited rates). 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.

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 annuity 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 have 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 , and U.S. treasury rates.

The Federal Reserve Bank of New York calculates SOFR using transaction information from the Treasury repurchase market. On July 29, 2021, the ARRC officially recommended for usage the forward-looking SOFR term rates published by the CME Group. The roll out in late July of the Commodity Futures Trading Commission (CFTC)'s "SOFR First" initiative, which required financial institutions to switch from LIBOR to SOFR for all linear swap trades in the interdealer market, helped boost volumes in the SOFR marketplace. A SOFR forward curve can be constructed by calibrating an interest rate curve that incorporates SOFR-based swap quotes . SOFR's resilience and the rise in liquidity following the launch of the "SOFR First" initiative has made it a strong candidate to serve as the basis for setting risk-free rate assumptions for annuity valuations, especially because SOFR is the reference rate chosen by regulators to replace LIBOR for usage in derivatives and financial markets.

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) . 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.

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

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). 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.

Similar considerations could apply to registered index-linked annuities already subject to VM-21 and to fixed-indexed annuities which will be subject to VM-22, currently under development, with respect to hedging of the guarantees and appreciation in the credited rates.

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.

Chart 1: Rate Curves by Tenor as of 9/30/2021

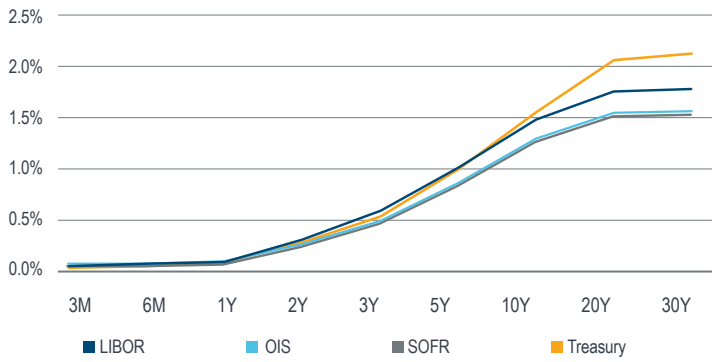


Chart 2: OIS - Treasury Spread

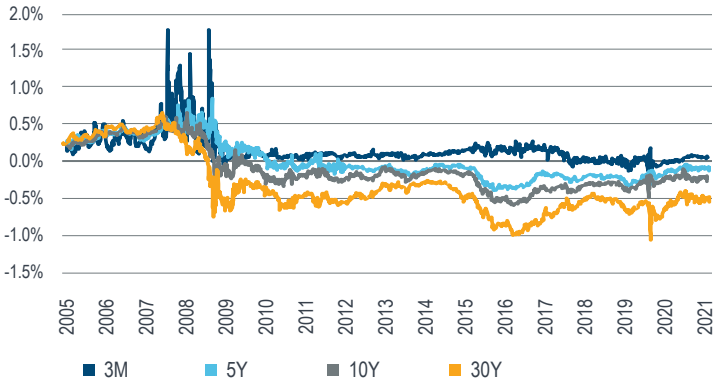
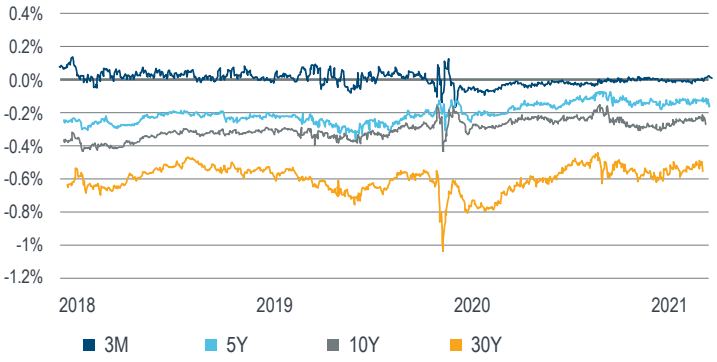


Chart 3: SOFR - Treasury Spread



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

ACCOUNTING STANDARDS

Another common area where illiquidity spreads appear is under the financial reporting of 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 (LDTI). 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. 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 fulfil 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 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 many 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 annuity fair valuation. For example, FASB's guidance on FAS 157 requires reflecting a non-performance risk (NPR) adjustment on the base rates. Component parts of non-performance risk include credit risk and liquidity risk, but it tends to focus more on the credit risk of the entity holding the insurance liabilities.

EMERGING MARKET PRACTICE

As the transition away from LIBOR has continued, there have been three alternative liability fair valuation practices that have come to the forefront in the U.S. marketplace:

1. SOFR
2. SOFR plus Fallback Spread
3. Treasury Curve

SOFR is the Alternate Reference Rates Committee's (ARRC) preferred alternative to LIBOR. The ARRC remains focused on facilitating a smooth transition away from LIBOR, and believes that SOFR is the strongest alternative rate (ARRC, 2021). Although the adoption of SOFR is voluntary, the fact that LIBOR will become unusable soon makes it essential that market participants consider moving to alternative rates such as SOFR and that they have appropriate fallback language in existing contracts referencing LIBOR.

Furthermore, the ARRC has also specified spread adjustments for USD LIBOR to reflect and adjust for the historical differences between LIBOR and SOFR in order to make the spread-adjusted rate comparable to LIBOR in a fair and reasonable way, thereby minimizing the impact to borrowers and lenders. The ARRC performed backtests over the 1999-2019 period to determine an appropriate spread adjustment, and they have determined that SOFR with a static spread adjustment is superior to a dynamic spread adjustment (ARRC, 2021).

The ARRC did not recommend dynamic spread adjustments because these would need to be based on the same wholesale unsecured funding markets that underpin LIBOR and that have now grown to be very thin. In its consultations, the ARRC presented a range of historical data and analysis providing information on how different potential spread methodologies would have performed over different time periods, including an analysis of the mean absolute error (MAE) over 1999-2019. The ARRC demonstrated that a static spread, like the spread adjustment used in fallbacks implemented in ISDA's documentation for derivatives, could produce results that are as, or even more accurate than a potentially dynamic spread (ARRC, 2021).

Meanwhile, other alternative reference rates such as Bloomberg's Short-Term Bank Yield (BSBY) have faced increased scrutiny from the Federal Reserve, US Treasury and Securities and Exchange Commission (SEC). In particular, the SEC chair Gary Gensler stated that he did not believe that BSBY met global standards devised by the International Organization of Securities Commissions (Parsons, 2021).

All current LIBOR-based Interest Rate Swaps will convert to SOFR plus fallback spread when all remaining LIBOR rates cease to be quoted. To the extent that LIBOR was historically representative of derivative market participants' funding costs, the fallback spread may be viewed as a reasonable funding spread proxy going forward, along with ongoing reviews of material changes in funding spreads as reflected in derivative market prices.

By switching to SOFR with a fallback spread, the impact of transitioning away from LIBOR will be reduced from a GAAP reporting standpoint. Given that SOFR is a securitized rate and is typically lower than LIBOR at all tenors (see chart 4), any company that does not incorporate a spread on SOFR will likely experience a large adverse change in the fair value of annuity contracts. Meanwhile, the impact of using a treasury-based curve for discounting will vary depending on the rho profile of each block. This is due to spreads between LIBOR and Treasuries being positive at shorter tenors and negative at longer tenors.

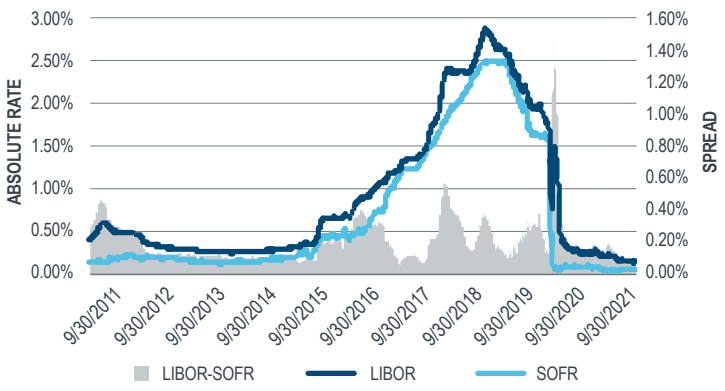
In August 2018, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2018-12 titled *Targeted Improvements to the Accounting for Long-Duration Contracts*, containing its targeted changes to the accounting for long duration insurance contracts. The new standard will require fair valuation for all variable annuities, fixed-indexed annuities, and registered index-linked annuities with riders and guarantees. Any contracts already using fair value will have minimal impact from a yield curve standpoint when using SOFR with a fallback spread as this is an excellent proxy for LIBOR. Any products using SOP 03-1 for purposes of valuing riders and guarantees will need to switch to fair value and deal with associated impacts; however, this will cause a valuation impact regardless of which curve is used for discounting.

Treasury-based Total Return Swaps (TRS) are a potential alternative to SOFR swaps for duration hedging; however, executing Total Return Swaps (TRS) on Treasuries or other fixed income indices are over-the-counter derivatives transactions that require additional legal documentation, and the process is not as seamless and simple as it can be for cleared SOFR Interest Rate Swaps (IRS). Furthermore, hedging costs using TRS can vary based on balance sheet capacity, changes in bank capital regulations and other capital constraints, which can also impact liquidity and cost, especially at year-end or during periods of market stress. Exchange-traded Treasury futures can provide an easier alternative to Treasury TRS from a documentation and liquidity standpoint, but come with their own idiosyncrasies including the cheapest-to-deliver (CTD) and the need to roll contracts with attendant costs.

Given the various factors discussed above including liquidity, cost, reduced counterparty risk, and market and regulatory preference for SOFR swaps as the tool for duration hedging, along with better alignment with the transitional impact of the ISDA fallback protocol and procedures, "SOFR with Fallback Spread" may emerge as the preferred LIBOR replacement for U.S. annuity financial reporting and hedging. At the same time, some companies have selected the Treasury curve, while others have chosen SOFR without the fallback spread as a successor to LIBOR for various reasons including their particular accounting and regulatory perspectives, and views about cost and liquidity.

As the SOFR market and interest rate derivatives markets in general evolve, Milliman will continue to evaluate the implications for rate and spread selection methodologies, and hedge instrument selection for the annuity industry.

Chart 4: Historical 3M LIBOR vs SOFR



Data Source: Bloomberg

FOOTNOTES

1 The ISDA fallback spread adjustment, which we discuss later in the paper, is a historical median over a five-year lookback period, calculated as the difference between LIBOR and the underlying risk-free rate.

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

3 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.).

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

5 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.

6 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.

7 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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