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Life after LIBOR

In all likelihood, the reporting banks, regulators and administrators that produce the London Interbank Offered Rate (LIBOR) will stop doing so at, or shortly after, the end of 2021. In this paper, we discuss why LIBOR is no longer considered fit for its original purpose, and the progress regulators are making toward finding a replacement. We conclude by addressing what investors need to know about how this transition is likely to affect both legacy and newly issued financial instruments that require a reference rate.

Executive Summary

- The London Interbank Offered Rate (LIBOR) is one of the most important interest rates in the world, and is referenced by approximately $240 trillion worth of financial products, across seven different currencies, according to Oliver Wyman. Nonetheless, the Financial Conduct Authority (FCA), the U.K. regulator that oversees its production, has announced its intention to stop compelling banks to provide their estimates for the rate at the end of 2021.
- In 2013, the G20 asked the Financial Stability Board (FSB) to review and reform major reference rates such as LIBOR, which is no longer considered a suitable reference rate for a number of reasons.
- As part of that effort, regulators in various jurisdictions have selected alternative reference rates to LIBOR. In this paper, we focus on U.S. regulators' selection of the Secured Overnight Financing Rate (SOFR).
- Unlike LIBOR, SOFR is a nearly risk-free rate. It is based on market transactions in the most liquid rates market in the world, covers multiple segments of the U.S. repo market and reflects the activity of a wide array of market participants.
- The plan to transition from LIBOR to SOFR is laid out in a detailed timeline provided by the U.S.'s Alternative Reference Rates Committee (ARRC).
- The end of the LIBOR era should not be a "Black Swan" event, but rather one that market participants should assume to be likely after the end of 2021, and therefore should begin preparing for today.

In a July 2017 speech, Andrew Bailey, the CEO of the U.K.'s Financial Conduct Authority (FCA), which has regulated LIBOR since 2013, stated, "Our intention is that, at the end of [2021], it would no longer be necessary for the FCA to persuade, or compel, banks to submit to LIBOR. It would therefore no longer be necessary for us to sustain the benchmark through our influence or legal powers."

After more than four decades as the world's most widely used benchmark interest rate, referenced by approximately $240 trillion worth of financial products, it appears that LIBOR has but three years to live. What went wrong with LIBOR? What is likely to replace it? What transition plans are in place? What are some of the implications for investors?

What Went Wrong with LIBOR?

The London Interbank Offered Rate (LIBOR) originated in the late 1960s in order to facilitate syndicated loan transactions and increase the transparency of their pricing. As the name suggests, it reflects the interest rates offered in the interbank unsecured lending markets. It is available in five currencies (USD, EUR, GBP, JPY and CHF) and in seven maturities (overnight, one week, one month, two months, three months, six months and one year).

Since 2013, the FCA, the ICE Benchmark Administration (IBA) and the panel banks that submit the estimates that feed into LIBOR have gone to great efforts to improve the benchmark, its governance and its submission process. Despite these efforts, LIBOR still faces three major problems.

First and foremost, the market for unsecured interbank lending is no longer sufficiently liquid or active enough to produce a reliable reference rate. To put it in perspective, the Board of Governors of the Federal Reserve System (FRB) observed an average of only six or seven transactions per day at market rates that could underpin three-month LIBOR during the second quarter of 2018.

As a result, panel banks were increasingly being called upon to exercise their "expert judgment" to submit LIBOR levels to the benchmark's regulators and administrators. This subjected LIBOR to vast misconduct and manipulation, and years of rate-rigging scandals followed.

Finally, LIBOR is a reflection of unsecured interbank lending rates and therefore by definition it includes a credit risk premium. Many financial derivatives contracts, which comprise the largest market that references LIBOR, typically do not need a credit risk premium included in the reference rate and would be better off with a risk-free rate instead. LIBOR had simply become the standard, as no other alternatives had been established.

International Efforts to Reform Reference Rates

The aforementioned problems with LIBOR have damaged investors' confidence in its integrity, represent potentially serious sources of vulnerability, and could pose systemic risks to global financial markets. Against this backdrop, in 2013 the G20 asked the Financial Stability Board (FSB) to review and reform major reference rates, such as LIBOR, and develop plans to ensure that rates are robust and appropriately used by market participants.

Regulators in various countries have since selected or created different reference rate alternatives to LIBOR (Figure 1). For example, the Bank of England chose the unsecured Sterling Overnight Index Average (SONIA) as the alternative rate. Other regulators chose secured rates, such as the Swiss Average Rate Overnight (SARON) in Switzerland and the Secured Overnight Financing Rate (SOFR) in the U.S. While the alternatives are different in unique ways, one commonality is that they are based on overnight lending transactions.

FIGURE 1. A GLOBAL SNAPSHOT OF ALTERNATIVE REFERENCE RATES

Currency	Alternative Rate	Secured or Unsecured?	Overnight Rate Available?	Term Rate Available?	Rate Administrator
USD	Secured Overnight Financing Rate (SOFR)	Secured	Yes	Planned by end 2021	Federal Reserve Bank of New York
GBP	Sterling Overnight Index Average (SONIA)	Unsecured	Yes	Under consultation	Bank of England
CHF	Swiss Average Rate Overnight (SARON)	Secured	Yes	Under consideration	SIX Swiss Exchange
JPY	Tokyo Overnight Average Rate (TONAR)	Unsecured	Yes	Under consideration	Bank of Japan
EUR	Euro Short Term Rate (ESTER)	Unsecured	No: To begin October 2019	Under consideration	European Central Bank

Source: Oliver Wyman, Neuberger Berman.

The U.S. Solution: SOFR

In 2014, in response to the G20 and Financial Stability Board initiative, the FRB and the Federal Reserve Bank of New York (FRBNY) tasked the Alternative Reference Rates Committee (ARRC) to determine a suitable alternative reference rate to replace USD LIBOR and to develop plans to facilitate the transition from USD LIBOR to the new reference rate.

On June 22, 2017, the ARRC identified SOFR as the recommended alternative reference rate to USD LIBOR. The FRBNY began publishing SOFR on April 3, 2018. SOFR is a broad measure of the cost of borrowing cash overnight, collateralized by U.S. Treasury securities. It is calculated as the volume-weighted median rate of all eligible transactions, which are described in the following box:

The Components of the Secured Overnight Financing Rate (SOFR)

There are three types of "repo" trades eligible to be used as components of SOFR: those which Federal Bank of New York uses to calculate its Tri-Party General Collateral Rate (TGCR); General Collateral Financing (GCF) trades; and bilateral trades cleared by the Fixed Income Clearing Corporation (FICC).

A repo transaction is the sale of a security combined with an agreement to repurchase the security on a specified future date at a prearranged price. The initial seller of the security (the ''securities provider'') may view itself as a borrower of cash and the initial buyer of the security (the ''cash provider'') may view itself as a lender in a secured transaction. The discount on the repurchase is equivalent to an interest rate. In the event the securities provider is unable to repurchase the securities (i.e., repay the loan) at maturity, the cash provider is entitled to liquidate the security. Below are three kinds of repo transactions included in SOFR calculation.

Transactions used in the TGCR are specific-counterparty tri-party Treasury general collateral repo transactions. Let's divide this long definition into pieces. "Specific-counterparty" means that you know who's on the other side of the trade at the time of the trade; "tri-party" means that a clearing bank is used to facilitate the transaction as a third party; and "general collateral" means that a pool of Treasury securities can be used as collateral instead of a particular security.

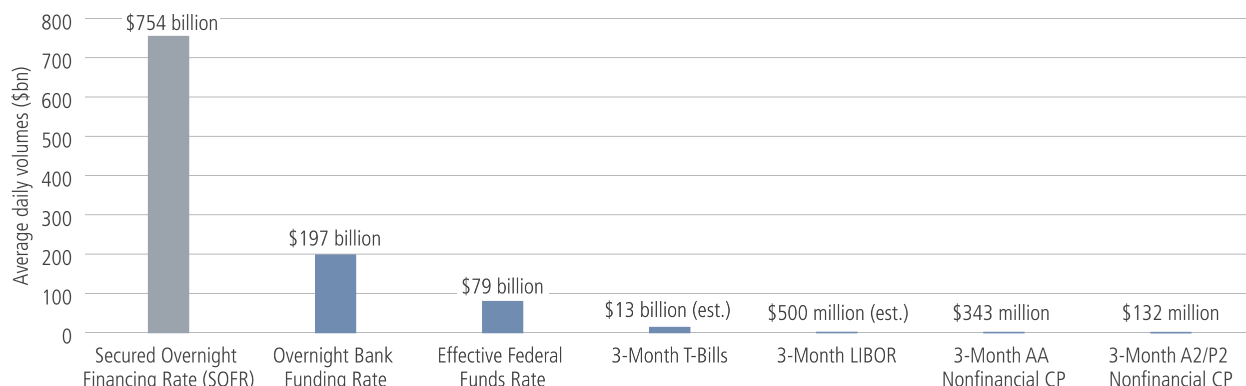
In a GCF Repo trade the FICC acts as the central counterparty. It is also a tri-party Treasury GC repo transaction, but counterparties don't know each other's identity at the time of the trade as they only face the FICC. However, the FICC only provides the GCF Repo service to the netting members of its Government Securities Division. As a result the GCF Repo market is an interdealer market where security dealers borrow from and lend to each other.

In a bilateral repo trade counterparties stipulate specific securities as collateral to settle each trade. SOFR includes bilateral repo trades that are cleared by the FICC, and excludes transactions with rates that are too low (below the 25th volume-weighted percentile rate). This is because some cash providers in the bilateral repo market accept a lesser rate in order to obtain a particular security, and therefore these lower rates don't truly reflect the secured funding costs.

SOFR is based on market transactions in the most liquid rates market in the world—with over $750 billion of daily activity in the first half of 2017 (Figure 2), according to the "ARRC Second Report" dated March 2018. By covering multiple segments of the repo market, it allows for future market evolution. It also reflects a wide array of market participants active in these markets, including not only broker-dealers, but also money market funds, asset managers, insurance companies, securities lenders and pension funds.

FIGURE 2. SOFR IS BASED ON TRANSACTIONS IN HIGHLY LIQUID, ACTIVE MARKETS

Average daily volumes in U.S. money markets, H1 2017



Source: Federal Reserve Bank of New York; Financial Industry Regulatory Authority; DTCC Solutions LLC; the Board of Governors of the Federal Reserve System. Average daily volumes during H1 2017, with the exception of three-month Treasury Bills, which are preliminary estimates from available FINRA Trade Reporting and Compliance Engine (TRACE) data over August and September 2017.

LIBOR and SOFR: What Are the Differences?

There are two major fundamental differences between LIBOR and SOFR. First, LIBOR is an unsecured rate while SOFR is a secured rate. The unsecured nature of LIBOR results in a widely acknowledged credit risk premium embedded in the rate. In contrast, SOFR is based on transactions secured by U.S. Treasury securities, resulting in a rate that is nearly risk free.

Second, LIBOR represents the borrowing cost over seven different maturities, out to one year, with the most widely used rate being three-month LIBOR. Unlike LIBOR however, SOFR reflects only the overnight rate and at this point does not have a term structure. ARRC has recognized the importance of a term rate, especially for participants in cash products such as Loans and Floating Rate Notes (FRNs). As a result, the creation of a term reference rate from SOFR has been incorporated into the transition plan. Figure 3 lists additional differences between LIBOR and SOFR.

FIGURE 3. KEY DIFFERENCES BETWEEN LIBOR AND SOFR

	LIBOR	SOFR
Definition	**Unsecured wholesale inter-bank lending rate** based on daily annualized interest rate submissions from 16 panel banks	**Secured overnight repo rate** based on transaction data of over $750 billion in daily volume from different segments of the repo market
Maturity/Term	Overnight, one week, one month, two months, three months, six months and one year	Overnight
Credit Risk Premium	Unsecured transaction: incorporates credit risk premiums	Secured transaction: no credit risk premium
Methodology	Calculated based on the arithmetic mean of trimmed panel bank submission rates (removing upper and lower quartile outliers)	Calculated as a volume-weighted median (50th percentile) for the combined repo datasets
Historical Performance	Relative lack of actual transactions underpinning the rate has led to reliance on expert judgment; Historically less volatile than SOFR	SOFR typically trades close to overnight LIBOR, but with higher volatility due to its methodology and wide dispersion in bilateral repo data.
Administrator	IBA	FRBNY
Publication Time	11:55 am London Time	8:30 am Eastern Time

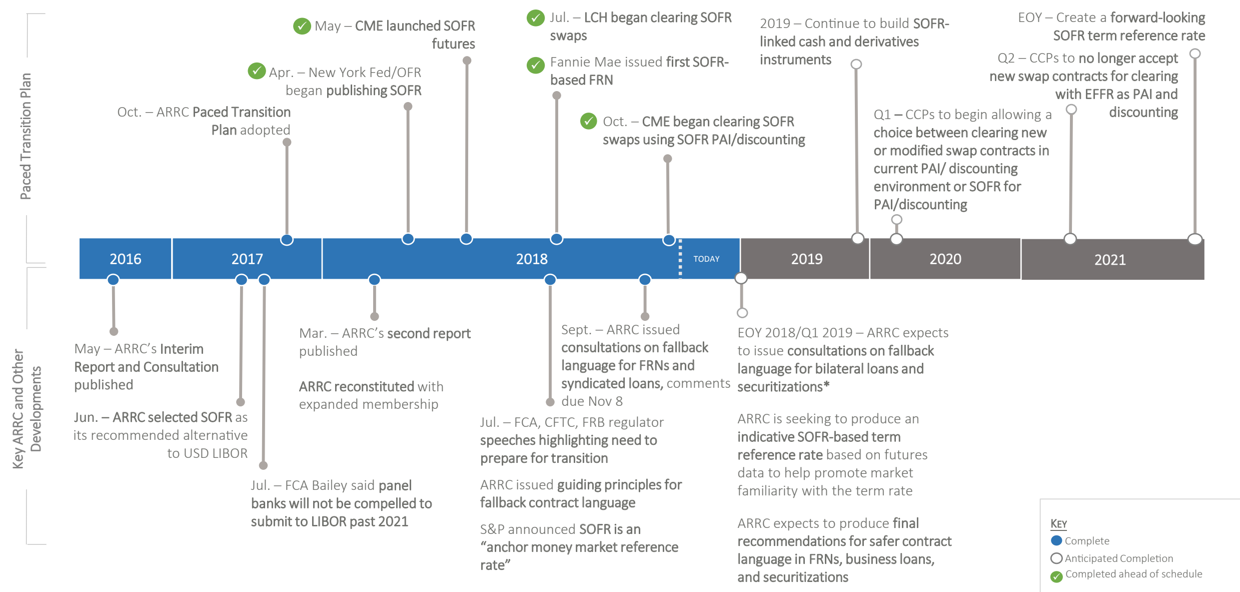
Source: Intercontinental Exchange (ICE); FRBNY; Ernst and Young.

Transition Plan: From LIBOR to SOFR

The ARRC adopted its Paced Transition Plan in 2017 (Figure 4). The initial steps of the plan are to progressively build liquid and robust derivatives markets referencing SOFR. As a comparison, there was an average of approximately 15,000 SOFR contracts traded per day as of December 2018, while approximately 3.6 million Eurodollar futures contracts traded per day.

The final step is to create a term reference rate based on SOFR derivatives markets by the end of 2021 once liquidity has developed sufficiently to produce a robust rate. The creation of a term reference rate is necessary because many participants in cash contracts with floating-rate payments have grown accustomed to a term rate predetermined at the start of the payment period.

FIGURE 4. TRANSITION FROM U.S DOLLAR LIBOR: TIMELINE



Source: Alternative Reference Rates Committee. Correct as of October 30, 2018.

Implications for Investors: "Not a Black Swan"

"The discontinuation of LIBOR should not be considered a remote probability 'black swan' event," as Andrew Bailey of the FCA put it in a speech in 2018. "Firms should treat it is as something that will happen and which they must be prepared for."

While the FCA is authorized to compel banks to submit LIBOR estimates, although not indefinitely, it has reached an agreement with panel banks that they should continue to submit LIBOR estimates until the end of 2021. It has also made it clear, however, that 2021 is the time beyond which it no longer intends to sustain the reference rate through its own influence or legal authorities. Given the discomfort banks now express about providing submissions based on so little actual borrowing activity, it is quite probable that 2021 could be the date for a permanent discontinuation of LIBOR.

Backing up this resolve are the many preparations that the FCA and other regulatory bodies have been making for the transition away from LIBOR. The FCA set an example by being the first reference rate regulator to send out "Dear CEO" letters addressing LIBOR. In September 2018 it sent the letters to the heads of major banks and insurers under their oversight in the U.K., requesting that detailed transition plans be laid out by December 2018.

In the U.S., progress that might typically take years to make has already been accomplished. SOFR only came into existence a matter of months ago, but already a wide range of market participants have worked steadily to build liquidity in SOFR futures, offer clearing of SOFR swaps, add SOFR to hedge accounting benchmarks and issue floating rate debt referencing SOFR .

Implications for Investors: Fallback Language

While the market plumbing for the transition away from LIBOR is being prepared, investors still face a number of questions about how interest rate referencing contracts will work during the transition. How is the trigger event of a permanent discontinuation of LIBOR to be defined? What reference rate should be used to replace LIBOR in each contract? How should the spread be calculated between LIBOR and the replacement rate? How will the transition work for outstanding contracts that were written before the permanent cessation of LIBOR was envisioned?

To answer such questions, the ARRC and the International Swaps and Derivatives Association (ISDA) are working to publish recommended "fallback language"—the legal provisions in a contract that apply if the underlying reference rate in the product is discontinued or unavailable—for market participants to consider for inclusion in new contracts. We will discuss the cash and derivatives markets separately.

In the cash markets, as of the end of 2016, the ARRC reported that there were $1.8 trillion FRNs, $1.8 trillion Securitized Products and $4.7 trillion Loans outstanding that all referenced LIBOR. Of these, 85% of the Corporate FRNs, 50% of the Securitized Products and 75% of the Loans will mature by the end of 2021. For the rest, it remains to be seen if and how regulators and industry groups will update the contracts, as many cash security prospectuses require unanimous consent from all holders, a fact that makes it nearly impossible to change them.

According to legacy contracts, once LIBOR is no longer available, some cash securities, including most if not all Corporate FRNs, will pay a fixed coupon at the LIBOR rate of the immediately preceding payment date (see the steps for calculating the reference rate in Figure 5). For Securitized Products, the prospectus language varies by collateral types and individual deals.

FIGURE 5. THE STANDARD LANGUAGE FOR CALCULATING A REFERENCE RATE IN LEGACY CASH SECURITIES CONTRACTS

Source: Sample security prospectuses.

To develop more robust LIBOR fallback language in new contracts, the ARRC has initiated consultations with market participants in order to gather their feedback. While these consultations are ongoing, preliminary fallback provisions have been added to recently issued FRN contracts so that an independent adviser will decide the replacement rate and adjustment spread if and when LIBOR is discontinued permanently.

In the derivatives markets, as of end-2016, the outstanding notional amounts of over the counter (OTC) and exchange traded contracts referencing USD LIBOR were $145 trillion and $45 trillion, respectively. Approximately 76% of the OTC contracts and nearly all of the exchange traded contracts will mature before the end of 2021. For the remainder, ISDA will publish a protocol to facilitate multilateral amendments to include the amended fallbacks in the near future.

Due to the standardization of derivatives contracts and the leadership of ISDA, updating fallbacks in new LIBOR-based derivatives could be relatively more straightforward. The goals of ISDA are to minimize value transfer, market manipulation and the impact of market disruption at the time the fallback is applied.

Conclusion

If the transition plans are implemented effectively and SOFR and its international equivalents are widely adopted by market participants, LIBOR may cease to exist after 2021. The common view among market participants, however, is that LIBOR will in fact continue to exist beyond 2021. This belief exists because end users may need more time to rebuild systems that have LIBOR embedded in them and that banks will voluntarily maintain submissions in their own interests because they have large exposures to legacy contracts. Also, the LIBOR administrator IBA may continue to persuade panel banks to submit estimates. Either way, in our view, the fact that LIBOR is a benchmark rate that did not keep up with the evolution of the financial market remains unchanged.

A detailed assessment of existing exposure to LIBOR is necessary for all market participants as the risks of relying on LIBOR will only grow over time. Understandably, some investors still shy away from SOFR-linked products due to thin liquidity, but that should not stop one from closely monitoring the development of SOFR markets and analyzing the price behavior of SOFR-linked products as liquidity gradually improves.

The unsustainability of LIBOR is unlikely to reverse for the reasons set out at the beginning of this paper. Moreover, regulators in the European Union (EU) can prohibit supervised entities subject to the EU Benchmark Regulation from using LIBOR should they judge it to no longer be sufficiently representative of the economic reality it intends to measure, even if LIBOR continues to exist beyond 2021.

We will conclude with words Andrew Bailey, CEO of the U.K.'s Financial Conduct Authority, offered in July 2018: "For firms who are not yet aware, not yet engaged, and without plans to address their LIBOR-related dependencies, I warn you again of the risks."

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