

## Replacing LIBOR

July 2019

*Sometimes called the “world’s most important number,” the London Inter-Bank Offered Rate (LIBOR) is the benchmark interest rate tied to over \$300 trillion in global derivatives, fixed income securities, futures, and securitized products. For three decades, LIBOR has been the primary reference benchmark for short-term interest rates around the world, but since the 2012 LIBOR scandal irrevocably tarnished its credibility, global regulators have taken coordinated steps to find a replacement for LIBOR as the global benchmark interest rate.*

*In April 2018, the New York Federal Reserve began publishing the Secured Overnight Financing Rate (SOFR), an interest rate that is rapidly gaining acceptance and will likely replace LIBOR when it is scheduled to disappear at the end of 2021. However, two significant transition issues exist. The first requires financial intermediaries to develop and trade SOFR one- and three-month maturities as well as SOFR derivatives, such as futures, swaps, and options. The second is contractual, reaching consensus on how to handle LIBOR to SOFR “switching,” both in existing LIBOR agreements that did not foresee a permanent end to LIBOR and agreements currently being written.*

*A best-case scenario is a LIBOR/SOFR convergence such that there is no material difference to financial contracts on the effective date of the change. However, a worst-case scenario could leave lending markets in dislocation, which could result in systemic market risk.*

### *What is LIBOR?*

Manufacturers Hanover’s \$80 million loan to the Shah of Iran in 1969 was the first syndicated loan pegged to London Inter-Bank Offered Rate (LIBOR). It took nearly two decades for LIBOR to gain prominence when, in 1986, the British Bankers Association (BBA) officially embraced the reference rate by establishing a governance system. The BBA set LIBOR as the default standard interest rate just as the market for interest rate-based products began to explode in the late 1980s.

LIBOR has undergone many evolutions over the years, but the explosion of the derivatives market in the early 2000s – and LIBOR as its standard benchmark interest rate – cemented LIBOR’s place as the preeminent benchmark for short-term, interbank loans.

LIBOR is a series of short-term interest rate averages calculated from estimates submitted by 16 major banks, including Bank of America, Barclays, Citibank, Deutsche Bank, JPMorgan Chase, and UBS. Each

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day the Intercontinental Exchange<sup>1</sup> (ICE) asks these banks how much they would charge other banks for an unsecured loan. Contributors often rely on “expert judgment” to estimate funding rates. ICE takes out the highest and lowest figures and calculates the “trimmed average” from the remaining numbers.

LIBOR is quoted on five currencies (the US Dollar, the British Pound, the Japanese Yen, the Euro, and the Swiss Franc) across seven maturities (overnight, one week, and one, two, three, six, and 12 months). The combination of five currencies and seven maturities leads to a total of 35 different LIBOR rates calculated and reported each business day. The most commonly quoted LIBOR rate is the three-month US dollar rate, usually referred to as the current LIBOR rate.

Today, LIBOR is tied to over \$300 trillion in financial contracts and touches nearly every financial institution and consumer in the world. LIBOR is commonly used as the floating rate for interest rate swaps, futures contracts, mortgages, student loans, and corporate funding.

LIBOR was beset by twin scandals during the Global Financial Crisis. First, rate-setting banks tweaked their quotes, possibly with supervisors’ implicit support, to limit the chances of a run on their bank. Second, traders subtly manipulated the rates to make trading profits. Subsequently, several banks have paid billions in civil damages and several individual traders convicted of rate-rigging went to prison. Public perception of LIBOR plummeted, and the fate of the benchmark index was sealed in July 2017 when the UK Financial Conduct Authority (FCA) said that it no longer plans to compel banks to submit LIBOR quotes past 2021. At that point, LIBOR will lose its global significance and importantly, a new global interest rate benchmark must be ready to take its place.

### *Potential LIBOR Replacements*

The five national governing financial bodies of each of LIBOR’s currencies (the US Dollar, the Euro, the British Pound, the Japanese Yen, and the Swiss Franc) have put forward recommendations for LIBOR replacements. In the United States, the Fed’s Alternative Reference Rates Committee (ARRC) convened in 2014 as a collection of regulators and representatives from the private sector. The ARRC conducted two public roundtables and created advisory groups across market sectors and, after a four-year study, selected SOFR as its preferred benchmark to replace LIBOR. The UK, Japan, the EU, and Switzerland each have their own processes in place to provide references rates to replace their outgoing LIBOR rates.

Exhibit 1: Alternative LIBOR References

Country	LIBOR Currency	Replacement Reference Rate	Working Group Association
USA	USD LIBOR	Secured Overnight Financing Rate (SOFR)	Federal Reserve Bank of New York
UK	GBP LIBOR	Reformed Sterling Overnight Index Average (SONIA)	Bank of England
Japan	JPY LIBOR	Tokyo Overnight Average Rate (TONA)	Bank of Japan
EU	EUR LIBOR	Euro Short-Term Rate (€STR)	European Central Bank
Switzerland	USD LIBOR	Swiss Average Rate Overnight (SARON)	Swiss National Bank

ARRC’s corresponding UK group has put forward Reformed SONIA (Sterling Overnight Index Average). A big advantage of SONIA is that it has been in existence since 1997, although Reformed SONIA only went live on April 23, 2018. The Bank of Japan’s version is the Tokyo Overnight Average Rate (TONAR), which has served as the reference rate for the Japanese Yen overnight index swap market. The ECB’s Governing Council developed a euro short-term rate (€STR), which will publish its first rate on October 2, 2019. The €STR will reflect the wholesale Euro unsecured overnight borrowing costs of euro area banks, and this rate

<sup>1</sup> The BBA administered this task until the aftermath of the LIBOR scandal when it was taken over by the Intercontinental Exchange in February 2014. The change from BBA LIBOR to ICE LIBOR is the most important change that LIBOR has undergone.

will gradually replace EONIA. Finally, the Swiss National Bank has put in place an alternate reference rate called the Swiss Average Rate Overnight (SARON), which was originally introduced in 2009 and adopted officially as a LIBOR replacement in December 2017.

Two other nascent interest rate benchmarks – the US Dollar ICE Bank Yield Index and Ameribor – are a distance second and third place behind SOFR as potential replacements for USD LIBOR. The Bank Yield Index, a benchmark overnight interest rate for unsecured loans, was introduced by the ICE Benchmark Administration in January 2019. This administration – which currently oversees LIBOR – hopes to begin publishing the Bank Yield Index by the first quarter of 2020. Ameribor launched in December 2015 as a daily index to reflect the borrowing costs for transactions between members of the American Financial Exchange, a collection of small banks.

### *What is SOFR?*

SOFR, which debuted in April 2018, is set daily based on overnight repurchase agreement transactions secured by US Treasuries. Citing the depth and robustness of the market, the ARRC selected SOFR as the best alternative to LIBOR because they believe benchmarks should be based on observable, arm's-length transactions rather than estimates. Futures and other derivatives linked to SOFR are already trading, and the World Bank, MetLife and Fannie Mae have already used SOFR in bond offerings. While SOFR is still only tied to overnight funding, officials intend to introduce longer-term rates.

Exhibit 2: Key Differences Between LIBOR and SOFR

LIBOR	SOFR
Unsecured Rate	Secured Rate (Collateralized with Treasury Securities)
Ubiquitous (dates to 1969)	New as of April 2018
Includes Credit Risk	Nearly Risk Free
Seven Quoted Maturities: overnight, one week, and one, two, three, six, and 12-month	Overnight rate (with planned expansion)
Rate Setting Subject to Judgment	Rate Setting a Function of Supply and Demand in Large Liquid Markets

Since the launch of SOFR last year, key market participants have bolstered the infrastructure to support its future viability. The CME now trades both one- and three-month SOFR futures contracts with increasingly more volume. However, the financial markets have not yet seen a wholesale adoption of SOFR as LIBOR's replacement because of its lack of term structure and volatility.

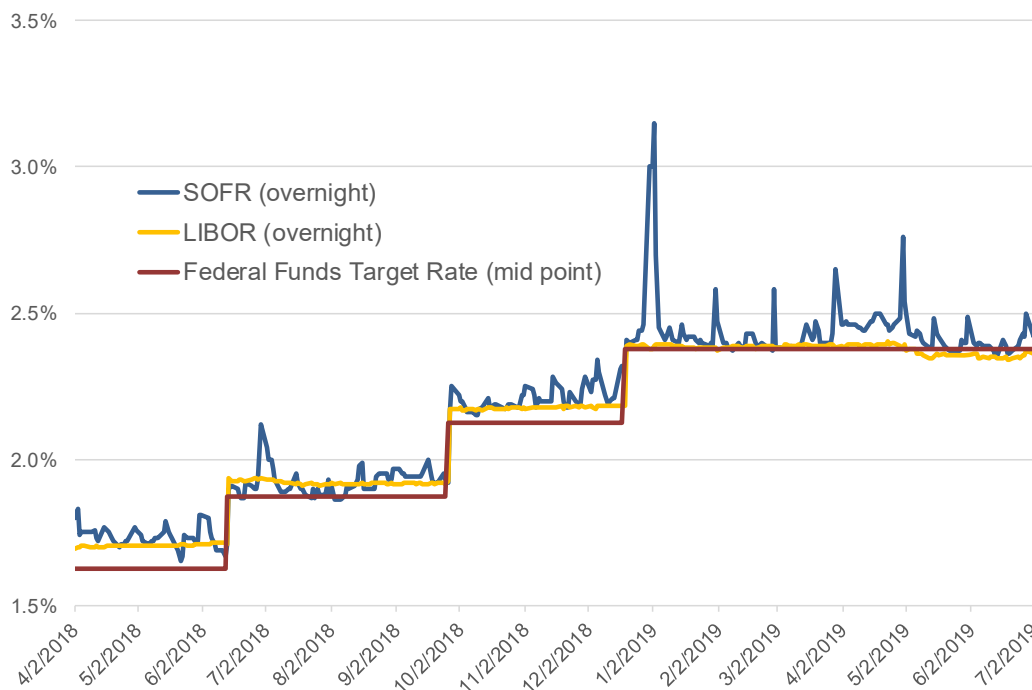
Most contracts that reference LIBOR key-off of the three-month rate, while mortgages typically use one-year LIBOR. SOFR, though, is an overnight rate, and there is no such thing (yet) as a three-month or six-month SOFR. Market participants are still awaiting the creation of a term structure, or maturities beyond overnight rates. Minutes from the Federal Open Market Committee's January 2019 meeting disclosed that the central bank is still working on this area for SOFR, and a Fed paper from February 2019 discussed inferring term rates from SOFR futures prices.

Mark-to-market volatility is the double-edge sword of a market-based benchmark like SOFR. While SOFR reflects the market's real-time pricing of overnight rates, this real-time pricing comes with the cost of increased volatility. In a predictable fashion, the days before month-ends are characterized by an increase in the demand for cash and a decrease in the availability of dealer balance sheets. For example, at the end of 2018, SOFR surged from 2.46% on Dec. 28 to 3.15% on Jan. 2 because of the year-end demand for cash, then back down to 2.45% two days later. Since then, the rate has jumped by about 20 basis points at the end of each month. This volatility and unpredictability could make it harder for borrowers to trust a

benchmark rate that is prone to sporadic swings because it could add to borrowing costs. A longer-dated SOFR rate, like one-month or three-month, would likely be less volatile.

Exhibit 3 plots SOFR (blue line) versus other benchmark yields since its debut in April 2018. SOFR has generally traded in line with the Fed Funds rate (red line) and Overnight LIBOR (yellow line) but has been punctuated by volatility at month-, quarter- and year-end. In addition, since LIBOR includes an element of credit risk tied to the strength of the banking industry, it should trade at a premium to the Fed Funds rate (red line), which is essentially risk-free. However, the premia went negative in June 2019 as the market began pricing imminent Federal Reserve interest rate cuts (the yellow line dips below the red line).

Exhibit 3: Overnight SOFR, LIBOR, and Fed Funds  
(April 2, 2018 to July 26, 2019)



Source: Bloomberg, Cliffwater

### *Transition from LIBOR to SOFR*

The biggest challenge to the transition from LIBOR to SOFR will likely be the amendment of current LIBOR contracts that will mature after LIBOR's transition date. This is further complicated by the fact that no firm date for the transition has been set. Except for securitizations, most of the outstanding LIBOR-related securities will expire before 2021. However, there are at least \$36 trillion<sup>2</sup> of outstanding contracts that will not mature before LIBOR is set to end. Problems will arise if lenders and borrowers cannot amend these contracts prior to LIBOR's cessation or if LIBOR is no longer considered a reliable measure of interbank loans.

Loan documents for LIBOR-based loans generally provide a definition of LIBOR, which contains fallback provisions in case LIBOR is no longer determinable. However, these fallbacks are triggered when LIBOR is unavailable from a temporary system interruption and not when LIBOR permanently ceases to exist. Many older contracts do not contain fallback language that contemplates the cessation of LIBOR as a

<sup>2</sup> Andrew Deichler, Association for Financial Professionals, *Libor vs. SOFR: Big Changes Are Coming for U.S. Treasurers*, June 28, 2019.

benchmark interest rate. For this reason, loan modification of these older contracts will be a formidable challenge – even after standard fallback language has become generally accepted – particularly as it relates to make-whole agreements<sup>3</sup> and break funding clauses<sup>4</sup>.

For new loan agreements using LIBOR as the interest rate benchmark before the cessation of LIBOR, market participants have begun to address the likelihood that LIBOR will not continue after 2021. However, language in these documents varies widely, from a simple acknowledgement of the risks of a replacement rate to detailing the SOFR replacement rate calculation. Earlier this year, ARRC released proposed fallback language that can be used in new transactions or amended for existing transactions, while ISDA is independently developing its own modification language. ARRC's language is still under development and has not been widely accepted by the marketplace.

ARRC has proposed two different approaches for making future amendments when LIBOR ceases: the "amendment" approach and the "hardwired" approach. Each of these approaches vary across asset class and there are pros and cons of each.

The "amendment" approach provides that, upon the occurrence of a defined LIBOR replacement trigger, the administrative agent and the borrower may amend the existing agreement unless other parties to the loan agreement (for example, a certain percentage of "required lenders") object in writing within a specified time frame.

The "hardwired" approach fixes decision-making into the credit agreement without amendments. Upon the occurrence of a defined LIBOR replacement trigger, the "hardwired" approach looks to a waterfall of potential replacement rates and spread adjustments. This approach provides for an automatic replacement of existing reference rates that have been agreed to in advance. Replacement benchmarks and spread waterfalls differ depending on the product, but some common alternatives are shown in Exhibit 4 below.

Exhibit 4: "Hardwired" Waterfall<sup>5</sup>

	Step	FRNs	Securitizations	Bilateral Business Loans	Syndicated Business Loans
Replacement Benchmark	1	Term SOFR	Term SOFR	Term SOFR	Term SOFR
	2	Compounded SOFR	Compounded SOFR	Compounded SOFR	Compounded SOFR
	3	Spot SOFR	ARRC Recommended	Streamlined amendment process selection	Overnight SOFR
	4	ARRC Recommended	Then-Current ISDA definition		Streamlined amendment process selection
	5	Then-Current ISDA definition	Designated Transaction Representative		
	6	Issuer determination			
Spread	1	ARRC Recommended	ARRC Recommended	ARRC Recommended	ARRC Recommended
	2	ISDA-defined fallback for derivatives	ISDA-defined fallback for derivatives	ISDA-defined fallback for derivatives	ISDA-defined fallback for derivatives
	3		Issuer determined	Alternative rate selected by lender	Alternative rate selected by lender

Source: Credit Suisse, ARRC

<sup>3</sup> Make-whole agreements are call provisions that state that the borrower must make a payment to the lender in an amount equal to the net present value of the coupon payments that the lender will forgo if the borrower pays the bonds off early.

<sup>4</sup> Break funding charges are assessed for loans that are paid off before maturity and represent the cost of having to reinvest the funds at a lower return.

<sup>5</sup> Jonathan Cohn, Credit Suisse, *SOFR Transition Guide*, March 28, 2019.

The “amendment” approach provides both parties with greater flexibility and does not rely on rates that do not exist today, in contrast to the “hardwired” approach. However, if the market had to transition tens of thousands of LIBOR agreements to a new reference rate over a short period of time, the “amendment” approach would be inadequate, and the existing fallback language would remain in loan agreements.

### *Conclusion*

LIBOR is tied to over \$300 trillion in financial contracts and touches nearly every financial institution and consumer in the world. It has been the international standard reference rate for three decades, which makes its likely discontinuation by the end of 2021 a significant challenge facing the finance industry. SOFR, which debuted in April 2018, is in line to replace LIBOR, but significant progress needs to be made. The duration mismatch between the two benchmark indices is already a speedbump on the road to a full transition in addition to SOFR’s nascent derivatives market and its rate volatility.

LIBOR’s transition to SOFR requires the amendment of existing contracts and for new contracts to be written with reference to SOFR as a replacement. To this end, the Fed’s Alternative Reference Rates Committee has proposed voluntary fallback language to facilitate contract amendments when LIBOR ceases. Although new loan agreements using LIBOR have begun to address the possibility that LIBOR will not continue after 2021, fallback language is not yet standardized. The announcement of a firm date for the discontinuation of LIBOR could be the catalyst to propel the financial markets to embrace SOFR as the market’s key interest rate.

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