Alternative Reference Rates Committee : *SOFR Starter Kit Part I*

Background on USD LIBOR

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What is LIBOR and how is it calculated?

LIBOR is a series of interest rates intended to reflect banks' average cost of short-term, wholesale unsecured borrowing. It is currently used in many financial products worldwide, from derivatives, to mortgages, to bonds, to corporate loans. It is currently calculated for five currencies and in seven "tenors," or lengths of time – like three-month or 12-month LIBOR.

Each business day, a panel of banks for LIBOR in each currency (16 banks for USD LIBOR) submit their estimates of the cost to borrow in wholesale unsecured funding markets. For each tenor, the upper and lower quartiles are removed, then the rest is averaged to determine the LIBOR rate for that day.

What are the problems with LIBOR? Why is LIBOR being replaced?

Changes in the way banks fund themselves have caused the **volume of transactions underlying LIBOR to decline considerably**. Today, the market for unsecured wholesale term borrowing by banks is not sufficiently active, with a relatively small number of transactions underpinning LIBOR. LIBOR is sustained through "expert judgment," which means panel banks submit estimates of their borrowing costs with little actual borrowing activity to validate them.

For example, on a typical day, the volume of three-month wholesale funding transactions by major global banks was about $500 million, and just seven daily transactions, on average, make up this volume. Compared to the $200 trillion of financial contracts referencing USD LIBOR, that number is miniscule.

This scarcity of transactions in underlying markets calls into question LIBOR's sustainability. Many LIBOR panel banks feel uncomfortable submitting estimates based on expert judgment. Several banks have already stopped providing LIBOR submissions, making LIBOR even more unstable and less representative of the market it is intended to represent.

In 2014, global regulators highlighted the financial stability risks associated with overreliance on LIBOR. In response, national working groups in jurisdictions worldwide—like the ARRC—were convened to support a transition away from LIBOR (and other LIBOR-like rates) by identifying robust alternative interest rate benchmarks anchored in deep, active markets. In 2017, those efforts were accelerated when the Financial Conduct Authority (FCA), the UK government body that regulates LIBOR, stated that it had exerted considerable effort persuading panel banks to continue submitting to LIBOR and that it brokered a voluntary agreement with the remaining panel banks to continue submissions through the end of 2021. In April 2020 following the outbreak of COVID-19, the FCA reaffirmed that timeline announcing that the central assumption that **firms cannot rely on LIBOR being published after the end of 2021** has not changed and should remain the target date by which **all firms should be prepared for LIBOR to be unusable.**

A relatively small number of underlying transactions underpin LIBOR

Source: Drawn from Table 1 and Figure 3 in the ARRC's Second Report, which depicts gross notional exposures as of year-end 2016.

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History of the ARRC and the Selection of SOFR

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History of the ARRC

In 2014, the Federal Reserve Board and the New York Fed **convened the ARRC, a group of private-market participants tasked with identifying robust alternatives to USD LIBOR** and supporting a transition away from LIBOR.

Today, there are **over 300 member and nonmember institutions**—including banks, asset managers, insurers, and industry trade organizations—contributing to the ARRC's work, with the support of 13 official sector ex-officio members.

ARRC has broad participation across the financial services industry and representation from the official sector

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10 Industry Associations
12 Banks
9 Asset Managers, Insurers, & Other End Users
13 Official Sector (ex officio)
3 Financial Exchanges
3 Gov.-Sponsored Enterprises

ARRC Working Groups (includes members and non-members)

25+ Asset Managers & Insurers
50+ Banks & Fin. Service Firms
20+ Fin. Infrastructure & Consulting Firms
20+ Industry Associations

ARRC's Criteria to Select Alternative Rates

To identify robust alternatives to USD LIBOR anchored in observable transactions in deep and active markets, the ARRC developed the following criteria to evaluate potential alternative rates:

1. **Benchmark Quality:** Whether the market underlying the rate can reasonably be expected to remain sufficiently deep and active to support a robust reference rate
2. **Methodological Quality:** Whether the rate is produced in accordance with internationally-accepted best practices
3. **Accountability**: Whether compliance with best practices can be ensured
4. **Governance:** Whether the rate is produced subject to a governance structure that promotes the integrity of the benchmark
5. **Ease of Implementation**: How easily a transition to the rate could be done

Evaluation and Consultation Process

As part of its evaluation process, the ARRC considered a comprehensive list of potential alternatives, including:

- Term unsecured rates
- Overnight unsecured rates like the Overnight Bank Funding Rate (OBFR)
- Term secured rates
- Overnight secured rates like the Secured Overnight Financing Rate (SOFR)
- Treasury bill and bond rates

The ARRC was asked to consider alternative rates based on active and robust markets.

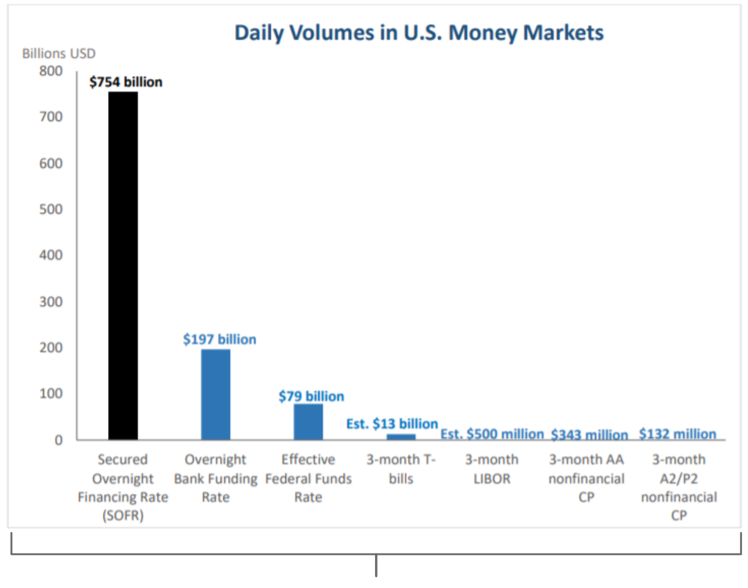
The ARRC formed an Advisory Group consisting of a diverse set of users of LIBOR-linked products active in a range of market sectors to ensure that its recommendations reflected a wide consensus of market participants. In addition, the ARRC published an Interim Report and Consultation laying out the possible rate choices and seeking market views as it moved to select a rate.

The ARRC ultimately concluded that a term unsecured lending rate would not be robust enough given the limited transactions, unstable samples of borrowers, and sensitivity to market stress that these markets exhibit. Although term secured rates were considered, it was determined that there is not sufficient trading to support such a rate.

After extensive discussion, the ARRC narrowed its list of potential alternatives to USD LIBOR to two rates that it considered the be the strongest candidates: an overnight unsecured rate (OBFR) and an overnight Treasury repurchase agreement (repo) rate (SOFR).

Selection of SOFR

In June 2017, the ARRC, with the support of a significant majority of its Advisory Group, announced it had selected SOFR as its preferred alternative to USD LIBOR. SOFR is a broad measure of the cost of borrowing cash overnight in the repo market collateralized by U.S. Treasury securities. Produced daily by the New York Fed, SOFR is robust, is based on a deep, active market with a diverse set of borrowers and lenders, is not at risk of being discontinued due to a scarcity of underlying transactions, and meets international best practices. *(See SOFR Starter Kit Part II for more)*.



SOFR is a robust rate that is backed by significant transaction volume

Source: Drawn from Figure 3 in the ARRC's Second Report and represents the information available to the ARRC when selecting SOFR as its preferred alternative reference rate. This depicts average volumes over 2017H1, with the exception of 3-month T-bills, which are estimates from August and September 2017.

How SOFR Works

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In 2017, the ARRC selected the Secured Overnight Financing Rate (SOFR) as its preferred alternative to U.S. dollar (USD) LIBOR. SOFR is a broad measure of the cost of borrowing cash overnight, collateralized by U.S. Treasury securities in the repurchase agreement (repo) market. *(See SOFR Starter Kit Part I for more on the selection of SOFR.)*

SOFR has several characteristics that make it much safer and less vulnerable to manipulation than LIBOR, including that it:

- Is based on an active underlying market with a diverse set of borrowers and lenders;
- Is based entirely on transactions (not estimates);
- Is produced in compliance with international best practices; and
- Covers multiple market segments, ensuring robust transaction volumes in a wide range of market conditions.

Repo Market Overview

SOFR reflects transactions in the Treasury repo market. Repos are conceptually straightforward. They effectively are collateralized loans, in many ways similar to mortgages in which homeowners borrow money using their homes as collateral. In the Treasury repo market, people borrow money using Treasury debt as collateral.

Reason for Borrowing "Secured" Funds

When a borrower "secures" a loan with collateral, the lender has more options to get repaid. After all, if the borrower fails to repay the loan, the lender is able to take possession of the collateral and sell it to recover the funds lent.

Lenders are therefore typically more willing to make "secured" loans—like repos—than unsecured loans, where the lender does not have the benefit of collateral to guarantee payment.

Repo Market Participants

There are a wide range of financial market participants directly involved in the Treasury repo market, including asset managers, banks, broker-dealers, corporate treasurers, insurance companies, money market funds, pension funds, and securities lending agents.

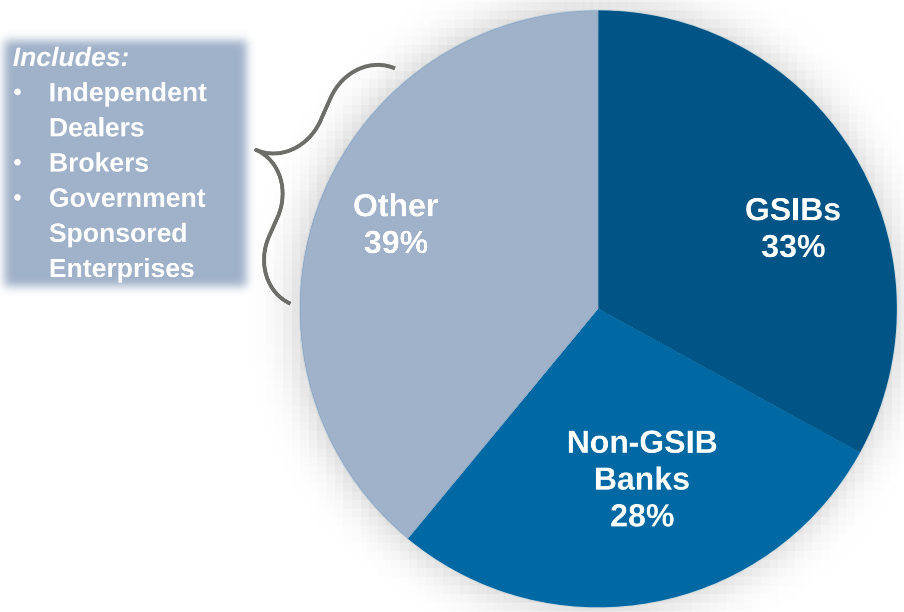
To understand the diversity of institutions involved in the Treasury repo market, consider the segment of the repo market involving the Fixed Income Clearing Corporation (FICC).

- In 2020, FICC has accounted for only 60% of SOFR's roughly $1 trillion in daily transaction volume. That segment alone involves roughly 2,000 institutions through its members and "sponsored memberships" who are able to transact in the Treasury repo market with FICC.

Beyond the diverse entities that regularly transact directly in the repo market, there is a significant number of entities with indirect exposure to the Treasury repo market.

- For example, any investor in the $4.5 trillion money market fund industry likely has exposure to the repo market. Similarly, pension funds—like the California Public Employees' Retirement System, which serves over two million members in the retirement system—typically lend cash in the repo market.

FICC Members Eligible to Transact in the Repo Market



Source: Fixed Income Clearing Corporation; New York Fed calculations

Chart above reflects segmentation of FICC members. FICC members affiliated with 79 different "parent entities," are eligible to transact in the segments of the repo market where FICC serves as central counterparty.

Two-thirds of those parent entities include non-GSIB banks, non-bank affiliated securities dealers, and government sponsored enterprises.

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How SOFR Works – Q&A

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Q: What makes SOFR a robust rate?

A: SOFR is a fully transaction-based rate reflecting roughly $1 trillion of daily transactions in a market with a diverse set of borrowers and lenders. This is much larger than the transaction volumes in any other U.S. money market and dwarfs the volumes underlying LIBOR. It is produced by the New York Fed with a methodology and governance structure consistent with international best practices. These factors make SOFR a reliable representation of conditions in the overnight Treasury repo market – reflecting lending and borrowing activity by a wide array of market participants, including asset managers, banks, broker-dealers, insurance companies, money market funds, pension funds, and securities lenders.

Q: What sort of financial products are expected to reference SOFR?

A: SOFR is suitable for use across a broad range of financial products, including derivatives and many cash products that historically referenced USD LIBOR.

Q: What should market participants do now to transition to SOFR?

A: As ARRC Chair Tom Wipf often says: "The first step to get out of a hole is to stop digging." Consistent with his advice, the ARRC recommends writing new contracts based on SOFR whenever possible, and provides a range of tools to support market participants transitioning to SOFR, including recommended Best Practices and the User's Guide to SOFR. For contracts that still need to reference USD LIBOR, the ARRC recommends incorporating language so that those contracts fall back to SOFR when LIBOR inevitably becomes unusable. *(See SOFR Starter Kit Part III for more ARRC transition tools).*

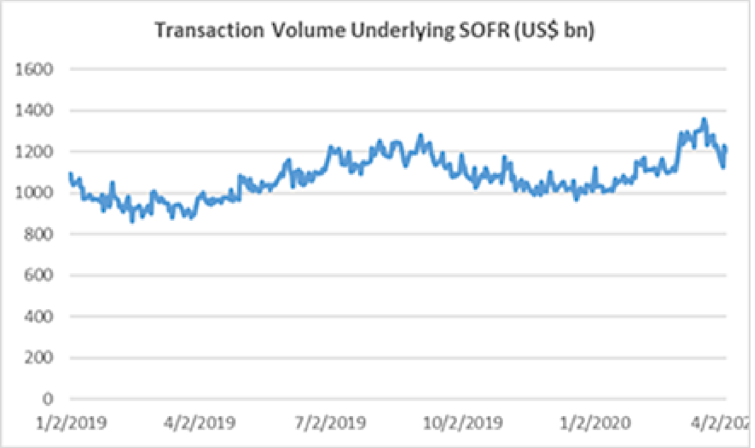
Q: Of the many rates evaluated, why did the ARRC ultimately select SOFR?

A: Moving the financial system off of LIBOR is a very challenging and costly process, so it was extremely important to the ARRC to avoid the need for another transition in the future. In identifying its recommended alternative to USD LIBOR, the ARRC looked for a rate that met its selection criteria including robustness, governance, ease of use and quality. *(See SOFR Starter Kit Part I for more on the selection of SOFR)*

In addition to meeting those standards, SOFR stood out for having the most underlying transactions. It is also the broadest measure of the market it covers, making it best placed to remain robust even if its underlying market evolves. That market – the Treasury repo market – is very durable, since the ARRC expects it to exist as long as the U.S. Treasury is issuing debt.

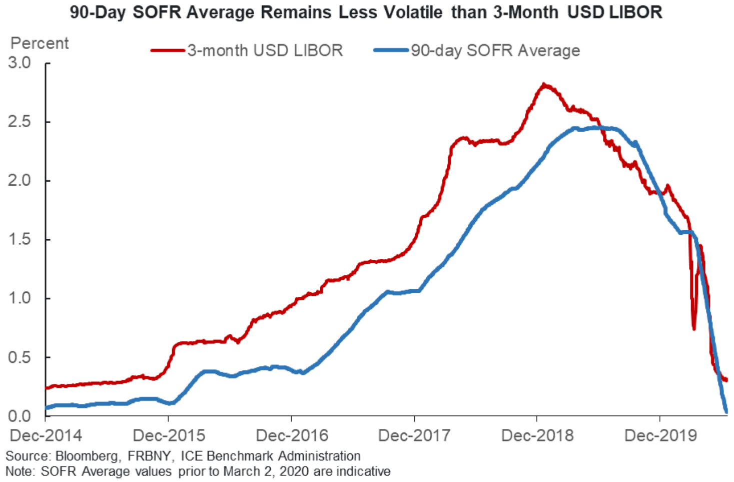
With these factors in mind, SOFR is the most resilient option and it is the most likely rate to ensure we will not have to go through this process again.

SOFR by the Numbers



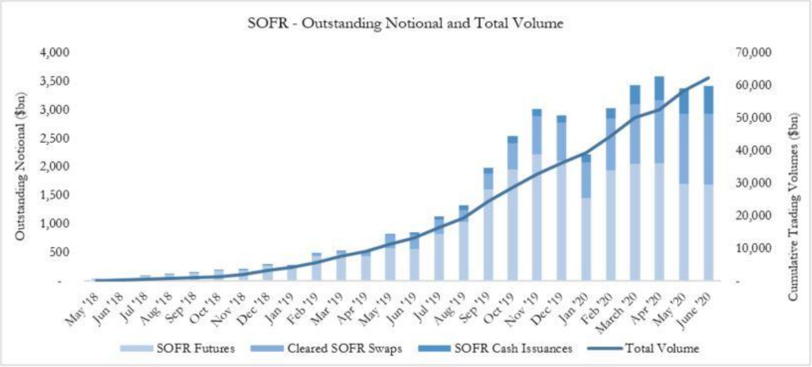
~$1 trillion

The transaction volume underlying SOFR averages around $1 trillion per day. This is far greater than the volumes underlying overnight unsecured rates, and, while not a direct comparison, dwarfs the volumes underlying term unsecured rates—such as the ~$500 million estimated to underlie 3-month USD LIBOR.



300+

The ARRC has 300+ diverse private-market institutions and associations involved on its working groups, supporting the transition to SOFR, its preferred alternative to USD LIBOR.



2021

After December 31, 2021, market participants should assume LIBOR will not continue. The ARRC encourages market participants to continue to adopt SOFR in a range of financial contracts and incorporate SOFR fallback language if they enter new LIBOR-referencing contracts.

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Common Misconceptions of SOFR

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Misconception 1: SOFR is more volatile than LIBOR.

SOFR is based entirely on actual transactions. As a robust, well-designed reference rate, it accurately reflects conditions in the market it was created to represent. The ARRC picked SOFR fully aware that transaction-based rates may be volatile if market conditions become volatile. Variability in SOFR is not an issue for its use as an alternative to USD LIBOR since **almost all contracts referencing SOFR will rely on averages of daily rates**. These averages are relatively stable and can be easily referenced in financial contracts, as demonstrated by the growing use of SOFR in futures, swaps and floating-rate debt. In fact, a three-month average of SOFR has been less volatile than three-month USD LIBOR over a range of market conditions.

Misconception 2: Market participants should wait for a forward-looking SOFR term rate before moving to SOFR.

While it is true that a forward-looking SOFR term rate may be appropriate for a limited set of contracts, the growth in SOFR-linked futures, swaps, and floating-rate debt demonstrates the current viability of using SOFR itself in a wide range of financial contracts. A robust forward-looking term rate requires a deep, active SOFR derivatives market, which requires most financial contracts to reference SOFR itself. **It is essential that most financial contracts reference SOFR itself as soon as possible, in order to develop a forward-looking SOFR term rate, and in turn facilitate a smooth transition**. Since March 2020, the New York Fed has been publishing SOFR Averages for several tenors and an index to calculate SOFR rates over custom time periods. These provide a transparent and reliable source that market participants can use to start building new SOFR-linked contracts now. As there is currently not sufficient underlying futures activity to support a robust term rate and no assurance that one will be produced ahead of LIBOR becoming unusable, those who are able to use SOFR should not wait for forward-looking rates in order to transition away from LIBOR.

Misconception 3: SOFR is not appropriate for all market participants.

After more than two years of transparent research and public consultation, the ARRC determined that **SOFR is the most suitable alternative rate for institutions of all sizes and products of all types**. It's a robust rate that can be used in a wide variety of products, including loans, and it's available now. The ARRC supports a vibrant and innovative market with reference rates that are robust, consistent with international best practices, and available for use before the end of 2021. The ARRC's recommendations have always been voluntary and it recognizes that market participants may choose other rates, but any solution must be robust.

Misconception 4: Transitioning to SOFR is less urgent due to the COVID-19 pandemic.

Key financial regulators, including the regulator of LIBOR, have made it clear that market participants should continue to assume they cannot rely on LIBOR being published after the end of 2021. Thus, it is important that market participants continue to prepare for LIBOR becoming unusable after 2021. While the ARRC recognizes that certain near-term, interim steps in the transition may be delayed given the current economic environment, the financial system must continue to transition away from LIBOR – and, ideally, toward SOFR.