

# Alternative Reference Rates Committee : *SOFR Starter Kit Part I (also see [Part II](#) and [Part III](#))*

## Background on USD LIBOR

### 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?

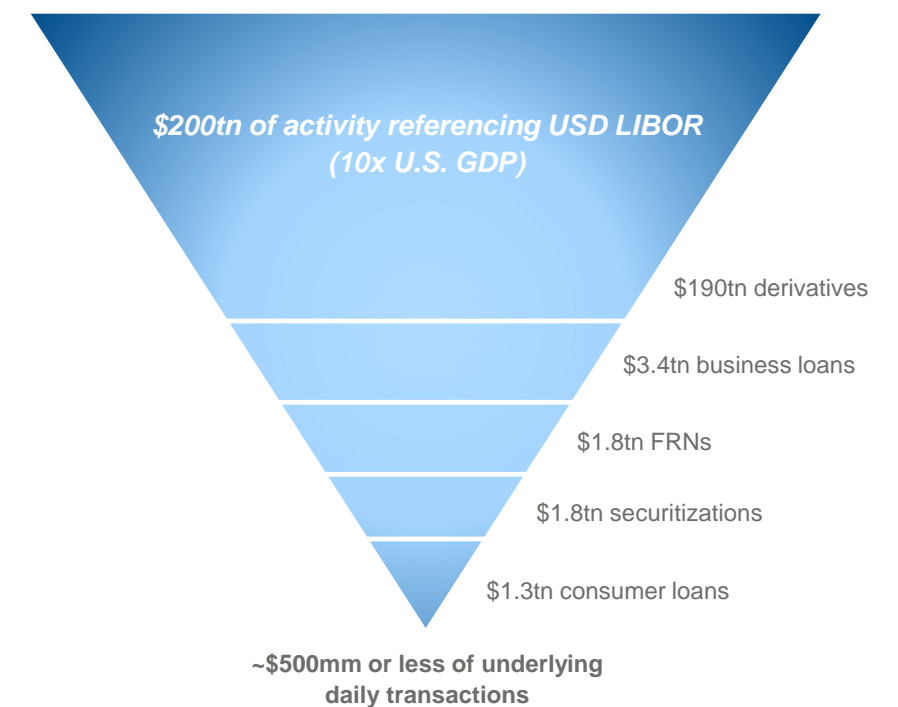
Changes in the way banks fund themselves have caused the **volume of transactions underlying LIBOR to decline considerably**. Today, the market for unsecured wholesale term borrowing by banks is not sufficiently active, with a relatively small number of transactions underpinning LIBOR. LIBOR is sustained 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

ARRC

ALTERNATIVE  
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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*

#### ARRC

**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:

- Benchmark Quality:** Whether the market underlying the rate can reasonably be expected to remain sufficiently deep and active to support a robust reference rate
- Methodological Quality:** Whether the rate is produced in accordance with [internationally-accepted best practices](#)
- Accountability:** Whether compliance with best practices can be ensured
- Governance:** Whether the rate is produced subject to a governance structure that promotes the integrity of the benchmark
- 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.

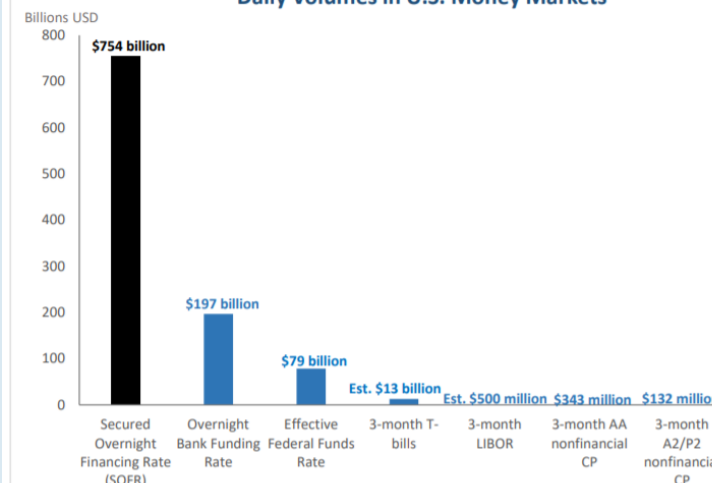
The ARRC ultimately concluded that a term unsecured lending rate would not be robust enough given the limited transactions, unstable samples of borrowers, and sensitivity to market stress that these markets exhibit. Although term secured rates were considered, it was determined that there is not sufficient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

Daily Volumes in U.S. Money Markets



**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

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.

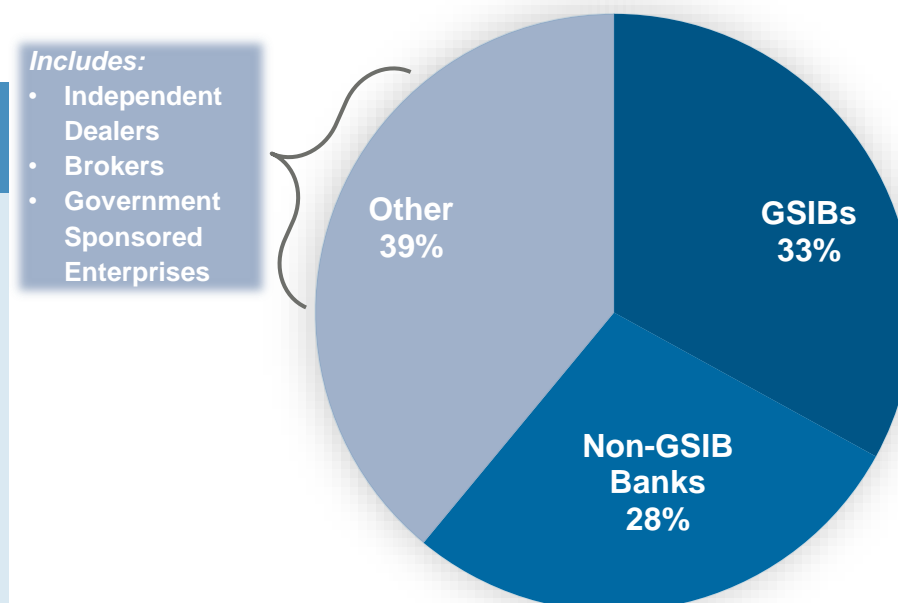
To understand the diversity of institutions involved in the Treasury repo market, consider the segment of the repo market involving the Fixed Income Clearing Corporation (FICC).

- 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



### 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?

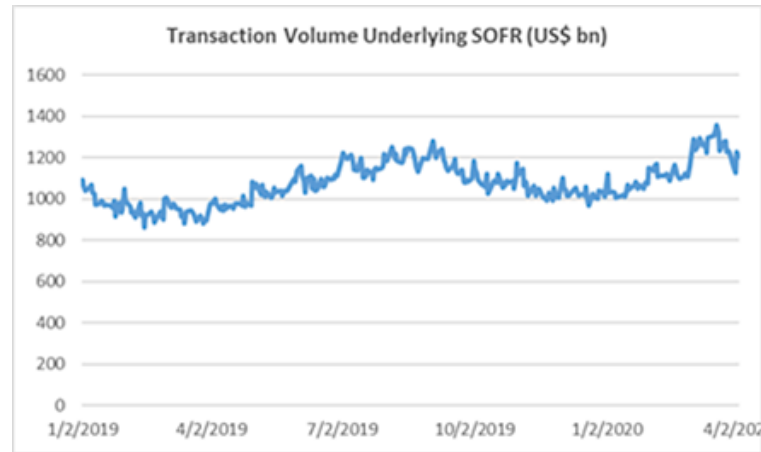
**A:** Moving the financial system off of LIBOR is a very challenging and costly process, so it was extremely important to the ARRC to avoid the need for another transition in the future. In identifying its recommended alternative to USD LIBOR, the ARRC looked for a rate that met its selection criteria 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.

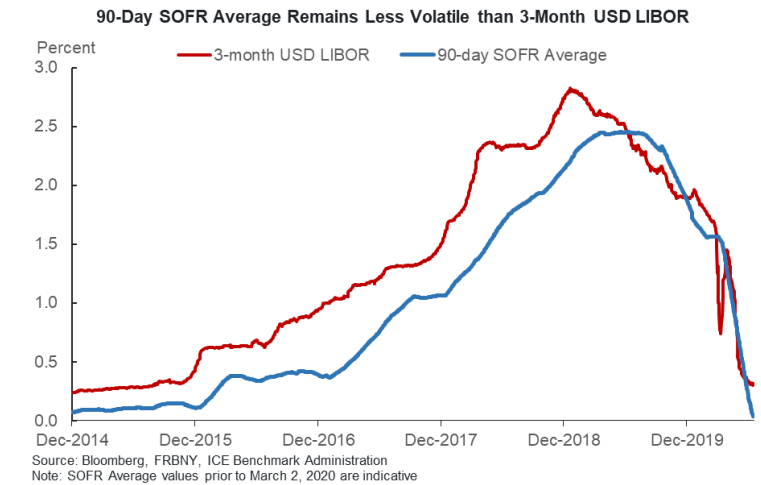
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## SOFR by the Numbers



## ~\$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+

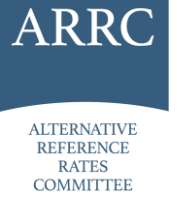
The ARRC has 300+ diverse private-market institutions and associations involved on its working groups, supporting the transition to SOFR, its preferred alternative to USD LIBOR.

## 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



### 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.

# Alternative Reference Rates Committee: *SOFR Starter Kit Part III (also see [Part I](#) and [Part II](#))*

## SOFR Best Practices



With LIBOR's end-2021 deadline rapidly approaching, it is important that all market participants are prepared for LIBOR to become unusable. The ARRC has produced numerous tools to assist firms in the transition to SOFR.

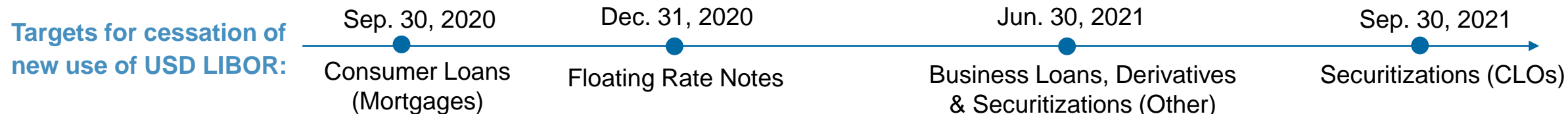
The ARRC recently published a set of [best practices](#) that outline key recommended milestones that market participants should aim to achieve across floating-rate notes, business loans, consumer loans, securitizations, and derivatives. These best practices are designed to guide you as you transition your institution away from USD LIBOR, providing a clear recommended timeline to help you achieve a seamless transition and ensure that your institution is ready for LIBOR to become unusable.

### As described in the best practices, the ARRC recommends that you:

- ✓ **Take active steps to meet the timelines** set out in the recommended transition milestones;
- ✓ **Have clear internal programs in place** to prepare for a transition away from USD LIBOR, including a rigorous assessment of exposures;
- ✓ **Be aware of additional ARRC recommendations** and incorporate additional ARRC recommended conventions into new contracts; and
- ✓ **Have an ongoing dialogue with your key stakeholders** to promote awareness of the transition away from LIBOR and their preparedness for it.

### These best practices are grounded in the ARRC's core guidance for preparing for the transition:

1. To the extent not already utilized, new USD LIBOR cash products should include ARRC-recommended, or substantially similar, fallback language as soon as possible.
2. Third-party technology and operations vendors relevant to the transition should complete all necessary enhancements to support SOFR by the end of 2020.
3. New use of USD LIBOR should stop, with timing depending on specific circumstances in each cash product market.
4. For contracts specifying that a party will select a replacement rate at their discretion following a LIBOR transition event, the determining party should disclose their planned selection to relevant parties at least six months prior to the date that a replacement rate would become effective.



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## User's Guide to SOFR



In April 2019, the ARRC published [the User's Guide to SOFR](#) – a comprehensive handbook for market participants looking to use SOFR in cash products – along with several ARRC-recommended conventions, including [syndicated loans conventions](#), [student loan conventions](#), [cross currency swap conventions](#), [FRN conventions matrix](#), and a [guide on using SOFR in ARMs](#).

In this practical guide, the ARRC provides four key considerations for you and your organization to think through as you prepare for the transition:

- 1** Financial products either explicitly or implicitly use some kind of average of SOFR – never a single day's reading of the rate – in determining the floating-rate payments that are to be paid or received. An average of SOFR will accurately reflect movements in interest rates over a given period of time and smooth out any idiosyncratic, day-to-day fluctuations in market rates.
- 2** Issuers and lenders will face a technical choice between using a simple or compounded average of SOFR as they seek to use SOFR in cash products. A compounded average will more accurately reflect the time value of money, which becomes a more important consideration as interest rates rise, and it can allow for more accurate hedging, which can result in better market functioning. The simple average of SOFR may be operationally easier, and the difference relative to the compounded average of SOFR is typically small even in higher rate environments.
- 3** Users need to determine the period of time over which the daily SOFRs are observed and averaged. An in advance structure would reference an average SOFR observed before the current interest period begins, while an in arrears structure would reference an average of SOFR over the current interest period.
- 4** An average of SOFR in arrears will reflect what actually happens to interest rates over the period, but it provides very little notice before payment is due. There have been a number of conventions designed to allow for a longer notice of payment within the in arrears framework – including payment delays, lookbacks, and lockouts – and different markets have successfully adopted each of these.

Note: The User's Guide specifically notes that those who are able to use SOFR should not wait for forward-looking rates in order to transition away from LIBOR.



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## Fallback Language



While the ARRC encourages market participants to write contracts referencing SOFR whenever possible, for those who continue to use USD LIBOR, the ARRC supports the transition to SOFR by publishing [recommended fallback language](#) for voluntary use in new USD LIBOR-linked contracts – provisions that specify:

- the trigger events for a transition to a replacement rate;
- the replacement rate itself; and
- the spread adjustment to align the replacement rate with the benchmark being replaced (in this case, USD LIBOR).

The ARRC developed this language for institutions with the goal of avoiding significant market disruption once LIBOR is no longer usable. With the end of LIBOR less than 18 months away, market participants should be incorporating robust fallback language in all new contracts referencing USD LIBOR to help facilitate a smooth transition to alternative reference rates.

The ARRC encourages you to review the recommended contractual fallback language it has published for each of the following products:

- [Floating rate notes](#)
- [Bilateral business loans](#)
- [Syndicated loans](#)
- [Securitizations](#)
- [Adjustable rate mortgages](#)

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## Helpful Tools From the ARRC

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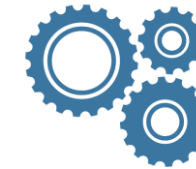
[Frequently Asked Questions](#)



[Practical Implementation Checklist](#)



[Buy-Side / Asset Owner Checklist](#)



[Internal Systems / Processes Transition Aid](#)



[ARRC Second Report](#)



[Syndicated Loan Conventions](#)



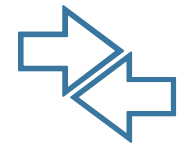
[Student Loan Conventions](#)



[Guide on Using SOFR in ARMs](#)



[FRN Conventions Matrix](#)



[Cross Currency Swap Conventions](#)