LIBOR Transition: SOFR, So Good

Implications of a new reference rate for your business • Q1 2020
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What is LIBOR?

A brief history of the London Interbank Offered Rate

The London Interbank Offered Rate (LIBOR) emerged in the 1980s as the fast-growing and increasingly international financial markets demanded a consistent rate to serve as a common reference rate for financial contracts. A Greek banker is credited with arranging the first transaction to be based on the borrowing rates derived from a “set of reference banks” in 1969.¹

The adoption of LIBOR spread quickly as many market participants saw the value in a common base rate that could underpin and standardize private transactions. At first, the rate was self-regulated, but in 1986 the British Bankers’ Association (BBA), a trade group representing the London banks, stepped in to provide some oversight. With the blessing of the Bank of England, they formalized the process of surveying a group of banks to answer the following question each day at 11:00 a.m.:

“At what rate could you borrow funds, were you to do so by asking for and then accepting interbank offers in a reasonable market size just prior to 11:00 a.m.?”

The data set originally included submissions from 20 banks and the BBA would drop the top and bottom submissions before publishing a trimmed mean rate.

From that point forward, LIBOR grew to be one of the most dominant and recognizable rates in the world. It serves as a reference rate for tens of millions of contracts worth more than $200 trillion USD.²

LIBOR is calculated and published daily across five currencies and seven maturities.

LIBOR is a critical component of the financial system, hardwired into not only global derivatives but also business loans, securitizations, floating rate notes, adjustable mortgages, and student loans.


Source: Wells Fargo Securities, IBA.
### Overall exposure per currency

<table>
<thead>
<tr>
<th>Currency</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD LIBOR</td>
<td>&gt;$200tn</td>
</tr>
<tr>
<td>GBP LIBOR</td>
<td>&gt;$30tn</td>
</tr>
<tr>
<td>EURIBOR</td>
<td>&gt;$150tn</td>
</tr>
<tr>
<td>CHF LIBOR</td>
<td>&gt;$6.5tn</td>
</tr>
<tr>
<td>JPY LIBOR</td>
<td>&gt;$30tn</td>
</tr>
<tr>
<td>TIBOR</td>
<td>&gt;$5tn</td>
</tr>
</tbody>
</table>

#### USD LIBOR and EURIBOR
USD LIBOR and EURIBOR together represent approximately 80% of the total IBOR market exposure.

<table>
<thead>
<tr>
<th>Product Type</th>
<th>USD LIBOR</th>
<th>EURIBOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derivatives</td>
<td>Over-the-counter (OTC) derivatives and exchange traded derivatives (ETD) represent more than $300tn (80%) of products referencing IBORs.</td>
<td></td>
</tr>
<tr>
<td>Syndicated loans³</td>
<td>$1.5tn of syndicated loans in the U.S. market reference USD LIBOR. 90% of the $535bn of syndicated loans in the euro market reference EURIBOR.</td>
<td></td>
</tr>
<tr>
<td>Floating Rate Notes</td>
<td>$1.8tn of FRNs in the U.S. market reference USD LIBOR. 70% of the $2.6tn of FRNs in the euro market reference EURIBOR.</td>
<td></td>
</tr>
<tr>
<td>Bilateral corporate loans³</td>
<td>$0.8tn of bilateral corporate loans in the U.S. market reference USD LIBOR. $4.3tn of bilateral corporate loans in the euro market reference EURIBOR.</td>
<td></td>
</tr>
</tbody>
</table>

### Efforts to “fix” LIBOR post-financial crisis

The financial crisis, which began in 2007, prompted the first major concerns over LIBOR’s credibility as the whole world watched these key rates behave in unpredictable and volatile ways that were inconsistent with other market rates and prices. A very public series of investigations by regulators into rate-fixing, rigging, and other market manipulation led to large fines, high-profile settlements, and, in a few cases, prison sentences. As the volume of direct borrowing underpinning LIBOR submissions decreased, LIBOR panel banks relied on hypothetical transactions and expert judgment.

George Wheatley, the U.K.’s Chancellor of the Exchequer, commissioned an independent review of LIBOR. The Wheatley Review of LIBOR yielded a number of constructive reforms that were implemented during 2013. The International Organization of Securities Commissions (IOSCO) also released its Principles for Financial Benchmarks in 2013, to articulate “best practices” on policy guidance, principles, and transparency for benchmarks used in financial markets. In early 2014, the ICE Benchmark Administration (IBA) took over the administration of LIBOR from the BBA and began publishing ICE LIBOR with more robust oversight and transparent guidelines as prescribed in the regulatory review. Despite these improvements, the fundamental challenge with LIBOR is that the volume of transactions that form the basis for the rate is no longer derived from a widely traded market, inconsistent with a key IOSCO principle that a benchmark should be anchored by an active market of observable, arm’s-length transactions.

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³Significant overlap exists between syndicated loans and bilateral corporate loans.
Why does LIBOR have to go?

“World’s Most Important Rate” lacks market-driven inputs

Despite improvements made post-financial crisis, the volume of inputs that support LIBOR has continued to shrink for a variety of reasons:

- **Basel III:** Pushes banks away from short-term unsecured funding markets. Money center banks no longer rely on unsecured interbank lending to finance their daily operations. Median daily volume of 3-month LIBOR is less than $1 billion.

- **Financial crisis:** Banks stopped lending to each other, which meant LIBOR did not always reflect actual extensions of short-term interbank credit.

- **Manipulation:** LIBOR has been found susceptible to market manipulation by: 1) traders looking to bolster profits by skewing the average LIBOR fixing in their favor on a given day and 2) banks submitting artificially low rates during periods of disruption so as not to trigger loss of confidence from investors, market participants, or regulators.

- **Reference Banks:** Concerns about willingness of contributors to continue voluntarily submitting judgment-based quotes

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**Secured Overnight Financing Rate**

**Overnight Bank Funding Rate**

**Effective Federal Funds Rate**

**3-Month T-Bills**

**3-Month LIBOR**

**3-Month AA Non-Financial CP**

**3-Month A2/P2 Non-Financial CP**

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Source: Federal Reserve Bank of New York; Financial Industry Regulatory Authority; DTCC Solutions LLC, an affiliate of the Depository Trust & Clearing Corporation; and the Board of Governors of the Federal Reserve System.

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**LIBOR submissions varied dramatically post-Lehman collapse**

Source: Thomson Reuters.
Replacing the “IBORs” is an international effort

The massive undertaking to replace interbank offered rates (IBORs) is not simply a U.S. or U.K. effort, but a coordinated, global initiative. The path forward is being paved in multiple jurisdictions advancing on different timelines. International working groups have identified alternative reference rates, as shown in the table to the right, and are developing a transition strategy for each currency IBOR. In some jurisdictions, the new alternative reference rate will co-exist alongside other IBORs, such as EURIBOR or TIBOR.

Recently, the UK Financial Conduct Authority (FCA) called for banks to make SONIA the market convention in the UK at the end of Q1 2020 by making it standard to quote and offer swaps based on SONIA instead of GBP LIBOR unless a particular reason for preferring LIBOR to SONIA exists.

<table>
<thead>
<tr>
<th>IBOR</th>
<th>Successor Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD LIBOR</td>
<td>Secured Overnight Financing Rate (SOFR)</td>
</tr>
<tr>
<td>GBP LIBOR</td>
<td>Reformed Sterling Overnight Index Average (SONIA)</td>
</tr>
<tr>
<td>EURIBOR</td>
<td>Not expected to be discontinued</td>
</tr>
<tr>
<td>Euro LIBOR</td>
<td>Euro Short-term Rate (€STR) or EURIBOR</td>
</tr>
<tr>
<td>EONIA(^1)</td>
<td>Euro Short-term Rate (€STR)</td>
</tr>
<tr>
<td>CHF LIBOR</td>
<td>Swiss Average Rate Overnight (SARON)</td>
</tr>
<tr>
<td>JPY LIBOR</td>
<td>Tokyo Overnight Average Rate (TONAR) or TIBOR</td>
</tr>
<tr>
<td>TIBOR</td>
<td>Not expected to be discontinued</td>
</tr>
</tbody>
</table>

The foundation for global transition oversight was laid in 2013 – 2017

G20 finance ministers and central bank governors commissioned the Financial Stability Board (FSB) to review and reform major interest rate benchmarks. It is comprised of major regulatory bodies across the globe including the Fed, the Securities and Exchange Commission (SEC) and the U.S. Treasury.

The FSB established the Official Sector Steering Group (OSSG) to coordinate reviews of widely used benchmarks. This is co-chaired by the Fed Chairman and Financial Conduct Authority (FCA).

International Organization of Securities Commissions (IOSCO) published principles for benchmark reform. These principles are followed by global regulators, including U.S. regulators. IOSCO principles govern work of FSB, OSSG, and MPG.

2014 – 2017: Working groups have been established in the U.S., U.K., Eurozone, Switzerland, and Japan to identify and transition IBORs to alternative reference rates.

The OSSG engaged the International Swaps and Derivatives Association (ISDA) to implement more robust fallbacks for benchmarks in the ISDA Definitions.

The FCA announced that it would no longer compel panel banks to submit LIBOR after 2021.


\(^1\)EONIA was recalibrated on October 2, 2019, to be €STR + 8.5bps. It will be published in this manner until January 3, 2022, at which point it will be discontinued.
The important mission of the Alternative Reference Rates Committee (ARRC)

In November 2014, the Federal Reserve convened the ARRC, a public/private sector working group, to explore alternatives for replacing USD LIBOR as a benchmark rate in the U.S. **The ARRC’s mission is to identify best practices for alternative reference rates, develop an adoption plan, and create an implementation plan with metrics of success and a timeline.** In June 2017, the ARRC officially endorsed the Secured Overnight Financing Rate (SOFR) as its preferred alternative reference rate. For many, this news and the subsequent speech by the head of the FCA, stating that the FCA would no longer compel banks to submit quotes for LIBOR after 2021, served as a call to action. As traction has increased on this historic undertaking, so has participation in the overall transition process. Membership of the ARRC was expanded in March 2018 to include a number of asset managers, insurance companies and trade associations. In total there are 31 firms (including Wells Fargo), 11 U.S. government agencies as ex officio members, and 5 observers on the Committee.\(^7\)

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\(^6\)Alternative Reference Rates Committee.  


Observers: Bank of Canada, BNP Paribas, Cadwalader, Morgan Lewis, Venerable
LIBOR transition background | ARRC 2.0 Paced Transition Plan

The ARRC announced a Paced Transition Plan (PTP) in October 2017, which established a process and timeline for building market structure and liquidity in derivatives and cash products that reference SOFR. The plan entails generally building market acceptance around SOFR. The final step will be developing a term structure. The timeline below includes some key milestones in the transition.

**ARRC 2.0 Paced Transition Plan**

<table>
<thead>
<tr>
<th>Key ARRC and Other Developments</th>
<th>Paced Transition Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARRC selected SOFR as its recommended alternative to USD LIBOR.</td>
<td>ARRC Paced Transition Plan approved.</td>
</tr>
<tr>
<td>FCA’s Bailey said panel banks will not be compelled to submit LIBOR past 2021.</td>
<td></td>
</tr>
<tr>
<td>ARRC’s second report published. ARRC reconstituted with expanded membership.</td>
<td></td>
</tr>
<tr>
<td>FCA, CFTC, FRB regulator speeches highlighting need to prepare for transition.</td>
<td></td>
</tr>
<tr>
<td>ARRC issued guiding principles for fallback contract language.</td>
<td></td>
</tr>
<tr>
<td>S&amp;P announced SOFR is an “anchor money market reference rate.”</td>
<td></td>
</tr>
<tr>
<td><strong>2019:</strong> ARRC published fallback language for bilateral loans, syndicated loans, securitizations, floating rate notes and residential adjustable rate mortgages. New York Fed produced an indicative SOFR-based term reference rate based on futures data to help promote market familiarity with the term rate.</td>
<td></td>
</tr>
<tr>
<td><strong>2020:</strong> Continue to build SOFR-linked cash and derivatives instruments.</td>
<td></td>
</tr>
<tr>
<td><strong>Q3 2020:</strong> CCPs to begin allowing a choice between clearing new or modified swap contracts in current PAI/discounting environment or SOFR for PAI/discounting.</td>
<td></td>
</tr>
<tr>
<td><strong>Q2:</strong> CCPs to no longer accept new swaps contracts for clearing with EFFR as PAI and discounting.</td>
<td></td>
</tr>
<tr>
<td><strong>EOY:</strong> Create a forward-looking SOFR term reference rate.</td>
<td></td>
</tr>
</tbody>
</table>

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What should I know about SOFR?

Overview of SOFR

Officially launched in April 2018, SOFR is a broad measure of the cost of borrowing cash overnight secured by Treasury securities. The Federal Reserve Bank of New York (FRBNY) publishes daily rates and volumes on its website: https://apps.newyorkfed.org/markets/autorates/SOFR.

The actual inputs for the Secured Overnight Financing Rate incorporate three data sets illustrated in the charts below:

- Tri-party treasury repo data collected by BNY Mellon
- General collateral repo data collected by The Depository Trust & Clearing Corporation (DTCC)
- Bilateral treasury repo data collected by Fixed Income Clearing Corporation (FICC)\(^8\)

The market underlying SOFR has a daily trading volume of roughly $750+ billion and has demonstrated consistent volume for several years. In December 2019, daily volumes exceeded $1 trillion.\(^9\)

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\(^8\)Excludes “specials” which are repos for specific-issue collateral, which take place at cash-lending rates below those for general collateral repos because cash providers are willing to accept a lesser return on their cash in order to obtain a particular security.

Why are repo transactions so important?

Repo serves as a proxy for a “risk free” rate

The IOSCO Principles for Financial Benchmarks are a set of guidelines and best practices established by global regulatory bodies to ensure transparency and confidence in global benchmarks. A key principle provides for benchmarks based on “overnight risk-free, or nearly risk-free, rates (RFRs) that are sufficiently robust for such extensive use.” To align with these objectives, the ARRC selected a benchmark based on the secured Treasury repo market as its alternative reference rate due to the depth, resilience, and transparency of the market. Money market mutual funds, asset managers, securities lenders, and securities dealers, among others, are key participants in this short-term lending market.

A repurchase agreement (repo) is a form of short-term financing where one party (Party A) sells securities (e.g., Treasury bonds) to another party (Party B), usually on an overnight basis, and then buys them back the following day at a pre-set price. Essentially, repos are fully collateralized sale and repurchase transactions whereby the securities secure Party B’s cash and the cash secures Party A’s securities with the economic intention that the market risk and reward of the underlying securities remain with Party A. The buyer (Party B) acts as a short-term lender and the seller (Party A) as a short-term borrower, fully collateralized by the securities in the trade. The difference between the price paid at the beginning of the contract and price received at the end equals the return to the original seller (Party A).

A reverse repurchase agreement (reverse repo) describes the position of the counterparty on the other side of the repo transaction (e.g., from the buyer’s point of view as a purchase and resale transaction). The buyer has an agreement to purchase a security today (opening leg) and then sell it back at a higher price on the future date (closing leg).

Repo agreements are critical to the efficient working of the financial markets.

Overview of Repo Transactions

<table>
<thead>
<tr>
<th>Repo (Party A)</th>
<th>Opening Leg</th>
<th>Reverse Repo (Party B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterparty (Cash Investors)</td>
<td>Treasuries</td>
<td>Counterparty (Securities Dealers)</td>
</tr>
<tr>
<td>• Broker Dealers</td>
<td>Cash (X% of Treasury Value)</td>
<td>• Banks</td>
</tr>
<tr>
<td>• Fund Managers</td>
<td></td>
<td>• Broker Dealers</td>
</tr>
<tr>
<td>• Pension Funds</td>
<td></td>
<td>• Hedge Funds</td>
</tr>
<tr>
<td>• Municipalities</td>
<td></td>
<td>• Other Securities Dealers</td>
</tr>
<tr>
<td>• Other Securities Owners</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Closing Leg:

| Cash + Repo Interest | Treasuries |

Overview:

- Tri-Party Repo: Cash and collateral are exchanged via a third-party custodial bank who facilitates settlement and other operational processes.
- General Collateral Financing (GCF): Tri-Party Repo which is executed without designation of specific securities until the end of the trading day. Dealers and Investors interact through intermediaries.
- Bilateral/Delivery vs Payment: There are two parties to the transaction, under one agreement and cash and collateral are exchanged simultaneously via an agreed settlement system.


10Financial Stability Board “Interest rate benchmark reform – overnight risk-free rates and term rates” July 12, 2018
11Repos perform four basic functions: 1) safe investment vehicles, 2) liquid asset financing facilities, 3) yield enhancement opportunities, and 4) liquidity facilities to cover variation margin.
How can SOFR fill LIBOR’s big shoes?

Key qualitative differences between SOFR and LIBOR

- **SOFR is an overnight rate** and therefore does not have a term structure (e.g., 1-, 3-, or 6-month rates; although, it is contemplated that there may be a SOFR term structure in the future).

- **SOFR is a secured borrowing rate** and therefore does not reflect the interbank unsecured credit component inherent in LIBOR.

- **SOFR is supported by over a trillion dollars in daily transaction volumes** and is administered by FRBNY whereas LIBOR has few actual trades underpinning the rate itself, which is administered by ICE Benchmark Administration.12

Key quantitative differences between SOFR and LIBOR

While the FRBNY formally began publishing SOFR in 2018, it has published historical data from 2014 to provide additional context for the market. The Fed also polled various repo dealers to gather data going back to 1998 to develop a longer-term proxy for SOFR performance over various economic cycles.

### LIBOR vs SOFR: Quick Summary of the Historic Differential

<table>
<thead>
<tr>
<th>Data Period Analyzed</th>
<th>1-month LIBOR - SOFR</th>
<th>3-month LIBOR - SOFR</th>
<th>6-month LIBOR - SOFR</th>
<th>Fed Funds - SOFR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Avg daily differential since August 22, 2014</strong> (when FRBNY started publishing SOFR)</td>
<td>0.119%</td>
<td>0.293%</td>
<td>0.466%</td>
<td>0.018%</td>
</tr>
<tr>
<td><strong>Avg daily differential since February 1, 1998</strong> (furthest back that the Fed could collect General Collateral Data which would have been a good proxy for SOFR)</td>
<td>0.212%</td>
<td>0.334%</td>
<td>0.470%</td>
<td>0.058%</td>
</tr>
<tr>
<td><strong>Avg daily differential during 2008 – 2009</strong> (focus on performance during financial crisis)</td>
<td>0.884%</td>
<td>1.329%</td>
<td>1.610%</td>
<td>0.108%</td>
</tr>
<tr>
<td><strong>95th percentile differential point</strong> (based on full data set available since February 1, 1998)</td>
<td>0.532%</td>
<td>0.877%</td>
<td>1.074%</td>
<td>0.200%</td>
</tr>
<tr>
<td><strong>5th percentile differential point</strong> (based on full data set available since February 1, 1998)</td>
<td>-0.006%</td>
<td>0.001%</td>
<td>-0.049%</td>
<td>-0.080%</td>
</tr>
</tbody>
</table>

Source: Wells Fargo Securities, FRBNY, Bloomberg, as of October 30, 2019

- SOFR simulations since August 2014 show that SOFR averaged 11.9 bps, 29.3 bps, 46.6 bps, and 1.8 bps less than 1-month LIBOR, 3-month LIBOR, 6-month LIBOR, and Fed Funds respectively.

- Based on this data, a loan priced at 3-month LIBOR + 150 bps would hypothetically equate to SOFR + 179.3 bps (credit spread of 150 bps and 29.3 bps basis adjustment).

- The positive differential for most of the values in the table shows that term LIBORs are typically higher than SOFR (as would be expected). The data points from the 5th and 95th percentile show that there have been times where SOFR was higher than a term LIBOR, but that has not been the norm.

- The distribution of the data also shows that LIBOR has more upside variability. For example, the differential between 3-month LIBOR and SOFR at the 5th percentile and 95th percentile range from 0.1 bps to 87.7 bps, but the average is 33.4 bps.

12Daily volume of SOFR averaged in excess of $1 trillion in December 2019. [https://apps.newyorkfed.org/markets/autorates/sofr](https://apps.newyorkfed.org/markets/autorates/sofr)

Understanding Repo Volatility and the Federal Reserve Board
Open Market Operations

Daily observed SOFR is more volatile than LIBOR on any given day due to SOFR’s greater sensitivity to real-time market dynamics. Trading activity around month and quarter-ends, when companies adjust balance sheets for reporting requirements, typically causes repo rates, including SOFR, to rise. Other activity in the secured funding markets can similarly cause repo rates to rise, such as bank reserve volumes, liquidity, Treasury settlements, and auctions.

On September 17, 2019, the repo market experienced a significant spike in rates, with general collateralized repos increasing over 800 basis points overnight to 10% from about 2% and SOFR increasing about 300 basis points to 5.25% from 2.2%. This substantial spike resulted from a confluence of technical aspects of the Treasury market, notably the lack of liquidity due to the need for corporations to make tax payments, which is estimated to have drained approximately $100 billion from the system and $54 billion in net supply of mid-month Treasury settlements. The combination of a reduction in cash reserves plus an increase in collateral in the system likely exacerbated the funding squeeze, resulting in a spike in repo rates. In response, the Federal Reserve stepped in to purchase several billion in Treasuries, infusing the market with needed liquidity and became an active lender of cash in the repo market on both an overnight and term basis. The Fed’s actions resulted in a return to repo rates, including SOFR, closer to the Fed’s target federal funds rate.

Despite greater overnight variability, average daily SOFR has been less volatile than 3-month LIBOR. Although SOFR rose sharply over a few days in mid-September, the three-month average rose only two basis points. By comparison, the three-month average LIBOR rose four basis points over the same period.

Since the September spike in repo rates, the Fed has continued to inject liquidity into the market, which has muted much of the overnight volatility. Notably, the typical year-end repo spike did not manifest going into 2020 as a result of Fed intervention.

The following figure shows SOFR’s daily fluctuations and its September spike.


13 Wells Fargo Securities “Economics and Rate Strategy: Repo Running Wild” September 17, 2019
https://www08.wellsfargomedia.com/assets/pdf/commercial/insights/economics/special-reports/funding-pressures-20190917.pdf
14 Ibid
15 Tom Wipf, ARRC Chair. “Wave Goodbye to Libor. Welcome Its Successor, SOFR” December 6, 2019
https://www.bloomberg.com/opinion/articles/2019-12-06/wave-goodbye-to-libor-welcome-its-successor-sofr
Tackling SOFR implementation

Choosing SOFR as the go-forward benchmark rate is the easiest part of the process. Actually replacing LIBOR is a highly complex undertaking for numerous reasons, including, but not limited to:

- Tens of millions of contracts, totaling more than $200 trillion, reference USD LIBOR.
- LIBOR is the benchmark for a very wide spectrum of products ranging from residential mortgages to corporate bonds to derivatives (and everything in between).
- SOFR is a liquid, risk-free rate, which lacks the interbank credit component inherent in LIBOR.

Three of the most critical transition questions for cash products and derivatives are:

- How to create a term structure from the overnight SOFR rate?
- How to coordinate the conversion of contractual documentation?
- How to address the differences between LIBOR and SOFR from an economic standpoint, specifically value transfer

Currently, regulators, swap dealers, financial institutions, asset managers, and other market participants are considering a variety of alternatives to address these items in the derivative and cash markets.

**Term Structure.** A SOFR term rate is not guaranteed and may not be available until after a potential LIBOR cessation at the end of 2021. Therefore, a transition strategy with a heavy reliance on a term SOFR carries increased risk.

**Contractual Documentation.** Many types of financial contracts do not include provisions (known as “fallback language”) that adequately address a permanent end to LIBOR, while others have ambiguous language. ISDA is in the process of developing fallback language that sets forth the steps to be taken, or the interest rate to be applied should LIBOR be discontinued during the term of a contract for use in derivatives (See page 18) and the ARRC published fallback recommendations for non-derivatives (See page 20).

**Value Transfer.** Almost all existing LIBOR contracts would, upon a permanent end to LIBOR, dramatically change the economics of hundreds of thousands of contracts and create complex problems for parties or courts to sort out. ISDA, the ARRC and other international working groups recognize that LIBOR and the alternative reference rates are fundamentally different and have stated that a spread adjustment is needed to make the successor rates more comparable to LIBOR and they have (or soon plan) to consult the market on the appropriate spread adjustment methodology.
SOFR Interest Accruals and the SOFR Index

Like many other overnight rates such as effective federal funds rate (EFFR) used in overnight index swaps (OIS), financial products will likely use some kind of average of SOFR for determining the floating rate payments. Issuers and lenders will face a technical choice between using a simple or a compound average of SOFR as well as whether the averages will use in-arrears or forward calculations. The ARRC published “A User’s Guide to SOFR” to help market participants understand how they can use an overnight rate. The Guide contains the following key concepts for users to consider:

- Use of a simple or compound average of SOFR;
- The period of time over which the daily SOFRs are observed and averaged. An in advance structure would reference an average of SOFR observed before the current interest period begins, while an in arrears structure would reference an average of SOFR over the current interest period;
- Calculation conventions in order to allow for advance notice of payment within the in arrears framework: payment delay, lockout or suspension period, or lookback.

Those who are able to use SOFR should not wait for forward-looking term rates in order to transition from LIBOR.

Both the ARRC and the Financial Stability Board have made compound calculations available to promote clear and consistent use of overnight rates. Compounded averages of SOFR have been increasingly adopted by issuance in the floating rate note market and will be included in ISDA’s amended Definitions for LIBOR fallback rates (see page 18). Market participants can apply payment notification adjustments as needed, particularly a lookback period or payment delay.

The Official Sector advises market participants to act now to effect an orderly transition

The LIBOR transition is being led by the working groups in each IBOR currency jurisdiction, and in the U.S. market, the ARRC represents a public-private partnership under the guidance of the Fed. While regulators are generally looking to the market to facilitate the transition away from LIBOR and into new alternative reference rates such as SOFR, they have strongly emphasized the importance of prioritizing transition work ahead of the 2022 timeline.

In December 2019, the Fed announced that the LIBOR transition is one of its top supervisory priorities for 2020. Similarly, the OCC stated that it is increasing oversight of the LIBOR transition through 2020 and 2021. Both agencies, as well as the Chairman of the Commodity Futures Trading Commission and SEC staff, noted that LIBOR’s discontinuation and the movement to a new reference rate may increase operational, compliance, and reputational risks to market participants and the financial system, and that these risks will be exacerbated unless the work to transition is accomplished in a timely manner.

“I believe that the ARRC has chosen the most viable path forward and that most will benefit from following it, but regardless of how you choose to transition, beginning that transition now would be consistent with prudent risk management and the duty that you owe to your shareholders and clients.”

— Randal K. Quarles, Vice Chair for Supervision, Federal Reserve Board, and the Chair of the Financial Stability Board

Source: https://www.federalreserve.gov/newsevents/speech/quarles20190603a.htm

“...I have a word of caution to anyone hoping that LIBOR will continue into 2022. It is simply this: failing to transition away from LIBOR is source of risk to your individual firm as well as the global financial system. The CFTC agrees with our fellow regulators here and abroad that it is time for global financial markets to move away from LIBOR. We want to encourage and facilitate that transition.”

— Heath P. Tarbert, Chairman of the CFTC

Source: https://www.cftc.gov/PressRoom/SpeechesTestimony/tarbertstatement121119
Practical Considerations

To facilitate the work required to change from LIBOR to SOFR, the ARRC published a [practical implementation checklist](#) that outlines steps to consider to mitigate risks and ensure a smooth transition. The checklist contains a list of practical considerations for the following 10 categories:

- **Establish Program Governance**: Implement a robust governance framework with accountable senior executives to oversee the delivery and coordination of the firm’s enterprise-wide LIBOR transition program.

- **Develop Transition Management Program**: Establish an enterprise-wide program across functions and businesses to evaluate and mitigate the risks associated with transition with specific considerations for unique product and client exposures.

- **Implement Communication Strategy**: Develop and implement an enterprise-wide strategy with clear objectives to proactively engage, consistently communicate, and increase levels of education with impacted internal and external stakeholders.

- **Identify and Validate Exposure**: Quantify and develop a flexible approach to monitor LIBOR-linked exposures through the transition period. Obtain or develop capabilities to value SOFR-based products as part of transition to using those products.

- **Develop Product Strategy**: Develop strategy for redesigning or transitioning the existing portfolio of LIBOR products, including creating or using new products based on SOFR.

- **Risk Management**: Identify, measure, monitor and control financial and non-financial risks of transition, establishing processes and oversight routines for ongoing management.

- **Assess Contractual Remediation Impact and Design Plan**: Understand the financial, customer, and legal impacts resulting from transitioning from LIBOR to SOFR via fallbacks, and plan mechanisms for implementing.

- **Develop Operational and Technology Readiness Plan**: Develop a plan to address the large scale operating model, data and technology implications required for LIBOR transition.

- **Accounting and Reporting**: Determine accounting considerations along with related reporting considerations.

- **Taxation and Regulation**: Determine the tax and regulatory reporting considerations.

While not exhaustive, the ARRC’s checklist provides a practical guide to organizing and managing LIBOR transition for individual market participants.
Addressing Legacy Contracts: Fallback provisions of various asset classes

Contracts in both the derivative and cash markets contain fallback language in the event a LIBOR rate is not available. However, existing language was drafted assuming a temporary discontinuation of LIBOR, not a permanent cessation.

The ARRC released four guiding principles in regards to developing new LIBOR fallback language:

**Guiding Principle 1:** Market participants should not wait too long to begin implementing new language. Since there are still many unknowns, language should be flexible.

**Guiding Principle 2:** Fallback language should be consistent across and within asset classes.

**Guiding Principle 3:** Fallback language should be based on observable facts, have feasible implementation, and should minimize value transfer.

**Guiding Principle 4:** Replacement language should provide triggers for when successor rate and spread adjustments should occur.

While recommended fallbacks are designed to mitigate value transfer, fallbacks will invariably lead to some degree of value transfer. The best way to transition is through amendment of the reference rate prior to a permanent cessation.

Overview of General Legacy Fallback Provisions of Various Asset Classes

| Derivatives | • Under the 2006 ISDA Definitions, if USD-LIBOR-BBA is not available on the relevant Reuters screen, reference rates will be requested from reference banks. The new rate would be the average of the quotations given. However, the definition does not address the event that no reference banks are willing to provide a reference rate.  
|            | • ISDA is expected to release new fallback language for deals going forward; however, the language will not retroactively apply to existing deals without consent from both parties (via adherence to ISDA protocols or bilateral amendments). |
| Corporate Loans | • Fallback language in credit agreements vary, but typically reference a “base rate” which is often Prime.  
|            | • Changes to fallback language will need to be negotiated between borrower and lender and in the case of syndicated loans, all or most of the lenders would need to agree to the change. |
| Floating Rate Notes (FRN) and Securitizations | • Similar to derivatives, fallback language for FRNs and securitizations typically rely on receiving quotes from reference banks. In the event no reference rates are available, the security will convert to fixed at the most recent LIBOR period fix.  
|            | • FRNs and securitizations are anticipated to be one of the most challenging to amend. For securities with a large number of investors, any amendment usually requires a significant majority, and in some cases 100%, of holders to agree to a change. |
| Mortgages and Consumer Loans | • Both mortgages and consumer loans provide more flexibility to the lender than the borrower. |

How will derivative contracts be impacted?

Proposed approach for replacing LIBOR in the derivatives markets

ISDA intends to amend its standard definitions to implement alternative reference rates (ARRs) for certain key IBORs, including LIBOR, to protect against the risk that those IBORs could cease at some point in the future. ISDA has conducted several market-wide consultations to determine fallback rates and adjustments for multiple currency IBORs.

**Cash Market LIBOR Footprint by Product**

<table>
<thead>
<tr>
<th>Market</th>
<th>Product</th>
<th>Volume ($T)</th>
<th>End 2021</th>
<th>End 2025</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Over-the Counter Derivatives</strong></td>
<td>Interest Rate Swaps</td>
<td>81</td>
<td>66%</td>
<td>88%</td>
</tr>
<tr>
<td></td>
<td>Forward Rate Agreements</td>
<td>34</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Interest Rate Options</td>
<td>12</td>
<td>65%</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>Cross Currency Swaps</td>
<td>18</td>
<td>88%</td>
<td>93%</td>
</tr>
<tr>
<td><strong>Exchange Traded Derivatives</strong></td>
<td>Interest Rate Options</td>
<td>34</td>
<td>99%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Interest Rate Futures</td>
<td>11</td>
<td>99%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Federal Reserve staff calculations, BIS, Bloomberg, CME, DTCC, Federal Reserve Financial Accounts of the United States, G.19. Shared National Credit, Y-14 data and JPMorgan Chase; Data are gross notional exposures as of year-end 2016.

**One key advantage for the derivatives market is that documentation is relatively standard.** Most swaps reference the ISDA Definitions, which ISDA amends from time to time. ISDA can facilitate amendment of legacy trades by publishing a multilateral protocol that counterparties can voluntarily choose to adopt. By adhering to the protocol, market participants would agree that their legacy derivative contracts will include the amended fallback rate option for the relevant IBOR. Once ISDA updates the 2006 ISDA Definitions, all new transactions that incorporate those Definitions will include the new fallbacks.

**ISDA plans to finalize its LIBOR definitions and publish a protocol in Q1 2020.**

**Main challenges**

- Value transfer at the time LIBOR is discontinued as a result of the differences between the IBORs and the ARR. The differential is primarily driven by 1) the lack of a term structure, and 2) the lack of an embedded credit spread premium in the ARRs. ISDA has outlined adjustments to the ARRs to account for these differences (see following page).
- The FSB’s advice to market participants to use only overnight rates in derivative fallback language.
- Bespoke swap contracts that do not reference ISDA Definitions.
- Parties that do not adhere to the ISDA LIBOR protocols.
Fallback Rate and Spread Adjustment

After several market-wide consultations, ISDA has selected a fallback rate and spread adjustment that will be incorporated into the Amended 2006 ISDA Definitions.16

**Fallback Rate for USD LIBOR:** Compounded average SOFR calculated in arrears. SOFR compounding period will correspond to the length of transaction’s calculation period with two-banking day backward-shifted observation period so that payments are known before they become due (e.g., 30 day average for 1-month LIBOR or 90 day average for 3-month LIBOR)

**Spread Adjustment for USD LIBOR:** Spread adjustment based on the historical median between LIBOR and compounded SOFR calculated over a 5-year lookback period

**Next Steps**

Amended ISDA definitions will include two triggers (i.e., the events that precipitate the transition from LIBOR to the new reference rate) relating to the permanent unavailability of LIBOR.17

1. The Administrator of LIBOR (ICE Benchmark Administration (IBA)) issues a public statement announcing that it has ceased or will cease to provide LIBOR permanently or indefinitely, and there is no successor administrator

2. The regulator of the administrator of LIBOR (the U.K. FCA), the central bank for the LIBOR currency, or an entity with insolvency or resolution authority over the administrator of LIBOR states that LIBOR has ceased or will cease to be provided, and there is no successor administrator

ISDA is currently considering whether to include a third trigger, which would be a pre-cessation trigger. ARRC recommended fallback language for cash products includes a “pre-cessation” trigger, which occurs upon a public statement or publication of information by the FCA announcing that LIBOR is “no longer representative of the underlying market or economic reality.” ISDA has not yet determined if the amended ISDA definition will also provide for a pre-cessation trigger event.

**Central Clearing Party “Big Bang”**

Market participants anticipate that effective at close of business on October 16, 2020, central clearing houses: (i) will use SOFR for price aligned interest (PAI) and discounting of new U.S. dollar swap contracts going forward (in place of EFFR); and (ii) will modify outstanding swap contracts to replace EFFR with SOFR for PAI and discounting. Central Clearinghouses have made similar announcements with respect to a transition of PAI and discounting from EONIA to €STR.

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16 [https://www.isda.org/category/legal/benchmarks/](https://www.isda.org/category/legal/benchmarks/)
17 [https://www.isda.org/a/n6tME/Supplemental-Consultation-on-USD-LIBOR-CDOR-HIBOR-and-SOR.pdf](https://www.isda.org/a/n6tME/Supplemental-Consultation-on-USD-LIBOR-CDOR-HIBOR-and-SOR.pdf)
How will loans and bonds be impacted?

Replacing LIBOR in the cash markets

Cash market participants are actively working to create fallback language for new LIBOR-based cash products.

Current LIBOR fallback language in loan documents was often designed without the permanent discontinuation of LIBOR in mind and is either unworkable (e.g., polling reference banks) or allows lender/agent discretion to select a new rate, as described on page 17.

The ARRC has worked to develop more robust fallback language to address a permanent cessation of LIBOR. In 2019, the ARRC published recommended fallback language for floating rate notes, business loans, securitizations, syndicated loans and closed-end, residential adjustable rate mortgages (ARMs). The recommended fallback provisions define the trigger events and provide for the selection of a new reference rate to replace LIBOR as well as a spread adjustment to account for the differences between LIBOR and the replacement rate. For ARMs, the recommended language provides for an adjusted index comprised of SOFR plus a spread. The Fed expects to publish such an adjusted index in 2020.

To support the use of SOFR in new contracts, the Loan Syndications and Trading Association (LSTA) released a sample credit agreement to familiarize market participants with replacement benchmark alternatives. The sample agreement references a compounded average of daily SOFRs calculated in arrears. The LSTA is seeking feedback on the agreement and intends to publish a final document in the first quarter of 2020. The Loan Market Association (LMA) has also published draft SOFR and SONIA credit agreements for market comment.

The first SOFR-based instruments were issued in the Investment Grade Floating Rate Note market in July 2018 and subsequent issuances continue to be well-received by investors. The notes have been issued with a variety of coupon conventions (daily resets as well as simple and compounded averaging), different pay frequencies (monthly and quarterly) and lockout periods (the number of days where SOFR is frozen at the end of each pay period to provide for interest calculation). Some SOFR notes have been left unhedged and others hedged with a LIBOR basis swap.

Market participants have done significant work to identify and standardize conventions for SOFR products. To facilitate the awareness of conventions used to date, the ARRC released a Floating Rate Note conventions matrix that illustrates look-backs, lockouts and payment delays that have been included in debt market issuances. The matrix is intended to supplement to the ARRC’s “User’s Guide to SOFR”. An appendix to the matrix includes (1) term sheets with key provisions to provide additional explanation on how to issue compounded SOFR-based floating rate notes and (2) recommended fallback language for SOFR-based floating rate notes.

Cash Market LIBOR Footprint by Product

<table>
<thead>
<tr>
<th>Market</th>
<th>Product</th>
<th>Volume ($T)</th>
<th>End 2021</th>
<th>End 2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Loans</td>
<td>Syndicated Loans</td>
<td>1.5</td>
<td>83%</td>
<td>97%</td>
</tr>
<tr>
<td></td>
<td>Nonsyndicated Business Loans</td>
<td>0.8</td>
<td>86%</td>
<td>97%</td>
</tr>
<tr>
<td></td>
<td>Nonsyndicated CRE/Com. Mortgage</td>
<td>1.1</td>
<td>83%</td>
<td>94%</td>
</tr>
<tr>
<td>Consumer Loans</td>
<td>Retail Mortgages</td>
<td>1.2</td>
<td>57%</td>
<td>82%</td>
</tr>
<tr>
<td>Bonds</td>
<td>Floating/Variable Rate Notes</td>
<td>1.8</td>
<td>84%</td>
<td>93%</td>
</tr>
<tr>
<td></td>
<td>Mortgage-backed Securities</td>
<td>1</td>
<td>57%</td>
<td>81%</td>
</tr>
<tr>
<td></td>
<td>Collateralized Loan Obligations</td>
<td>0.4</td>
<td>26%</td>
<td>72%</td>
</tr>
<tr>
<td></td>
<td>Asset-Backed Securities</td>
<td>0.2</td>
<td>55%</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Collateralized Debt Obligations</td>
<td>0.2</td>
<td>48%</td>
<td>73%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Issuer Name</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHLB</td>
<td>164.1</td>
</tr>
<tr>
<td>Freddie Mac</td>
<td>67.8</td>
</tr>
<tr>
<td>Fannie Mae</td>
<td>21.5</td>
</tr>
<tr>
<td>Credit Suisse</td>
<td>19.3</td>
</tr>
<tr>
<td>Federal Farm Credit Banks</td>
<td>7.9</td>
</tr>
<tr>
<td>MetLife</td>
<td>6</td>
</tr>
<tr>
<td>Citi</td>
<td>5.3</td>
</tr>
<tr>
<td>Goldman</td>
<td>4.1</td>
</tr>
<tr>
<td>Bank of Montreal</td>
<td>3.5</td>
</tr>
<tr>
<td>Bank of Nova Scotia</td>
<td>1.7</td>
</tr>
<tr>
<td>World Bank</td>
<td>1.5</td>
</tr>
<tr>
<td>JPMorgan</td>
<td>1.5</td>
</tr>
<tr>
<td>Wells Fargo</td>
<td>1.1</td>
</tr>
<tr>
<td>Various Other Issuers</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>$334</td>
</tr>
</tbody>
</table>

Source: Federal Reserve staff calculations, BIS, Bloomberg, CME, DTCC, Federal Reserve Financial Accounts of the United States, G.19, Shared National Credit, Y-14 data and JPMorgan Chase. The figures are syndicated and corporate loans do not include undrawn lines. Nonsyndicated business loans exclude CRE/commercial mortgage loans. Estimated maturities for retail mortgages based on historical pre-payment rates.

How is Wells Fargo contributing?

Wells Fargo is a leader in the LIBOR transition process

Wells Fargo is a leading presence at the ARRC
- Chair of Floating Rate Notes working group
- One of two banking institutions participating in all working groups
- Assumed leadership role in the drafting of key industry papers (Title VII relief letter, ARRC FAQ documents, and ARRC fallback language consultations)

Wells Fargo has regular dialogue with LIBOR transition leadership at ISDA, Loan Syndications & Trading Association (LSTA), and American Bankers Association (ABA), among other organizations.

Wells Fargo frequently speaks at industry conferences including ARRC roundtables, Securities Industry and Financial Markets Association (SIFMA), ISDA and Structured Finance Association (SFA).

As part of Wells Fargo’s commitment to the SOFR transition, Wells Fargo was the first globally systemically important bank to issue SOFR-linked notes.

Wells Fargo is one of the world’s largest banks by market capitalization; a top five U.S. bank by total assets; and the second-largest bank in home lending. In recognition of the scope and importance of the LIBOR transition work, as well as the significant LIBOR exposure across multiple product types, risk categories, and customer segments, Wells Fargo created a LIBOR Transition Office (LTO) in January 2018.

Its top priority is to manage the impacts and risks inherent in the transition and support our customers with information and resources. Wells Fargo is an active member of key industry groups, providing a platform for the firm to relay feedback on concerns related to the transition that impact our customers and the broader industry. Notable membership includes:

- Representation on every ARRC working group, chair of the ARRC’s Floating Rate Notes working group and co-chair of certain Communications and Consumer Products sub-working groups
- CFTC’s Market Risk Advisory Committee
- ISDA
- Euro RFR Working Group

This transition work is still underway and it is critical that all market participants understand what is happening and why, specifically with respect to the potential impacts on new and legacy contracts.

17Title VII relief letter: ARRC letter requesting regulatory relief for derivatives in connection with the LIBOR transition.
Where can I get further information?

New information is continuously being published regarding the transition

**ARRC**
https://www.newyorkfed.org/arrc/publications

**CME**
https://www.cmegroup.com/education/browse-all.html#search=sofr#pageNum=1

**Financial Stability Board**

**FRBNY**
https://apps.newyorkfed.org/markets/aautorates/sofr

**International Organization of Securities Commissions**

**ISDA**

**Oliver Wyman**

**Speech Transcripts**
https://www.federalreserve.gov/newsevents/speech/quarles20180719a.htm
For more information, please email our LIBOR Transition Office at libortransitionoffice@wellsfargo.com.

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(a) changes to the way in which LIBOR is calculated, or differences between the way a replacement rate and LIBOR are calculated, could significantly affect the value, price, cost and/or performance of affected contracts;

(b) replacement rates for LIBOR may differ across affected contracts, and those differences may create material economic mismatches with any affected contracts used for hedging or similar purposes;

(c) some existing affected contracts may not provide for any replacement rate; as such, there could be disputes about what replacement rate applies when LIBOR is unavailable or is no longer representative or whether contracts are enforceable in the absence of any replacement rate;

(d) new alternative rates are likely to be developed over time and these new rates may be significantly different from both LIBOR and replacement rates that are currently being considered;

(e) existing or new regulations may limit the ability of market participants to enter into new transactions, products, or services linked to LIBOR if a determination or announcement is made that LIBOR is no longer representative of the relevant market;

(f) Wells Fargo may have rights to determine a replacement rate for LIBOR for affected contracts, including any price or other adjustments to account for differences between the replacement rate and LIBOR, and the replacement rate and any adjustments we select may be inconsistent with, or contrary to, your interests or positions; and

(g) moving from LIBOR to a replacement rate may raise a variety of tax, accounting, and regulatory risks.

Derivatives-related risks of the LIBOR transition are discussed in greater detail at the IBOR Alternative Reference Rates disclosure at: www.wellsfargo.com/swaptdisclosures.

Wells Fargo cannot provide any assurances as to the consequences, or likely costs or expenses associated with any of the changes arising from the LIBOR transition, though they may be important to you. The above is provided for informational purposes only and is not intended to apply to any specific customer or transaction.

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