Alternative Reference Rates Committee

Guide to Published SOFR Averages

There are a variety of ways for market participants to use averages of overnight SOFR in financial products right now. For example, market participants can use simple or compounded SOFR averages, which can be calculated either *in advance* or *in arrears*. The User's Guide to SOFR lays out these various ways to use SOFR averages and the differences between them. This guide specifically focuses on the New York Fed-published SOFR Averages ("SOFR Averages"), but market participants are encouraged to reference the User's Guide for a more exhaustive overview of options for using averages of SOFR.

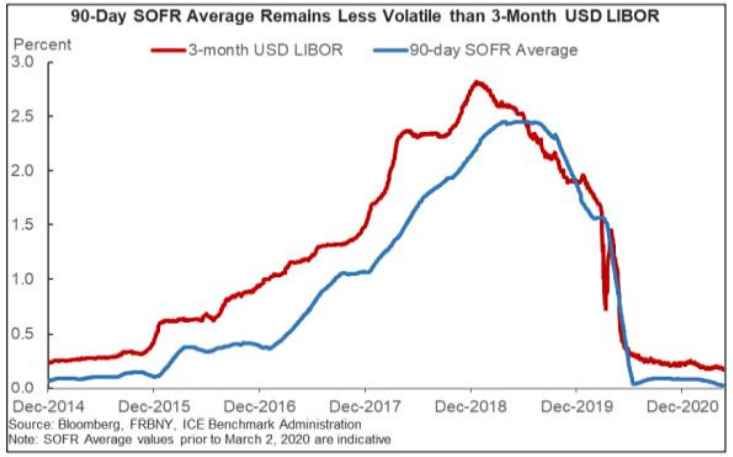
SOFR Averages are available now, are consistently calculated across different time periods, and are published by the official sector. This guide outlines how SOFR Averages can be used so that borrowers can better understand the different types of SOFR-based loans they could potentially get from their lenders.

These Averages have been very smooth and can be easily referenced in financial contracts today. The Averages have already been successfully taken up in the consumer mortgage market, which they were originally created to support, and they can be utilized in any product where there is a need for the borrower to know the payment well in advance. With less than a year left until no new LIBOR issuances, the ARRC encourages all financial market participants to make use of them now.

Of note, while SOFR and other overnight repo rates can be more volatile than term rates on a day-to-day basis, it is important to remember that contracts referencing SOFR are based on an average of SOFR. These averages smooth out day-to-day volatility (see graph) and can be easily referenced in financial contracts, as demonstrated by the growing use of SOFR in futures, swaps, and floating-rate debt.

"The new SOFR adjustable rate mortgages eligible for purchase by Fannie Mae and Freddie Mac reference the 30-day average of SOFR as published by the Federal Reserve Bank of New York. All of the new SOFR-based securities issued by Fannie and Freddie reference the in advance SOFR average published by the New York Fed, other than their debt securities, which utilize a simple average of overnight SOFR in arrears. The market take-up rate of these compound average SOFR products, along with SOFR-indexed debt issuances of all of FHFA's regulated entities, has been and remains strong."

Daniel E. Coates, Chair of FHFA's Reference Rate Transition Steering Committee, and FHFA representative on the ARRC.



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About New York Fed-Published SOFR Averages

What They Are:

The New York Fed has published SOFR Averages since March 2020. As the name suggests, they are an average of the daily overnight SOFR rate over certain periods of time: 30-, 90-, and 180-days and they are calculated on a compounded basis[1]. These SOFR Averages reflect movements in interest rates over a given period of time, specifically the prior 30-, 90- and 180-days, and smooth out idiosyncratic day-to-day fluctuations in market rates over that period, making them ideal for use in cash products.

How They're Calculated:

- The 30-, 90-, and 180-day SOFR Averages employ daily compounding on each business day. On any day that is not a business day, simple interest applies, at a rate of interest equal to the SOFR value for the preceding business day.
- In accordance with broader U.S. dollar money market convention, interest is calculated using the actual number of calendar days, but assuming a 360-day year.
- The SOFR Averages for a given publication date incorporate all SOFR values starting exactly 30-, 90-, and 180-calendar days *before* the publication date, regardless of whether or not that date is a weekend or holiday, and extend through SOFR published that day.

How to Use New York Fed-Published SOFR Averages

The Fed-Published SOFR Averages are particularly useful for those market participants who are:

- Looking for a rate that applies for a 30-, 90- and/or 180-day term product;
- Looking for a rate that is known in advance to be applied to the relevant product up front;
- Looking for a rate produced by the official sector and publicly available and transparent to all market participants; and
- Looking for a rate that is robust and reliable, rooted in a deep and enduring market with thousands of transactions (*for more background on money market volumes underlying SOFR and other reference rates, see Page 4*).

As highlighted above, the Fed-Published SOFR Averages offer the convenience of having a published rate of the relevant tenor known and established up front. Although the averages reflect the overnight SOFR rates from the *prior period*, these rates can be transparently applied *in advance* of the upcoming payment period. In some cases, market participants may instead prefer using compounded averages of *SOFR in arrears*, so as to reflect the overnight SOFR rates during the actual investment time horizon and thus would not be known up front. As noted in the SOFR User's Guide, both the "in advance" and "in arrears" structures for using SOFR will directly reflect the moves in monetary policy that are the primary driver of money-market rates albeit with different lags in timing.

1. The Fed also publishes a SOFR Index, which allows borrowers to calculate averages over custom time periods.

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About New York Fed-Published SOFR Averages

How to Use New York Fed-Published SOFR Averages (continued)

The applicability of SOFR Averages in advance certainly explains the attractiveness of SOFR for products such as consumer mortgages, but in fact it's suitable for a wide variety of cash products, including loans where corporate borrowers might reasonably prefer to know their payments ahead of time. The ARRC has already provided a number of conventions (i.e. product-specific methods) for using SOFR Averages now, including for student loans, intercompany loans, and securitizations. Some banks are also offering these rates in business loans (see chart).[2]

ARRC Conventions

Product	Conventions/Term Sheet Document
Intercompany Loans	30- or 90-Day SOFR in Advance
Adjustable-Rate Mortgages	30- or 90-Day SOFR in Advance
Student Loans	30- or 90-Day SOFR in Advance
ABS, MBS, and CMBS Securitizations	30-Day SOFR in Advance

SOFR Averages vs SOFR Term Rate

The application of SOFR Averages in advance can address borrower concerns about not knowing the interest payment due ahead of time.

This solution is distinct from a *term* SOFR, which would be a forward-looking rate, in that it would look today at what the rate would be over a given future horizon based on what was implied by derivatives markets for the given term. The ARRC continues to work towards developing a recommendation of a forward-looking SOFR term rate and has set out principles to support that work as well as the market indicators that would allow the ARRC to recommend a term rate.

Borrower Perspectives

A March 2021 survey of members of the ARRC's Nonfinancial Corporate Working Group showed that 90% of respondents wished to be offered SOFR-based rate choices, including SOFR averages that are in advance and in arrears.[3]

- **Bjork Hupfeld, Hershey:** "An in advance structure without any adjustments would, from a calculations perspective, really look like the current LIBOR, so systems changes would be minimal, if [there were] any at all. That would be the preferred solution."
- **Rich Moore, Caterpillar:** "Certainly for inter-company loans, where we in effect are the market-makers within our own corporations, we strongly prefer the simple interest in advance using the SOFR average rates that the Fed has been publishing."
- **Jason Behnke, Ford:** "For many of our products, SOFR in arrears works. However, given that a SOFR term rate has not developed yet… we're preparing to use SOFR in advance for certain products. Two of those in particular would be intercompany loans and securitizations. … We think we could benefit, and other corporates could benefit, from SOFR in advance, and we think it's important that banks continue to offer their clients multiple options on these SOFR-based products."
    - "None of the products that we use today need a term rate offering, and they could all utilize an overnight SOFR-based rate, whether in arrears or in advance. … With the supervisory guidance that encourages banks to cease entering into LIBOR-based contracts by the end of 2021, I don't think we should wait for a term rate, and I don't think we need to."
- **Tom Deas, NACT**: "Although [a term rate] is a laudable end goal, what we need right now to make this conversion work is to have an in advance, simple interest rate that we can use. And we think that the average SOFR in advance rate provides that."
- **Mack Makode, Under Armour:** "As Under Armour continues to evolve, we are transitioning away from LIBOR to SOFR-based products. Similar to the one, three and six-month LIBOR tenors that currently exist, it would be ideal if SOFR follows suit as we'd prefer not to wait for a term rate. From our perspective, SOFR in advance would be our strong preference."[4]

2. Source: Full table is available on Page 5 of the ARRC's Progress Report.
3. Ibid., 13.
4. All quotes from the first session of the SOFR Symposium, held on March 22.

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Know Your Reference Rate

The transition away from LIBOR is one of the largest financial market transformations in many years, involving the transition of over $200 trillion in contracts linked to the critically flawed benchmark. The markets that underlie LIBOR—term unsecured bank borrowing markets--have undergone a secular change as banks have turned to more stable forms of funding. As a result, today, the market for unsecured wholesale term borrowing by banks has a relatively small number of transactions underpinning LIBOR that dry up even more under stress.

The ARRC supports a vibrant and innovative market with reference rates that are robust, align with the IOSCO Principles, and are available for use before the end of 2021 -- and it selected SOFR as its preferred alternative rate with those factors in mind. The ARRC encourages all market participants to "know" the reference rates that they choose as an alternative to LIBOR, something that is consistent with the best practices of the Treasury Market Practices Group (TMPG). Understanding the construction, vulnerabilities, design and suitability of the reference rates they use can help market participants avoid finding themselves in a position where they will have to go through a costly and risky transition again.

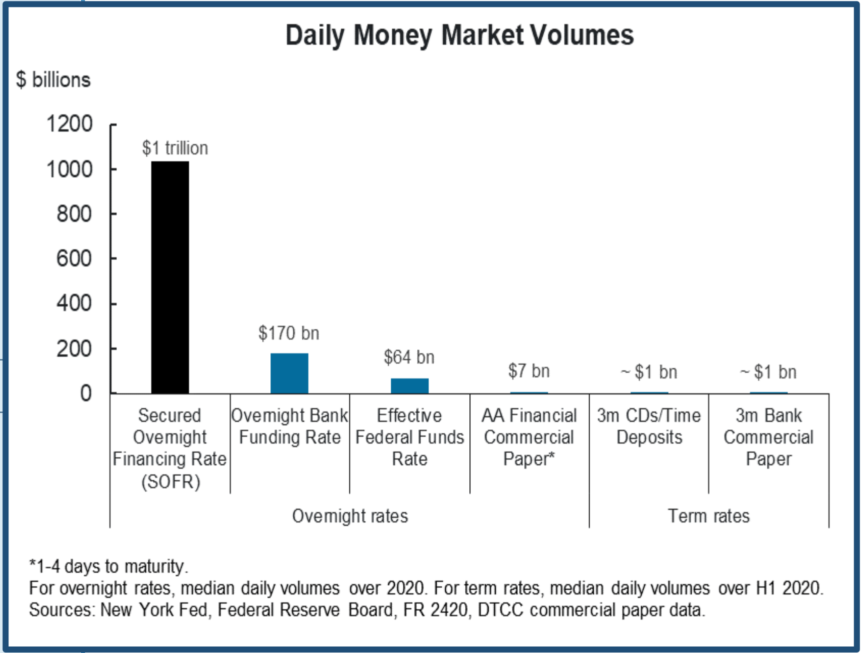
These best practices highlight that market participants should:

- Understand how any financial benchmark they use is constructed as well as potential vulnerabilities associated with using it;
- Assess and understand the degree to which the financial benchmarks stand up to the IOSCO Principles;
- Carefully evaluate whether the financial benchmarks they use are appropriate for the reason they are being used.[5]

Specifically:

The ARRC encourages all market participants to "know" SOFR as a reference rate, and why it recommended SOFR as the most robust replacement for LIBOR:

- SOFR is based on a deep underlying market and is resilient across different market conditions;
- SOFR daily volumes were consistently above $800 billion in 2020, well above those in other overnight money markets, and several orders of magnitude larger than those in term unsecured wholesale bank funding markets;
- During acute market stress in March 2020, SOFR volumes remained robust—while activity in term unsecured markets further dried up[6];
- The New York Fed has rigorously evaluated SOFR against each IOSCO principle and has offered extensive documentation of the auditing and testing done to ensure that it stands up to those principles; and
- SOFR is suitable for use across a wide range of financial market contracts, and given its robustness, is a reliable and durable solution.



5. Drawn from the Treasury Market Practices Group best practices.
6. Financial Stability Board 2020 Progress Report, Box 1.