SOFR As A Replacement For USD LIBOR

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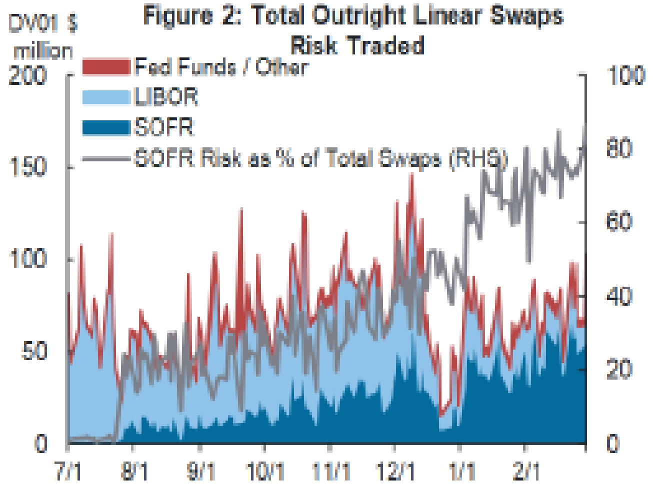
SOFR is Now the Dominant U.S. Dollar Benchmark Rate

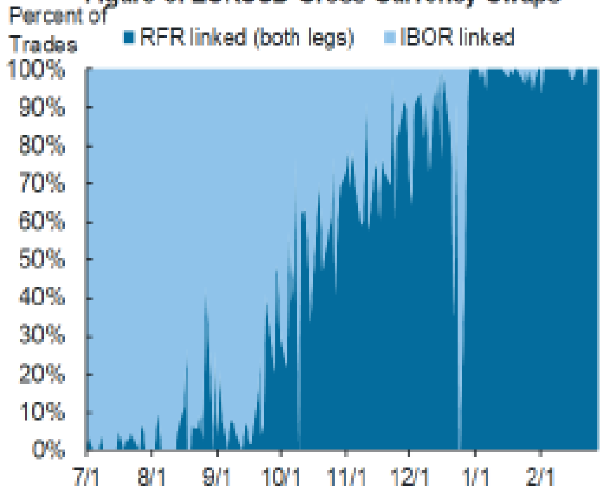
- SOFR now accounts for 80 percent of all risk traded in interest rate swaps.
- SOFR is now predominant in almost all cross-currency basis swaps with other Advanced Economies.
- Nearly all floating-rate debt issuance in the United States is now based on SOFR.
- Since the start of the year, nearly all new syndicated lending in the United States has been based on SOFR.
- All new floating rate mortgages in the United States are based on SOFR Averages.

Figure 2: Total Outright Linear Swaps Risk Traded



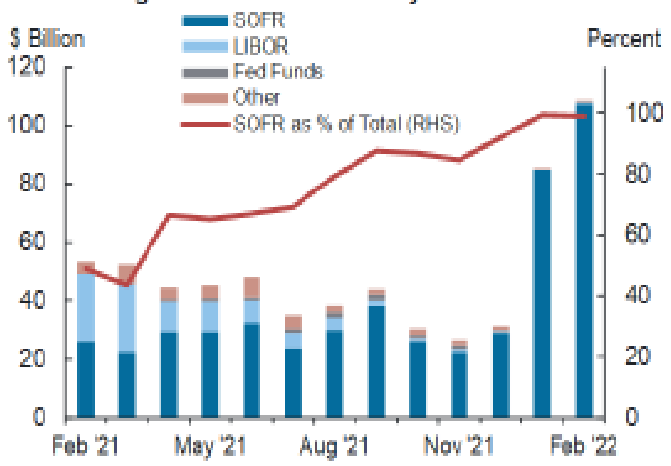
Note: data include vanilla interest rate swaps and OIS.
Source: Clarus Financial Technology (Swap Execution Facility data)

Figure 6: EURUSD Cross-Currency Swaps



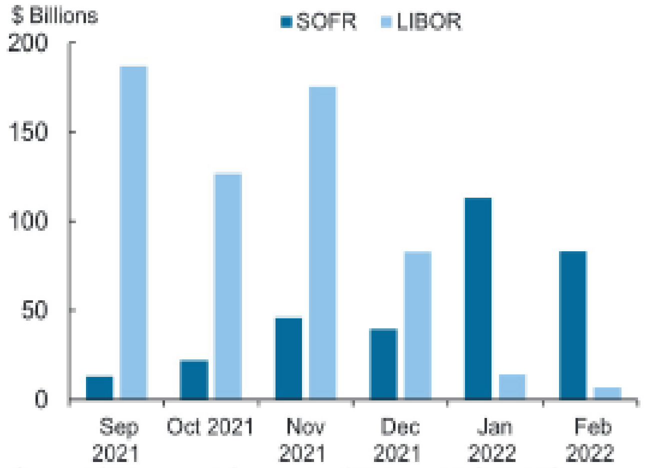
Source: Clarus Financial Technology (Swaps Data Repository data)

Figure 10: FRN Issuance by Reference Rate



Source: Bloomberg
Note: Excludes issuance by U.S. Treasury.

Figure 12: Syndicated Lending



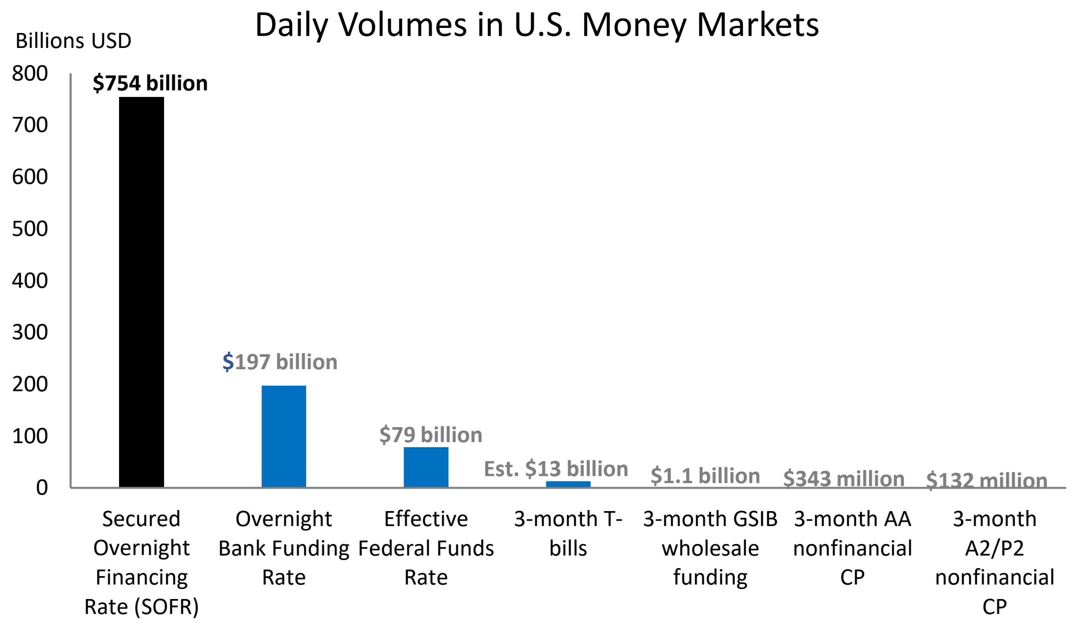
Source: LCD Leveraged Commentary & Data, and Refinitiv LPC

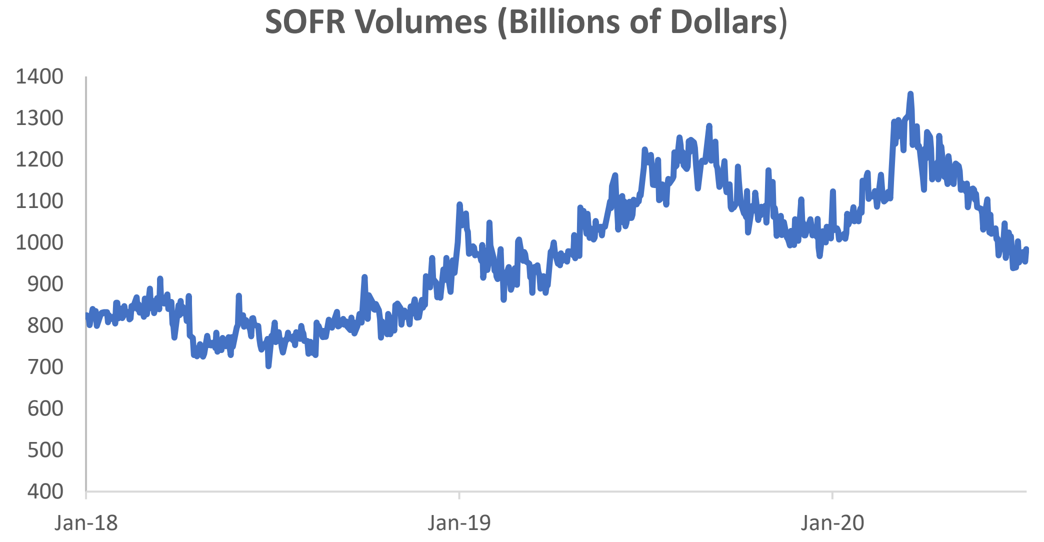
Source: Alternative Reference Rates Committee March 23 Readout
www.newyorkfed.org/medialibrary/Microsites/arrc/files/2022/arrc-readout-for-march-23-2022-meeting

The Choice of SOFR

Each National Working Group carefully studied a wide range of potential alternative rates, selecting the risk-free rate that was most robust and appropriate given its market structures. In the case of US dollar, the selected SOFR rate is based on overnight borrowing in the U.S. Treasury repo market. SOFR was chosen because

- The U.S. Treasury repo market is the single largest rates market at a given maturity in the world. SOFR has sufficient depth to make it extraordinarily difficult to ever manipulate or influence;
  - When SOFR began production, its underlying volumes were in the range of $750 billion on a daily basis, but daily volumes have risen to nearly $1 trillion.
- The U.S. Treasury repo market was able to weather the global financial crisis and the ARRC credibly believes that it will remain active enough in order that it can reliably be produced in a wide range of market conditions.
- SOFR is produced by the Federal Reserve Bank of New York (FRBNY) for the public good;
- It is produced in a transparent, direct manner and is based on observable transactions, rather than being dependent on estimates, like LIBOR, or derived through models.





The Different Potential Versions of SOFR-Based Rates

In Advance

- **SOFR Averages**

  Interest payments are based on SOFR Averages set at the start of an interest period. Payments typically based on 30-, 90-, or 180-Day SOFR Averages but can use the SOFR Index, all published by the Federal Reserve Bank of New York.

- **SOFR Term Rates**

  The ARRC has recommend CME Group's 1-, 3-, and 6-month forward-looking term rates based on SOFR derivatives for use in:

  - Legacy cash products
  - New business loans that have difficulty using other forms of SOFR
  - Derivatives and securitizations tied to legacy products or loans using Term SOFR.

In Arrears

- **Compound In Arrears**

  Interest payments are based on compound averages of SOFR, the SOFR Index, or daily SOFR over the interest period and not known until near the end of the period.

- **Daily Simple SOFR (Simple in Arrears)**

  Interest payments are based on daily SOFR over the interest period and not known until near the end of the period. Similar to Compound in arrears but based on simple interest

Where SOFR Rates are Published

ARRC

SOFR is published on the Federal Reserve Bank of New York's website every U.S business day at approximately 8am EST. (https://apps.newyorkfed.org/markets/autorates/sofr)

FRBNY also produces 30-, 90-, and 180-day compound averages of SOFR that can be directly referenced in contracts, and a SOFR "Index" that allows calculation of compound averages over any period, which should help with systems implementation for SOFR products

In a few cases (US dollar, sterling, and Japanese yen), term version of the rates are also available. CME Term SOFR rates are produced commercially by CME Group and available through a licensing agreement.

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Secured Overnight Financing Rate Data

The Secured Overnight Financing Rate (SOFR) is a broad measure of the cost of borrowing cash overnight collateralized by Treasury securities. The SOFR includes all trades in the Broad General Collateral Rate plus bilateral Treasury repurchase agreement (repo) transactions cleared through the Delivery-versus-Payment (DVP) service offered by the Fixed Income Clearing Corporation (FICC), which is filtered to remove a portion of transactions considered "specials".[a]

The SOFR is calculated as a volume-weighted median of transaction-level tri-party repo data collected from the Bank of New York Mellon as well as GCF Repo transaction data and data on bilateral Treasury repo transactions cleared through FICC's DVP service, which are obtained from DTCC Solutions LLC, an affiliate of the Depository Trust & Clearing Corporation. Each business day, the New York Fed publishes the SOFR on the New York Fed website at approximately 8:00 a.m.[b]

For more information on the production of the SOFR, please see Additional Information about the TGCR, BGCR and SOFR.

To access historical data, please see: Repo Rates Data Historical Search

Download daily historical indicative SOFR and accompanying volumes from August 2014 – March 2018 EXCEL

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SECURED OVERNIGHT FINANCING RATE DATA

Statistics on the Secured Overnight Financing Rates
See Secured Overnight Financing Rates Chart

Export to:
Excel | XML: Volume | Rates

DATE	RATE (PERCENT)	PERCENTILES				VOLUME (US$ BILLIONS)
		1ST (PERCENT)	25TH (PERCENT)	75TH (PERCENT)	99TH (PERCENT)	
04/15	2.47	2.40	2.43	2.52	2.60	988
04/12	2.44	2.39	2.40	2.49	2.55	955
04/11	2.44	2.39	2.40	2.49	2.55	974

4/16/2019

SOFR is published on every U.S. business day at approximately 8:00am EST. Because the Fed has the ability to correct and republish this rate until 2:30pm New York City Time each day, users may wish to reference the rate after this time (e.g. 3:00pm)

The SOFR rate published on any day represents the rate on repo transactions entered into on the previous business day and the date associated with each rate reflects the date of the underlying transactions rather than the date of publication.

Where the Different SOFR Rates are Used

The ARRC has recommended limited use of the CME term rates, encouraging use in products that otherwise had difficulties in transitioning to other forms of SOFR: business loans and securitizations tied to those loans. The ARRC has recommended specifically that use in derivatives markets be limited only to end-user hedging of term SOFR cash products and that term SOFR should not be traded in interdealer markets. Most business loans have used term SOFR, but most other products are using the other forms of SOFR.

	Business Loans	Consumer Loans	Floating Rate Notes	Securitizations	Derivatives	Intercompany Loans
Daily Simple SOFR	some use		most prevalent		some use	
Compound SOFR	some use		some use		most prevalent	
30- and 90-Day SOFR Averages	some use	prevalent		common in Agency RMBS	some use	Recommended by ARRC
CME Term SOFR	most prevalent			common in CLOs	use limited only to end user hedging of term SOFR cash exposures	

Pros and Cons of the Different SOFR Rates

Although the recommendation of a term SOFR rate was eagerly anticipated, all the forms of SOFR have respective advantages and disadvantages. For hedging purposes, overnight SOFR or SOFR in advance would likely be simpler to use.

	Next Payment Known at Start of Interest Period	Requires System Changes for Borrowers	Reflects Expected and Unexpected Changes in Rates	Payments Delayed Relative to Interest Period in which Rate Changes Occurred	Hedge Effectiveness for Borrower relative to standard OIS Hedge
Compound SOFR in Arrears with Lookback	No	Yes	Yes	No	Very Likely Effective (Full hedge can be obtained if there is no lookback)
Simple SOFR in Arrears with Lookback	No	No, if systems already allow Prime Loans or other overnight borrowing structures	Yes	No	Very Likely Effective (diminimous basis between simple and compound interest)
SOFR in Advance	Yes	No	Yes	Yes	Very Likely Effective (payments from OIS hedge would be received prior to loan payment date)
SOFR in Advance Interest Rollover	Yes	No	Yes	Yes	Very Likely Effective (although hedging requires entering in to a set of standard OIS swaps and hedge payments would be received prior to loan payment date)
SOFR in Advance Principal Adjustment	Yes	Some Changes May be Required?	Yes	No	Full (Relative to both Interest and Principal)
Term SOFR	Yes	No	Expected Rate Changes Only	No	Likely Effective unless unexpected rate changes are large (can be hedged more fully through a series of short OIS transactions)

SOFR as a Fallback: US Legislation

- Federal legislation has been passed directing the Federal Reserve to issue rules that specify a spread-adjusted SOFR rate as the replacement to LIBOR in contracts that do not have workable fallbacks.
- The Federal Reserve's rules will be issued later this year and would cover all contracts governed under U.S. law.
- How will contracts under foreign laws operate?

Key Components	Legislation Structure
"Mandatory" v. "Permissive" Application of the Statute	• **Mandatory**: If the legacy contract is *silent* as to fallbacks. • **Mandatory**: If the legacy language falls back to a *Libor-based rate* (such as last-quoted Libor). • **Permissive**: If the legacy language gives a party the right to exercise *discretion or judgment* regarding the fallback, that party can decide whether to avail itself of the statutory safe-harbor.
Degree of Override of Legacy Contract Fallback Provisions	• **Override**: Where the legacy language falls back to *a Libor-based rate* (such as last quoted Libor). • **Override**: If the legacy language includes a fallback to *polling for Libor or other interbank funding rate*, the statute mandates that the polling not occur. • **No Override**: Where the legacy language is *silent* as to fallbacks or gives a party the right to exercise *judgment or discretion* regarding the fallback. *In these instances, there is nothing to override.* • **No Override**: The statute would not override legacy language that falls back to an express *non-Libor based rate* (such as Prime).
Mutual "Opt-Out"	• Parties are permitted to mutually opt-out of the application of the statute, in writing, at any time *before or after* the occurrence of the Trigger Event.

Trigger Events	• The statute would become applicable or available (as described in "Mandatory" v. "Permissive" above) upon the occurrence of statutory trigger events
	    • **Cash Products**: The statutory trigger events for cash products would be based on the ARRC permanent cessation and pre-cessation trigger events
	    • **Derivatives**: The statutory trigger events for derivatives would be based on what ISDA does

"All Products"	• **No Exclusions**: No product is categorically excluded from the statute. Parties can opt-out as described above.
Conforming Changes	• The statute provides safe-harbor protection for parties who add conforming changes to their documents to accommodate administrative/operational adjustments for the statutory endorsed benchmark rate.

The Size of the Legacy Problem

- The ARRC has estimated that there are approximately $223 trillion in financial contracts referencing USD LIBOR
- Of that, it estimates that about $74 trillion of these financial contracts will remain outstanding as of June 30, 2023, comprised of an estimated $69 trillion of derivatives and $5 trillion in cash products.
- These estimates do not include the myriad uses of LIBOR in nonfinancial corporate contracts, such as purchase/sales agreements. These exposures are difficult to measure, but likely are larger than the exposure through financial instruments.
- We know that adherence to the ISDA IBOR Protocol has been good and that a majority of derivatives contracts should now be covered by it, but don't have a precise estimate about the amount not covered.
- Market participants will need to prepare for June 2023 and the end of USD LIBOR.

Table 1: USD LIBOR Market Footprint by Asset Class[1]

		Currrently Outstanding ($TN)	Maturing After June 2023 ($TN)
Over-the-Counter Derivatives	Interest rate swaps	81	46
	Forward rate agreements	47	0
	Interest rate options	20	12
	Cross currency swaps	23	8
Exchange Traded Derivatives	Interest rate options	32	0
	Interest rate futures	11	2
Business Loans	Syndicated loans[2]	2.0	1.1
	Nonsyndicated business loans	1.3	0.4
	Nonsyndicated CRE/Commercial mortgages	1.5	0.8
Consumer Loans	Retail mortgages[3]	1.3	0.8
	Other Consumer loans	0.1	0.1
Bonds	Floating/Variable Rate Notes	1.1	0.3
Securitizations[3]	Mortgage-backed Securites (incl. CMOs)	0.8	0.8
	Collateralized loan obligations	0.5	0.5
	Asset-backed securities	0.2	0.2
	Collateralized debt obligations	0.1	0.1
Total USD LIBOR Exposure:		**223**	**74**

[1] Source: Federal Reserve staff calculations, BIS, Bloomberg, CME, DTCC, Federal Reserve Financial Accounts of the United States, G.19, Shared National Credit, and Y-14 data. Data are gross notional exposures as of 2020Q4. [2] The figures for syndicated and nonsyndicated business loans do not include undrawn lines. Nonsyndicated business loans exclude CRE/commercial mortgage loans.[3] Estimated amounts maturing after June 2023 based on historical pre-payment rates