WELLS FARGO

SOFR, So Good

An update on the transition from LIBOR to the Secured Overnight Financing Rate

April 2019

Together we'll go far

- The interbank offered rates (collectively, LIBOR) underpin more than **$350 trillion** of financial products

- **LIBOR is a widely utilized benchmark that is no longer derived from a widely traded market**

  - **Basel III**: Pushes banks away from short-term unsecured funding
  - **Financial crisis**: Banks stopped lending to each other
  - **Manipulation**: To conceal borrowing costs and bolster trading profits
  - **Panel Banks**: Concerns about panel-bank participation beyond 2021

- In July 2017, the U.K. Financial Conduct Authority announced that it will not compel banks to provide LIBOR submissions beyond 2021

- Various regulators, including members of the Fed and the CFTC, continue to encourage market participants to adopt alternative rates

The USD LIBOR Footprint

~$200 trillion in asset exposures

OTC **$145T**
- Swaps, options,
- Forwards, cross-currency

Exchange **$45T**
- Options
- Forwards

Loans **$5T**
- Syndicated, CRE
- Residential, Consumer

Bonds **$4T**
- FRNs
- Securitizations

1) Source: Federal Reserve Second Report of the Alternative Reference Rates Committee.

In 2014, the Federal Reserve Board convened the Alternative Reference Rate Committee to explore alternatives for replacing USD LIBOR as a benchmark rate in the U.S.

The ARRC was convened to address the following:

Objectives	
1	Identify best practices for alternative reference rates
2	Identify best practices for contract robustness to ensure contracts are resilient to the possible cessation of USD LIBOR
3	Develop an adoption plan that identifies factors that would either facilitate or impede the adoption of the alternative reference rates
4	Create an implementation plan with metrics of success and a timeline

In March 2018, the ARRC was reconstituted to:[1, 2]

- Include a **broader** representation of the financial market and establish **working groups** to address regulatory, legal, tax and accounting issues
- Ensure successful implementation of the paced transition plan
- Coordinate planning across cash/derivatives products

ARRC Members	
Banks/Dealers:	9
Exchanges:	3
Industry Associations:	6
GSE/SSA:	3
Asset Managers/Insurance:	4
Official Sector (ex officio):	10
Other	2

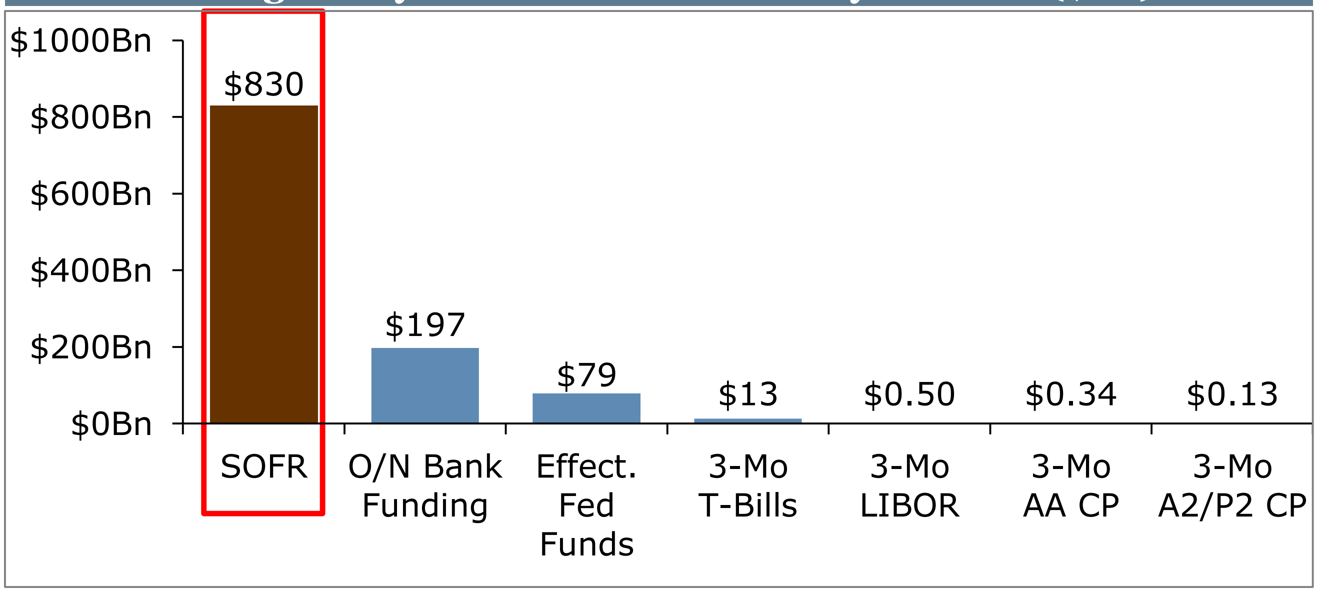
Ex Officio Members	
CFPB	CFTC
FDIC	SEC
FRB New York	FHFA
U.S. Treasury	OCC
Fed Reserve	OFR

[1] Source: ARRC's Website
[2] Source: IBOR Global Benchmark Transition Report, June 2018.

Overview

- In June 2017, the ARRC identified the Secured Overnight Financing Rate (SOFR) as its preferred alternative for USD LIBOR
  - **Secured:** Based on trades in the triparty, cleared bilateral, and certain DVP Treasury repo markets.
  - **Overnight:** The repo rates used are overnight and reflect borrowing for one business day
  - **Financing Rate:** The rate represents secured funding costs for financial institutions pledging Treasury collateral

Average Daily Volumes in U.S. Money Markets ($bn)[1]



1) Average volumes over 2017H1, with the exception of 3-month T-bills, which are preliminary estimates from available FINRA Trade Reporting and Compliance Engine (TRACE) data over August and September 2017. 3-month volumes are based on all transactions with remaining maturities between 80 and 100 calendar days or 41-80 business days. SOFR average from inception to 2/1/19.

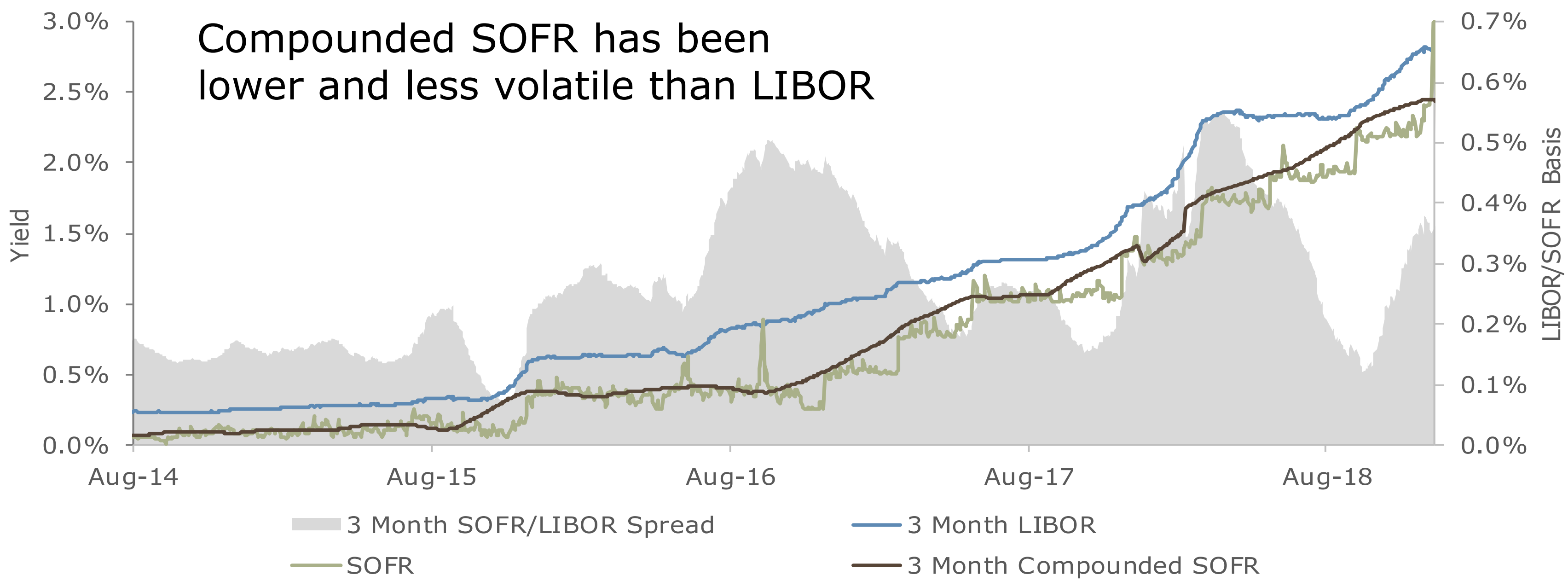
USD LIBOR is published in seven maturities from overnight to 12-months, and incorporates a credit risk premium. SOFR is an overnight, secured rate with no credit risk premium.

	USD LIBOR	SOFR
Definition	Unsecured wholesale interbank lending rate	Secured overnight repo rate
Maturity/Term	Overnight, 1 week, 1-, 2-, 3-, 6-, and 12 months	Currently only overnight
Credit Premium	Unsecured – incorporates credit risk premiums	Secured – no credit risk premium
Methodology[1]	Trimmed mean of panel bank submission rates based on Waterfall Methodology.	Volume-weighted median for the combined tri-party, GCF and bi-lateral repo datasets
Historical Performance	Lack of transactions underpinning the rate has led to reliance on judgment and indicative pricing	Typically trades close to overnight LIBOR, but with higher volatility due to wide dispersion in repo data
Administrator	IBA	FRBNY
Publication Time	11:55 am London Time	Approximately 8:30 am Eastern Time the following business day

Source: *ARRC Fallback Consultation Webinar: Floating Rate Notes*, October 2018

- The Federal Reserve Bank of New York (FRBNY) began publishing SOFR April 3, 2018 and provided historical data back to 2014 using the dataset underpinning SOFR
- The actual inputs for the Secured Overnight Financing Rate incorporate three data sets:
  - 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)

Historical Rates

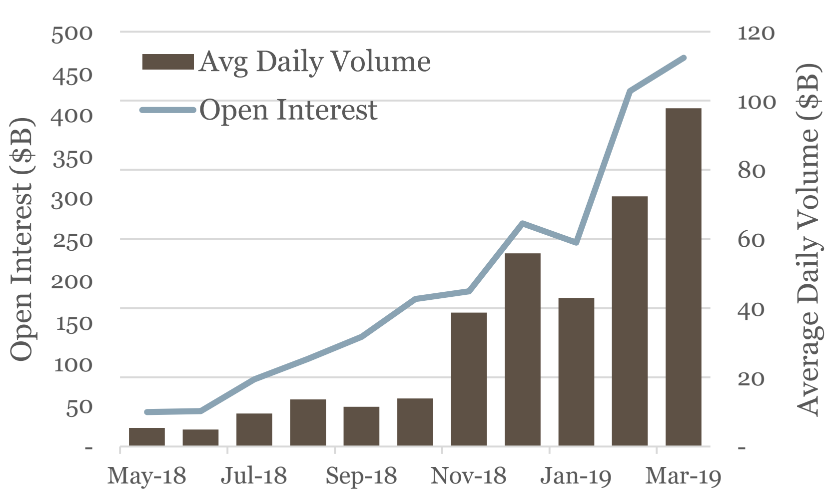


1) CME Group.
Sources: Federal Reserve Bank of New York; Financial Industry Regulatory Authority; DTCC Solutions LLC, an affiliate of the Depository Trust & Clearing Corporation; and the Board of Governors of the Federal Reserve System

Market adoption has increased significantly over the past year, with over 80 global participants currently trading in SOFR

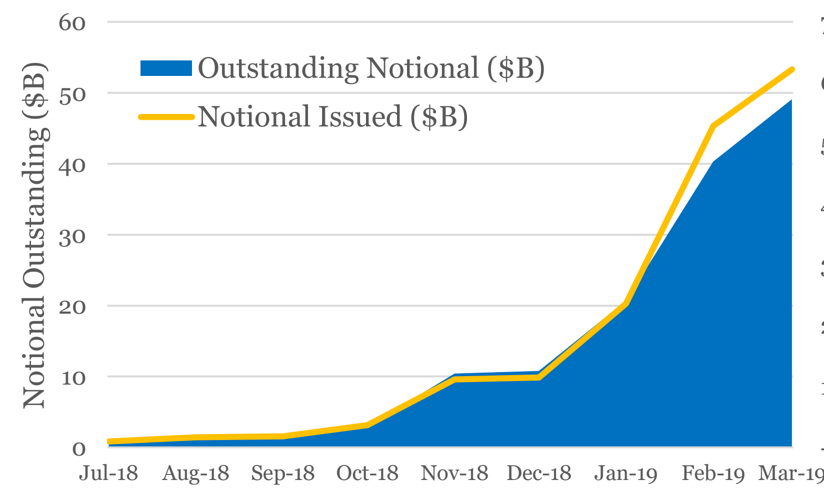
- SOFR futures and swap markets were launched in 2018. Wells Fargo is approved to trade SOFR futures and cleared swaps
- From August 2014 through December 2018, SOFR was approximately 25 basis points less than 3-month LIBOR
- SOFR has been higher and more volatile for a 1-2 day period over quarter end, as some repo providers are less willing to carry balances at that time. On average over a quarterly period, SOFR has been less volatile than LIBOR

SOFR Futures Traded on CME and ICE



Sources: CME, ICE

SOFR Swap Notional



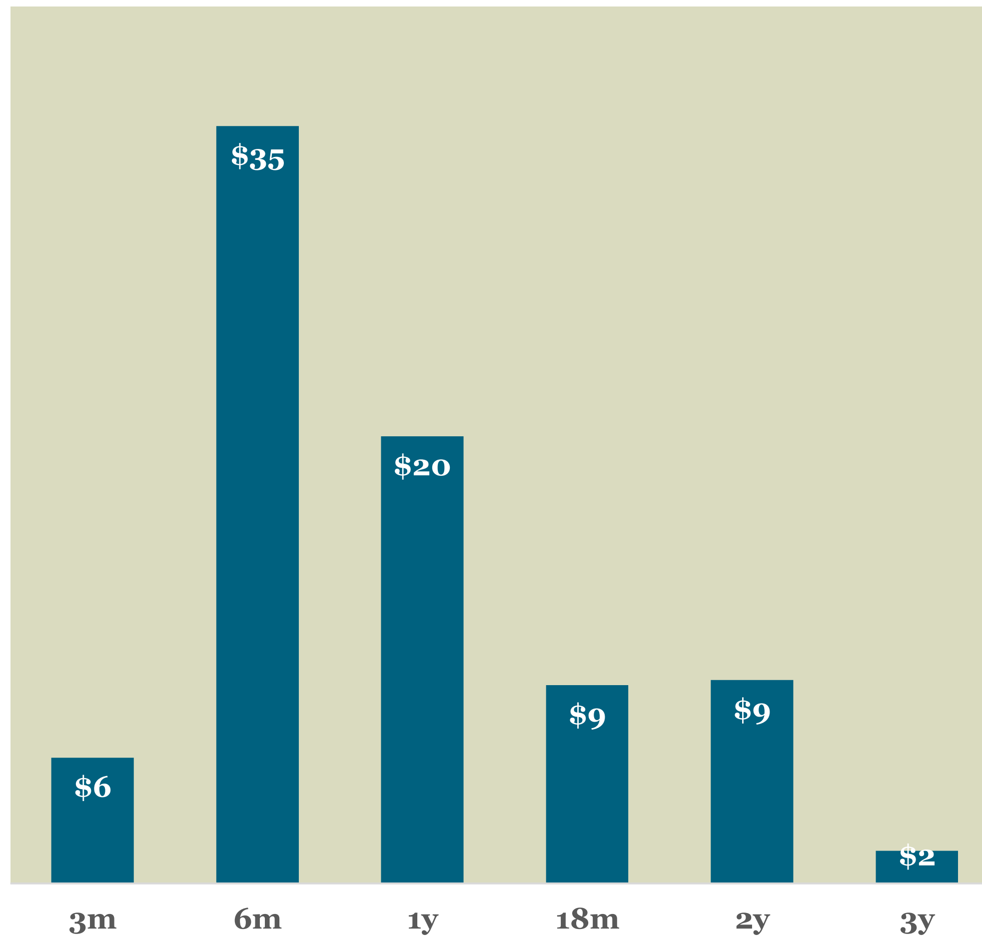
Sources: CME, LCH

Over $80B in SOFR-based transactions from 20 issuers

Notable Issuers

Issuer Name	Sector	Total
FHLB	GSE	$39.2
Freddie Mac	GSE	12.2
Fannie Mae	GSE	10.5
Credit Suisse	FBO Branch	5.9
MetLife	Insurance	2.5
Bank of Nova Scotia	FBO Branch	1.7
Wells Fargo	US Bank	1.1
JPMorgan Chase	US Bank	1.1
Citi	US Bank	1.0
EIB	SSA	1.0
Federal Farm Credit Banks	SSA	1.0
World Bank	SSA	1.0
Various Other Issuers		2.3
	Total	$80.6

Volume by Tenor ($B)



Source: Bloomberg; CME Group; as of 4/5/19

What is LIBOR Fallback Language?

- The contractual language that specifies the rate which will be used if LIBOR is unavailable
- Fallback language was originally intended to address the temporary unavailability of LIBOR instead of a permanent cessation
- As a result, fallback language in many contracts may not produce a commercially reasonable result

Development of More Robust Fallback Language

- The ARRC and ISDA have been developing new fallback language to address a permanent cessation of LIBOR
- The intention of the fallback language is to:
  - Ensure contracts continue to function as closely as possible to what was initially intended by the parties; and
  - Designed to minimize any potential transfer of value between the parties when the fallback takes effect

Components of Fallback Language

- **Trigger events:** Define the circumstances under which references to LIBOR in a contract will be replaced with an alternative reference rate
- **Replacement benchmark:** Identify the rate, or waterfall of rates, that would replace LIBOR following a trigger event
- **Spread adjustment:** An adjustment added to the replacement rate to account for differences between LIBOR and the replacement benchmark

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