Overview of the ARRC’s Work

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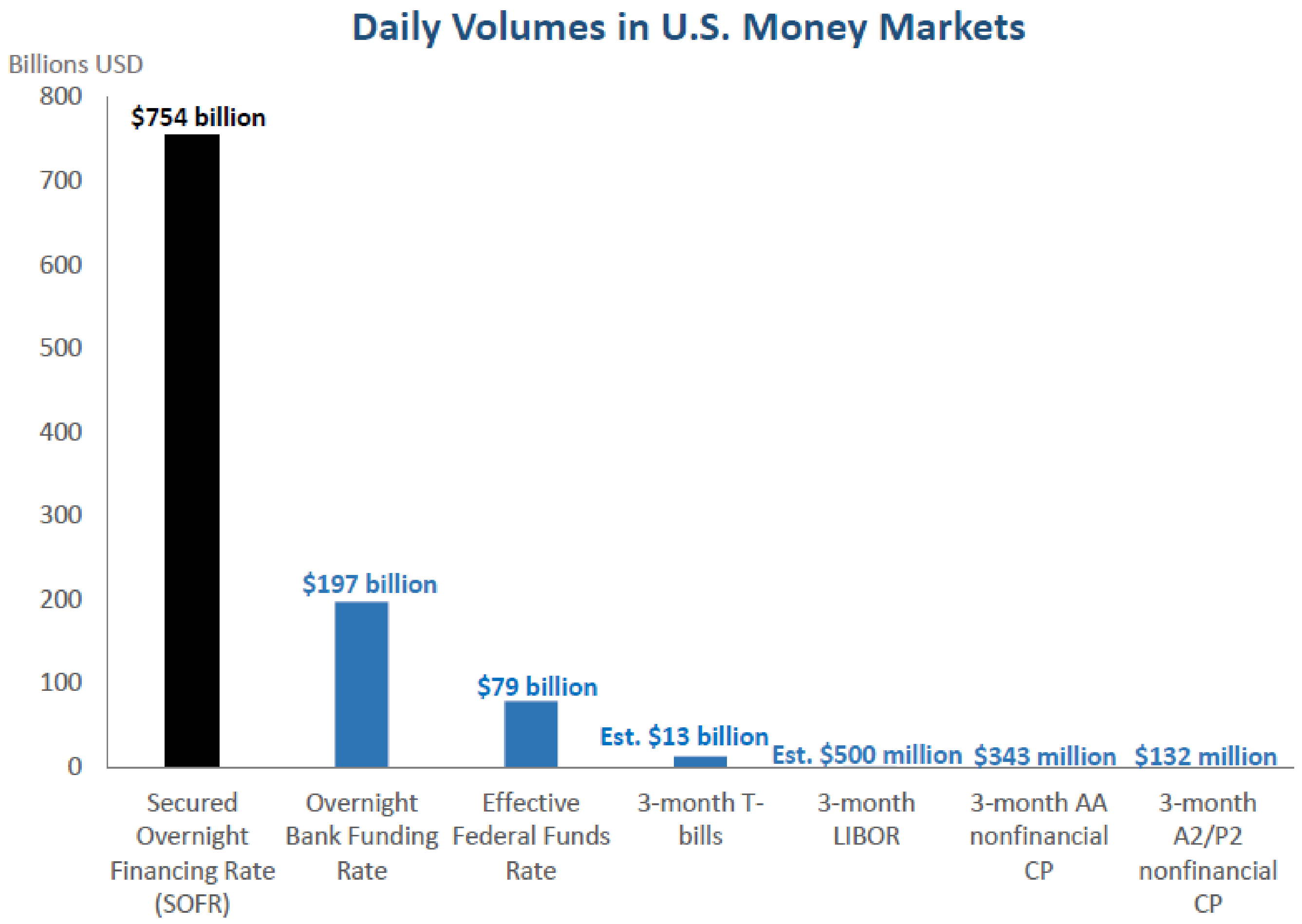
Chair, Alternative Reference Rates Committee



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. 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.

LIBOR and Financial Stability

US dollar (USD) LIBOR is estimated to be referenced in $200 trillion worth of financial contracts (equivalent to 10 times US GDP).

Most of this exposure (95 percent) is in derivatives, but USD LIBOR is also referenced in an estimated $3.4 trillion business loans, $1.3 trillion retail mortgages and other consumer loans, $1.8 trillion in floating rate debt, and $1.8 trillion in securitizations.

The official sector has had to support LIBOR because most contracts did not envision the possibility that LIBOR could ever stop publication and do not have economically appropriate fallbacks in place for such an event.

Without preparation, a stop to LIBOR would cause considerable disruption and would threaten global financial stability.

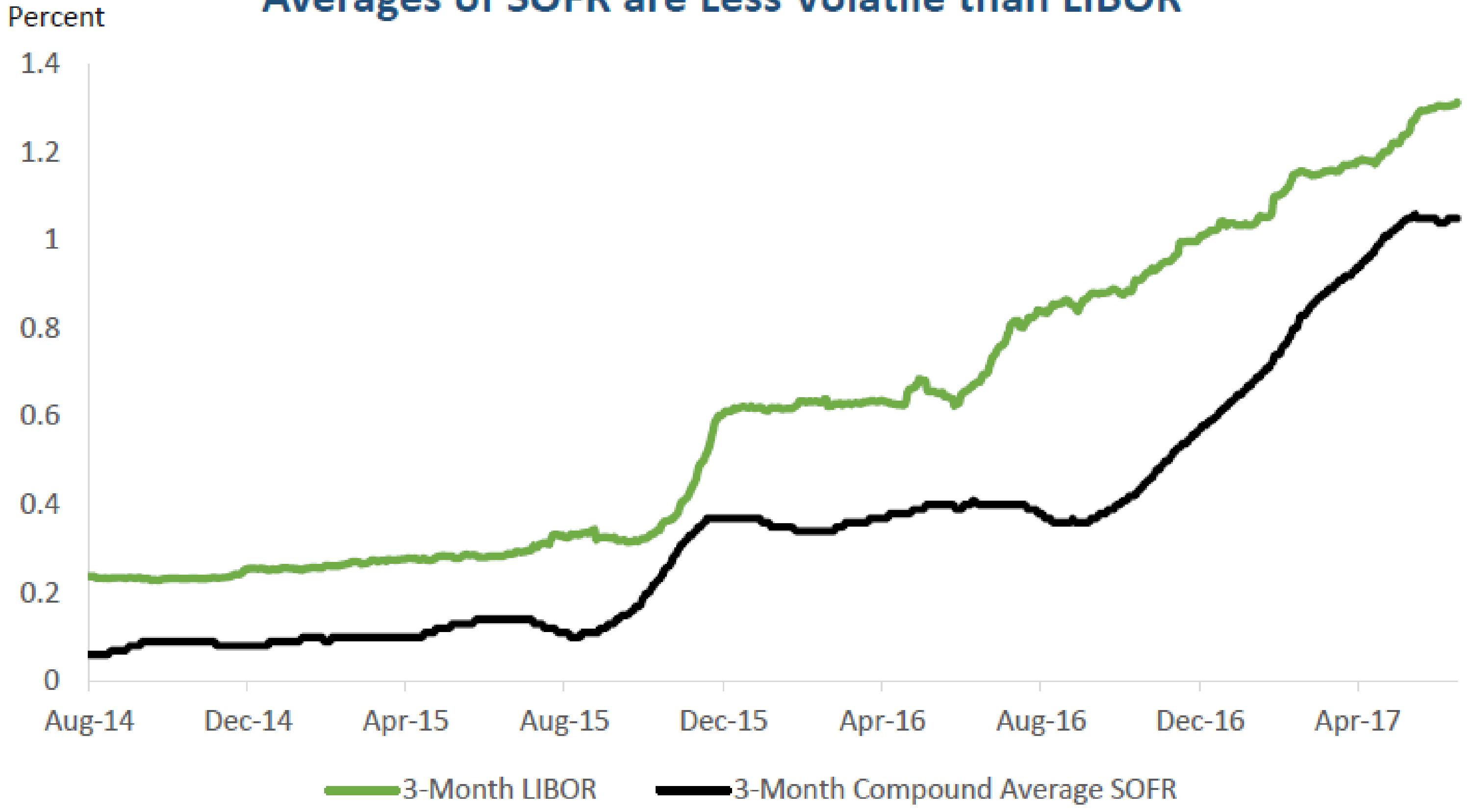
Luckily, most legacy contracts will roll off before 2021, thus there is time to prepare if it is used wisely.

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

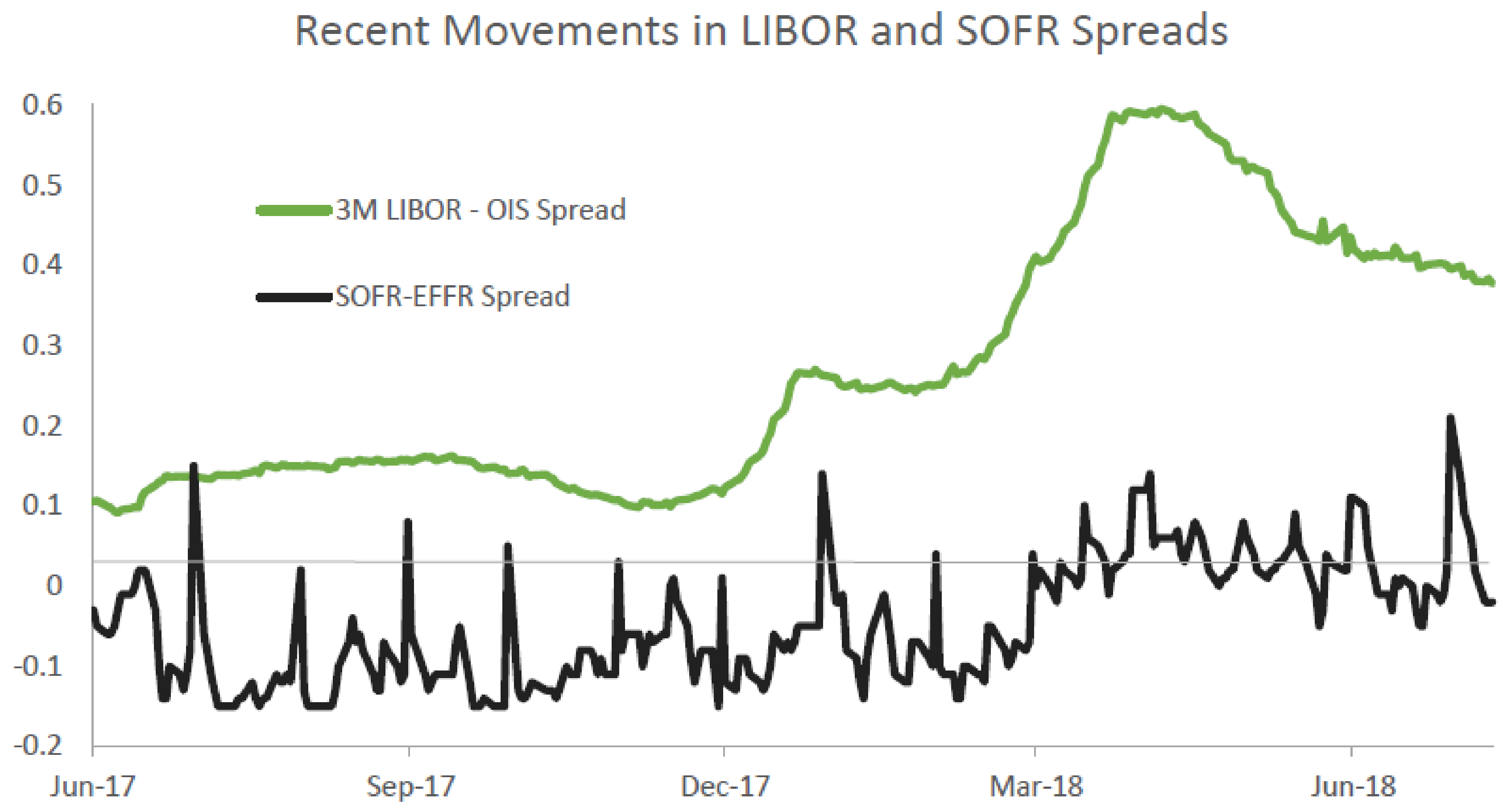
		Volume (Trillions USD)	Share Maturing By: End 2021	End 2025	After 2030	After 2040
Over-the-Counter Derivatives	Interest rate swaps	81	66%	88%	7%	5%
	Forward rate agreements	34	100%	100%	0%	0%
	Interest rate options	12	65%	68%	5%	5%
	Cross currency swaps	18	88%	93%	2%	0%
Exchange Traded Derivatives	Interest rate options	34	99%	100%	0%	0%
	Interest rate futures	11	99%	100%	0%	0%
Business Loans[2]	Syndicated loans	1.5	83%	100%	0%	0%
	Nonsyndicated business loans	0.8	86%	97%	1%	0%
	Nonsyndicated CRE/Commercial mortgages	1.1	83%	94%	4%	2%
Consumer Loans	Retail mortgages[3]	1.2	57%	82%	7%	1%
	Other Consumer loans	0.1	---	---	---	---
Bonds	Floating/Variable Rate Notes	1.8	84%	93%	6%	3%
Securitizations	Mortgage -backed Securites (incl. CMOs)	1.0	57%	81%	7%	1%
	Collateralized loan obligations	0.4	26%	72%	5%	0%
	Asset-backed securities	0.2	55%	78%	10%	2%
	Collateralized debt obligations	0.2	48%	73%	10%	2%
Total USD LIBOR Exposure:		**199**	**82%**	**92%**	**4%**	**2%**

[1] Source: Federal Reserve staff calcuations, BIS, Bloomberg, CME, DTCC, Federal Reserve Financial Accounts of the Unites States, G.19, Shared National Credit, and Y-14 data, and JPMorgan Chase . Data are gross notional exposures as of year-end 2016. [2] The figures for syndicated and corporate business loans do not include undrawn lines. Nonsyndicated business loans exlucde CRE/commercial mortgage loans. [3] Estimated maturities based on historical pre-payment rates

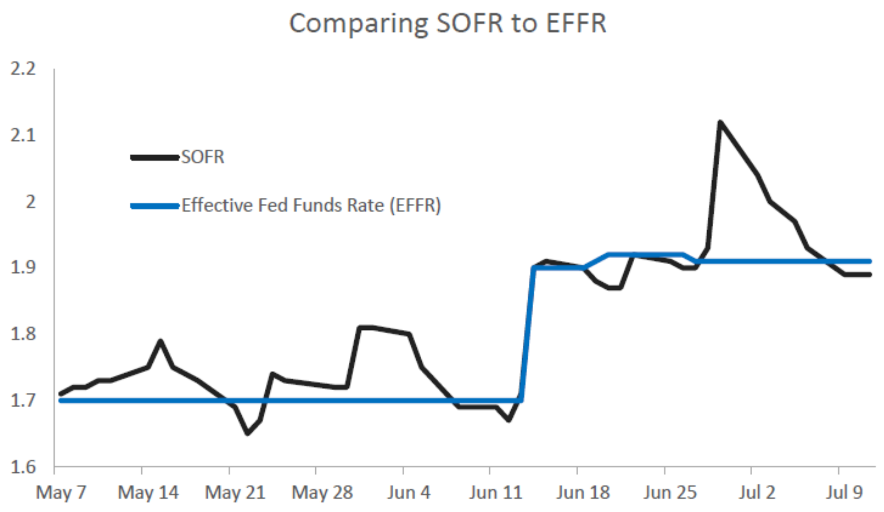
Averages of SOFR are Less Volatile than LIBOR

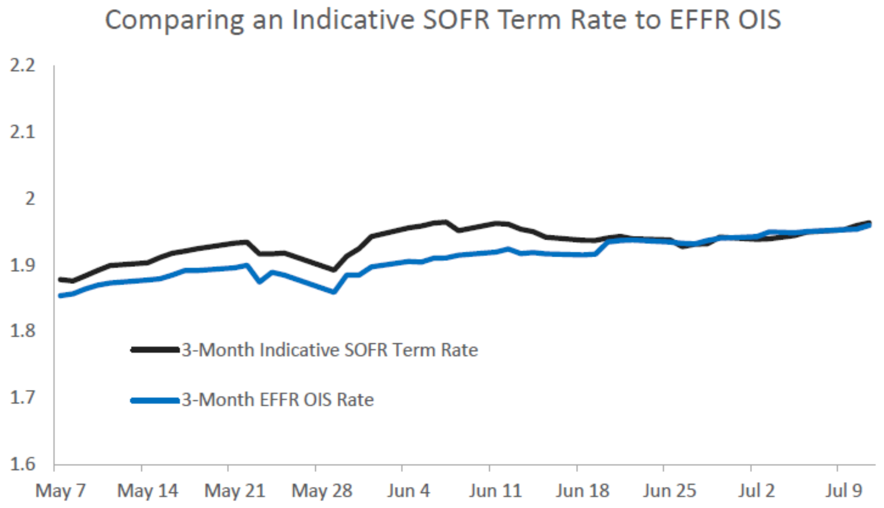


Compound Average SOFR is a compound geometric average of daily rates over the subsequent quarter. Source: Federal Reserve Bank of New York (link to data) and Ice Benchmarks Administration.



Source: Federal Reserve Bank of New York and Bloomberg





Source: Federal Reserve Bank of New York, CME, Bloomberg and Federal Reserve staff calculations

The ARRC's Paced Transition Plan for Developing SOFR Markets is Ahead of Schedule

1. Infrastructure for futures and/or OIS trading in the new rate is put in place by ARRC members.

   Anticipated completion: 2018 H2 **– ARRC members already trading futures and OIS**

2. Trading begins in futures and/or bilateral, uncleared, OIS that reference SOFR.

   Anticipated completion: by end 2018 **– CME began SOFR Futures on May 7**

3. Trading begins in cleared OIS that reference SOFR in the current (EFFR) PAI and discounting environment.

   Anticipated completion: ~~2019 Q1~~ **– LCH offered SOFR OIS and basis swap clearing on July 16, CME to offer this year**

4. CCPs begin allowing market participants a choice between clearing new or modified swap contracts (swaps paying floating legs benchmarked to EFFR, LIBOR, and SOFR) into the current PAI/discounting environment or one that uses SOFR for PAI and discounting.

   Anticipated completion: 2020 Q1

5. CCPs no longer accept new swap contracts for clearing with EFFR as PAI and discounting except for the purpose of closing out or reducing outstanding risk in legacy contracts that use EFFR as PAI and discount rate. Existing contracts using EFFR as PAI and the discount rate continue to exist in the same pool, but would roll off over time as they mature or are closed out.

   Anticipated completion: 2021 Q2

6. Creation of a term reference rate based on SOFR-derivatives markets once liquidity has developed sufficiently to produce a robust rate.

   Anticipated completion: by end of 2021

Alternative Reference Rates Committee (ARRC 2.0)

The Alternative Reference Rates Committee (ARRC) was originally convened in November 2014 by the Board of Governors and Federal Reserve Bank of New York (FRBNY) and charged with:

- Identifying one or more alternative USD reference rates that both fit the needs of the market and meet standards of best practice.
- Developing plans for the voluntary adoption of these rates.
- Identifying best practices for contract robustness.

The ARRC was reconstituted ("ARRC 2.0") this year to facilitate the much wider interest in mitigating risks related to LIBOR following Andrew Bailey's speech.

ARRC Members	
AXA	JP Morgan Chase & Co.
Bank of America	LCH
BlackRock	MetLife
Citigroup	Morgan Stanley
CME Group	National Association of Corporate Treasurers
Deutsche Bank	PIMCO
Federal National Mortgage Association	TD Bank
Federal Home Loan Mortgage Corporation	The Federal Home Loan Bank of New York
GE Capital	The Independent Community Bankers of America
Goldman Sachs	The Loan Syndications and Trading Association
Government Finance Officers Association	SIFMA
HSBC	Wells Fargo
Intercontinental Exchange	World Bank Group
ISDA	
Ex Officio Members	
Board of Governors of the Federal Reserve	Federal Reserve Bank of New York
Bureau of Consumer Finance Protection	Office of Financial Research
Commodity Futures Trading Commission	Office of the Comptroller of the Currency
Federal Deposit Insurance Corporation	Securities and Exchange Commission
Federal Housing Finance Agency	Treasury Department

The ARRC 2.0 Has Expanded Its Work Scope

The ARRC's NewWorking Group Structure