LIBOR to SOFR Transition Challenges in the Path Ahead

Alternative Reference Rates Committee

Money Market Expo

March 5, 2019

Alternative Reference Rates Committee

Speakers

David Bowman – Senior Advisor – Board of Governors – Federal Reserve

Meredith Coffey – EVP – The Loan Syndications and Trading Association

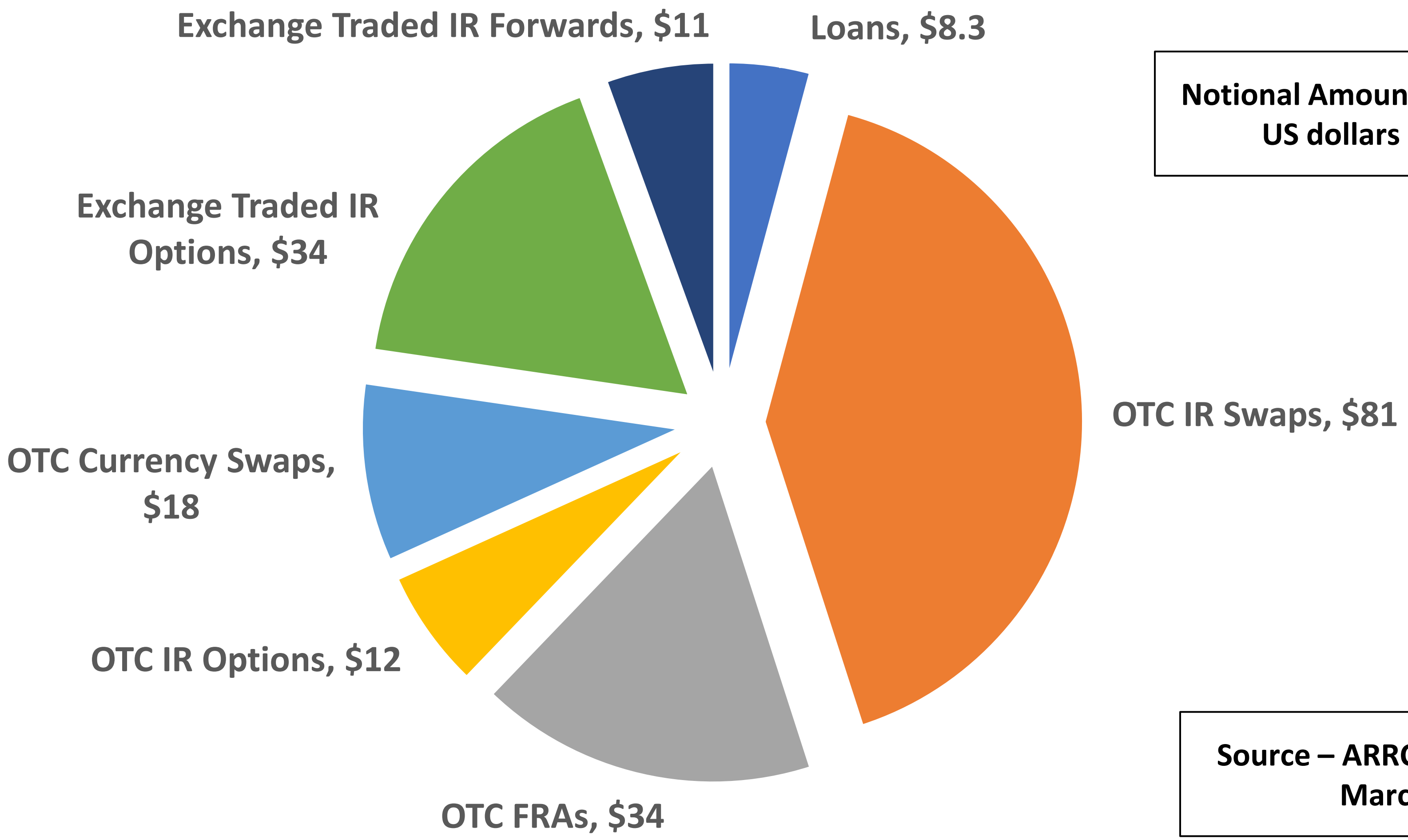
David Messerly – Director, Global IR – FHLBanks, Office of Finance

Thomas Deas – Chairman – National Association of Corporate Treasurers

ARRC Reconstituted – First Quarter 2018

Members of the Alternative Reference Rates Committee		
AXA	Goldman Sachs	National Association of Corporate Treasurers
Bank of America	Government Finance Officers Association	Pacific Investment Management Co
BlackRock	HSBC	TD Bank
Citigroup	Intercontinental Exchange	The Federal Home Loan Bank of New York
CME Group	International Swaps and Derivatives Association	The Independent Community Bankers of America
Deutsche Bank	JP Morgan Chase & Co	The Loan Syndications and Trading Association
Federal National Mortgage Association	LCH Clearnet	The Securities Industry and Financial Markets Association
Federal Home Loan Mortgage Corporation	MetLife	Wells Fargo
GE Capital	Morgan Stanley	World Bank Group

U.S. Dollar LIBOR Exposures – $ 200 Trillion



Notional Amounts Outstanding
US dollars - trillions

Source – ARRC Second Report
March 2018

Typical Existing Fallback Language in Loans

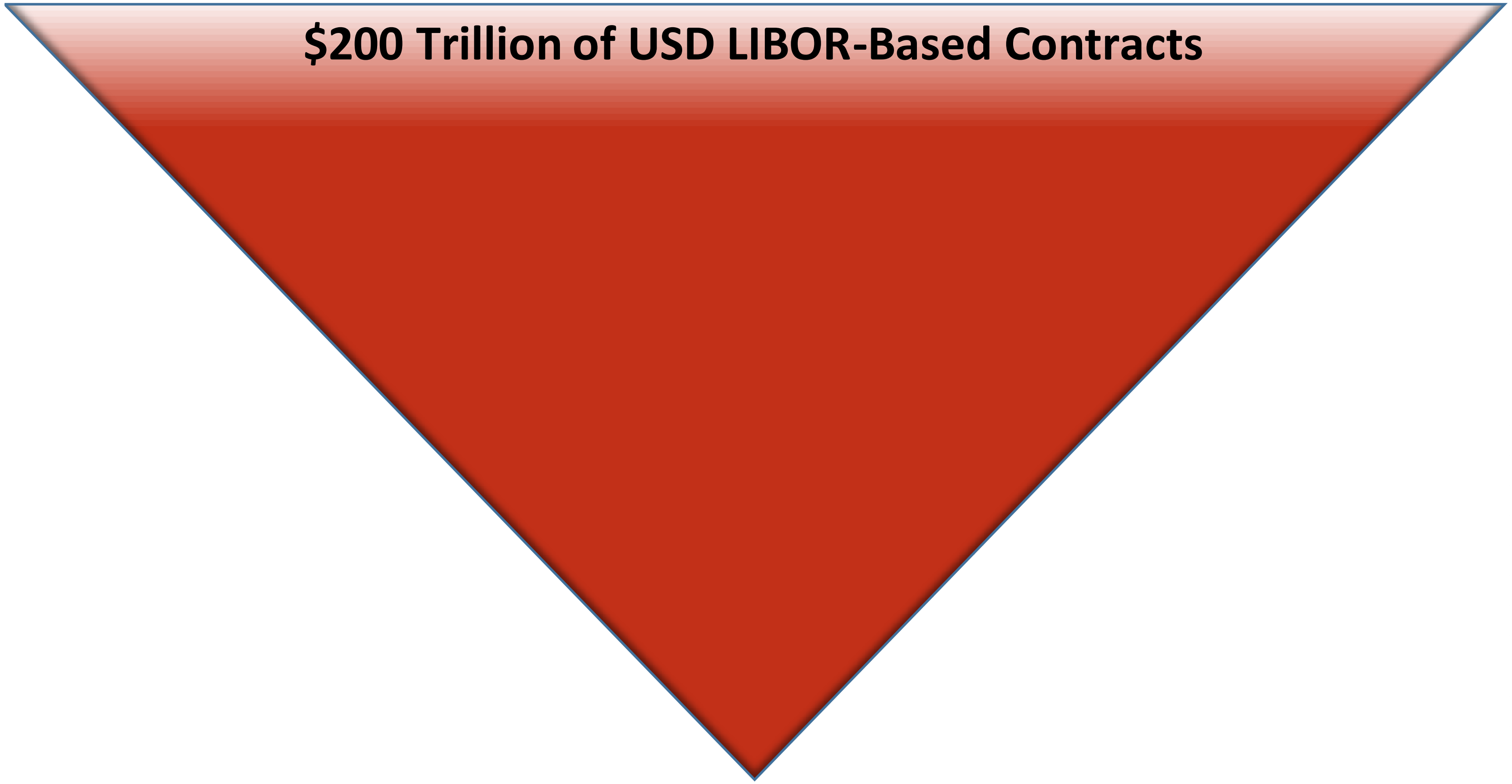
- Floating Rate Notes – Typical contract language would direct the calculation agent to first poll a sample of banks (similar to the ISDA fallback language) and then convert to fixed-rate at the last published value of LIBOR if quotes are not received.

- Corporate Loans – Typical contract language appears to name the Prime Rate or the Effective Fed Funds Rate + a spread as the fallback if LIBOR was discontinued.

- Securitizations – Agency MBS allow Fannie Mae and Freddie Mac to name a successor rate if LIBOR were permanently discontinued, but typical contract language in other securitizations would require a poll of banks and then convert to fixed-rate at the last published value of LIBOR if quotes are not received.

- Mortgages and Other Consumer Products – Typical contract language in mortgages gives the noteholder the ultimate authority to name a successor rate if LIBOR was permanently discontinued, although it is unclear if the spread can be adjusted. Other consumer loans may be more varied but thus far seem to have similar flexibility.

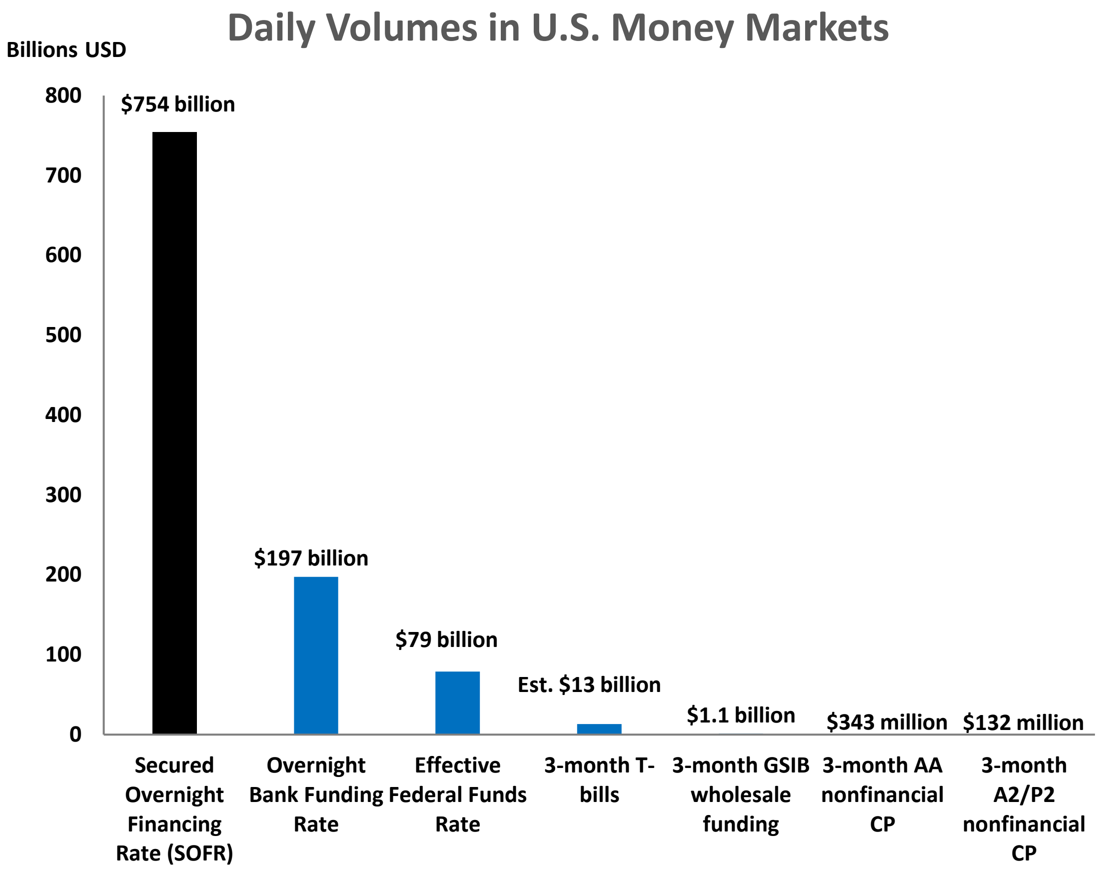
LIBOR and Financial Stability



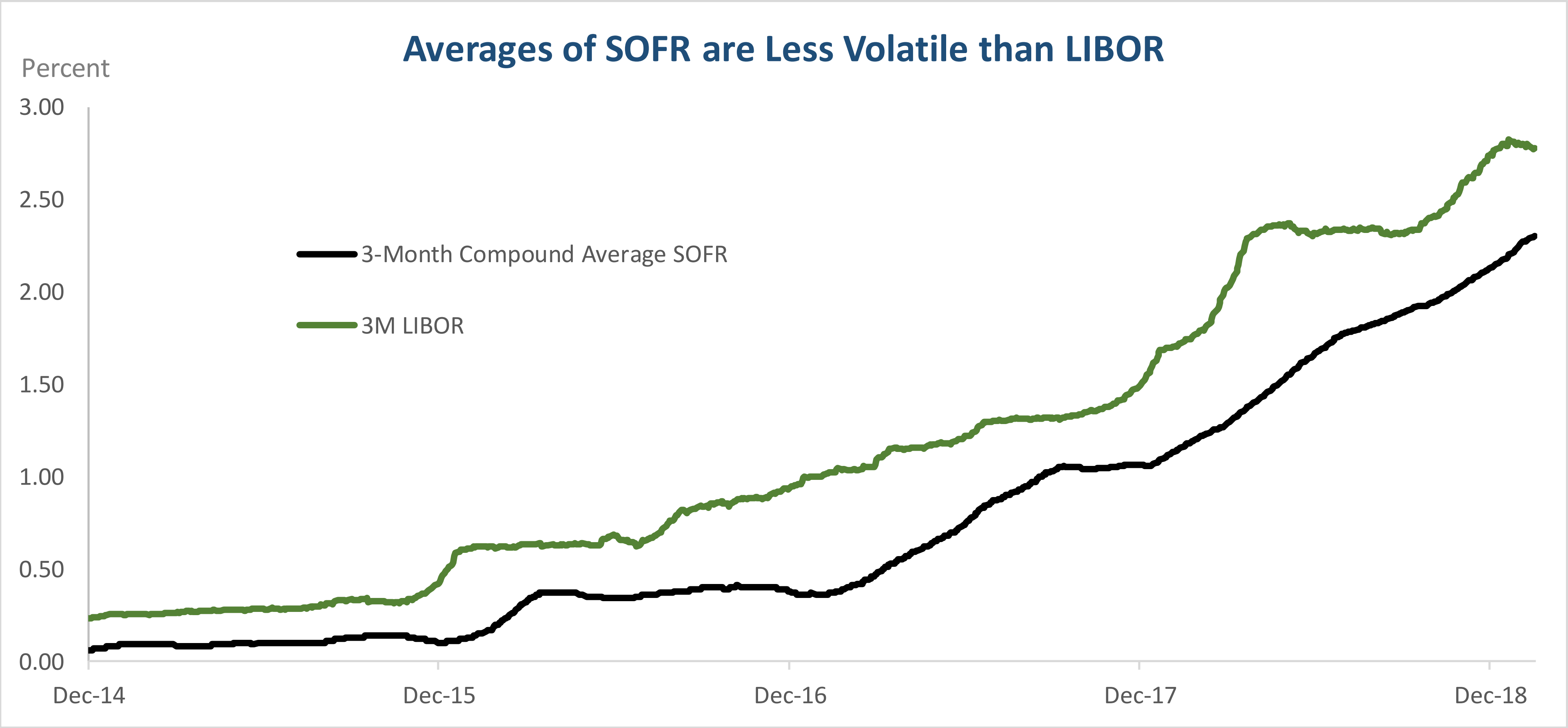
Priced off $500 million or less of underlying daily transactions

Secured Overnight Financing Rate = SOFR

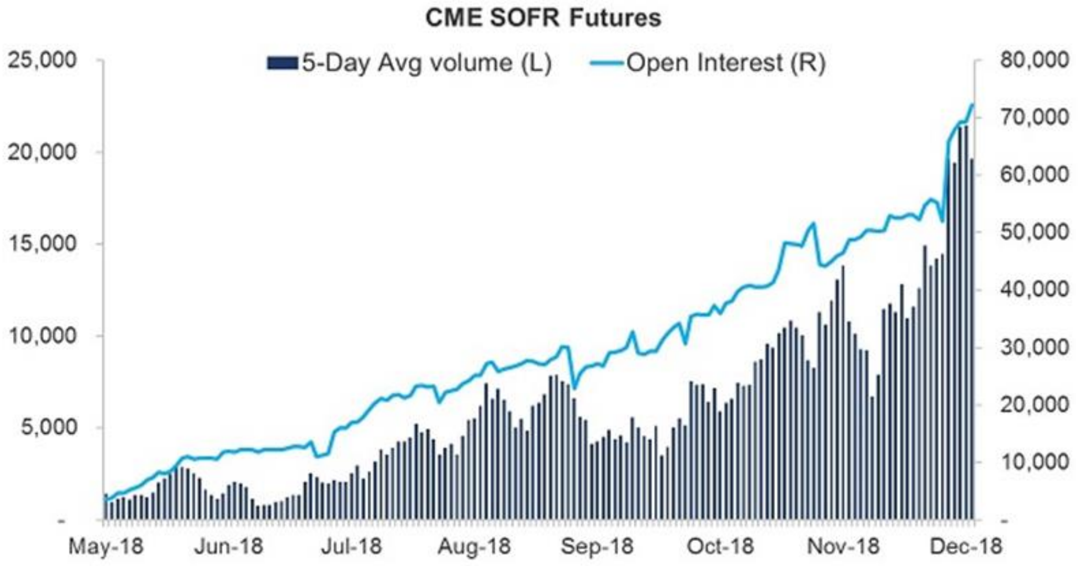
- SOFR began production on April 3, 2018.
- Underlying volumes reliably remain above $700 billion on a daily basis, generally close to $800 billion, and recently have risen to nearly $1 trillion as new participants have entered the market.
- SOFR represents the single largest rates market at a given maturity in the world.
- No other rates market is as large
- No term rates market has enough depth to make a convincing alternative for USD LIBOR.
- No prospective rate is likely to have the same level of derivatives depth, robustness, public sector support in production, or FASB hedge accounting status.

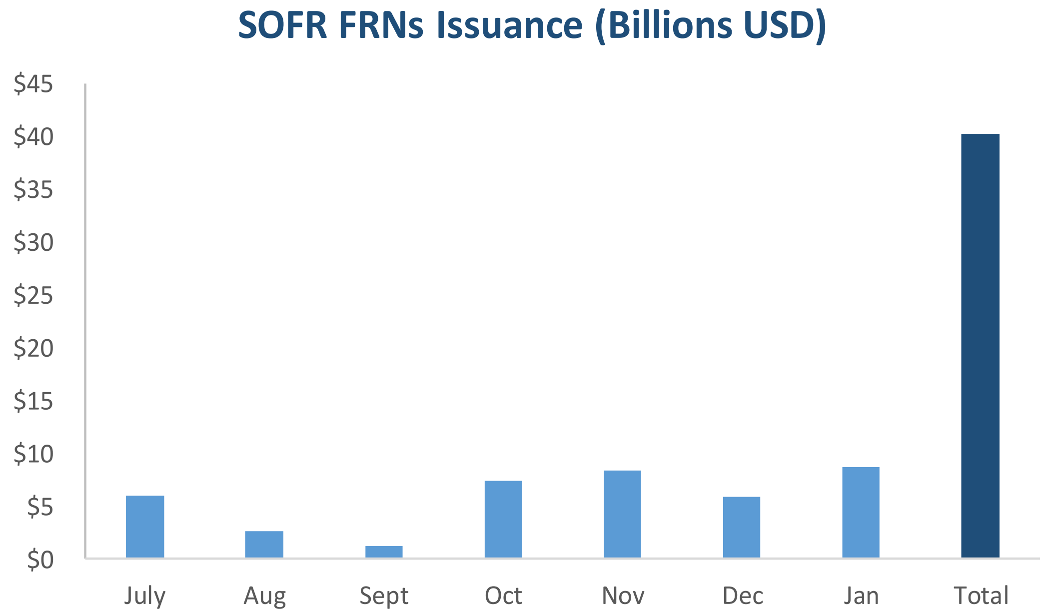


Compound Average SOFR



SOFR Issuance - 2018



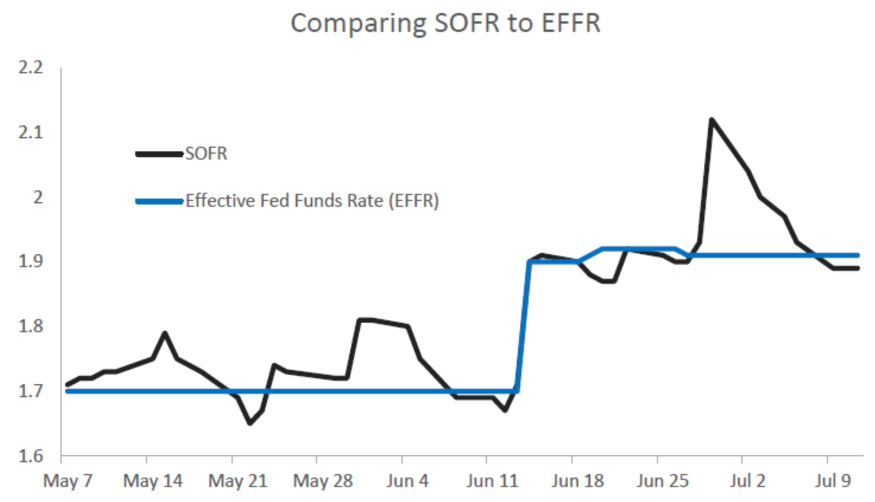


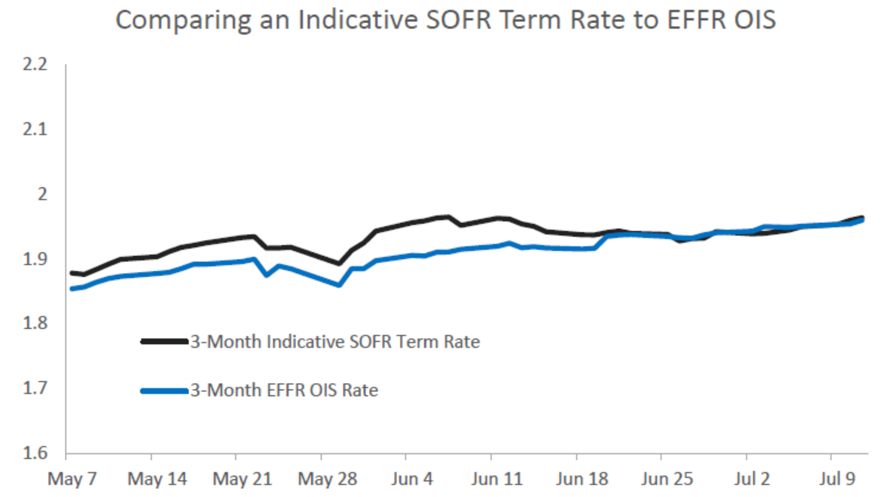
Paced Transition Plan for Developing SOFR Markets

	Step	Anticipated Date of Completion	Actual Date
1.	Infrastructure for futures and/or OIS trading in the new rate is put in place by ARRC members	2018 H2	ARRC members already trading futures and OIS
2.	Trading begins in futures and/or bilateral, uncleared, OIS that reference SOFR.	by end 2018	CME began SOFR Futures on May 7, 2018; ICE to launch on October 22, 2018
3.	Trading begins in cleared OIS that reference SOFR in the current (EFFR) PAI and discounting environment	2019 Q1	LCH offered SOFR OIS and basis swap clearing on July 18, 2018; CME began clearing OTC SOFR swaps on October 1, 2018
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.	2020 Q1	CME began clearing swaps using SOFR PAI/discounting on October 1, 2018
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.	2021 Q2	LCH has announced that it expects to move SOFR PAI/discounting on both new and legacy swaps during the second half of 2020
6.	Creation of a term reference rate based on SOFR-derivatives markets once liquidity has developed sufficiently to produce a robust rate.	by end of 2021	

SOFR-Based Term Reference Rate

- **The ARRC is seeking to produce an indicative SOFR-based term reference rate from futures data to help promote market familiarity with the term rate.**





ISDA Consultation: Converting Legacy Contracts

ISDA will amend its 2016 definitions to incorporate more robust IBOR fallbacks. It will offer a protocol allowing legacy contracts to incorporate the new definitions.

ISDA concluded its first market consultation (of ISDA members and non-members) on October 22nd, 2018.

- **This initial consultation was for Sterling, Swiss Franc, Yen LIBOR and Yen TIBOR and the BBSW rate.**
- **USD LIBOR consultation is expected in Q1.**

In the ISDA consultation, fallbacks would only be triggered a public statement or publication of information by or on behalf of the administrator or by the regulatory supervisor or other public agency announcing that the administrator has ceased or will cease to provide LIBOR permanently or indefinitely. ***However, the OSSG has encouraged ISDA to consult on including a trigger in the event that LIBOR has been found to be non-representative by the UK Financial Conduct Authority (the regulator of IBA LIBOR) and ISDA to be has promised to determine what additional documentation solutions may be demanded to allow for a transition to alternative rates prior to the permanent discontinuation of an IBOR.***

Responses to the initial consultation showed a cleared preference for:

Fallback Rate:

- **Compounding Setting in Arrears Rate – the RFR observed over the relevant IBOR tenor and compounded daily during that period**

Spread Methodology

- **Historical Mean/ Median Approach – Spreads would revert over one year to the mean or median spot spread between the relevant IBOR and RFR calculated over a significant, static lookback period (*e.g.,* 5 or 10 years)**

An ARRC Consultation on Recommended Language for Cash Products – New Activity

- **Safer language is still needed in the market. Syndicated loans have moved away from language that requires unanimous consent of all lenders to charge a fallback rate other the Prime rate, but does not discuss the nature of any spread adjustment and continues to require majority consent. Some FRNs have adapted new fallback language, but many have not, and the new language tends to refer to terms like "industry standards" that are legally ambiguous.**
- **The ARRC released a set of Guiding Principles for contract language in June and has now finished consultations regarding more robust contract fallback language in floating rate notes and syndicated loans bilateral loans, and securitizations. The ARRC is seeking to make final recommendations in Q1.**
- **Key components include:**

Triggers

- **The current ISDA triggers for a LIBOR cessation**
- **Pre-cessation triggers if FCA finds LIBOR to be non-representative or its quality degrades**

Fallback Rates

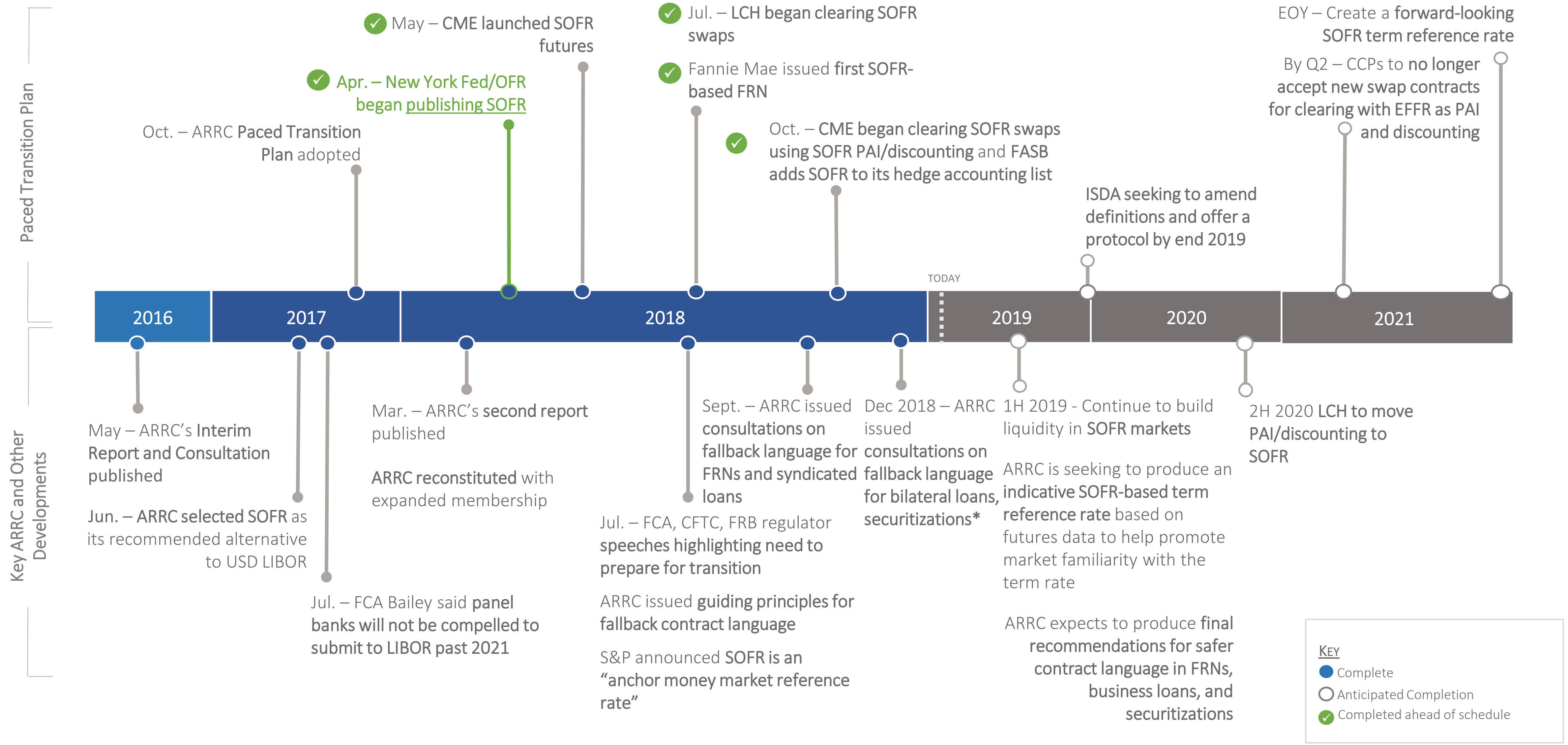
- **First fallback to the forward-looking term rate if the ARRC has recommended one**
- **A compound average of SOFR (similar to ISDA) if there is no recommended forward-looking term rate**
- **Other fallbacks included if SOFR does not exist**

Spread Adjustments

- **A spread adjustment recommended by the ARRC for cash products**
- **The ISDA spread adjustment if the ARRC has not recommended an adjustment**

Transition from U.S. Dollar LIBOR – Timeline

The Alternative Reference Rates Committee (ARRC) was originally convened in November 2014. Significant progress has been made to date.



**ARRC expects to consult on fallback language for other cash products*

As of 1/30/19

Issues for Loan Market Participants

Meredith Coffey

Executive Vice President of Research & Regulation

The Loan Syndications and Trading Association

Syndicated Loan Checklist

- **Identify your exposure**
- **Know your potential loan replacement rates**
- **Create workable LIBOR fallback language in existing loans**
- **Begin systems upgrades to operationalize replacement rates**
- **Start issuing loans off replacement rates**

Identify Your Exposure

- **What are the loans that have LIBOR exposure**
  - **Term loans**
  - **Revolvers**
  - **What currencies?**
- **Are your loans hedged – and therefore you need to think about basis risk?**
- **What other products – like FRNs, securitizations, etc – have LIBOR exposure?**

Know Your Potential Replacement Rates

- **For U.S. dollar LIBOR, most lenders believe SOFR is the likely replacement rate. But which SOFR?**

  - ***Forward-Looking Term SOFR***. Many lenders (and borrowers?) want a forward-looking term SOFR, which would have a term curve like LIBOR. This would allow borrowers to know their interest rates in advance and would be relatively easy to operationalize. However, because actual SOFR is an overnight rate, a forward-looking term SOFR must be derived from SOFR futures trading. As a non-trivial drawback, there is no absolute guarantee that this rate can be developed.

  - ***SOFR Rate Compounded in Advance***. This rate is determined by compounding the equivalent number of days for the previous time period. As a purely hypothetical example, if a borrower wanted a 30-day compounded in advance SOFR contract beginning April 1st, it could determine the rate in advance by compounding daily SOFR from March 2nd until March 31st. The positive is that this rate is known in advance and would be operationalized similarly to term SOFR. The negative is that, for longer contract periods, it could be stale.

  - ***SOFR Compounded in Arrears***. This rate is determined by compounding the SOFR *during* the interest period. Let's continue with the hypothetical example above, with a borrower wanting a 30-day compounded in arrears SOFR beginning April 1st. In this case, daily SOFR would compound every day from April 2nd to April 30th. The positives are that this is the true, exact interest rate on the loan and it is neatly hedgeable with swaps. The main negatives are that the final compounded rate is not precisely known at the beginning of the interest period, and many borrower and lender systems cannot easily operationalize a daily compounding rate yet.

  - ***Simple Daily SOFR in Arrears***. This rate is pulled daily, just like compounded in arrears, but it is not compounded. Using the example above, a daily SOFR rate would be applied to the loan every day from April 1st to April 30th. The positives are that this rate is basically the exact rate of interest, it is close to being perfectly hedgeable and loan systems already can do this with daily LIBOR and Prime. The negative is that the exact rate will not be known until the end of the interest period and it creates far more data flow through systems.

Create Workable Fallback Language

- **The US loan market is considering two major syndicated loan fallback options**
    - **Amendment approach**
        - Similar to what is being used in syndicated loan market today
        - Borrower and administrative agent identify that a LIBOR trigger has occurred, select a replacement rate (and potential spread adjustment); majority lenders have 5-day negative consent period
        - Pros: Utilizes loan amendment flexibility and avoids committing to SOFR + unknown spread today
        - Cons: Probably cannot realistically be utilized en masse if LIBOR ceased; could lead to gamesmanship; hard to operationalize today
    - **Hardwired approach**
        - Sets out all the transition steps at the initiation of the credit agreement
        - Upon a LIBOR trigger, the loan converts to a replacement rate using a “rate waterfall”
            - First step is Forward Looking Term SOFR + Spread adjustment; if this does not exist
            - Second step is Compounded SOFR + Spread Adjustment; if this doesn’t exist
            - Fallback to amendment approach
        - Pros: Similar to what is happening in other asset classes; reduces systemic risk and basis risk; can be operationalized; reduces gamesmanship
        - Cons: Requires lenders and borrowers to agree to rates/spreads that do not yet exist

Begin Operationalizng Systems for SOFR

- **The ARRC Business Loans Working Group and the LSTA are beginning to work on operationalizing SOFR**
  - Engaging with lenders and systems providers
  - Identifying potential replacement rates and how they would be operationalized
  - Identifying necessary data and calculation fields
  - Identifying convention changes
  - Determining timelines for time to market

Start Issuing SOFR-Based Loans

- Sounds crazy?
- There have been roughly $60 billion of SOFR-based securities issues
- There has been a SONIA securitization
- If we put a man on the moon, can we put a loan on SOFR?

Issues for FRN Market Participants

David Messerly

Director, Global Investor Relations

FHLBanks – Office of Finance

FHLBank’s SOFR Debt Transition

- As the financial markets begin the broad transition away from LIBOR:
  - The FHLBanks recognize our leading role in supporting development of liquidity in the SOFR-linked debt market
  - Part of the FHLBanks’ transition will be supporting our members transition plans which will lead to our need to source SOFR-based funding

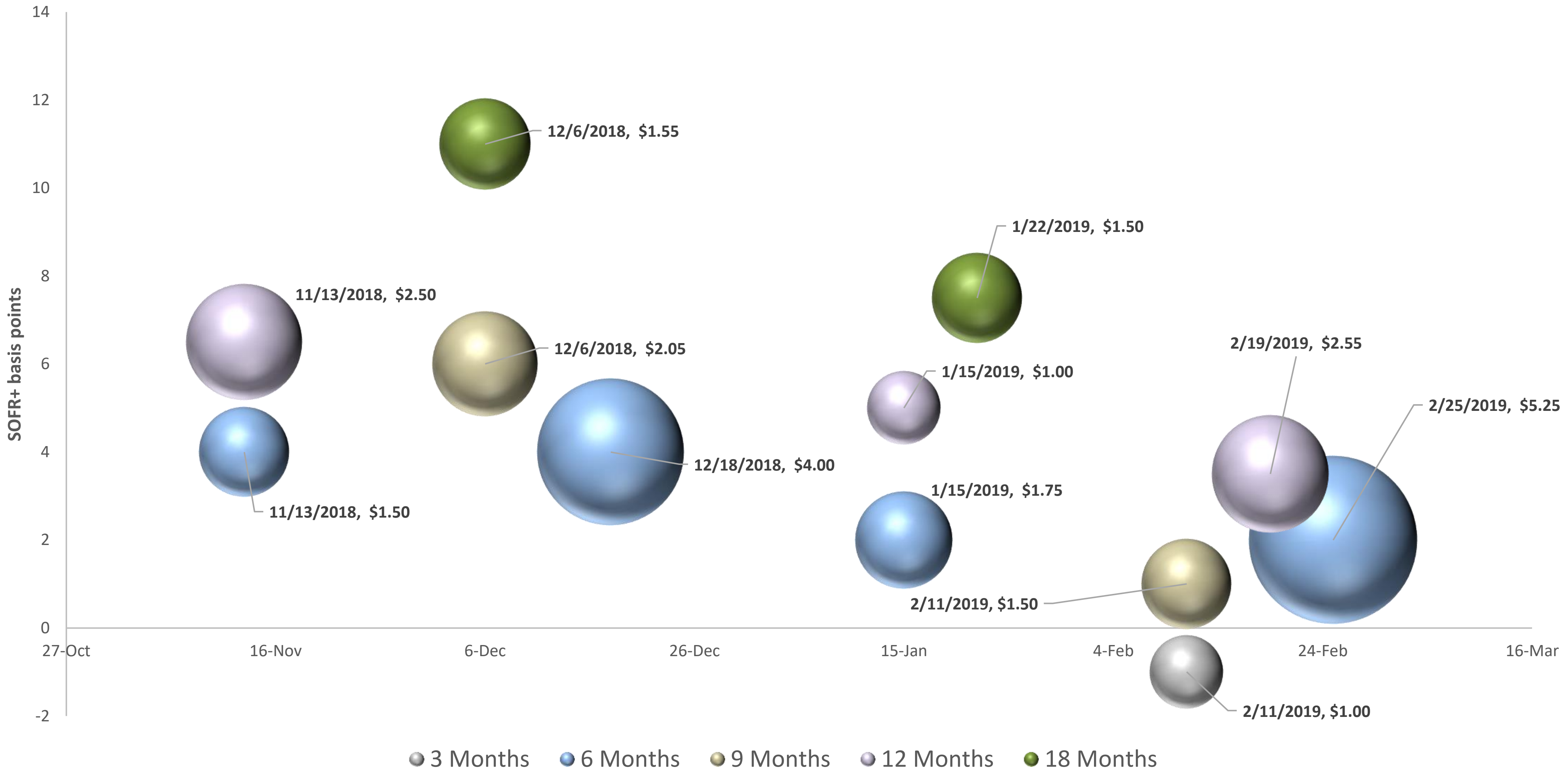
- The System began its SOFR issuance program in November 2018 with these objectives:
  - Support development of SOFR floating rate note (FRN) market through regular and consistent issuance
  - Encourage broad investor participation to promote market development and liquidity
  - Standardize payment and reset features that are consistent with market participants’ expectations

- The FHLBanks anticipate a multi-phased approach to developing our SOFR issuance platform

- Initial focus is on multi-dealer syndicated issues to foster transparency and liquidity
  - We expect to access the SOFR market in a regular and consistent fashion
  - Diverse investor participation including MMFs, State & Local Governments, Fund Managers, Insurance & Pension Managers and Corporations

- We will assess market developments, investor feedback, and member needs to adjust issuance methodology and SOFR terms as developments warrant

FHLBanks Issuance of SOFR FRNs - $26.15 billion



Issues for Corporate Treasurers

Thomas Deas

Chairman – National Association of Corporate Treasurers

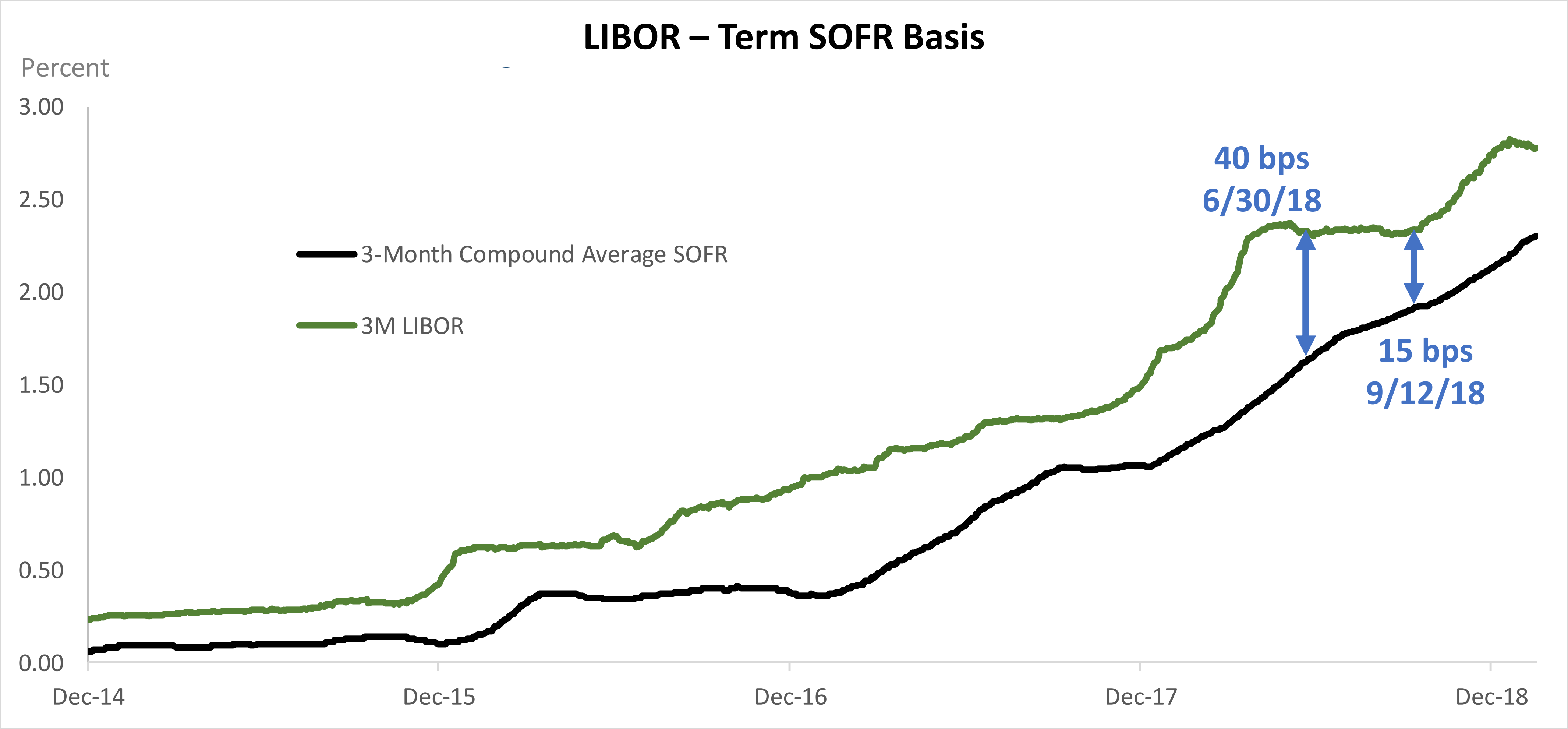
Corporate Uses of LIBOR/IBORs

- **Committed Credit Agreements** (Including CP Back-up Lines)
- **Multi-currency Credit Agreements** (Borrowings in USD, EUR, GBP)
- **Inter-affiliate/intra-group loans** (Used for daily cash concentration)
- **Term Loans / FRNs / Asset Securitizations** (Interest payment calculations)
- **Accounting** (FV Calcs, Lease Valuations, Capitalization of Interest, Derivatives)
- **Asset Purchase and Sale Agreements** (Adjustment for changing closing date)
- **Supply Agreements** (Adjustments for volume variances, late payments)
- **Long-term Capital Goods Purchases** (Milestone timing adjustments)
- **Employee Benefit Payments** (Adjustments for payment delays)

Credit Agreement Challenges

- **Credit agreement pricing grids are based on LIBOR plus a ratings-based credit spread**
- **Same IBOR spread in multi-currency agreements for USD, EUR, GBP**
- **LIBOR includes an inter-bank lending spread while SOFR is secured**
- **The euro and sterling IBOR replacements (ESTER, SONIA) are unsecured**
- **LIBOR-SOFR spreads have exhibited volatility**
- **The typical corporate borrower with no SOFR securities issued has no current market check on what its SOFR spread should be, making repricing its credit agreements to SOFR challenging**

LIBOR – Term SOFR Basis: Still Volatile



Potential Money Market Pricing Solution

- **Credit agreements in the 1980s and 90s often had a money market pricing option:**
  - **Borrowers could request competitive bids from existing members of their revolving credit bank group, but banks' participation in any bidding was optional on their part**
  - **Borrowers requested terms of either 1, 2, 3, or 6 months**
  - **Banks bid amounts at a spread over LIBOR**
  - **Borrowers accepted bids from lowest to highest with the total amount accepted the borrower's choice**
- **SOFR spreads could be determined by reincorporating this process into new corporate credit agreements, with the SOFR-based loans resold into the money markets**