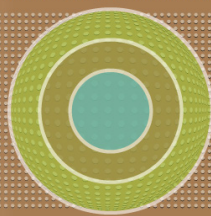


Updated Sep-2019



The efforts to reform LIBOR and support alternative reference rates (ARR) make a clear case that significant changes are coming for derivatives market participants and it's time to start making plans. pasVal is committed to helping you meet these challenges and to making our powerful platform easily accessible for you and your clients.

Here's what we think you should be watching to stay on top of these changes to LIBOR (see last page for background):

### Market acceptance of ARR

How quickly will market players begin using ARRs and how does this impact their reliance on LIBOR?

**New!** 4 key milestones of the 6 outlined by the ARRC's Paced Transition Plan have completed earlier than anticipated. The two remaining milestones, where CCPs no longer accept swaps for clearing with EFFR as PAI and a term reference rate based on SOFR exists, are anticipated to complete in Q2 2021 and at the end of 2021 respectively.

[Paced Transition Plan](#)

**New!** By May 3, 2019, the traded notional for SOFR swaps totaled \$41.2 billion, including \$5.9 billion of basis swaps.

[ISDA SwapsInfo](#)

**New!** Singapore, which is not a LIBOR jurisdiction, announced transition plans from SGD Swap Offer Rate (SOR) to the Singapore Overnight Average (SORA) in anticipation of LIBOR cessation.

[ABS Announcement](#)

**New!** The ARRC has published a useful matrix and comparison of SOFR FRN conventions.

[SOFR FRN Conventions Comparison](#)

**New!** Since our last update, overall SOFR-based issuance has increased from over \$81B to \$148B from 27 different institutions, hitting a new record of \$36B in June 2019.

[SOFR Market Update Detail](#)  
[SOFR CME Recap](#)

**New!** Both the SEC and IOSCO have issued statements regarding the LIBOR transition.

[SEC Statement](#)  
[IOSCO Statement](#)

- In April 2019, ICE Benchmark Administration (IBA) announced that it successfully transitioned all LIBOR Panel Banks to the Waterfall Methodology and also published preliminary methodology for a potential LIBOR replacement index the USD ICE Bank Yield Index.

[ICE Announcement](#)  
[ICE Announcement](#)

- In March 2019, the Working Group on euro risk-free rates published a report on the transition from EONIA to ESTR.

[EMMI Announcement](#)

- In August 2018, S&P recognized SOFR as an "anchor money market

reference rate" in its principal stability fund ratings (PSFR) methodology.

[CME Rates Recap August 2018](#)

- In July 2018, CME Clearing confirmed that its existing collateral policy includes acceptance of floating rate US government agencies for performance bond requirements, including FRNs anchored to the SOFR.

[CME Clearing Notice 18-308](#)

- From October 2017, New "compression" ideas were under consideration by relevant industry groups. This would involve amending the fallback documentation to include the new alternative rate and assessing the valuation change under that condition. Then auctioning bids between both receivers and payers of LIBOR to determine a "stop-out" rate.

[Risk Article](#)

### ? Will the authorities maintain a paced rather than a big-bang transition?

- Certain USD Swap Market participants have expressed a preference for a "big bang" transition of discounting and price alignment from EFFR to SOFR. CME has expressed its support for this approach and is working with participants to reach a consensus on potential issues with the approach.

[Big Bang Discussion Document](#)

### ? How long will parallel markets remain liquid?

- Current fallback provisions in ISDA contracts are not viewed as sufficient for a permanent discontinuation of LIBOR nor will they be satisfactory with an illiquid LIBOR market.

### ? Will you have to amend agreements? (This includes ISDA masters and CSAs)

**New!** In August 2019, ISDA published preliminary results of its fallback consultation and no clear majority view was apparent.

[ISDA Benchmark Fallback Consultation](#)

**New!** In July 2019, the ARRC released a consultation on fallback contract language for new closed-end, residential adjustable-rate mortgages.

[ARRC ARM Consultation](#)

- In December 2018, ISDA announced its intention to develop fallbacks based on the compounded setting in arrears rate and the historical mean/median approach to the spread adjustment.

[ISDA Announcement](#)  
[ISDA Summary of Responses](#)

- In October 2018, the ARRC released consultations on fallback contract language for floating rate notes and syndicated business loans.

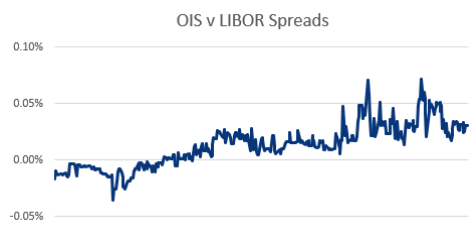
[ARRC Fallback Consultation](#)  
[ARRC Webinars and Presentation](#)

- In July 2018, the ARRC released guiding principles for the development of fallback language for new financial contracts.

[Guiding Principles](#)

### ? How will LIBOR v. OIS spreads behave?

- Spreads have frequently widened considerably from the beginning of 2019.



[ISDA Transition Roadmap](#)  
[ISDA Fallback Presentation](#)  
[ARRC FAQ's](#)

**New!** In the meantime, SOFR/EFFR spread trading drove SOFR futures trading to record levels in August 2019.

[CME Rates Recap](#)

### Other Useful References

[ARRC SOFR Adoption Highlights](#)  
[ARRC User's Guide to SOFR](#)  
[ISDA Transition Roadmap](#)  
[ISDA Transition Report and Checklist](#)  
[ISDA Fallback Presentation](#)  
[ARRC FAQ](#)  
[IBA Survey Results](#)

### Development of futures & swap markets

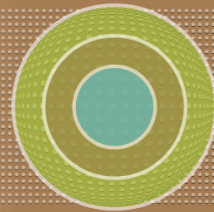
The success of the ARRs will depend on the development of sufficient liquidity in the futures and swaps markets referencing these new rates.

### ? What futures exchange products will be offered around new ARR?

**New!** From August 2019, the participation for SOFR Futures traded on the CME is 195+ global firms, with a balanced mix of buy-side, banking, and proprietary trading firms. Open interest reached a new high of 168K contracts and price discovery extends past 3 years.

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Updated Sep-2019



### [SOFR CME Recap](#)

- 1M & 3M SOFR and 1M SONIA Futures are now trading on both the ICE and CME and the term structure for CME SOFR futures now extends past 3 years. **(New!)** In June 2019, SONIA futures were the leading liquidity pool, based on volume, with 47% market share.

### [CME Rates Recap](#)

- ? **How will clearing houses adapt for existing ARR?**
- ? **When will ARR OIS trading become eligible for central clearing?**
- ? **Has a basis market developed?**

- SOFR swaps and basis swaps began clearing by both LCH and CME in Q3 2018.

[What's Next for LIBOR and Eurodollar Futures?](#)

[LCH SOFR Swaps](#)  
[CME SOFR Swaps](#)

## □ Tenor fixes

The ARR are overnight rates set in arrears, whereas LIBOR fixes for set tenors in advance. With sufficient liquidity in the swap OIS market, it might be possible to create such term fixings for these benchmark rates.

- In early 2020, the Federal Reserve Bank of NY will begin publishing a series of backward-looking SOFR tenors.

[Risk Net Article](#)

- ? **Do end-users of derivatives need ARR term fixings?**
- ? **Will tenor fixes based on the ARR evolve?**

- LIBOR's administrator, the IBA, is launching a portal to provide users with the first forward-looking term risk-free rates. While they will begin with SONIA, the methodology could be applied to SOFR and other RFRs in the future.

[IBA Whitepaper](#)

- In their [second report](#), the ARRC added tenors to their paced transition plan.
- The EMMI is ceased publication of 2W, 2M and 9M EURIBOR tenors in December 2018.

## □ Risk-free rate and credit premiums

LIBOR is based on unsecured interbank borrowings, whereas the ARRs are near risk-free rates. The proposed alternatives SOFR, SARON are secured while SONIA, TONAR and ESTER are unsecured.

- In April 2019, the ARRC released recommended fallback language for Floating Rate Notes and Syndicated Loans.

[ARRC Announcement](#)

- ? **How will fallback provisions account for this credit spread premium?**

- ISDA has issued a Request for Proposal for an independent service provider to calculate and publish adjustments.

[ISDA Announcement](#)

- ISDA has announced its intention to use a historical mean/median approach for spread adjustments. This is will be finalized in 2019

[ISDA Announcement](#)

- ? **Will new ARRs replace currently used discounting/risk-free rate (e.g. Effective Fund Funds rate in the US)?**

- CME is already discounting their SOFR swaps with a SOFR curve. LCH has announced their intention to do the same in 2020. The ARRC transition roadmap anticipates this transition to complete within Q2 2021.

[ARRC Checklist](#)

[CME Swaps Overview](#)  
[Risk Article](#)

- ? **How quickly will CCP price alignment interest (PAI) transition to new ARR?**

**(New!)** Currently, the ARRC anticipates this to complete in Q2 2021.

[Paced Transition Plan](#)

## □ Development of options market

The lack of an options market will place limitations on the derivatives markets' ability to replace LIBOR fully. Without one, valuations of non-linear ARR-based OTC derivatives with embedded options, calls, puts or convexity will be very challenging.

- ? **How long will it take to establish an active option market?**

- ? **Will cap/floor and swaption ARR products develop?**

For example, CME has an active US Fed Funds futures and futures options exchange, which they have committed to extend to SOFR.

## □ Hedge accounting implications

End-users of derivatives may find the new rates are not as appropriate for hedging their

obligations or may introduce ineffectiveness in the hedge relationship.

- ? **Will FASB accept these new ARR as eligible indices for hedging interest rate risk?**

- FASB officially added SOFR as an approved rate for hedge accounting.

[FASB update 2018-16](#)

- In February 2019, FASB issued a proposed standards update to allow SOFR as an allowed benchmark interest rate. The ARRC has requested inter-agency guidance from U.S. Regulators that, in the event of an IBOR fallback or replacement event, certain interest rate derivatives will not result in a change in regulatory status under Title VII of Dodd-Frank.

[ARRC Title VII Letter](#)

- ? **Will contract amendments or LIBOR fallback provisions require de-designation existing hedging relationship?**

- ? **How will the ARR change hedge effectiveness?**

[FASB update 2017-12](#)

[FASB update 2018-02](#)

## □ Valuation and system requirements

In the long term, a move from LIBOR to ARR could simplify certain aspects of derivative valuations by eliminating the need for OIS discounting. However, the uncertainty and phased transition to ARR will add complexity in all aspects of derivatives processing.

- ? **Can you capture the new ARR and associated futures and swaps for curve construction?**

- This is available with a subscription to pasVal.

- ? **What model changes are needed for valuation of ARR based products?**

- ? **How will you extend the SOFR curve?**

- pasVal allows you to extrapolate the curve in the absence of SOFR market benchmarks.

- ? **How will this impact hedge effectiveness tests and risk measures?**

- pasVal offers comprehensive HET and a wide range of risk metrics.

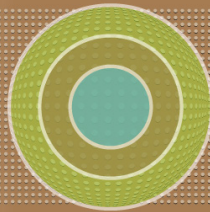
- ? **What is the impact on your overall operational and accounting process?**



# Derivative Valuations in Practice

## Status Update: Replacing LIBOR

Updated Sep-2019




While there is still an effort to reform LIBOR to make it more transaction based, there is a lot of effort underway to offer alternative benchmarks which could also completely replace it. New benchmark rates will be introduced in all LIBOR jurisdictions. These changes will have far-reaching impacts for the market and pose very specific challenges for individual businesses. We want you to have our most up-to-date understanding of the situation, so you can minimize the risks and make the switch as effortlessly as possible.

### What is involved?


London Interbank Offer Rate (LIBOR) is a benchmark rate based on the rates at which designated panel banks charge each other for short-term loans for 1W, 1M, 2M, 3M, 6M and 1Y terms. In recent years, the manipulation of these rates by contributing banks has highlighted the urgent need for reform.


Originally offering 15 maturities and covering 10 jurisdictions, it was reformed in 2013 to apply to just the 7 maturities noted above and only 5 jurisdictions (the US, UK, EU zone, Japan, and Switzerland). Now, each of these has its own body dedicated to reviewing and proposing alternatives to LIBOR.


### Who is responsible?

 The United States of America (USD) has the [Alternative Reference Rate Committee \(ARRC\)](#) at the Federal Reserve.

 The United Kingdom (GBP) has the [Risk Free Rate Working Group](#) at the Bank of England.

 The European Union (EUR) has a [joint working group](#).

 Japan (JPY) has a [study group on risk-free rates](#) at the Bank of Japan.

 Switzerland (CHF) has the [National Working Group](#) at the Swiss National Bank.

[Intercontinental Exchange \(ICE\)](#) is the current administrator of LIBOR.

[UK Financial Conduct Authority \(FCA\)](#) ensures panel banks contribute to LIBOR.

[European Money Market Institute \(EMMI\)](#) publishes [EURIBOR](#) which works similarly to LIBOR but specific to EU interbank loans. The EMMI also publishes EONIA.

[Financial Stability Board \(FSB\)](#) is the international body which originally recommended reform to


LIBOR.


[International Swaps and Derivatives Association \(ISDA\)](#) will contribute critical guidance specific to derivatives markets.


### What is *definitely* happening?


ICE is currently making a concerted effort to [reform LIBOR](#), so it is more transaction-based. They have begun requiring Panel Banks to transition to a [new waterfall methodology](#). Likewise, the EMMI is undertaking a [reform of EURIBOR](#).

The relevant authorities have each selected alternative rates: SOFR (United States), SONIA (United Kingdom), ESTER (Euro Area), SARON (Switzerland), and TONAR (Japan). Only TONAR and SONIA were already established market rates and SOFR is well on its way. The EU has decided against EONIA and will [publish the Euro Short-term Rate \(ESTER\) by 2020](#).

 In March, the ARRC produced a [second report](#) which outlines anticipated dates for a paced transition plan. They have also published a [helpful FAQ](#). [Four of the six transition milestones have completed. The two remaining milestones have anticipated completion in Q2 2021 and the end of Q4 2021.](#)

 The FASB has issued [Accounting Standards Update \(2018-16\)](#) to make SOFR an eligible benchmark interest rate.

 The Bank of England implemented [SONIA reforms](#) in April 2018.

 The ECB announced in May that it will [cease publication of 2W, 2M and 9M EURIBOR tenors](#) in December 2018.

At the end of 2021, the FCA will no longer compel panel banks to contribute to LIBOR.

ISDA's working group has [published a Transition Roadmap](#) and their latest [Transition Report](#) includes a Transition Checklist for market

participants.

ISDA also published [Supplement 57](#) to the 2006 Definitions to include "USD-SOFR-COMPOUND" and its designated fallbacks.

### What is still undecided?

It is still undecided if any of these alternative rates will *replace* LIBOR. That will depend on market adoption. Regardless, any of these alternative rates could still replace the OIS in a given jurisdiction, which would still have a significant impact to valuations.

While all jurisdictions have working groups committed to proposing *alternate* rates, the ECB and SNB have *yet to make formal proposals*.

The main questions that the market must answer, described in detail overleaf, are:

- ? Will futures & swap markets sufficiently develop?
- ? Will tenor fixes become established?
- ? Will any ARRs replace risk-free rates?
- ? Will an options market develop?
- ? What hedge accounting impacts will there be?
- ? What valuation and system changes will be required?

## About Principia

### A practical solution

Principia SFP provides clients with a multi-curve valuation and risk management environment to forecast using appropriate tenor LIBOR forward curves and to select the relevant discounting curves for accurate, independent valuations.

Beyond valuations, the system is an end-to-end operational platform for derivatives portfolios allowing users to perform detailed impact analysis, risk management and the full operational implementation of OIS discounting into daily mark-to-market and hedge effectiveness processes. Principia also provides and automates delivery of

extensive daily market data and curves as standard, for precise valuations, proven to closely match the interdealer market.

In a world moving towards central clearing, Principia users have the tools to implement industry best practices in the analysis, trading and risk management of vanilla and complex derivatives. With this single coherent platform, clients can streamline derivatives operations from trade capture and risk, through to accounting and central clearing.

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### About Principia Partners

Principia Partners LLC (Principia) provides a comprehensive single platform solution for the end-to-end management of structured finance and derivative investments. Global financial institutions and independent asset managers have used the award winning Principia Structured Finance Platform since 1995 to unify investment analysis, portfolio management, risk surveillance, accounting and operational control across the breadth of structured credit assets, fixed income investments and complex derivatives. In 2015, Principia launched its Analytic Service, pasVal, to make its award-winning pricing and analytics available to an even broader range of businesses.

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