Updated Sep 2018

Derivative Valuations in Practice

WATCHLIST: LIBOR Replacement

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 overleaf for background and status updates):

☐ Market acceptance of ARR

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.

The ICE is also working to reform LIBOR and panel banks will gradually transition to a new transactions-based waterfall methodology. As such, it may be that replacement rates never overtake LIBOR's acceptance in the market.

New! The ARRC released a new and very useful set of SOFR-related FAQs, complete with links to detailed source material.

ARRC SOFR FAQ

New! SOFR-based debt issuances and swaps continued to rise in September, including the first muni-bond by NY's MTA and the first commercial paper issued by Barclays.

Risk Article

- In July and August, the first SOFR-based debt was issued as well as the first SOFR-based swaps.

FT Article
The Trade Article

- S&P recognized SOFR as an "anchor money market reference rate" in its principal stability fund ratings (PSFR) methodology.

CME Rates Recap August 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

- The EIB has sold 1bn 5-year SONIA based debt which represents the first bonds issued for ARR.

FT Article

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

- ISDA published a transition report in late June 2018 highlighting the need for immediate action from market participants and providing a transition checklist.

Transition Report and Checklist

? **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)**

- The AARC has released guiding principles for the development of fallback language for new financial contracts.

Guiding Principles

New! The ARRC released consultations on fallback contract language for floating rate notes and syndicated business loans.

ARRC Fallback Consultation

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

- In April, US spreads had widened to at least 60 bps, a level not seen since 2009.

ISDA Transition Roadmap
ISDA Fallback Presentation
ARRC FAQ

☐ 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?**

- *1M & 3M SOFR and 1M SONIA Futures are now trading on both the ICE and CME and* New! *the term structure for CME SOFR futures now extends past 3 years.*

? **How will clearing houses adapt for existing ARRs?**

? **When will ARR OIS trading become eligible for central clearing?**

? **Has a basis market developed?**

- *LCH began clearing SOFR swaps and basis swaps in July 2018. CME intends to begin in Q3 as well.*

What's Next for LIBOR and Eurodollar Futures?
LCH SOFR Swaps
CME SOFR Swaps

☐ Tenor fixes

The ARR are by definition 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.

? **Do end-users of derivatives need ARR term fixings?**

? **Will tenor fixes based on the ARR evolve?**

- *In their second report, the ARRC added tenors to their paced transition plan.*

☐ 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.

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

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

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

☐ 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.

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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?**
  - *In February, FASB issued a proposed standards update to allow SOFR as an allowed benchmark interest rate.*
- The AARC 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

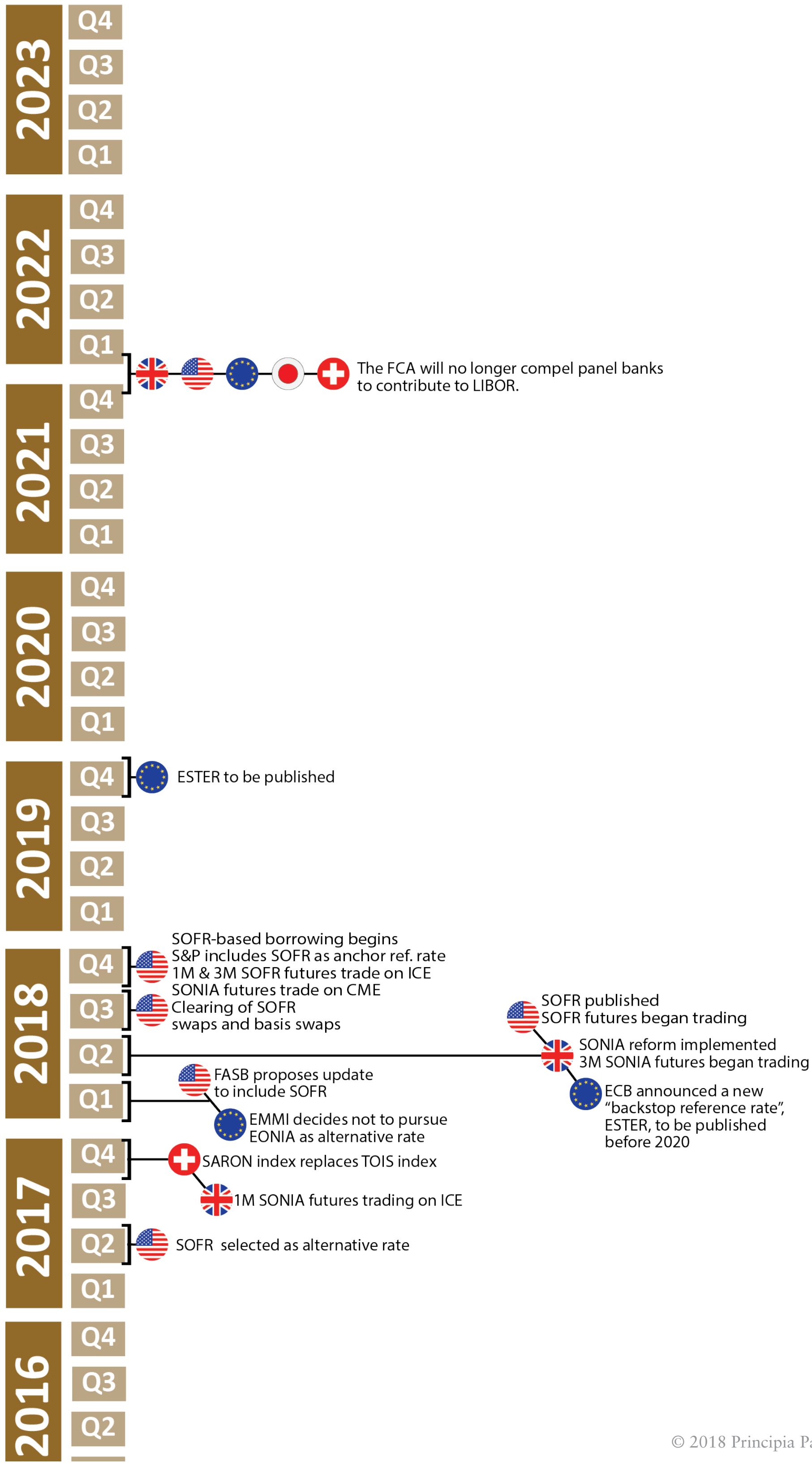
- ? **Will contract amendments or LIBOR fallback provisions require de-designation existing hedging relationship?**
- ? **How will the ARR change hedge effectiveness?**

FASB update 2017-12
FASB update 2018-02

Valuation and system requirements

In the long term, a move from LIBOR to ARR will simplify certain aspects of derivative valuations, as the same curve is used for forecasting cash flows as well as the discount curve. 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?**
- ? **What model changes are needed for valuation of ARR based products?**
- ? **How will you extend the SOFR curve?**
- ? **How will this impact hedge effectiveness tests and risk measures?**
- ? **What is the impact on your overall operational and accounting process?**



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Status Update: Replacing LIBOR

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 ON, 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.

Alternative rates (not necessarily replacement rates) to LIBOR have been declared, if not already published, in all jurisdictions: In many cases, instruments based on alternative rates have begun trading. In particular, the US and UK jurisdictions.

The ARRC recommended a new Secured Overnight Financing Rate (SOFR) as the alternative benchmark, which has been published since April 2, 2018.

In March, they also produced a second report which outlines anticipated dates for a paced transition plan.

The FASB has issued a proposed Accounting Standards Update to add SOFR as an allowed benchmark interest rate.

The Bank of England implemented SONIA reforms in April 2018.

The ECB announced in May that it will publish a daily euro unsecured overnight interest rate, ESTER, based on data already available to the Eurosystem, to be finalized before 2020.

The BoJ identified (Dec. 2016) TONAR as its LIBOR alternative.

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 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.