

IBOR Transition's Impact on the Derivatives Market

July 2021



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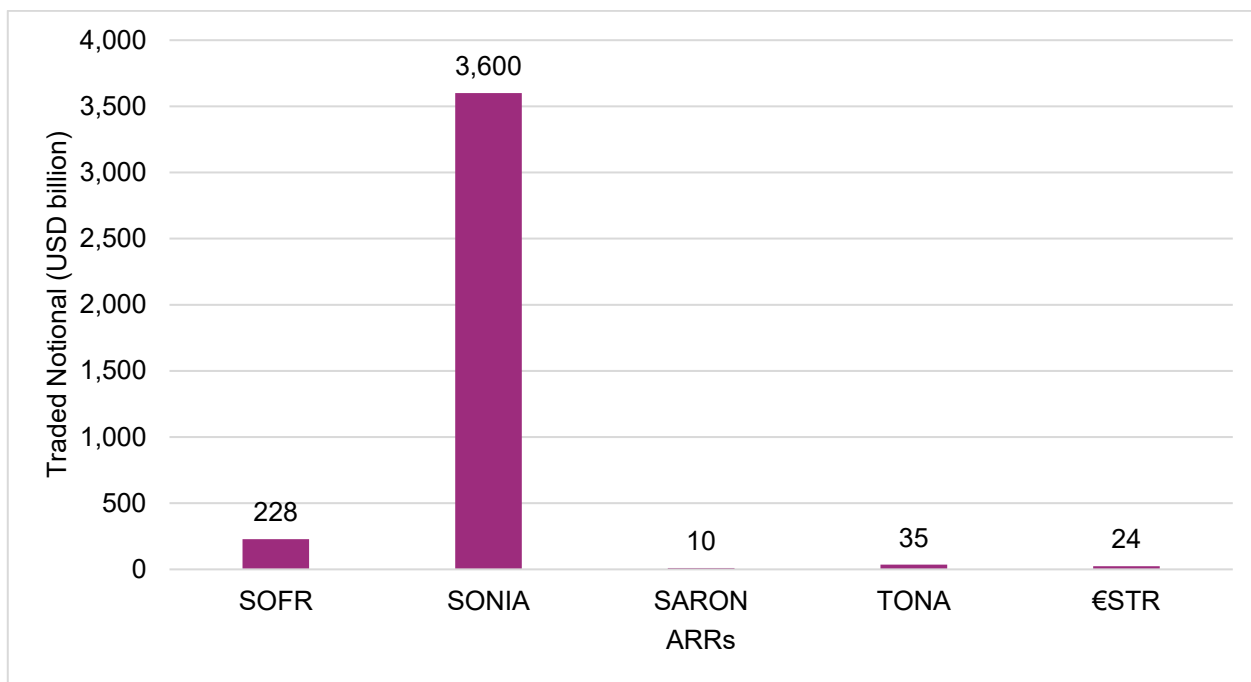
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Preparing for a World Without LIBOR

The London Inter-bank Offer Rate (LIBOR) is the most important rate globally, referencing nearly USD 370 trillion (as of 2018) equivalent of contracts that cover a myriad of products such as mortgages, bonds, and derivatives. As a result, the transition from LIBOR is accompanied by a high degree of complexity that involves negotiating existing contracts with clients, assessing the appropriateness of existing models, and upgrading existing systems to handle the change.

The development of Alternative Reference Rates (ARRs), such as Secured Overnight Financing Rate (SOFR), Sterling Overnight Index Average (SONIA), and Swiss Average Rate Overnight (SARON), only provides a partial solution in the form of possible risk-free rates. This is due to reasons such as – a) lack of term structure b) non-inclusion of risk spreads such as credit risk premia c) Timing differences in the adoption of ARR across different currencies d) difference in nature of ARRs in terms of secured vs. unsecured rates. However, the liquidity of contracts referencing the ARRs is still too thin to be considered an appropriate alternative. Among the ARRs, SONIA has the highest liquidity, followed by SOFR in the interest rate derivatives segment (Figure 1).

Figure 1. ARRs-linked Interest Rates Derivatives (IRDs) traded notional during Q3-2020 in the US (excluding futures)



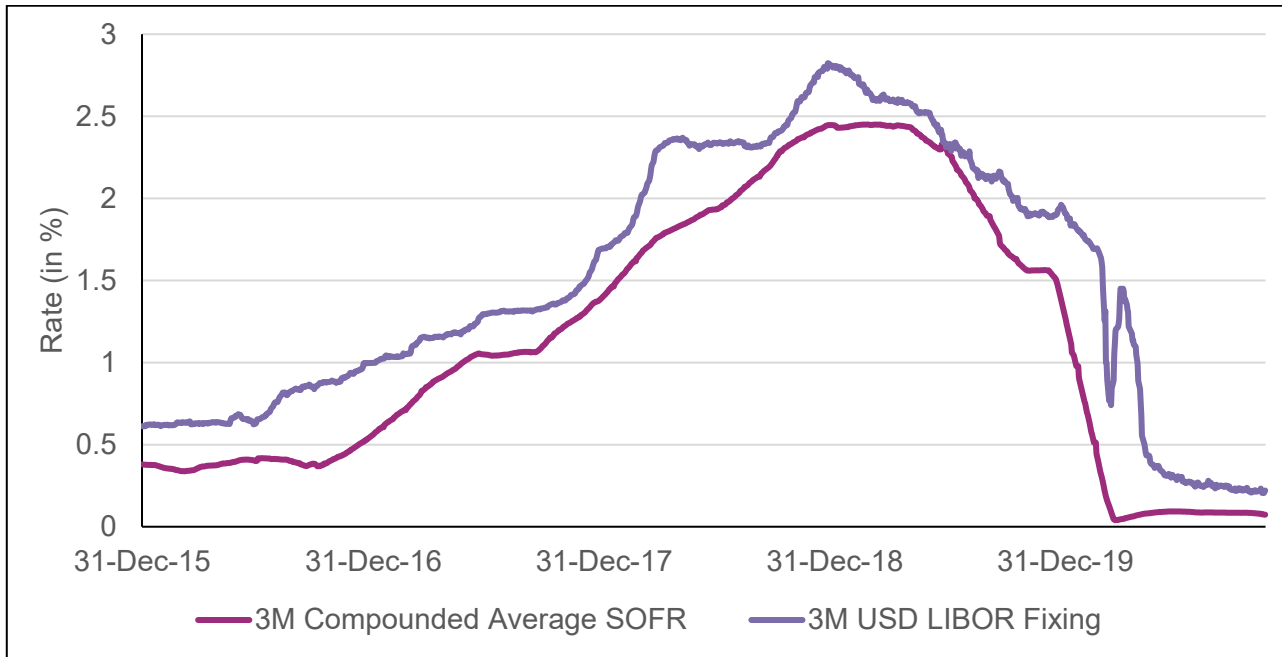
Source: [ISDA](#) (page 3)

The Financial Conduct Authority (FCA) had set the end of 2021 as a deadline for market participants to prepare for a world without LIBOR. Despite external factors such as the Covid-19 pandemic, the FCA reiterated that the deadline of publishing of LIBOR (end of 2021) has not changed. The Bank of England, FCA, and Working Group will continue to monitor and assess the impact on transition timelines and will update the market as soon as possible. The transition process will be complex and extensive since LIBOR is deeply entrenched in the financial world and is the basis for several standard interbank and commercial loans and derivative products.

During the initial period of COVID-19, central banks globally reduced their policy rates, but the LIBOR rates increased, representing the increased cost of funds for banks (Figure 2 and 3). This is contrary to popular notion and re-emphasizes the weakness of LIBOR as a benchmark. The following inferences can be drawn from Figure 2 and Figure 3.

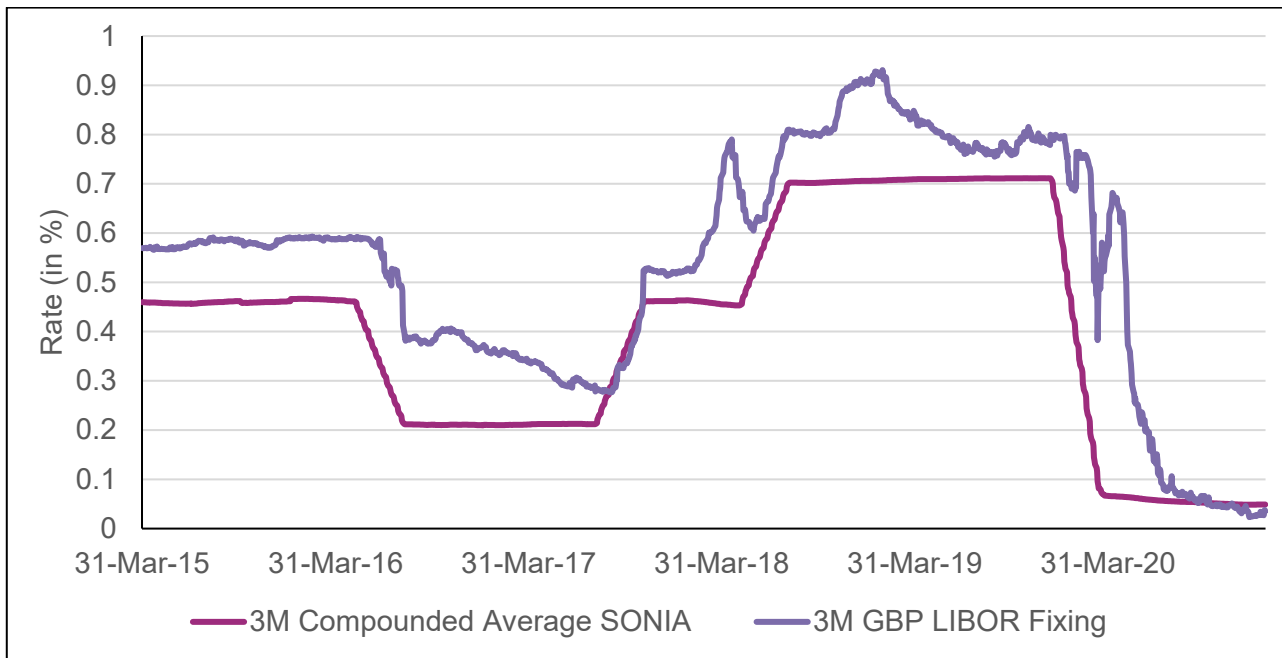
- During periods of significant market volatility, 3-month ARR's like SOFR and SONIA has proved to be more stable. Unlike LIBOR rates, the 3-month compounded average SOFR and SONIA decreased gradually during Mar-Apr 2020.
- During Mar-Apr 2020, the spread between 3-month compounded average SOFR, SONIA, and corresponding LIBOR rates increased to nearly 140 bps and 70 bps, respectively. The spread's increase was due to a gradual decrease of average ARR's compared to LIBOR rates which responded quickly to market stress.

Figure 2. Three months compounded SOFR vs. USD LIBOR 3M index



Source: Bloomberg

Figure 3. Three months compounded SOFR vs. GBP LIBOR 3M index



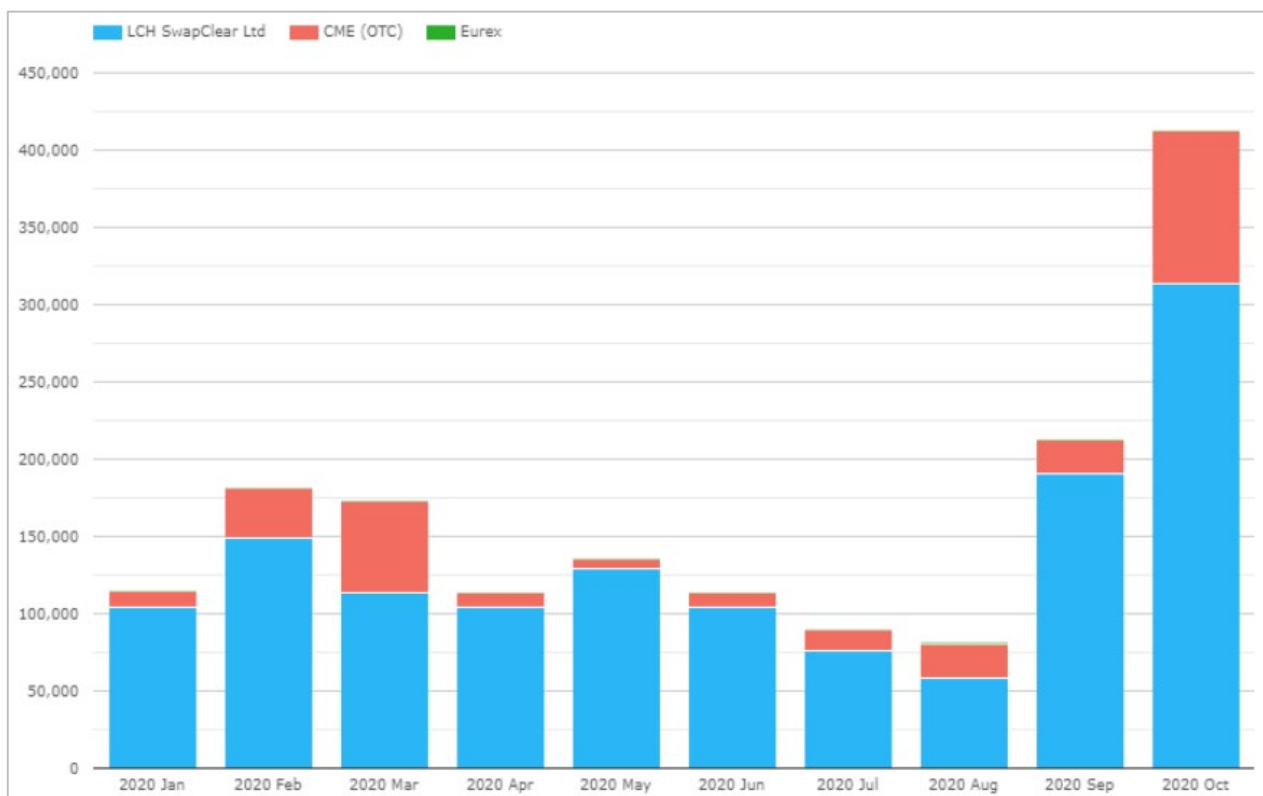
Source: Bloomberg

Recent Developments

Central Counterparties' Adoption of ARR:

- During July 2020, central counterparties (CCPs) like Chicago Mercantile Exchange (CME), London Clearing House (LCH), and EUREX transitioned to Euro short-term rate (€STR) discounting from Euro Overnight Index Average (EONIA) for EUR-denominated contracts.
- €STR transition was followed by CME and LCH transitioning to SOFR discounting from Effective Federal Funds Rate (EFFR) for USD-denominated contracts on October 16, 2020. The transition to SOFR is unique because, apart from the compensating cash component, it was accompanied by additional issuance of EFFR-SOFR basis swaps which is expected to reduce the overall risk to investors and reduce re-hedging costs.

Figure 4. USD SOFR Swap Traded Notional in 2020 (USD million)



Source: [Clarus Financial Technology](#)

- With the move, CCPs' Price Alignment Interest (PAI) has changed to SOFR for USD-based contracts. This also helps bring liquidity in the market as nearly 90% of interest rate derivatives are cleared through CCPs, and CME and LCH are the largest clearinghouses.
- The volume of SOFR-linked swaps sharply increased during October 16-19. Nearly 91% of the SOFR swaps booked on October 16 were basis swaps due to LCH's auctioning of basis swaps. Similarly, 70% of the SOFR-linked swaps booked on October 19 were fixed-float Overnight Indexed Swaps (OIS), swap pairs of EFFR, and SOFR driven by the CME auction.
- Overall, in October 2020, volumes of the SOFR swaps traded increased drastically to USD 412 billion from USD 213 billion in September 2020 due to the transition (Figure 4). As time progresses, the re-hedging requirement will further add to the liquidity of SOFR swaps.

ISDA Fallback Supplement and Protocol

Just a week later on October 23rd, 2020, the International Swaps and Derivatives Association (ISDA) published the Fallback Supplement and the Fallback Protocol. Together, these documents mark a significant step in the

transition away from IBORs once they became effective on January 25, 2021. The documents provide the pathway to amend existing derivative contracts referencing IBORs, albeit voluntarily.

- The supplement provides amendments to the 2006 ISDA definitions referencing IBORs. The definitions describe the alternate reference rate to fall back upon under specific trigger events. The protocol is a standard way to amend the legacy contracts.
- The supplement is forward-looking and affects contracts initiated effective from January 25, 2021. The protocol, on the other hand, can be applied to contracts issued before the effective date.
- Definitions of IBOR rates related to GBP, CHF, USD, EUR, JPY, AUD, CAD, HKD, SGD, and THB have been amended through the fallback supplement.
- The definitions have been amended to highlight the events of temporary and permanent triggers, which would require fallback to be used.

The calculation and publication of the fallback rate and spread will be done by Bloomberg Index Services Limited post the cessation of LIBOR, as per IBOR Fallback Rate Adjustments Rule Book.

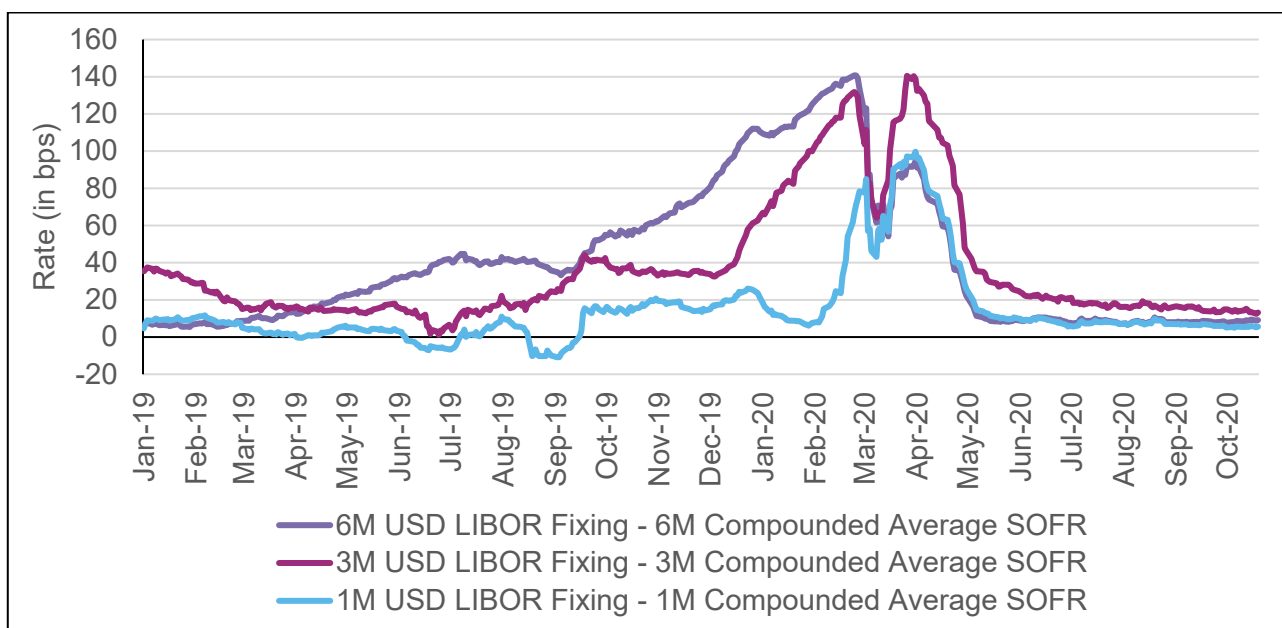
IBA Consultation

The Intercontinental Exchange (ICE) has recently announced its intention to continue with the publication of LIBOR rates for all maturities except one week and two months tenor of USD till June 30, 2023, for which it will follow a consultation process. This will serve the dual purpose of allowing most of the legacy contracts referencing LIBOR to mature, which ensures the stability of financial institutions by preventing possible disruption.

COVID Impact on Fallback Calculation

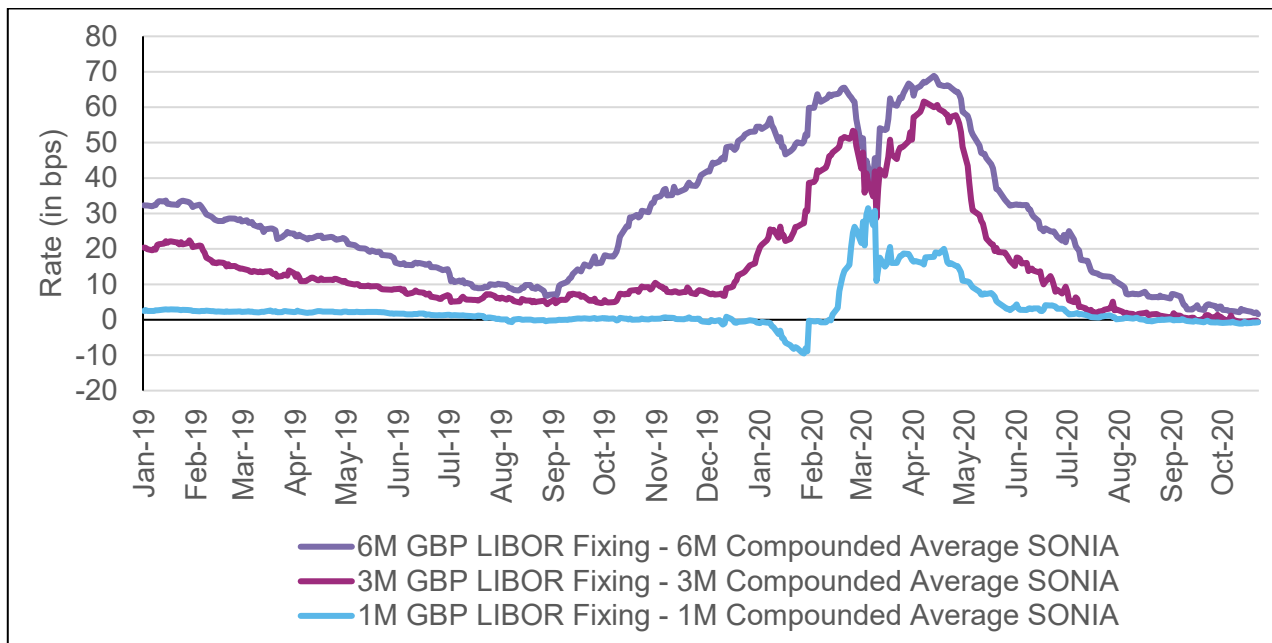
The COVID period exacerbated the impact of the IBOR transition. The ISDA fallback calculation is based on the median spread over SOFR, which means that the widened spread during COVID could increase the spread added to ARRs (Figure 5, Figure 6). This will increase the fallback rate even during stable periods.

Figure 5. USD LIBOR vs. average SOFR spreads



Source: Bloomberg

Figure 6. GBP LIBOR vs. average SONIA spread



Source: Bloomberg

The following interpretations can be drawn from the spread curves in Figure 5 and 6:

- The spread generally increases with tenor for both LIBOR- SOFR and LIBOR-SONIA. This is expected as tenors rise, the riskiness of unsecured LIBOR rates also increases.
- Before the onset of COVID, average 3M spreads for both USD and GBP remained stable at around 25-35 bps and 10-20 bps, respectively. Spreads started increasing from February due to COVID-related uncertainties
- During early March, the Federal Reserve decreased its policy rate target by 50 bps, and USD LIBOR rates and SOFR rates followed suit. Due to the averaging effect of SOFR 3-month average rates, the LIBOR 3M – SOFR 3M average spread decreased momentarily. The spread again started increasing due to increasing USD LIBOR rates, to peak around end-March. Since then, the spread has been decreasing.
- Similarly, GBP LIBOR rates decreased momentarily on March 11 when the Bank of England reduced Bank Rate by 50 bps. While SONIA remained low post the event, GBP LIBOR rates increased, which resulted in widened LIBOR 3M – SONIA 3M average spread.

Impact on LIBOR-based Business Transactions

The IBOR transition impacts model selection and model performance to a large extent. While the valuation of vanilla products may be straightforward, the valuation of complex or exotic derivatives will need model assessment for appropriateness. The challenge to market development of ARRs is evident from Table 1 below.

- As exotics, inflation swaps, cross-currency swaps, options, and cap/floors are more complex to model with ARRs, the liquidity is low for these products.
- On a comparative basis, SONIA-linked OIS is much more liquid than other ARRs. Basis swaps are nearly equal for SOFR and SONIA. However, better liquidity of SOFR-linked OIS and basis swaps is to be expected in Q4-2020 due to CCPs transition to SOFR discounting.
- Liquidity is very low for SARON, TONA, and €STR. Among products, liquidity is low for cross-currency swaps, inflation swaps, exotics, and options.

Table 1. ARR linked interest rate derivatives traded notional during Q3-2020 and 9M 2020

Product	9M-2020 (USD billion)				
	SOFR	SONIA	SARON	TONA	€STR
OIS	368.8	13,529.1	30.1	202.4	37.5
Basis Swap	339.5	216.7	-	0.1	-
Fixed vs floating IRS	3.0	38.4	-	-	-
Cross-currency IRS	-	0.4	-	-	-
Inflation swaps	-	0.2	-	-	-
Exotics	4.3	5.5	-	1.6	-
Options	0.3	-	-	-	-
Cap/floor	0.9	-	-	-	-
Total	716.8	13,790.3	30.1	204.1	37.5

Source: [ISDA](#)

Note: the data only includes deals which are required to be disclosed under US regulations and does not include features.

Here, we analyze the impact of the transition on models across some linear and non-linear interest rate derivatives. One common feature of all these products is the use of interest rate term structures. Term structure can be divided into short term (up to 1 year) and long term (beyond one year). Traded futures are used to construct the short term, and swaps are used for longer tenors of the interest rate curves.

Currently, SOFR, SONIA, and SARON futures are traded in exchanges, out of which the former two have comparatively high liquidity. During 2019, SONIA futures' volume was nearly 7% of the total futures in GBP. On the contrary, although the volume of SOFR futures has increased, it is still thin compared to other USD-linked futures (Eurodollar futures and fed fund futures). The increasing liquidity of the futures market provides comfort in the short end of interest rate term structure. In the longer tenor, market activity is low to derive comfort.

Banks and financial institutions have taken necessary steps to handle the new rates and the corresponding curves in their existing systems from an infrastructure standpoint. General practice is to build the curves as spreads over existing risk-free and basis curves following the existing implementation of multi-curve framework. For instance, USD LIBOR 3M-6M basis is adjusted over USD LIBOR curve to account for tenor basis. Likewise, EUR-USD cross currency basis is adjusted in the curves for currency swaps. A similar philosophy has been extended to ARR linked curves where SOFR-EFFR OIS spreads are incorporated over the OIS curve and EONIA-€STR spread is adjusted over the EONIA curve. The spreads are computed using compounding of respective rates, which is expected to be replaced by market quotes once the respective tenors become liquid.

From a risk management standpoint, additional ARR-OIS spread sensitivities will require hedging. Considering that the market for ARR-based instruments are not well developed, alternate OIS rates could be used as proxy hedging instruments.

Another potential area of contention is the applicability of forward-looking rate models to backward-looking rates (setting in arrears). Recent research suggests that interest rate models can be extended to backward-looking rates (Andrei Lyashenko, 2019). Specific extension to the LIBOR Market Model (LMM) model has been shown to be effective. However, the model is calibrated using cap/floor or swaption volatilities and the market for these products is not yet liquid, thereby restricting the applicability of the model.

Swaps

Interest rate basis swaps would follow ISDA fallback rates (ISDA, 2020) unless the contracts are re-negotiated to reference ARR. The transition of cross-currency basis swaps may not be that easy to follow due to the challenges below:

- Cross-currency basis deals may face substantial difficulties due to the different timing of adoptions and liquidity of ARRs. For instance, SONIA and SOFR may gain sufficient liquidity much earlier than Tokyo Overnight Average Rate (TONA), SARON, or other ARRs.
- There is also a basis between the secured and unsecured nature of ARRs. For example, SONIA is unsecured while SOFR is secured. This can add complications to the valuation of simple cross-currency swaps.
- Currently, there are only a few actual examples of cross-currency swaps referencing ARRs.

To facilitate the growth of the market, ISDA provided a recommendation for Interdealer Cross-Currency Swap Market Convention (Alternative Reference Rates Committee, 2020), which provides details of conventions and fallback mechanisms that dealers may follow. ISDA has provided further convention guidance for other types of swaps (ISDA, 2020), as mentioned below.

- Swaps with different tenors than IBOR tenors and swaps with stub period and range accruals seem to fit well to the fallback language, and there should not be much issue in settlement.
- In arrears, swaps may stop trading as the forward-looking term rates of ARRs cannot be considered as fixing rates.
- Forward rate agreements (FRA) can have a similar fate. These instruments are generally used to manage LIBOR fixing risk. In the absence of term fixings, the viability of the product is questionable.

Interest Rate Options

The interest rate options market referencing the ARRs is at a very nascent stage and poses a challenge to the valuation without the volatility surface or unreliable volatility surface. Economically, caps/floors, inverse floaters, range accruals, callable range accruals, and callable inverse floaters referencing ARRs can be considered as different products as compared to their LIBOR counterparts due to the change in optionality (The Working Group on Sterling Risk-Free Reference Rates, 2020). For instance, the valuations of caps and floors have the following challenges:

- Caps and floors are based on forward-looking rates, mainly LIBOR rates. In the new regime, these rates would be linked to spot rates, and fixings would be gradually known in the compounded setting, similar to Asian options. Therefore, a simple vanilla type of valuation would become more complex.
- Hedging will need to be reconsidered as traditional hedging alternatives, such as Eurodollar options, which are based on Libor, will no longer be effective.
- Caps and floors are used to hedge obligations towards debt repayment; for instance, in the case of adjustable-rate mortgage. Borrowers find it reassuring to know their obligations beforehand rather than depending on an OIS-type structure. Earlier the situation was hedging a 3-month obligation with a 3-month indexed cap/floor. In the ensuing case, there may be a situation wherein the dynamic is distorted and hedging needs to be carefully managed.

Amid all the challenges, it is worth noting that caps/floors linked to SONIA traded multiple times during 2020 and broker prices were frequently available.

Similarly, for swaptions, the underlying swap will convert to an OIS-type structure. The settlement would follow fallback rates but will depend on the settlement method. Cash-settled deals will follow Collateralized Cash Price Cash Settlement Method (ISDA, 2020) as defined by ISDA. The market for swaptions in SONIA is at a very early stage and there had not been a single issuance till November 2020 (The Working Group on Sterling Risk-Free Reference Rates, 2020). Similarly, the market for SONIA-linked range accrual, callable range accrual, CMS range accrual, and cancellable swaps has yet to develop. In addition, fallback for some of the exotic products has not been provided by ISDA.

Conclusion

The transition from the most important rate to ARR may not be straightforward. Legacy derivative contracts need to be re-negotiated or depend on the fallback language, while new contracts referencing IBORs will need to keep in mind the ISDA fallback language. Although the fallback guidance has been provided by ISDA, the challenges still remain.

Firstly, the liquidity of ARRs is a major concern. In the IRD segment, SONIA has the highest liquidity followed by SOFR-linked deals; however, other ARRs have yet to gain momentum. CCPs like CME and LCH have taken the lead in the transition away from LIBORs by shifting to SOFR and €STR discounting. This will eventually help in building liquidity as the requirement for hedging and re-hedging ARRs increase.

Secondly, during the COVID period, the USD LIBOR 3M—SOFR 3M average spread and the GBP LIBOR 3M – SONIA 3M average spread have widened. This could have a bearing on the median spread calculation as per the ISDA Fallback mechanism.

Finally, OIS and the basis swaps are the only products with some liquidity, and that too in specific ARRs. Due to interlinkages between ARRs for products like cross currency swaps, the timing difference of market liquidity of ARRs adds complexity to their valuation. The valuations of products with optionality like caps/floors are even more challenging, as the product feature changes. Although ISDA has provided fallback for the settlement of some major products, it does not cover some exotic products such as CMS-linked range accruals.

How Evaluesserve Can Support Your Transition from LIBOR

Evaluesserve is positioned to tackle challenges related to this transition, which is backed by years of experience working with globally systemic financial institutions in their risk management and data management processes. We get deeply involved in the client's migration, implementation and operations processes, and our success is tightly related to our client's success

Evaluesserve is capable of supporting the following:

- **Migration to new reference rates**, which include mapping technological impact in user interfaces, backend processes, executive reports and dashboards.
- **Model recalibration and revalidation**, which impact P&L, risk management and asset management.
- **Migration of legacy contracts**, which involves identifying contracts with inadequate legal clauses, prioritizing legacy contracts for negotiation through analytics, and revaluation of contracts.
- **Running high-level impact analysis** in financial institution's risk management and hedging strategy.

In order to deliver cost-efficient results, Evaluesserve has developed a highly collaborative approach within each team. Our clients gain access to:

- Experienced senior quants, with over 10 years in globally systemic financial institutions, who lead and leverage a mix of senior quants and programmers to deliver cost-efficient solutions
- Access to best practices, 360-degree assessment from multidisciplinary team of professionals
- Valuation and risk assessment of complete portfolio, through standardized and automated methodologies
- Increased quality in impact estimations through automation, quality checks, and standardized methodologies

Abbreviations

IBOR	Inter Bank Offered Rate
LIBOR	London Inter-bank Offered Rate
ARR	Alternative Reference Rate
SOFR	Secured Overnight Financing Rate
SONIA	Sterling Overnight Index Average
SARON	Swiss Average Rate Overnight
TONA	Tokyo Overnight Average Rate
ISDA	International Swaps and Derivatives Association
CCP	Central Counterparties
CME	Chicago Mercantile Exchange
LCH	London Clearing House
EONIA	Euro Overnight Index Average
(€STR)	Euro short-term rate
EFFR	Effective Federal Funds Rate
FRA	Forward Rate Agreement
OIS	Overnight Indexed Swaps
MBS	Mortgage Backed Securities
CMS	Constant Maturity Swaps
ICE	Intercontinental Exchange
IBA	ICE Benchmark Administration

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