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Research Note

Adoption of Risk-Free Rates: Major Developments in 2020

Transition from LIBOR and other interbank offered rates (IBORs) to alternative risk-free rates (RFRs) is a monumental task and it is one of the biggest challenges facing the financial industry. The shift is critical because of the issues associated with the robustness and viability of some IBORs – and LIBOR in particular – given the sharp decline in activity in the unsecured interbank funding market.

This paper examines several major upcoming developments in 2020 related to the adoption of RFRs, including the publication of new benchmark fallbacks for derivatives contracts and central counterparty (CCP) changes in discounting and price alignment interest (PAI) for certain currencies.

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SUMMARY

This study examines upcoming developments in 2020 relating to the adoption of risk-free rates

Transition from LIBOR and other IBORs to alternative RFRs is a monumental task and it is one of the biggest challenges facing the financial industry. The shift is critical because of the issues associated with the robustness and viability of some IBORs – and LIBOR in particular – given the sharp decline in activity in the unsecured interbank funding market.

The UK Financial Conduct Authority (FCA) has clearly stated that it will not compel the banks that submit quotes for LIBOR to provide submissions beyond the end of 2021[1]. The future of LIBOR in all five of its currencies is therefore uncertain after that date. Given the volume of transactions that still reference LIBOR and the less than two years remaining, it is crucial that market participants focus now on transitioning to RFRs and ensuring that any remaining LIBOR contracts have robust fallbacks in place so that they are nor exposed to uncertainty and risk if and when LIBOR ceases.

This paper examines several major upcoming developments in 2020 related to the adoption of RFRs that have been identified as alternatives to LIBOR and other IBORs.

These developments include:

- The calculation and publication by Bloomberg of IBOR fallback rates based on adjusted RFRs for key IBORs in the first half of 2020. Alongside this, ISDA will publish amendments to the 2006 ISDA Definitions incorporating the adjusted RFR fallbacks in new contracts referencing the covered IBORs. ISDA will also publish a protocol that will enable market participants to include the amended 2006 ISDA Definitions with fallbacks in legacy IBOR contracts.

- The change of discounting and PAI/price alignment amount (PAA) by CCPs for cleared euro-denominated derivatives from the Euro Overnight Index Average (EONIA) to the Euro Short-Term Rate (€STR) in June 2020.

- The change of discounting and PAI/PAA by CCPs for cleared US dollar-denominated interest rate derivatives from the Effective Federal Funds Rate (EFFR) to the Secured Overnight Financing Rate (SOFR) in October 2020.

- The expected change of the market convention for sterling interest rate swaps from sterling LIBOR to Sterling Overnight Index Average (SONIA) on March 2, 2020[2].

- The expected continued growth in the issuance of RFR-based cash products that will likely propel the need for hedging activity and increase the demand for RFR-based derivative products.

The amended 2006 ISDA Definitions, ISDA protocol and publication of adjusted RFR fallback rates may be helpful catalysts for dealers and customers in transitioning legacy IBOR portfolios to the RFRs. The published rates may provide market participants with clarity on the calculation of the spread and term adjustments to the RFRs that would apply to fallback rates. This information may help market participants to value their portfolios as they decide how and when to migrate existing portfolios from IBORs to RFRs.

[1] The Future of LIBOR, available at: https://www.fca.org.uk/news/speeches/the-future-of-libor

[2] FCA and Bank of England encourage switch from LIBOR to SONIA for sterling interest rate swaps from Spring 2020, available at: https://www.fca.org.uk/news/statements/fca-and-bank-england-encourage-switch-libor-sonia-sterling-interest-rate-swaps-spring-2020

As new swap contracts are expected to incorporate the amended 2006 ISDA Definitions, this will create an incentive for market participants to adopt the new protocol for their legacy portfolios so that they have the same fallbacks in both new and legacy IBOR contracts. However, agreement to amend legacy contracts to include fallbacks (either via the protocol or bilaterally) may depend on having more clarity on the regulatory, accounting and tax implications of the transition. There have been many positive developments in this regard, both in the US and globally, over the past six months. Additionally, the largest CCPs have indicated they will adopt the amended definitions and thereby achieve an equivalent outcome as under the new protocol for their legacy cleared portfolios.

The CCP discounting and PAI change will be important for further embedding €STR and SOFR within the derivatives market and driving liquidity in €STR and SOFR products. For example, as dealers usually hedge their discounting liabilities, the switch to SOFR discounting and PAI is expected to create additional trading in SOFR overnight index swap (OIS), EFFR-SOFR basis swaps and SOFR futures. As CCPs issue compensating/hedging EFFR-SOFR basis swaps with longer maturities as part of the transition to SOFR discounting, the unwind/auction of these swaps by market participants that choose to do so will drive trading activity in these swaps around and beyond transition. It is expected to extend the tenors of SOFR swaps and create liquidity across the entire SOFR curve.

The FCA and the Bank of England published a statement in January 2020 encouraging market makers to change the market convention for sterling interest rate swaps from LIBOR to SONIA on March 2, 2020. This change is intended to move the greater part of new sterling swaps trading to SONIA and reduce the risks from creating new LIBOR exposures.

The UK Working Group on Sterling Risk-Free Reference Rates has identified ceasing issuance of sterling LIBOR-based cash products maturing beyond 2021 by the end of the third quarter of 2020 as one of its top priorities[3]. As market participants start issuing more cash products that reference SONIA and other RFRs, it might also increase demand for RFR-based derivatives products.

[3] UK Working Group on Sterling Risk-Free Reference Rates (RFR WG) 2020 Top Level Priorities, available at: https://www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/rfr/rfrwgs-2020-priorities-and-milestones.pdf?la=en&hash=653C6892CC68DAC968228AC677114FC37B7535EE

IBOR FALLBACKS

ISDA is developing robust contractual fallbacks for 11 key IBORs to address the risk posed by continued exposure to the IBORs

The transition to RFRs is happening across all major currencies, although the process and the progress varies across different jurisdictions. To address the risk that market participants may have continued exposure to IBORs, ISDA is amending the 2006 ISDA Definitions for derivatives contracts that reference IBORs. These amendments will incorporate fallbacks for 11 key IBORs.

ISDA has conducted several industry consultations to determine the adjustments that would apply to fallback rates if the fallbacks referencing the RFRs take effect[4]. The fallback rates are based on RFRs that have been identified for the relevant IBORs by regulators and industry working groups.

Table 1: IBORs and Corresponding Fallback Rates

Currency	IBOR	Fallback Rate
AUD	BBSW	AONIA
CAD	CDOR	CORRA
CHF	CHF LIBOR	SARON
EUR	EUR LIBOR/EURIBOR	€STR
GBP	GBP LIBOR	SONIA
HKD	HIBOR	HONIA
JPY	JPY LIBOR/TIBOR/Euroyen TIBOR	TONA
USD	USD LIBOR	SOFR

There are some fundamental differences between IBORs and RFRs. RFRs are overnight rates, while IBORs are available in multiple tenors. Additionally, IBORs incorporate a bank credit/liquidity risk premium and exhibit different liquidity characteristics and fluctuations in supply and demand compared to RFRs. For example, Table 2 compares several structural characteristics of US dollar LIBOR and SOFR.

Table 2: Main Differences between US Dollar LIBOR and SOFR

USD LIBOR	SOFR
Unsecured (uncollateralized)	Secured (collateralized)
Bank lending rate (includes credit/liquidity risk)	Risk-free rate (no credit risk)
Forward-looking term structure	Overnight
Based on panel bank submissions of transactions and expert judgement	Fully transaction based
Calculated and published daily by ICE Benchmark Administration	Calculated and published daily by the Federal Reserve Bank of New York

[4] ISDA Benchmark Fallbacks: https://www.isda.org/2020/01/10/benchmark-fallback-consultations/

Due to the structural differences between IBORs and RFRs, certain adjustments to RFRs are needed to ensure that derivatives contracts referencing IBORs will continue to function as closely as possible to the original agreement if fallbacks referencing the RFRs take effect.

ISDA consultations have established that market participants prefer to use the compounded setting in arrears rate to address differences in tenor between IBORs and overnight RFRs, and the historical median over a five-year lookback period approach to deal with differences in credit/liquidity risk and other factors such as liquidity and fluctuations in supply and demand[5,6].

Fallback Adjustments Explained

The compounded setting in arrears rate is the relevant RFR observed over a period of time that is generally equivalent to the relevant IBOR tenor (eg, three months for three-month US dollar LIBOR) and compounded daily during that period. It will be calculated and published on a daily basis for each relevant IBOR tenor.

The historical median approach to the spread adjustment is based on the median difference between the IBOR and the adjusted RFR, calculated over a static lookback period prior to the relevant announcement or publication triggering the fallback provisions. It will be calculated and published for each relevant IBOR tenor based on historical differences between the IBOR for that tenor and the corresponding RFR compounded over a time period with the same length as the tenor. As a result, the historical spread may differ across different tenors for the same IBOR.

Bloomberg, which has been selected to calculate and publish the adjustments and 'all-in' fallback rates, expects to start publishing the below calculations during the first half of 2020[7,8].

- Adjusted RFR: compounded setting in arrears for each RFR for each relevant IBOR tenor;
- Spread adjustment: median of the historical differences between the IBOR for each tenor and the compounded RFR for that tenor over a five-year period prior to an announcement triggering a fallback;
- The 'all-in' fallback rate: the combination of the adjusted RFR and the spread adjustment for each relevant IBOR tenor[9].

ISDA will amend the 2006 ISDA Definitions, which would change the fallback mechanism for reference rates in derivatives contracts. This change will only automatically apply to derivatives contracts entered into after the effective date of the amendment.

5 ISDA Publishes Results of Consultation on Final Parameters for Benchmark Fallback Adjustments, available at: https://www.isda.org/2019/11/15/isda-publishes-results-of-consultation-on-final-parameters-for-benchmark-fallback-adjustments/

6 These conclusions for euro LIBOR and EURIBOR are pending the results of a recent ISDA consultation

7 Bloomberg Selected as Fallback Adjustment Vendor, available at: https://www.isda.org/2019/07/31/bloomberg-selected-as-fallback-adjustment-vendor/

8 IBOR Fallback Rate Adjustments FAQs, available at: http://assets.isda.org/media/136ec500/cfc34adf-pdf/

9 These adjustments are hypothetical numbers that would apply if the trigger events happened immediately, not the final spread adjustments

ISDA will also publish a protocol that will enable market participants to include the amended 2006 ISDA Definitions in legacy IBOR contracts if they choose to. Both the amended 2006 ISDA Definitions and the protocol are expected to be finalized in 2020[10].

While not resulting in any immediate increased exposure to the RFRs, the work will hopefully be a helpful catalyst for dealers and customers in adopting the RFRs and ultimately transitioning legacy LIBOR portfolios to the RFRs because these fallbacks will result in contingent exposure to the RFRs in the event the fallbacks are triggered and the fallback rates apply.

Specifically, Bloomberg's publication of the spread and term adjustments together with contractual agreement to reference those fallback rates may provide clarity to market participants on future valuations of IBOR – and in particular LIBOR – contracts. Market participants might choose to amend their trades to incorporate IBOR fallbacks, close out their IBOR positions and/or reprice their contracts by moving them to RFRs before fallbacks are triggered.

The Alternative Reference Rates Committee (ARRC) Market Structures Working Group identified nine possible models of conversion that market participants may use when voluntarily transitioning derivatives transactions that reference IBORs to RFRs[11].

Table 3: Possible Models of Conversion From IBORs to RFRs

Conversion Models	Description
Singe trade conversion for equivalent risk	Converting an IBOR to an adjusted RFR plus spread or a change in fixed rate
Singe trade conversion with payment	Converting an IBOR to an adjusted RFR plus compensation for difference
Single trade conversion (with or without payment) for non-equivalent risk	Converting an IBOR to an adjusted RFR, with a change in risk of a hedge (eg, cash position) for all, or part, of difference
Bilateral one-for-one portfolio conversion	Multiple trade conversion that results in a one-for-one trade conversion with similar variations on resulting trades as summarized above, which would not be the same across the portfolio (eg, spread may only need to be changed on one trade)
Bilateral portfolio conversion	Multiple trades converted for an equivalent risk in RFR plus a spread (or to adjusted RFR plus a payment for the basis) but fewer (or conceivably more) trades between the two counterparties
Bilateral conversion of a portfolio involving multiple counterparties	A client might approach a single dealer seeking to convert a portfolio of IBOR trades across from multiple dealers to adjusted RFR
Quasi-compression (multi-participant)	Multiple participants and/or multiple portfolios of trades are submitted as part of a process to replace IBORs with adjusted RFRs
Execution of an offsetting IBOR / RFR basis swap	Participants may transition from IBOR to adjusted RFR using basis swap(s) to lock in the adjusted RFR fallback spread in advance of a cessation and offset future IBOR payments
Trade at settle	Single or multiple trades transition based on agreement to convert risk on a future settlement date using a published index

Source: ARRC

[10] ISDA intended to publish amendments to the 2006 ISDA Definitions to incorporate permanent cessation fallbacks in the first half of 2020, as well as a protocol to include permanent cessation fallbacks into legacy trades. The timing of publication will now be subject to the results of the new consultation on how to implement pre-cessation fallbacks: https://www.isda.org/2020/02/05/isda-to-re-consult-on-pre-cessation-fallbacks/

[11] Re: Follow-up Letter Regarding Treatment of Derivatives Contracts Referencing the Alternative Risk-Free Rates, available at: https://www.newyorkfed.org/medialibrary/Microsites/arrc/files/2019/ARRC_Letter_CFTC_Regulatory_Derivatives_Treatment_05132019.pdf

As new swap contracts will automatically adopt the amended 2006 ISDA Definitions, it could create an incentive for market participants to adhere to the protocol so that legacy IBOR portfolios have the same fallbacks. However, an agreement to amend legacy contracts to include fallbacks (either via the protocol or bilaterally) may depend on having more clarity on the regulatory, accounting and tax implications of the transition. There have been many positive developments in this regard, both in the US and globally, over the past six months.

Regulatory Implications of IBOR Transition

In March 2019, the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO) published guidance stating that amendments to derivatives contracts in response to interest rate reform do not require the application of margin requirements[12]. However, national regulators need to issue guidance or take other steps to ensure national rules reflect the BCBS and IOSCO guidance.

In November 2019, US prudential regulators proposed a rule that would provide relief to covered swap entities and their counterparties that amend their swaps referencing LIBOR or other key interest rate benchmarks[13,14]. The proposal would preserve the legacy status of non-cleared swaps that were entered into prior to the applicable compliance date under the non-cleared margin requirements in the event that they are amended to replace an IBOR or other discounted rate.

In December 2019, the Commodity Futures Trading Commission issued no-action letters that provide relief to swap dealers and other market participants transitioning from IBORs to RFRs. The relief letters cover fallback amendments (amendments of IBOR-linked swaps to include fallbacks to new RFRs); replacement rate amendments (amendments to voluntarily amend IBOR-linked contracts to reference RFRs); and new RFR swaps (new transactions that reference RFRs).

The relief is provided to swap dealers from *de minimis* registration requirements, non-cleared margin rules, business conduct requirements, confirmation, documentation, and reconciliation requirements, and certain other eligibility requirements. Additionally, time-limited relief is provided from the trade execution requirement and swap clearing requirement and related exceptions and exemptions[15]. The clearing relief only applies to fallback rate amendments, not to replacement rate amendments.

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[12] BCBS/IOSCO Statement on the Final Implementation Phases of the Margin Requirements for Non-centrally Cleared Derivatives, available at: https://www.bis.org/press/p190305a.htm

[13] US prudential regulators include the Office of the Comptroller of the Currency, the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Farm Credit Administration, and the Federal Housing Finance Agency

[14] Margin and Capital Requirements for Covered Swap Entities, Proposed Rules, available at: https://www.federalregister.gov/documents/2019/11/07/2019-23541/margin-and-capital-requirements-for-covered-swap-entities

[15] CFTC Provides Relief to Market Participants Transitioning Away from LIBOR, available at: https://www.cftc.gov/PressRoom/PressReleases/8096-19

In December 2019, the European Supervisory Authorities (ESAs) issued a statement that amendments made to outstanding non-cleared over-the-counter (OTC) derivatives legacy contracts for the sole purpose of introducing fallbacks should not create new obligations on these legacy contracts. In particular, margining requirements should not apply to these legacy contracts where they were not subject to those requirements before the introduction of the fallbacks[16,17]. The statement also mentions that the ESAs are in contact with the co-legislators to see how a legislative change could be achieved to ensure this legal certainty.

In November 2019, the UK FCA reiterated its view that amending a reference rate or adding a fallback rate would not trigger the application of margin requirements. This applies to the treatment of legacy LIBOR trades, but does not extend to new transactions; for example, due to compression activity[18].

Accounting Implications of IBOR Transition

For accounting purposes, contract modifications are required to be evaluated in determining whether the modifications result in the establishment of new contracts or the continuation of existing contracts. Changes in a reference rate could disallow the application of certain hedge accounting guidance, and certain hedging relationships may not qualify as highly effective during the period of the market-wide transition to a replacement rate. The inability to apply hedge accounting because of reference rate reform would result in financial reporting outcomes that do not reflect entities' intended hedging strategies when those strategies continue to operate as effective hedges.

In September 2019, the Financial Accounting Standards Board issued a proposed accounting standards update (ASU) that would provide temporary optional guidance to ease the potential burden in accounting for, or recognizing the effects of, reference rate reform on financial reporting[19].

The proposed ASU provides temporary exceptions for applying generally accepted accounting principles to contract modifications, hedging relationships and other transactions affected by the transition.

Without this relief, accounting for changes to contracts stemming from reference rate reform would be costly and burdensome to apply and could have a significant impact on financial reporting, including increased earnings volatility.

The International Accounting Standards Board has started work on the second phase of its project that deals with issues that may arise when existing interest rate benchmarks are replaced with RFRs[20].

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[16] The ESAs include the European Banking Authority, the European Insurance and Occupational Pensions Authority and the European Securities and Markets Authority

[17] The Introduction of Fallbacks in OTC Derivative Contracts and the Requirement to Exchange Collateral, available at: https://www.esma.europa.eu/sites/default/files/library/esas_2019_19_statement_on_the_introduction_of_fallbacks_in_otc_derivative_contracts_to_increase_contract_robustness.pdf

[18] Minutes of the Working Group on Sterling Risk-Free Reference Rates, available at: https://www.bankofengland.co.uk/-/media/boe/files/minutes/2019/rfr-november-2019.pdf?la=en&hash=69418FFD6A88763B029F8C0AA50CCDEB173BB885

[19] FASB Proposes Guidance to Assist in Transition Away From Interbank Offered Rates to New Reference Rates, available at: https://www.fasb.org/cs/Satellite?cid=1176173291628&pagename=FASB%2FFASBContent_C%2FNewsPage

[20] IASB Amends IFRS Standards in Response to the IBOR Reform, available at: https://www.ifrs.org/news-and-events/2019/09/iasb-amends-ifrs-standards-in-response-to-the-ibor-reform/

Tax Implications of IBOR Transition

In certain jurisdictions, changes to existing contracts, if considered material, may constitute a disposal of the existing contract and entering into a new contract for corporation tax purposes.

In October 2019, the US Department of the Treasury and the Internal Revenue Service jointly issued proposed guidance on the transition from IBORs to other reference rates. The proposed regulations address the possibility that modifying a debt instrument, derivative, or other financial contract to replace a reference rate based on an IBOR could be a taxable transaction for federal income tax purposes, or could result in other tax consequences.

The proposed regulations modify a number of provisions of the income tax regulations, providing specific guidance and reducing uncertainty regarding the tax impact of the anticipated discontinuation of IBORs[21].

[21] Guidance on the Transition From Interbank Offered Rates to Other Reference Rates, available at: https://www.federalregister.gov/documents/2019/10/09/2019-22042/guidance-on-the-transition-from-interbank-offered-rates-to-other-reference-rates

CCP SHIFT TO PAI AND DISCOUNTING BASED ON €STR AND SOFR

As part of the transition to the risk-free rates, central counterparties will switch PAI and discounting to €STR and SOFR in 2020

CCPs, including CME Clearing, LCH SwapClear and Eurex Clearing, are planning to update the PAI/PAA and discounting on all cleared euro-denominated products from EONIA to €STR flat (no spread). The switch is expected to take place in June 2020.

CME Clearing and LCH SwapClear are planning to change the discounting and PAI/PAA for cleared US dollar interest rate derivatives from fed funds to SOFR[22]. This transition is expected to happen in October 2020.

CCP Discounting Practices

CCPs and market participants currently use OIS discounting to price collateralized derivatives. Before 2010, LIBOR was used to discount all derivatives. However, as the spread between LIBOR and overnight rates widened significantly during the financial crisis, CCPs and major dealers switched to OIS discounting.

OIS rates are also used for calculating PAI/PAA, which is also referred to by CME as a 'price alignment' (PA). PAI/PAA is the interest charged on cumulative variation margin (VM) received by a clearing member or interest paid on the cumulative VM that has been paid. PAI/PAA is transferred to the collateral payer to cover the loss of interest on posted collateral.

The switch to €STR and SOFR PAI and discounting will result in a valuation change for affected contracts. This transition will not have any impact on the contract coupon payments, which are linked to their original benchmark rates. Despite the changes in valuation and risk due to this switch, the CCPs will use compensation mechanisms so that individual participants will experience almost no 'net' changes.

To facilitate the transition to €STR, LCH SwapClear plans to apply cash compensation payments for all accounts with live euro-denominated positions at the point of conversion. Any new transactions cleared after the point of conversion will be €STR discounted from inception and no compensation will apply[23].

As part of the change to SOFR PAI and discounting, LCH SwapClear is planning to provide compensation for the valuation and risk change as a combination of cash and basis swaps for most users. However, client accounts will have a choice to elect a cash-only compensation. An auction will be used to facilitate cash-only election and to determine the cash compensation amounts[24].

Cash payments would be calculated on a full revaluation basis using mid prices from the auction process to build a pricing curve.

[22] LCH SwapClear has also announced that it will move to SOFR discounting on MXN swaps and non-deliverable swaps in eight other currencies (KRW, CNY, INR, BRL, COP, CLP, THB, TWD)

[23] Transition to €STR Discounting in SwapClear, available at: https://www.lch.com/membership/ltd-membership/ltd-member-updates/transition-eustr-discounting-swapclear

[24] LCH SOFR Discounting Letter – CFTC, available at: https://www.cftc.gov/media/3221/MRAC_LCH_SOFRDiscountingLetter121119/download

Each compensating swap would be a standardized EFFR vs SOFR basis swap on one of the major benchmark tenors (eg, two years, five years, 10 years, 15 years, 20 years, 30 years)[25]. The size and direction of each swap will be calibrated with the intention that the compensating swaps provide an overall offset to the change in the user's discounting risk profile at the point of conversion. The mid prices from the auction would be used to determine the required spreads on all compensating swaps to ensure zero net present value (NPV).

To neutralize value transfer due to the change to SOFR discounting, CME Clearing is planning to conduct a special valuation cycle, which would determine settlement variation and cash payments as calculated with SOFR-based discounting and PA. CME Clearing will make cash adjustments that are equal and opposite to the resulting NPV of each cleared US dollar IRS product[26].

To mitigate both the potential re-hedging costs associated with this transition and the sensitivity of valuations to closing curve marks following the transition, CME Clearing will facilitate a mandatory process to book a series of EFFR/SOFR basis swaps to participants' accounts. These basis swaps will restore participants' positions to their original risk profiles and will be booked at closing curve levels ($0 NPV) as of the transition date.

In the CME transition, market participants would be able to choose to have the basis swaps booked as either float-versus-float basis swaps or as pairs of fixed-versus-float swaps with equal and opposite fixed cash flows.

CME Clearing is also considering setting up an auction process for market participants that want to liquidate any EFFR/SOFR basis swap exposure arising from the mandatory discounting risk exchange process.

Table 4: Comparison between CME Clearing and LCH SwapClear SOFR Discounting Switch

	CME Clearing	LCH SwapClear
Expected transition date	October 16, 2020	October 16, 2020
Products	All US dollar-denominated interest rate swap products, including fixed-for-floating interest rate swaps, overnight index swaps, forward rate agreements, zero coupon swaps, basis swaps and swaptions	All US dollar-denominated IRS contracts that reference US dollar LIBOR, fed funds and SOFR; CPI zero coupon inflation swaps; fed funds discounted MXN swaps and non-deliverable swaps in eight other currencies (KRW, CNY, INR, BRL, COP, CLP, THB, TWD)
Compensation	Cash adjustments and basis swaps	Cash compensation and basis swaps for most users. Client accounts will be able to elect cash-only if they choose to do so via their clearing broker
Conversion prices	Currently calculates SOFR discount rates for its SOFR swaps. The closing marks will be used to price the conversion	Currently does not offer SOFR discounting. Price will be determined by a centralized auction conducted ahead of conversion
Auction	Intends to engage a third-party service provider (or providers) to conduct an auction to enable participating firms to offload EFFR/SOFR basis positions	Mid prices from the auction process will be used to build a pricing curve to calculate cash payments on a full revaluation basis. The same mid prices would be used to determine the required spreads on all compensating swaps to ensure zero present value

25 The basis swap in each tenor will be trade-captured as a pair of EFFR/Fixed + Fixed/SOFR contracts with equal and opposite fixed cash flows

26 SOFR Discounting & Price Alignment Transition Plan for Cleared USD Interest Rate Swaps, available at: https://www.cmegroup.com/education/articles-and-reports/sofr-price-alignment-and-discounting-proposal.html

To neutralize value transfer attributable to the change to €STR discounting, CME Clearing will conduct a special valuation cycle, determining settlement variation and cash payments on those positions as calculated with €STR-based discounting and PA. To neutralize value transfer attributable to the change in the discounting basis, the special valuation cycle will include a cash adjustment that is equal and opposite to the resultant change in the NPV of each position in EUR IRS products[27].

Eurex Clearing will compensate for the changes in the present value of euro derivatives by a euro cash credit or debit. This will mitigate profit-and-loss impacts resulting from VM payments induced by the discounting switch. The change will apply to new and existing transactions simultaneously[28].

While the discounting and PAI switch will not affect the reference rate for swaps, this transition will be important for further embedding €STR and SOFR within the derivatives market and driving liquidity in these products.

For example, as dealers usually hedge their discounting liabilities, they are likely to start using SOFR-based products instead of fed funds swaps and futures following the switch to SOFR discounting and PA. Therefore, this transition to SOFR discounting is expected to create additional trading in SOFR OIS, EFFR-SOFR basis swaps and SOFR futures.

As CCPs issue compensating/hedging EFFR-SOFR basis swaps with longer maturities as part of the transition to SOFR discounting, the unwind/auction of these swaps by market participants that choose to do so will drive day-one activity in these swaps. It is expected to extend the tenors of SOFR swaps and create liquidity across the entire SOFR curve. Currently, most SOFR transactions have duration up to one year.

Market participants will need to make internal reporting changes to transition their own profit and loss and risk management for euro- and US dollar-denominated cleared derivatives to €STR and SOFR discounting to be able to correctly value their trades in the new discounting regime. As market participants would seek to re-hedge their discounting risk, they will need to prepare to trade, book and risk manage basis swaps based on the new RFRs.

After CCPs make the switch to new discount curves, market participants may also consider the switch for their non-cleared trades to keep them consistent with cleared portfolios. This will involve a renegotiation of existing credit support annexes. In bilateral contracts, interest paid on collateral is negotiated by the counterparties. US dollar-denominated instruments are typically, but not exclusively, based on EFFR. Similarly, euro-denominated instruments are typically based on EONIA. The change from EFFR to SOFR and from EONIA to €STR in bilateral contracts will create changes in value and risk, which would need to be addressed by counterparties.

[27] €STR Discounting & Price Alignment Transition Plan for Cleared EUR Interest Rate Swap Products, available at: https://www.cmegroup.com/education/articles-and-reports/euro-str-discounting-price-alignment-plan.html

[28] EurexOTC Clear service: Discounting switch from EONIA to €STR for cleared OTC EUR derivatives https://www.eurexclearing.com/clearing-en/resources/circulars/clearing-circular-1653578

OTHER IMPORTANT DEVELOPMENTS IN 2020

Regulators and working groups in the US and the UK are taking steps to support the transition to SONIA and SOFR throughout 2020

The FCA and the Bank of England published a statement in January 2020 encouraging market makers to change the market convention for sterling interest rate swaps from LIBOR to SONIA on March 2, 2020[29]. This implies that market makers will quote and offer new interest rate swaps based on SONIA rather than sterling LIBOR, although sterling LIBOR swap transactions can still be executed. This change is intended to move the greater part of new sterling swaps trading to SONIA and reduce the risk from creating new sterling LIBOR exposures.

The UK Working Group on Sterling Risk-Free Reference Rates has set ceasing issuance of sterling LIBOR-based cash products maturing beyond 2021 by the end of the third quarter of 2020 as one of its top priories[30]. Other priorities for 2020 include promoting and enabling widespread use of SONIA compounded in arrears; enabling a further shift of volumes from sterling LIBOR to SONIA in derivatives markets; significantly reducing the stock of contracts referencing sterling LIBOR by the first quarter of 2021 and providing market input on issues around 'tough legacy' (those contracts not readily available to be amended).

In September 2019, the Federal Housing Finance Agency (FHFA) sent a letter to the 11 federal home loan banks instructing them that they should stop purchasing investments in assets tied to LIBOR with a contractual maturity beyond December 31, 2021 as of December 31, 2019. Additionally, the federal home loan banks should no longer enter into all other LIBOR-based transactions involving advances, debt, derivatives, or other products with maturities beyond December 31, 2021, with only very limited exceptions granted by the FHFA, as of March 31, 2020[31].

On February 5, 2020, the FHFA announced that the government sponsored enterprises (GSEs) Fannie Mae and Freddie Mac will stop accepting adjustable-rate mortgages (ARMs) based on LIBOR by the end of 2020. The GSEs announced that they anticipate accepting deliveries of ARMs based on SOFR in the second half of 2020[32]. This development will have a major impact on the mortgage market.

Growth in the issuance of RFR-based securities will likely propel the need for hedging activity, increasing demand for RFR-based derivatives products.

The Federal Reserve Bank of New York is planning to initiate the publication of three daily compounded averages of SOFR with tenors of 30, 90, and 180 calendar days[33]. In addition to these three SOFR averages, the Federal Reserve Bank of New York is also proposing to publish daily a SOFR index that would allow the calculation of compounded average rates over custom time periods. The publication of compounded SOFR averages could increase the reference to SOFR in consumer loans and floating rate notes, which, in turn, could encourage greater use of SOFR derivatives to hedge positions in these instruments.

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[29] FCA and Bank of England encourage switch from LIBOR to SONIA for sterling interest rate swaps from Spring 2020, available at: https://www.fca.org.uk/news/statements/fca-and-bank-england-encourage-switch-libor-sonia-sterling-interest-rate-swaps-spring-2020

[30] UK Working Group on Sterling Risk-Free Reference Rates (RFR WG) 2020 Top Level Priorities, available at: https://www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/rfr/rfrwgs-2020-priorities-and-milestones.pdf?la=en&hash=653C6892CC68DAC968228AC677114FC37B7535EE

[31] FHFA Instructs FHLBanks to Begin Transitioning Away from LIBOR, available at: https://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Instructs-FHLBanks-to-Begin-Transitioning-Away-from-LIBOR.aspx

[32] FHFA Announces Fannie Mae and Freddie Mac Update on LIBOR Transition, available at: https://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Announces-Fannie-Mae-and-Freddie-Mac-Update-on-LIBOR-Transition.aspx

[33] Statement Requesting Public Comment on a Proposed Publication of SOFR Averages and a SOFR Index, available at: https://www.newyorkfed.org/markets/opolicy/operating_policy_191104

Trading activity in products referenced to SOFR grew in 2019, but the market is still dominated by LIBOR

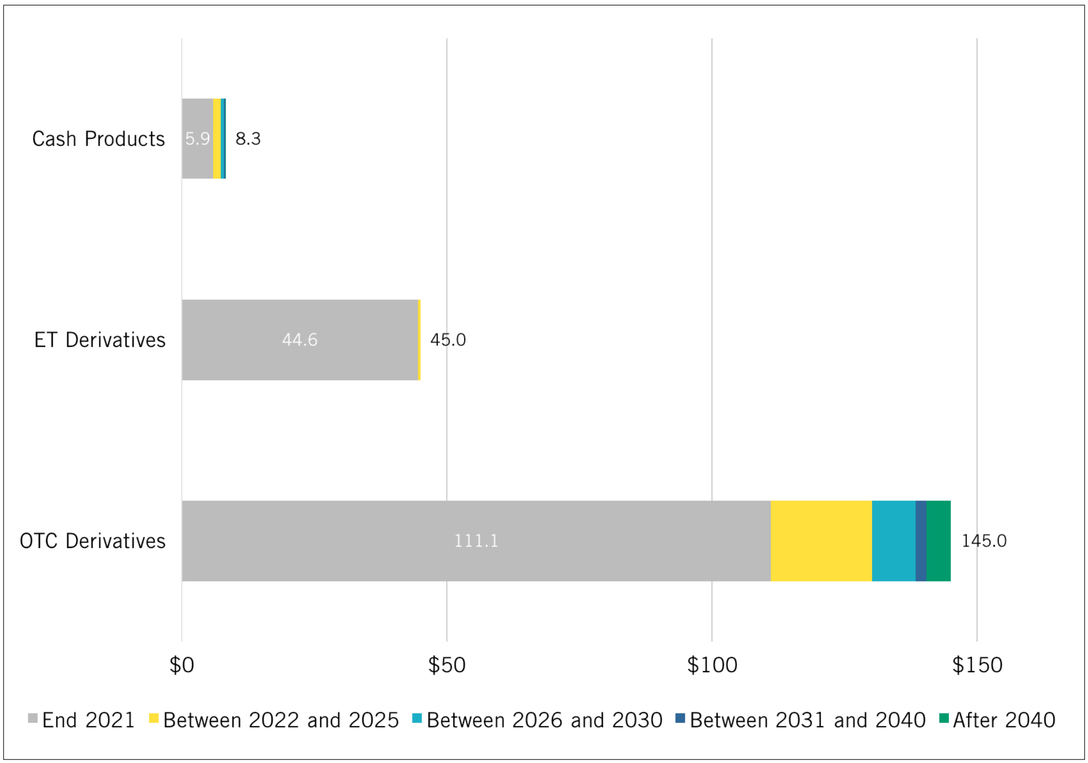
CURRENT US DOLLAR LIBOR EXPOSURE AND LIQUIDITY IN SOFR

Exposure to USD LIBOR

Based on the ARRC's estimates, the outstanding gross notional of all financial products referencing US dollar LIBOR was about $199 trillion at the end of 2016, including $145.0 trillion of OTC derivatives, $45 trillion of exchange traded (ET) derivatives and $8.3 trillion of cash products[34].

Roughly 77% of OTC derivatives, 99% of ET derivatives and 71% of cash products notional outstanding is expected to mature before 2021 (see Chart 1). This leaves about 23% of OTC derivatives and 29% of cash products with total outstanding gross notional of about $37 trillion to mature after 2021.

Chart 1: Gross Notional Outstanding of All Financial Products Referencing US Dollar LIBOR (US$ trillions)



Source: ARRC Second Report

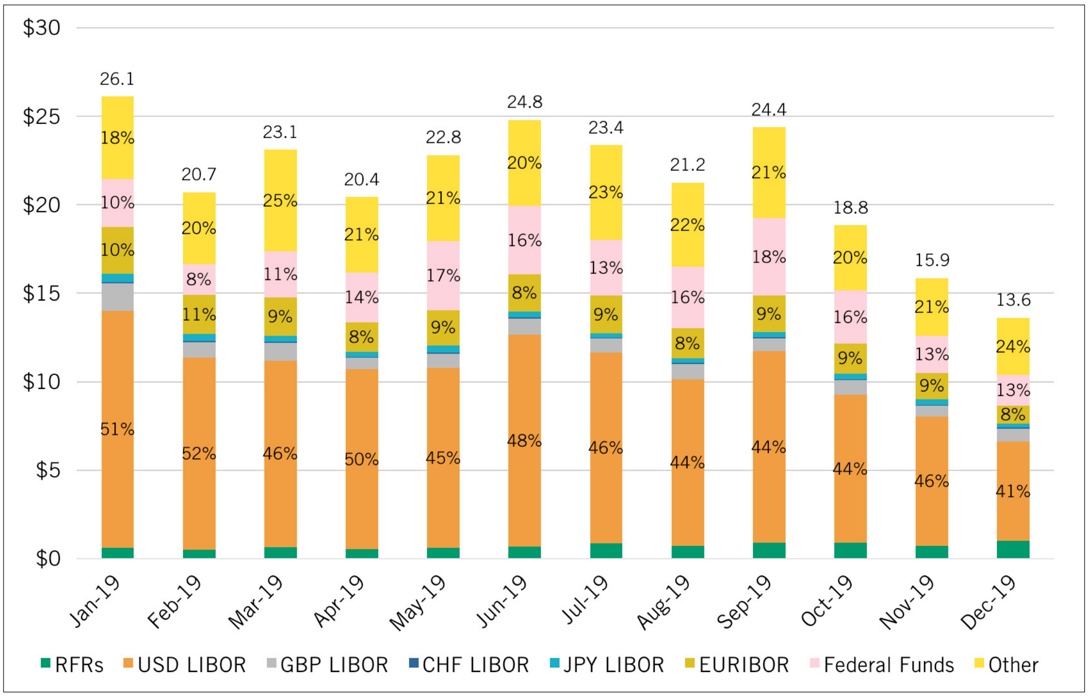
Market participants still continue trading LIBOR-based derivatives. US dollar LIBOR transactions accounted for about 47% of interest rate derivatives (IRD) traded notional in the US during 2019 (see Chart 2)[35]. RFR transactions, including SOFR, SONIA, the Swiss Average Rate Overnight, the Tokyo Overnight Average Rate and €STR, accounted for 3.4% of total IRD trading activity in 2019[36].

[34] Second Report, The Alternative Reference Rates Committee, March 2018, available at: https://www.newyorkfed.org/medialibrary/Microsites/arrc/files/2018/ARRC-Second-report

[35] This data includes only the transactions required to be disclosed under US regulations

[36] Please refer to the ISDA Interest Rate Benchmarks Review: Full Year 2019 and the Fourth Quarter of 2019 for more data on trading volumes of IRD transactions referencing selected RFRs, available at: https://www.isda.org/a/W5LTE/Interest-Rate-Benchmarks-Review-Full-Year-2019-and-Q4-2019.pdf

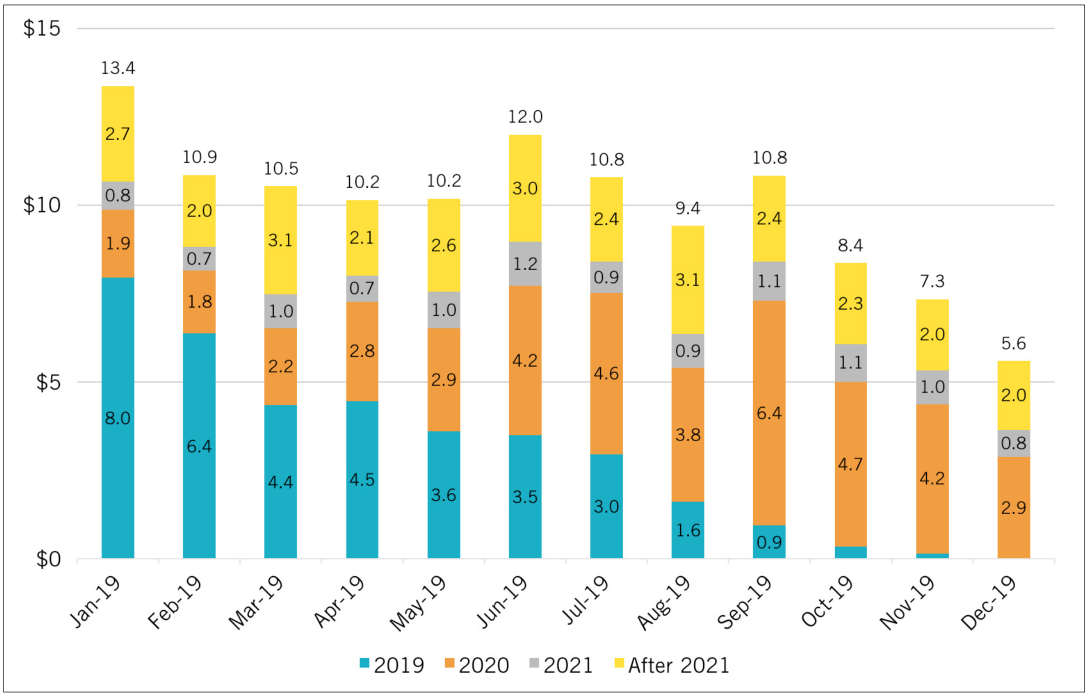
Chart 2: IRD Traded Notional (US$ trillions)



Source: DTCC SDR

US dollar LIBOR traded notional totaled $119.4 trillion in full-year 2019 (see Chart 3). $36.3 trillion of US dollar LIBOR traded notional had a 2019 maturity, $42.3 trillion matured in 2020, $11.1 trillion matured in 2021, while $29.7 trillion of traded notional had a maturity after 2021.

Chart 3: US Dollar LIBOR-based IRD Traded Notional (US$ trillions)

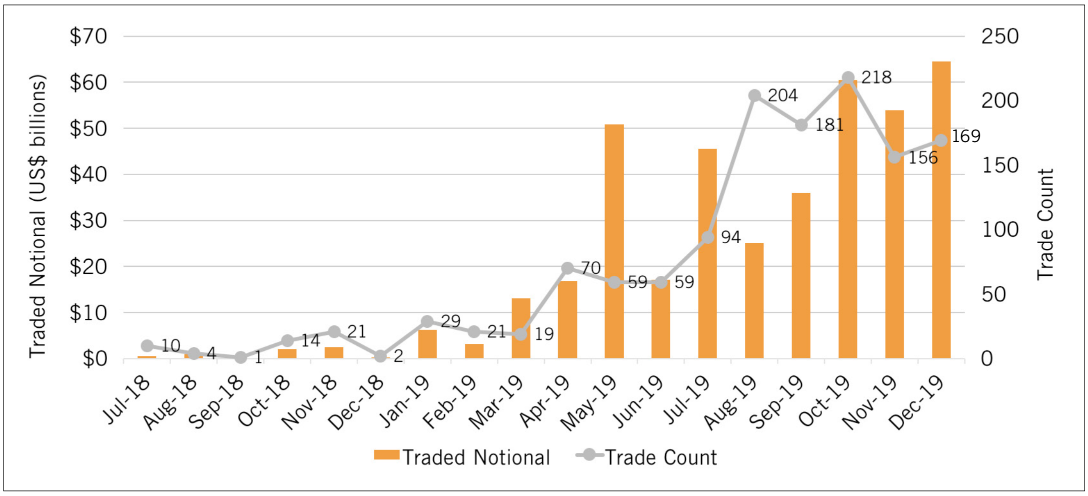


Source: DTCC SDR

Trading Volumes in SOFR Swaps

SOFR swaps started trading in the third quarter of 2018 and trading activity has been growing during 2019. SOFR traded notional increased to $392.7 billion in 2019 from $6.3 billion in 2018, according to ISDA analysis based on data from the Depository Trust & Clearing Corporation's swap data repository (DTCC SDR). Despite this growth, the proportion of IRD traded notional referencing SOFR remained small, accounting for 0.23% of US dollar IRD and 0.15% of total IRD traded notional in 2019. The number of SOFR transactions increased to 1,279 in 2019 from 52 in 2018 (see Chart 4)[37].

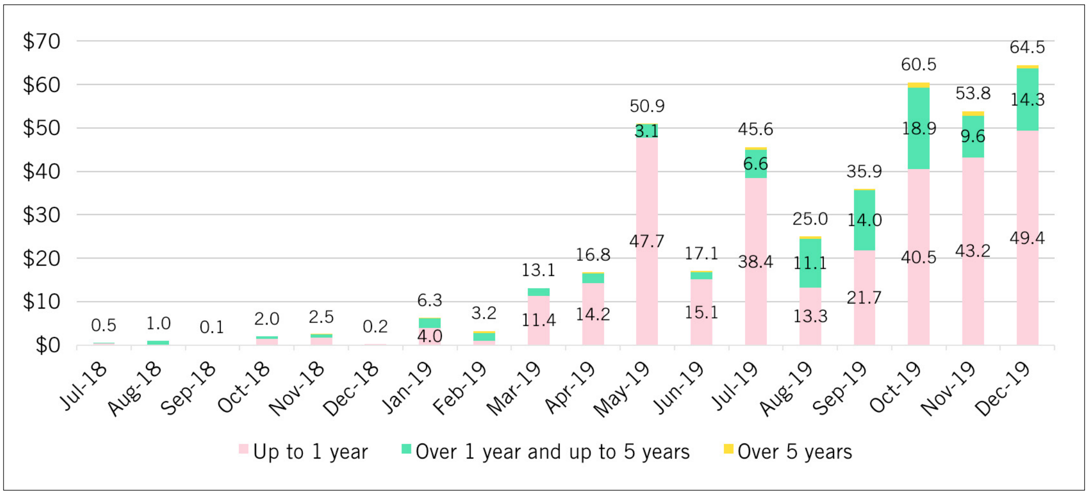
Chart 4: SOFR Traded Notional and Trade Count



Source: DTCC SDR

Deeper analysis of SOFR data reveals that most SOFR transactions had a tenor up to one year[38]. Out of $392.7 billion traded in the full year 2019, $299.8 billion had a tenor up to one year, $87.3 billion was between one and five years and only $5.6 billion had a tenor over five years (see Chart 5).

Chart 5: SOFR Traded Notional by Tenor (US$ billions)



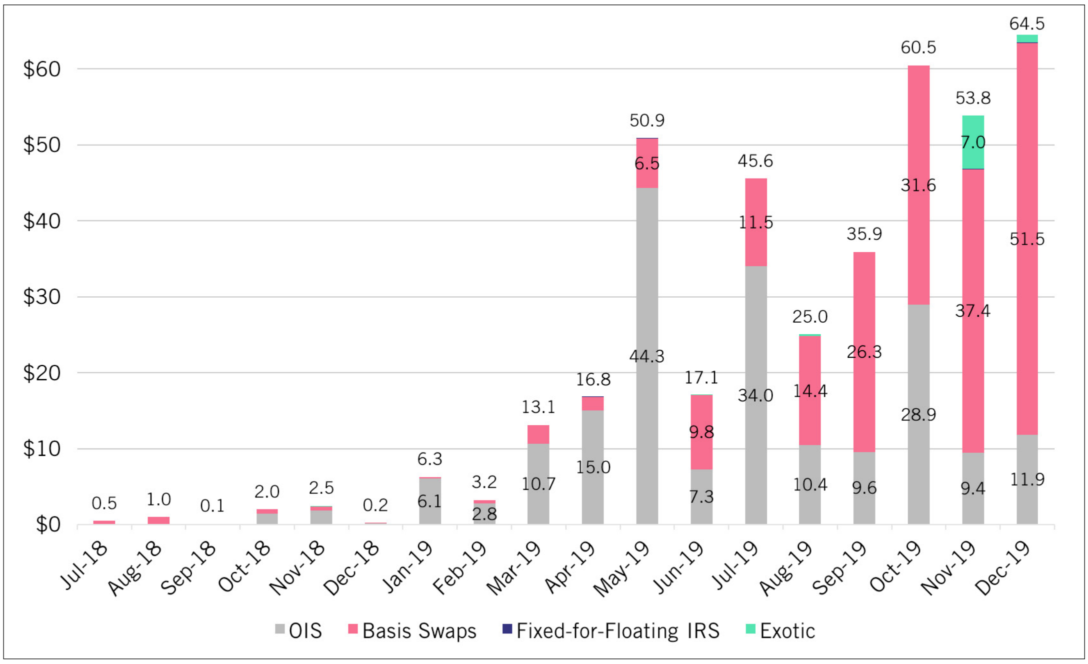
Source: DTCC SDR

[37] Based on data from LCH SwapClear, SOFR traded notional totaled roughly $655.8 billion in the full year 2019. LCH SwapClear volumes were adjusted for double counting to make data consistent with DTCC data. https://www.lch.com/services/swapclear/volumes/rfr-volumes

[38] Tenor is calculated as the difference between the effective date and the maturity date

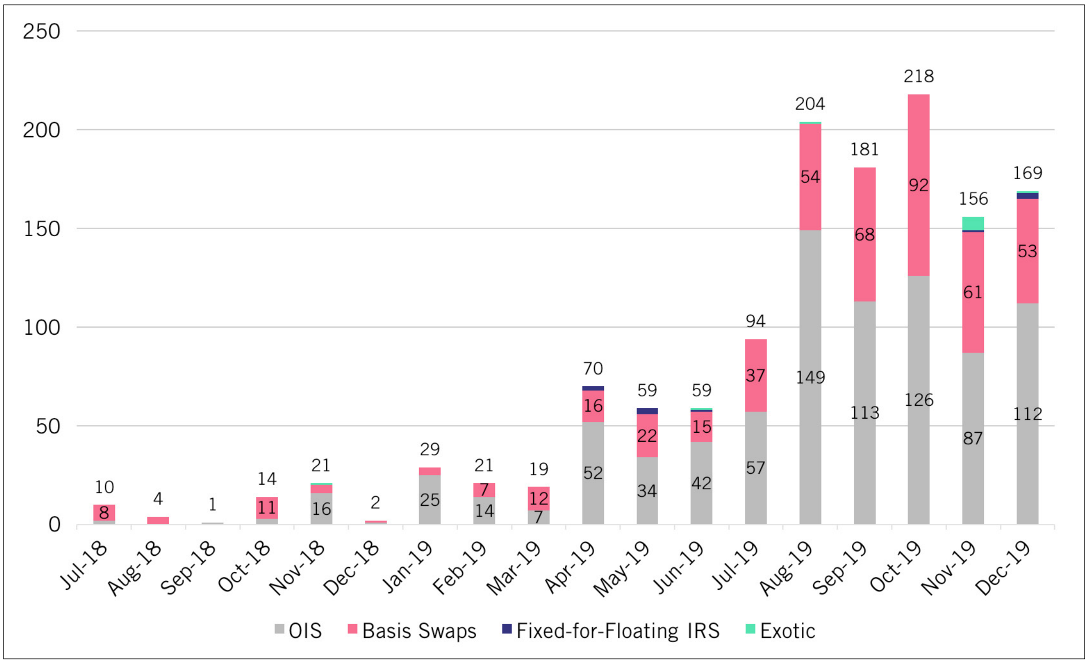
The majority of SOFR traded notional was comprised of basis swaps and OIS (see Charts 6 and 7). Out of 1,279 contracts traded in the full year 2019, 818 were OIS transactions, 441 were basis swaps, 10 were fixed-for-floating swaps and 10 were exotic products.

Chart 6: SOFR Traded Notional by Product (US$ billions)



Source: DTCC SDR

Chart 7: SOFR Trade Count by Product



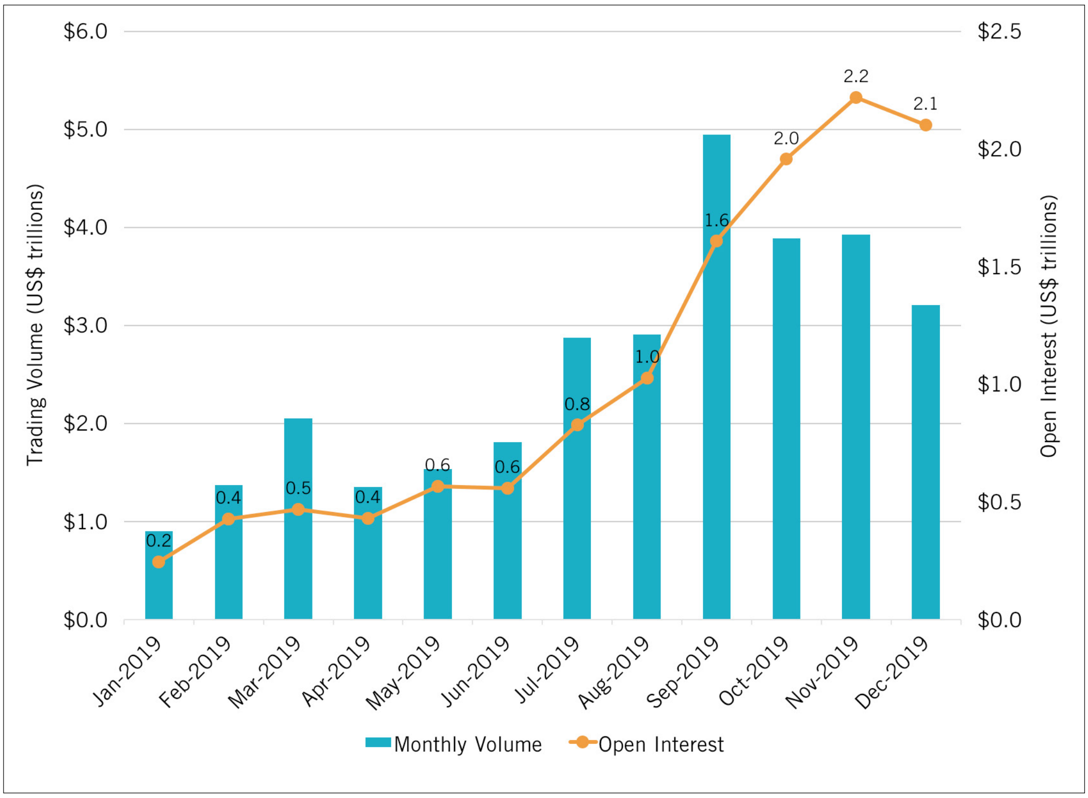
Source: DTCC SDR

Trading Volumes in SOFR Futures

CME Group launched three-month and one-month SOFR futures contracts in May 2018. Three-month SOFR futures are consecutive quarterly contracts reflecting SOFR expectations between the International Monetary Market dates over the next 10 years. One-month SOFR futures indicate market expectations of future SOFR values over the nearest 13 calendar months. ICE launched one-month and three-month futures contracts in October 2018.

Trading in SOFR futures has been growing in 2019 and significantly jumped in September 2019 (see Chart 8). This was most likely linked to volatility in SOFR and Federal Reserve actions in the repo market in September 2019. Trading volume in SOFR futures increased to $11.0 trillion in the fourth quarter of 2019 from $4.3 trillion in the first quarter of 2019. Open interest jumped to $2.1 trillion at the end of December 2019, from $0.2 billion at the end of January 2019.

Chart 8: SOFR Futures Monthly Trading Volume and Open Interest (Implied Notional in OTC Equivalent)



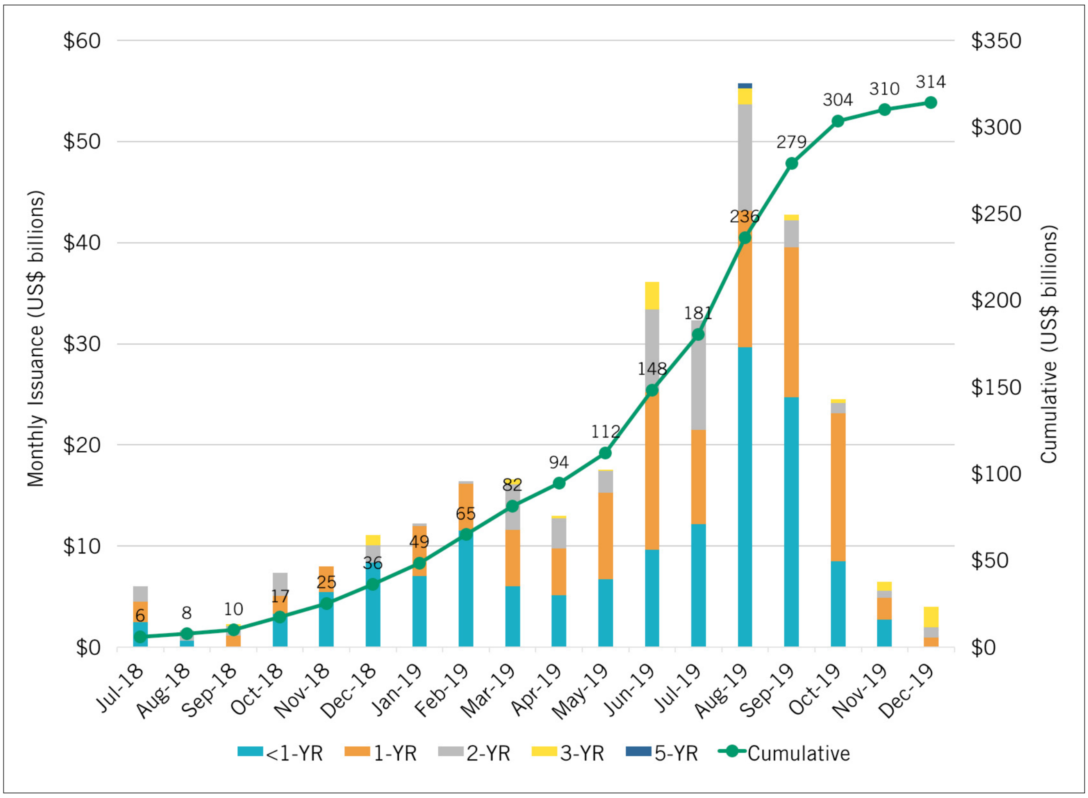
Source: CME and ICE

Issuance of SOFR-based Cash Products

Monthly issuance of SOFR-based cash securities has been gradually increasing since July 2018, but dropped in the last quarter of 2019 (see Chart 9). Cumulative issuance exceeded $300 billion at the end of 2019.

Most of the debt referencing SOFR was issued by Fannie Mae, Freddie Mac and federal home loan banks. Additionally, banks have been issuers of SOFR-based floating-rate notes and preferred shares referencing SOFR in their floating period[39].

Chart 9: Issuance of SOFR-based Cash Securities (US$ billions)



Source: Bloomberg, compiled by CME Group

[39] Preferred shares typically have fixed rate coupons until their call date in five or 10 years, when they switch to a floating rate if not called

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- ***Interest Rate Benchmarks Review: Full Year 2019 and the Fourth Quarter of 2019, January 2020***
  https://www.isda.org/a/W5LTE/Interest-Rate-Benchmarks-Review-Full-Year-2019-and-Q4-2019.pdf

- ***Key Trends in The Size and Composition of OTC Derivatives Markets in the First Half of 2019, November 2019***
  https://www.isda.org/a/CicTE/Key-Trends-in-the-Size-and-Composition-of-OTC-Derivatives-Markets-1H-2019.pdf

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