

Nearly two years ago, the UK Financial Conduct Authority ("FCA") announced a voluntary agreement with the banks who contribute to the daily ICE LIBOR^{®1} surveys to continue supporting the ICE LIBOR[®] interest rate benchmarks through year-end 2021, beyond which the benchmarks "would no longer be sustained through the mechanism of the FCA persuading or obliging contributor panel banks to stay."²

For interest rate benchmark users, the FCA's action spotlighted a set of fundamental questions: If an interbank offered rate ("IBOR") benchmark becomes impaired, what alternative should take its place? How should market participants who hold financial exposures to the IBOR make transition to the alternative benchmark? What fallbacks will protect market participants from the risks of a permanent cessation of the IBOR?

The consultation published by the International Swaps and Derivatives Association ("ISDA") last July and concluded last November ("Consultation") sought public comment on technical aspects of the fallback question, drawing 152 actual responses from 164 entities.³ The Consultation's scope was limited to a subset of IBORs -- those for Australian dollar, Japanese yen (including Japanese yen LIBOR[®]), Swiss franc LIBOR[®], and pound sterling LIBOR[®]. ISDA took the opportunity, however, to invite comment on technical issues that might arise in connection with prospective fallbacks for US dollar ICE LIBOR[®] ("USD LIBOR"), Euro ICE LIBOR[®], and EURIBOR.⁴

Among the findings is a broad consensus, embraced by more than 75 percent of Consultation respondents, that one reasonably uniform set of fallback procedures should apply to IBORs for all major currencies, so as to facilitate risk management, reduce potential for market disruption, and mitigate the complexity of IBOR transition.⁵ Though market practitioners' views on fallback procedures specifically intended for USD LIBOR will not be known for some time,⁶ the widely held preference for procedural uniformity offers a strong hint that the fallback scheme that emerged as the favorite among the Consultation's respondents will be at least a worthy candidate, if not the preferred approach, for USD LIBOR.

Now is not too soon for market participants to consider its empirical features. In what follows:

- we briefly review the features of the fallback scheme that Consultation respondents favored most highly, and
- examine summary statistics, based on daily data for 2000 through February 2019, that indicate how the credit spread component of that fallback scheme would have behaved for 3-month USD LIBOR.

1 ICE LIBOR[®] is a registered trademark of Intercontinental Exchange Holdings, Inc. and is used under license.

2 Bailey, Andrew, *The future of LIBOR*, speech presented at Bloomberg London, 27 July 2017, available at: <https://www.fca.org.uk/news/speeches/the-future-of-libor>

3 ISDA, *Interbank Offered Rate (IBOR) Fallbacks for 2006 ISDA Definitions, Consultation on Certain Aspects of Fallbacks for Derivatives Referencing GBP LIBOR, CHF LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR and BBSW (2018)*, 12 July 2018, available at: <http://assets.isda.org/media/f253b540-193/42c13663-pdf> This Consultation is one part of the work that ISDA began in 2016, at the request of the Official Sector Steering Group of the Financial Stability Board, to increase the robustness of derivative contracts referencing key IBORs.

4 *Ibid*, pg 1.

5 Brattle Group, *Anonymized Narrative Summary of Responses to the ISDA Consultation on Term Fixings and Spread Adjustment Methodologies*, 20 December 2018, available at: <https://www.isda.org/2018/12/20/isda-publishes-final-results-of-benchmark-fallback-consultation/>, Section 159, pg 60.

6 ISDA intend to conduct supplemental consultations within the first half of this year to solicit market participants' views before moving forward with fallback procedures for major IBOR benchmarks, such as USD LIBOR, EUR LIBOR, and EURIBOR, that were not within the Consultation's scope. See, eg, ISDA, *Preliminary Results of ISDA Consultation on Certain Aspects of Fallbacks for Derivatives Referencing GBP LIBOR, CHF LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR and BBSW*, 27 November 2018, available at: <http://assets.isda.org/media/736bd0ed/1f0db5ee-pdf/>

Early signs of consensus

For each fallback rate within its scope, the Consultation asked market participants their views on nine candidate adjustments to the fallback rate, to be deployed in the event the fallback takes effect. Each candidate combined two basic ingredients:

- a risk-free interest rate component, based on one of various functions of the alternative risk-free interest rate ("RFR") corresponding to the IBOR at hand (eg, the Sterling Overnight Index Average ("SONIA") as fallback for pound sterling ICE LIBOR, the Swiss Average Rate Overnight ("SARON") as fallback for Swiss franc ICE LIBOR); and
- a credit spread component, intended to account for the prevailing spread between the RFR (suitably modified for term exposure) and the corresponding IBOR.

Of 142 respondents who shared their rankings of these candidates, a 61 percent majority expressed preference for a single candidate that combines:

- a risk-free interest rate component set in arrears on the basis of daily compounded RFR values over the term of the IBOR at hand, and
- a credit spread component, determined as the mean or median of historical values of the spread between the IBOR and daily compounded RFR values over the IBOR's term.

Another 29 percent of respondents favored a second candidate in which the risk-free interest rate component is the same as above, but with an estimated forward-looking term credit spread serving as the credit spread component.⁷

This outcome charts a reassuringly clear course for the risk-free interest rate component: For 90 percent of the Consultation's respondents, daily compounded interest in arrears is the approach of choice.

For the credit spread component the outcome is less obvious, chiefly because the estimated forward-looking credit spread approach is controversial. Its advocates make the fair point that, if validly specified and computed, it would be the most value-neutral of the credit spread candidates presented in the Consultation. In theory, it would pose the least risk of arbitrary value transfer in a fallback event.

Its detractors might concede this point on principle, but they fault the approach nonetheless for a variety of practical reasons:⁸

Non-robustness

It presupposes levels of market liquidity that might not exist on the day (or days) immediately preceding an IBOR fallback trigger event. If transaction flows were to become thin or episodic, or to disappear entirely, in asset and derivatives markets based on the corresponding RFR, then there might be insufficient market data to ensure valid computation at all key tenors for which fallback values are needed. For the same fundamental reasons, even if trading flows and market data were available in sufficient quantity, there would be no guarantee that they would be representative of fair value.⁹

Susceptibility to manipulation

In all circumstances this approach would be sensitive to the integrity of those market data, enough to make it more vulnerable to attempted manipulation than other credit spread candidates. (A deeper potential challenge is whether there would exist a legal framework empowering financial market regulators to surveil for such attempted manipulation or to bring sanctions against it.)

⁷ *Ibid*, Sections 15-20, pp 7-9.

⁸ *Ibid*, Sections 83-94, pp 33-38.

⁹ As one commentator asserts, "the [estimated forward-looking credit spread] approach cannot be relied upon to be representative, since there is no obstacle to [market prices] becoming driven by technical rather than fundamental factors, particularly shortly before [a fallback is triggered]. *Ibid*, Section 90, pg 37.

Non-generality

In orderly market conditions, trading volumes in assets or derivatives based on RFRs naturally will vary from one currency to another. In the febrile atmosphere that might precede triggering of one or more fallbacks, such liquidity differentials could widen. Seen in this light, the forward-looking credit spread approach is unlikely to fit comfortably with the prevalent desire for procedural uniformity in fallback procedures.

Operational complications

This approach would necessitate not just that both IBOR-based and RFR-based markets are functioning properly, but also that the associated market data streams are reliably and timely available. Given the nature and sensitivity of the task, moreover, it is fair to anticipate (1) that a reputable independent vendor would be required to absorb those data streams and to administer, compute, and publish the forward-looking credit spread estimates, and (2) that the terms on which the vendor publishes and commercializes those estimates may become a matter of concern or dispute.

By contrast, there seems broad agreement among Consultation respondents that the historical mean/median approach, despite its imprecision, is acceptable by virtue of being simple, reliable, tractable, transparent, easily understandable, and effectively nonmanipulable.¹⁰

History and its dilemmas

The Consultation queried respondents as to how a historical mean or median credit spread estimate should be parameterized. For instance, should the measure of location be the median value, the arithmetic average, or perhaps a trimmed or weighted average estimator?

Nearly half of respondents preferred the median. Less than one in five favored averaging. (About 30 percent either were indifferent between the two or gave no answer.) Unsurprisingly, those who advocate for the median cite its robustness against outliers in the data and its relative stability over time. The minority who prefer averaging counter that its comparative sensitivity to extreme data values is a virtue, not a vice (provided that any such extreme values are genuine indications of market conditions, and not simply erroneous).

What is the appropriate length of historical interval for estimation of the "prevailing" credit spread?

Consultation respondents generally are concerned that the credit spread component of any IBOR fallback should be representative of the prevailing level of the spread over a historical lookback period long enough to span an entire credit cycle. Half of them see 10 years as appropriate. Roughly one out of every five propose that five years would suffice. Among the remaining 30 percent are some who argue that the lookback period should be 15 or even 20 years.

ISDA has indicated it will solicit further comment from market participants on these points before implementing fallbacks in its standard definitions.¹¹

Meantime, how might the historical credit spread approach work in practice? To gauge the answer, we've narrowed our focus to the spread relationship between 3-month USD LIBOR and the Secured Overnight Financing Rate ("SOFR") benchmark.¹²

¹⁰ For "more than 80 percent of respondent rankings, the historical mean/median approach to the spread adjustment was in the top two preferences, primarily due to concern over manipulation risk." *Ibid*, Section 127, pg 49.

¹¹ *Ibid*, Section 13, pg 6.

¹² The SOFR benchmark is administered, calculated, and published by the Federal Reserve Bank of New York in cooperation with the U.S. Office of Financial Research. See: <https://www.newyorkfed.org/markets/treasury-repo-reference-rates-information> and <https://www.newyorkfed.org/markets/reference-rates>

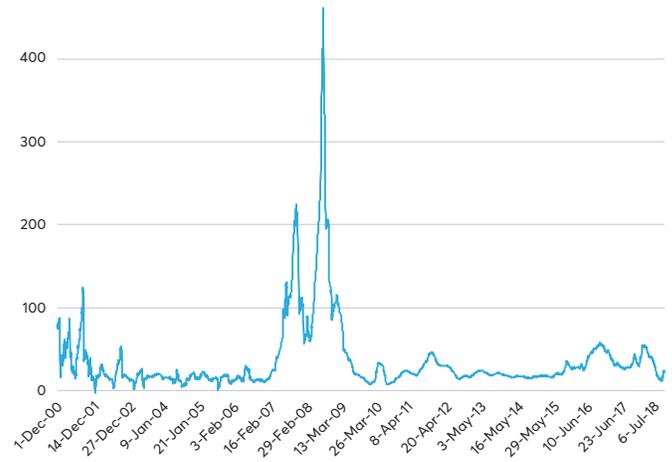
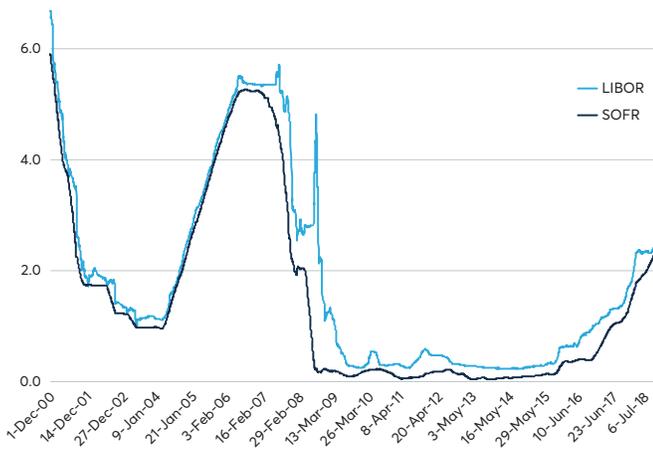
We've examined 3-month intervals starting each day from 1 December 2000 (ie, the 3-month interval ending on 1 March 2001) to 13 November 2018 (the 3-month interval ending on 13 February 2019). For each US government securities market business day on which a 3-month US dollar LIBOR value was published, we've computed the spread between (a) that day's LIBOR value minus (b) the realized rate per annum that would have obtained through daily compounding of US Treasury general collateral repo interest – or, where SOFR benchmark values are available, daily compounding of SOFR interest – over the 3-month term corresponding to that LIBOR value.¹³ Exhibit 1 depicts these time series.

Exhibit 1

3-Month USD LIBOR, 3-Month Daily Compounded SOFR, and the SOFR-LIBOR Spread

Left panel – Levels, pct/yr.

Right panel – LIBOR minus SOFR (basis points/yr)



Data sources: Bloomberg LLC, CME Group, Federal Reserve Bank of New York

We've then computed, across this historical span of nearly 19 years, daily moving 5-year median values and daily moving 10-year median values of the SOFR-LIBOR spread. The second and third columns in Exhibit 2 below show empirical distribution quantiles for daily values of these moving medians. The rightmost two columns similarly indicate empirical distribution quantiles for daily moving 5-year average and daily moving 10-year average levels of the spread.

13 Given that SOFR has been in live production for roughly one year, our time series of daily Treasury general collateral repo rates is assembled from multiple sources – From 1 December 2000 to 21 Aug 2014, we use the Overnight Treasury GC Repo Primary Dealer Survey Rate, maintained by the Federal Reserve Bank of New York ("FRBNY") Open Market Trading Desk, for which FRBNY have published a lengthy historical segment at: https://www.newyorkfed.org/markets/opolicy/operating_policy_180309. From 22 August 2014 to 29 March 2018, we use hypothetical historical estimates of the SOFR benchmark prepared by FRBNY and published at: <https://apps.newyorkfed.org/markets/autorates/sofr>. From 2 April 2018 through 13 February 2019, we use daily live-production SOFR data administered and published by FRBNY, also at: <https://apps.newyorkfed.org/markets/autorates/sofr>.

Exhibit 2**Empirical Distribution Quantiles for Daily 5-Year and 10-Year Moving Medians and Moving Averages of the 3-Month USD LIBOR/SOFR Spread, 1 Dec 2000 to 13 Feb 2019 (basis points/yr)**

Percentile	Medians		Averages	
	5-Yr	10-Yr	5-Yr	10-Yr
Maximum	35.3	24.0	66.7	45.7
95	32.4	24.0	65.4	45.3
75	25.2	22.8	62.5	42.6
Median	20.2	20.2	27.8	41.9
25	18.2	19.5	21.7	41.5
5	15.3	18.5	16.5	38.7
Minimum	15.0	18.5	15.9	30.3
Range	20.3	5.5	50.8	15.4

Data sources: Bloomberg LLC, CME Group, Federal Reserve Bank of New York

Among insights to be drawn are that:

- The evidence affirms the median estimator's comparative stability. In this sample, the median daily spread is 20.2 basis points irrespective of the lookback period's length.
- The evidence also confirms the relative sensitivity of the average to extreme values. For a 10-year lookback window, the representative spread estimate is nearly 42 basis points. That's not surprising, given that nearly all 10-year intervals within the sample include at least some data points drawn from the period of stressed credit conditions surrounding the 2008 US banking crisis, when spreads between USD LIBOR and general collateral repo rates temporarily blew out to several hundred basis points.
- Only a subset of 5-year lookback windows were touched by the distressed conditions of 2007-9. Thus, the representative 5-year average credit spread is far lower, less than 28 basis points.
- Comparison of ranges of estimated values underscores the stability of the median relative to the average. For 10-year lookback windows, for instance, all median estimates reside within a range of just 5.5 basis points; the range for average estimates is almost three times as wide.
- The relative locations of the ranges of estimated values merits comment. For 5-year lookback windows, the range of median estimates occupies approximately the lower half of the range of average estimates. Given the skewness in the distribution of spread values, this is as expected.
- Results for 10-year lookback windows are more extreme and potentially worrisome. In this data set, the entire range of average estimates lies strictly above the range of median estimates. Indeed, the minimum average estimate exceeds the maximum median estimate by more than six basis points.

As consultations on procedural details continue, market participants must soon arrive at a consensus on methodology. The last point above underscores that, at its crux, any such consensus will require agreement on a methodological value judgment: *Either the credit spread component that enters into the benchmark fallback should be determined with the robustness and stability of the median, or it should be set with the responsiveness to extreme values that averaging permits.*

Market practitioners may yet find that weighting of historical data points – perhaps through trimming or exponential weighting – provides the necessary elements of a methodological compromise.



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