

## Interbank Offered Rate (IBOR) Fallbacks for 2006 ISDA Definitions

### *Consultation on Certain Aspects of Fallbacks for Derivatives Referencing GBP LIBOR,<sup>1</sup> CHF LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR and BBSW*

#### Executive Summary

- ISDA is amending its standard documentation to implement fallbacks for certain key IBORs.
- The fallbacks will apply if the relevant IBOR is *permanently discontinued*, based on defined triggers.
- The fallbacks will be to alternative risk-free rates (RFRs) that have been identified for the relevant IBORs as part of recent global benchmark reform work.
- **This consultation seeks input on *the approach for addressing certain technical issues* associated with adjustments that will apply to the RFRs if the fallbacks are triggered. These adjustments are warranted because of the differences between the IBORs and the RFRs.**
- This consultation covers GBP LIBOR, CHF LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR and BBSW. ISDA will launch supplemental consultations covering USD LIBOR, EUR LIBOR and EURIBOR but requests preliminary feedback on the technical issues associated with fallbacks for these benchmarks in this consultation.<sup>2</sup>
- Based on responses to this consultation, ISDA will determine the style of approach to implement. ISDA will then work with an independent third-party vendor (selected pursuant to a formal request-for-proposal process) to build out and finalize the approach. Before implementing any changes to its standard documentation, ISDA will publish the final approach for review and comment.

#### Introduction

ISDA plans to amend certain ‘floating rate options’ in the 2006 ISDA Definitions to include fallbacks that would apply upon the *permanent discontinuation* of certain key IBORs. As it has done from time to time, ISDA will amend the 2006 ISDA Definitions by publishing a ‘Supplement’ (or ‘Supplements’) to the 2006 ISDA Definitions. Upon publication of the Supplement for the relevant IBOR, transactions incorporating the 2006 ISDA Definitions that are entered into on or after the date of the Supplement (*i.e.*, the date that the 2006 ISDA Definitions are amended) will include the amended floating rate option (*i.e.*, the floating rate option with the

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<sup>1</sup> Note that, as discussed below, this consultation relates to certain aspects of *derivatives fallbacks* that ISDA will implement in the 2006 ISDA Definitions and is *separate from* the Working Group on Sterling Risk-Free Reference Rates’ consultation on term SONIA reference rates.

<sup>2</sup> ISDA is also considering fallbacks for HIBOR.

fallback). Transactions entered into prior to the date of the Supplement (so called “legacy derivative contracts”) will continue to be based on the 2006 ISDA Definitions as they existed before they were amended pursuant to the Supplement, and therefore will not include the amended floating rate option with the fallback.

ISDA also expects to publish a protocol (or protocols) to facilitate multilateral amendments to include the amended floating rate options, and therefore the fallbacks, in legacy derivative contracts. By adhering to the protocol, market participants would agree that their legacy derivative contracts *with other adherents* will include the amended floating rate option for the relevant IBOR and will therefore include the fallback. As always, any such protocol will be completely voluntary and will amend contracts only between two adhering parties (*i.e.*, it will not amend contracts between an adhering party and a non-adhering party or between two non-adhering parties). The fallbacks included in legacy derivative contracts by adherence to the protocol will be exactly the same as the fallbacks included in new transactions that incorporate the 2006 ISDA Definitions.

**As explained in greater detail below, this consultation is to determine the approach for calculating the adjusted RFRs and spread adjustments that would apply if the fallbacks are triggered.** After discussions within its working groups and with its board of directors and outside advisors, ISDA has determined that it is most appropriate to consult with all market participants (*i.e.*, not only derivatives market participants) on these aspects of the fallbacks it will implement in the 2006 ISDA Definitions.

**Please submit responses online at <https://www.isda.org/2018/07/10/interbank-offered-rate-ibor-fallbacks-for-2006-isda-definitions> by Friday October 12<sup>th</sup>, 2018.**

During the consultation period, ISDA will host two webinars to introduce the consultation and answer questions. The first will be during the week of July 23<sup>rd</sup>, 2018. The second will be during week of September 10<sup>th</sup>, 2018. You can also submit questions to [FallbackConsult@isda.org](mailto:FallbackConsult@isda.org) at any time during the consultation period. Beginning during the week of July 30<sup>th</sup>, 2018, ISDA will maintain a list of FAQs at <https://www.isda.org/2018/07/10/ibor-fallbacks-for-2006-isda-definitions-faqs>.

Upon selection of the approach for calculating the adjusted RFR and spread adjustment, an independent third-party vendor will obtain the data necessary to perform the relevant calculations, run the calculations and publish the adjusted RFR and spread adjustment on a screen so that users can access the information in the same way that they access the relevant IBOR or RFR. This will provide certainty to counterparties regarding the rate that would apply to their contracts if and when the fallback is triggered and avoid disputes and inefficiencies that could arise if market participants all performed their own calculations. ISDA will conduct a request-for-proposal process open to all interested vendors in order to select the vendor that will publish the adjusted RFR and spread adjustment. Among other things, qualified vendors must be able to access the data required to calculate the adjusted RFR and spread adjustment, which, depending on the approach selected, may be very data intensive. ISDA will then work with the selected vendor to

build out the selected approach or approaches (if different approaches are selected for different currencies). Before publishing any amendments to the 2006 ISDA Definitions, ISDA will publish the final approach for review and comment. If necessary, ISDA will also solicit feedback on any outstanding details during this review and comment period.

*Note to Recipients: By participating in this consultation, you agree not to use this process for any anticompetitive purpose, and further agree and warrant that you will not engage in any conduct that would cause any other party participating in this consultation to be in violation of any competition or antitrust law or regulation. ISDA has taken and will continue to take safeguards and protections to ensure that the use of the results of this consultation comply with applicable laws and regulations.*

## **Background**

In July 2016, the Financial Stability Board (FSB) Official Sector Steering Group (OSSG) asked ISDA to participate in work to enhance the robustness of derivative contracts referencing widely used benchmarks. The FSB's objectives were for market participants to understand the fallback arrangements that would apply if key benchmarks were permanently discontinued and for the arrangements to be robust enough to prevent potential serious market disruption upon such an event. In September 2016, ISDA agreed to convene discussions regarding derivative contract robustness including, specifically, selection of fallbacks for key benchmarks and development of an implementation plan for contractual adoption of the fallbacks.

Prior to 2016, global groups focusing on benchmark reform had noted the need for more robust fallback provisions in derivatives and other financial instruments. Principle 13 of the IOSCO *Principles for Financial Benchmarks* provides that users should be encouraged by administrators to “take steps to make sure that contracts or other financial instruments that reference a benchmark have robust fallback provisions in the event of [cessation of] the referenced benchmark.”<sup>3</sup> In 2014, the FSB OSSG Market Participants Group concluded in its final report that “[i]n most cases, fallback provisions are not sufficiently robust for a permanent discontinuation of a key IBOR”.<sup>4</sup> Under the 2006 ISDA Definitions, if an IBOR is not available (including if it is permanently discontinued) current fallbacks require the calculation agent to obtain quotations for what the IBOR should be from major dealers in the relevant interdealer market. If an IBOR has been permanently discontinued, it is likely that major dealers would be unwilling and/or unable to give such quotations. Even if quotations were available in the near-term after the permanent discontinuation, it is unlikely that they would be available for each future reset date over the remaining tenor of long dated contracts. It is also likely that quotations could vary materially across the market.

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<sup>3</sup> <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf>, page 24.

<sup>4</sup> [http://www.fsb.org/wp-content/uploads/r\\_140722b.pdf](http://www.fsb.org/wp-content/uploads/r_140722b.pdf), page 12.

In January 2018, IOSCO published a *Statement on Matters to Consider in the Use of Financial Benchmarks*, which provides that benchmark users should “consider their contingency plans in the event a benchmark is no longer available or materially changes in order to mitigate the potential risks involved. Users are encouraged to produce and maintain clear, comprehensive and robust written policies and procedures on actions they would take in such an event. ... Where feasible and appropriate, contingency plans for the cessation of a benchmark should include users’ having sufficiently robust fall back provisions in their financial contracts and instruments. These provisions should ideally involve at least one alternative or fall back rate and/or other figure as a substitute for the benchmark originally referenced should it no longer be available. Users should also seek to reflect their contingency plans in their contractual arrangements”.<sup>5</sup>

An IBOR could be permanently discontinued for a variety of reasons, including but not limited to issues with the administrator, unavailability of submissions from panel banks or regulatory concerns. The fallbacks that ISDA plans to implement in the 2006 ISDA Definitions would apply upon any permanent discontinuation (based on the triggers described below), regardless of its cause.

### **Scope of Consultation and Fallbacks**

Please note the following regarding both the scope of this consultation and the scope of the fallbacks ISDA plans to implement:

- Implementation of fallbacks for derivatives is one part of ongoing benchmark reform. Efforts are also underway globally to encourage adoption of alternative rates and transition to those rates. These efforts are outside the scope of the fallbacks that ISDA is implementing in the 2006 ISDA Definitions and therefore beyond the scope of this consultation. ISDA continues to work with its members and relevant regulators to determine what additional documentation solutions may be helpful with respect to adoption of, and transition to, alternative rates prior to the permanent discontinuation of an IBOR.<sup>6</sup>
- ISDA is amending the 2006 ISDA Definitions to include fallbacks that would apply upon a *permanent discontinuation* of the relevant IBOR. Market participants that reference IBORs in derivatives and other financial contracts may decide to include contractual triggers pursuant to which their contracts would move to different rates prior to such time. Additionally, regulation in the European Union (and potentially in other jurisdictions) gives certain regulators the right to prohibit use of IBORs by market participants subject to such regulation, even if the IBORs continue to be published. Any such voluntary or mandatory

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<sup>5</sup> <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD589.pdf>, page 4.

<sup>6</sup> Among other things, ISDA is discussing with its members triggers and fallbacks that may be appropriate if a regulator prohibits use of a particular IBOR by market participants in a given region. ISDA does not contemplate any further revisions to the 2006 ISDA Definitions as part of this work but contemplates offering appropriate documentation solutions.

amendments that occur prior to a permanent discontinuation are beyond the scope of the fallbacks that ISDA is implementing in the 2006 ISDA Definitions and therefore beyond the scope of this consultation.

- The 2006 ISDA Definitions are intended for incorporation in derivatives. Therefore, the fallbacks that ISDA plans to implement via amendments to certain floating rate options in the 2006 ISDA Definitions are intended to apply to derivatives. Efforts are also underway globally to implement fallbacks for other products (*e.g.*, loans, bonds, notes) that reference IBORs. ISDA does not make any representation regarding whether the fallbacks it implements in the 2006 ISDA Definitions would be appropriate for such products. While it is important to consider whether fallbacks would be appropriate for derivatives that hedge these products, this consultation does not discuss or cover whether the adjusted RFRs and spread adjustments would be appropriate for fallbacks in non-derivative securities or other financial products.
- The fallbacks that ISDA is implementing are to address the systemic disruption that could occur if a key IBOR is permanently discontinued. These fallbacks are not proxies for the relevant IBORs but will provide clarity and certainty to market participants if an IBOR is permanently discontinued.

## **Description of Fallbacks**

### *Form of Amendments*

To account for any permanent discontinuation of relevant IBORs, amendments to the floating rate options in Section 7.1 of the 2006 ISDA Definitions for any such IBORs will take the form of:

- a statement identifying the objective triggers that would activate the selected fallbacks; and
- a description of the fallback that would apply upon the occurrence of that trigger, which will be the relevant RFR adjusted using methodologies to account for (i) the fact that the RFR is an overnight rate and (ii) the various premia included within the IBOR.

### *Triggers*

The fallbacks in the 2006 ISDA Definitions will be triggered upon:<sup>7</sup>

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<sup>7</sup> Note that the language of these triggers may need to be modified based on the characteristics of the individual IBORs and what would constitute a “permanent discontinuation” for each IBOR. However, any modifications will not affect the general principle that the fallbacks in the 2006 ISDA Definitions will be triggered upon a permanent discontinuation that is publicly known based on objective information.

- a public statement or publication of information by or on behalf of the administrator of [the relevant IBOR]<sup>8</sup> announcing that it has ceased or will cease to provide [the relevant IBOR] permanently or indefinitely, provided that, at that time, there is no successor administrator that will continue to provide [the relevant IBOR]; or
- a public statement or publication of information by the regulatory supervisor for the administrator of [the relevant IBOR], the central bank for the currency of [the relevant IBOR], an insolvency official with jurisdiction over the administrator for [the relevant IBOR], a resolution authority with jurisdiction over the administrator for the [the relevant IBOR] or a court or an entity with similar insolvency or resolution authority over the administrator for [the relevant IBOR], which states that the administrator of [the relevant IBOR] has ceased or will cease to provide [the relevant IBOR] permanently or indefinitely, provided that, at that time, there is no successor administrator that will continue to provide [the relevant IBOR].

Note that the fallbacks will not apply until the actual discontinuation of the relevant IBOR (if that is after the announcement date).

**Rates**

ISDA has determined, after consultation with industry participants, regulators and the FSB OSSG, that for a given IBOR below, the fallback rate will be the overnight RFR identified by the relevant public-private sector RFR working group as an alternative to that IBOR or, if no such RFR working group exists, the RFR identified by relevant regulators. These include:

<b>Relevant IBOR and corresponding floating rate options in 2006 ISDA Definitions</b>		<b>Fallback rate</b>
GBP LIBOR	GBP-LIBOR-BBA GBP-LIBOR-BBA-Bloomberg	SONIA
CHF LIBOR	CHF-LIBOR-BBA CHF-LIBOR-BBA-Bloomberg	SARON
JPY LIBOR	JPY-LIBOR-FRASET JPY-LIBOR-BBA JPY-LIBOR-BBA-Bloomberg	TONA <sup>9</sup>

<sup>8</sup> The relevant IBOR will be named in revisions to relevant floating rate option.

<sup>9</sup> The scope of this consultation focuses on the cases in which the RFRs are used as the fallback rates for IBORs, however, this consultation does not exclude the possibility of a market participant electing to use TIBOR as the fallback for JPY LIBOR.

TIBOR	JPY-TIBOR-TIBM JPY-TIBOR-17096 JPY-TIBOR-17097 JPY-TIBOR-TIBM (All Banks)-Bloomberg	TONA
Euroyen TIBOR	JPY-TIBOR-ZTIBOR	TONA
BBSW	AUD-BBR-AUBBSW AUD-BBR-BBSW AUD-BBR-BBSW-Bloomberg	RBA Cash Rate
<i>USD LIBOR*</i>	<i>USD-LIBOR-BBA</i> <i>USD-LIBOR-BBA-Bloomberg</i> <i>USD-LIBOR-LIBO</i>	<i>SOFR</i>

\*Not covered by this consultation.

This consultation covers GBP LIBOR/ SONIA, CHF LIBOR/SARON, JPY LIBOR/TONA, TIBOR/TONA, Euroyen TIBOR/TONA and BBSW/RBA Cash Rate. Subsequent consultations will cover USD LIBOR/SOFR, EURIBOR/[the identified EUR RFR], EUR LIBOR/[the identified EUR RFR] and may cover other benchmarks, including HIBOR. Note that some of the questions below relate to USD LIBOR, EUR LIBOR and EURIBOR. Responses to those questions may inform the content and timing of subsequent consultation for these benchmarks.

### **Adjusted RFRs**

The RFRs are overnight rates but the relevant IBORs are published for various tenors. To account for the move from a “term” rate (*i.e.*, the IBOR) to an overnight rate (*i.e.*, the overnight RFR), the fallbacks ISDA implements will apply an adjustment to the relevant overnight RFR so that it is comparable to the relevant IBOR. The adjusted rate is called the “adjusted RFR”.

The following approaches for calculating the adjustment are under consideration. Please see the attached [Annex A](#) for a more detailed description of each approach.

Note that the approaches described below are different from the forward-looking term rates that the Working Group on Sterling Risk-Free Reference Rates (Sterling RFR WG) is considering primarily for cash products referencing SONIA. The Sterling RFR WG indicated in its December 12<sup>th</sup>, 2017 minutes that there should be no need for forward-looking term rates to be used for cleared and

listed derivatives and, over time, a reduced need for term rates in bilateral swap markets.<sup>10</sup> While USD LIBOR is not directly in scope for this consultation, we note that the Alternative Reference Rates Committee (ARRC) has also indicated that derivatives should reference the overnight RFRs and that forward-looking term rates are intended for use in cash products and would not be appropriate for most derivatives. The fallbacks that ISDA is implementing will be for derivatives (as opposed to cash products) and therefore, unlike the forward-looking term rates under consideration by the Sterling RFR WG and the ARRC, the approaches below are based on the overnight RFRs. This is also consistent with the FSB OSSG’s message that ISDA should develop fallbacks that could be used in the absence of suitable term rates and, in doing so, should focus on calculations based on the overnight RFRs for the IBORs covered by this consultation.<sup>11</sup> We note that by using calculations based on the overnight RFRs, none of the approaches described below will explicitly replicate the forward-looking term rates for the RFRs.

The approaches described below were identified based on the following criteria: (1) simplicity and ease of calculating; (2) data requirements; and (3) similarity with the structure of overnight index swaps that reference the RFRs. Note that the different approaches satisfy these criteria to differing degrees. When considering the approaches and answering the questions below, respondents must determine for themselves how to weight each criterion. Respondents may also want to consider their own additional criteria.

The descriptions below contain brief discussions of potential advantages and disadvantages for each approach. These discussions are provided for information only. They are not intended to be comprehensive and ISDA makes no representation regarding their accuracy or applicability to the particular circumstances of an individual market participant. Respondents are strongly encouraged to formulate their own views regarding the advantages and disadvantages of each approach, taking into account their particular circumstances, and to consult with their own professional advisors in doing so.

### ***Option 1: Spot Overnight Rate***

The fallback could be to the RFR that sets on the date that is one or two business days (depending on the relevant IBOR) prior to the beginning of the relevant IBOR tenor.

Potential advantages of the spot overnight rate approach:

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<sup>10</sup> <https://www.bankofengland.co.uk/-/media/boe/files/minutes/2017/rfr-dec-2017.pdf?la=en&hash=57DF04D160219EAC3FB6E99770278285D797B8CB>, paragraph 12. A consultation on forward looking term rates is scheduled in the UK and the Sterling RFR WG will provide a recommendation once consultation responses are assessed.

<sup>11</sup> See also “Interest rate benchmark reform – overnight risk-free rates and term rates” published by the FSB OSSG, available at <http://www.fsb.org/wp-content/uploads/P120718.pdf>.

- It would be accessible to all market participants because it is easy to understand, simple to implement and relies on readily available information.
- It reflects risk-free interest rate market conditions for one-day borrowing just prior to the start of the relevant IBOR tenor.

Potential disadvantages of the spot overnight rate approach:

- It ignores the inherent variation in risk-free interest rates over different tenors.
- Overnight rates are sometimes more volatile than term rates so the adjusted RFR computed using this approach may also be more volatile than it should be.
- It does not mirror the structure of overnight index swaps that reference the RFRs.

### ***Option 2: Convexity-adjusted Overnight Rate***

This approach is very similar to the spot overnight rate approach, with a first-order modification to adjust for convexity.<sup>12</sup> The modification attempts to account for the difference between flat overnight interest at the spot overnight rate versus the realized rate of interest that would be delivered by daily compounding of the RFR over the IBOR's term. This is achieved by using an approximation in which "today's" overnight RFR is assumed to hold constant at "today's" value on each day during the relevant IBOR's tenor.

Potential advantages of the convexity-adjusted overnight rate approach:

- It relies on data readily available at the beginning of the relevant IBOR tenor.
- To the extent that it renders overnight RFR exposure more closely comparable to term IBOR exposure by accounting for daily compounding of the overnight RFR, it is a closer match for the term structure of risk-free interest rates.

Potential disadvantages of the convexity-adjusted overnight rate approach:

- The "convexity adjustment" may not match the shape of the term structure of risk-free interest rates, especially in market conditions with high and/or volatile short-term rates.
- Many market participants may not appreciate the benefit provided by the convexity adjustment against the increased complexity.

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<sup>12</sup> A lag before an interest rate is observed typically results in greater uncertainty as to that interest rate. Because earned returns reflect compounding over time, interest rate uncertainty changes the expected return from that which would be earned at the expected rate. This implies that, even if expectations of interest rate levels were not changing over time, increased uncertainty in interest rates would lead to changes in interest rates over different tenors. This effect is called "convexity" although, more generally, convexity is often used to refer to any curvature in the graph of interest rates versus tenor.

- It ignores the inherent variation in risk-free interest rates over different tenors.
- Overnight rates are sometimes more volatile than term rates so the adjusted RFR computed using this approach may also be more volatile than it should be.
- It does not mirror the structure of overnight index swaps that reference the RFRs.

### ***Option 3: Compounded Setting in Arrears Rate***

The fallback could be to the relevant RFR observed over the relevant IBOR tenor and compounded daily during that period.

Potential advantages of the compounded setting in arrears rate approach:

- It reflects actual daily interest rate movements during the relevant period.
- It is calculated as an “average” rate and therefore should be less volatile than the spot overnight rate.
- It should be understandable by most market participants.
- It mirrors the structure of overnight index swaps referencing the RFRs.

Potential disadvantages of the compounded setting in arrears rate approach:

- The information needed to determine the rate is not available at the start of the relevant period.
- Actual interest rate movements may not reflect prior expectations of interest rate movements over the period.

### ***Option 4: Compounded Setting in Advance Rate***

This approach is mathematically the same as the compounded setting in arrears rate approach but, while the observation period would be equal in length to the IBOR tenor, it would end immediately prior to the start of the relevant IBOR tenor so that the rate would be available at the beginning of that period.

Potential advantages of the compounded setting in advance rate approach:

- It would be available at the beginning of the relevant IBOR tenor because it is set in advance.
- It reflects actual daily interest rate movements over a comparable tenor during a period near the relevant period.

- It should reasonably match the market interest rate term structure at the start of the period over which it applies.<sup>13</sup>
- It is calculated as an “average” rate and therefore should be less volatile than the spot overnight rate.
- It should be understandable by most market participants.
- Its payment structure is similar to that of overnight index swaps referencing the RFRs.

Potential disadvantages of the compounded setting in advance rate approach:

- It is inherently backward-looking. Market conditions may have changed since the relevant historical period, which could lead to differences from the current market term structure and may affect hedging.

### **Spread Adjustment Methodologies**

The overnight RFRs are risk-free or nearly risk-free whereas the relevant IBORs incorporate a bank credit risk premium and a variety of other factors (*e.g.*, liquidity, fluctuations in supply and demand). While it would not be possible to replicate these factors upon a permanent discontinuation of the relevant IBOR, a spread adjustment could apply to the relevant adjusted RFR as a rough proxy.

The following methodologies for calculating the spread adjustment are under consideration. Please see the attached [Annex B](#) for a more detailed description of each methodology.

The spread adjustment will be calculated as of the business day before the fallback is triggered (*i.e.*, the business day before the public statement is made or the formal publication of information regarding permanent discontinuation) but will not apply until the fallback takes effect (*i.e.*, the first day that the relevant IBOR is not published following a permanent discontinuation).<sup>14</sup> Once calculated, the spread adjustment will be set (*i.e.*, it will not be dynamic or reflect any changes in the interbank market once the fallback applies after the permanent discontinuation of the IBOR). In the case of a sudden permanent discontinuation, the calculation and application of the spread adjustment would be contemporaneous but in the case of a permanent discontinuation that is announced in advance, there will be a period of time between the calculation of the spread adjustment and the application of the fallback (with the exception of the spread adjustment that would apply at the beginning of the one-year transitional period described below in relation to the historical mean/median approach). Calculating the spread adjustment as of the business day before the fallback is triggered is necessary to

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<sup>13</sup> This approach should provide a rate that matches the market interest rate term structure at the start of the period to the degree that recent daily interest rates are at levels similar to current rates and to the degree that recent daily interest rate movements reflect variation consistent with anticipated forward-looking volatility of interest rates.

<sup>14</sup> There is the potential, in rare circumstances, to lead to negative spread adjustments based on the interest rates and market conditions leading to a trigger event.

avoid distortions due to market disruption during the period between the fallback being triggered and actual discontinuation of the relevant IBOR.

The methodologies described below were identified based on the following criteria: (1) eliminating or minimizing value transfer at the time the fallback is applied; (2) eliminating or minimizing any potential for manipulation; and (3) eliminating or mitigating against the impact of market disruption at the time the fallback is applied. Note that the different methodologies satisfy these criteria to differing degrees. When considering the methodologies and answering the questions below, respondents must determine for themselves how to weight each criterion. Respondents may also want to consider their own additional criteria.

The descriptions below contain brief discussions of potential advantages and disadvantages for each methodology. These discussions are provided for information only. They are not intended to be comprehensive, and ISDA makes no representation regarding their accuracy or applicability to the particular circumstances of an individual market participant. Respondents are strongly encouraged to formulate their own views regarding the advantages and disadvantages of each methodology, taking into account their particular circumstances, and to consult with their own professional advisors in doing so.

### ***Option 1: Forward Approach***

The spread adjustment could be calculated based on observed market prices for the forward spread between the relevant IBOR and the adjusted RFR in the relevant tenor at the time the fallback is triggered. A forward spread curve up to 30-60 years for the adjusted RFR in each relevant tenor could be published on a daily basis up until the date the fallback is triggered. Upon the permanent discontinuation of the relevant IBOR, the fallback would consist of the adjusted RFR (as published each day going forward), plus a spread based on the relevant curve (which would specify the spread to be applied for every future date and would be frozen at the point of trigger). For future dates beyond the length of the curve, the spread would remain static at the spread for the last date on the curve.

A variation would be to use the average of the spreads based on the curves for a period of days or months (*e.g.*, 5 trading days, 10 trading days, 1 month or 3 months) before the trigger as opposed to one day before the trigger.

The forward approach requires a forward IBOR curve and a forward adjusted RFR discount curve, both of which would ideally extend out to 30-60 years.

The forward approach is not compatible with the spot overnight rate approach or the convexity-adjusted overnight rate approach.

Potential advantages of the forward approach:

- It prevents significant value transfers near the date the fallback is triggered because spread adjustments match the expected market pricing as of the day before the fallback is triggered (or the average expected market pricing over the specified number of days before the fallback is triggered).

Potential disadvantages of the forward approach:

- It requires functioning markets and extensive market data,<sup>15</sup> which may not be readily available. Any market data considered must be accurate, verifiable and accessible to market participants. It should not be based on any proprietary data from individual dealers.
- Availability of the curves required to compute this approach would be dependent on a vendor continuing to calculate and publish the curves up until the fallbacks are triggered. There is no guarantee that a vendor would do so.
- It may be vulnerable to manipulations and distortions in the market.

### ***Option 2: Historical Mean/Median Approach***

The spread adjustment could be based on the mean or median spot spread between the IBOR and the adjusted RFR calculated over a significant, static lookback period (*e.g.*, 5 years, 10 years) prior to the relevant announcement or publication triggering the fallback provisions. This spread adjustment could then be used from the end of a one-year transitional period after the fallback takes effect. During the transitional period, the spread to be used would be calculated using linear interpolation between the spot IBOR/adjusted RFR spread at the time the fallback takes effect (*i.e.*, the spot IBOR-adjusted RFR spread on the last date that the relevant IBOR is published) and the spread that would apply after the end of the transitional period. The one-year transitional period would mitigate against a “cliff effect” at the time the fallback takes effect if the spot IBOR/adjusted RFR spread at that time differs from the historical mean/median. The progression from that spot IBOR/adjusted RFR spread to the spread adjustment that will apply going forward will be gradual over the one-year transitional period.

The historical mean/median approach requires historical spot IBOR fixings for each relevant tenor and historical spot adjusted RFR fixings, in each case over the relevant look-back period.

Potential advantages of the historical mean/median approach:

- It reflects current market conditions at the time the fallback takes effect (and therefore avoids a cliff effect at such time) but transitions to longer-term average market conditions as time passes.

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<sup>15</sup> This approach requires forward IBOR curves and forward adjusted RFR curves for each tenor, extending out through the time horizon over which the fallbacks will be quoted.

- It captures the tendency of interest rates to fluctuate around a long-term mean.
- It ultimately ameliorates the effect of market distortions and potential manipulation at the time of triggering because it is based on a transition to longer-term average market conditions.
- It is based on readily available information.

Potential disadvantages of the historical mean/median approach:

- It is unlikely to be present-value neutral on the calibration date because spot rates are unlikely to be consistent with forward rates and because the average historical market conditions may not match market expectations for future market conditions (including, *e.g.*, expected changes in monetary policy).
- It requires long histories of IBOR fixings and adjusted RFR fixings.

### ***Option 3: Spot-Spread Approach***

The spread adjustment could be based on the spot spread between the IBOR and the adjusted RFR on the day preceding the relevant announcement or publication triggering the fallback provisions. A variation would be to use the average of the daily spot spread between the IBOR and the adjusted RFR over a specified number of days (*e.g.*, 5 trading days, 10 trading days or 1 month). This approach is similar to the historic mean/median approach but for a very short time and without the transitional period.

The spot-spread approach requires spot IBOR fixings for each relevant tenor and spot adjusted RFR fixings.

The spot-spread approach is not compatible with the compounded setting in arrears rate.

Potential advantages of the spot-spread approach:

- It is simple to implement and understand.
- It requires only IBOR fixings and adjusted RFR fixings at the time of triggering.

Potential disadvantages of the spot-spread approach:

- It is unlikely to be present-value neutral on the calibration date because it only reflects spreads under market conditions at the time of calibration, which could differ from anticipated market conditions in the future (including, *e.g.*, expected changes in monetary policy). This may be of particular concern if the fallback is triggered during market turmoil or when spot spreads are out of line with forward spreads.

### **Example Calculations**

During the week of July 23<sup>rd</sup>, 2018, ISDA will publish a set of graphs illustrating the approaches for calculating the adjusted RFR and spread adjustments for each relevant IBOR.

### Questions

Relying on responses to this consultation, ISDA will identify the approaches for calculating the adjusted RFR and spread adjustments for each relevant IBOR pursuant to the process described below.

	Forward Approach	Historical Mean/Median Approach	Spot-Spread Approach
Spot Overnight Rate	Not compatible		
Convexity-adjusted Overnight Rate	Not compatible		
Compounded Setting in Arrears Rate			Not compatible
Compounded Setting in Advance Rate			

Based on the table above, the following pairs of adjusted RFR and spread adjustment are possible:

1. Compounded Setting in Arrears Rate with Forward Approach
2. Compounded Setting in Advance Rate with Forward Approach
3. Spot Overnight Rate with Historical Mean/Median Approach
4. Convexity-adjusted Overnight Rate with Historical Mean/Median Approach
5. Compounded Setting in Arrears Rate with Historical Mean/Median Approach
6. Compounded Setting in Advance Rate with Historical Mean/Median Approach
7. Spot Overnight Rate with Spot-Spread Approach
8. Convexity-adjusted Overnight Rate with Spot-Spread Approach
9. Compounded Setting in Advance Rate with Spot-Spread Approach

#### **Preferred Approach**

- Please rank the combinations listed above with 1 as your preferred approach, 2 as your second preferred approach, and so forth.
  - Please explain your rankings. Please specifically comment on the characteristics of the combinations you ranked the highest that most influenced your decision.

- If you are completely opposed to an approach to adjusted RFRs, please do not rank it but explain why you are completely opposed to it.
- Indicate whether your preferences apply universally to GBP LIBOR/SONIA; JPY LIBOR/TONA; TIBOR/TONA; Euroyen TIBOR/TONA; CHF LIBOR/SARON and BBSW/RBA cash rate. Alternatively, provide a separate ranking for each IBOR that should be handled separately.
- If your preferences apply universally, please indicate whether you would also expect your preferences to apply to USD LIBOR/SOFR, EUR LIBOR/[the identified EUR RFR] and EURIBOR/[the identified EUR RFR].<sup>16</sup>
- Please provide preliminary comments on your preferred approach for USD LIBOR/SOFR (regardless of whether your preference applies universally or to USD LIBOR/SOFR only). Indicate what, if any, additional information you need to confirm this as your preferred approach.
- Please indicate whether you would not be able to transact using definitions that incorporate fallbacks based on any of the approaches to adjusted RFRs or spread adjustments. If you would not be able to transact, please give specific examples of the types of derivatives for which the fallbacks would be problematic and explain why.
- Would it be problematic for market participants to use different approaches to calculate adjusted RFRs and spread adjustments in fallbacks across different currencies? Please explain why or why not, commenting specifically on the potential implications of using different approaches across different currencies.
- Please provide separate comments on the general appropriateness and effectiveness of each of the four approaches to adjusted RFRs and three methodologies for the spread adjustments. Please specifically comment on anticipated operational challenges, economic impacts, implications for hedging, feasibility of implementation and any other complexities. Indicate whether your comments apply to all contracts, new contracts only or legacy contracts only. With respect to any operational challenges, please explain how long it would take to overcome such challenges.
- Questions about specific methodologies for calculating the spread adjustment:
  - Forward Approach
    - Should the forward approach be based on data from the day prior to the trigger only or a number of days or months prior to the trigger? If the latter, how many days or months? Please specifically consider 5 trading days, 10 trading days, 1 month and 3 months but also indicate whether a different length is most appropriate and explain why.

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<sup>16</sup> Note that this consultation does not ask more specific questions about EUR LIBOR and EURIBOR because the alternative RFR for the euro is not expected to be selected until September 2018.

- What is the appropriate length of the forward spread curve? Please specifically consider 30 years, 40 years, 50 years and 60 years but also indicate whether a different length is more appropriate and explain why.
- Would it be acceptable to use data for cleared transactions only when using the forward approach to calculate the spread adjustment? If so, how should the differential between central counterparties (CCPs) be addressed?
- Historical Mean/Median Approach
  - What is the appropriate historical static lookback period? Please specifically consider 5 years and 10 years but also indicate whether a different time period is most appropriate and explain why.
  - Should the calculation be based on the mean or the median spot spread between the IBOR and the adjusted RFR? Please explain why.
- Spot-Spread Approach
  - Should the spot-spread approach be based on data from the day prior to the trigger only or, alternatively, some number of days prior to the trigger? If the latter, how many days prior to the trigger should this be? Please specifically consider 5 trading days, 10 trading days and 1 month, but also indicate whether a different time period is most appropriate and explain why.

## **General**

- How important or unimportant is it for the fallbacks to be approximately present-value neutral at the time of trigger? Please explain why.
- How important or unimportant is it for the fallback rates to be available in advance of the accrual period. Alternative, is setting in arrears acceptable? Please explain why or why not.
- How important or unimportant is it for the fallback rates to be wholly (or mostly) convexity free? Please explain why or why not.

**Process for Determining Selected Approaches for Calculating the Adjusted RFRs and Spread Adjustments**

- For each currency, ISDA will analyze the responses to this consultation and determine the approach for calculating the adjusted RFR and spread adjustment. The ISDA Board Benchmark Committee will have the ultimate responsibility for this determination.
- ISDA will publish a full explanation of how it made the determination based on the responses received. In making the determination, ISDA will consider all factors that it considers appropriate after consultation with its advisors, which will include but not be limited to:
  - The percentage of individual market participants who prefer the approach.
  - Whether a segment of market participants have a consensus view, or a meaningful number of all market participants indicate, that they would not be able to transact using definitions that incorporate fallbacks based on such approach.
  - Whether the approach would result in transactions that could not be cleared by major derivatives CCPs, either once the fallbacks are incorporated in transactions or once the fallbacks are applied.
  - Whether selecting the approach could expose ISDA to the risk of litigation or regulatory action.
- ISDA will also publish an aggregated and anonymized summary of responses received but will not publish the numerical results of the rankings. The summary ISDA publishes will not contain any information that could be used to attribute a particular response or position to an individual respondent.
- If the responses received are not conclusive, then ISDA retains the right to issue a follow up consultation.
- ISDA retains the right to make adjustments to the selected methodology for calculating the spread adjustment and the selected approach to the adjusted RFR based on the answers to the questions above, as well as the discretion to make other minor and technical adjustments. As described above, ISDA will publish the final approach or approaches for review and comment before implementing any amendments to the 2006 ISDA Definitions.
- ISDA does not have the obligation to verify the identity of any respondents or the substance of any responses. However, ISDA may reject responses from any respondents who submit information that ISDA reasonably believes to be false or in bad faith after consultation with its advisors.

## Glossary

**2006 ISDA Definitions:** A definitional booklet published by ISDA to provide a basic framework for the documentation of privately negotiated interest rate and currency derivative transactions. The 2006 ISDA Definitions are intended for use in confirmations of individual transactions governed by ISDA Master Agreements and are also referenced by CCPs that clear interest rate and currency derivative transactions. From time to time, ISDA publishes ‘Supplements’ to amend the 2006 ISDA Definitions on its website. The amendments made by these Supplements apply to transactions referencing the 2006 ISDA Definitions that are entered into on or after the date the relevant Supplement is published.

**Bank Bill Swap Rate (BBSW):** The Bank Bill Swap Rate administered by the Australian Securities Exchange.

**Central Counterparty (CCP):** A financial entity that stands between counterparties of a trade in order to mitigate counterparty credit risk, acting as the buyer to every seller and the seller to every buyer. A CCP nets transactions between counterparties on a multilateral basis, resulting in lower gross exposures. Counterparties are required to contribute margin and other resources on a regular basis to cover losses. Once the resources contributed by a defaulting entity are depleted, any further losses are mutualized.

**Euro Interbank Offered Rate (EURIBOR):** The Euro Interbank Offered Rate administered by the European Money Markets Institute.

**Financial Stability Board (FSB):** An international body that monitors and makes recommendations about the global financial system. The FSB was established in April 2009, as the successor to the Financial Stability Forum, with a broadened mandate to promote financial stability.

**Floating Rate Option (FRO):** The price source or ‘interest rate benchmark’ for the floating rate leg of a swap transaction. The FROs are set forth in Section 7.1 of the 2006 ISDA Definitions. Counterparties to swap transactions that reference the 2006 ISDA Definitions may specify one of the FROs in their confirmations. By doing so, the counterparties agree that the terms of that FRO will govern the amount that is payable by the floating rate payer on the applicable payment date. The fallbacks that ISDA is implementing for certain IBORs will be amendments to the FROs for the relevant IBORs.

**HKD Overnight Index Average (HONIA):** The Hong Kong Dollar Overnight Index Average administered by the Treasury Markets Association.

**Hong Kong Interbank Offered Rate (HIBOR):** The Hong Kong Interbank Offered Rate administered by the Treasury Markets Association.

**Interbank Offered Rates (IBORs):** Average rates at which certain banks could borrow in the interbank market, which range in tenors from overnight to 12 months. The rates include a spread reflecting the credit risk involved in lending money to banks. In this document, LIBOR, EURIBOR, TIBOR, BBSW and HIBOR are collectively known as the ‘IBORs’.

**International Organization of Securities Commissions (IOSCO):** An international body that brings together securities regulators and is recognized as the global standard setter for the securities sector. IOSCO was established in 1983. Its membership regulates more than 95% of the world's securities markets in more than 115 jurisdictions and includes all the major emerging markets. IOSCO develops, implements and promotes adherence to internationally recognized standards for securities regulation. It works closely with the G-20 and the FSB on the global regulatory reform agenda. IOSCO published its *Principles for Financial Benchmarks* in July 2013 and *Statement on Matters to Consider in the Use of Financial Benchmarks* in January 2018.

**ISDA Protocol:** A multilateral contractual amendment mechanism that has been used to effectuate standard amendments to ISDA documentation among adhering counterparties. The first protocol that ISDA launched was the ISDA EMU Protocol in 1998, which addressed contractual and legal certainty issues arising from the implementation of the European Monetary Union. This protocol and many others since 1998 have provided an efficient way of implementing industry standard contractual changes over a broad number of counterparties. Legally, the effect of protocols is the same as bilateral amendments among adhering parties but protocols have the benefit of eliminating the need for costly and time-consuming bilateral negotiations.

**London Interbank Offered Rate (LIBOR):** The London Interbank Offered Rate administered by the ICE Benchmark Administration.

**Market Participants Group (MPG):** As part of its work on considering reforms to major interest rate benchmarks, the FSB OSSG established the MPG to propose options for robust reference interest rates that could serve as potential alternatives to existing LIBOR, EURIBOR and TIBOR. It was also intended to propose strategies for any required transition to alternative reference rates and for dealing with legacy contracts in national or regional currencies. The MPG published its *Final Report on Reforming Interest Rate Benchmarks* in July 2014.

**Official Sector Steering Group (OSSG):** In February 2013, the G-20 nations commissioned the FSB to review and reform major interest rate benchmarks. In June 2013, the Financial Stability Board established the OSSG comprised of senior officials from central banks and regulatory agencies to focus on interest rate benchmarks. The OSSG recommended enhancing LIBOR and other IBOR

benchmarks, selecting alternative risk-free benchmarks and developing plans to transition to them, and implementing contractual fallbacks that would apply in the event of permanent discontinuation of an IBOR. The OSSG published its *Reforming Major Interest Rate Benchmarks* report in July 2014 and has since published updates in 2015, 2016 and 2017.

**Sterling Overnight Index Average (SONIA):** The Sterling Overnight Interbank Average administered by the Bank of England.

**Reserve Bank of Australia (RBA) Cash Rate:** The cash rate target set by the Reserve Bank of Australia.

**Risk-free Rates (RFRs):** Average rates of investments that are risk free or nearly risk free. Unlike the IBORs, RFRs do not account for credit risk involved in lending money to banks. In this document, SONIA, TONA, SARON, SOFR, the RBA cash rate and HONIA are collectively known as the ‘RFRs’.

**Secured Overnight Financing Rate (SOFR):** The secured overnight financing rate administered by the Federal Reserve Bank of New York.

**Swiss Average Rate Overnight (SARON):** The Swiss Average Rate Overnight administered by SIX Swiss Exchange.

**Tokyo Interbank Offered Rate (TIBOR):** The Tokyo Interbank Offered Rate administered by the JBA TIBOR Administration (JBATA).

**Tokyo Overnight Average Rate (TONA):** The Tokyo Overnight Average Rate administered by the Bank of Japan.

## Annex A

### Approaches for calculating the adjusted RFR

Let us start by defining key moments for an IBOR on a timeline. The date  $T$  will denote the start date of the IBOR accrual period. The time interval  $f$  is the length of the IBOR term, which could be overnight, 1w, 1m, 2m, 3m, 6m or 12m. The accrual end date is  $T + f$ , which is also the date on which the IBOR is naturally paid. The setting date for this IBOR is denoted by  $t$  which we will assume is two business days before the start date, that is  $t = T - 2\text{bd}$ . Note that for some currencies, such as GBP and AUD, the setting delay is 0bd rather than 2bd.

If we are working with forwards, the forward observation date (the date on which the forward is calculated) is denoted by  $s$ , where date  $s$  is on or before date  $t$  ( $s \leq t$ ).

Let us define the spot IBOR of term  $f$  which sets at time  $t = T - 2\text{bd}$  and accrues over the period from  $T$  to  $T + f$  as  $L_f(t)$ . The accrual period from  $T$  to  $T + f$  can also be written as  $[T, T + f]$ .

We also define the forward IBOR, over an IBOR term of length  $f$ , as

$$FL_f(s, t)$$

which is the observed market expectation at time  $s$  of the forward for  $L_f(t)$ .

One of the approaches for calculating the adjusted RFR will be selected as part of this consultation. This can be the spot overnight rate, convexity adjusted overnight rate, compounded in arrears rate, or compounded in advance rate.<sup>17</sup> Let us denote the adjusted RFR chosen as  $R_f(t)$ .

We also define the forward for the adjusted RFR  $R_f(t)$ , as observed at some earlier time  $s \leq t$ , as

$$FR_f(s, t).$$

There are also two important dates in the future. The first is the *calibration date*,  $t_0$ , which is the business day prior to the date on which it is announced that IBOR publication will be discontinued. The second is the *discontinuation date*,  $t_1$ , which is the first day on which the IBOR will not be published.

### Spot Overnight Rate

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<sup>17</sup> Note that the spot overnight rate is not compatible with the forward rate approach because it contains convexity.

In this style we simply use the overnight RFR which sets on date  $t$ ,  $RFR_t$ , as the adjusted RFR for the period from  $T$  to  $T + f$ , where  $T = t + 2bd$ . Calling this rate,  $SOR_f(t)$ , we have the straightforward definition:

$$SOR_f(t) = RFR_t.$$

This style is technically the wrong rate for the period  $[T, T + f]$  and would introduce convexity effects in vanilla floating payments. But it is available at the same time as the current IBOR fixings.

Since this rate has a convexity element it is not possible to calculate its forward (for payment at  $T + f$ ) from the yield curve alone because the forward will also depend on current levels of interest-rate volatility.

### Convexity-adjusted Overnight Rate

This overnight style can be modified to make a first-order correction for the convexity. This style uses the following formula:

$$COR_f(t) = RFR_t(1 + \delta_1 RFR_t)^{\delta_f / \delta_1},$$

where  $RFR_t$  is the overnight rate for  $[t, t + 1bd]$ , and  $\delta_f$  is the cash day count fraction for the period from  $t + 1bd$  to  $T + f$ , and  $\delta_1$  is the cash day count fraction for one calendar day.

This style has smaller convexity effects than the raw spot overnight rate, and it is still available at the same time as the current IBOR fixings. This rate may be inaccurate for the accrual period from  $T$  to  $T + f$  if the yield curve is strongly sloped.

The forward for this rate, as observed at time  $s \leq t$ , is (approximately):

$$FwdCOR_f(s, t) = \mathbb{E}_{T+f}(COR_f(t) | \mathcal{F}_s) = r(s, t)(1 + \delta_f r(s, t)),$$

where  $r(s, t)$  is the forward adjusted RFR.

### Compounded Setting in Arrears Rate

In this style, we observe the overnight rates over the relevant IBOR period from  $T$  to  $T + f$  and compound them daily to get the arrears setting,  $ARR_f(t)$ . It is equal to:

$$ARR_f(t) = \frac{1}{\delta_f} \left( \prod_{u=T}^{T+f-1bd} (1 + \delta_u RFR_u) - 1 \right),$$

where  $\delta_f$  is the cash day count fraction for the accrual period, and  $\delta_u$  is the cash day count fraction for the overnight accrual period from  $u$  to  $u + 1bd$ .

This is convexity-free, but it has the disadvantage that it is not available until the end of the accrual period.

Because it is only available at the end of the accrual period, it is not compatible with the spot-spread approach.

The forward for this rate, as observed at time  $s \leq t$ , is

$$FwdARR_f(s, t) = \mathbb{E}_{T+f}(ARR_f(t)|\mathcal{F}_s) = FTR_f(s, t),$$

where  $FTR_f(s, t)$  is the forward adjusted RFR.

### Compounded Setting in Advance Rate

A variant of the compounded setting in arrears approach is to use the same approach but take an earlier period which ends at  $t$ , plus a convexity adjustment. It is equal to:

$$ADR_f(t) = RA_f(t)(1 + \delta_f RA_f(t)) \text{ where } RA_f(t) := \frac{1}{\delta_A} \left( \prod_{u=T-f}^{T-1bd} (1 + \delta_u RFR_u) - 1 \right),$$

where  $\delta_f$  is the cash day count fraction for the period from  $t$  to  $T + f$ ,  $\delta_A$  is the cash day count fraction for the period from  $t - f$  to  $t$ , and  $\delta_u$  is the cash day count fraction for the overnight accrual period from  $u$  to  $u + 1bd$ .

This rate is available on the IBOR fixing date  $t$ . The raw rate  $RA_f(t)$  introduces convexity, since it is naturally for payment at date  $t$  and is being paid instead on date  $T + f$ . The form of the equation for  $ADR_f(t)$  provides a first-order correction for this convexity, although this rate may be inaccurate for the accrual period from  $T$  to  $T + f$  if the yield curve is strongly sloped.

The forward for this rate, as observed at time  $s \leq t - f$ , is (approximately):

$$FwdADR_f(s, t) = \mathbb{E}_{T+f}(ADR_f(t)|\mathcal{F}_s) = FTR_f(s, t') \left(1 + \delta_f FTR_f(s, t')\right)$$

where  $t' = t - f - 2bd$ ,

and  $FTR_f(s, t)$  is the forward adjusted RFR.

## Annex B

### Methodologies for calculating the spread adjustment

#### Forward Approach

The spread adjustment calculation under this approach would be based on observed market prices for the forward IBOR-adjusted RFR spread in the relevant tenor. A forward spread curve up to 30-60 years for each IBOR/adjusted RFR pair in each relevant tenor could be published on a daily basis up until the date the fallback is triggered.

Upon the permanent discontinuation of the relevant IBOR, the fallback would consist of the relevant adjusted RFR (as published each day going forward and adjusted in accordance with the RFR adjustment) plus a spread based on the relevant curve (which would specify the spread to be applied for every future date).

The relevant spread adjustment,  $CS_f$ , is calculated as the forward spread adjustment, observed at time  $s$ , of the difference between the IBOR and the forward adjusted RFR over the period from  $T$  to  $T + f$  indexed by the future setting date  $t = T - 2\text{bd}$ , namely

$$CS_f(s, t) = FL_f(s, t) - FR_f(s, t).$$

On the calibration date,  $t_0$ , the day before it is announced that the relevant IBOR will be permanently discontinued as of  $t_1$ , this spread curve  $CS_f(t_0, t)$  is observed for all future setting dates  $t \geq t_1$  (including for the date of permanent discontinuation,  $t_1$ , and every date following this). See below for more details.

Alternatively, the calculation may use an average/median of the spread adjustment calculated over a recent period of time, such as 10 to 20 business days ( $\delta = 10\text{bd}, \dots, 20\text{bd}$ ):

$$CS_f(t_0, t) = \frac{1}{\delta} \sum_{t_0 - \delta}^{t_0} (FL_f(s, t) - FR_f(s, t))$$

where  $\delta$  is the selected number of business days over which the spread adjustment should be calculated to obtain the relevant average spread adjustment.

In practice, for example in the USD case, we observe the USD LIBOR/SOFR basis swap curve (with quarterly coupons) on the calibration date  $t_0$ , as well as other interest rate instruments, and construct our yield curve to generate 3m USD LIBOR and SOFR discount factors. From tenor basis swaps, we can also construct discount factors for the other USD LIBOR tenor curves such as 1m USD LIBOR, 6m USD LIBOR, etc. Given all those, we can derive the values of  $CS_f(t_0, t)$  for all dates  $>t_0$  (including for the date of permanent discontinuation,  $t_1$ , and every date following this). Other currencies will use similar methodologies based around their standard cash coupon frequency. It should be noted that this will require basis swap data for all of the relevant tenors and, in some cases, markets for these swaps may not be liquid.

A curve fitting function will need to be computed to convert market instruments into discount factors. The correct procedure to derive this function (*e.g.*, linear, spline or other non-linear) would need to be developed and market participants would need transparency into the procedure. The methodology to calculate the forwards should be simple but should accurately capture the relevant intermediary rates between available forward data points.

The discontinuation date,  $t_1$ , is the first date on which the relevant IBOR ceases to be published, which may be simultaneous with the announcement or as of a later date (*e.g.*, 1 year later). After the discontinuation date, contracts referencing the relevant IBOR would instead reference the fallback rate,  $LF$ , which would be computed as:

$$LF_f(t) = R_f(t) + CS_f(t_0, t), \quad \text{for } t \geq t_1.$$

Here  $t$  is the rate-setting date for an accrual period from  $T$  to  $T + f$ . In other words, the rate at a future date is given by adding to the adjusted RFR for the same period the forward spread adjustment for the same period which was observed at the calibration date.

### Historical Mean/Median Approach

Under this approach, the spread adjustment for each existing IBOR tenor is based on the average/median spot IBOR-adjusted RFR spread calculated over a significant, static lookback period such as 5 years or 10 years. This spread adjustment would then be used from the end of the one-year transition period after the fallback takes effect. During the transition period, the spread to be used would be calculated using linear interpolation between the spot IBOR-adjusted RFR spread at the time the fallback takes effect (*i.e.*, the spot IBOR-adjusted RFR spread on the last date that the relevant IBOR is published) and the spread that would apply after the end of the transition period.

The relevant spread adjustment for IBORs of period  $f$  after the end of the transitional period,  $t_2$ , is calculated as:

$$CS_f(t_2) = \frac{1}{L} \int_{t_0-L}^{t_0} (L_f(t) - R_f(t)),$$

where the average is performed over a period of length  $L$  which runs up to the calibration date  $t_0$  and where  $L_f(t)$  is the spot IBOR rate for the accrual period beginning in two business days, and  $R_f(t)$  is the adjusted RFR selected under this consultation, with period  $f$ .

If the adjusted RFR is calculated based on the compounded in arrears rate approach, then the end date of the integral above needs to be reduced by the rate tenor  $f + 2bd$  to ensure that the rate  $R_f(t)$  is knowable by the calibration date  $t_0$ .

The relevant spread adjustment during the transitional period after the fallback takes effect from  $t_1$  to  $t_2$ , is calculated as:

$$CS_f(t) = \left( \frac{t_2 - t}{t_2 - t_1} \right) (L_f(t_0) - R_f(t_0)) + \left( \frac{t - t_1}{t_2 - t_1} \right) CS_f(t_2).$$

Here  $CS_f$  is the calculated spread adjustment for IBORs of period  $f$ ,  $t_0$  is the calibration date,  $L_f(t_0)$  is the spot IBOR at the calibration date, and  $R_f(t_0)$  is the chosen adjusted RFR at the calibration date.

The fallback rate for dates within the transitional period  $[t_1, t_2]$  will be  $LF_f(t)$  which is defined as

$$LF_f(t) = R_f(t) + CS_f(t).$$

For observation dates beyond the transitional period end date  $t_2$ , the fallback rate will be

$$LF_f(t) = R_f(t) + CS_f(t_2).$$

## Spot-Spread Approach

Another approach may be to set the IBOR-adjusted RFR spread across the entire curve equal to the spot fixing on the day preceding the relevant announcement triggering the fallback provisions. In order to minimize value transfer resulting from market stress, the average of the daily spot IBOR-adjusted RFR spread over a specified time period (*e.g.*, 5 trading days, 10 trading days, 1 month) could be used.

Note that this approach is not compatible with calculating the adjusted RFR based on the compounded setting in arrears rate approach, because that rate is not available on the calibration date  $t_0$ .

The relevant spread adjustment for IBORs of period  $f$  is calculated as:

$$CS_f(t_0) = L_f(t_0) - R_f(t_0).$$

Here  $CS_f$  is the calculated spread adjustment,  $L_f(t)$  is the spot IBOR for the accrual period from  $T$  to  $T + f$  where  $T = t + 2bd$ ,  $R_f(t)$  is one of the possible approaches for calculating the adjusted RFR set forth in this consultation, and  $t_0$  is the calibration date.

Alternatively, the calculation may use an average of the spread adjustment calculated over a recent period of time, such as 5 trading days, 10 trading days or 1 month:

$$CS_f(t_0) = \frac{1}{\delta} \int_{t_0 - \delta}^{t_0} (L_f(t) - R_f(t)) dt.$$

Here  $\delta$  is the retained number of business days over which the average of the spread adjustment should be calculated to obtain the effective spread adjustment.

For observation dates beyond the discontinuation date  $t_1$ , the fallback rate,  $LF_f(t)$ , will be:

$$LF_f(t) = R_f(t) + CS_f(t_0).$$