

# Consultation on credit adjustment spread methodologies for fallbacks in cash products referencing GBP LIBOR

The Working Group on Sterling Risk-Free Reference Rates

December 2019

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## Foreword

The overall objective of the Working Group on Sterling Risk-Free Reference Rates (the "**Working Group**") is to enable a broad-based transition to SONIA by the end of 2021 across the sterling bond, loan and derivative markets. This will reduce the financial stability risks arising from widespread reliance on GBP LIBOR.

The Bank of England and the Financial Conduct Authority ("**FCA**") are each ex-officio members of the Working Group. The views and outputs set out in this Consultation do not constitute guidance or legal advice from the Bank of England (including the Prudential Regulation Authority ("**PRA**") or the FCA and are not necessarily endorsed by the Bank of England (including the PRA) or the FCA.

This Consultation Paper is addressed to cash market participants who are considering how to approach the differences between GBP LIBOR and SONIA when considering fallbacks to their contracts. The active conversion of legacy GBP LIBOR products to reference SONIA and those pre-cessation fallbacks that are similar to active conversion (early opt-in fallback triggers), are discussed briefly but are outside the scope of this Consultation Paper and will be considered in more detail in a future publication by the Working Group.

Derivatives markets participants have since July 2018 been in the process of being consulted on fallbacks from IBORs (including GBP LIBOR) to overnight rates (including SONIA). These consultations by ISDA have included a consideration of the credit adjustment spread. However, the ISDA consultations focused on this for derivatives market fallbacks only. It is important that end users in the cash markets (including the loan and debt capital markets) also consider the issue of credit adjustment spreads in respect of fallbacks in their contracts from GBP LIBOR to SONIA; this Consultation Paper is designed to facilitate such consideration.

The release of this Consultation Paper also fulfils one of the key deliverables detailed in the roadmap published by the Working Group for 2019-2021 on 5 June 2019.<sup>1</sup> It is expected that the feedback to this Consultation will assist the market in forming a view on credit adjustment spreads in cash markets, which will ultimately assist the objective of the Working Group of a smooth transition away from GBP LIBOR to SONIA.

This Consultation Paper was considered at the meeting of the Working Group on 7 November 2019 where it was agreed to be published. The Working Group is particularly grateful to the Loan Market Sub-Group chaired by Clare Dawson of the LMA for having developed this Consultation Paper.

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<sup>1</sup> <https://www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/roadmap>.

## Section 1: Executive summary

### Background

Used globally, LIBOR is very widely referenced in derivative, floating rate note ("FRN"), loan and securitisation documentation, and in a range of consumer lending instruments, such as mortgages and student loans.

Since July 2017, there has been an increased focus in the financial markets on the need to transition away from LIBOR and to include more robust fallbacks in contracts referencing LIBOR that will mature after the end of 2021 (the end-date stated by the FCA for LIBOR benchmark publication).<sup>2</sup>

Working groups in the LIBOR currency jurisdictions have selected replacement rates for LIBOR; all have proposed alternative near risk-free rates ("RFRs").<sup>3</sup> These RFRs are not, however, economically equivalent to LIBOR. The relevant RFR rate needs to be adjusted to account for: (i) the fact that the RFR is an overnight rate and not a term rate;<sup>4</sup> and (ii) the various premia included within LIBOR (i.e. a term liquidity premium and a bank credit risk element). In most cases, the RFRs are therefore expected to be lower than their LIBOR equivalent and consequently a credit adjustment spread may be required to minimise the economic impact of moving to these RFRs.

### Purpose of this Consultation Paper

In the derivatives market, the International Swaps and Derivatives Association ("ISDA") has conducted a series of consultations on adjustments required to RFRs to account for the differences with LIBOR in respect of fallbacks applying on the cessation of LIBOR. In particular, a consultation in July 2018 covered GBP LIBOR (amongst certain other IBORs)<sup>5</sup> (the "ISDA July 2018 Consultation") and a follow-up consultation in September 2019<sup>6</sup> sought input on (amongst other areas) the final parameters of the spread and term adjustment methodology (the "ISDA Final Parameters Consultation"). Further information on the ISDA consultations is set out in Appendix 2 (*Summary of the ISDA consultations on IBOR fallbacks*) to this Consultation Paper. There was clear feedback received in response to those consultations in respect of the methodologies for the required adjustments, including a methodology to calculate a credit adjustment spread. **A significant majority of respondents to the ISDA Final Parameters Consultation felt that the most appropriate methodology for calculating a credit adjustment spread for fallbacks on cessation of LIBOR would be a historical median over a five-year lookback period.**<sup>7</sup> This credit adjustment spread methodology will be applicable to all tenors of GBP LIBOR. The actual credit adjustment spread, however, would differ across the different tenors.<sup>8</sup>

Whilst the ISDA consultations were open to all market participants (i.e. not only derivatives market participants), their coverage understandably did not include fallbacks for non-derivative products. **The focus of this Consultation Paper is to assist cash market participants that would need to consider the appropriateness of methodologies for credit adjustment spreads in the cash markets, in terms of:**

- (i) **fallbacks that operate on the cessation of LIBOR; and**
- (ii) **fallbacks that operate before the cessation of LIBOR and trigger as a consequence of a regulatory announcement of non-representativeness of LIBOR.**

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<sup>2</sup> See Appendix 1 (*Background to LIBOR reform and alternative rates*) for further details on the background to LIBOR reform.

<sup>3</sup> See Figure 2 in Appendix 1 (*Background to LIBOR reform and alternative rates*) for further detail of the RFRs chosen.

<sup>4</sup> See Appendix 3 (*Term rates*) for more information on how term rates can be created from RFRs.

<sup>5</sup> [Consultation on Certain Aspects of Fallbacks for Derivatives Referencing GBP LIBOR, CHF LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR and BBSW](#), ISDA, 12 July 2018.

<sup>6</sup> [Consultation on Final Parameters for the Spread and Term Adjustments in Derivatives Fallbacks for Key IBORs](#), ISDA, 18 September 2019.

<sup>7</sup> [Summary of Responses to the ISDA Consultation on Final Parameters for the Spread and Term Adjustments](#), The Brattle Group, 15 November 2019.

<sup>8</sup> For example, the actual credit adjustment spread applicable for 1-month GBP LIBOR would be different to that applicable for 3-month GBP LIBOR. See further Appendix 5 (*Example calculations and illustrative graphs*).

This Consultation Paper recognises the importance of the identification of a market accepted methodology in a transparent manner and of raising awareness of the need for such adjustments.

When dealing with (i) and (ii), cash market participants should be mindful of the ISDA consultations as there are several benefits for deciding that the credit adjustment spread methodology identified for the derivatives market is also appropriate for the cash markets.

Where derivatives are used to hedge interest rate risk in cash products, having consistency with the credit adjustment spread methodology identified by ISDA will support the alignment of fallbacks so that these products operate in a more robust fashion upon LIBOR cessation and minimise basis risk between them. Such alignment may also reduce operational, legal, tax, accounting and similar issues between loan products and any related securitisations and associated hedges. Cash products that are currently unhedged would secure similar benefits from having consistency with the methodology in the derivatives market were they to be hedged in future.

Whilst the result of a credit adjustment spread methodology could be applied to either backward-looking compounded in arrears rates or to forward-looking term rates (see further Appendix 3 (*Term rates*) of this Consultation Paper), there may be other differences to take into account between the fallback rate in cash products and in the derivatives market. Cash market participants need to consider all of these points carefully.

***This Consultation Paper therefore seeks feedback on the appropriate methodologies for credit adjustment spreads in the cash markets.*** The methodologies are described further in Section 5 (*Description of credit adjustment spread methodologies*).

***This Consultation will remain open until Friday 6<sup>th</sup> February 2020.***

***The Working Group strongly encourages market participants to respond to this Consultation.*** It hopes to receive feedback from as broad a range of market participants as possible, including from different sectors and product categories.

#### *Application of results of this Consultation Paper*

The results of this Consultation will not be binding on cash market participants. However, it is expected that the feedback to this Consultation will assist the market in developing conventions and reaching market acceptance on appropriate credit adjustment spread methodologies for cash products. In particular, reaching a market consensus on suitable credit adjustment spread methodologies for cash products would:

- assist the process of negotiating an appropriate credit adjustment spread methodology;
- facilitate the inclusion of stronger fallback clauses in cash products which continue to reference LIBOR; and
- assist the application of existing fallbacks which reference credit adjustment spreads. For example, many FRNs issued since July 2017 include enhanced fallback provisions, many of which refer to the application of a credit adjustment spread. Similarly, in the syndicated loan market, the LMA's recommended form of revised replacement of screen rate language (first published in May 2018) refers to a method for calculating a credit adjustment spread.<sup>9</sup>

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<sup>9</sup> [LMA Recommended Revised Form of Replacement Screen Rate Clause and Users Guide](#), LMA, 18 October 2018.

## Section 2: Scope of this Consultation

### *Products in scope*

This Consultation focuses on cash products, including (but not limited to) syndicated loans, FRNs, retail loans, bilateral corporate loans and securitisations.

### *Term rate adjustment out of scope*

Unlike the ISDA July 2018 Consultation, this Consultation Paper does not focus on a term adjustment to the RFR. This is because the ISDA July 2018 Consultation specifies the fallback in the derivatives market for GBP LIBOR to be SONIA. As a result, to account for the move from a term rate (GBP LIBOR) to an overnight rate (SONIA), the fallbacks ISDA implements will apply an adjustment to SONIA so that it is comparable to GBP LIBOR. The compounded setting in arrears rate was selected by the majority of respondents to that consultation for this purpose (see further Appendix 2 (*Summary of the ISDA consultations on IBOR fallbacks*) to this Consultation Paper).

This Consultation Paper assumes that cash market participants will instead reference term versions of the overnight RFRs directly (i.e. either a backward-looking or forward-looking term rate, together referred to as "**RFR-derived rates**").<sup>10</sup> As a result, it is assumed that an adjustment to reflect a term structure would not be needed for cash products as this will already be built into the RFR-derived rate being referenced in the relevant cash product. This Consultation Paper therefore focuses on the credit adjustment spread only.

### *LIBOR currencies in scope*

This Consultation focuses only on GBP LIBOR and credit adjustment spreads to be applied to a SONIA-derived rate.<sup>11</sup> Other currency working groups are also separately considering the issue of a credit adjustment spread to their respective RFRs and separate announcements are expected on this issue from those currency working groups in due course.

### *Fallbacks in scope*

This Consultation considers the credit adjustment spread methodology to be used in respect of fallbacks from LIBOR to a SONIA-derived rate where the relevant spread is determined at the 'fallback trigger date' (e.g. the announcement of the cessation of GBP LIBOR) and applied at the 'fallback activation date' (e.g. the actual cessation date of GBP LIBOR).

Fallbacks in cash products may apply on the cessation of LIBOR only. In addition, some cash products may also contain fallback triggers which operate prior to the cessation of LIBOR. There are two different types of pre-cessation fallbacks in the cash markets (see further Appendix 4 (*Pre-cessation fallback triggers*) of this Consultation Paper).

The first type operates before the cessation of LIBOR and triggers as a consequence of a regulatory announcement of non-representativeness. This pre-cessation fallback is within the scope of this Consultation. The second type can trigger before any such regulatory announcement of non-representativeness ("**early opt-in fallback trigger**") and is not within the scope of this Consultation (given its similarity to active conversion, discussed further below); these will be considered in more detail in a future publication by the Working Group.

### *Active conversion out of scope*

This Consultation does not consider the credit adjustment spread methodology to be used by market participants who wish to actively convert LIBOR-linked cash products to a SONIA-derived rate at an

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<sup>10</sup> For further information on such term versions see Appendix 3 (*Term rates*) of this Consultation Paper.

<sup>11</sup> Being either a backward-looking or forward-looking term rate based on SONIA. See further Appendix 3 (*Term rates*) of this Consultation Paper.

earlier stage than a fallback activation date. The active conversion of legacy GBP LIBOR products to reference SONIA will be considered in more detail in a future publication by the Working Group.

*New cash products directly referencing SONIA not included*

This Consultation Paper is not intended to apply to cash products which directly reference SONIA (e.g. FRNs and securitisations that have been issued referencing SONIA or new loans based on SONIA). In this case, market participants will need to consider how best to structure their transactions using SONIA given the differences between SONIA and GBP LIBOR.

## Section 3: Consultation process

### *Responses*

Responses to this Consultation should be sent to the RFR Secretariat ([RFR.Secretariat@bankofengland.gsi.gov.uk](mailto:RFR.Secretariat@bankofengland.gsi.gov.uk)) by **Friday 6<sup>th</sup> February 2020**.

Information provided in response to this Consultation, including personal information, may be subject to publication or release to other parties or disclosure in accordance with access to information regimes including under the Freedom of Information Act 2000 or data protection legislation, or as otherwise required by law or in discharge of statutory functions. Respondents should indicate if they regard all, or some of, the information provided in response to this Consultation as confidential. If a request for disclosure of this information is received, respondents' indications will be taken into account, but no assurance can be given that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by a respondent's IT system on emails will not, of itself, be treated as constituting notice that such respondent regards any information supplied as confidential.

By responding to this Consultation, respondents provide personal data to the Bank of England or FCA as the RFR Secretariat. This may include a respondent's name, contact details (including, if provided, details of the organisations respondents work for), and opinions or details offered in the response itself. For details on how the Bank of England or FCA deal with personal data, rights of respondents in this connection or to get in touch, please visit <https://www.bankofengland.co.uk/legal/privacy> or <http://www.fca.org.uk/privacy>, respectively.

### *Process for publishing results*

The Working Group will discuss all feedback and publish an aggregated and anonymised summary of responses received. The summary published 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, the Working Group retains the right to issue a follow-up consultation.

In respect of the calculation of any credit adjustment spread, an independent third-party vendor would need to obtain the data necessary to perform the relevant calculations and publish the credit adjustment spread on a screen so that market participants can access the information in a transparent manner. In relation to the derivatives market, ISDA has selected Bloomberg Index Services Limited (BISL) as the vendor that will publish the credit adjustment spread selected following the ISDA consultations.

### *Competition notice*

By participating in this Consultation, you agree to act in full compliance with applicable competition law requirements. The Working Group has taken and will continue to take appropriate safeguards to ensure that the conduct of this Consultation complies with applicable competition laws.



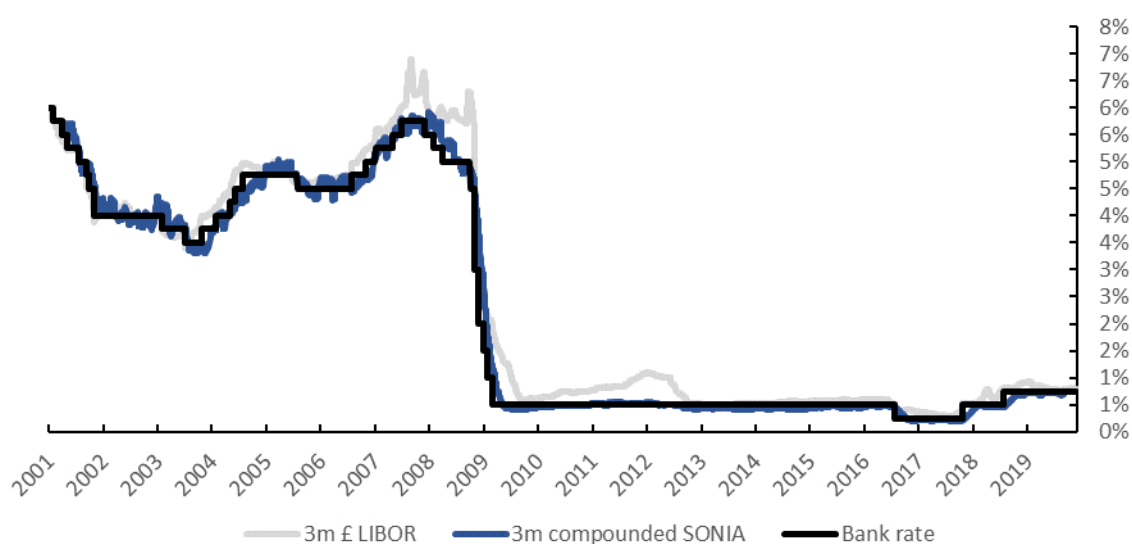
## Section 4: Background on the need for a credit adjustment spread and the relevance of the ISDA consultations

### *The need for a credit adjustment spread*

An important issue in referencing RFRs is how to account for the economic difference between LIBOR and the RFRs (which are overnight and without a term structure or credit component). The RFRs are risk-free or nearly risk-free and may be secured or unsecured. In contrast, LIBOR is forward-looking and is an unsecured term rate quoted for different tenors. LIBOR also includes a bank credit risk component and reflects a variety of other factors (e.g. liquidity, fluctuations in supply and demand) which are not reflected in the RFRs and consequently LIBOR rates show more volatility in times of market stress.

This differential is illustrated by Figure 1 below, using SONIA (the chosen RFR in the sterling market) as an example. It shows the economic difference between 3-month GBP LIBOR and SONIA taken over the same 3-month period.

Figure 1: Bank Rate, 3-month GBP LIBOR, 3-month compounded SONIA time series (source: Bank of England website, Bloomberg, Bank



Source: Bank of England website, Bank of England calculations, and Bloomberg Finance L.P.

Similar economic differences have been seen across the other LIBOR currencies and their chosen RFRs.

Therefore adjustments will be needed to transactions when either:

- including fallbacks to RFRs in contracts which reference LIBOR; or
- transitioning to RFRs from LIBOR.

**As noted in Section 2 (Scope of this Consultation), this Consultation Paper focuses only on GBP LIBOR and on fallbacks from GBP LIBOR to a SONIA-derived rate. It does not cover other LIBOR currencies.**

### *ISDA consultations on IBOR fallbacks and their relevance to cash markets*

The issue of credit adjustment spreads has already been considered in the context of the derivatives market. The ISDA July 2018 Consultation closed on 22 October 2018 and the ISDA Final Parameters Consultation closed on 23 October 2019. Further information and background on the consultations can be found in Appendix 2 (*Summary of the ISDA consultations on IBOR fallbacks*) of this Consultation Paper.

Based on the feedback received, ISDA is developing fallbacks from certain IBORs (including GBP LIBOR) on cessation of those IBORs to the relevant overnight RFRs based on:

- a compounded setting in arrears rate for the term adjustment (see further Appendix 3 (*Term rates*)); and
- the historical median approach over a five-year lookback period for the credit adjustment spread (see further Section 5 (*Description of credit adjustment spread methodologies*)).

Whilst both the ISDA July 2018 Consultation and the ISDA Final Parameters Consultation were open to all market participants (i.e. not only derivatives market participants), their coverage understandably did not include fallbacks for non-derivative products.

However, the issues covered in the ISDA consultations in respect of how to account for the differences between the relevant IBORs and the selected RFRs on cessation of the relevant IBORs are similar to the issues that arise in the cash markets in the context of fallbacks from GBP LIBOR to SONIA.

## Section 5: Description of credit adjustment spread methodologies

As well as outlining the ISDA preferred option of using the historical median approach for fallbacks on cessation of LIBOR, this Section outlines three other potential options for the calculation of credit adjustment spreads. Two of these were considered in the ISDA July 2018 Consultation, namely the ISDA forward approach and the ISDA spot-spread approach.<sup>12</sup> The third alternative option to the ISDA preferred option of the historical median approach is a variation of the ISDA forward approach.

The descriptions of the credit adjustment spread methodologies that follow outline potential considerations for each approach. These are provided for information only. They are not intended to be comprehensive and the Working Group makes no representation as to their accuracy or applicability to the particular circumstances of an individual market participant. Readers are strongly encouraged to formulate their own views regarding the potential considerations applicable to each approach, taking into account their particular circumstances, and to consult with their own professional advisers in doing so. ***In particular, readers should consider the scope of this Consultation (as outlined in Section 2 (Scope of this Consultation), the assumptions made in Section 6 (Assumptions when determining the selection of a credit adjustment spread methodology), as well as the questions outlined in Section 7 (Questions for consultation), when considering these options.***

In each of the alternatives outlined below, the credit adjustment spread, once calculated for a particular tenor, would be a set figure applicable for the remainder of the life of the transaction, i.e. the methodologies would produce spreads that are determined at the time of the fallback trigger date to apply for all future dates for that tenor from the fallback activation date. ***The credit adjustment spread figure will not be dynamic or reflect any changes in the interbank market once the fallback applies.***

It should be noted that the Working Group was unable to identify a methodology for a dynamic credit adjustment spread which would be sufficiently robust (one reason being insufficiency of relevant data). Similarly, ISDA has noted that although it considered ways to calculate a dynamic credit adjustment spread, market participants and regulators expressed concerns regarding the long-term viability of such an approach.<sup>13</sup>

### Option 1 – ISDA historical median approach

#### *Description*

The credit adjustment spread will be based on the difference between GBP LIBOR and the SONIA-derived rate that is calculated using a median over a five-year lookback period prior to the fallback activation date.

This approach therefore looks into the past, i.e. historical differences between GBP LIBOR and the SONIA-derived rate over a given period of time. The historical median approach derives a single value for the credit adjustment spread. The credit adjustment spread would be calculated and published for each GBP LIBOR tenor based on historical differences between the GBP LIBOR for that tenor and the SONIA compounded rate over the relevant tenor (so the credit spread will differ across different tenors).

#### *Availability of SONIA-derived rates*

The historical median approach requires historical spot GBP LIBOR fixings for each relevant tenor and historical spot SONIA-derived rate fixings, in each case over the relevant lookback period. It should be noted that whilst forward-looking term rates are not yet available, it is possible to use historical backward-looking term rates in this analysis (see further Appendix 3 (*Term rates*) of this Consultation Paper). In this respect, SONIA has been published since March 1997 (originally by the Wholesale Brokers' Markets Association until the Bank of England became administrator on 25 April 2016). References to 'SONIA-derived rate' in respect of the historical median approach should therefore be

<sup>12</sup> Reference to spot-spread is the difference between the spot price (i.e. the current market price of, for instance, the relevant LIBOR) and whatever metric is being compared against spot, e.g. a new RFR-derived rate.

<sup>13</sup> [IBOR Fallbacks for 2006 ISDA Definitions – FAQs](#), ISDA.

read as referring to the backward-looking compounded in arrears SONIA rate (and not a forward-looking term rate).

### *Potential considerations*

Some potential considerations in respect of the historical median approach are set out below:

- This was the preferred approach selected by the majority of respondents to the ISDA Final Parameters Consultation. Its adoption for fallbacks on cessation of GBP LIBOR in the cash markets would therefore provide consistency with derivatives for hedging purposes, should hedging be a relevant consideration, and reduce basis risk.<sup>14</sup>
- This approach is more appropriate for measurement of a value at a single point in time based on historical average. It would not represent present value on a forward-looking basis if applied at any time between today and the activation of GBP LIBOR fallbacks. The decision by the derivatives market to adopt this approach should mean the forwards will themselves reflect the historic average on the activation date of an ISDA fallback trigger. It might therefore be appropriate for fallbacks triggered on cessation of GBP LIBOR or fallbacks triggered as a consequence of a regulatory announcement of non-representativeness.
- It captures the tendency of the SONIA/GBP LIBOR basis to fluctuate around a long-term mean.
- It is less susceptible to market distortions and potential manipulation at the fallback trigger date because a long lookback period is used as the data set rather than a single observation at the fallback trigger date.
- It is based on readily available information and is therefore transparent. As historical GBP LIBOR and SONIA rates are accessible to the market, this spread is one which parties could anticipate.
- If a definite point of transition is announced and agreed in advance, a convergence of forward and historical curves should occur to minimise value transfers when the fallback activation date actually occurs.
- Robustness and simplicity.
- It requires long histories of GBP LIBOR fixings and SONIA-derived rate fixings. The relevant data may not be available for all fixings, particularly for long lookback periods and thus may create inconsistency across currencies given that €STR and SOFR are both relatively new rates.
- Prevailing market-implied spreads before the fallback activation date may differ after activation. There may be some value transfer under this option.

### Option 2 – ISDA forward approach

#### *Description*

The credit adjustment spread could be calculated based on observed market prices for the forward spread between GBP LIBOR and the SONIA-derived rate in the relevant tenor. This would be calculated at the fallback trigger date. A forward spread curve up to 30 – 60 years for the SONIA-derived rate in each relevant tenor would need to be published on a daily basis until the cessation of GBP LIBOR.

The fallback rate would consist of the SONIA-derived rate (assuming this is 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 fallback trigger date). For future dates beyond the length of the curve, the spread would remain static at the spread for the last date on the curve.

### *Potential considerations*

Some potential considerations in respect of the ISDA forward approach are set out below:

- This was not the preferred approach of respondents to the ISDA July 2018 Consultation. If adopted for fallbacks on cessation of GBP LIBOR in the cash markets, this would create a mismatch with

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<sup>14</sup> Basis risk is the risk that the value of a hedge will not move in line with that of the underlying cash product exposure.

derivatives products for hedging purposes, should hedging be a relevant consideration, and increase basis risk.

- Originally, it was thought that the ISDA forward approach may be more effective in preventing significant value transfers near the fallback trigger date because spread adjustments match the expected market pricing as of the day before the fallback trigger date (or the average expected market pricing over the specified number of days before the fallback trigger date). However, the decision by the derivatives market to adopt the historical median approach should now mean the forwards will themselves reflect the historic average on the trigger date of an ISDA fallback trigger (i.e. cessation and pre-cessation fallback triggers as a consequence of a regulatory announcement of non-representativeness).
- It might be the more appropriate approach in the context of active conversions to SONIA (which is beyond the scope of this Consultation) or for early opt-in fallback triggers (which are in many respects similar to active conversions and also beyond the scope of this Consultation). A similar approach has been seen in the SONIA market already, which has an existing derivatives market (compared to other RFRs).<sup>15</sup>
- It requires functioning markets and extensive market data, which may not be readily available. In particular, this approach requires forward GBP LIBOR curves and forward SONIA-derived rate curves for each tenor, extending out through the time horizon over which the fallback rates will be quoted. 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.
- If a forward curve were only to be produced for the cash markets, there may not be enough active borrowers in order to meet the market liquidity requirements in order to build a curve.
- This approach may not produce a result that is close to spot spreads that have been observed in the market.
- Prevailing market-implied spreads before the fallback activation date may differ after activation. There may be some value transfer under this option.
- Given the reliance of this approach on market conditions at the time of activation, it may be vulnerable to manipulations and distortions in the market. For example, spreads could be exposed to extreme moves (whether due to manipulation or otherwise) in the run up to a potential trigger event, locking in spreads at temporarily high levels.
- There are significant operational challenges related to data and process requirements for this approach. This approach requires an agreed choice of model and a third-party vendor / benchmark administrator to calibrate the agreed model each day.

### Option 3 – ISDA spot-spread approach

#### *Description*

The credit adjustment spread could be based on the spot-spread between GBP LIBOR and the SONIA-derived rate on the day preceding the fallback trigger date. A variation would be to use the average of the daily spot-spread between GBP LIBOR and the SONIA-derived rate over a specified number of days prior to the fallback trigger date (e.g. 5 trading days, 10 trading days or 1 month).

This approach is similar to the historical median approach and derives a single value for the credit adjustment spread, but references a very short period. The credit adjustment spread would be calculated and published for each relevant GBP LIBOR tenor.

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<sup>15</sup> The ABP consent solicitation in May 2019 to implement a change in interest basis for its £65 million FRNs due 2022 from GBP LIBOR to SONIA used an adjustment spread based on the forward market. See page 8 of the consent solicitation memorandum for further details of the approach used: [https://www.abports.co.uk/media/sz4lxqz/final\\_abp\\_sonia\\_consent-solicitation-memorandum\\_may-2019.pdf](https://www.abports.co.uk/media/sz4lxqz/final_abp_sonia_consent-solicitation-memorandum_may-2019.pdf). Similarly, the GBP LIBOR to SONIA loan amendment for South West Water in October 2019 used an adjustment spread based on the forward market.

### *Potential considerations*

Some potential considerations in respect of the spot-spread approach are set out below:

- Respondents to the ISDA July 2018 Consultation felt this method was incompatible with the compounded setting in arrears approach. Therefore it could only be applicable for forward-looking term rates. As a result, it could only be a viable approach if a SONIA forward-looking term rate is being produced at the fallback trigger date.
- This approach was not favoured by many respondents to the ISDA July 2018 Consultation and was opposed by a large number of respondents (primarily because it does not safeguard against unusual market conditions being captured at the time of trigger and the sensitivity of this approach to elevated volatility).
- It is unlikely to be present-value neutral on the fallback trigger date because it only reflects spreads under market conditions at the time of trigger, 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 trigger date occurs during market turmoil or when spot spreads are out of line with forward spreads.
- There is a level of uncertainty in relying on a single day's rate.
- Given the reliance of this approach on market conditions at the time of activation, it may be vulnerable to manipulations and distortions in the market. For example, spreads could be exposed to extreme moves (whether due to manipulation or otherwise) in the run up to a potential trigger event, locking in spreads at temporarily high levels
- This approach is simple and easy to understand. It also requires only spot GBP LIBOR fixings for each relevant tenor and spot SONIA-derived rate fixings at the time of trigger.

### Option 4 – Modified forward approach

#### *Description*

This is similar to the ISDA forward approach (option 2 above), and provides for the credit adjustment spread to be based on observed market levels for the forward GBP LIBOR / SONIA-derived rate spread in the relevant GBP LIBOR tenor. However, unlike the ISDA forward approach, this methodology restricts the number of spread values to five data points after the fallback trigger date (as opposed to each day into the future) and data would be collected over a long observation period (1 year is proposed) and averaged to calculate the spreads as a means to address some of the concerns raised with the ISDA forward approach.

#### *Potential considerations*

The potential considerations for this approach are largely similar to those for the ISDA forward approach. In addition:

- The modified forward approach is simpler than the ISDA forward approach and easier to understand.
- The number of data points could be increased, with the trade-off between accuracy and data quality/complexity.
- There are operational challenges to creating a robust mechanism for the data capture and process requirements in respect of the observed market levels for the forward GBP LIBOR / SONIA-derived rate spread.

## Section 6: Assumptions when determining the selection of a credit adjustment spread methodology

### *Criteria for selection*

The credit adjustment spread methodologies detailed in Section 5 (*Description of credit adjustment spread methodologies*) were identified based on the following criteria:

- eliminating or minimising value transfer at the time the fallback is applied;
- eliminating or minimising any potential for manipulation;
- transparency of calculation; and
- eliminating or mitigating against the impact of market disruption at the time the fallback is applied.

It should be noted that the purpose of this Consultation and the credit adjustment spread is not to provide a complete economic replacement for LIBOR. However, the methodologies are intended to provide a helpful proxy as well as clarity and certainty to market participants in this transition phase.

### *Application of spread to different tenors*

Where a credit adjustment spread methodology is selected, it is assumed that the same methodology would apply to all tenors of GBP LIBOR. The actual credit adjustment spread figure, however, would differ across the different tenors. This is illustrated further by the graphs in Appendix 5 (*Example calculations and illustrative graphs*).

### *Activation dates*

The credit adjustment spreads in the ISDA July 2018 Consultation in respect of GBP LIBOR referencing derivatives are determined at the fallback trigger date and applied at the fallback activation date following a cessation of GBP LIBOR. It should be noted that triggers for fallbacks in cash markets may differ from fallback triggers in ISDA documentation (in particular, they may contain pre-cessation fallback triggers).

The credit adjustment spread figure that would apply for a fallback triggered by GBP LIBOR cessation would differ from the credit adjustment spread figure applied for a fallback triggered by a pre-cessation event (since the credit adjustment spread would be fixed at a different time in each case and by reference to the relevant data available at that time).

This Consultation Paper assumes that the relevant credit adjustment spreads will be published and available at the time the fallback trigger date occurs, whenever that may be.

### *Continuing publication of GBP LIBOR*

If GBP LIBOR continues to be produced after cash market participants convert to SONIA-derived rates plus a credit adjustment spread, market participants would be able to determine whether they are receiving / paying more or less on the basis of the SONIA-derived rate plus the credit adjustment spread by comparison with the GBP LIBOR that continues to be published.

## Section 7: Questions for consultation

1. Please indicate whether the ISDA historical median approach is your preferred credit adjustment spread methodology for cash products in respect of:
  - (a) fallbacks which apply on cessation of GBP LIBOR; and
  - (b) pre-cessation fallbacks for GBP LIBOR that trigger as a consequence of a regulatory announcement of non-representativeness.

If not, please rank the approaches in Section 5 (*Description of credit adjustment spread methodologies*) in order of preference (with 1 as your preferred approach).

2. Are there any other methodologies for calculation of a credit adjustment spread which should be considered in the cash markets? If so, please indicate which of the situations outlined in (a) and (b) in Question 1 above this methodology would be most applicable to.
3. Please comment on the characteristics of the proposed methodologies that most influenced your decision (including whether alignment with related hedging formed a part of your decision-making process).
4. Please indicate whether your comments apply to all cash products, or whether there are different considerations for different cash products.
5. In respect of fallbacks, would it be problematic to have different credit adjustment spreads apply based on when fallbacks take effect (i.e. prior to cessation or upon cessation of GBP LIBOR)?
6. In respect of fallbacks, should the credit adjustment spread following a pre-cessation fallback trigger subsequently change should GBP LIBOR be discontinued to the credit adjustment spread calculated following the permanent cessation of GBP LIBOR? Alternatively should it remain at the credit adjustment spread for the pre-cessation event?
7. Please comment on anticipated operational challenges and elaborate on how long you feel it would take to overcome such challenges.
8. Would it be problematic for market participants to use different approaches to calculate credit adjustment spreads in fallbacks or for transitioning legacy documentation across different currencies? Please explain why or why not, commenting specifically on the potential implications of using different approaches across different currencies.



## Appendix 1: Background to LIBOR reform and alternative rates

### Background to LIBOR reform

Regulatory reform in relation to benchmarks has been ongoing for many years. Following the Wheatley Review of LIBOR in 2012 and the Financial Stability Board ("**FSB**") report on "*Reforming Major Interest Rate Benchmarks*" in 2014, ICE Benchmark Administration Limited ("**IBA**"), the benchmark administrator for LIBOR, has been working on strengthening the existing LIBOR benchmark. Work has also been ongoing in the various LIBOR currency jurisdictions on the development of alternative rates. It should be noted that such work is also taking place in respect of other currency jurisdictions.

In July 2017, Andrew Bailey, Chief Executive of the FCA, gave a speech to the market about the future of LIBOR. The speech made it clear that market participants should not rely on LIBOR being available after 2021.

LIBOR is currently published for five currencies: Sterling ("**GBP**"), U.S. Dollars ("**USD**"), Euros, Swiss Francs ("**CHF**") and Japanese Yen ("**JPY**") and in seven different tenors: overnight/spot next; 1 week; 1 month; 2 months; 3 months, 6 months; and 12 months.

### Alternatives and fallbacks to LIBOR

Each of the currency working groups in the LIBOR currency jurisdictions has now selected RFRs, see Figure 2 below. These RFRs are primarily based on transactions and are stated to be risk-free (or at least near risk-free) as they do not contain term bank credit risk or a liquidity premium.

Figure 2: RFRs identified by the currency working groups

Currency	Proposed Risk-Free Rate	Secured / Unsecured	Administrator	Working Group
Sterling	SONIA (Sterling Overnight Index Average)	Unsecured	Bank of England	Bank of England Working Group on Sterling Risk-Free Reference Rates
Euro	€STR (Euro Short-Term Rate)	Unsecured	European Central Bank	Working Group on Euro Risk-Free Rates
Swiss Franc	SARON (Swiss Averaged Rate Overnight)	Secured	SIX Swiss Exchange	Swiss National Working Group
U.S. Dollar	SOFR (Secured Overnight Financing Rate)	Secured	Federal Reserve Bank of New York	Alternative Reference Rates Committee
Japanese Yen	TONA (Tokyo Overnight Average Rate)	Unsecured	Bank of Japan	Cross-Industry Committee on Japanese Yen Interest Rate Benchmarks

It should be noted that, in respect of LIBOR, the FCA and relevant regulators in the UK, Switzerland and the U.S. have stated that there is a need to transition away from LIBOR to RFRs before the end of 2021 (as after this point the FCA will no longer compel panel banks to make submissions to LIBOR). In respect of EURIBOR, the focus of the European regulators has been on reforming EURIBOR, rather than on a move away from it, whilst at the same time working on more robust fallbacks to EURIBOR based on RFRs in the event EURIBOR is not available.

## Appendix 2: Summary of the ISDA consultations on IBOR fallbacks

Following a request from the FSB Official Sector Steering Group ("**OSSG**"), ISDA is in the process of amending its standard documentation to implement fallbacks for certain key IBORs in derivatives contracts. The fallback rates will be the selected overnight RFRs (see Figure 2 in Appendix 1 (*Background to LIBOR reform and alternative rates*)).

The ISDA July 2018 Consultation closed on 22 October 2018 and sought input on the approach for addressing certain technical issues associated with term and spread adjustments that will apply to the RFRs if the fallbacks are triggered. This covered the following IBORs: GBP LIBOR; CHF LIBOR; JPY LIBOR; TIBOR (Tokyo Interbank Offered Rate); Euroyen TIBOR; and BBSW (Bank Bill Swap Rate). The purpose of the adjustments is to ensure that legacy derivatives contracts referencing an IBOR continue to function as closely as possible to what was intended in economic terms after a fallback takes effect.

The ISDA July 2018 Consultation focused on two aspects of the transition from an IBOR to an RFR: (i) an adjustment to the RFR to account for the move from a term rate (i.e. the IBOR) to an overnight rate (i.e. the selected RFR) so that it is more comparable to the relevant IBOR; and (ii) a credit adjustment spread.

In respect of the adjustment to the RFR for the term element, the ISDA July 2018 Consultation proposed four options: (i) the spot overnight rate; (ii) the convexity adjusted overnight rate; (iii) the compounded setting in arrears rate; and (iv) the compounded setting in advance rate.

The three options for calculating the credit adjustment spread were: (i) the historical mean/median approach; (ii) the forward approach; and (iii) the spot-spread approach. These approaches are explained in more detail in Section 5 (*Description of credit adjustment spread methodologies*) of this Consultation Paper.

In December 2018, ISDA published the results of its consultation.<sup>16</sup> Based on these responses, the preferred methodologies were: (i) the compounded setting in arrears rate for the term adjustment; and (ii) the historical mean/median approach for the credit adjustment spread. The majority of respondents to the ISDA July 2018 Consultation preferred to use the same methodologies across all benchmarks covered by the consultation (and potentially other benchmarks).

ISDA launched a further consultation on 16 May 2019 covering USD LIBOR, CDOR (the Canadian Dollar Offered Rate) and HIBOR (Hong Kong Interbank Offered Rate) and certain aspects of fallbacks for derivatives referencing SOR (Singapore Dollar Swap Offer Rate) (the "**ISDA May 2019 Supplemental Consultation**").<sup>17</sup> This consultation asked similar questions as the July 2018 ISDA Consultation but for USD LIBOR, CDOR, HIBOR and SOR. It also asked respondents to comment on some of the outstanding questions from the ISDA July 2018 Consultation (for example, the appropriate length of any lookback period and whether the calculation should be based on a mean or median). ISDA announced the preliminary results of this consultation on 30 July 2019.<sup>18</sup> Consistent with the responses to the ISDA July 2018 Consultation, the overwhelming majority of respondents preferred: (i) the compounded setting in arrears rate for the term adjustment; and (ii) the historical mean/median approach for the credit adjustment spread. There was a strong desire to use the same methodologies across all benchmarks covered by the consultation (and potentially other benchmarks).

The ISDA Final Parameters Consultation<sup>19</sup> was issued on 18 September 2019 as a follow-up to the ISDA July 2018 Consultation and sought input from market participants on the final parameters of the credit adjustment spread and term adjustment methodology, proposing the choices of either a median

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<sup>16</sup> The results of the July 2018 ISDA Consultation are available here: <http://assets.isda.org/media/04d213b6/db0b0fd7-pdf/>.

<sup>17</sup> *Supplemental Consultation on Spread and Term Adjustments for Fallbacks in Derivatives Referencing USD LIBOR, CDOR and HIBOR and Certain Aspects of Fallbacks for Derivatives Referencing SOR*, ISDA, 16 May 2019.

<sup>18</sup> The press release announcing the preliminary results can be found here: <https://www.isda.org/2019/07/30/isda-publishes-preliminary-results-of-supplemental-benchmark-fallbacks-consultation/>.

<sup>19</sup> *Consultation on Final Parameters for the Spread and Term Adjustments in Derivatives Fallbacks for Key IBORs*, ISDA, 18 September 2019.

over a five-year lookback period or trimmed mean over a ten-year lookback period. The consultation also sought input on whether a lag or lockout mechanism should be introduced for end users unable to process same day payments, and whether a transitional period for the historical mean/median approach is appropriate. The ISDA Final Parameters Consultation closed on 23 October 2019 and the results were published on 15 November 2019. The majority of respondents preferred: (i) the historical median over a five-year lookback period for the credit adjustment spread; (ii) not to include a transitional period in the credit adjustment spread calculation, not to exclude outliers, and not to exclude any negative spreads; and (iii) for the compounded setting in arrears rate, a two-banking-day backward shift adjustment for operational and payment purposes.

ISDA launched a consultation on pre-cessation issues on 16 May 2019 (the "**ISDA Pre-Cessation Consultation**").<sup>20</sup> The consultation sought feedback on how derivatives contracts should address a regulatory announcement that LIBOR or certain other IBORs categorised as critical benchmarks under the EU Benchmarks Regulation are no longer representative of an underlying market. Anything implemented as a result of this consultation (i.e. pre-cessation triggers) would be in addition to the fallbacks ISDA expects to implement to address a permanent cessation of a key IBOR. The consultation followed a request by the FSB OSSG. ISDA will use the responses to the consultation to determine what protocols or other documentation solutions would be most useful and appropriate for derivatives market participants to use in addressing pre-cessation issues. The consultation closed on 12 July 2019 and ISDA published preliminary results on 9 August 2019.<sup>21</sup>

According to the preliminary results, respondents expressed a wide variety of views regarding whether and how to implement a pre-cessation trigger related to "non-representativeness" for derivatives. In general, the respondents fell into three categories, without a clear majority in any one category: (i) those who supported adding a pre-cessation trigger to the permanent cessation triggers in the "hard wired" amendment to the 2006 ISDA Definitions and related protocol; (ii) those who supported use of the pre-cessation trigger provided that it was implemented with optionality and flexibility (or indicated that their support for the trigger depended on a number of factors); and (iii) those who opposed the pre-cessation trigger. Respondents also expressed a number of issues for consideration related to the potential pre-cessation trigger itself and how to implement such a trigger. ISDA will continue to work with market participants and regulators to determine how best to address concerns regarding "non-representative" benchmarks and implementation of pre-cessation fallbacks for derivatives.

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<sup>20</sup> [Consultation on Pre-Cessation Issues for LIBOR and Certain Other Interbank Offered Rates \(IBORs\)](#), ISDA, 16 May 2019.

<sup>21</sup> [ISDA Preliminary Results of Benchmark Fallbacks Consultation on Pre-cessation Issues](#), ISDA, 9 August 2019

### Appendix 3: Term rates

For GBP LIBOR, the cash markets will move to reference either backward-looking term rates or (to the extent available) forward-looking term rates based on the RFRs.

#### *Backward-looking term rates (based on historical / realised prices)*

Backward-looking term rates can be constructed mechanically from past realised daily fixings of the overnight RFR over a given period of time:

- (i) One methodology for constructing such a rate is known as "compounded in arrears" which involves compounding overnight RFRs over an interest period to produce a backward-looking rate. To determine an interest payment obligation of say 3 months, the overnight RFRs compounded over the same 3-month period would be used. This calculation will only be possible once the full set of overnight RFRs are known, i.e. at the end of the period or a few days before the end of the period if a lag is used;<sup>22</sup>
- (ii) It is also possible to use a "compounded in advance" method, which would involve using, for example, the overnight RFRs compounded over the previous 3-month period on a forward-looking basis for the next 3-month period. This rate is known at the beginning of the interest period.

Note that simple averaging may also be used rather than compounding (for example, some SOFR-referencing FRNs, 1-month SOFR and SONIA futures have used this method).

Backward-looking term rates using "compounded in arrears" are being used in SONIA-referencing FRNs, SONIA-referencing securitisations, SONIA-referencing bilateral loans, as well as in recent SOFR FRNs. In August 2019, the Working Group published a statement and summary of responses to the discussion paper on conventions for referencing SONIA in new contracts.<sup>23</sup> This highlighted a desire amongst respondents for close alignment of conventions between the cash market and existing overnight index swap ("**OIS**") products and for the development of standardised agreements and contracts to facilitate consistency of conventions across products and currencies.

The "compounded in advance" and "compounded in arrears" term rates could be calculated with immediate effect by market participants themselves (although it is recognised that for some cash market segments self-calculation may not be possible or desirable) or by using a third-party calculator.

#### *Forward-looking term rates (based on market expectations)*

Forward-looking term rates are known at the beginning of the period. In the context of RFRs, such term rates could be constructed based on derivatives markets which themselves reference the underlying RFR. Such rates would reflect the market-implied expected path of future overnight rates over the interest period. This could be based on the interest rate on the fixed leg of an OIS linked to the RFRs and/or from futures prices linked to the RFRs.

Forward-looking term rates are currently under consideration by the Working Group. However, such forward-looking term rates based on the RFR derivatives markets are not yet available as at the date of this Consultation Paper.<sup>24</sup>

Note that in the case of backward- and forward-looking term rates based on the RFRs, they do not embed a premium for term funding risk and do not include any element of bank credit risk. Therefore, a credit adjustment spread is still required when including fallbacks to such RFR-derived rates.

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<sup>22</sup> For more information see the [Discussion Paper: Conventions for referencing SONIA in new contracts](#), Working Group on Sterling Risk-Free Rates, March 2019.

<sup>23</sup> [Statement from the Working Group and Summary of Responses to Discussion Paper on Conventions for referencing SONIA in new contracts](#), Working Group on Sterling Risk-Free Rates, August 2019.

<sup>24</sup> Statement on ['Progress on adoption of risk-free rates in sterling markets'](#), Working Group on Sterling Risk-Free Rates, 15 May 2019.

### *Calculation of the credit adjustment spread*

The result of the credit adjustment spread calculation using any of the methodologies outlined in Section 5 (*Description of credit adjustment spread methodologies*) will give a credit adjustment spread that could be applied to either backward-looking compounded in arrears rates or to forward-looking term rates, given that the (risk-neutral) expectation of a backward-looking compounded in arrears rate is the forward-looking term rate.

In order to calculate the relevant credit adjustment spreads, the underlying data series to be used in the calculation needs to be considered. In applying the historic median approach, two potential methods to calculate the median of the spread would be:

- (i) the GBP LIBOR rate at the start of the period and the compounded in arrears rate during the same period; or
- (ii) the GBP LIBOR rate at the start of the period and the forward-looking OIS term rate at the start of the period.

The ISDA methodology for the credit adjustment spread uses option (i) above for the calculation of the credit adjustment spread, as the compounded in arrears rate was selected for the term adjustment (see Appendix 2 (*Summary of the ISDA consultations on IBOR fallbacks*)).

Forward-looking term rates are based on market consensus of actual future expectations. However, the expected rate at the beginning of the period may not equal the realised rate for that period. In the long run, however, the differences between the expected and realised rates can be expected to balance out.<sup>25</sup> Therefore calculating a credit adjustment spread using historic data derived from compounded in arrears rates<sup>26</sup> or based on forward-looking OIS term rates could be considered close to equivalent.

Option (ii) above would add additional complexity to the calculation of the historic median. In addition, it should be noted that it is unlikely that a long history of compliant forward-looking OIS term rates could be produced for this type of calculation (i.e. using option (ii) above), due to the limited availability of reliable market data required, whereas the daily SONIA fixes are robust and transparent.

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<sup>25</sup> All things being equal, the differences between expected and realised rates for the same period will be distributed evenly.

<sup>26</sup> The fallback could be to the relevant RFR observed over the relevant GBP LIBOR tenor and compounded daily during that period.

## Appendix 4: Pre-cessation fallback triggers

Pre-cessation fallback triggers are those triggers which occur other than on the cessation of GBP LIBOR. Pre-cessation fallback triggers can mean different things in different products and therefore it is important to identify what is meant by this term as the considerations in respect of credit adjustment spread methodologies can be different depending on the type of pre-cessation fallback trigger in question.

As noted in Appendix 2 (*Summary of the ISDA consultations on IBOR fallbacks*), ISDA launched the ISDA Pre-Cessation Consultation in 16 May 2019 on pre-cessation issues. This sought feedback on how to address a regulatory announcement that LIBOR or certain other IBORs categorised as critical benchmarks under the EU Benchmarks Regulation are no longer representative of an underlying market. These types of triggers have also been incorporated into certain cash products (for example, since January 2019, new fallbacks in FRNs have started to include this type of pre-cessation fallback trigger).

With these types of triggers, it is expected that the market would treat this similarly to a cessation trigger event, as there will most likely be a determined date from which GBP LIBOR ceases to be representative. In particular, it is expected that the historic median approach and the forward approach (detailed further in Section 5 (*Description of credit adjustment spread methodologies*)) would converge on the fallback trigger date. This type of pre-cessation trigger is within the scope of this Consultation Paper.

In certain cash market products, there may be triggers which apply prior to a pre-cessation fallback trigger. These are referred to in this paper as "**early opt-in fallback triggers**". An example of these types of early opt-in fallback triggers can be found in the syndicated loan market. For example, the LMA's recommended form of revised replacement of screen rate language<sup>27</sup> contains a trigger which applies where, in the opinion of the majority lenders and the borrowers, the screen rate is otherwise no longer appropriate for the purposes of calculating interest under the agreement. This trigger is more akin to an active conversion from GBP LIBOR to SONIA and the relevant credit adjustment spread would be applied from a negotiated date in each case.<sup>28</sup> As a result, in the case of these type of fallback triggers, a historical median approach and forward approach to the credit adjustment spread methodology would yield different results on the fallback trigger date, so in many respects similar to active conversions. These types of fallback triggers are not within the scope of this Consultation Paper and will be considered in more detail in a future publication by the Working Group.

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<sup>27</sup> See footnote 9.

<sup>28</sup> An example of this can also be seen in the U.S. where the ARRC contains an "Early Opt-In Election" as well as a pre-cessation fallback trigger coinciding with the pre-cessation trigger identified in the ISDA Pre-Cessation Consultation. See further [ARRC Recommendations regarding more robust fallback language for new originations of LIBOR syndicated loans](#), ARRC, 25 April 2019.

## Appendix 5: Example calculations and illustrative graphs

This Appendix sets out rough illustrations of the approaches outlined in this Consultation Paper for calculating the credit adjustment spread. Please note that the examples in this Appendix are for information purposes only. Spread levels implied by these methodologies are sensitive to the parameters chosen (e.g. period over which the historical average is taken). Actual build out and implementation of the selected approach may yield different values. However, the examples below should provide a helpful sense of how the approaches would function.

### ISDA historical median approach

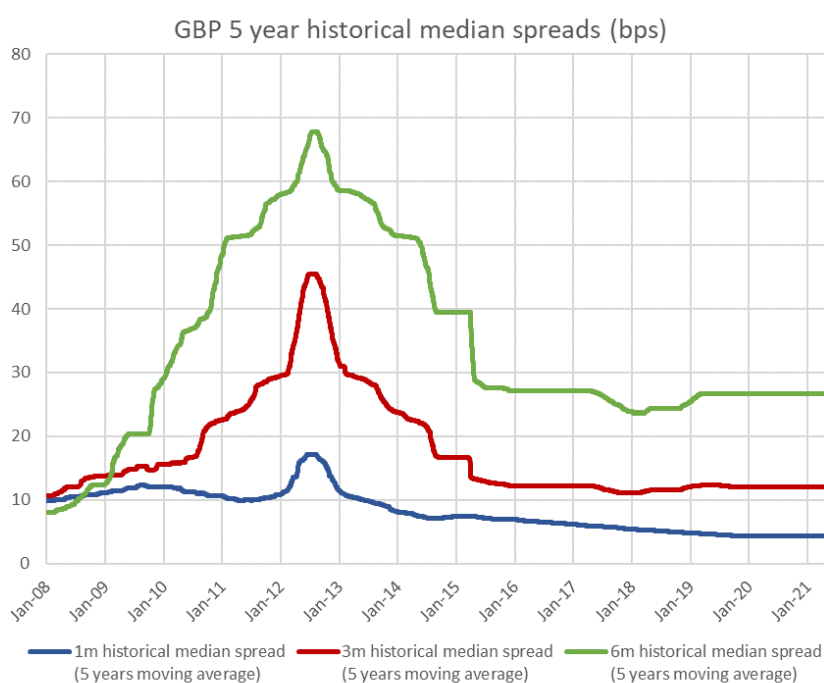
As per the the ISDA July 2018 Consultation, the definition is as follows:

*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...prior to the relevant announcement or publication triggering the fallback provisions.*

Upon the permanent discontinuation of GBP LIBOR, any references to this index would fallback to SONIA-derived rate plus a spread to reflect the credit element present in the former index but not in the latter. The credit adjustment spread is determined by averaging, for every day in the lookback window, the difference between GBP LIBOR and compounded SONIA using the same accrual period. The results of the ISDA Final Parameters, which identified that the majority of respondents preferred the historical median over a five-year lookback period for the credit adjustment spread.

#### Illustration for informational purposes

To provide a sense of how this approach would function, the chart below roughly outlines the historical median approach for calculating the credit adjustment spread for 1-month, 3-month and 6-month GBP tenors based on recent data and assuming GBP LIBOR is discontinued in December 2019. Actual build out and implementation of the selected approach may yield different values.



Source: Bank of England calculations, International Swaps and Derivatives Association data, and Bloomberg Finance L.P..

### Worked Example

In this example, the credit adjustment spread for 1 week GBP LIBOR is calculated using the following terminology and hypothetical assumptions:

- **Fallback trigger date.** For simplicity a fallback trigger date of 29 June 2015 is assumed, which is the final day LIBOR is published. After this date all future LIBOR references are replaced with a SONIA-derived rate plus the credit adjustment spread.
- **Lookback window length.** A hypothetical lookback window length of 1 month is used, over which the daily realised SONIA/LIBOR bases are averaged to calculate the credit adjustment spread.
- **Lookback window start date.** The date of the initial observation used to calculate the credit adjustment spread. This will equal the fallback trigger date minus the lookback window length. In this example where 1 week GBP LIBOR is discontinued on 29 June 2015 with a lookback window length of 1 month, the initial observation will be 29 May 2015.
- **Lookback window end date.** The date of the final observation used to calculate the credit adjustment spread. This will equal the fallback trigger date minus the tenor of the LIBOR being discontinued. In this example where 1 week GBP LIBOR is discontinued on 29 June 2015 with a lookback window length of 1 month the final observation will be on 23 June 2015.
- **Adjusted RFR.** This is equal to compounded SONIA over the same accrual period as the corresponding LIBOR.

Calculating the credit spread adjustment:

Date	1w LIBOR	SONIA Fixing	Adjusted RFR	1w LIBOR-Adjusted RFR
01-May-15	0.4905%	0.4655%	0.4623%	0.0282%
05-May-15	...	0.4632%	...	0.0302%
06-May-15	...	0.4611%	...	0.0304%
07-May-15	...	0.4621%	...	0.0304%
08-May-15	...	0.4583%	...	0.0306%
11-May-15	...	...	...	...
...	...	...	...	...
29-May-15	...	...	...	0.0308%
01-Jun-15	...	...	...	0.0309%
02-Jun-15	...	...	...	0.0304%
03-Jun-15	...	...	...	0.0298%
04-Jun-15	...	...	...	0.0299%
05-Jun-15	...	...	...	0.0298%
08-Jun-15	...	...	...	0.0304%
09-Jun-15	...	...	...	0.0299%
10-Jun-15	...	...	...	0.0303%
11-Jun-15	...	...	...	0.0305%
12-Jun-15	...	...	...	0.0307%
15-Jun-15	...	...	...	0.0300%
16-Jun-15	...	...	...	0.0302%
17-Jun-15	...	...	...	0.0310%
18-Jun-15	...	...	...	0.0314%
19-Jun-15	...	...	...	0.0315%
22-Jun-15	...	...	...	0.0337%
23-Jun-15	...	...	...	0.0432%
24-Jun-15	...	...	...	0.0447%
25-Jun-15	...	...	...	0.0470%
26-Jun-15	...	...	...	0.0505%
29-Jun-15	...	...	...	0.0958%

**Step 1** – Calculating the Adjusted RFR for 1 week LIBOR for each date

For example for 1 May 2015, the 1 week Adjusted RFR is the compounded average, using standard daycount conventions, of the daily SONIA fixings corresponding to 1 May 2015 to 8 May 2015. This equals 0.4623%.

**Step 2** – For each date subtract the Adjusted RFR from the 1 week LIBOR fixing. For 1 May 2015 this equals 0.4905% minus 0.4623%, which is 0.0282%.

**Step 3** – On the date the fallback is triggered, 29 June 2015, calculate the average of the daily 1 week LIBOR minus the corresponding adjusted RFR between the lookback window start (29 May 2015) and end date (23 June 2015). In this example that is equal to 0.0314% when using mean.

**Step 4** – Replace all future references to 1 week LIBOR within contracts to the SONIA-derived rate plus the credit adjustment spread, 0.0314%, as calculated above.



## ISDA forward approach

As per the the ISDA July 2018 Consultation, the definition is as follows:

*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.*

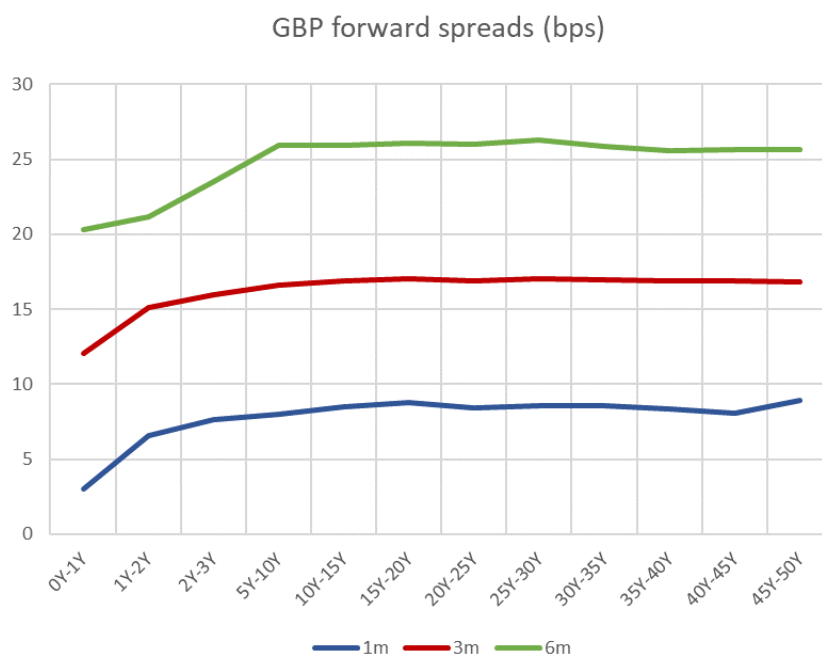
A prerequisite for this approach is the daily publication of a forward spread curve out to 30-60 years for the adjusted RFR, and in each relevant tenor, up until the fallback trigger date.

Such curves would need to be frozen at the point of the fallback trigger date upon the permanent discontinuation of GBP LIBOR and the spread would be added to the SONIA-derived rate to reflect the credit element present in the former index but not in the latter.

Beyond the length of the curve the spread for the last date on the curve would be applied.

### *Illustration for informational purposes*

To provide a sense of how this approach would function, the chart below roughly outlines the forward approach for calculating the credit adjustment spread for 1-month, 3-month and 6-month GBP tenors based on recent data and assuming GBP LIBOR is discontinued in December 2019. Actual build out and implementation of the selected approach may yield different values.



Source: Bank of England calculations, and Bloomberg Finance L.P.

### Worked Example

The publication of an adjustment table, calculated over a fixed observation period is not practical, neither are all possible dates independently observable. Unlike the stepped approach which applies simple compounding to calculate 5 forward basis levels that are assigned maturity buckets, the simple forward approach looks to preserve the curve shape.

To ensure standardisation across the industry and enable incorporation into models, simple linear interpolation may need to be adopted:

$$y = y_a + (y_b - y_a) \frac{x - x_a}{x_b - x_a} \text{ at the point } (x, y)$$

The replacement GBP LIBOR rate for any given day after cessation would be calculated as:

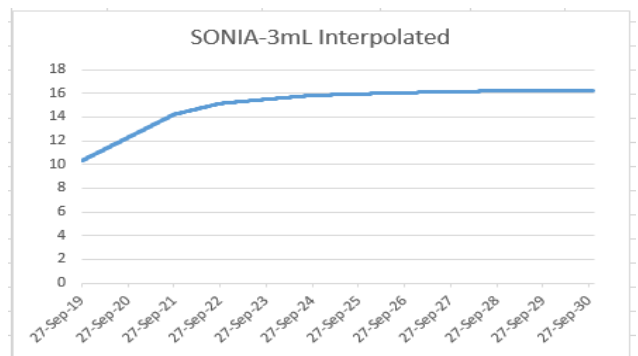
- SONIA-derived rate + linear interpolated credit adjustment spread

An observation period against a single date is not advisable, a minimum of 30 days would avoid single flows, market events from distorting forwards and allow normalisation.

26-Sep-19	Maturity	Sonia-3mL	Ref 1	Ref 2	Avg
1Y	26-Sep-20	BPBSSL1	12.20	12.33	12.27
2Y	26-Sep-21	BPBSSL2	14.30	14.14	14.22
3Y	26-Sep-22	BPBSSL3	15.20	15.09	15.15
4Y	26-Sep-23	BPBSSL4	15.50	15.50	15.50
5Y	26-Sep-24	BPBSSL5	15.80	15.85	15.83
6Y	26-Sep-25	BPBSSL6	15.90	16.00	15.95
7Y	26-Sep-26	BPBSSL7	16.00	16.10	16.05
8Y	26-Sep-27	BPBSSL8	16.10	16.20	16.15
9Y	26-Sep-28	BPBSSL9	16.20	16.20	16.20
10Y	26-Sep-29	BPBSSL10	16.20	16.20	16.20
12Y	26-Sep-31	BPBSSL12	16.20	16.20	16.20
15Y	26-Sep-34	BPBSSL15	16.20	16.20	16.20
20Y	26-Sep-39	BPBSSL20	16.20	16.20	16.20
25Y	26-Sep-44	BPBSSL25	16.20	16.20	16.20
30Y	26-Sep-49	BPBSSL30	16.20	16.20	16.20
40Y	26-Sep-59	BPBSSL40	16.20	16.20	16.20
50Y	26-Sep-69	BPBSSL50	16.20	16.20	16.20
60Y	26-Sep-79	BPBSSL60	16.20	16.20	16.20

\*Data Source ICAP & Tulletts

y	Solved = 14.69
ya	14.22
yb	15.15
x	01-Apr-22
xa	26-Sep-21
xb	26-Sep-22



Source: Bank of America, and Bloomberg Finance L.P.

## ISDA spot-spread approach

As per the ISDA July 2018 Consultation, the definition is as follows:

*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).*

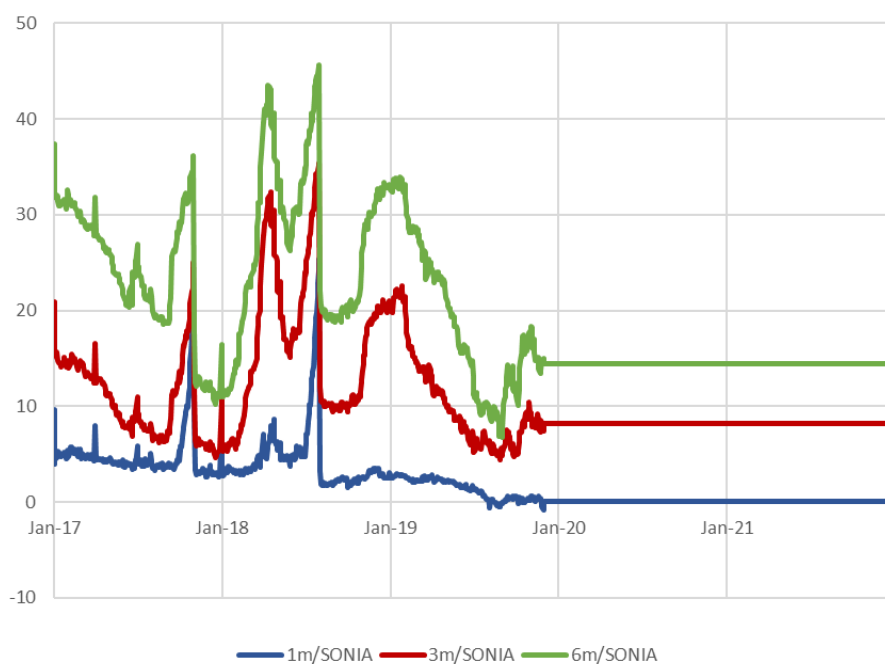
...

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

### Illustration for informational purposes

To provide a sense of how this approach would function, the chart below roughly outlines the spot-spread approach for calculating the credit adjustment spread for 1-month, 3-month and 6-month GBP tenors. It is using a 5 day lookback and spot overnight rate, based on recent data and assuming GBP LIBOR is discontinued in December 2019. Actual build out and implementation of the selected approach may yield different values.

GBP spot spreads using 5 day lookback (bps)



Source: Bank of England calculations, and Bloomberg Finance L.P.

### Worked Example

In this example, the credit adjustment spread for 3-month GBP LIBOR is calculated using the following hypothetical assumptions:

- A lookback of 5 days is assumed.
- Of the five methods to calculate the “Adjusted RFR”, this example considers the “Spot Overnight Rate Approach”:

*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.*

- The LIBOR discontinuation date is on  $t_0$ . Subscripts for time  $t$  denote business days prior to  $t_0$ , e.g.  $t_{-1}$ : denotes one day prior to the LIBOR discontinuation date.

	RFR	3m LIBOR	3m LIBOR - RFR	Adjusted RFR
$t_{+2}$	...			...
$t_{+1}$	0.7100			0.7636
$t_0$	0.7120	0.7637	0.0536	
$t_{-1}$	0.7101	0.7580	0.0471	
$t_{-2}$	0.7109	0.7609	0.0500	
$t_{-3}$	0.7109	0.7708	0.0609	
$t_{-4}$	0.7099	0.7643	0.0538	
$t_{-5}$	0.7105	0.7660	0.0561	
$t_{-6}$	0.7099			

In this example the RFR taken one day prior (0.7099 at  $t_{-4}$ ) is deducted from 3m LIBOR (0.7708 at  $t_{-3}$ ) to determine the 3m LIBOR – RFR spread (0.0609 at  $t_{-3}$ ).

This process is repeated for the 5 days prior to LIBOR discontinuation so that the mean of the 3m LIBOR – RFR between  $\{t_{-5}, t_0\}$  is calculated (0.0536).

This becomes the static LIBOR – RFR spread that is added to RFRs going forward above the dotted line to establish the Adjusted RFR (0.7636).

$$3m \text{ LIBOR}_{t+n} = RFR_{t+n-1} + [3m \text{ LIBOR} - RFR]_{t_0}$$

Where:

- $3m \text{ LIBOR} - RFR_{t-3} = 3m \text{ LIBOR}_{t-3} - RFR_{t-4}$
- $[3m \text{ LIBOR} - RFR]_{t_0}$  is the mean of the 3m LIBOR – RFR between  $\{t_{-5}, t_0\}$ , this is then applied to RFRs going forwards.

## Modified forward approach

Similar to the ISDA forward approach, the relevant credit adjustment spread under this approach would be based on observed market levels for the forward GBP LIBOR/SONIA-derived rate spread in the relevant GBP LIBOR tenor. Upon the fallback activation date, the credit adjustment spread would be based on a formula (described further below) which specifies the credit adjustment spread to be applied for every future date. However, unlike the ISDA forward approach which aims to specify a *different* spread for every day into the future, this methodology restricts the number of spread values to 5.

For each GBP LIBOR tenor, the following methodology would be used to obtain the 5 credit spread adjustment values:

1. On each day through the observation period, the GBP LIBOR/SONIA-derived rate spread for the spot starting 2Y, 5Y, 10Y, 20Y, and 30Y points is observed.
2. At the end of the observation period, the average is taken of the 2Y, 5Y, 10Y, 20Y, and 30Y rates across all observed days.
3. The 2Y3Y, 5Y5Y, 10Y10Y, and 20Y10Y forward rates are derived from the averaged spot rates by basic de-compounding. This is repeated for each GBP LIBOR tenor. (Note 2Y3Y represents the GBP LIBOR/SONIA-derived rate basis for 3Y period in 2Y time).

An important consideration is the quality of the data inputted to calculate the credit adjustment spreads. Market data would need to be accurate, verifiable and accessible to market participants. Approved dealers would also need to submit daily observations of the required GBP LIBOR and SONIA-derived rates.

The following dates are relevant for this approach:

$t_0$  = The first calibration date which is the date from which observations of the forward curves commences. It is defined as the date 1Y prior to the fallback activation date (the 1 year observation period could also be adjusted depending on specific requirements).

$t_1$  = The fallback activation date.

Next there are the dates which define which credit adjustment spread should be applied from the fallback activation date:

$t_2 = t_1 + 2$  years

$t_3 = t_1 + 5$  years

$t_4 = t_1 + 10$  years

$t_5 = t_1 + 20$  years

$t_6$  = Potential final replacement rate publication date ( $t_1 + 60Y$ )

The replacement rate for any given day after the fallback activation date would be obtained by taking the relevant SONIA-derived rate and adding the credit adjustment spread according to the following map:

For  $t_1 \leq t < t_2$  Use 2Y average credit spread

For  $t_2 \leq t < t_3$  Use 2Y3Y average credit spread

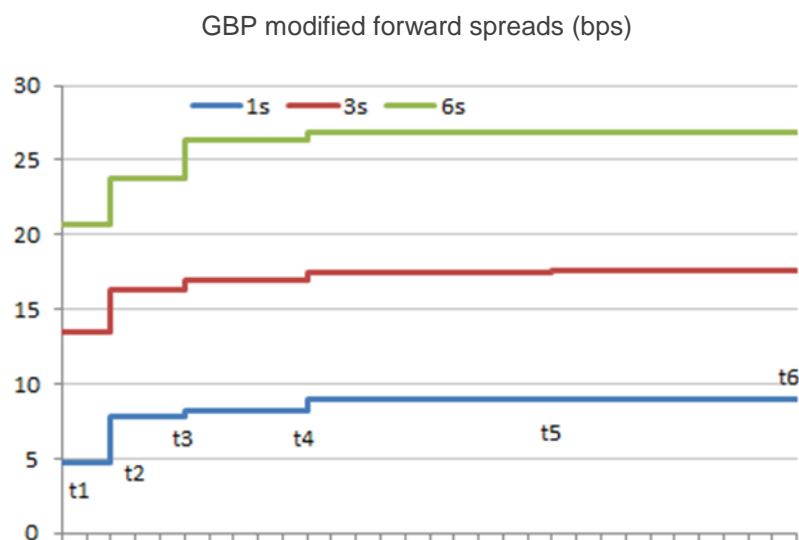
For  $t_3 \leq t < t_4$  Use 5Y5Y average credit spread

For  $t_4 \leq t < t_5$  Use 10Y10Y average credit spread

For  $t_5 \leq t < t_6$  Use 20Y10Y average credit spread

*Illustration for informational purposes*

To provide a sense of how this approach would function, the chart below roughly outlines the modified forward approach for calculating the credit adjustment spread for 1-month, 3-month and 6-month GBP tenors, based on recent data and assuming GBP LIBOR is discontinued in December 2019. Actual build out and implementation of the selected approach may yield different values.



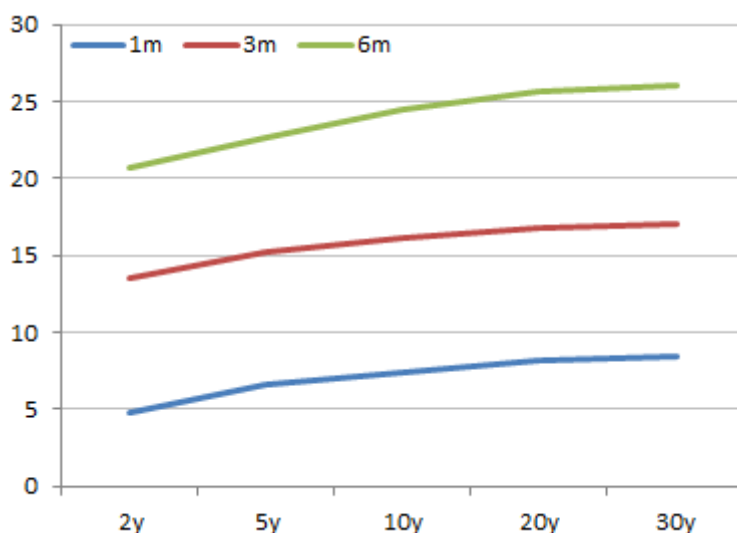
Source: JP Morgan.

*Application*

The above illustration is produced by firstly assuming the following spot starting LIBOR/SONIA spread on average from  $t_0$  to  $t_1$ :

**Average Libor/SONIA spread (bp)**

	1m	3m	6m
2y	4.75	13.5	20.75
5y	6.6	15.2	22.6
10y	7.4	16.1	24.5
20y	8.2	16.8	25.7
30y	8.45	17.05	26.1



Source: JP Morgan.

Source: JP Morgan.

The 2Y3Y, 5Y5Y, 10Y10Y, and 20Y10Y forward rates are then derived using basic de-compounding:

Libor/SONIA fwd spread (bp)

	1s	3s	6s
2Y3Y	7.83	16.33	23.83
5Y5Y	8.20	17.00	26.40
10Y10Y	9.00	17.50	26.90
20Y10Y	8.95	17.55	26.90

Source: JP Morgan.

The following rates schedule is then used from  $t_1$  to map the chart:

Libor/SONIA fwd spread (bp)			
	1m	3m	6m
$t_1 \leq t < t_2$	4.75	13.50	20.75
$t_2 \leq t < t_3$	7.83	16.33	23.83
$t_3 \leq t < t_4$	8.20	17.00	26.40
$t_4 \leq t < t_5$	9.00	17.50	26.90
$t_5 \leq t < t_6$	8.95	17.55	26.90

Source: JP Morgan.