

# LIBOR Transition in the Loan Markets

## Frequently Asked Questions

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## Glossary

ARRC	Alternative Reference Rate Committee. Established by the Federal Reserve Board and the Federal Reserve Bank of New York to help ensure a successful transition away from US dollar LIBOR across the markets that have historically used it.
BMR	EU Benchmarks Regulation. See paragraph 1.6.
BoE RFR Group	Bank of England Working Group on Sterling Risk-Free Reference Rates. Established to help ensure a successful transition away from sterling LIBOR across the markets that have historically used it.
Compounded RFR	See paragraph 2.1.
FCA	The UK Financial Conduct Authority, being the regulator of LIBOR.
FRN	Floating rate note.
IBA	ICE Benchmark Administration Limited, being the administrator of LIBOR.
ISDA	International Swaps and Derivatives Association.
LMA	Loan Market Association.
LMA Exposure Drafts	See paragraph 2.2.
RFR	Overnight, virtually risk-free rate. See paragraph 1.3.

## Introduction

For several decades now, a significant proportion of financing transactions denominated in sterling, US dollars, euro, Swiss franc and Japanese yen have used LIBOR as a reference rate to determine amounts payable (in particular interest payable) under the relevant financing transaction. Transitioning away from LIBOR is now a top priority for many financial institutions in Europe (including the UK), the US, the Middle East and beyond. The likelihood that LIBOR will disappear after 2021 is also increasingly concerning the even wider group of stakeholders, including businesses and consumers, who use products referencing LIBOR. This note answers the questions we are most frequently asked, by both financial institutions and their customers, about LIBOR transition in the context of the loan markets. The note's primary focus is on commercial loans under English law documentation. However, some of the answers refer to, or will also be relevant in, other financing contexts.

The original version of this note was published in February 2020. It has now been updated to describe developments up to 5 June 2020. We hope you find it useful.

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# 1 Background

## 1.1 Will LIBOR definitely disappear at the end of 2021?

No. The end of 2021 is seen as a key deadline because:

- on 27 July 2017 Andrew Bailey, then chief executive of the FCA, announced that the FCA would no longer use its influence or legal powers to persuade or compel LIBOR panel banks to continue making LIBOR submissions after 2021;
- on 24 November 2017 the FCA announced that it had secured the voluntary agreement of all 20 LIBOR panel banks to continue submitting contributions until the end of 2021.

Whether LIBOR continues after 2021 is much less certain and is likely to depend largely on the attitude of LIBOR's panel banks. They will have to weigh up the regulatory and other liability risks of continuing to make LIBOR submissions voluntarily against the risks to their own business of LIBOR disappearing at that time.

What regulators have repeatedly emphasised is that no one should assume that LIBOR will still exist after 2021. The FCA, the Bank of England and the BoE RFR Group have confirmed that the economic disruption caused by the COVID-19 pandemic during 2020 should not change this "central assumption".

## 1.2 Why are regulators so keen for the financial markets to stop using LIBOR?

The two main reasons are:

- the underlying market that LIBOR has historically sought to measure – the market for unsecured wholesale term lending to banks – has not been an active market since the financial crisis; and
- the financial markets' over-reliance on LIBOR creates systemic risk.

The second of these points is particularly key. LIBOR has evolved significantly in recent years such that it is arguably no longer even an interbank rate. In April 2019, the IBA completed the transitioning of LIBOR panel banks onto a new "Waterfall Methodology". It now describes LIBOR as "*a wholesale funding rate anchored in LIBOR panel banks' unsecured wholesale transactions to the greatest extent possible, with a waterfall to enable a rate to be published in all market circumstances*". If LIBOR, as reformed in this way, were still only being used for its original purpose – to price loans arranged in London – regulators might have been less concerned about its ongoing use. Compare, for example, the regulators' approach to EURIBOR (see paragraph 1.7).

## 1.3 What are RFRs and how are they relevant to LIBOR transition?

Across the full range of financial products that have historically used LIBOR, regulators want market participants to use rates based on overnight, virtually risk-free rates (**RFRs**) instead. Regulators in the home jurisdictions of each of the five current LIBOR currencies have now identified the preferred RFR for their local currency, each of which is now published, as follows.

Currency	Approved RFR	Administrator	Secured or unsecured?
US dollar	SOFR (Secured Overnight Financing Rate)	Federal Reserve Bank of New York	Secured
Sterling	SONIA (Sterling Overnight Index Average)	Bank of England	Unsecured
Euro	€STR (Euro Short-Term Rate)	European Central Bank	Unsecured
Swiss franc	SARON (Swiss Average Rate Overnight)	SIX Swiss Exchange	Secured
Yen	TONA (Tokyo Overnight Average Rate)	Bank of Japan	Unsecured

Regulators prefer RFRs to IBORs because RFRs are:

- based on deep, highly liquid, overnight borrowing markets; and
- calculated by reference to recorded transactions in those markets, rather than relying on submissions from panel banks.

However, there are disadvantages to using RFRs instead of LIBOR in the loan markets. These include:

- different RFRs measure different types of overnight borrowing (some secured and some unsecured, see table above), have different calculation methodologies and are published at different times, in each case in the principal financial centre of the currency for which they have been developed; and
- RFRs have only a single tenor – overnight. This makes it impractical to use "raw" RFRs in most loan transactions. This would create an interest rate that fluctuates each business day. For more information on how RFRs are likely to be used in the loan markets, see paragraph 2.1.

#### 1.4 What are credit spread methodologies and how are they relevant to LIBOR transition?

Credit spreads are particularly relevant in the context of transitioning legacy LIBOR-based agreements to RFR-based alternative rates, whether that transition occurs by amending existing contractual terms, or through "hard-wired" fallback or switch mechanics (see paragraph 2.13).

In either case, the transition from LIBOR to an RFR-based rate should avoid any transfer of economic value between the parties. The total amount of interest the borrower pays after the transition should – to the extent possible – stay the same.

An RFR does not price in bank credit risk or term risk so will inevitably be lower than a term LIBOR (e.g. one, three or six months) in the same currency. RFR-based rates that are expected to be used significantly in loan transactions (such as compounded RFRs) are likely to be higher than "raw" daily RFRs, but they will still be lower than LIBOR. Therefore, where LIBOR is replaced in an existing contract with an RFR-based rate, adding a credit spread to the latter is a useful method of avoiding any transfer of economic value.

Creating standardised published spreads between specific LIBORs and the RFR-based rates that will most commonly replace them is key to a smooth transition away from LIBOR in legacy loans, for the following reasons:

- if the transition occurs through a hard-wired fallback, an objectively ascertainable spread avoids the need for any party to exercise a discretion to determine it; and
- if the transition occurs through a manual amendment, a published, market standard spread avoids any need for the parties to negotiate the spread on a deal-by-deal basis.

The development of approved, published credit spreads is also likely to be an important catalyst in growing the market in new RFR-based loans. See paragraph 2.15 below.

For more information about progress on creating and publishing credit spreads for use in the loan markets, see paragraph 3.5.

## 1.5 How relevant to the loan markets is ISDA's work on LIBOR transition?

ISDA has provided a key "thought leadership" role in the LIBOR transition process. It has focused on developing fallbacks based on RFRs to include in legacy IBOR-based derivatives contracts with a view to ensuring contractual continuity. Its broad approach is to:

- amend the definitions of IBORs in the 2006 ISDA Definitions by adding a hard-wired fallback to:
  - a compounded RFR; plus
  - a credit spread based on the historical difference between the relevant IBOR and that compounded RFR,

with the switch to that fallback occurring automatically on an "Index Cessation Event" or (probably) on a "non-representative" statement from the FCA (under which the FCA states publicly that LIBOR is no longer representative of the market it seeks to measure); and

- publish a Protocol to enable parties to incorporate this mechanism into legacy trades<sup>1</sup>.

ISDA hopes to complete this work by July 2020 with the amendments and Protocol becoming effective four months after publication.

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<sup>1</sup> By signing up to a Protocol, an entity agrees that the amended terms to which the Protocol relates will automatically apply in all existing transactions between that entity and each other "adherent" to the Protocol.



It is likely that the loan markets will adopt adapted versions of some of the methodologies ISDA has developed, such as those relating to credit spreads. However, ISDA's use of a Protocol and hard-wired fallbacks to deal with legacy IBOR-based derivatives:

- is not an approach the loan markets can realistically copy for dealing with legacy LIBOR loans (see paragraphs 2.13 and 3.3); and
- is unlikely to be appropriate for amending finance-linked hedging terms (see paragraph 3.10).

## 1.6 What impact does the EU Benchmarks Regulation have on the ongoing use of LIBOR in loan transactions?

The BMR has, and is likely to have, a more limited impact on the loan markets (outside consumer credit and regulated mortgages) than in other product areas that use LIBOR, such as derivatives and debt capital markets.

The BMR contains obligations on contributors to, and administrators and users of, benchmarks. Most of these apply after the transitional period provided for in the BMR (Article 51), which now ends on 31 December 2021.

Article 28(2) of the BMR requires a supervised entity that uses a benchmark (which includes LIBOR) to have robust written plans in place setting out what actions will be taken if a benchmark "materially changes or ceases to be provided". Supervised entities must reflect these plans in their contractual relationships with clients. Supervised entities are, broadly, regulated firms, including credit institutions and investment firms.

However, while parties to LIBOR-based bonds and derivatives are likely to be "using" LIBOR for the purposes of the BMR, loan transactions (other than consumer credit and regulated mortgage contracts) are out of scope. As a result, parties to commercial loans have not generally considered it necessary to include hard-wired fallbacks in their loan agreements (on which see paragraph 2.13) in order to comply with the BMR.

The BMR may nevertheless indirectly affect LIBOR-based loans by contributing to LIBOR's demise. The obligations it imposed on benchmark contributors may be a factor that encourages LIBOR panel banks to stop making voluntary submissions after 2021.

## 1.7 What is happening to EURIBOR and other non-LIBOR interbank rates?

EURIBOR and TIBOR (the rate for Japanese yen in the Tokyo interbank market) will continue to be used for the foreseeable future. There are also currently no plans to discontinue the main local IBORs used in the Middle East markets – EIBOR, SAIBOR, OMIBOR and QIBOR. However, as the underlying currencies to which these local Middle East benchmarks apply are pegged to US dollars, the discontinuation of US dollar LIBOR may still have an impact on their ongoing use.

EURIBOR has undergone significant reform in recent years, moving to a new "hybrid methodology" during 2019. Its future currently appears so settled that the LMA plans to produce an exposure draft of a multicurrency facilities agreement which continues to use it: loans in currencies other than euro will be RFR-based, but EURIBOR will remain the benchmark interest rate for euro loans (rather than €STR, the euro RFR).

By contrast, EONIA, the overnight interbank rate for euro (equivalent to overnight LIBOR) will be discontinued on 3 January 2022. Until then, EONIA will simply track €STR (the euro RFR), being €STR plus a fixed spread of 8.5 basis points. In the loan markets, the discontinuation of EONIA is most relevant for euro swingline facilities. The LMA published a note in October 2019 with suggested drafting for new facility agreements incorporating euro swingline facilities, to take account of the phasing-out of EONIA. This provided for interest on euro swingline loans to be calculated by reference to €STR or "Enhanced €STR" (the latter being an economic equivalent to EONIA) instead of EONIA.

## 1.8 Why are regulators taking a different approach to EURIBOR (and some other interbank rates) than they are taking with LIBOR?

The lower systemic risk involved in the continued use of other IBORs, when compared to LIBOR, is likely to be a significant factor. See paragraph 1.2 above.

## 2 New loans

### 2.1 How is it expected that RFRs will be used to calculate interest in new loan transactions?

In English law agreements, and other agreements based on English law forms of documentation (as is common, for example, in the Middle East), we anticipate that most (but not all) loan products that have used LIBOR to date will instead use compounded average in arrear RFRs (**compounded RFRs**) with a short "look-back" period, typically of five business days. This is primarily on the basis of the following:

- this is the approach the UK regulators are advocating. In January 2020, the BoE RFR Group published Use Cases of Benchmark Rates: Compounded average in arrear, Term Rate and Further Alternatives. It argued that 90% of loans by volume should be able to transition to this methodology. Although the remit of the BoE RFR Group is limited to the transition of sterling LIBOR, the analysis of whether compounded RFRs are suitable for a particular product is not currency dependent. So its views may also be of interest to, and influence practice in, US dollar and other LIBOR currency products;
- the (relatively few) RFR-based loans made to date under English law have used this methodology;
- the LMA's Exposure Drafts provide for this methodology for sterling and US dollar syndicated loans; and
- in the bond markets, RFR-based sterling FRNs issued to date have also used compounded average in arrear SONIA with a short look-back (although some SOFR-based US dollar FRNs have used a simple average of SOFR with a short "lockout" period instead).

### 2.2 What are the LMA Exposure Drafts?

In September 2019, the LMA released "exposure drafts" of two single currency term and revolving facilities agreements that broadly indicate how compounded RFRs might be calculated and used in syndicated loan facilities. One LMA Exposure Draft is for sterling loans; the other works with US dollars. The interest rate under both Exposure Drafts is based on compounded RFRs (SONIA in the case of the sterling LMA Exposure Draft; SOFR in the case of the US dollar LMA Exposure Draft).

The LMA Exposure Drafts are a vehicle to consult the market on a number of issues relating to the use of RFRs in lending transactions – there being insufficient loan market practice for the LMA to produce recommended forms at this stage. For more information, see our December 2019 note [LIBOR discontinuation – the LMA Exposure Drafts and other recent loan market developments](#).

### 2.3 What is the significance of the "look-back" when using a compounded RFR?

LIBOR for an interest period is fixed at the beginning of that interest period: all the parties know then how much interest the borrower will have to pay at the end of the interest period. By contrast, the compounded RFR over a period cannot be determined until the end of that period. A "look-back" mechanism provides that the interest payable over an interest period is not determined by the compounded RFR over the interest period itself, but over an "observation period". The observation period is the same number of business days as the interest period but starts and ends a specified number of business days before the relevant interest period. This ensures the parties know the interest that will be payable at the end of that interest period a few days in advance of the payment date.

### 2.4 How is a compounded RFR calculated?

Broadly, this involves the compounding of the RFR itself over the relevant observation period (using the daily published rates during that period) and then averaging that compounded figure. It does not involve any "capitalisation" or compounding of accrued interest – the principal amount of the loan does not increase as interest accrues during the interest period. Instead:

- the compounded average of the RFR over an observation period is calculated at the end of that observation period;
- interest is charged on the loan principal at that rate for the duration of the interest period; and
- that interest is payable at the end of the interest period.

While the LMA Exposure Drafts are clear on the broad method of using compounded RFRs, they do not specify the equation for doing so. The main variable to date on transactions using compounded RFRs is whether the look-back should apply using the "lag" method or the "observation shift" method.

### 2.5 What is the difference between the "lag" and "observation shift" methods?

With both the lag<sup>2</sup> and observation shift methods:

- the observation period is determined in the same way – if there is a five business day look-back, the observation period begins five business days before the beginning of the relevant interest period and ends on (but excludes) the day five business days before the end of that interest period; and

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<sup>2</sup> The term "lag" is not used entirely consistently. Sometimes parties use it to describe any look-back mechanism. Where that is the case, the lag method described in this paragraph might be called a "lag without a shift/observation shift", and the observation shift method described in this paragraph called a "lag with a shift/observation shift".

- the interest rate for the interest period is determined by reference to the daily RFRs during the observation period.

The key difference between the two methods relates to the weighting of the daily RFRs in the compounding formula to address non-business days (on which RFRs are not published). Under the observation shift method, a multiplier is applied to an RFR on any given day during the observation period if that day is followed by one or more non-business days. For example, the RFR on a Friday will be multiplied by three provided the following Monday is not a public holiday – Friday's rate is treated as applying on Friday, Saturday and Sunday for the purposes of the calculation. If the following Monday is a public holiday, Friday's rate will be multiplied by four instead. The lag method also weights daily RFRs to address non-business days. But it applies a multiplier to an RFR on any given day during the observation period if the day that is five business days after that day is followed by one or more non-business days (assuming a five business day look-back between the interest period and the observation period). Whilst the observation shift method "shifts" the weighting of the daily RFRs back to the days in the observation period, with the lag method it remains based on the days in the interest period. See the Appendix for a worked example.

The two methods are unlikely to produce significantly different results, and the technical differences between them may be of limited interest other than to those who need to calculate them. There is, however, a significant practical difference. A compounded RFR over a specified observation period calculated using the observation shift method is not impacted by any variables outside that observation period. As such, it can be calculated from a published index of the relevant compounded average rate (see paragraph 2.6 below). This is not possible when using the lag method.

While most of the early RFR-based loan and bond transactions used the lag method, the observation shift method now appears to be more popular, primarily because it offers the possibility of using published indexes.

## 2.6 How can published indexes streamline the calculation of compounded RFRs?

On loan transactions that have used compounded RFRs to date, the agent or lender has had to calculate the rate manually, by inputting into a formula the daily rates published for the relevant RFR during the observation period (see the Appendix). This approach is viable for a small number of pilot transactions, but it is cumbersome and time consuming.

A compounded index of an RFR represents the returns from a rolling investment earning interest at that RFR on a compounded basis. The change in this index between any two dates can be used to calculate the compounded average of the relevant RFR over that period. Inflation indexes (such as the CPI and RPI) work in a similar way.

The Federal Reserve Bank of New York began publishing a compounded SOFR index on 2 March 2020. In February 2020, the BoE published a discussion paper [Supporting Risk-Free Rate transition through the provision of compounded SONIA](#), in which it stated its intention to start publishing a compounded SONIA index by the end of July 2020.

One of the main advantages of this type of index is its flexibility. It enables parties to calculate compounded average interest easily for a period of any maturity using any combination of start and end dates. However, it still requires a calculation to be performed, and so does not provide the same operational convenience of published "term" rates (e.g. one, three and six months) that parties using LIBOR have been used to.

## 2.7 Are compounded RFRs being published for the tenors most commonly used as interest periods?

Since 2 March 2020 the Federal Reserve Bank of New York has also published on each business day the compounded SOFR average over the previous 30, 90 and 180 days. Since 25 March 2020, SIX Swiss Exchange has similarly published compounded average SARON over the previous one, three and six month periods.

The Bank of England has been more cautious about publishing "period averages" of compounded SONIA in this way. In the February 2020 discussion paper referred to in paragraph 2.6 above, it acknowledged that this would further simplify the calculation of interest on transactions using compounded SONIA. However, it highlighted the risk that the use of published period averages could create a mismatch between linked products (particularly in relation to hedging) unless the same day count and business day methodology is used in those linked products. It began a consultation on whether to publish SONIA period averages but stated that "*in the absence of a clear market consensus it is likely the Bank would choose not to publish period averages at this time*". That consultation has now ended, but the BoE is yet to confirm whether it plans to proceed with the publication of period averages for compounded SONIA.

For now, the key practical points to consider are as follows:

- Published indexes simplify interest calculations considerably, compared to manual calculation from the daily RFRs themselves. However, an index does not provide the same level of simplicity and clarity as parties have been used to with LIBOR. It may not be as easy for lenders to explain to some of their borrowers how interest will be calculated from an index.
- To the extent published compounded averages of RFRs are available for specified periods, using them may produce different results than the "lag" or "observation shift" methods would (see paragraph 2.5 above). When using the "lag" or "observation shift" method, the length of the observation period is determined by the number of business days in the relevant interest period. By contrast, if interest during a three-month interest period is calculated by reference to a published three-month or 90-day compounded average of the relevant RFR, the precise number of business days in that interest period will have no impact on the interest calculation.

While there may be reluctance for yet another method of interest calculation to be adopted for RFR-based loans, in reality the loan markets have still barely started to use RFRs, precisely because of the complexity involved. Our view is that if the Bank of England published compounded SONIA for the most commonly used interest period tenors (one, three and six months) this could significantly assist the sterling loan market's transition towards using RFRs. Any related hedging products would need to adapt to ensure consistency.

## 2.8 Is it anticipated that all types of loan products that have used LIBOR to date will use compounded RFRs instead?

No. In its January 2020 publication Use Cases of Benchmark Rates: Compounded average in arrear, Term Rate and Further Alternatives, the BoE RFR Group acknowledged that using compounded RFRs with a short look-back period could be impractical for some loan types including:

- loans to smaller corporate wealth and retail clients;

- trade and working capital products;
- export finance;
- Islamic finance;
- loans to borrowers in emerging market jurisdictions with exchange controls.

These products have been identified as problematic because it is particularly important for parties to these products to be able to ascertain the amount of interest that will accrue during an interest period at the outset of that interest period, or significantly in advance of the interest becoming payable. The BoE RFR Group has accepted that it might be more appropriate to calculate interest for these products using a term RFR, once available (see paragraph 2.9 below), or an alternative rate (such as a fixed rate, or the Bank of England's base rate), rather than compounded RFRs.

## 2.9 Are forward-looking term RFRs an alternative to compounded RFRs?

Not for the majority of loan products.

To replace LIBOR, many loan market participants have called for the development of forward-looking term rates derived from RFRs (**term RFRs**) for each LIBOR currency. Like LIBOR, term RFRs would make it possible to calculate the interest payable over an interest period at the beginning of that interest period.

However, the UK and US regulators, in particular, have put pressure on the loan markets to switch from using LIBOR to using RFRs without waiting for the development of such forward-looking term RFRs, which may not be available in the foreseeable future. This is not just a question of timing. One of the perceived advantages of RFRs over IBORs is that RFRs are derived directly from transaction data in very deep markets. By contrast, LIBOR derives from what are now very shallow markets and relies on submissions from a limited number of panel banks participating in those markets. That advantage may not apply to term RFRs, which are likely to be based not on overnight borrowing transactions themselves, but on derivative transactions based on the overnight borrowing market.

As noted in paragraph 2.8 above, the BoE RFR Group has made it clear that compounded RFRs are appropriate for the vast majority of the sterling LIBOR loan market, and that a term RFR (or alternative rate) is likely to be required only for certain niche products, including those listed at paragraph 2.8.

Nevertheless, the BoE RFR Group is hoping to finalise the development of term RFRs for SONIA, with a view to publishing them from Q3 2020. See [UK RFR Working Group Roadmap, 2020](#). It seems less likely that term RFRs will be available soon in LIBOR currencies other than sterling. For example:

- the ARRC has suggested the earliest a SOFR term RFR can be expected is the middle of 2021; and
- the National Working Group on Swiss Franc Reference Rates has indicated that a SARON term RFR is unlikely to be feasible and recommends using compounded average in arrear SARON wherever possible.



## 2.10 What other alternatives are there to using compounded RFRs as anticipated in the LMA Exposure Drafts?

The main alternatives are likely to be:

- compounded RFRs but with a full interest period look-back;
- central bank base rates; and
- fixed rates.

For more information, see our note [LIBOR transition – are full interest period lags a viable way to simplify some compounded RFR loans?](#)

## 2.11 So to what extent have the loan markets now transitioned away from using LIBOR on new loan transactions?

The transition away from LIBOR has been much slower in the loan markets than in other markets that have traditionally used LIBOR, in particular derivatives and debt capital markets. Based on published information, only a small number of RFR-based loans have been concluded – all since summer 2019 – including, in Europe:

- [NatWest / National Express](#) - a bilateral SONIA-based revolving credit facility.
- [NatWest / South West Water](#) – an amendment to an existing bilateral LIBOR loan now based on SONIA.
- NatWest / SSE – a bilateral SONIA-based revolving credit facility.
- [Deutsche Bank European Commercial Real Estate Group / Kennedy Wilson](#) – a bilateral SONIA-based loan.
- [UBS / Halter AG and SenioResidenz AG](#) - two bilateral SARON-based commercial real estate finance loans in Swiss francs.

In December 2019, Royal Dutch Shell also announced that it had signed a new English law US dollar syndicated revolving credit facility agreement (as borrower), which references LIBOR but with a mechanism to switch to compounded SOFR at a specified later date. In March 2020, [British American Tobacco](#) completed the first multicurrency facility referencing RFRs, which used a similar LIBOR-to-RFR "switch" mechanic.

We have not yet seen any significant transition away from LIBOR to any other pricing alternative, such as fixed rates or central bank base rates. For new floating rate loans in the European loan markets, interest is still usually IBOR-based. Other than for euro loans referencing EURIBOR, we expect this to change in the near future.

## 2.12 Have regulators set any pre-2021 deadlines relating to the transition away from LIBOR?

Yes. In its [Priorities and roadmap for 2020](#) published in January 2020, the BoE RFR Group stated that lenders should not be issuing new LIBOR-based sterling loans after the end of Q3 2020. However, in a [further statement](#) published on 29 April 2020, it pushed this deadline back to the end of Q1 2021, acknowledging that many lenders' transition plans had been disrupted by COVID-19. The same statement also introduced these interim milestones:

- lenders should be in a position to offer non-LIBOR linked products to their customers by the end of Q3 2020; and

- from the end of Q3 2020, any new LIBOR loans should contain "clear contractual arrangements...to facilitate conversion ahead of end-2021, through pre-agreed conversion terms or an agreed process for renegotiation, to SONIA or other alternatives".

On 27 May 2020, ARRC published similar recommendations for the transition away from US dollar LIBOR – including a target of no new US dollar LIBOR business loans after the end of Q2 2021. This gives lenders an extra three months compared to the BoE RFR's target deadline for sterling loans. However, if lenders have updated their operating systems, financial modelling and documentation so as to be in a position to transition their sterling loans by the end of Q1 2021, they are also likely to be able to transition their loans in other LIBOR currencies (including US dollars) at or around the same time.

### 2.13 Is it common for new LIBOR-based loans to now include "hard-wired" RFR-based fallbacks?

Market participants entering into new LIBOR-based loans with a tenor beyond 2021 do so in the knowledge that LIBOR may well disappear during the term of the loan. There are broadly three approaches to addressing this risk:

- amend the LIBOR fallbacks in the original loan agreement so that there is an automatic switch to an alternative rate based on an RFR at a specified trigger point relating to the cessation of LIBOR (the **Hard-wired Fallback Approach**);
- include a mechanism to switch to an alternative rate based on an RFR at a specified future date or on some other trigger unrelated to the cessation of LIBOR (the **Hard-wired Switch Approach**); or
- rely on a right to amend the pricing terms as needed at the relevant time (the **Amendment Approach**).

In the European loan markets, there has been limited adoption of the Hard-wired Fallback Approach. Most loan market participants are still grappling with the details of how RFRs are to be used in loan transactions. While that remains the case, the Hard-wired Fallback Approach cannot generally set out a comprehensive set of alternative terms that will apply at the relevant trigger date. Instead, the Hard-wired Fallback Approach will typically require the lender (on a bilateral transaction) or agent (on a syndicated transaction) to "fill in the blanks" on some of the amended terms at the point the switch to the RFR-based fallback occurs (such as determining the credit spread). We have seen lenders adopt this approach in some of their bilateral standard form facility agreement templates. However, in the syndicated markets, this approach is less practical – agents are generally uncomfortable exercising this type of discretion. Once parties know what alternative to LIBOR they want to use and are able to use it, they will generally amend the terms of their new loan to make that alternative the primary source of interest calculation, rather than as a fallback.

However, the development of the Hard-wired Switch Approach in the Royal Dutch Shell and British American Tobacco transactions referred to in paragraph 2.11 shows that this is not always the case. In those transactions, the parties agreed all the RFR-based terms in the original facility agreement, but for operational ease agreed to use LIBOR pricing for an initial period. This mechanism is perhaps currently best suited to the largest investment grade transactions, where the size of the facility justifies more complex documentation. We are not aware of its use on smaller transactions to date.

If lenders are unable to transition fully away from LIBOR on new loans by the end of Q3 2020, they may need to consider adopting the Hard-wired Fallback Approach or the Hard-wired

Switch Approach more widely, to ensure they conform with the transition milestones set by the BoE RFR Group and the ARRC (see paragraph 2.12 above).

In the meantime, European lenders are generally taking the view that they will be able to amend any new LIBOR-based loans along with the rest of their legacy LIBOR-based book as needed at the relevant time and are therefore continuing to favour the Amendment Approach.

To facilitate the Amendment Approach, the LMA published a revised "Replacement of Screen Rate" clause in May 2018, which has now been added to the LMA's recommended forms of facility agreement. This potentially makes it easier to amend a syndicated facility on an actual or imminent discontinuation of LIBOR (or other relevant interest rate benchmark). It does so by providing that relevant amendments require "Majority Lender", rather than all lender, approval. The clause is therefore of limited scope and is not relevant to a bilateral facility. However, with occasional minor variations, the clause has become largely standard in European syndicated transactions.

The US loan market has already shown a greater interest in the Hard-wired Fallback Approach. In April 2019, the ARRC published recommended fallback language, both for the Amendment Approach and the Hard-wired Fallback Approach, for various products that use US dollar LIBOR, including syndicated loans and bilateral business loans. The ARRC has indicated that it will publish updated hardwired fallback language in June 2020.

Our experience is that parties to US dollar loans governed by English law have generally followed the drafting recommendations of the LMA, rather than those of the ARRC.

#### 2.14 [Has the prospect of LIBOR being discontinued had any other impact on the terms of new LIBOR-based loans?](#)

Some lenders now require their LIBOR-based facility agreements to state expressly that the borrower will pay the reasonably incurred costs of the lender or (on a syndicated transaction) agent in any future amendment to the facility terms relating to LIBOR transition. However, this is by no means a market standard approach. Indeed borrowers often argue for the opposite – a clear statement that the borrower will not have to pay any other party's costs on any amendment relating to LIBOR discontinuation. For more information about the costs of amending legacy LIBOR loans, see paragraph 3.8.

#### 2.15 [What are the key market developments that will enable a wider transition to RFR-based pricing on new loans?](#)

- For sterling loans, the publication of a SONIA index (see paragraph 2.6) and, ideally, daily publication of compounded average SONIA over the previous one, three and six month periods (see paragraph 2.7).
- Banks completing the process of recalibrating their operating systems, and the software supporting them, so that they are compatible with compounded RFRs.
- The publication of market-approved credit spreads between the main LIBOR tenors, particularly in US dollars and sterling, and equivalent compounded RFRs. It is not anticipated that LIBOR-RFR credit spreads would ordinarily be referred to in new RFR-based loan terms. However, borrowers are used to gauging the pricing of a loan by reference to the margin that will apply on top of LIBOR. In new loans, borrowers will be paying a different margin on top of an RFR-based rate with which they are less familiar.

Until that familiarity grows, an approved credit spread is likely to help lenders explain to their customers what this new margin really means.

## 3 Legacy LIBOR loans

### 3.1 What are the options for dealing with existing LIBOR-based loans with a term beyond 2021 (legacy LIBOR loans)?

For legacy LIBOR loans that do not contain hard-wired RFR-based fallbacks (being the vast majority), there are broadly three options:

- amend the loan terms so the interest is calculated by reference to an RFR-based rate (or other benchmark acceptable to the relevant regulator). Although few legacy LIBOR loans have been amended to date, most banks with significant legacy LIBOR books are actively planning to adopt this approach, by undertaking major "bulk" repapering projects;
- amend the loan terms to include a hard-wired fallback to an RFR-based rate plus a credit spread. Although there have already been isolated examples of amendments of this nature (see paragraph 2.11) we do not anticipate there being a large uptake of this option. Once parties know what alternative to LIBOR they want to use and are able to use it, they will generally amend the loan terms to make that the primary source of interest calculation, rather than as a fallback; or
- do nothing, relying on the existing fallbacks in the agreement. Under typical fallbacks, the rate of interest following a permanent discontinuation of LIBOR is likely to be each lender's own cost of borrowing plus the margin (instead of LIBOR plus the margin). This is clearly unattractive for a borrower. On a syndicated facility agreement, it is also unattractive for an agent, who will have to calculate different interest rates for different lenders. While superficially more attractive for a lender, this is unlikely to be a viable long-term solution. Failing to take active steps to address LIBOR discontinuation could adversely affect a lender's relationship with both its customers and its regulators.

### 3.2 Are any legislative solutions anticipated to avoid the need to manually amend legacy LIBOR loans?

In the first two years after Andrew Bailey's July 2017 LIBOR discontinuation announcement (referred to in paragraph 1.1), there was surprisingly little discussion about legislative solutions. Then, in a [speech](#) in New York in July 2019, Mr Bailey (still then chief executive of the FCA) mooted the possibility of legislation helping with the transition of the financial markets away from LIBOR, including "*legislators redefin[ing] LIBOR as RFRs plus fixed spreads for...tough legacy contracts*".

Legacy LIBOR-based bonds are usually seen as the most difficult product to transition away from LIBOR, because:

- they are often difficult to amend;
- unless amended, many will convert to a fixed rate on and from the permanent discontinuation of LIBOR, fixing at the last available published LIBOR; and
- many have long tenors well beyond 2021.

By contrast, until recently LIBOR loans (at least outside the consumer space) have not generally been categorised as "tough legacy contracts", and it was assumed they would not be the primary target of any legislative solution. While that remains broadly true, developments in recent months have suggested that legislative solutions might be more relevant for legacy LIBOR loans than originally anticipated.

In March 2020, the [ARRC announced](#) a proposed legislative solution for New York law US dollar LIBOR-based contracts. This provides that in existing LIBOR contracts with inadequate fallbacks, references to LIBOR will automatically be replaced with references to a "Recommended Benchmark Replacement" designated by the Federal Reserve Board, the Federal Reserve Bank of New York, or the ARRC. (The paper does not specify what this replacement will be.) This automatic replacement would, for example, override a fallback to a previous LIBOR rate or other rate based on an interbank funding rate. It would not override a fallback to a different publicly quoted rate, such as the prime rate. As a prime rate fallback is a common feature of New York law LIBOR-based business loans, many may be out of scope. Nevertheless, the legislation does not exclude any product types.

In May 2020, a "Tough Legacy Taskforce" formed by the BoE RFR Group published a [Paper on the identification of Tough Legacy issues](#). In it, the Taskforce considered both references to sterling LIBOR in existing contracts and also references to LIBOR generally (including US dollar LIBOR) in existing English law contracts. In the section of the Paper on syndicated and bilateral loans, the Taskforce noted the practical difficulties of renegotiating such large numbers of legacy LIBOR loans before the end of 2021 and concluded that there is a "case for action" to address this. It concluded as follows:

- a legislative solution of some kind would be preferable, but work on this would need to begin as soon as possible;
- other solutions should be pursued in parallel. In particular, there may be potential benefits to implementing a "synthetic methodology" for LIBOR for a wind down period beginning after the end of 2021; and
- its *"overarching view remains that firms should proactively remove LIBOR dependencies from their contracts before the end of 2021"*.

While the positive references in the Paper to possible legislative and "synthetic" solutions are welcome, discussions around them remain at a very early stage. The difficulty of creating a single legislative fix that works for all products and forms of documentation should not be underestimated. So for now, parties to an English law legacy LIBOR loan with a scheduled tenor beyond 2021 must still assume that they will need to amend its terms before the end of 2021, as recommended by the Taskforce.

### 3.3 [Are any protocols available or anticipated to streamline the process of amending legacy loans?](#)

It is not anticipated that an ISDA style protocol (see paragraph 1.5) will be developed for amending the terms of legacy LIBOR loans. The main reasons for this are:

- loan terms are not as standardised as derivative terms;
- derivatives are always bilateral. If both parties to an existing derivatives transaction sign up to a protocol, this will amend the terms of that transaction. Facility agreements often have multiple parties, making it harder to effect change in this way;

- many derivative contracts are between financial institutions. If a relatively small number of financial institutions sign up to an ISDA Protocol, this can result in the amendment of a significant number of derivative contracts. By contrast, most borrowers are only party to one (or a small number) of facility agreements at any one time.

### 3.4 What are the key market developments that will enable the widespread amendment of legacy LIBOR loans?

For loans that will transition to compounded RFRs (anticipated to be the majority):

- for sterling loans, the publication of a SONIA index (see paragraph 2.6) and, ideally, daily publication of compounded average SONIA over the previous one, three and six month periods (see paragraph 2.7);
- banks completing the process of recalibrating their operating systems, and the software supporting them, so that they are compatible with compounded RFRs; and
- the publication of market-approved credit spreads between the main LIBOR tenors, particularly in US dollars and sterling, and equivalent compounded RFRs. This is so that when a lender proposes replacing an interest rate of LIBOR plus margin of x% with a compounded RFR plus margin of y%, it can explain the difference between x and y to its customer.

### 3.5 How advanced is the process of creating and publishing credit spreads for use in the loan markets?

The derivatives market has already identified a preferred method of calculating credit spreads between a LIBOR that is being replaced and an RFR-based rate that is replacing it: fix the spread at the date of replacement based on the median average difference between the two rates over the previous five years. The ARRC has confirmed it will adopt the same approach for US dollar cash products. In December 2019, the BoE RFR Group published a [Consultation on credit spread methodologies for fallbacks in cash products referencing GBP LIBOR](#) and has since confirmed a strong consensus among respondents that sterling cash products should follow ISDA's approach.

The credit spread methodologies proposed by ISDA, the ARRC and the BoE RFR Group anticipate that parties will be converting from LIBOR to an RFR-based rate on the following events (each a **trigger event**):

- the discontinuation of LIBOR itself; or
- a regulatory announcement that LIBOR is no longer representative of the underlying market.

The intention is that, on those trigger events, the spreads would be calculated and published by an identified third party (the **spread publisher**) to facilitate a change from LIBOR to RFR-based pricing on relevant transactions. ISDA has already chosen Bloomberg to do this job for derivatives. In the English law markets, this precise scenario is much more likely to be relevant to FRNs than to loans. FRNs have increasingly included hard-wired fallbacks that would apply on a trigger event, in part to ensure compliance with the BMR. By contrast, commercial loans are (broadly) outside the scope of the BMR and to date have rarely included a hard-wired fallback to an RFR-based rate (see paragraph 1.6). Parties to LIBOR-based loans are therefore more likely to amend them manually in advance of a trigger event.



To facilitate these manual amendments, the loan markets really need the spreads to be published on a daily basis (once the methodology for calculating them has been agreed) until such time as LIBOR is permanently discontinued. Calculating and publishing the spreads only on a very limited number of trigger events will not be sufficient.

So it is helpful that for the purposes of calculating spreads for derivatives fallbacks, ISDA is anticipating that Bloomberg will publish fallback rates daily on a "what if" basis before the discontinuation of LIBOR (i.e. what would the spread be if the "trigger event" were today). Parties to cash products amending LIBOR contracts before a trigger event may be able to use these published rates to determine the credit spread at the point of amendment. The December 2019 BoE RFR Group consultation document stated that there will be a separate consultation on spreads for "active conversions" in the cash markets.

### 3.6 [Is there a standardised documentary approach to amending the terms of legacy LIBOR loans?](#)

On 25 October 2019, the LMA released another document in exposure draft form – the Reference Rate Selection Agreement (the **RRSA**). The purpose of the RRSA is to help streamline the process of replacing LIBOR with an RFR-based rate in the many legacy transactions that have tenors beyond 31 December 2021.

The scheme of the RRSA is that:

- all parties to the legacy LIBOR-based facilities agreement whose benchmark rate is to be replaced will execute the RRSA;
- in the RRSA, those parties will make high-level selections from a series of pre-determined key options for amending the legacy facilities agreement;
- the RRSA will authorise the agent and the obligors to enter into a separate amendment agreement amending the legacy facilities agreement; and
- that amendment agreement will bind all parties to the legacy facilities agreement and implement in detail the high-level key choices taken by all parties in the RRSA.

The RRSA is therefore not a recommended form of amendment agreement. It simply provides a mechanism to enable the agent and borrower to agree amendments (in a separate document) within an agreed framework, without having to obtain further consents from the syndicate. The RRSA therefore would have no application in a bilateral transaction.

It is too early to tell whether there will be significant take-up of the RRSA when syndicated legacy LIBOR loans are being amended. Other than the RRSA, there are no standard or recommended form documents available dealing with the amendment of legacy LIBOR loans.

### 3.7 [Who will instigate the amendment of legacy LIBOR loan agreements?](#)

We anticipate that lenders will generally instigate this process, on both bilateral and syndicated transactions. On syndicated transactions, a lender wishing to start an amendment process would first need to put forward a proposal to the agent, and ask it to circulate this among the syndicate for discussion and agreement, before any proposal is put to the borrower.

### 3.8 Who will pay for the amendment of legacy LIBOR loan agreements?

Facility agreements generally provide that if a borrower requests an amendment to the loan terms, it must pay the reasonably incurred costs of the lender (on a bilateral transaction) or agent (on a syndicated transaction) in connection with that amendment. As a result, lenders and agents rarely have to pay for amendment costs – loan terms are usually only ever amended at the request of the borrower. However, the repapering of lenders' legacy LIBOR loans is likely to be an exception – it is more likely that lenders will instigate this process (see above).

The terms of some recent loans do specifically require the borrower to pay for the lender's costs in connection with LIBOR-related amendments, regardless of who instigated the amendment (see paragraph 2.14). However, this is the exception.

Otherwise, if a lender were determined that its borrower should pay for the lender's costs, it potentially has some commercial leverage to engineer this. It could point out that if the loan terms are not amended, the borrower is likely to have to pay the lender's cost of funds plus margin after LIBOR is discontinued (see paragraph 3.1).

It is too early to say how lenders will approach this. However, most banks are treating the amendment of their large legacy LIBOR books as a regulatory-driven project, not unlike ring-fencing, EMIR and MiFID2. It is quite possible that, as with those other project types, banks will not seek to pass on their costs to their customers.

### 3.9 If a legacy LIBOR loan is subject to interest rate hedging, will that hedging need to be amended at the same time as the loan terms?

Yes, in order to ensure that the borrower (and lender(s)) benefit from a true hedge of interest rate risk, the terms of the hedging will need to be amended so that the floating rate element in it is consistent with the amended floating rate in the loan.

### 3.10 Can finance-linked hedging terms be amended by using the ISDA Protocol and hard-wired fallbacks?

For background information on the ISDA's work on hard-wired fallbacks and related Protocol, see paragraph 1.5. Our view is that these mechanisms are not suitable for amending finance-linked hedging terms for two main reasons:

- the hard-wired fallbacks in the updated 2006 ISDA Definitions will only take effect on specified "index cessation events" or (probably) on a "non-representative" statement from the FCA. Huge numbers of hedged legacy LIBOR loan terms will be amended at various times between now and the end of 2021. The parties will need to effect the amendment of the hedging terms at the same time; and
- for each LIBOR currency and tenor the hard-wired fallback provided for in the updated 2006 ISDA Definitions will comprise a standard RFR-based rate plus a standard credit spread. This will not always correspond to the rate replacing LIBOR when a legacy LIBOR loan is amended.

We therefore anticipate that parties to legacy finance-linked hedging transactions will need to amend their terms manually, at the same time as amending the legacy LIBOR loan terms to which the hedging relates.

### 3.11 What conduct and litigation risk issues should lenders consider when amending legacy LIBOR loans?

The specific conduct obligations of a lender will depend on the jurisdiction(s) in which it is incorporated or operating. Regulated entities in the UK should, in particular, note the FCA's [Questions and answers for firms about conduct risk during LIBOR transition](#), published in November 2019. In relation to a lender's engagement with its corporate borrowers, we consider the following to be the key litigation risks:

- *Exercising contractual discretions.* It is anticipated that most commercial legacy LIBOR loans with a tenor beyond 2021 will transition to an RFR-based rate by amendment agreement (see paragraph 2.13). However, in some legacy LIBOR loans that transition process may involve the lender, agent or other "finance party" exercising a discretion. For example, if a loan has a hard-wired fallback or gives the lender a unilateral right to amend the terms following certain trigger events, the lender may be responsible for adjusting the margin to account for the difference between LIBOR and the replacement rate. Where a party to an English law contract exercises a discretion of this nature, it is generally under an obligation not to exercise that discretion irrationally, capriciously or arbitrarily (sometimes referred to as a "Braganza duty"). Similar implied duties may apply under other laws. One would not expect a lender to fail to meet this obligation, but lenders should keep clear records of their decision-making processes before exercising contractual discretions of this nature.
- *Avoiding assumption of an advisory role.* Across all lending products, lenders will need to engage with their customers to explain how they propose to amend existing loan terms to address the risk of LIBOR discontinuation. However, it is important that lenders avoid creating an advisory relationship with their borrowers. For example, in product areas where compounded RFRs are impractical (see paragraph 2.8) there may be different approaches to replacing LIBOR across the market for that product. Where that is the case, if a lender "recommends" a specific option to a customer, it may incur a duty to the client in respect of that option's suitability to the client. Lenders should make clear that borrowers are responsible for taking their own decisions, particularly where those customers do not have their own legal counsel.

## Appendix – "Lag" method v. "observation shift" method – a worked example

For background information about the lag and observation shift methods, see paragraph 2.5 above.

### Scenario

- Sterling loan
- Interest rate = compounded average in arrear SONIA
- Two week interest period from 10 to 24 April
- Five business day "look-back" between interest period and observation period

### SONIA rates during and immediately before interest period

Day/Date	SONIA	Interest Period <sup>3</sup>	Observation Period <sup>4</sup>
Monday, 1 April	a%		
Tuesday, 2 April	b%		
Wednesday, 3 April	c%		
Thursday, 4 April	d%		
Friday, 5 April	e%		
Saturday, 6 April	No rate – weekend		
Sunday, 7 April	No rate – weekend		
Monday, 8 April	f%		
Tuesday, 9 April	g%		
Wednesday, 10 April	h%		
Thursday, 11 April	i%		
Friday, 12 April	j%		
Saturday, 13 April	No rate – weekend		
Sunday, 14 April	No rate – weekend		
Monday, 15 April	k%		
Tuesday, 16 April	l%		Look-back business day 5
Wednesday, 17 April	m%		Look-back business day 4
Thursday, 18 April	n%		Look-back business day 3
Friday, 19 April	o%		Look-back business day 2
Saturday, 20 April	No rate – weekend		Non-business day
Sunday, 21 April	No rate – weekend		Non-business day
Monday, 22 April	No rate – bank holiday		Non-business day
Tuesday, 23 April	p%		Look-back business day 1
Wednesday, 24 April	q%		
Thursday 25 April	r%		
Friday 26 April	s%		

<sup>3</sup> The days in an interest period are counted by the number of "overnights". So a 14-day interest period such as this straddles 15 days.

<sup>4</sup> An observation period always has the same number of business days as the interest period to which it relates (in this case, nine). It may have a different number of calendar days (as here). Where there is a five business day "look-back", the observation period ends on "but excludes" the date five business days before the end of the interest period. Five business days before the end of this interest period is Tuesday 16 April, so the observation period ends on Monday 15 April.

## Calculation of interest (i) using the lag method

Formula for calculation of interest

$$\left[ \prod_{i=1}^{d_b} \left( 1 + \frac{SONIA_{i-5LBD} \times n_i}{365} \right) - 1 \right] \times \frac{365}{d_c}$$

### Extract from definitions

$i$  = a series of whole numbers from one to  $d_b$ , each representing the relevant London Banking Day in chronological order from, and including, the first London Banking Day in the relevant Interest Period. [5 BD lag addressed through the formula]

### Calculation of interest (using SONIA rates shown on previous page)

$$\left[ \left( 1 + \frac{0.0c}{365} \right) \left( 1 + \frac{0.0d}{365} \right) \left( 1 + \frac{0.0e \times 3}{365} \right) \left( 1 + \frac{0.0f}{365} \right) \left( 1 + \frac{0.0g}{365} \right) \left( 1 + \frac{0.0h}{365} \right) \left( 1 + \frac{0.0i}{365} \right) \left( 1 + \frac{0.0j \times 4}{365} \right) \left( 1 + \frac{0.0k}{365} \right) - 1 \right] \times \frac{365}{14}$$

Number of calendar days in **Interest Period** (see footnote 4 on previous page)

## Calculation of interest (ii) using the observation shift method

Formula for calculation of interest

$$\left[ \prod_{i=1}^{d_b} \left( 1 + \frac{SONIA_i \times n_i}{365} \right) - 1 \right] \times \frac{365}{d_c}$$

With the lag method, SONIA on 12 April ( $j\%$ ) gets weighting of  $x4$ , based on the number of days between 19 April (5BDs ahead) and the next day SONIA is published (19<sup>th</sup>, 20<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup>).

With the observation shift method, SONIA on 12 April gets weighting of  $x3$ , based on the number of days between 12 April and the next day SONIA is published (12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>).

### Extract from definitions

$i$  = a series of whole numbers from one to  $d_b$ , each representing the relevant London Banking Day in chronological order from, and including, the first London Banking Day in the relevant Observation Period. [5 BD shift addressed through the definitions.]

**Observation Period** = the period from and including the date falling five London Banking Days prior to the first day of the relevant Interest Period...and ending on, but excluding, the date falling five London Banking Days prior to the Interest Payment Date for such Interest Period.

### Calculation of interest (using SONIA rates shown on previous page)

$$\left[ \left( 1 + \frac{0.0c}{365} \right) \left( 1 + \frac{0.0d}{365} \right) \left( 1 + \frac{0.0e \times 3}{365} \right) \left( 1 + \frac{0.0f}{365} \right) \left( 1 + \frac{0.0g}{365} \right) \left( 1 + \frac{0.0h}{365} \right) \left( 1 + \frac{0.0i}{365} \right) \left( 1 + \frac{0.0j \times 3}{365} \right) \left( 1 + \frac{0.0k}{365} \right) - 1 \right] \times \frac{365}{13}$$

Number of calendar days in **Observation Period** (see footnote 4 on previous page)

