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OIS AND RFR FUTURES CONVENTIONS: LESSONS FOR LIBOR REPLACEMENT TERM RATES

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The development of term benchmarks based on risk-free rates (RFRs) is an important aspect of the work to facilitate a successful transition from LIBOR, particularly for corporate lending and other cash products. This briefing considers how conventions used in Overnight Index Swaps (OIS) and RFR futures markets are relevant to the development of RFR-based term rates.

Addressing differences between IBORs and RFRs

There are various practical and economic differences between the -IBORs and the RFRs that have been identified to replace them. Differences of particular significance for cash products such as loans and bonds include:

- **-IBORs are term rates whereas RFRs are overnight rates**
  -IBORs are term rates published for various tenors (e.g. one week, one month, three months, six months and one year). These tenors align with typical interest payment periods for financial products.

  On the other hand, RFRs that have been identified to replace -IBORs are typically overnight rates. In general, it would be impractical for market participants to make daily interest payments on financial products referencing RFRs.

- **-IBORs are forward-looking rates whereas RFRs are backward-looking rates**
  -IBORs are forward-looking rates, where the rate is fixed at the beginning of each interest period. This gives firms certainty of funding costs for each interest period, which is important for cashflow management.

  On the other hand, the RFRs that have been identified to replace LIBOR are backward-looking overnight rates. This means that firms will not know how much interest they need to pay on a product referencing an RFR before the end of the relevant interest period.

  This lack of certainty is one of the main reasons why many market participants in loan and bond markets consider the development of forward-looking term rates based on RFRs to be essential to their business needs. These term rates would seek to represent the market's expectation of the average value of the relevant RFR over a designated tenor. These market expectations can be derived from prices in RFR derivatives markets, such as OIS and RFR futures.

Practical challenges of adapting to the use of RFRs

There are a number of economic and operational reasons why the loans industry, in particular, has been supporting the development of a forward-looking term rate based on SONIA. Some of these can be illustrated by considering how loan markets may otherwise need to adapt to use of RFRs.

For example, firms could address the fact the RFRs are generally overnight rates by using a cumulated rate based on the daily RFR over a given interest period. This could be calculated as the average (mean) rate or a daily compounded rate over the interest period; ideally, a consistent approach would be agreed across the market.

In practice, parties would need to allow a few days for calculation and settlement of the cumulated interest amount. This could be done by introducing a payment lag, such that the interest payment dates would fall a few days after the end of each interest reference period. However, this may mean that principal repayment dates no longer match interest payment

dates. The industry is therefore exploring possible workarounds, such as use of an interest rate cut-off mechanism. Firms would also need to amend their systems to allow for use of cumulated RFRs.

In theory, borrowers could also address the cashflow uncertainty arising from the backward-looking nature of RFRs by entering into OIS or RFR futures, as illustrated in the example below. However, the need to enter into derivatives transactions alongside a loan potentially adds to the cost and complexity of the overall transaction. It is nevertheless instructive to consider how borrowers could use OIS or RFR futures to achieve certainty of funding, as this illustrates how the conventions used for OIS and RFR futures can have practical implications for the development of cumulated or term rates based on RFRs.

Example: using OIS or RFR futures to achieve a fixed interest rate

In this example, a borrower enters into a loan facility under which it is due to pay interest at the end of a three-month period based on the average of overnight RFR fixings during the interest period (i.e. a backward-looking rate), plus a margin.

The borrower might therefore enter into an OIS under which it receives a floating payment to match its interest commitment on the loan and pays a fixed rate at the end of the period. In this example, the borrower would want the floating payment on its loan to match the floating receipt on its OIS. Therefore, the contractual terms setting out how the RFR is used to calculate the interest payable under the loan would need to be drafted to match the conventions used for the OIS floating leg.

Instead of entering into an OIS, the borrower in the example could purchase a three-month RFR futures contract that would pay out an amount matching its interest commitment on the loan at the end of the three-month period. As with the OIS, the borrower would want to ensure that the loan is drafted so that the floating interest payment due matches the payment received under the RFR futures contract.

OIS and RFR futures: market conventions

Basis of calculation: mean or compounded rate?

Cumulated or term interest rates based on overnight RFRs can be calculated in different ways.The current convention for sterling OIS and three-month RFR futures on SONIA and SOFR is to use a compounded rate. This represents the effective rate of interest that would be achieved by reinvesting at the RFR for each day of the calculation period.

However, the floating rate for one-month futures on SONIA and SOFR is calculated on the basis of an average (mean) of the RFR over the month and not a compounded rate. Using an arithmetic average as opposed to a compounded rate will generally result in a lower amount being payable over the relevant period.

There may also be differences in day count fractions used for calculating cumulated rates, which would again affect the resulting amount of interest payable. ISDA 2006 Definitions suggest that the main OIS rates tend to use Actual/365 (fixed). ICE three-month SONIA index futures also use Actual/365 (fixed) whereas CME three-month SOFR futures use Actual/360 (fixed).

Timing considerations: fixing and payment lags

In practice, the interest payment dates on products referencing cumulated RFRs may also need to fall a few days after the end of each interest reference period to allow time for calculation and settlement of the cumulated interest amount.

Under current market practice, the conventions for the floating leg of OTC OIS vary by currency in at least two respects:

- the date on which the rate for a particular day is available; and
- the usual payment lag for the floating rate payment at the end of the calculation period.

Exchange-traded RFR futures

A number of exchanges have launched RFR futures products over the past few months. For example:

- ICE launched one-month SONIA futures in December 2017 and three-month SONIA futures in June 2018
- ICE launched one-month and three-month SOFR futures in October 2018
- CurveGlobal launched three-month SONIA futures in April 2018
- CME Group launched one-month and three-month SOFR futures in May 2018

In August 2018, ICE announced that it also intends to offer futures on euro and Swiss franc RFRs once these underlying benchmarks become available.

The table below sets out current market conventions for OTC OIS in various currencies.

Currency	Fixing lag (D)	Payment lag (D)
CHF	0	+2
EUR	0	+1
GBP	+1	+1[1]
JPY	+1	+2
USD	+1	+2

If the terms of a loan or bond referencing an RFR provide for a shorter payment lag than the corresponding OIS, this could cause short-term liquidity or funding issues as the borrower would need to pay interest under the loan before it receives the corresponding payment under the OIS. Similarly, if there is a mismatch in the fixing lag, the two products will have different interest reference periods and so the borrower may need to pay different amounts of interest under the loan and the OIS.

By way of example, the interest rate observation period for the European Investment Bank's June 2018 SONIA-linked floating rate note is set so that interest on the bonds is paid five business days after the last overnight SONIA fixing for each period.

The July 2018 Fannie Mae SOFR-linked notes adopt a different approach and fix the interest rate for the last four days of each interest period to allow for calculation of the interest amount before the end of the relevant interest period. This "lock-out" mechanism means that there is no payment lag between the interest reference period and interest payment dates. However, fixing the rate for the last four days of the interest period means that the interest payment due may not match other products that reference SOFR but do not include this fixing mechanism. It is also worth noting that the interest rate on the SOFR-linked notes is calculated as the average (mean) rate rather than a compounded rate.

The interest reference periods for RFR futures also vary by maturity. The one-month RFR futures use calendar months whereas the three-month RFR futures use standard International Monetary Market (IMM) dates. Settlement or delivery is usually on the business day following the last available trading day.

Consultations on developing term SONIA reference rates and the ICE RFR portal

Sterling RFR Working Group consultation

In July 2018, the Working Group on Sterling Risk-Free Reference Rates established by the Bank of England and Financial Conduct Authority consulted on the development of forward-looking term SONIA reference rates. The consultation originally closed at the end of September but was subsequently extended until 26 October.

In the consultation, the Working Group expressed the view that the short-dated SONIA OIS market provides the best potential source of input data in the near term. This is largely because current trading volumes are much lower for SONIA futures than in OIS markets. However, most SONIA OIS trading is currently conducted OTC and so the Working Group considers there is insufficient price transparency to support a term SONIA reference rate.

Therefore, the Working Group is encouraging the market to work towards greater trading of SONIA OIS on regulated exchanges. This should then allow use of firm quotes as input data for a term rate (although the Working Group suggests that a 'prototype' benchmark using indicative quotes could be produced as an initial step).

1. Settlement of SONIA OIS transactions cleared on Eurex and LCH occurs on the Termination Date. Settlement of SONIA OIS transactions cleared on CME will be on Termination Date +1, but CME will adjust the actual settlement amount so that it is economically equivalent to settlement on the Termination Date.

Similar efforts are also underway to develop term rates based on RFRs for other currencies.

ICE consultation and launch of term RFR portal

In October 2018, ICE Benchmark Administration Limited (IBA) issued a consultation setting out a preliminary methodology for deriving a SONIA-based term rate based on futures contracts data. The paper also sets out some alternative approaches to constructing term rates based on SONIA.

At the same time, IBA has launched an ICE Term RFR Portal, a webpage where it will make available daily information on:

- one-, three- and six-month rates derived from SONIA futures and published SONIA data;
- realised simple and compounded averages for the same periods, derived from historical RFR data; and
- the published overnight RFR.

However, IBA states this is provided for information purposes only and should not be used as a benchmark. In due course, IBA also hopes to include data on term rates derived from SONIA OIS contracts and to cover other currencies on the portal.

Lessons for developing RFR term rates?

The different conventions used for OIS and RFR futures and the range of approaches identified in the recent consultations highlight that there are a number of possible solutions for developing term rates based on RFRs. In general, it will be important to ensure that the methodology for calculating the term rate is consistent with the conventions of the underlying input data. This is particularly relevant where derivatives, loan and bond markets converge, for example where OIS are used to hedge interest rate risk. This should help facilitate a smooth transition away from -IBORs and ensure that firms remain able to hedge exposures effectively.

In its recent consultation on term SONIA reference rates, the Working Group proposed that the methodology and data sources for producing a term SONIA reference rate should be allowed to evolve in line with changes in market structure. This seems sensible, given that different conventions are used for OIS and RFR futures and that these markets will develop further over the coming years.

OIS and RFRs at a glance

- There is clear industry demand for forward-looking term rates based on RFRs
- Recent consultations consider how these rates can be derived from OIS and RFR futures
- There is no single way to do this and various approaches have been proposed
- The conventions used in the OIS or RFR futures to which a term rate is anchored will affect calculation of the rate
- Different conventions include:
  - a simple average or compounded rate
  - fixing and payment lags
  - day count fractions
- Consistency of approach across loan, bond and derivatives markets will be important
- Otherwise, it may be challenging for firms to hedge exposures

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