



Consultation on Term SONIA Reference Rates

The Working Group on Sterling Risk-Free Reference Rates

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Foreword

On behalf of the Working Group on Sterling Risk-Free Reference Rates ('Working Group'), it is our pleasure to introduce the Consultation on Term SONIA Reference Rates (TSRRs).

The Working Group's overall objective is to catalyse a broad-based transition from sterling Libor to SONIA by end-2021. SONIA is an overnight rate, whilst Libor is most commonly referenced in 3 and 6-month tenors. Derivatives markets participants are 'fluent' in the direct use of overnight rates, where payments are calculated based on an average of realised daily rates. But an important subset of end users in loan and debt capital markets report that term rates are essential for their business needs.

Our consultation seeks feedback on practical recommendations aimed at catalysing the development of TSRRs. We encourage market participants – including venue operators, market makers and potential administrators – to work towards this objective.

We believe that term rates can play an important role in facilitating transition to SONIA. They complement ongoing efforts to encourage the direct use of overnight rates in financial contracts. In this context we welcome the European Investment Bank's efforts to establish SONIA as a new market standard in sterling FRN markets. The majority of Working Group members believe that overnight rates offer compelling benefits in many applications, and that most users will, over time, adapt to referencing SONIA directly in their financial contracts.

We note that this consultation is launched simultaneously with ISDA's consultation on new IBOR fallbacks for OTC derivatives contracts.¹ These consultations address different aspects of benchmark reform: the ISDA consultation is focused on preventing derivatives market disruption in the event a key IBOR is discontinued; our consultation focuses on how a TSRR can be constructed in order to facilitate sterling Libor transition in markets where term rates better suit users' needs. ISDA's consultation contemplates that the primary fallbacks for key IBORs will directly reference overnight risk-free rates (RFRs).

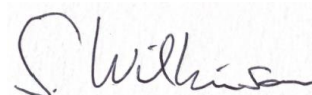
We also note that the Financial Stability Board published a position paper last week on the role of overnight and term RFRs in international benchmark reforms. The paper clearly signals that transition of most derivatives to robust overnight risk-free rates is important to ensuring financial stability. The paper also supports efforts to develop robust RFR-derived term rates where these can facilitate Libor transition.

We would like to take the opportunity to thank the chair of sub-group on TSRRs, Nick Saggars of Bank of America Merrill Lynch, for his dedication, leadership and judicious balancing of diverse views. We also thank all members of the Working Group and other sub-group participants who have provided important contributions to this work.

François Jourdain, Chair
Barclays International

Frances Hinden, Vice-Chair
Shell International Ltd

Simon Wilkinson, Vice-Chair
Legal & General Investment
Management



The Working Group on Sterling Risk Free Reference Rates

¹ See www.isda.org/2018/07/12/interbank-offered-rate-ibor-fallbacks-for-2006-isda-definitions

Executive Summary

- *Term SONIA reference rates (TSRRs) can play an important role in facilitating transition to SONIA, particularly in loan and debt capital markets.*
- *The short-dated SONIA OIS market provides the best potential source of input data for the development of TSRRs in the near term.*
- *While liquidity in the existing SONIA OIS market is sufficient to support TSRRs, current market structure does not provide the necessary degree of price transparency.*
- *That could be addressed through greater trading of OIS on regulated electronic trading platforms. Firm quotes on such platforms could provide sufficiently transparent data sources for TSRRs.*
- *Market participants are encouraged to work towards listing and trading SONIA OIS on these trading platforms and the development of robustly designed TSRR benchmarks.*

The Working Group on Sterling Risk-Free Rates (the 'Working Group') has been mandated to catalyse a broad-based transition to SONIA across sterling bond, loan and derivatives markets.

A key priority for the Working Group is to make recommendations relating to the potential development of Term SONIA Reference Rates (TSRRs). SONIA is an overnight rate, and many existing users of Libor, which is most commonly referenced in 3 and 6-month tenors, have indicated a strong interest in using term benchmarks.

A sub-group was established to identify relevant use cases for TSRRs, assess the feasibility of constructing robust TSRRs, and provide practical guidance on how these could be developed in order to facilitate transition to SONIA.

Potential TSRR Use Cases

In a significant majority of cases where sterling Libor is used, an overnight rate like SONIA will meet users' needs. However, outreach has identified operational challenges which could inhibit the use of an overnight rate by users in loan and debt capital markets. In addition, an important subset of end users in these markets report that term benchmarks serve genuine risk management needs such as cash flow forecasting or managing interest rate risk. ***The development of TSRRs for use in these markets can therefore play an important role in facilitating transition to SONIA.***

Alongside the development of TSRRs, we note ongoing work in developing market standards in loan and bond markets (such as interest calculation and settlement conventions) which could facilitate the direct use of overnight SONIA in financial contracts.

Outreach did not identify significant demand for TSRRs from active participants in cleared over-the-counter and exchange-traded derivatives markets; participants note that there is already an active OIS market which references SONIA directly, and interest rate futures which directly reference SONIA have recently been launched. However, some users will require suitable hedges for financial instruments such as loans, securitisations and floating rate notes which may reference TSRRs in future – so some use of TSRRs in derivative markets is likely.

Whilst TSRRs may prove sufficiently robust for selected applications, supervisory authorities – including the Financial Stability Board – and some market participants have expressed significant

reservations regarding their suitability for widespread use in the derivatives markets which currently reference Libor.

SONIA derivatives market

TSRRs seek to represent the market's expectation of the average value of SONIA over a designated tenor. These market expectations can be derived from prices in SONIA derivatives markets.

Liquidity in the short-dated SONIA OIS market is sufficient to support TSRRs. In Q1 2018 average daily notional turnover of nearly £60 billion was observed for cleared SONIA OIS with maturities of 12 months or less. Daily volumes are variable: they are higher on MPC meeting dates or days with significant economic data releases, but lower volumes are seen on other trading days. Activity in SONIA OIS is spread across the short-end of the yield curve, with the highest volumes observed in trades with 3 to 6-month maturities.

While there is also a nascent market in exchange-traded SONIA futures, thus far open interest and trading volumes are relatively low compared to OIS – average daily volume across all contracts was roughly £1.8 billion-equivalent per day in the month of June 2018 – although volumes should increase as the markets for these new instruments mature.

Potential data sources and methodologies

The Working Group considered a number of possible data sources, including the following:

- Executed transaction data: As there are few spot-starting OIS trades in specific 1, 3, 6 and 12-month tenors, executed transaction data cannot be wholly relied upon to produce a robust benchmark. A broader set of transaction data, including forward-starting OIS trades – which make up around 80% of transactions – could be used to produce TSRRs but with the application of a centralised yield curve model.
- Firm, executable quotes: These provide a high degree of transparency and a strong link to transaction data, but with the benefit of ongoing availability even where transaction volumes are low. Quotes can be obtained for spot-starting OIS in the required tenors without the need for a centralised yield curve model; instead, the average of the quotes reflect a market consensus yield curve which is supported by liquidity and arbitrage in forward-starting OIS trades.
- Indicative quote surveys: This data source is less grounded in transactions and is more challenging to verify, but may be useful for producing 'prototype' TSRRs.

Consequently, ***firm quotes for SONIA OIS in 1, 3, 6 and 12-month tenors are likely to offer the most feasible and robust data sources for TSRRs*** in the near-term.

However, these data inputs are not readily available. Market transparency is currently limited – the most reliable quotes may only be available under subscription, and even these may be indicative rather than firm. Therefore, ***production of a TSRR using firm quotes requires further development in the trading of OIS***: by moving from a predominantly voice OTC market, to one more frequently traded on regulated electronic platforms which will be a more transparent and verifiable data source.

Notwithstanding this, data sources and methodologies should evolve with changes in market structure. For example, as liquidity develops in SONIA futures these may provide reliable pricing inputs from a regulated market with a high level of transparency and a broad participant base.

This consultation seeks feedback on the Working Group's conclusions regarding the development of TSRRs. Subject to that feedback, as next steps, market participants – including venue operators, market makers and potential administrators – should be encouraged to:

- List and trade SONIA OIS on platforms with firm quotes and requisite transparency;
- Implement best practice benchmark design, controls and governance – including fallback arrangements.

The Working Group anticipates that a TSRR could be available in the second half of 2019.

Introduction

1. The Working Group on Sterling Risk-Free Reference Rates was set up by the Bank of England ('Bank') in 2015 to recommend a near risk-free reference rate ('RFR') and promote its adoption as an alternative to sterling Libor.² In April 2017, the Working Group recommended the Sterling Overnight Index Average ('SONIA') – an unsecured overnight rate for wholesale funds – as its preferred RFR.³

2. In January 2018 the Bank and the Financial Conduct Authority ('FCA') reconstituted the Working Group with a broader mandate and broader representation. The Working Group's overall objective is to catalyse a broad-based transition to SONIA by end-2021 across sterling bond, loan and derivative markets, in order to reduce the financial stability risks arising from widespread reliance on Libor.⁴ This reflects concerns regarding the sustainability of Libor as highlighted in a speech by Andrew Bailey, CEO of the FCA, in July 2017.⁵

3. A sub-group was established to consider the role of TSRRs in catalysing the adoption of SONIA.⁶ The primary objectives of the sub-group are to identify relevant use cases for TSRRs, assess the feasibility of constructing robust TSRRs, and provide practical guidance on how these could be developed in order to facilitate benchmark transition.⁷

4. SONIA has been available since 1997 and is widely used as a reference rate in sterling wholesale markets, including as the reference rate for Overnight Index Swaps (OIS). Following a programme of reform by the Bank, SONIA is now underpinned by a daily average of 375 transactions with an aggregate value of around £50bn.⁸

5. The Libor series of benchmarks is available in a range of tenors – from overnight to one year – while SONIA is an overnight rate. In sterling markets, three and six month tenors are most commonly used as contractual references, with lower usage of one and twelve month tenors. Based on extensive market outreach – including through a 2017 White Paper,⁹ a Roundtable conference¹⁰ and specific contributions to the sub-group by member firms and trade associations – the Working Group has identified significant demand for TSRRs as these could provide more compatible Libor alternatives across some applications.

6. SONIA is a measure of the rate at which interest is paid on sterling short-term wholesale funds in circumstances where credit, liquidity and other risk factors are minimal. It is calculated

² For more information on the Working Group, see www.bankofengland.co.uk/markets/transition-to-sterling-risk-free-rates-from-libor

³ The press release is available here www.bankofengland.co.uk/news/2017/april/sonia-recommended-as-the-sterling-near-risk-free-interest-rate-benchmark

⁴ The terms of reference of the Working Group are available here www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/rfr-terms-of-reference.pdf

⁵ See www.fca.org.uk/news/speeches/the-future-of-libor

⁶ The full terms of reference of the sub-group are available at www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/sonia-reference-rates-sub-group-terms-of-reference.pdf

⁷ The original terms of reference indicated that the sub-group would recommend for which applications TSRRs may be appropriate and propose measures with the aim of avoiding systemic reliance on these indices. After extensive deliberations, the Working Group concluded that it would be advisable to seek guidance from supervisory authorities on these issues.

⁸ More information on SONIA is available here www.bankofengland.co.uk/markets/sonia-benchmark

⁹ The White Paper is available here, www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/sonia-as-the-risk-free-reference-rate-and-approaches-to-adoption.pdf and the summary of responses is available here www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/summary-responses-to-white-paper-questions.pdf

¹⁰ A record of the Roundtable is available here www.bankofengland.co.uk/-/media/boe/files/markets/benchmarks/record-roundtable-on-sterling-risk-free-rates-6-july-2017.pdf

based on the rates paid on eligible overnight unsecured deposit transactions reported to the Bank's Sterling Money Market daily data collection.

7. By comparison, a TSRR seeks to measure the market's forward expectation of an average SONIA rate over a designated term – as explained in **Box 1**.

8. This consultation summarises the findings of the sub-group and seeks feedback on a number of issues, specifically:

- Section 1 sets out sources of potential demand for TSRRs across different use cases;
- Section 2 provides an overview of SONIA derivative markets which could be used as the basis for TSRR price discovery;
- Section 3 reviews and assesses various potential data sources and methodologies which could be used to construct TSRRs; and
- Section 4 lists detailed next steps for market participants, including trading venue operators, market makers and benchmark administrators, to progress the development of TSRRs.

9. The Working Group seeks feedback from market participants – including dealers, other banks, investment managers, pension fund managers, insurance companies, corporates, benchmark administrators, infrastructure providers and others on these issues.

10. Responses should be provided to the RFR Secretariat (RFR.Secretariat@bankofengland.gsi.gov.uk), by 30 September 2018. The Working Group will discuss all feedback and publish an anonymised and aggregated summary of responses.

11. 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 Financial Conduct Authority (FCA) as the RFR Secretariat. This may include 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 www.bankofengland.co.uk/legal/privacy or www.fca.org.uk/privacy, respectively.

12. The Bank of England and the 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 PRA) or the FCA and are not necessarily endorsed by the Bank of England (including the PRA) or the FCA.

Box 1 – What are Term Reference Rates?

SONIA, the preferred sterling RFR, is an overnight rate. Libor rates are produced at various maturities: overnight, one week, one month, two months, three months, six months and one year. Interest payments for financial products are typically made at less frequent intervals than daily – for example, every three or six months.

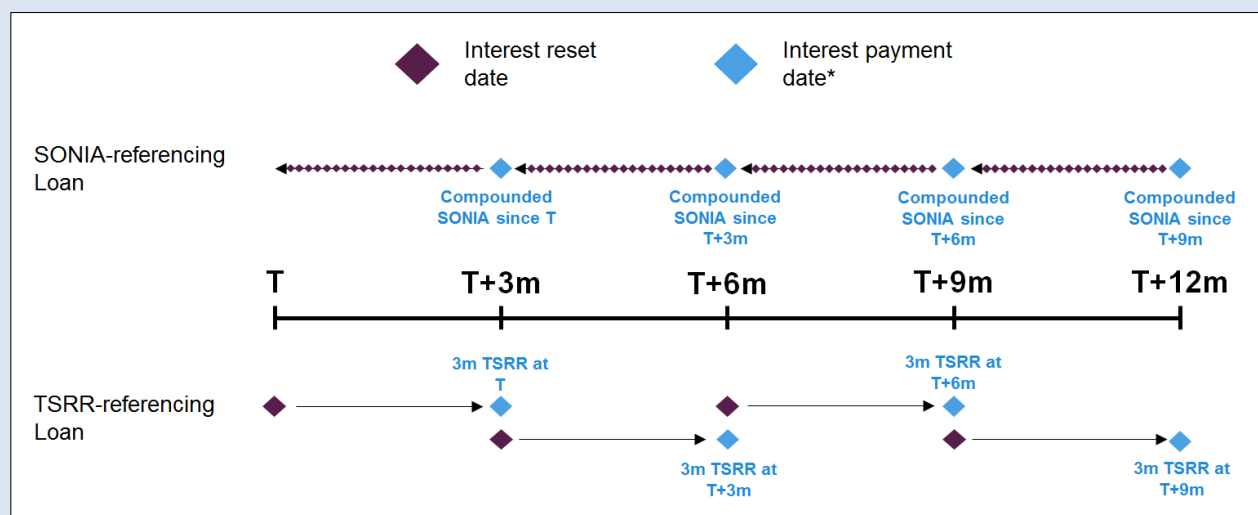
Consistent with the choice of an overnight RFR, but without needing to make interest payments daily, market participants can use the overnight rate but with cash flows generated from the average of realised daily SONIA fixings over the desired payment frequency. This average could either be a simple mean or a daily compounded interest rate over the period – the current convention for sterling OIS products.

Alternatively, market participants could use a ‘term rate’ which reflects the expected average SONIA over a given period. This allows the rate to be fixed at the outset of a given interest period. Most IBORs are term rates – however, a key difference is that IBORs reflect the interest rate on longer-term deposits and hence also reflect bank credit and liquidity risk.

In principle, term rates can be generated from the prices of RFR-referencing derivatives such as futures or overnight indexed swaps (OIS), because these provide information on market expectations of SONIA over a future period.

Figure 1 shows a stylised example of a one year loan with quarterly interest payments, either: i) using an overnight rate, where interest payments are based on realised overnight rates over a three month period; or ii) using TSRRs derived from SONIA derivatives, where payments are based on expectations of overnight rates over a three month period.

Figure 1 – Stylised example of interest rate payments using overnight rates and term RFRs, for a loan product



* In practice, the last daily interest reset date would be a number of days (between 2 to 5 days) before the interest payment date to allow time for calculation and settlement.

Section 1 – Summary of reported use cases for TSRRs

13. Libor is currently used in a wide variety of different financial products, contracts or practices. The Working Group has considered the strength of demand under each of these use cases in order to report whether TSRRs might be necessary to fulfil the same function.

14. As a result of outreach by the sub-group, including specific contributions by member firms and trade associations, the Working Group has concluded that there is demand for TSRRs, which allows the final rate and cash flows to be known in advance of payment, at the outset of the interest accrual period. Reported drivers of demand for TSRRs can be summarised under two categories:

- Operational and technological issues: Existing systems and settlement processes may not be able to accommodate payment amounts which are only known with certainty at the end of the interest accrual period. Material amendments to systems, process work-arounds, and new market conventions may be required.
- Economic issues, such as financial risk or cash flow management: End users may not want an exposure to interest rates over a short, pre-determined period – such as three or six months – and hence prefer to index their interest payments to a term reference rate for that period. The use of TSRRs also allows accurate liquidity management and cash flow planning.

15. **Table 1** below summarises the conclusions of the Working Group regarding the strength of demand for using a TSRR – the detailed discussion is set out in **Annex 2**.

16. It is clear that there is likely to be a strong demand for TSRRs in corporate lending, driven by both economic and operational issues. Additionally, there may be some demand for TSRRs in floating rate notes and securitisation structures, although this may not be universal among participants in these markets. As a consequence, there is likely to be demand for TSRRs in derivatives in order to hedge loan or bonds – although using OIS-style interest rate swaps (i.e. realised SONIA) could be an effective alternative.

17. In contrast, outreach suggests that there is likely to be very weak demand for a TSRR in cleared or listed derivatives. Use of OIS can meet all needs of the sophisticated participants in the cleared/listed derivatives market; this would enhance portfolio compression opportunities, facilitate risk management and provide operational benefits.

18. That means for the vast majority of contracts, by notional and number, there is no strong demand for TSRRs; however, they may be demanded for a number of specific users and products.

19. Whilst TSRRs may prove sufficiently robust for selected applications, supervisory authorities and some market participants have expressed significant reservations regarding their suitability for widespread use in the derivatives markets which currently reference Libor.¹¹

¹¹ See for example, Financial Stability Board (2018), *Interest rate benchmark reform: overnight risk-free rates and term rates*; available at www.fsb.org/2018/07/interest-rate-benchmark-reform-overnight-risk-free-rates-and-term-rates/

Table 1 – Rationale for reported use cases			
Potential Use Case	Operational issues	Economic issues	Strength of Demand
Cleared OTC interest rate derivatives	Low	Low	Very weak
Exchange-traded derivatives	Low	Low	Very weak
Cash flow discount rate	Low	Low	Very weak
Performance benchmarks	Low	Low	Very weak
Financial Leasing	Low	Low	Very Weak
Late payment clauses	Medium	Low	Weak
Uncleared OTC derivatives	Medium	Low	Weak
Money markets or securities lending	Medium	Low	Weak
Capital/perpetual securities	Medium	Low	Weak
Floating rate notes	High	Low	Medium
Retail loans/mortgages	Medium	Medium	Medium
Securitisation structures	High	High	Strong
Corporate lending (inc. syndicated)	High	High	Strong

Question 1: *Would the availability of robust TSRRs facilitate transition to SONIA for end users in loan and debt capital markets? Are there other use cases which should be considered?*

Question 2: *In what context would you foresee use of TSRRs in OTC and listed derivative markets? What risks might arise with their use and how could they be managed?*

Question 3: *Do you foresee a risk that, once introduced, TSRR referencing derivatives will supplant liquidity in short-dated OIS markets and/or inhibit growth of the long-dated OIS market? Or do you believe that SONIA OIS offer distinct benefits in either or both markets?*

Section 2 – An overview of the SONIA derivatives market

20. TSRRs seek to represent the market's expectation of the average value of SONIA over a designated tenor. In principle, the price of SONIA-referencing derivative instruments can be used to derive market expectations for SONIA, which can in turn be used as inputs to TSRRs. There are two SONIA derivative markets: SONIA OIS and SONIA Futures.

SONIA OIS market

21. The SONIA OIS market is a well-established OTC swap market which has traded since the inception of SONIA in 1997. This market has grown significantly since the financial crisis as OIS rates more directly reflect changes in policy rate expectations than available alternatives. OIS curves are also now widely used as a risk-free discount curve for valuation.

22. The daily average trading volume of new cleared contracts with maturities of 12 months or shorter was estimated at nearly £60 billion for Q1 2018.¹² But trading in OIS is episodic – higher trading volumes are seen on MPC dates and other dates where public statements or market data may impact policy rate expectations, but lower volumes are seen on other trading days – see **Table 2**.

Table 2 – Cleared SONIA OIS daily notional turnover 12-month maturity or less; Q1 2018, £ billion			
Median	44.6	5th percentile	13.5
Mean	59.2	10th percentile	15.0
Minimum	3.1	90th percentile	98.8
Maximum	293.0	95th percentile	172.5

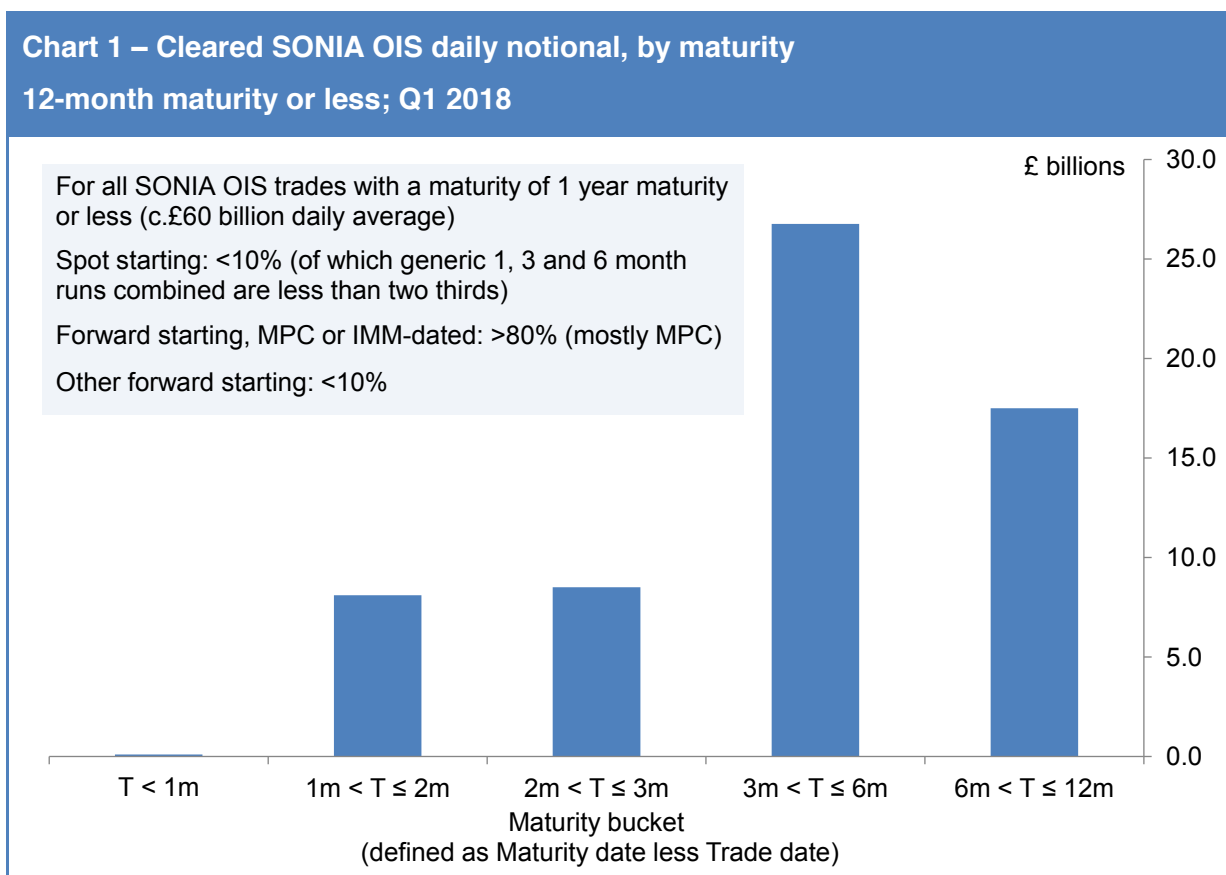
Source: RFR Secretariat calculations based on transaction data from LCH Ltd

23. Short-dated SONIA OIS activity is spread across the yield curve, with the highest volumes observed in trades with 3 to 6 month maturities. There are few spot-starting transactions for SONIA OIS in the specific 1, 3, 6 and 12-month tenors. Instead, market activity is predominantly forward-starting, with the largest observed volumes in trades which settle and mature on MPC meeting dates ('meeting-to-meeting swaps') as well as those that settle and mature on quarterly International Money Market (IMM) dates. These forward trades are the instrument of choice for expressing or hedging short-term interest rate expectations in sterling markets.

24. However, price discovery for 1, 3, 6 and 12-month tenors is strongly supported by the availability of continuous liquidity in forward-starting swaps. Market makers use internal yield curve models to allow them to price SONIA OIS across the whole yield curve. And arbitrage opportunities between forward and spot-starting transactions give discipline to market pricing, which consequently reflects the market consensus yield curve.

¹² By comparison, Bank of England data suggests that average daily volumes in sterling unsecured term deposits total less than £1bn (<https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2018/sterling-money-markets.pdf>).

25. **Chart 1** shows average daily volume for cleared SONIA OIS trades with maturities shorter than 12 months for Q1 2018 split by final maturity. The data also show that less than 10% of average daily volume is traded in spot-starting OIS, with 80% being forward-starting MPC and IMM-dated OIS trades.



Source: RFR Secretariat calculations based on transaction data from LCH Ltd

SONIA Futures market

26. There is a nascent market in exchange-traded SONIA futures. The first SONIA futures contract (with monthly contracts) was launched in December 2017. A new quarterly IMM-dated contract was launched in April 2018 and a competitor to that new contract in early June 2018. Thus far open interest and trading volumes are relatively low compared to OIS volumes, with average daily volume across all contracts was estimated to be £1.8 billion-equivalent per day in the month of June 2018.¹³

27. Whilst current volumes in SONIA futures are relatively low compared to OIS markets, there is clearly scope for volumes to increase as the markets for these contracts mature. As a comparison average daily volume in the first 12 monthly expiries of USD Federal Funds futures over the same week was estimated at \$1.8 trillion.

28. SONIA futures have fixed maturity dates. Therefore, similar to forward-starting SONIA OIS, it is not possible to obtain direct prices for specific 1, 3, 6 and 12-month tenor

¹³ Source: Bloomberg data encompassing ICE Futures and CurveGlobal.

derivatives. Instead, an administrator would need to design and maintain a centralised yield curve model to use futures pricing in order to produce TSRRs.

Question 4: *In your view, is existing liquidity in short-dated SONIA OIS markets sufficient to support the price discovery for TSRRs in at least some spot-starting tenors? If yes, which tenors?*

Question 5: *Do you believe that, subject to improving liquidity over time, the SONIA futures market could support price discovery in TSRRs, either independently or alongside SONIA OIS?*

Section 3 – Data sources and methodologies for a TSRR

29. As discussed in the section above, there are two possible markets for deriving expectations of SONIA: the OIS market and the futures market. There are a number of broad data sources for calculating an average rate – these are discussed below and summarised in **Table 3**.

30. **Executed transactions, sourced from central counterparties, or swap trade repositories** – this is applicable to the OTC OIS or exchange-traded Futures market. The volume-weighted average price of executed transactions can be used to produce TSRRs for desired maturities, subject to data validation checks.

31. Transaction data could be accessible either through reporting to trade repositories, through central counterparties, or directly from trading venues (where applicable). Transaction data seen so far demonstrate that, while daily volumes are on average quite high, there is significant variation between days.

32. Additionally, given the low volume of spot-starting OIS trades in specific 1, 3, 6 and 12-month tenors, it is unlikely that executed transaction data can be consistently sufficient to produce a benchmark. In order to use transaction data directly, it would be necessary for an administrator to model a yield curve based on forward-starting trades – which introduces complexity to a TSRR, since the model would need ongoing calibration. This would also apply to the use of Futures transaction data, given fixed maturity date contracts.

33. **Firm quotes available on exchange or MTF central limit order books (CLOBs)** – this may be applicable to OIS or Futures trading. TSRRs could be calculated as the volume-weighted mid-point of best bid and offer quotes on order books – which if matched would result in an executed trade, in a continuous auction.

34. Quotes can be obtained for spot-starting OIS in the required tenors without the need for a centralised yield curve model; instead, the quotes reflect a market consensus yield curve which is supported by liquidity in and arbitrage with forward-starting OIS trades. However, if using Futures a centralised yield curve model would again be required.

35. Firm quotes are publically visible to all trading members, aiding transparency, and have the benefit of ongoing availability, even in periods of low trading volumes. Robustness can be enhanced where quotes across several order books are aggregated.

36. **Firm quotes submitted to a point-in-time auction process** – OIS only. Similar to the continuous auction process as above, this would be a single short auction once per day, with bid and offer quotes submitted at one point by participants. Again pre-defined maturities can be used so interpolation or modelling between non-standard dates is not required. Such an auction process is not currently in place, but could be considered if firm quotes from CLOBs were not available.

37. **Streamed indicative quotes available on request-for-quote trading venues** – OIS only. An average of streamed quotes for standardised OIS contracts would be taken. A potential drawback is that the construction and publication of these quotes is not transparent to all market participants and they are not necessarily firm. However, streamed OIS quotes are currently commonly available in sterling markets – albeit to subscribers – so the time to production of a benchmark is likely to be short.

38. **A survey of quotes by banks or clearing houses** – OIS only. This is a survey-based submission process where, participants submit indicative daily quotes and an average is taken. This data source is less grounded in transactions and is more challenging to verify.

39. **A ‘hybrid’ methodology might make use of a combination of the above data sources** – OIS and Futures. Such an approach could use executed transaction data alongside executable quotes in both the OIS and Futures markets. This would maximise the use of data sources, but the individual issues around using each source would remain and benchmark production may be more complex and possibly less transparent.

Conclusion on data sources and methodology

40. The Working Group has concluded that the most feasible and robust methodology for the production of a TSRR in the near-term is the weighted average mid-point of the best, firm bids and offer quotes for listed SONIA-OIS products on a central limit order book. Subject to necessary changes in OIS market structure (see below), this approach balances the desire for the benchmark to be close to executed transactions with the ability to produce a rate even in difficult market conditions.

41. Additional methodological features can also enhance robustness. For example, a long data observation period (ideally between 09:30 and 11:00am¹⁴) where observations are taken at randomised intervals, with outliers removed, would minimise opportunities for misconduct. The Working Group also notes that benchmark robustness is also greatly improved by ongoing surveillance, effective governance and controls. So prospective benchmark administrators should consider all ways to enhance robustness of TSRRs notwithstanding the methodology used and liquidity conditions.

42. In addition, the Working Group notes that the methodology and data sources for producing the TSRR should be allowed to evolve in line with changes in market structure.

¹⁴ This time window is after typical timings for UK economic data releases (09.30am) and allows time for Benchmark Administrator to run any necessary checks and to publish ahead of MPC decisions (at noon).

For example, as an initial step in the development of TSRRs – to promote familiarity and allow systems testing – a ‘prototype’ benchmark could be produced using indicative quotes for SONIA OIS from RFQ platforms. This would be with the explicit intention of moving to firm quotes from trading venues when available.

43. Furthermore, as liquidity develops in SONIA futures these may provide reliable data sources from a regulated market with a high level of transparency and a broad participant base.

Table 3 – Summary of data source and methodologies for producing a TSRR

	Data source	Market	Methodology	Data sufficiency	Transparency	Ease of implementation
Degree of connection to executed trades	Executed transactions	Spot-starting OIS	Weighted average rate	Low	High	Medium
	Executed transactions	All OIS or Futures	Average rates and a centralised yield curve model	High	Medium (due to model)	Harder
	Firm quotes on CLOBs;	Spot-starting OIS	Weighted average rate at top of order book	High	High	Medium
	Firm quotes on CLOBs;	Futures	Weighted average rate at top of order book; then centralised yield curve model	Low (currently)	Medium (due to model)	Harder
	Firm quotes in daily point-in-time auction	Spot-starting OIS	Weighted average rate at top of auction order book	High	Medium	Medium
	Streamed indicative quotes on RFQ venues	Spot-starting OIS	Average of best bids and offers	Medium	Medium	Easier
	Survey of indicative quotes	OIS	Weighted average of all submissions	High	Low	Easier

Required changes to OIS market structure

44. The necessary price transparency in the SONIA OIS market is currently insufficient to produce a TSRR based on firm quotes. SONIA OIS are primarily traded in voice OTC markets and a significant proportion of trades are centrally cleared. MIFID II trading obligations do not currently apply to OIS – there is no obligation to trade on regulated

venues.¹⁵ As currently structured, the SONIA OIS market does not benefit from the same level of transparency available in other regulated markets (e.g. interest rate futures or Libor-based swaps). The most reliable quotes may only be available to subscribers, and even these may be indications and not firm.

45. Further development in the trading of SONIA OIS on regulated trading platforms running central limit order books (CLOBs), to provide greater transparency and verifiable quotes, would be required. Trading of listed derivatives on CLOBs is common practice in other markets – such as EONIA OIS and sterling Libor swaps – so a similar approach could be taken for SONIA OIS.

46. Additionally, market making firms would also need to stream live, firm quotes. In order to assess the feasibility of this, the sub-group ran an indicative survey seeking feedback from market making firms on readiness to stream firm quotes to listed OIS. Of those who responded, half were willing to stream quotes for the production of a TSRR; other responses were more nuanced, with some citing the need to review policies around potential conflicts of interest before being able to commit.

Question 6: *Do you agree that firm OIS quotes on regulated, electronic trading platforms are likely to offer the most feasible and robust data source for TSRRs in the near term? Are there alternative proposals which merit further consideration?*

Question 7: *Do you agree that greater transparency and verifiable quotes would be required to support the development of robust TSRRs? How would trading practices in SONIA derivatives need to evolve in support of robust TSRRs?*

Question 8: *Do you see benefit in early publication of 'prototype' TSRRs based on currently available data sources?*

Question 9: *Do you agree that the definition of TSRR benchmarks should allow data sources to evolve (for example, to include inputs from listed futures) to reflect potential future changes in market structure?*

Section 4 – Next steps

47. This consultation has set out the Working Group's conclusions regarding the development of TSRRs and seeks feedback on a number of issues. Subject to consultation feedback, the Working Group anticipates that the following steps would be required in order to produce robust and reliable TSRRs.

- Trading venue operators and market making firms should work towards listing and trading of SONIA OIS products:
 - Trading venues need to list short-dated SONIA OIS contracts, including specific 1, 3, 6 and 12-month maturities;

¹⁵ Two dealer-to-client electronic trading platforms operate request-for-quote (RFQ) trading systems with streaming quote indications for benchmark tenors out to two years. Several inter-dealer-broker platforms also provide live bids and offers, but SONIA OIS are not currently traded on exchange-like central limit order books (CLOBs) with firm quotes.

- Venues and liquidity providers need to agree market making commitments, including live streaming of firm quotes for short-dated OIS; and
 - A test period to assess the development and robustness of liquidity and trading conditions on the venues, to ensure suitability as data source(s) for the TSRRs.
- Potential benchmark administrators – in consultation with end-users – should begin to consider design, governance and control issues for producing TSRRs. These should be in line with legal and regulatory requirements, and should include (but not be limited to):
 - Establishing data licensing agreements with trading venues (ideally at least two, with at least six market makers streaming quotes to each venue and at least ten different market makers in aggregate), to collate order book data and complete a test phase using the data;
 - Defining an appropriate two-part definition of the TSRR, including an underlying interest and a detailed statement of methodology. The Working Group suggest that the underlying interest should be a measure of market-derived expectations for the average level of SONIA over a set of defined maturities;
 - Developing appropriate procedures and governance for the evolution of the TSRR to ensure its methodology keeps up with changes in market structure, as well as short-term contingency procedures;
 - Publishing a procedure for actions to be taken in the event of permanent discontinuation of the TSRRs at some future point; and
 - In common with all benchmarks, setting out how any potential conflicts of interest for market participants would need to be managed.

48. The Working Group notes that these next steps may take some time and therefore anticipate that a TSRR will be available for use by the second half of 2019.

49. Respondents are invited to respond before 30 September 2018, by email to the RFR Secretariat (RFR.Secretariat@bankofengland.gsi.gov.uk). The Working Group will discuss all feedback and publish an anonymised and aggregated summary of responses in early autumn 2018.

Question 10: *Do you have any additional views on the potential use cases, data sources and calculation methodologies, and risks associated with TSRRs?*

Annex 1 – Questions for consultation

Question 1: *Would the availability of robust TSRRs facilitate transition to SONIA for end users in loan and debt capital markets? Are there other use cases which should be considered?*

Question 2: *In what context would you foresee use of TSRRs in OTC and listed derivative markets? What risks might arise with their use and how could they be managed?*

Question 3: *Do you foresee a risk that, once introduced, TSRR referencing derivatives will supplant liquidity in short-dated OIS markets and/or inhibit growth of the long-dated OIS market? Or do you believe that SONIA OIS offer distinct benefits in either or both markets?*

Question 4: *In your view, is existing liquidity in short-dated SONIA OIS markets sufficient to support the price discovery for TSRRs in at least some spot-starting tenors? If yes, which tenors?*

Question 5: *Do you believe that, subject to improving liquidity over time, the SONIA futures market could support price discovery in TSRRs, either independently or alongside SONIA OIS?*

Question 6: *Do you agree that firm OIS quotes on regulated, electronic trading platforms are likely to offer the most feasible and robust data source for TSRRs in the near term? Are there alternative proposals which merit further consideration?*

Question 7: *Do you agree that greater transparency and verifiable quotes would be required to support the development of robust TSRRs? How would trading practices in SONIA derivatives need to evolve in support of robust TSRRs?*

Question 8: *Do you see benefit in early publication of 'prototype' TSRRs based on currently available data sources?*

Question 9: *Do you agree that the definition of TSRR benchmarks should allow data sources to evolve (for example, to include inputs from listed futures) to reflect potential future changes in market structure?*

Question 10: *Do you have any additional views on the potential use cases, data sources and calculation methodologies, and risks associated with TSRRs?*

Annex 2 – Reported use cases for TSRRs

Use case	Tenors used	Est. Usage ¹⁶
Cleared interest rate derivatives	1, 3, 6, 12m	Very high (c£25trn)
1. These trades are generally between frequent users of the markets who are able to meet the operational requirements of clearing trades and are able to make payments at short notice. These users are generally seeking to manage interest rate duration exposure as expressed through the fixed leg of any particular contract.		
2. Total adoption of OIS-style interest rate swaps – i.e. using realised SONIA – can meet all needs of the sophisticated participants in the cleared derivatives market. The use of OIS to represent desired exposures would enhance portfolio compression opportunities, facilitate risk management in a portfolio context, and provide operational benefits.		
3. Overall, there are no major operational or economic needs driving demand for TSRRs and dealers and market participants have expressed no interest in trading cleared interest rate derivatives referencing TSRRs.		
Exchange-traded interest rate derivatives (e.g. futures/options)	3m	Very high (c£6trn)
4. While traditional interest rate futures reference 3m 'IBOR-style rates, there is strong familiarity with futures and options which reference realised overnight rates (e.g. EONIA and Fed Funds futures). Realised SONIA rate futures have also recently been launched by providers in the sterling markets.		
5. Again, there are no clear operational or economic needs for TSRRs in exchange-traded futures or options and market participants have expressed little interest in trading such products.		
Uncleared OTC derivatives	1, 3, 6, 12m	High (c£4.5trn)
6. Some users of these products may be less likely to be sophisticated participants and product structures may be less standardised – instead, usage may be more tailored to individual needs. In particular, there may be a use case for uncleared interest rate derivatives to use TSRRs where they are used to hedge other products which use TSRRs – such as corporate lending (see below).		
7. As an alternative to using TSRR-referencing derivatives, end users could use a series of rolling OIS trades over the length of the loan or bond. For example, a 10-year derivative where a client pays a fixed rate and receives a 3-month TSRR can be replicated with a 10-year, pay fixed, OIS and an off-setting, receive fixed, 3-month OIS. The 3-month OIS needs to be rolled every quarter at prevailing rates, which then mimics the TSRR.		
Corporate loans (including syndicated loans)	1, 3, 6m	High (c£1trn)

¹⁶ Sources include: Oliver Wyman, LCH Ltd, Bloomberg, Financial Leasing Association, Bank of England SMMD

8. Feedback received by the Working Group is that corporate borrowers have a strong preference for using TSRRs. First, there is strong demand for certainty of interest payments up front, in order to better manage interest rate risk and manage near-term cash flows, especially as corporates tend to have lower surplus liquidity. Second, term rates are embedded in corporate borrower and lender computer systems and legal structures, so there are likely to be significant operational barriers requiring the use of term RFRs, at least for some time. A third issue is that corporate lending is typically based on a benchmark rate (traditionally 1-, 3- or 6-month Libor) plus a margin (being a fixed spread over Libor and which depends on the creditworthiness of the borrower). As a result, pricing of corporate loans currently depends on an underlying rate which includes both credit and term premia. There is some precedent for using overnight rates in corporate lending – but this is limited to swingline facilities which have very short-term maturities (up to 5 days).

9. To conclude, outreach suggests there is likely to be strong demand for TSRRs in corporate lending transactions.

Floating rate notes	3, 6, 12m (less frequent)	High (c£0.5trn)
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10. As with corporate loans, investors in and issuers of floating rate notes have some preference for cash flow certainty, and hence may prefer to use TSRRs. However, the majority of participants are large, sophisticated users and therefore may have the ability to manage short-term uncertainty over cashflows. There may also be operational issues arising from the secondary market trading of FRNs which do not reference TSRRs, since accrued interest cannot be calculated with certainty on the trade date, in advance of the settlement date. Workarounds may be available, for example applying a lag to the SONIA rate – for example, as demonstrated by a recent EIB sterling issuance referencing realised SONIA with a 5-day lag. On balance, there may be some users with strong demand to use TSRRs in FRNs.

Securitisations, such as MBS or ABS	3m	High (c£0.5trn)
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11. Securitisation securities have many features in common with other floating rate notes – and so the use case is balanced. However, there is additional complexity arising from the cashflows associated with the securitised assets, as interest payments, cash balances and cross-currency exposures need to be swapped back to a consistent reference rate in order to remove basis risk and achieve high credit ratings.

12. Securitisations typically use a term rate, like Libor, primarily due to common market conventions, but demand for a term rate could also be driven by improved hedge efficiency and improved cash flow forecasting.

Capital securities, perpetuals and corporate hybrid securities	3, 6m	High (reported)
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13. Banks and insurers issue capital securities and perpetuals, which form part of those issuers' capital structures. Corporates (predominantly non-financial corporates) also issue

hybrid securities. These securities could involve the following:

- a fixed rate coupon that converts to a floating rate coupon referencing LIBOR;
- a fixed rate coupon that resets from time to time to prevailing market swap rates or gilt yields; or
- a floating rate coupon from the time of issuance (whilst this is relatively uncommon it would currently reference Libor).

14. The considerations in relation to capital securities, perpetuals and corporate hybrid securities where the rate is, or may become, a floating rate, are similar to those set out above under Floating Rate Notes (FRNs); i.e. it may depend on the needs of the user.

Financial leasing	3m	Medium (c£100bn)
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15. The Finance & Leasing Association publishes a 'Base Rate' linked to average 3-month Libor, but rounded to the nearest half percentage point. This gives parties certainty over cashflows, although this is primarily driven by the rounding rather than the use of a term rate.

16. Therefore, as with retail products, the demand for TSRRs could be met by rounding prevailing SONIA rates.

Money market instruments and securities lending		Very low (<£0.1bn)
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17. The vast majority of money market instruments are fixed rate. Where the instruments are floating rate, users of these products are typically familiar with managing the risk and cashflows associated with movements in short-term money market rates, so the demand for TSRRs may not be high.

Retail products, e.g. mortgages		Low (<£1bn)
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18. Use of wholesale interest rate benchmarks is rare in retail mortgages in the UK, but these are occasionally embedded as an option in some buy-to-let mortgages. Retail customers will likely struggle to manage uncertain cashflows when using realised SONIA and so there may be demand for TSRRs in mortgages. However, it is common practice to use a variable rate which isn't subject to daily changes – for example Bank Rate is commonly used in retail mortgages.

19. So while there may be operational or economic need for retail users to have certainty over the rate and cashflows, it is not clear that it needs to be a term rate for retail products.

Performance benchmarks for investment funds	1, 3m	High (reported)
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20. Given that performance benchmarking is, by its nature, carried out looking at the past, there is no economic or operational reason to use TSRRs; it is driven by convention only. There is not likely to be a strong demand for TSRRs in performance benchmarking.

Cash flow discounting	1, 3, 6, 12m	Very high
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(reported)

21. OIS-based discount curves have commonly been used across the financial sector, since 2008 as OIS best represents a risk-free curve. There is no need to use TSRRs for the construction of risk-free curves.

Late payment clauses

1m

Unknown

22. In addition to other, ad-hoc, uses, the 1995 and 2000 versions of the Global Master Repurchase Agreement (GMRA) reference 1-month LIBOR for the calculation of interest on late payments and reasonable legal and other professional expenses incurred by a non-defaulting party. This is based purely on convention since there is no economic connection between late payments and 1-month term rates. An overnight realised rate could easily be used instead.

Glossary

ABS

Asset Backed Security: an asset-backed security is a security whose income is derived from and backed by a pool of underlying assets.

Bank Rate

The main policy rate of the Bank of England

CLOB

Central Limit Order Book: a trading protocol whereby participants all interact with one central order book rather than with each other.

EONIA

The Euro Overnight Index Average: the OIS reference rate used in euro markets.

Forward-starting

A transaction whose start date is a specified date further in the future than the market standard settlement date for spot-starting transactions (i.e. greater than the typical 1 or 2 days).

FRN

Floating Rate Note: bonds that have a variable coupon, equal to a money market reference rate, like LIBOR or federal funds rate, plus a quoted spread (also known as quoted margin).

GMRA

Global Master Repurchase Agreement: a standard agreement under which repo transactions are documented.

IMM-dated

Financial contracts starting and maturing on an IMM (International Monetary Market) date. IMM dates are the third Wednesday of March, June September and December.

Libor

Libor benchmark rates provide an indication of interest rates paid on short-term unsecured bank funding across different maturities and five currencies: sterling, US dollar, Japanese yen, Swiss franc and euro.

MBS

Mortgage Backed Securities: a security whose income is derived from and backed by a pool of underlying mortgages.

MIFID II

The second Markets in Financial Instruments Directive of the European Union. This was a major change in the regulatory landscape that largely came into force at the beginning of 2018. Notably it introduced rules that aim to increase transparency in OTC derivative markets.

MPC

Monetary Policy Committee: a Committee of the Bank of England which decides the monetary policy of the United Kingdom, including by setting Bank Rate.

MPC-dated

Financial contracts starting and finishing on MPC meeting dates.

MTF

Multilateral Trading Facility: a multilateral trading system, operated by an investment firm or a market operator which brings together multiple third-party buying and selling interests in financial instruments – in the system and in accordance with non-discretionary rules – in a way that results in a contract in accordance with the provisions of Title II of MIFID.

OIS

Overnight Index Swap: an interest rate swap where the floating rate payments are calculated by compounding a daily overnight rate.

OTC

Over the counter: a financial instrument is described as OTC when it is transacted between parties without the involvement of a recognised trading venue or exchange.

RFQ

Request for Quote: a trading protocol where participants request competitive quotes from market makers rather than placing limit orders on a central exchange.

SONIA

The Sterling Overnight Index Average: the chosen RFR for sterling markets, which has recently been reformed and is now administered by the Bank of England.

TSRR

Term SONIA Reference Rate: a measure the market's forward expectation of the average SONIA rate over a designated term.

The Working Group on Sterling Risk-Free Reference Rates ('Working Group')

A Working Group established by the Bank of England and the Financial Conduct Authority (FCA) whose mandate is to catalyse a broad-based transition to using SONIA – the market's preferred risk-free rate – as the primary sterling interest rate benchmark in bond, loan and derivatives markets.