EUROPEAN CENTRAL BANK

EUROSYSTEM

Second public consultation by the working group on euro risk-free rates

on determining an ESTER-based term structure methodology as a fallback in EURIBOR-linked contracts

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Contents

1 Executive summary

In February 2018, the ECB, the Financial Services and Markets Authority, the European Securities and Markets Authority and the European Commission established a working group tasked with identifying and recommending alternative euro risk-free rates (RFRs). Such rates could serve as a basis for an alternative to current benchmarks used in a variety of financial instruments and contracts in the euro area.

As part of its mandate the working group on euro risk-free rates[1] is expected to identify alternative euro RFRs likely to be consistent with the International Organization of Securities Commissions (IOSCO) principles[2] for financial benchmarks and compliant with the EU Benchmarks Regulation (BMR)[3]. The mandate also asks the working group to identify which RFRs should be used as best practice for certain new derivatives and other contracts, including mortgage contracts.[4] In fulfilment of its mandate, the working group is engaged in identifying and recommending a term structure methodology, based on the euro short-term rate (ESTER), that can serve as a fallback for EURIBOR-linked contracts. In this context, the working group is now seeking market feedback on (i) the use cases for certain term structure methodologies, as well as on (ii) the methodology preferred by the working group as proposed in this document.

While the working group's first public consultation looked at alternative overnight RFRs[5], this public consultation focuses on alternative term RFRs (in particular as a fallback in EURIBOR-linked contracts). These alternative term RFRs could function as a robust and resilient fallback to current term rates used as reference in financial contracts (e.g. EURIBOR) to give market participants the opportunity to comply with BMR Article 28(2) if a current benchmark changes materially or ceases to exist.

In September 2018, the working group recommended ESTER as the alternative RFR and replacement for EONIA. [6] The working group considers it necessary to incorporate fallbacks in EURIBOR-linked contracts and is focusing on methodologies based on ESTER as a fallback.

The working group has considered a variety of potential term rate methodologies which are discussed in this consultation. Term rates can be backward-looking or forward-looking. Backward-looking term rates are based on simple mathematical

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1 "Composition of the Working Group on Euro Risk-Free Rates".

2 "Principles for Financial Benchmarks", IOSCO, July 2013.

3 Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds and amending Directives 2008/48/EC and 2014/17/EU and Regulation (EU) No 596/2014 (OJ L 171, 29.6.2016, p. 1).

4 "Terms of reference for the working group on euro risk-free rates".

5 "First public consultation by the working group on euro risk-free rates on the assessment of candidate euro risk-free rates", June 2018.

6 "Private sector working group recommends ESTER euro risk-free rate", 13 September 2018.

calculations on the past realised daily fixings of the overnight risk-free rate (i.e. ESTER) over a given period in time, whereas forward-looking term rates are based on derivatives markets of the underlying RFR. A backward-looking methodology is easy to understand and to construct. However, the working group recognises the potential need for a forward-looking methodology for cash flow forecasting and for managing interest rate risk, especially in the mortgage, loan and debt securities markets.

The working group will ultimately consider both approaches.

The focus of this public consultation is to seek feedback on the need for term rates in different products, and on the analysis of forward-looking methodologies to obtain term rates, recognising that such rates could serve as fallback rates for EURIBOR-linked contracts[7].

The working group developed key selection criteria rooted in IOSCO principles for a robust alternative risk-free term rate.

It identified four forward-looking approaches building on as yet non-existent ESTER-based derivatives markets (overnight index swap (OIS) and futures markets) for deriving a euro risk-free term rate.

It acknowledged that any assessment of such risk-free term rates would necessitate a successful transition from EONIA to ESTER with:

1. a significant transfer of liquidity to ESTER OIS markets;

2. a transparent and regulated underlying derivatives market such as trading on multilateral trading facilities (MTF);

3. sufficient sources of data to capture the majority of market activity.

Against this background and making these assumptions the working group assessed three approaches for deriving term RFRs by building on OIS markets and one based on futures markets. Under the defined main assumptions, a majority of its members expressed a preference for the OIS quotes-based methodology as the methodology that is most likely to be viable at the present time.

The working group expects that the feedback on this consultation document will provide valuable input for recommending risk-free term rates as (fallback) reference rates for different financial products.

The working group also expects the feedback from this consultation to help in assessing the suitability of a one-size-fits all (vis-à-vis product specific) approach for a fallback rate. As part of the subsequent evaluation, the working group will assess various factors impinging on a broad-based market adoption of the recommended term RFR, including hedging and accounting issues, and will address the issue of the credit spread difference between EURIBOR and ESTER-based curves.[8]

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7 "Terms of reference of the subgroup on term rates".

8 "Working group on euro risk-free rates high level implementation plan".

The working group closely follows related initiatives in international fora and in working groups in other jurisdictions. It reflects on these developments and strives to factor them into its discussions and proposals.

The working group notably acknowledges that the International Swaps and Derivatives Association, Inc. (ISDA) has announced to launch a consultation on determining a fallback for EURIBOR linked derivatives contracts following the publication start of ESTER[9]. The results of this consultation will allow ISDA to propose a standard legal solution to all market participants aiming at facilitating the fallback process for derivatives. ISDA has already indicated that, as recommended by the Financial Stability Board (FSB), the options proposed will not include forward looking methodologies,[10]. The working group strongly encourages market participants, in particular end-users, to prepare for responding to this key consultation by ISDA.

In the meantime the working group will continue its work on helping market users to understand the issues and on finding simple and efficient solutions. It will consider the work done by related working groups in other currency areas and by ISDA, while taking into account the specific features of the affected euro denominated products and markets.

9 "Consultation on Certain Aspects of Fallbacks for Derivatives Referencing GBP LIBOR, CHF LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR and BBSW", ISDA, 12 July 2018.

10 "Interest rate benchmark reform – overnight risk-free rates and term rates", FSB, 12 July 2018.

2 Introduction

As part of its mandate, the working group is engaged in identifying and recommending an ESTER-based term structure methodology that can serve as a fallback for EURIBOR-linked contracts. In this context, the working group is now seeking market feedback on (i) the use cases for certain term structure methodologies, as well as on (ii) the methodology preferred by the working group as proposed in this document.

Against this background, the scope of this second public consultation by the working group is outlined below.

The consultation focuses on a term structure methodology based on ESTER, i.e. a risk-free methodology that does not capture any credit risk. Such a methodology would function as a first step to create a fallback rate for EURIBOR. At a later stage, the working group will analyse methodologies for the calculation of a spread, accounting for any differences in levels between EURIBOR and the rate calculated from the ESTER-based term structure methodology.

The working group aims to narrow the options available in order to simplify the implementation of the fallback rates and reduce basis, legal and operational risks. More specifically, the consultation focuses on forward-looking methodologies based on ESTER derivatives markets. Backward-looking methodologies that represent a calculation of past realised daily ESTER fixings are not included.

The purpose of this second consultation by the working group is twofold. On the one hand, it seeks responses that offer information on potential use cases (by asset class) for which market participants consider a fallback based on a forward-looking term rate to be necessary or desirable. On the other hand, market participants are invited to give feedback on the working group's expressed preference for one of the specific forward-looking term structure methodologies available that are outlined in this consultation. The working group strongly encourages market participants to respond to this public consultation; it hopes to receive feedback from as broad a range of market participants as possible, including stakeholders in EURIBOR-linked products from different sectors and product categories.

This public consultation document is structured in four major parts.

Section 3 outlines the rationale for the scope of this consultation and provides further context.

Section 4 describes the approach adopted by the working group, including the selection and implementation criteria for a euro risk-free term rate.

Section 5 presents four forward-looking methodologies, including the conditions and assumptions underlying the analysis of those methodologies and an analysis against the selection and implementation criteria. Market participants are encouraged to indicate, for each methodology, their agreement or disagreement with the working

group's analysis and to give their assessment of each different methodology's data sufficiency, transparency and overall feasibility.

Section 6 sums up the main considerations and conclusions from the analysis. Market participants are invited to express their views on the methodology, which the working group now deems to be the most likely to be viable within a reasonable amount of time.

Responses to this consultation should be sent to EuroRFR@ecb.europa.eu by 17:00 CET on 1 February 2019. The ECB provides the secretariat for the working group and is publishing the public consultation document solely in this capacity. The ECB does not however accept any responsibility or liability for the contents of the document and the fact that the ECB provides the secretariat for the working group should not be taken as implying in any way that it shares the views expressed in the document. The ECB will evaluate all the responses and prepare an anonymised summary of the feedback. This summary will be discussed by the working group and published on the ECB's website with other documents related to the working group's meeting on 27 February 2019.

3 Scope of the consultation and context

3.1 Need for ESTER-based fallback rates for EURIBOR

The working group on euro-risk free rates set up a dedicated subgroup to work on issues related to term rates. In this context, the working group identified two key tasks: (i) explore possible fallback arrangements for EURIBOR, and (ii) determine and recommend a term structure methodology on RFR(s) as a fallback for EURIBOR-linked contracts.

The working group seeks to cover all financial products referencing existing euro interest rate benchmarks.[11] The working group acknowledges that other stakeholders involved in the global process of benchmark reforms (notably ISDA for derivatives and working groups in other jurisdictions for other currencies; see Section 3.2) are also working on RFR-based term rates and their potential use as fallbacks for existing benchmarks.

In September 2018, in line with the FSB recommendations, the working group recommended ESTER as the alternative euro risk-free rate and replacement for EONIA. ESTER reflects wholesale euro unsecured overnight borrowing costs of euro area banks and will be produced by the ECB by October 2019 at the latest. Following this recommendation, the work on term rates hence focuses on methodologies based on ESTER as a fallback for EURIBOR.

The working group finds it necessary to recommend an approach for incorporating fallbacks in EURIBOR-linked contracts for the following reasons.

- EURIBOR is a reference rate used in a wide range and large volume of financial instruments denominated in euro (see Section 3.2). The working group notes that any existing current fallback provisions in contracts lack uniformity and are only temporary. In the event of a permanent cessation of EURIBOR, severe operating issues and economic impacts may hence affect users[12].

- The BMR requires supervised entities, other than administrators, to produce and maintain robust written plans setting out the actions that they would take in the event that a benchmark they are using materially changes or ceases to be provided (Article 28(2) BMR).

While EURIBOR's current methodology does not satisfy some of the requirements under the BMR, as it still relies on quotes or estimates submitted by contributing banks, the index is now being reformed by its administrator, EMMI, to anchor its determination in real transactions insofar as possible. The working group works under

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11 "Terms of reference for subgroup 2 on the identification and recommendation of a term structure on RFRs", 13 July 2018.

12 Existing fallbacks may not produce a commercially acceptable result for all parties as they may affect the economics of the product in the event of a permanent cessation of the relevant benchmark.

the assumption that this reform will be successful and EURIBOR will become BMR-compliant.

For the design of an ESTER-based fallback for EURIBOR, the working group has analysed available options and recommends a term structure methodology based on ESTER that is compliant with international standards for benchmarks, i.e. IOSCO principles. In order for a new rate to classify as a compliant benchmark rate under the BMR, it would need to be administered by an authorised administrator.[13]

3.2 Need for a forward-looking term rate as a fallback for EURIBOR

In principle, there are two broad approaches for deriving term structure methodologies.

- **Backward-looking methodologies** are based on simple mathematical calculations on the value of past realised daily fixings of the overnight risk-free rate (i.e. ESTER) over a given period in time. Strictly speaking these are not new methodologies, but rather agreed calculation methods that – assuming the successful implementation of ESTER - could essentially be calculated with immediate effect.

- **Forward-looking methodologies** are based on the derivatives markets referencing ESTER and produce forward-looking rates that are available at the start of the interest period. Although these derivatives markets have not yet been developed, the fixings themselves can be similar to EURIBOR in certain operational ways.

With respect to backward-looking methodologies, the working group notes that ISDA's "Consultation on Benchmark Fallbacks" for over-the-counter (OTC) derivatives contracts referencing certain interbank offered rates (IBORs) has recently closed.[14] ISDA's consultation envisages that the primary fallbacks for key IBORs will directly reference overnight RFRs. In this respect, the working group acknowledges the FSB's statement of 12 July 2018 explaining its preference for derivatives which reference an IBOR like EURIBOR to include a fallback on the basis of an overnight rate rather than a forward-looking term rate.[15] ISDA's consultation primarily covered IBOR rates other than EURIBOR (although it requested preliminary feedback in relation to fallbacks for

[13] The working group notes that not all term structure methodologies may require an administrator. A backward-looking methodology based on past realised daily fixings of ESTER would be a pure calculation that does not constitute a benchmark in itself. For these approaches an administrator would not be necessary, but could be seen as desirable.

[14] "Consultation on Certain Aspects of Fallbacks for Derivatives Referencing GBP LIBOR, CHF LIBOR, JPY LIBOR, TIBOR, Euroyen TIBOR and BBSW", ISDA, 12 July 2018.

[15] See page 4 of the FSB statement of July 2018 on reforms to interest rate benchmarks: "[…] the FSB supports a focus on the overnight RFRs as a primary IBOR fall back rate, in the work which it has invited the International Swaps and Derivatives Association (ISDA) to lead on robust fall backs for derivatives which reference IBORs. If the major derivative markets that are currently reliant on IBORs at risk of discontinuance were to fall back to RFR-derived term rates rather than overnight RFRs, and these RFR-derived term rates did not have sufficient liquidity to support production of a benchmark robust across the range of market conditions, this would not be effective in addressing systemic risks."

EURIBOR). ISDA has said that it will launch a supplementary consultation on spread and term adjustments that would apply to ESTER as a fallback to EURIBOR once ESTER has been published and market participants have sufficient information about how it trades compared to EURIBOR.

The working group finds that backward-looking methodologies could potentially be suitable as fallbacks in other products too. However, the working group recognises that for some products, users may consider it necessary or desirable to use a forward-looking term rate as a fallback for EURIBOR, which itself is forward-looking.[16] For the purpose of this consultation, the working group focuses on selecting a suitable forward-looking methodology. The interaction with backward-looking methodologies, e.g. across products, will be addressed at a later stage.

EURIBOR is seen as straightforward for end-users because it is known at the beginning of the interest period. Typically, the borrower pays the amount of interest so calculated in cash to the lender at the end of the interest period. As a comparison, backward-looking options for calculating a floating rate do not determine the final cash amount until the end of the period, which may pose economic and operational issues for some types of users, mostly corporates and retail customers.

EURIBOR is used in a wide variety of contracts and products, and in particular loans and mortgages are highly dependent on forward looking rate determinations. EURIBOR's significance and usage are not evenly spread across countries or products. It is very heavily relied on as a reference for mortgage rates in Spain, Italy, Portugal and Finland, while it is used far less for these purposes in other countries. On the other hand, floating rate bonds and corporate loans denominated in euro mostly refer to EURIBOR (see Annex). Table 1 outlines the working group's understanding of the use of term rates for different asset classes.

In particular, the working group assessed the degree of difficulty/operational issues that users would face if they need to update the existing stock of contracts for each individual asset class. It is assumed that – in the event of a permanent cessation of a benchmark - deals under broadly agreed protocols have a lower degree of difficulty than deals with a large portion of bespoke contracts. For example, mortgages are expected to present more challenges task than money market instruments because of the fragmentation of the national consumer protection laws that govern them.

A qualitative estimate was also made of the economic impact stemming from the cessation of an index because of the lack of standard legal solutions and/or the fragmentation of common fallbacks. As an example, securitisation structures are expected to bear a higher economic impact than OTC derivatives, which can more easily use other methodologies that do not involve forward-looking fallbacks. On the basis of the assessment in Table 1, the working group is seeking feedback on potential use cases (by asset class) for which market participants consider a fallback based on a forward-looking term rate as necessary or desirable.

[16] This is also in line with work being conducted by working groups in other jurisdictions, such as the UK and the US.

Table 1

Qualitative assessment of the need for term rate fallbacks broken down by asset class

Potential use case	Operational issues if a fallback is triggered	Economic issue if a fallback is triggered	Degree of demand for a fallback
Financial leasing	High	Medium	Strong
OTC derivatives*	Medium	Low	Strong
Exchange traded derivatives	High	High	Strong
Money Market or securities lending	Medium	Low	Weak
Capital/perpetual securities	Medium	Low	Medium
Floating rate notes	High	High	Strong
Retail loans/mortgages	High	High	Strong
Securitisation structures	High	High	Strong
Corporate lending	High	High	Strong

Source: working group on euro risk-free rates
Notes:
* Both cleared and un-cleared
(a) The uses as a cash-flow discount rate or for performance benchmarks have not been included in this table since the use case is judged to be low. Derivatives are considered to be referring to term rates.
(b) For a quantitative assessment of the footprint of different asset classes see presentations to the working group on euro risk-free rates:
• 20 April 2018 presentation: Item 4.1: Mapping exercise of the usage of EONIA and EURIBOR;
• 17 May 2018 presentation: Item 3.1: Update on quantitative mapping exercise.

QUESTION 1

For your current and future business, for which asset class would a forward-looking term rate methodology as a fallback to EURIBOR be required? (essential/desirable/dispensable/not business-relevant)
Please elaborate on the reasons underlying your answer, also taking into account possible interactions among asset classes and related instruments.

4 Selection criteria

The working group decided it was more suitable to define criteria following the IOSCO principles rather than the more prescriptive BMR requirements. Compliance with the BMR could only be ensured by an administrator and approved by a national competent authority (NCA).

IOSCO principles cover a large number of requirements for benchmark administrators, contributors and users. After careful consideration, the working group decided that Principles 6, 7 and 9 were most relevant for the evaluation of the methodologies. Having considered which criteria that the methodologies shouldmeet, the working group ordered these selection criteria in line with these principles (Table 2).

Table 2

Mapping of working group selection critieria to the IOSCO principles

IOSCO Principle	Criteria
IOSCO Principle 6: Benchmark design	Representative of near risk-free bank borrowing costs (at any time), (minimal counterparty risk)
	Reasonably aligned with policy rates
IOSCO Principle 7: Data sufficiency	Underpinned by a broad base of transactions
	Transactions represent sufficient volume/depth
	Existence of active related markets
IOSCO Principle 9: Transparency of benchmark determination	Underlying interest that the benchmark seeks to measure must be easy to understand
	Eligible transactions clearly defined / accessible data sources
	Calculation methodology easy to understand on a rudimentary basis
	Appropriate euro area representation
	Minimal opportunities for market manipulation

Sources: Working group on euro risk-free rates and "Principles for Financial Benchmarks", IOSCO, July 2013.

5 Detailed description and assessment of forward-looking methodologies against selection criteria

5.1 Necessary conditions and assumptions

Fundamental to any of the forward-looking term structure methodologies is the requirement for an instrument that represents the market expectations for ESTER over the given term period. The working group's analysis shows that the most feasible way of meeting this requirement is to use derivatives based on ESTER: **A central assumption in all methodologies described below is therefore the existence of a liquid underlying derivative market based on ESTER: this complies with IOSCO Principle 7 which requires a benchmark to be "anchored in an active market having observable, bona-fide arm's-length transactions."**

It is therefore important to make some clear statements in this regard:

1. With the publication of ESTER expected in the second half of 2019, the working group makes some general assumptions regarding the actual market that will exist once ESTER becomes fully established, namely that liquidity will, at a minimum, equal the current market in EONIA swaps and futures. Obviously, this process will be aided by a clear and efficient transition from EONIA to ESTER.[17]

2. Any derivative market used in the construction of a term rate is both highly transparent and highly regulated. Given the regulatory developments in recent years, the working group sees this condition being met for both futures (traded on an exchange) and any OIS swap market trading on a multilateral trading facility (MTF).

3. Any derivative price must incorporate only the future expectation of ESTER and be clear of any other risk premia (for example the price must not incorporate a counterparty risk premium). The working group assumes that any derivative contract included must be centrally cleared by designated clearing houses in order to assist in the fulfilment of this requirement.

4. Additionally, the working group assumes that sufficient sources of data would be readily available in order to capture most market activity and so provide a good representation of the overall market expectation for ESTER. The sources of data that are actually required would potentially differ depending on the underlying methodology, but could include exchanges, MTFs, clearing houses, trade depositories etc.

[17] See the Report by the working group on euro risk-free rates on the transition from EONIA to ESTER.

5. Finally, for all methodologies it is necessary to have an administrator who is willing and able to calculate the benchmark on a daily basis. The specific detailed methodology would be the responsibility of the individual administrator subject to the approval of its NCA.

5.2 OIS transactions-based methodology

5.2.1 Brief description

This methodology uses actual EUR OIS transaction data to construct a term rate representing the future market expectation for the ESTER overnight rate. In order to maximise the number of transactions and obtain sufficient volumes to create a robust term rate, transactions over a full trading day need to be taken into account. In addition, not only spot-starting transactions, but also forward-starting transactions might need to be incorporated to achieve this target.

5.2.2 Methodological description

An OIS transaction-based methodology should be fully anchored, to the extent possible, in real transactions. The forward RFR benchmark would thus be fixed on the basis of actual EUR OIS transactions in the specific relevant term maturities. The basic methodology would include:

1. viable data sources from which to source the transactions;
2. a clear process for providing a quality check on each reported transaction;
3. tests to ensure maximum concentrations;
4. removal of outlier transactions data and clear fallback procedures covering instances where transaction volumes do not meet specific thresholds;
5. at least a full day's volume of transactions, with some form of averaging then taken.

It is highly unlikely that the forward RFR benchmark fixing could be considered as a point-in-time benchmark fixing, which is discussed in more detail later in this consultation.

Like all transaction-based benchmarks, this approach relies heavily on a sufficient number of transactions occurring on a daily basis for each relevant maturity. This prerequisite was seen as critical to the viability and functioning of a transaction-based methodology. The working group therefore concluded that a detailed analysis of the current EONIA volumes and transaction numbers was necessary in order to assess the viability of this approach. It has to assume that an ESTER market will develop which will replicate at least the same liquidity as the EONIA market.

5.2.3 Market overview

Due to the very stable interest rate environment within the euro area over the past few years, the level of activity in the EONIA swap market has been lower compared with more volatile periods in the past. Similar to other jurisdictions the main volumes occur both in standard spot tenors but also in transactions with forward-starting dates corresponding to the ECB monetary policy meeting dates. For the analysis, daily EONIA OIS transaction-level data for the period from 1 July 2017 to 30 June 2018 was collected from the following sources:

1. Money Market Statistical Reporting (MMSR) data, which includes all daily OIS transactions where one of the two counterparties in the swap transaction is subject to MMSR reporting regulation.

2. LCH Ltd (LCH) data, which incorporates additional banks that are not subject to the MMSR regulations but clear relevant transactions through LCH.

The working group believes that this transaction-level market data provides a very good overview of the current market in terms of both volumes and number of transactions traded on a daily basis in the EONIA OIS market. It should be noted that, due to the overlap of transactions from banks included in both data sets, the LCH data includes elements of the MMSR data.

5.2.4 Results

Table 3 shows the average daily turnover and transaction count of EONIA OIS transactions by MMSR reporting banks for various tenors, for both spot and non-spot transactions.

Table 3

MMSR average daily turnover of vanilla EONIA OIS transactions

	One month	Three months	Six months	12 months	Other	Total volume	Total number of trades
Spot (€ million)	4162	6095	2463	1755	14302	28777	
Average number of trades	2	7	4	6	62		81
Non-spot (€ million)	6161	7370	1858	1247	8645	25281	
Average number of trades	-	4	1	2	19		26
						54058	107

Sources: ECB MMSR data and working group on euro risk-free rates.
Notes: The category “Other” includes transactions with maturities both below and above one year.

According to the MMSR data, there were no business days without trading activity. There were 48 reporting agents trading at least once in the observed time frame. Broken down per day, there were 17 agents on average, with at least one at the low end and as many as 25 at the high end.

Table 4 summarises the market share in terms of both volume and transaction count for the most active contributing banks. The top nine banks account for approximately 80% of the data, specifically for 81% of volumes and 79% of trade count.

Table 4

MMSR distribution of trading activity by banks

	Top three banks	Second top three banks	Third top three banks	Top nine banks
Market share in volume X%	50%	19%	12%	81%
Market share in number of trades X%	46%	19%	14%	79%

Sources: ECB MMSR data and working group on euro risk-free rates.

Table 5 summarises similar statistics based on LCH cleared transactions. The data provided by LCH confirm the observations based on MMSR data, except for significantly larger volumes in the “non-spot other” category. “Non-spot” includes all forward deals grouped by tenor e.g. the three-month category could include 1x4s, 2x5s, 3x6s etc. It may not be possible to aggregate these easily in terms of rates. “Other” includes all other maturities, some of which may be above one year.

Table 5

LCH cleared EONIA OIS transactions

	One month	Three months	Six months	12 months	Other < 1 year	Other > 1 year	Total volume	Total number of trades
Spot (€ million)	2670	5750	2330	2240	3830	8780	25600	
Average number of trades	2	7	4	7	7	58		85
Non-spot (€ million)	1850	9090	1600	4350	56100	9640	82630	
Average number of trades	1	6	1	12	24	88		132
							108230	217

Sources: LCH and working group on euro risk-free rates.

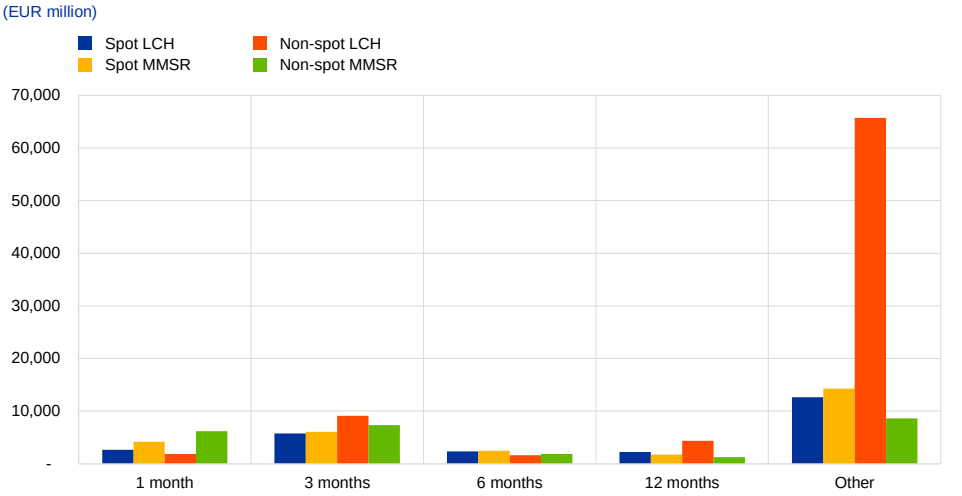
Charts 1 and 2 show a comparison between both data sets used. LCH cleared transactions are double both the volume and the number of MMSR reported transactions.

Based on MMSR data, the split between spot and non-spot transaction volumes seems to be roughly equal. However, the number of spot transactions (81) exceeds by far the number of reported non-spot trades (26).

On the other hand, based on LCH data, non-spot transactions outweigh spot transactions both in terms of trade count and volume.

Chart 1

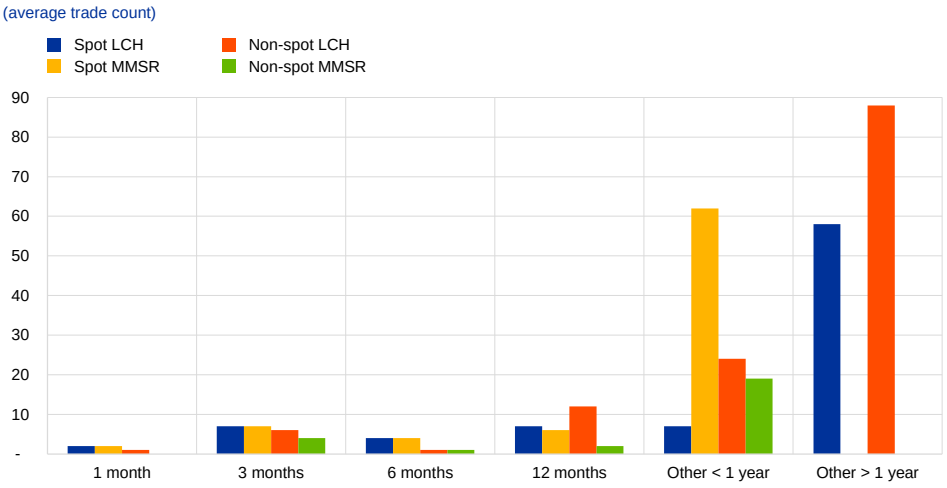
MMSR versus LCH daily volumes of EONIA OIS transactions



Sources: ECB, LCH and working group on euro risk-free rates.
Notes: The category " Other" includes transactions with maturities both below and above one year.

Chart 2

MMSR versus LCH daily EONIA OIS transaction number



Sources: ECB, LCH and working group on euro risk-free rates.
Notes: The category "Other" includes transactions with maturities both below and above one year.

5.2.5 Compliance with selection criteria

The transaction-based methodology offers two major benefits: (i) it is intuitive and relatively simple to understand, and (ii) the risk of manipulation is very low. However, it must also be based on sufficient transactions and volumes. The latter is not only required by IOSCO Principle 7, but also necessary in order to provide a benchmark that is robust, reliable and representative of the market expectations of the compounded RFR for the given term.

Overall, the available data at present allows for the conclusion that the spot-starting data in the main tenors, being one month, three months, six months and 12 months, are currently insufficient to support a purely transaction-based methodology for these tenors. Additionally, even the volumes for the non-spot starting transactions do not appear to be sufficient.

While it is possible to derive a spot-starting term curve from all available transactions using mathematical models, the working group is not recommending such an approach as it would require continuous adjusting and fine tuning of model parameters, thereby harming transparency for the end-user.

5.2.6 Conclusion

The working group believes that the OIS transactions-based methodology is not viable because of the likelihood that there would not be enough transactions and volumes to support it.

QUESTION 2

Do you agree with the working group's analysis of the OIS transactions-based methodology? (yes/no/no opinion)

Please provide your assessment of the OIS transactions-based methodology in terms of (i) data sufficiency (high/medium/low), (ii) transparency (high/medium/low), as well as (iii) overall feasibility (feasible/challenging/unviable)

Please elaborate.

5.3 OIS quotes-based methodology

5.3.1 Brief description

This methodology uses the mid-price for OIS quotes obtained from regulated electronic trading venues (i.e. MTFs). Certain integrity protection measures would need to be applied such as using randomised snapshots during a given data collection window and conducting liquidity checks. This could be a point-in-time fixing (for example at 11:00 CET, similar to EURIBOR) with a short predefined period for collection of the quotes.

5.3.2 Methodological description

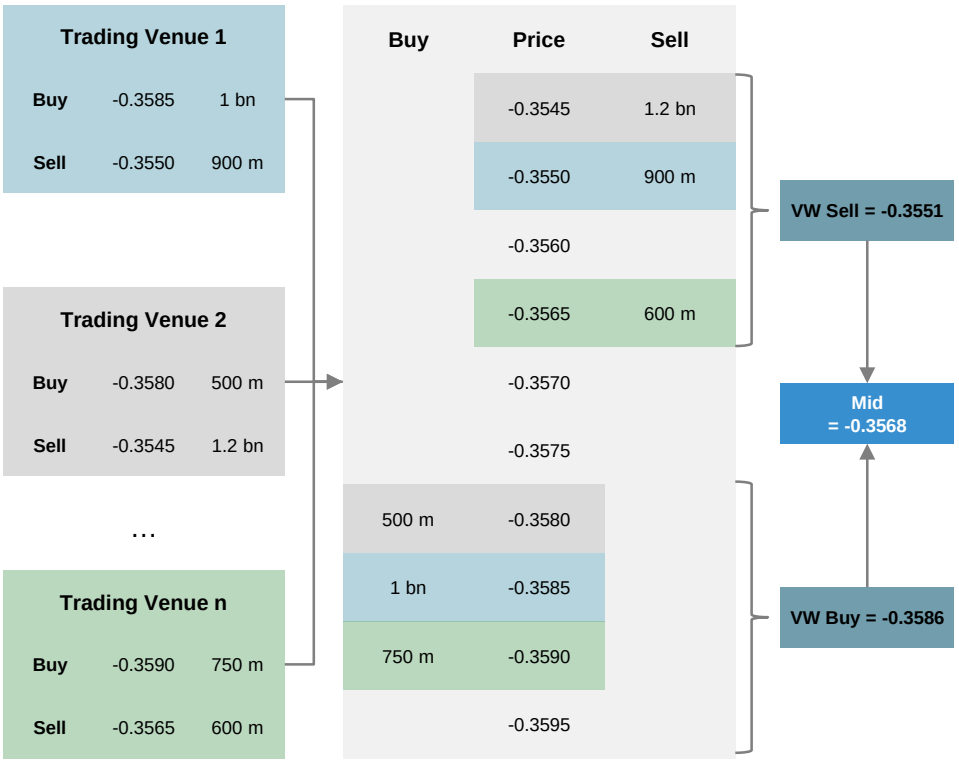
Due to the lack of underlying transaction data in the EUR OIS swap market (as outlined in Section 5.2) the working group finds that a methodology using tradable quotes in the ESTER OIS market would be a better way of constructing a fallback rate. Under a tradable quote, the individual dealer showing this quote must be able and willing to transact at this specific price in the specific volume at exactly this point in time. This differs from an indicative quote, where the institution is not required to actually trade at this level. If transacted on a regulated platform, with a sufficiently tight bid/ask spread (to be defined by the specific administrator) and with the underlying trades cleared centrally, the working group believes tradable quotes would be very similar in terms of transparency and robustness to actual transaction data.

Individual dealers will provide their firm, tradable bid and ask prices for ESTER OIS swaps for each of the relevant tenors, including volumes, throughout the day, streamed to individual MTFs which will then amalgamate the orders through the individual Central Limit Order Book (CLOB). The benchmark administrator would then combine multiple CLOBs across MTFs relevant for the ESTER OIS derivative market, in order to capture the maximum possible measure of liquidity. The benchmark administrator could then create a theoretical order book, on which a fixing rate bid and ask could be calculated, based on the weighted average volume. This process is illustrated in Figure 1 below.

Figure 1

Simplified illustration of the calculation process based on three-month EONIA swaps

(Prices in percent; volumes in EUR)



Source: ICE Benchmark Administration, Bloomberg and working group on euro risk-free rates.
Notes: The figure presents the tradable quotes from different trading venues in the left column, the global order book in the middle column, and the volume-weighted sell and buy prices respectively together with their average or mid-price in the right column.

It is assumed that prices would be streamed by each individual MTF at all points in time throughout the trading day. Randomised snapshots of the firm quotes could therefore be taken over a specified time frame throughout the day, the assumption being that a longer time frame would aid in minimising the risk of manipulation. At the extreme, snapshots could be taken over a full trading day. However, this may have significant implications for hedging and therefore impact the linkage between the fallbacks in the derivative and cash markets. The working group sees this as a critical topic and deals with it in more detail below (see Box 1 on point-in-time fixing).

A further assumption is that there will be enough dealers committing to quote electronically on MTFs with a reasonable bid-offer spread.

Once these market snapshots have been taken, some form of averaging could be used in order to calculate the final fixing. It would make most sense to use a mid-market fixing to represent an accurate market level.

5.3.3 Market overview

With both the regulatory changes introduced by the Markets in Financial Instruments Directive (MiFID II)[18] and Regulation (MiFIR)[19] as well as the technological developments in the market, the working group already sees significant liquidity and volumes tradable on electronic trading venues. It would already be technically possible to find an operational solution for the amalgamation of various tradable quotes in the market from individual dealers, similar to the process already being used for other regulatory compliant benchmarks.

While there is not yet a market in ESTER OIS swaps as described above, there is clearly a need to consider what dealer liquidity will be needed to create a robust and reliable fallback rate. The functioning of this methodology depends on a dealer's commitment to actively providing tradable prices in the relevant short dated ESTER OIS tenors under all market conditions. Further measures (such as formal market making agreements) that would give greater comfort in liquidity under all market conditions therefore need to be identified. On this overall point, it is worth reiterating that the transition process from EONIA to ESTER will also be an important factor in developing this commitment to market liquidity.

5.3.4 Compliance with selection criteria

The methodology is easy to understand, would provide an adequate view of the underlying euro-wide bank borrowing market, be related to active related markets and have easily defined/accessible market sources. However, it will require further development of electronic OIS trading in MTFs. Like any quotes-based methodology, it could potentially be more prone to market manipulation, but this would be mitigated by the fact that it would only take quotes from MiFID II regulated MTFs. The working group believes that the OIS quotes-based methodology is likely to meet the selection criteria.

5.3.5 Conclusion

Like the transaction-based methodology, the quotes-based methodology offers clear advantages: (i) it is forward-looking and therefore clearly represents the market expectation for ESTER, (ii) it is intuitive and relatively simple to understand, and (iii) the risk of manipulation is reduced, if not entirely eliminated due to the regulatory

[18] Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (OJ L 173, 12.6.2014, p. 349–496).

[19] Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012 (OJ L 173, 12.6.2014, p. 84–148).

changes introduced under the MiFID II, the Market Abuse Regulation (MAR)[20] and equivalent international legislation.

In addition it is (iv) robust even when only a limited number of transactions are available, (v) it can allow for a point-in-time fixing (see Box 1) and (vi) the rough development of the term rate can be watched in real-time by every market participant simply by following the ESTER OIS market.

However, the method clearly relies on dealers providing liquidity in tradable quotes for the specific tenors to construct a global order book with sufficiently high market depth (i.e. quoted volumes) and tight bid/offers in all market conditions in order to minimise the risk of manipulation and increase the robustness of the term rate. And as already outlined, it relies on the assumption that a firm quote in the cleared OIS derivative market is fundamentally similar to an actual transaction.

It should also be noted that similar methodologies are currently used within the derivative market for BMR/IOSCO compliant benchmarks (e.g. ICE Benchmark Administration Swap Rate Fix).

QUESTION 3

Do you agree with the working group's analysis of the OIS quotes-based methodology? (yes/no/no opinion)

Please provide your assessment of the OIS quotes -based methodology in terms of (i) data sufficiency (high/medium/low), (ii) transparency (high/medium/low), as well as (iii) overall feasibility (feasible/challenging/unviable).

Please elaborate.

Box 1

Point-in-time fixing

The working group finds it critical for any fallback rate methodology that any basis or fixing risk that may arise between the fallback rate fixing and the underlying derivative market is both minimised and can be efficiently managed. In this regard the working group believes a point-in-time fixing would be very beneficial, whereby the randomised snapshots of prices are taken over at most a one hour period rather than taking an average rate during the full trading day. It should be noted that this is despite the fact that the currently proposed EURIBOR hybrid methodology does precisely the same on the basis of actual deposit transactions, if available. The following example dating,

[20] Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse (market abuse regulation) and repealing Directive 2003/6/EC of the European Parliament and of the Council and Commission Directives 2003/124/EC, 2003/125/EC and 2004/72/EC (OJ L 173, 12.6.2014, p. 1–61).

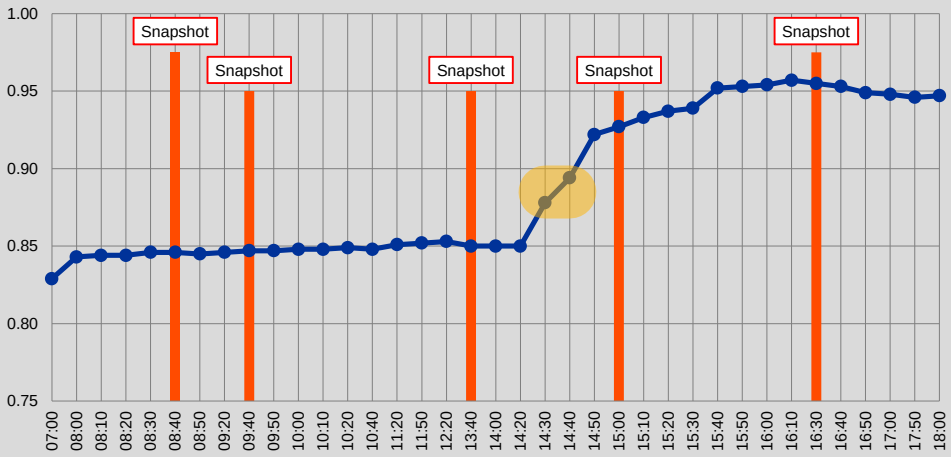
back to 2011 on account of the current low volatility in the EONIA swap market, illustrates the issue.

On 3 March 2011 the three-month EONIA swap rate moved more than 12 basis points throughout the day. An average rate calculated from five randomly timed market snapshots (no more than five for simplicity's sake) will most likely be in the range marked with yellow (depending on which averaging method is used). As can be seen it is nearly impossible to hedge the fixing risk at, or close to, this average rate calculated throughout the day.

Chart A

Price development of EONIA Swap with random snapshots taken throughout the day

(3 March 2011, 7:00 – 18:00 (CET); percentages)



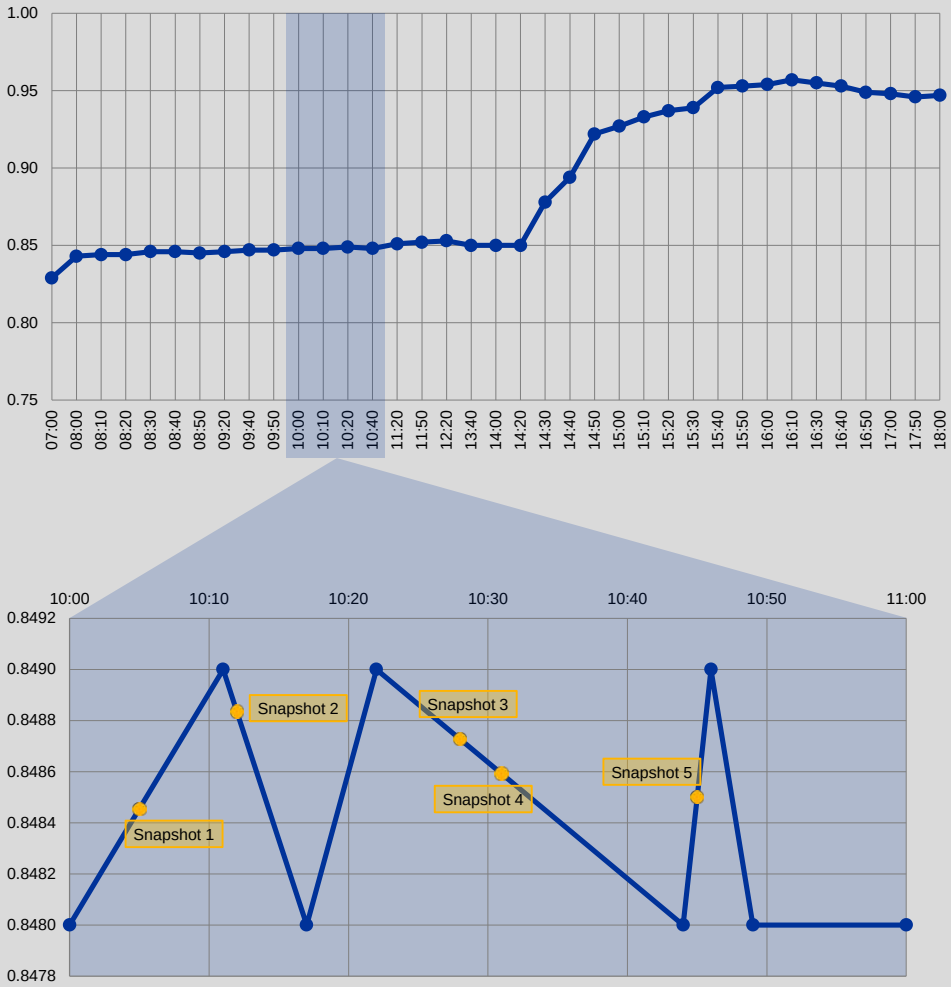
Source: Bloomberg and working group on euro risk-free rates.

If the time frame for taking the snapshots were, for example, from 10:00 to 11:00 CET (see Chart B) or even shorter, for example from 10:50 to 11:00 CET, it would be much easier to hedge the fixing risk as there would be less risk of large market moves during this time.

Chart B

Price development of EONIA Swap with random snapshots taken during one hour

(3 March 2011, 7:00 – 18:00 (CET); percentages)



Source: Bloomberg and working group on euro risk-free rates.

The downside of this approach is that, in times of stress, there is a higher risk of hitting a period of low volumes when taking the snapshots. The shorter the time frame, the higher the risk. This could lead to a situation where none, or not enough, of the snapshots would qualify for calculating a term fixing.
On the other hand, volume might be concentrated in this fixing time frame, as most of the hedging needs might be executed during this window.
Having considered the issues, the working group concluded that a shorter time window (for example, one hour) would be optimal.

Source: Working group on euro risk-free rates.

QUESTION 4

Do you agree with the working groups conclusions regarding a point-in-time fixing? (yes/no/no opinion)

Please elaborate.

5.4 OIS composite methodology

5.4.1 Brief description

Actual transactions executed on regulated exchanges are seen as the best set of data on which to build term rates. However, as elaborated in the OIS transactions-based methodology (Section 5.2), such methodologies rely heavily on a sufficient number of transactions occurring on a daily basis for each relevant maturity.

One way of mitigating the risk of a lack of sufficient number of transactions at any given date, while still using available and suitable transactions whenever possible, would be to combine firm executable quotes with transactions on regulated trading platforms to calculate the forward RFR benchmark fixing in a “composite” methodology.

The OIS composite methodology combines the quotes-based methodology above, with any available transaction data, to produce a composite rate derived from the two data sources according to certain weightings (with transactions assumed to have a higher weighting than quotes). This methodology could be operationally challenging and many decisions would have to be made with respect to how it would operate, for example whether to ignore quotes if sufficient transactions are available on a certain day for a certain tenor and which sources of transaction data to use. This methodology is better suited to an end-of-day fixing so that transactions data can be maximised.

The working group therefore additionally explored the possibility of defining a composite methodology that builds the forward RFR benchmark fixing on actual EUR OIS transactions in the specific relevant term maturities as well as on firm tradable quotes in the EUR OIS market.

5.4.2 Methodological description

Many of the methodological considerations already outlined for both the OIS transaction-based and quotes-based methodologies are equally relevant for the composite methodology. This methodology would incorporate both ESTER OIS transaction data and firm, executable quotes to calculate the fixing. The additional factor to consider is how these two data sets should be combined to produce a robust and transparent benchmark. Many composite models use a waterfall-based structure, using transaction data when volumes are sufficiently high and falling back to quotes only when volumes are not sufficient. This could, in theory, be done for a single short window during the day or over the whole trading day. Similar to the transactions-based methodology if the aim is to maximise the number of transactions and minimise the likelihood of using quotes, a full trading day would be needed. If both transaction data and quote data were to be taken from multiple different sources, an additional consideration would be the point at which quotes would be used. For example, if one trading venue or data source had sufficient transactions but another did not, would quotes be used or only transactions from one specific venue?

5.4.3 Market overview

Additional complexity arises in whether to take transactions and quotes from the same consistent sources or to expand the potential sources for transaction data in order to maximise the total data set. It would also be assumed that, similar to the transaction-based methodology, a full day fixing would be necessary in order to maximise the transaction set. If transactions were included in any of the OIS methodologies, the time between fixing and publication would tend to be extended because additional checks would then need to be put in place.

5.4.4 Compliance with selection criteria

As this methodology complements the expected lack of liquidity of the OIS transactions-based methodology with the OIS quotes-based methodology (expected to be compliant with the criteria), the working group expects this methodology to be compliant as well.

5.4.5 Conclusion

An OIS composite methodology provides a potential solution to calculate the forward risk-free rate benchmark fixing in the event of a lack of sufficient numbers of transactions.

The working group finds that the measures and decisions needed to define and implement this methodology would introduce an additional level of complexity without potentially providing much additional benefit. This methodology relies on the assumption that firm quotes within the OIS market are very similar in nature to actual transactions. The working group is therefore of the opinion that the potential benefits of an OIS composite methodology are outweighed by the complexity it introduces, methodologically as well as operationally.

The working group therefore advises against pursuing this methodology further at this point in time.

QUESTION 5

Do you agree with the working group's analysis of the OIS composite methodology? (yes/no/no opinion)

Please provide your assessment of the OIS composite methodology in terms of (i) data sufficiency (high/medium/low), (ii) transparency (high/medium/low), as well as (iii) overall feasibility (feasible/challenging/unviable).

Please elaborate.

5.5 Futures-based methodology

5.5.1 Brief description

This methodology uses a sequence of overlapping futures to extract the expected levels of the RFR between ECB monetary decision dates. The prices of the futures which straddle the period between two ECB dates are computed and used to calculate the forward compounded RFR. There are several constraints to this model (including the use of a scale factor) which are required to make it consistent (see below). This could be a point-in-time fixing, for example at 11:00 CET, similar to EURIBOR.

5.5.2 Methodological description

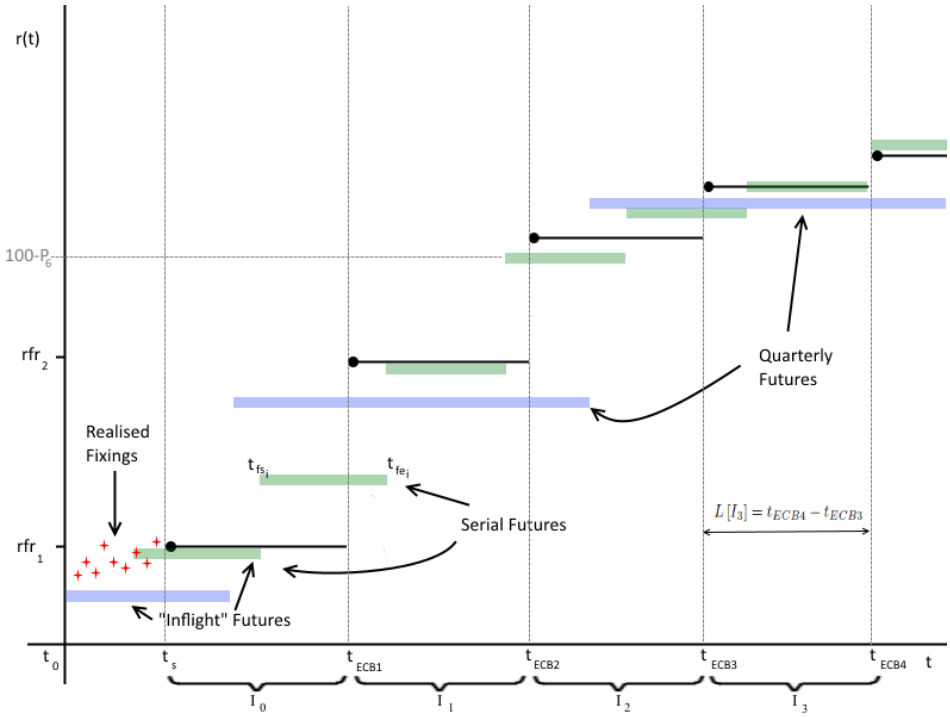
The futures-based methodology computes the constant-maturity term rate by bootstrapping between overlapping exchange-traded ESTER futures with respect to a sequence of predefined intervals. In the scope of the futures-based methodology the

expected levels of the RFR are extracted by subtracting the settlement future price from 100 between ECB monetary decision dates. Here the ECB monetary decision dates are defined as the dates on which the ECB announces a change in the target interest rate. Once all the levels have been computed, the term rate is determined from the underlying curve.

Figure 2

Graphical illustration of the futures-based methodology

(time (x-axis) and rate in percentages (y-axis))



Source: Working group on euro risk-free rates.

5.5.3 Market structure overview

The futures-based methodology makes multiple assumptions that are critical to the inner workings of the model but which are not yet fully observable in the market. A full reflection of the assumptions and their feasibility in real open markets is necessary.

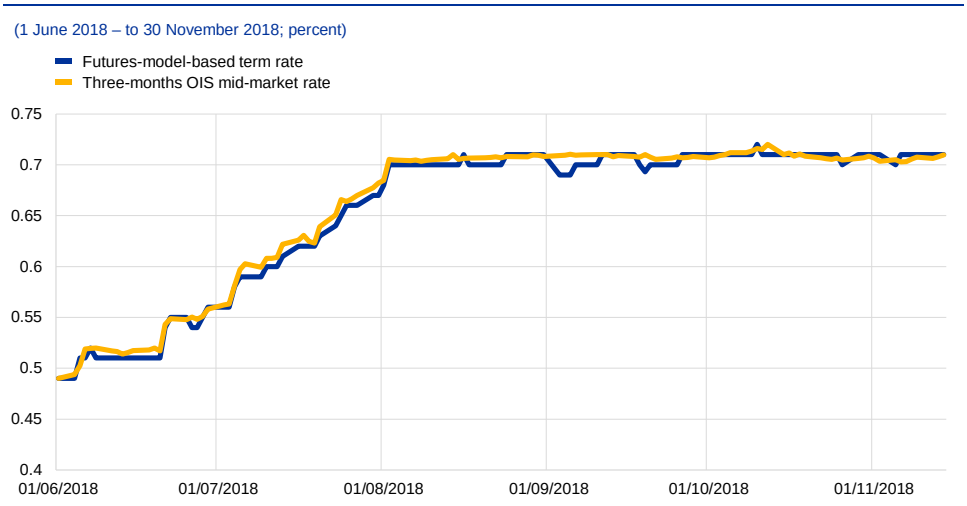
1. **Liquid futures market:** A critical model assumption is the existence of a liquid ESTER futures market, which trades both monthly and quarterly futures. A highly liquid market, with a large set of daily transactions and the expectation that it remains in this condition under all but the most extreme circumstances is needed due to the paramount role of the rate. Of course it is important to note that a liquid (or indeed any) ESTER futures market does not exist yet. However, multiple venues have listed futures products to support the transition to alternative risk-free rates in both the United States and the United Kingdom. In a short period of time, due to the importance of establishing these markets, significant trading has occurred in both jurisdictions. Settlement prices in futures market are

regulated and access is universal. In order to compare with equivalent OTC markets, the volumes are notional and trades are double counted as this is the standard convention at OTC clearing houses. This development can be seen in Chart 3 below. It should be noted that although growth has been quite significant in relative terms since the introduction of the futures contracts, it remains low in absolute terms compared with developed futures markets.

2. **Reporting dates and ECB monetary decisions:** As already stated, the model assumes a constant risk-free overnight rate between ECB monetary policy dates. In view of the impact of financial reporting dates on the overnight rate, this assumption is open to question. Additionally, to be able to split the term rate into distinct intervals, these dates need to be known in advance. In normal market conditions this is consistent with economic theory. Nonetheless, in adverse market scenarios the ECB may be required to make an unscheduled amendment to existing monetary policies. On the basis of empirical evidence, however, the working group believes it reasonable to assume that this would be a very rare event.

Chart 3

SONIA three-months – OIS vs futures-model-based term rate – time series



Sources: Reuters and working group on euro risk-free rates.

5.5.4 Results

In order to better assess the viability of such a methodology, a model was built using the general features outlined above in Section 5.5.1. In view of the lack of a EUR OIS futures market with any volumes, the sample model is based on the sterling overnight index average (SONIA) futures data. It should be noted that even here the market is currently in a development phase and so current volumes remain low (as outlined by the Sterling Working Group). Nonetheless, the working group felt it was still sufficiently valid to at least provide an illustration of how a model like this could work. The futures-based methodology was implemented for a three-month tenor against SONIA, with results shown in Table 6. The time-series ranges from 1 June 2018, trading start

date for three-month SONIA future, to 14 November 2018. The futures-based methodology is able to mirror the three-month SONIA quite accurately. The daily average generated by the futures-based methodology is nearly identical to the three-month SONIA, only diverging by 0.26 basis points but with considerably less daily volatility. The most significant result is the model's moderate sensitivity to extreme moves, with the minimum (maximum) daily change at -2.82% (5.88%) and -1.39% (5.05%) for the SONIA and the model output respectively.

Table 6

SONIA three-months – OIS vs futures-model-based term rate –statistics

	OIS mid-market	Futures-model
Mean	0.3235%	0.3210%
Standard deviation	1.1116%	0.8954%
Minimum	-2.8169%	-1.3889%
Median	0.0000%	0.1137%
Maximum	5.8824%	5.0484%
Skewness	1.5401	2.5287
Kurtosis	6.2396	8.3346
RSS		0.0089

Source: working group on euro risk-free rates.

5.5.5 Compliance with selection criteria

The futures-based methodology meets many of the selection criteria such as the alignment with policy rates, clearly defined transactions, appropriate euro area representation and minimal opportunities for market manipulation. However, as of today there is no liquidity in the EONIA futures market that could migrate to an ESTER futures market. Therefore, at this moment and for euro denominated products the working group broadly agrees that this methodology is unlikely to comply with the IOSCO principles. Nevertheless, pointing to the examples of the SOFR and SONIA futures markets (Chart 4), many members have also expressed the view that this situation could change and that the futures-based methodology would then be a very viable alternative.

5.5.6 Conclusion

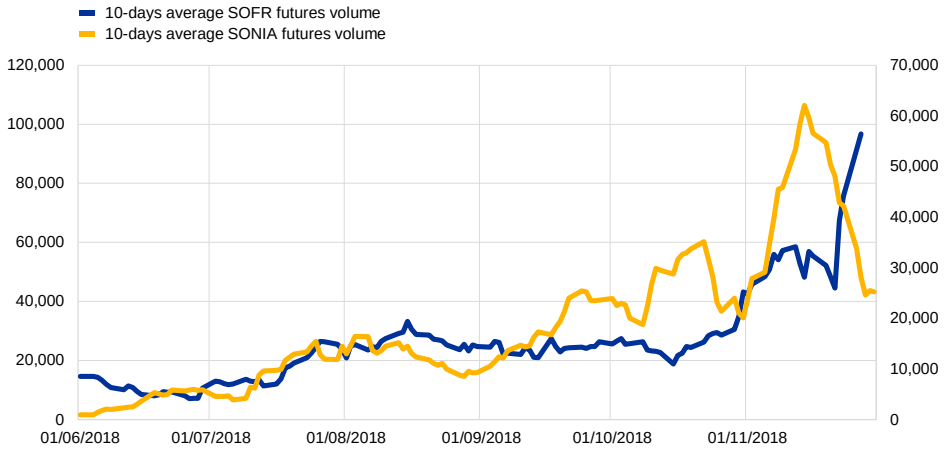
Based on the working group's analysis, the futures-based methodology is compliant, to a high level of confidence, with the outlined selection criteria: (i) it yields stable results consistent with the equivalent OIS; (ii) it is based on a regulated futures market, implying that the possibility of manipulation should be considered low and should deliver consistent pricing under different market environments; and (iii) if a liquid futures market is developed, the futures-based methodology will be easily reproducible to a very high level of accuracy by all of the market participants involved.

However, the absence of a liquid futures market would nonetheless impede the adoption of the futures methodology, as the lack of liquidity would clash with the best practices for robust contract design. Considering the historic lack of developments in the EONIA futures market, the point at which liquidity will be sufficient is still open to question.

Chart 4

SOFR and SONIA futures volumes

(1 June 2018 – 30 November 2018; USD million (LHS), GBP million (RHS))



Sources: Bloomberg and working group on euro risk-free rates.
Note: SOFR stands for the secured overnight financing rate published by the New York Federal Reserve.

QUESTION 6

Do you agree with the working group's analysis of the futures-based methodology? (yes/no/no opinion)

Assuming sufficient liquidity, what would be your view of the futures-based methodology?

Please provide your assessment of the futures -based methodology in terms of (i) data sufficiency (high/medium/low), (ii) transparency (high/medium/low), as well as (iii) overall feasibility (feasible/challenging/unviable).

Please elaborate.

6 Key considerations and conclusions

In this second public consultation, the working group seeks market feedback on the business needs for fallback rates based on a forward-looking methodology and assesses the suitability of identified forward-looking methodologies in providing risk-free term rates for different financial products as summarised in Figure 3.

Figure 3
Analysis summary

	Pros	Cons
01 **OIS transactions-based methodology**	• Provided sufficient transactions and volumes are available, least risk of manipulation • Simple to understand	• Reliant on sufficient volumes in spot transactions • Reliant on sufficient activity in the market in all monetary policy conditions • Not suitable for a point-in-time fixing
02 **OIS quotes-based methodology**	• Robust even when only a limited number of actual transactions available • Basic methodology already in use for BMR/IOSCO benchmarks (for example ICE Swap rate) • Underlying data comes from heavily regulated sources	• Not based on actual transactions • Reliant on dealers providing liquidity on individual electronic trading platforms with tight bid/ask pricing
03 **OIS composite methodology**	• Robust even when only a limited number of actual transactions available	• Operationally challenging • Agreement on decision paths under different liquidity scenarios • Not suitable for a point-in-time fixing
04 **Futures-based methodology**	• Simple from a modelling perspective • Transparent and robust • Rate directly reconstructable by market participants • Based on a heavily regulated underlying market • Less open to manipulation	• Model risk related to the model calibration • Reliant on liquid Future markets • Understanding for the real economy potentially challenging • Model assumptions may not match economic reality • An administrator may not be comfortable with the influence they have on the model

Source: Working group on euro risk-free rates.

The working group's opinion is that, at the present time, the OIS quotes-based methodology is the most likely to be viable. However, as the derivatives markets referencing ESTER develop, a futures-based methodology could present some advantages. It has to be noted that, even for the OIS quotes-based methodology, a number of significant assumptions will have to be met:

- successful transition from EONIA to ESTER
- transfer of current liquidity of EONIA OIS to ESTER OIS

further development of electronic MTF markets, including dealers' commitment to quote.

QUESTION 7

Do you agree with the working group's assessment that the OIS quotes based methodology offers the best prospect for producing a viable fallback rate within a reasonable time period following the launch of the daily ESTER publication? (yes/no/no opinion)

Please elaborate on the reasons for choosing your preferred forward-looking methodology, taking into account that it could serve as the basis for determining a fallback rate for EURIBOR.

The working group will discuss a summary of the feedback received during the public consultation. This feedback will be an essential input for the working group in recommending a term structure methodology for deriving a fallback for EURIBOR-linked contracts. Once it has made a recommendation, the working group will approach interested administrators who could then work on detailed implementation arrangements and seek NCA approval.

In the meantime, following on the launch of this public consultation, the working group will start focusing on the following issues:

- **Backward-looking methodologies:** As backward-looking and forward-looking methodologies may coexist in the future, further analyses on their interaction will need to be conducted to ensure that they are coherent. The forward-looking rate (i.e. EURIBOR) is currently used in many different products: some products and users may require a forward-looking rate (especially mortgages/loans; for which floating rates are very relevant in many countries, see Appendix); at the same time the working group expects that some issues will arise from a potential co-existence of backward and forward-looking methodologies (e.g. hedging).
- **Accounting for difference in values between EURIBOR and the fallback rate, if activated:** Issues to be addressed include (i) the necessary alignment between the fallback rate of a cash product and its derivative hedge (methodology for calculating spread to take into account credit spread included in EURIBOR); (ii) the implications of the EONIA-ESTER spread methodology for the EURIBOR-ESTER spread methodology.
- **Cooperation with other fora:** The working group will consider strengthening its working relationships with ISDA and working groups in other jurisdictions to evaluate the issues arising from the implementation of different fallbacks.
- **The implementation plan:** Identification of requirements that enable a broad based adoption of a new term structure and working out framework proposals ensuring their implementation.[21]

[21] "Working group on euro risk-free rates high level implementation plan".

7 Appendix

Table A1

Estimates of outstanding amounts linked to EURIBOR by asset class

(December 2017, March 2018 and October 2017; EUR trillion, percentages)

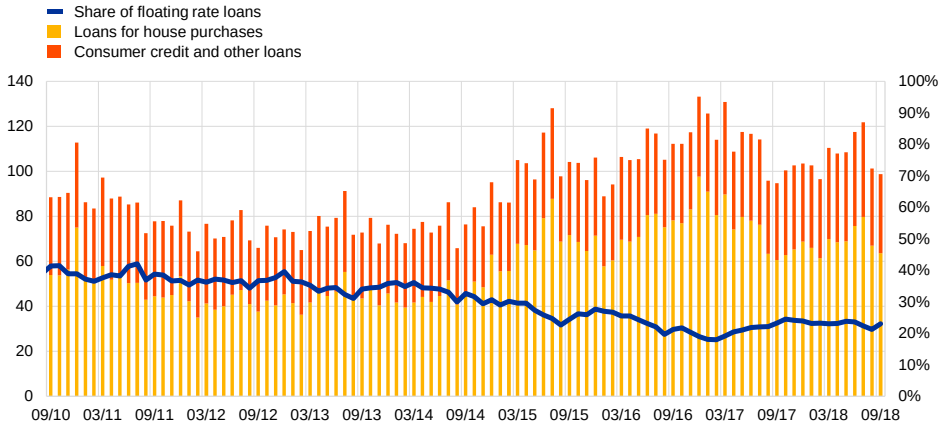
Asset class	Date	Estimated amounts outstanding	Of which outstanding after 2019 - amount	Of which outstanding after 2019 - percentage
		(1)	(2)	(3)=(2)/(1)
Loans	Dec-17	9.7	2.9	29.9%
Loans to households	Dec-17	5.5	1.7	30.5%
o.w. for house purchases	Dec-17	4.2	n.a.	-
o.w. for consumer credit and other loans	Dec-17	1.4	n.a.	-
Loans to NFCs	Dec-17	4.1	1.2	29.3%
Debt securities	Mar-18	1.6	1.3	80.0%
Interest rate derivatives	Oct-17	108.7	58.4	53.7%

Source: ECB and working group on euro risk-free rates.
Notes: see presentations to the working group on euro risk-free rates:
(i) 20 April 2018 presentation: Item 4.1: Mapping exercise of the usage of EONIA and EURIBOR ;
(ii) 17 May 2018 presentation: Item 3.1: Update on quantitative mapping exercise

Chart A1

Monthly production, composition and share of new euro denominated loans to euro area households with a floating rate

(September 2010 - September 2018; EUR billion (LHS) and percentages (RHS))

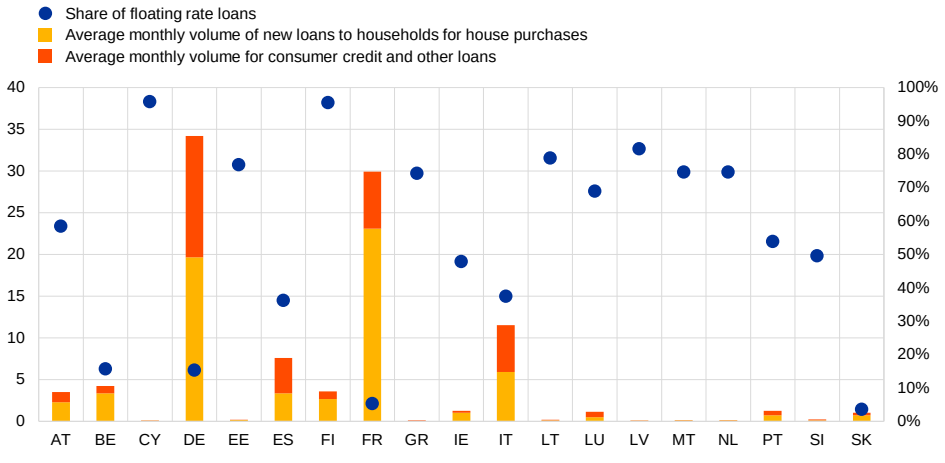


Source: ECB.

Chart A2

Average monthly production, composition and share of new euro denominated loans to euro area households with a floating rate by euro area country

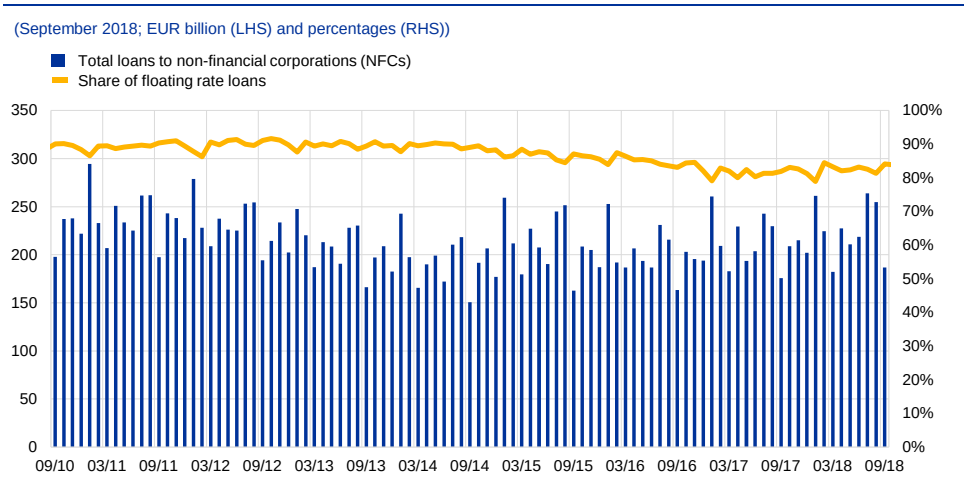
(September 2018; EUR billion (LHS) and percentages (RHS))



Source: ECB.
Notes: volumes and shares are computed using an average over the last 24 months.

Chart A3

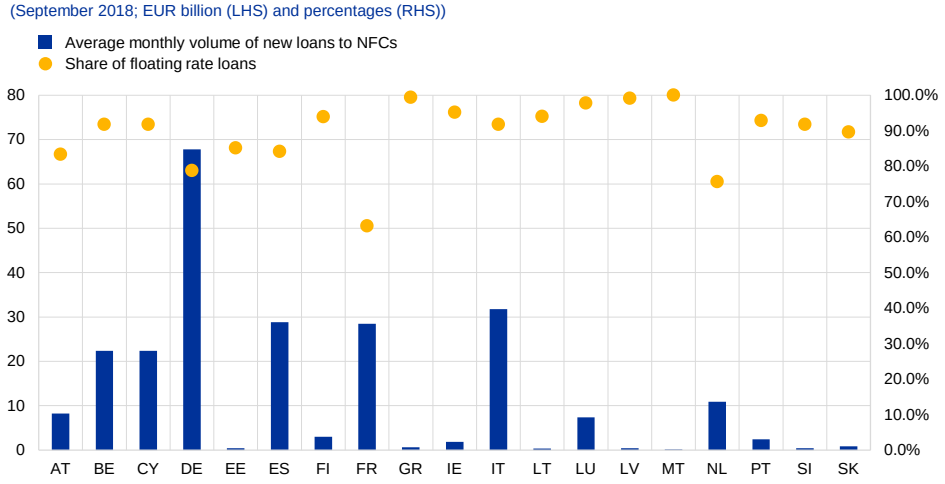
Monthly production, composition and share of new euro denominated loans to euro area non-financial corporations (NFCs) with a floating rate



Source: ECB.
Notes: volumes and shares are computed using an average over the last 24 months.

Chart A4

Average production and share of new euro denominated loans to euro area non-financial corporations (NFCs) with a floating rate by euro area country



Source: ECB.
Notes: volumes and shares are computed using an average over the last 24 months.

8 List of all questions

Question 1

For your current and future business, for which asset class would a forward-looking term rate methodology as a fallback to EURIBOR be required? (essential/desirable/dispensable/not business-relevant)

Please elaborate on the reasons underlying your answer, also taking into account possible interactions among asset classes and related instruments

Question 2

Do you agree with the working group's analysis of the OIS transactions-based methodology? (yes/no/no opinion)

Please provide your assessment of the OIS transactions-based methodology in terms of (i) data sufficiency (high/medium/low), (ii) transparency (high/medium/low), as well as (iii) overall feasibility (feasible/challenging/unviable)

Please elaborate.

Question 3

Do you agree with the working group's analysis of the OIS quotes-based methodology? (yes/no/no opinion)

Please provide your assessment of the OIS quotes-based methodology in terms of (i) data sufficiency (high/medium/low), (ii) transparency (high/medium/low), as well as (iii) overall feasibility (feasible/challenging/unviable)

Please elaborate.

Question 4

Do you agree with the working groups conclusions regarding a point-in-time fixing? (yes/no/no opinion)

Please elaborate.

Question 5

Do you agree with the working group's analysis of the OIS composite methodology? (yes/no/no opinion)

Please provide your assessment of the OIS composite methodology in terms of (i) data sufficiency (high/medium/low), (ii) transparency (high/medium/low), as well as (iii) overall feasibility (feasible/challenging/unviable).

Please elaborate.

Question 6

Do you agree with the working group's analysis of the futures-based methodology? (yes/no/no opinion)

Assuming sufficient liquidity, what would be your view of the futures-based methodology?

Please provide your assessment of the futures-based methodology in terms of (i) data sufficiency (high/medium/low), (ii) transparency (high/medium/low), as well as (iii) overall feasibility (feasible/challenging/unviable).

Please elaborate.

Question 7

Do you agree with the working group's assessment that the OIS quotes based methodology offers the best prospect for producing a viable fallback rate within a reasonable time period following the launch of the daily ESTER publication? (yes/no/no opinion)

Please elaborate on the reasons for your most preferred forward-looking methodology, taking into account that your preferred methodology could serve as the basis for determining a fallback rate for EURIBOR.

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