SECOND CONSULTATION PAPER

ON A

HYBRID METHODOLOGY

FOR

EURIBOR

17 October 2018

*The **European Money Markets Institute** (**EMMI**, formerly known as Euribor-EBF) is an international non-profit making association under Belgian law founded in 1999 with the launch of the euro and based in Brussels (56, Avenue des Arts, 1000 Brussels.*

As per EMMI's statutes, its purpose is twofold:

I. *The development and support of activities related to the money and interbank markets. To that end, the association shall have the task of making an evaluation of fluctuations in the interest rates in the money and interbank markets of the euro area and of providing the results of its research to the monetary authorities and interested parties who are active in these markets.*

II. *In ancillary, the association shall also serve to support other practical initiatives fostering the integration of the European financial market such as but not limited to the improvement of the liquidity, safety and transparency of the European short term debt market by means of a harmonized framework for short-term European paper 'STEP'.*

EMMI currently provides the following two indexes: Euribor®, the money market reference rate for the euro and Eonia®, the effective overnight reference rate for the euro.

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1 Introduction

Over the past years EMMI has been working to implement wide-ranging reforms related to its benchmark administration activities. These reforms were aimed at ensuring that EMMI had established and operated a best-in-class governance, oversight, and control framework in alignment with the ESMA-EBA Principles and the IOSCO Principles, as well as with Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks (EU BMR), which entered into force on 30 June 2016. Despite all the progress made by EMMI in enhancing the transparency and governance of the Euribor benchmark, the current methodology remains based on collecting quotes from contributing banks and the use of expert judgment.

All the initiatives above coincide and settle on the principle that a benchmark should be “anchored in an active market having observable, bona-fide, arm’s-length transactions.” In July 2014, the Financial Stability Board (FSB) published its report Reforming Major Interest Rate Benchmarks. In line with the IOSCO Principles, the FSB report recommended to strengthen “IBORs and other potential reference rates based on unsecured funding costs by underpinning them to the greatest extent possible with transaction data.”

Since the end of 2013 EMMI has been working to implement a new determination methodology for Euribor. In 2016, a six-month long verification exercise was conducted to assess the liquidity of the market underpinning the Euribor rate. The conclusion of this analysis was that in the current environment, a transition from the current quote-based to a fully transaction-based methodology would not be feasible. As a result, since May 2017, EMMI’s efforts have been dedicated to the development of a hybrid determination methodology for Euribor, where the calculation is supported by transactions from panel banks whenever available, and relies on other related market pricing sources when necessary. Where the aforementioned data is absent, the hybrid methodology relies on a panel bank’s appreciation of their cost of funds.

The hybrid methodology was developed by EMMI with the support of a dedicated Task Force, in which the Belgian Financial Services and Markets Authority (FSMA) participated as an observer.

In March 2018, EMMI published its First Consultation Paper on a Hybrid Methodology for Euribor, seeking the market’s views on EMMI’s proposed methodology for Euribor. The feedback received in response to the consultation questions was supportive of EMMI’s proposal, and encouraged EMMI to continue its path towards the finalization of the design of the methodology.

From May until the end of July 2018, EMMI, with the participation of the majority of Euribor panel banks, has tested the proposed hybrid methodology. This Second Consultation Paper presents a summary of EMMI’s findings during the Hybrid Euribor Testing Phase (HETP), and discusses EMMI’s proposals for the different methodological parameters which were yet to be specified.

The questions on which EMMI would welcome feedback from market participants, interested parties and stakeholders are placed throughout the text in the relevant sections. Feedback may be submitted by e-mail to hybrid2018@emmi-benchmarks.eu specifying **“Hybrid Euribor Consultation”** on the subject line. More instructions can be found on page 14. EMMI welcomes and encourages respondents to share any additional views or considerations that are not covered in the suggested questions.

Regulatory environment

Following the entry into force of the EU BMR, by virtue of Article 51, a two-year long period started, requesting index providers of benchmarks already existing on 30 June 2016 to apply for authorization to their corresponding National Competent Authorities under the Regulation. If this application is not submitted, or if a benchmark is deemed noncompliant with the requirements of the EU BMR, the index shall not be used for new contracts after 1 January 2020.[1]

Following the analysis of the data and submissions collected as part of the HETP, **EMMI is confident that the hybrid methodology is a robust evolution of the current quote-based methodology, compliant with the regulatory requirements of the EU BMR.** The phased implementation of the methodology will occur during 2019. EMMI intends to apply for authorization to the Belgian FSMA by Q2 2019, well ahead of the end of the two-year long period described above.

2 Benchmark Specification

As explained in the First Consultation Paper on a Hybrid Methodology for Euribor, EMMI considered it helpful to structure the reference rate's definition in a manner that would facilitate its evolution in case of need and, most importantly, help the public distinguish between:

- the market or economic reality that the index seeks to measure—its **underlying interest**; and
- the data inputs and method of calculation chosen to measure this underlying interest—**the index's methodology statement.**

The First Consultation Paper established the following as Euribor's clarified underlying interest:

> Euribor is a measure of the rate at which wholesale funds in euro could be borrowed by credit institutions in the EU and EFTA countries in the unsecured money market.

For the purpose of Euribor's underlying interest, 'credit institution' has the meaning as specified in Article 4(1)(1) of Regulation (EU) No. 575/2013, i.e. an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account.

3 Panel Bank Contributions

Following the feedback received in response to the First Consultation Paper, EMMI decided that **as of 3 December 2018, panel banks' individual submissions will not be published.** For the avoidance of doubt, this measure will be enacted under the current Euribor methodology, given that, under the new hybrid methodology, these indicators may reveal market-sensitive information which could affect a bank's ability to raise funds if misinterpreted.

Following the implementation of the new methodology, EMMI will start publishing aggregated anonymized indicators that will endow Euribor's determination process with the transparency required by the IOSCO Principles and the EU BMR.

Which anonymized indicators will be published?

- An indication of the **reliance on each of the different levels of the new methodology**;
- **Aggregated volume underpinning the benchmark's determination**, i.e. the sum of notional volumes of all transactions used as inputs for Level 1 and Level 2.2 submissions;
- **The percentage of counterparty types** in Level 1 submissions.

With what frequency? EMMI intends to publish these indicators on a monthly basis, and with a one month delay, e.g. the report containing details about January of a given year would be published on the first day of March.

Where will they be published? A report will be published on EMMI's website.

Taking into consideration the publication schedule described above, EMMI intends to commence the publication of these indicators at the end of 2019. More information about the publication of the first report will be provided in due course.

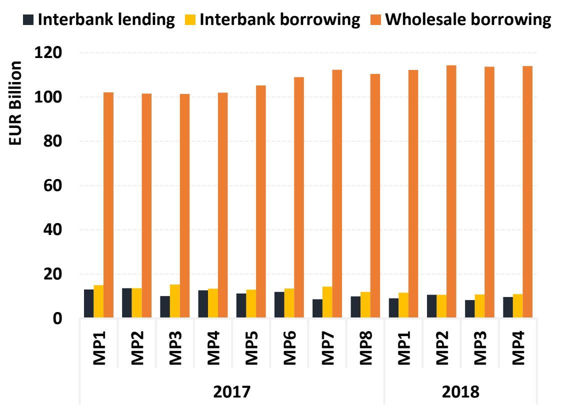
[1] Cf. EU BMR Article 51(4).

QUESTION 1	
	Do you agree with the set of anonymized indicators proposed by EMMI? Would you consider helpful to have any other indicator published on a regular basis? Do you think that the frequency is adequate, and will allow you to fully understand the benchmark determination? Could you provide an example of the use you will make of these indicators? Please, provide rationales for your answers

4 Hybrid Methodology for Euribor

In accordance with the requirements of the EU BMR, EMMI seeks to ground the calculation of Euribor, to the extent possible, in euro money market transactions that reflect the underlying interest. Studies of money market activity[2] and observations from the European Central Bank's MMSR dataset[3,4] make it apparent that the level of liquidity in the unsecured segment of the euro money market has not recently been sufficient to anchor Euribor's calculation solely in transactions.

Chart 1 (Unsecured money market activity—MMSR)



Source: ECB

After an attempt to implement a fully transaction-based methodology for Euribor, which was subject to public consultation in October 2015, and tested under live conditions at the end of 2016, EMMI concluded that the best way to guarantee Euribor's compliance with the EU BMR was to develop and transition Euribor's methodology to a model that would rely on transactions when possible, and other sources of data, if required: a *hybrid determination methodology*.

The hybrid methodology was presented in EMMI's First Consultation in March 2018, and follows a hierarchical approach consisting of three levels. On any day, each individual panel bank's submission, for every defined Euribor tenor, will be determined on the basis of one of these:

Level 1	Submission based solely on transactions in the Underlying Interest at the Defined Tenor from the prior TARGET day, using a formulaic approach provided by EMMI.
Level 2	Submission based on transactions in the Underlying Interest across the money market maturity spectrum and from recent TARGET days, using a defined range of formulaic calculation techniques provided by EMMI.
Level 3	Submission based on transactions in the Underlying Interest and/or other data from a range of markets closely related to the unsecured euro money market, using a combination of modelling techniques and/or the panel bank's judgment, following EMMI's guidelines.

A full account of the methodology can be found in the First Consultation Paper. For ease of reading, when appropriate, details about the methodology and waterfall levels are also included here.

5 Hybrid Euribor Testing Phase

From May until the end of July 2018, EMMI performed a testing of the proposed methodology. Sixteen out of the 20 banks which currently contribute toward the determination of Euribor agreed to participate in the exercise. Participants

[2] Euro money market survey, ECB (2015).

[3] Money Market Statistical Regulation (MMSR) data available at the ECB's Data Warehouse.

[4] See Chart 1 in the ECB's First public consultation on developing a euro unsecured overnight interest rate.

provided EMMI with their submissions on a daily basis, including a trade-by-trade report of their unsecured money market activity in the day prior to the contribution, as well as their Level 3 estimation when required.

EMMI's First Consultation Paper on a Hybrid Methodology for Euribor included clear guidance as to how EMMI expected panel banks to develop their determination methodologies for Level 3 contributions. Section 10 in the Consultation Paper describes, among others:

(i) the General Principles all panel banks are expected to follow;
(ii) considerations regarding the use of additional data on Euribor's underlying interest; and
(iii) reliance on observations from parallel markets.

During the Spring 2018, and prior to the start of the Hybrid Euribor Testing Phase (HETP), EMMI collected all participants' contribution procedures, to allow for a better and more complete understanding of panel banks' submissions during the HETP.

At the conclusion of the testing phase, EMMI decided to exclude contributions of one bank across all tenors and throughout the whole period, as it came to EMMI's attention that Level 3 contributions had ultimately not been done following EMMI's guidelines.

The results and discussion presented in the remaining of the document should be read in this context.

6 Euribor Tenors

In the First Consultation Paper, EMMI indicated its plans to cease the publication of the 2 weeks, 2 months, and 9 months tenors as of 3rd December 2018.

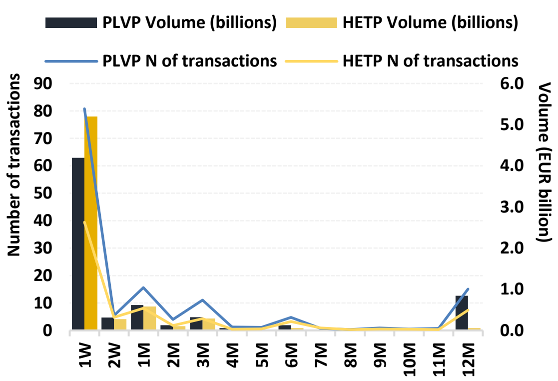
The analyses carried out with the transaction data collected during the testing phase confirmed that:

› the bulk of the activity in the euro unsecured money market captured by participants occurs at the very short-end of the curve; and

› excluding overnight transactions, the majority of volume (93%) was executed with maturities 1 week, 1 months, 3 months, 6 months, and 12 months. Over the three month period captured in this exercise, this amounted to EUR 426 billion.

To gauge the evolution of the market underlying the determination of the benchmark over the last two years, EMMI compared the activity captured during the Hybrid Euribor Testing Phase (HETP) with figures from the Pre-Live Verification Program (PLVP),[5] which ran from September 2016 until the end of February 2017. The comparison was established among the sample common to both exercises. Given the difference in the period analyzed, Chart 2 reflects the observed evolution of *daily* averages for both the number of transactions and notional volumes.

Chart 2 (Euribor's underlying market activity—evolution)



Source: EMMI

7 Level 1 Submissions

Level 1 submissions are based solely on eligible transactions, as defined below, in the unsecured

[5] From September 2016 until February 2018, as part of the Euribor+ project, EMMI conducted the Pre-Live Verification Program. The objectives of this exercise included the assessment of the feasibility of a *fully* transaction-based Euribor under the then-current market conditions. More information on the PLVP can be found here.

euro money market on the TARGET day, T, preceding the submission date, T+1.

7.1 Eligible transactions

A panel bank's *eligible transactions* will be determined by applying the filters in the following criteria:

7.1.1 Currency denomination

Only transactions directly denominated in euro will be eligible.[6]

7.1.2 Transaction timing

Only transactions executed on TARGET day T will be eligible for a Level 1 submission on TARGET day T+1.

7.1.3 Maturity date windows

For each of the Euribor tenors, EMMI needs to define 'maturity windows' in order to guarantee data sufficiency. Transactions are allocated to each of the five tenors depending on their time to maturity since the trade date. In order to rely on the largest set of transactions possible, while guaranteeing the representativeness of the prices captured, during the testing phase EMMI studied two different possibilities:

Tenor	Narrow	Broad
1W	1 week ± 1 day	1 week ± 2 days
1M	1 month ± 1 week	1 month ± 1 week
3M	3 months ± 1 week	3 months ± 2 week
6M	6 months ± 2 weeks	6 months ± 3 weeks
12M	12 months ± 2 weeks	12 months - 3 weeks

For example, within the *broad* bucket of eligible wholesale borrowing transactions at the 3 months tenor, executed on a given day, a Level 1 panel bank's contribution would be calculated on the basis of transactions with a maturity date within the range 3 months ± 2 weeks. The *narrow* maturity window would be more restrictive, and would only consider transactions with maturity date within 3 months ± 1 week as eligible.

Based on the analysis of the data, **EMMI proposes to have a broad definition of tenor windows**. This choice would allow for a larger set of transactions to be reflected in the calculation of the index. Available data suggests that this increase would be particularly significant for the 1 week tenor, where the average daily volume of transactions bucketed almost triples from EUR 700 million to EUR 1,910 million when enlarging the window. The increase in other tenors would be more modest, e.g. for the 3 months tenor, average daily volume increased from EUR 247 million to EUR 287 million. For the 12 months tenor a discrete increase of 1% over EUR 45.8 million is observed.

QUESTION 2

Do you consider that the proposed maturity windows allow EMMI to capture a more representative sample of transactions in the underlying interest? Please, provide a rationale for your answer.

7.1.4 Transaction types and counterparties

Only transactions conducted in the wholesale unsecured money markets and based on the following types of unsecured borrowing will be eligible, as Level 1 inputs,

- Unsecured, fixed rate, cash deposits attracted from the following counterparties[7], irrespective of their geographic location:

[6] In particular, borrowing transactions in euro through the foreign exchange market are not eligible.

[7] The counterparty classification above is based on the definitions of institutional sectors and subsectors described by the European System of Accounts (ESA 2010) developed by the EU's Eurostat group. The eligible transaction counterparty classification groups map directly to certain ESA 2010 institutional sectors and sub-sectors.

The mapping of the ESA 2010 institutional sector designations to 'wholesale' counterparty classifications is as follows: S2 (Rest of the World), S11 (Non-Financial Corporations), S13 (General Government), S121 (Central Bank), S122 (Deposit-taking corporations), S123 (Money Market Funds), S124 (Non-MMF

» Deposit-taking Corporations;
» Other Financial Institutions;
» Official Sector Institutions;[8]
» Insurance Corporations; and
» Pension Funds.

› Fixed rate, short-term securities (i.e. CPs, ECPs, CDs, ECDs, and others) irrespective of the type and location of the counterparty.

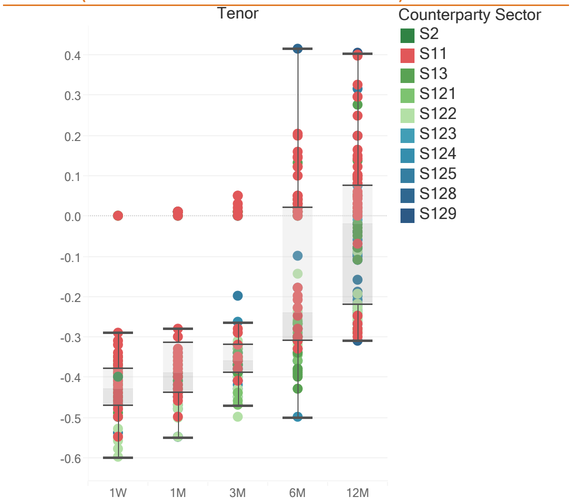
Borrowings or securities with embedded options will not be eligible.

Besides the transaction types described above, two specific categories required further analysis: transactions with Non-Financial Corporates (NFCs), and floating rate transactions.

Counterparty types: Non-Financial Corporates

The inclusion or exclusion of transactions with non-financial corporate counterparties (ESA code S11) was analyzed as part of the data collection exercise. The study confirmed that rates of transactions with these counterparties do not necessarily reflect market rates. While some of the deposits do reflect prices driven by competitive forces, Chart 3 illustrates however that the distribution of these prices is bimodal. This suggests that other considerations (such as the relationship between the bank and the non-financial corporate customer or specific legislation) may be playing a role in the pricing of corporate deposits. (Refer to footnote 7 for a full description of the counterparty sector codification in Chart 3.)

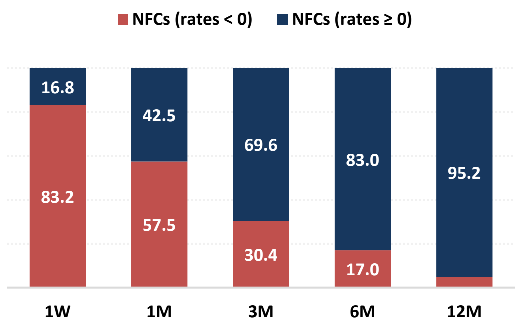
Chart 3 (Distribution of NFC transactions)



Source: EMMI (y-axis: deal rate in %)

As an example, transactions with rates greater than or equal to zero represent a significant share of the collected data, and are particularly ubiquitous in the 12 month tenor (Chart 4).

Chart 4 (Percentage of NFC transactions over 0%)



Source: EMMI (percentage of total)

In conclusion, the inclusion of these trades in the current environment would introduce a level of volatility in banks' submissions that is not driven by genuine moves in the underlying market which the index intends to measure. **To this end, EMMI proposes to exclude trades with non-financial corporate counterparties from the set of Level 1 eligible transactions.** This initial exclusion does not

investment funds), S125 (Other financial intermediaries, except insurance corporations and pension funds), S128 (Insurance corporations), S129 (Pension Funds).

[8] The Central Bank subsector is included as an eligible counterparty under Official Sector Institutions. Transactions related to tender operations and standing facilities or, in more general terms, any transaction conducted with Central Banks for the implementation of monetary policy, are not eligible.

prohibit EMMI from reconsidering its eligibility as part of the yearly review of the methodology[9] or in the light of eventual changes in market conditions, such as a tightening in the ECB's monetary policy stance.

QUESTION 3

On the basis of the evidence provided by EMMI, do you agree that transactions with NFCs should be excluded from the set of eligible L1 transactions? Please, provide a rationale for your answer.

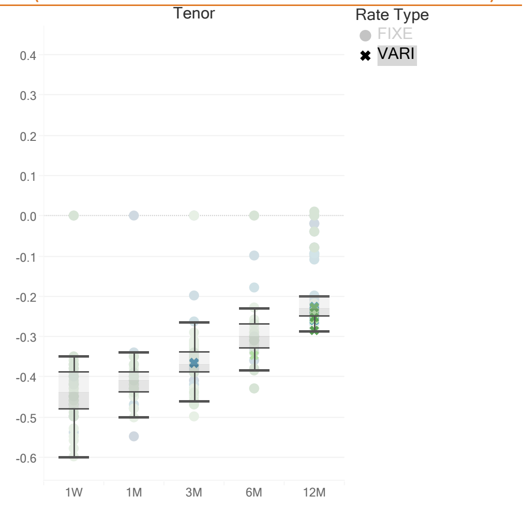
Floating rate transactions

Transactions conducted at a floating rate are an important source of funding in some European countries. As part of the testing phase, EMMI analyzed the possibility of qualifying transactions conducted against the unsecured euro overnight reference rate as eligible for Level 1 submission.

Banks participating in the testing phase were asked to report, for each floating rate transaction against the unsecured euro overnight reference rate[10], the fixed-rate equivalent price. Following EMMI's guidance, contributing banks relied on the corresponding Overnight Index Swap (OIS) market curve to derive the converted fixed rate.

The study confirmed that, after conversion, these transactions seem to reflect market rates, and would not impact negatively Level 1 submissions. In Chart 5 it can be observed how the distribution of these prices is in line with fixed-rate deposits.

Chart 5 (Distribution of EONIA-referenced transactions)



Source: EMMI (y-axis: deal rate in %)

According to the data received, floating rate transactions are mainly long-term instruments of funding. Volumes associated to these trades over the sample period represent about 45% of activity in the 12 month tenor.

	1W	1M	3M	6M	12M
Aggregated Volume (EUR billion)	107.48	21.07	16.49	3.72	3.37
Floating rate (%)	0%	0%	2%	1%	45%

On the basis of these findings, **EMMI proposes to consider floating rate transactions against the unsecured euro overnight interest rate as eligible under Level 1.**

QUESTION 4

On the basis of EMMI's analysis, do you agree with EMMI's proposal to include floating rate transactions referencing the unsecured euro overnight interest rate as eligible under Level 1? Please, provide a rationale for your answer.

[9] See EU BMR, Art. 5(3)(a).

[10] During the testing phase, participating banks were requested to report unsecured floating rate transactions indexed to EONIA.

7.1.5 Settlement dates

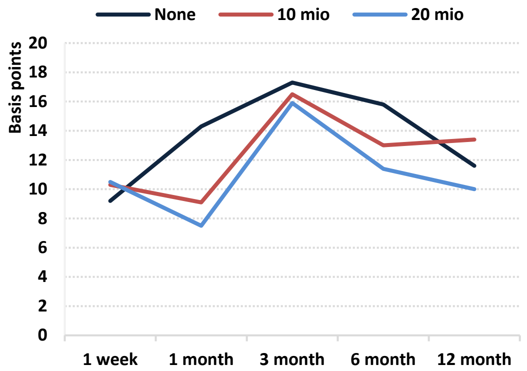
For all eligible transactions, the standard value date window for each TARGET day is T, T+1, and T+2.

7.1.6 Minimum size

During the testing phase, EMMI also studied the possibility of introducing a minimum notional volume threshold. In particular, three different cases were considered: the implementation of no threshold, a threshold of EUR 10 million per transaction, and a threshold of EUR 20 million per transaction.

In general terms, the introduction of a minimum size threshold helps stabilize the variability of prices with respect to the aggregated average rate of Level 1 transactions, especially in those tenors above 1 week (Chart 6).

Chart 6 (Impact of minimum size threshold, measured by the standard deviation of rates)



Source: EMMI

In addition, the analysis does not reveal a significant reduction in the average volume captured in the respective tenors.

On the basis of these observations, **EMMI proposes to introduce a minimum size threshold at EUR 20 million** for a transaction to be considered as eligible under Level 1.

QUESTION 5

On the basis of EMMI's analysis, do you agree with EMMI's proposal of a EUR 20 million minimum size threshold for a transaction to be considered eligible under Level 1? Please, provide a rationale for your answer.

7.1.7 Minimum number of transactions

During the testing phase, EMMI studied the introduction of a threshold on the number of eligible transactions a panel bank must have for a Level 1 submission to be possible.

EMMI's observed levels of activity in the underlying market do not allow for the introduction of a too restrictive threshold without triggering the use of Level 3 on a daily basis across the panel. While the introduction of a requirement in the minimum number of transactions could theoretically help gauge the *average* cost of funds of individual panel banks, under current market conditions (see Section 6) it would substantially reduce reliance on real transactions at Level 1.

On the basis of these arguments, **EMMI proposes not to introduce a threshold on the number of eligible transactions at panel bank level.**

QUESTION 6

Do you agree with EMMI's proposal of not introducing a threshold on the number of eligible transactions? Please, provide a rationale for your answer.

8 Level 2 Submissions

EMMI's design for Level 2 will be implemented when a panel bank has insufficient eligible transactions for a Level 1 submission to be calculated for a given tenor, but has had transactions in nearby maturities or on previous days.

Level 2 is structured in three different sub-levels, to be applied progressively and in the following order:

Level 2.1	Adjusted linear interpolation from adjacent Defined Tenors
Level 2.2	Transactions at non-Defined Tenors
Level 2.3	Eligible transactions from prior dates

As indicated in the First Consultation Paper, two parameter choices remained to be made: for Level 2.1, the number of days used to calculate the Spread Adjustment Factor and for Level 2.3 the number of lookback days to find a previous Level 1 submission.

The main objectives in the choice of final parameters were

a) to limit the use of Level 3 submissions;

b) to limit the effect of outlier transactions and rate volatility induced purely by the methodological settings; and

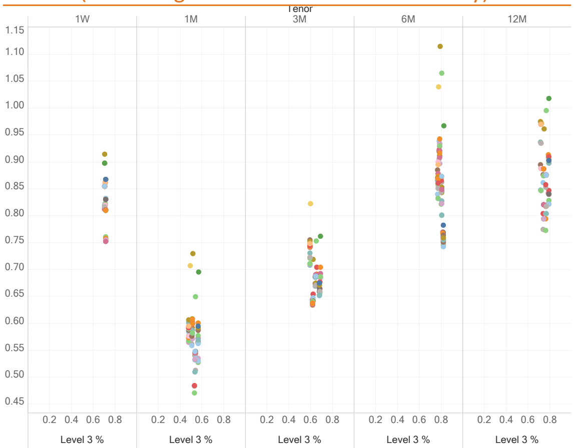
c) to maintain the final benchmark responsive to changes in market circumstances.

Given the exact specification of the methodology, the different Levels are interconnected to the extent that parameter choices made for one Level will affect the final submission rates made under another Level. Due to this, the final analysis was conducted by looking at all possible parameter combinations together, rather than analyzing each Level separately. The final choice of parameters was then made so that they jointly satisfy the three objectives outlined above.

The analysis shows that regarding the first objective, there is only minimal choice between the parameter settings with respect to how often a Level 3 submission is used. Regarding the second objective, some parameter choices introduced unnecessary volatility into the benchmark and were therefore discarded. The last objective could not be fully analyzed given the few market events during the testing phase. However the choice was made to limit the number of days both for Level 2.1 and 2.3 to maintain responsiveness to the greatest extent possible.

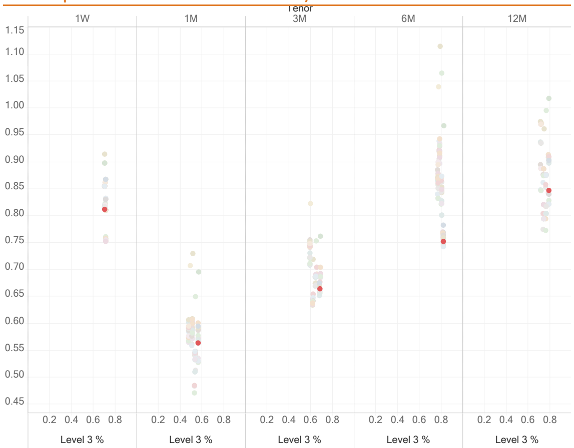
Following these findings, **a lookback period of 5 days is proposed for the Spread Adjustment Factor for Level 2.1** and **a period of 4 days is proposed to find a previous Level 1 submission for Level 2.3**. The effect on the reliance on Level 3 and the rate volatility of these choices with respect to the other parameter settings can be seen in Charts 7 and 8.

Chart 7 (Percentage of use of Level 3 vs. volatility)



Source: EMMI (y-axis: volatility in bps)

Chart 8 (Comparison 15% trim, SAF 5, MAF 4 against other parameter combinations)



Source: EMMI (y-axis: volatility in bps)

The following sections provide a detailed description of the corresponding sub-Levels, putting EMMI's proposal in context and describing its precise application.

8.1 Adjusted Linear Interpolation from Adjacent Defined Tenors (Level 2.1)

During the testing phase, EMMI analysed the appropriateness of Level 2.1. As explained in the First Consultation Paper this technique will apply to **submissions for the 1 month, 3 months and 6 months tenors only**. According to EMMI's rules, a panel bank's submission will be determined using this technique only when the panel bank's submissions at both adjacent tenors are calculated using the Level 1 methodology.

The panel bank's submission rate will be calculated as the sum of two components:

a) the linearly interpolated rate at the submission tenor, using the Level 1 submission rates at the adjacent tenors; and

b) a Spread Adjustment Factor (SAF), which seeks to correct for the curvature of the money market yield curve.

As mentioned in the First Consultation, EMMI designed the SAF to be determined based on the Euribor fixing rates published in recent days at each of the tenors. As part of its analysis over the Summer 2018, EMMI assessed the precise number of days in the lookback period for the determination of the SAF.

Based on the analysis, **EMMI proposes the SAF to be determined based on the prior 5 days of published Euribor fixing rates at each of the tenors.**

The calculation of the SAF will be calculated:

› For each of the last five fixings, the linearly interpolated rate at the submission tenor is calculated based on the fixing rates at the two adjacent tenors;

› The spread of these linearly interpolated rates to the actual fixing rates is taken;

› The SAF is the arithmetic mean of these spreads over the past five fixings.

QUESTION 7

On the basis of the analysis performed by EMMI, do you agree with the proposal to determine the Spread Adjustment Factor from the previous 5 days' Euribor fixings? Please, provide a rationale for your answer.

8.2 Transactions at Non-Defined Euribor Tenors (Level 2.2)

A *Qualifying Non-Standard Maturity Transaction* is a transaction that satisfies all of the conditions for being an eligible transaction, except that its maturity date falls between 1 week and 12 months but lies outside of the maturity date windows specified for eligible transactions.

The Level 2.2. methodology will apply to submissions at all tenors. A Panel Bank's submission will be calculated using this technique when it cannot be determined as a Level 1 or Level 2.1 submission at a particular defined Euribor tenor, but:

› The Panel Bank has a Qualifying Non-Standard Maturity Transaction(s) at a nearby non-standard maturity date; and

› The transaction volume allocated to the defined Euribor tenor from at least one Qualifying Non-Standard Maturity Transaction, as specified below, meets the minimum size criteria in subsection 7.1.6 above.

The idea underlying this technique is to determine the submission rate at the adjacent defined Euribor tenor based on a parallel shift of the yield curve from the prior day's Euribor fixing.

QUESTION 8

Do you have any comments you would like to share with regards to Level 2.2 in the hybrid Euribor methodology?

8.3 Transactions from Prior Dates (Level 2.3)

This technique will apply to submissions at all tenors **except for the 1 week tenor**. A panel bank's submission will be calculated using this technique when the submission rate cannot be determined as a Level 1, Level 2.1 or Level 2.2 submission at a particular tenor, but recent Level 1 submissions were recorded by the panel bank at this tenor.

Specifically, the panel bank's submission on TARGET date T+1 in respect of TARGET date T will be calculated using this technique when a Level 1 submission was made on previous days. During the testing phase, EMMI analysed the appropriateness of this technique, as well as the precise number of days in this lookback period.

The panel bank's submission rate for a given tenor will be determined as the sum of:

a) the submission rate on the most recent day at that tenor when a Level 1 submission was made; and

b) a *Market Adjustment Factor* (MAF). This factor seeks to correct for the overall movement in interest rates between the date of the submission in a) and the current date. As discussed in the First Consultation Paper, EMMI considers that the Euribor futures closing price captures the overall movement in interest rates in order to update the submission data.

The MAF will be calculated based on both the tenor and the market movement between the date of the most recent Level 1 submission and the current date.

As part of the testing phase analyses, EMMI studied the lookback period defining the eligibility of the most recent Level 1 submissions. Based on the study, **EMMI proposes the MAF to be determined based on Level 1 submissions as follows:**

Level 2.3 Submission Tenor	When Level 1 Submissions were made on any of:
1 Month	Days T to T-4
3 Months	Days T to T-4
6 Months	Days T to T-4
12 Months	Days T to T-4

The days in the table refer to the dates when submissions were made. The corresponding Level 1 eligible transactions will have been executed on the prior day. Thus, a Level 1 submission on day T-3 would have been based on transactions executed on day T-4, etc.

QUESTION 9

On the basis of the analysis performed by EMMI, do you agree with the proposal for the lookback period for Level 2.3, as described in the table above? Please, provide a rationale for your answer.

9 Calculation Methodology

Based on the daily submissions from each of the panel banks, EMMI will calculate and publish the final Euribor fixing rates for each of the defined tenors.

The fixing rates will be calculated as a statistical average of the individual panel bank submissions at each defined tenor. During the testing phase, EMMI analyzed different averaging methods seeking to suppress the influence of outlier rates and to be robust against over-reliance on the submission of any individual panel bank. Scenarios depicted in Charts 7 and 8 include cases in which different averaging techniques and trimming levels are considered (in particular, a 20% trimmed average and a median group calculation).[11] On the basis of the analyses performed, **EMMI proposes the averaging method to be a 15% trimmed mean[12] of the contributions of banks in the Euribor Panel.**

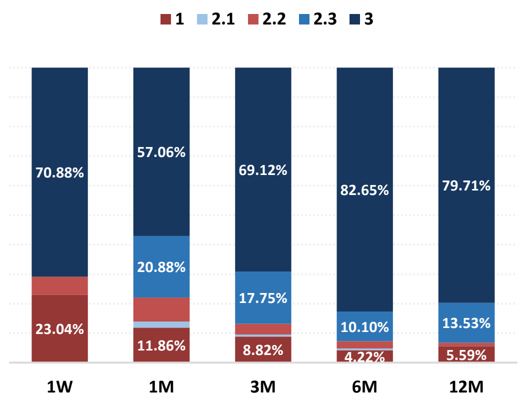
[11] The median group calculation is explained on page 14 in the Consultative Position Paper on the Evolution of Euribor published in October 2015.

[12] To calculate the 15% trimmed mean the submission rates are arranged in ascending order from lowest to highest. The highest

9.1 Reliance on Waterfall Levels

The calculation of a simulated index fixing the parameters as described throughout the text allows for an analysis of the estimation on the reliance on each of the different levels of the hybrid methodology—see Chart 9.

Chart 9 (Reliance of hybrid methodology levels)



Source: EMMI

These results are to be interpreted in the broader context of activity in the unsecured segment of the euro money market, as depicted in Chart 1.

9.2 Hybrid Euribor indicators

As described in Section 5, the data analysis exercise undertaken to finalize the design of the methodology was performed with a sample of 15 banks from the current 20 Euribor panel banks. While EMMI is confident that the conclusions presented in this Consultation Paper are robust and would still hold in case all Euribor panel banks had participated in the testing phase, EMMI finds it premature to release any precise and detailed figures for individual Euribor tenors.

The publication of this Second Consultation occurs only two months after the end of the testing phase, when the data collected could still be considered as market sensitive information. In addition, this document still leaves open for consultation on methodological parameters that will not be decided on until EMMI has collected stakeholders' feedback.

Considering the crucial role the Euribor benchmark plays for financial markets in Europe and beyond, and EMMI's commitment toward the transparency of the Euribor reform, the following charts intend to shed light on the trends, range, and behavior of the rates calculated under the hybrid methodology—in comparison, for example, with current Euribor and a simulated fully Level 1 index.

Chart 10 depicts the 5 current Euribor time series throughout the Testing Phase period. It can be observed how all Euribor tenors are contained within a band, whose upper and lower limits are calculated as:

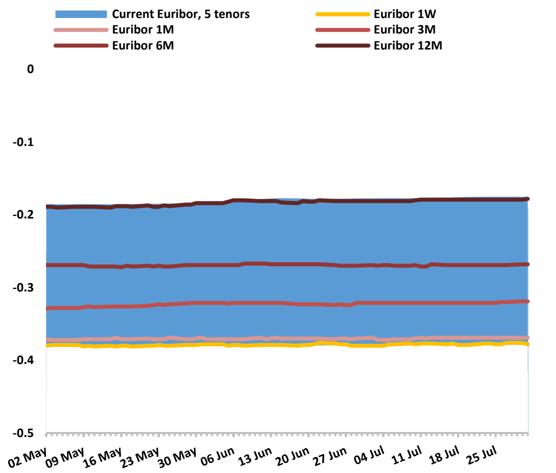
$$Upper_C = MovAvg(Eur_C^{12M} + StDev(Eur_C^{12M}),7)$$

and

$$Lower_C = MovAvg(Eur_C^{1W} - StDev(Eur_C^{1W}),7),$$

respectively.[13]

Chart 10 (Euribor under quote-based methodology)



Source: EMMI (y-axis: rate in %)

Chart 11 now adds to the current Euribor band, a new one, in orange, which **bounds the five Euribor tenors calculated using EMMI's proposed hybrid**

and lowest 15% of these rates are discarded and the benchmark is obtained as the simple average of the remaining rates.

[13] The following notation has been used for the formulas in this Section: MovAvg(·, *n*) stands for a simple moving average of length *n*, Eur_M^T represents the Euribor tenor *T* calculated under methodology *M*; StDev(·) is the sample standard deviation of the corresponding argument.

methodology. As before, the upper limit is calculated as

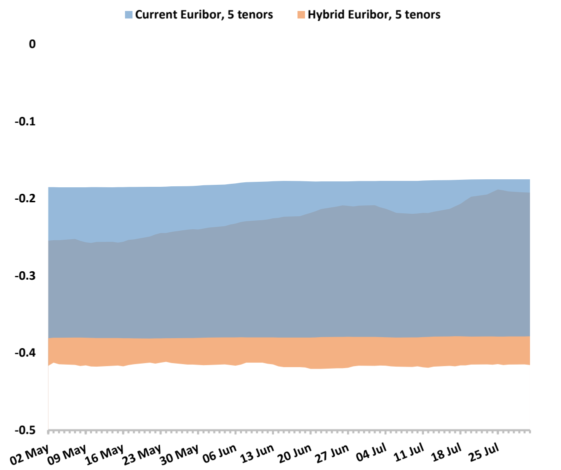
$$Upper_{Hyb}=MovAvg(Eur^{12M}_{Hyb}+ StDev(Eur^{12M}_{Hyb}),7)$$

and the lower limit as

$$Lower_{Hyb}=MovAvg(Eur^{1W}_{Hyb}- StDev(Eur^{1W}_{Hyb}),7).$$

This band presents a stable profile, while still revealing a more reactive behavior. EMMI's calculations indicate that the hybrid methodology yields a rate which presents a natural market-driven volatility that, across all maturities, ranges between 0.5 basis points and 1 basis point. In turn, average spreads across all maturities range between -5 basis points and -1 basis point.

Chart 11 (Euribor under hybrid methodology)



Source: EMMI (y-axis: rate in %)

Finally, in Chart 12, similar calculations have been carried out to portray the variation range of an **index calculated only on the basis of Level 1 submissions**, in dark blue. As before, the upper limit is calculated as

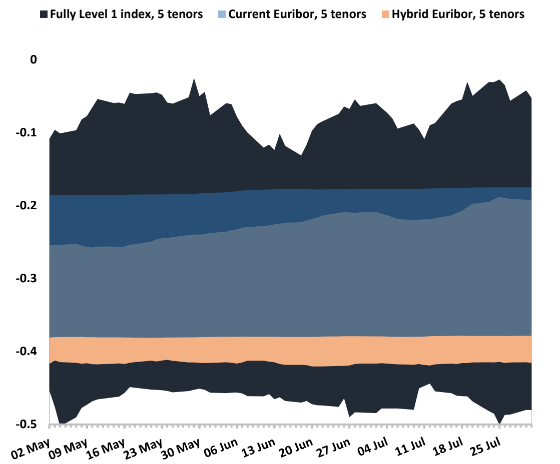
$$Upper_{L1}=MovAvg(Rate^{12M}_{L1}+ StDev(Rate^{12M}_{L1}),7)$$

and the lower limit as

$$Lower_{L1}=MovAvg(Rate^{1W}_{L1}- StDev(Rate^{1W}_{L1}),7).$$

The 7-day moving average used to stylize the representation obscures the extremely high volatility of an index solely based on transactions. For example, according to the input received, a 1 week fully transaction-based index would swing in one day from a value of -0.454 to -0.190. This erratic behavior is particularly accentuated in those tenors with lower levels of underlying liquidity, e.g. a fully transaction-based 6 months tenor could experience variations of over 30 bps from one day to the next.

Chart 12 (Pure Level 1 index, fully transaction-based)



Source: EMMI (y-axis: rate in %)

EMMI will publish further information on the individual tenor-by-tenor time series at the time of the release of the report summarizing the feedback received in response to the questions in this consultation.

10 EMMI's registration as Benchmark Administrator (under EU BMR)

According to the transitional provisions foreseen by the EU Benchmarks Regulation under Article 51, benchmark administrators providing a benchmark on 30 June 2016 shall apply for authorization by 1 January 2020.

EMMI is planning to apply for authorization to the Belgian Financial Services and Markets Authority, EMMI's National Competent Authority under the Benchmarks Regulation, by Q2 2019. To this end, EMMI expects to become an authorized benchmark administrator still within the 2 year long transitional period defined in the Regulation.

11 Responding to the consultation and publication of feedback

Throughout the text, EMMI placed a number of questions for which we would welcome the market's feedback. It is crucial for EMMI to obtain the largest number of responses possible, with a preference for responses in which the rationale behind each answer is fully elaborated.

For the readers' convenience, all questions are included in a .doc file published on EMMI's website.

EMMI kindly asks respondents to submit their answers by e-mail to hybrid2018@emmi-benchmarks.eu specifying "Hybrid Euribor Consultation" on the subject line.

EMMI welcomes and encourages additional views or considerations regarding any issue discussed in this consultation paper, even if explicit questions are not included in the text.

EMMI would be thankful if all responses were submitted by **Friday, 30th November 2018**. A summary of stakeholder feedback will be made public early 2019.

Together with their responses, EMMI kindly asks respondents to submit the following minimum information:

- Full name of respondent;
- Position;
- Organization and country;
- E-mail address;
- Contact telephone.

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