



European Money Markets Institute

**CONSULTATIVE PAPER
ON
ENHANCEMENTS TO THE EONIA BENCHMARK**

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Contents

Eonia Consultative Paper.....3

1 Objectives.....3

2 Eonia Review Program4

 a) Eonia Review Objectives and Governance framework4

 b) Eonia Review Timeline5

3 Eonia Contingency Triggers and Fallback Arrangements.....8

 a) Eonia Contingency Triggers.....8

 b) Eonia Fallback Arrangement13

4 Use of Eonia Benchmark17

5 Responding to this Consultation18

APPENDIX: Analysis of Eonia Benchmark Activity19

1 Analysis of Historical Eonia Benchmark Submission Activity.....19

 a) Eonia Submission Rate Dispersion19

2 Eonia Volumes.....21

 c) Panel Banks with Non-Zero Submissions22

3 Countries Represented in Eonia Benchmark Submissions.....22

Eonia Consultative Paper

1 Objectives

Eonia is a major reference rate for the European money markets, serving as the main benchmark for overnight unsecured interbank lending rates in euro. The European Money Markets Institute (“EMMI”) is the administrator of the Eonia benchmark, and the European Central Bank (“ECB”) acts as calculation agent.

EMMI considers that Eonia remains a robust and viable benchmark rate, and notes its broad use as the principal nearly risk¹-free reference rate in the euro-denominated interest rate derivatives markets. Since Eonia is already based directly on transactions, the underlying determination methodology already conforms broadly with international best practices. Nonetheless, EMMI has a responsibility as administrator to ensure that Eonia continues to remain fit for purpose for use by stakeholders over time, particularly in the light of both secular and cyclical developments in the European money markets. EMMI must also ensure that the governance and operation of Eonia remain in conformity with evolving global standards for benchmark administration, and with the requirements of the recently published EU Benchmarks Regulation. In discharging this responsibility, EMMI has launched a comprehensive review program for Eonia (“Eonia Review”), with a view to undertaking any necessary enhancements to underpin the robustness of the benchmark.

In this context, this consultative paper has three objectives:-

- i. to present the Eonia Review program and timeline to stakeholders; (Section 2)
- ii. to consult stakeholders on the introduction of arrangements for the determination of the Eonia benchmark under contingency circumstances; (Section 3) and
- iii. to consult stakeholders on the use of the Eonia benchmark, in order to inform the Eonia Review. (Section 4)

¹ FSB Report of 21 July 2016 “Reforming Major Interest Rate Benchmarks. Progress report on implementation of July 2014 FSB recommendations”
<http://www.fsb.org/wp-content/uploads/Progress-in-Reforming-Major-Interest-Rate-Benchmarks.pdf>

2 Eonia Review Program

In its July 2014 report on Reforming Major Interest Rate Benchmarks, the Financial Stability Board (FSB) acknowledged the systemic importance of the Eonia benchmark noting that:

“[Eonia is a] viable and actively used nearly-credit-risk-free reference interest rate, supported by a robust governance framework that is now being strengthened by the European authorities and its administrator ... It is directly anchored in the cash market, is based on real transactions and on a panel representing a wide range of banks across the Euro area. A derivatives market based on [Eonia] already exists ... and is extremely relevant for the Euro market.”²

EMMI’s administration and control framework for the Eonia benchmark have historically been closely aligned with those for the Euribor benchmark, itself a critical benchmark of systemic importance also administered by EMMI. In particular, both Eonia and Euribor, are subject to similar governance and oversight.

Over the past three years EMMI has been undertaking a comprehensive reform of the Euribor benchmark. EMMI’s Euribor reform program includes transitioning Euribor to a transaction-based methodology and the enhancement of EMMI’s policies, procedures, and control practices. Elements of this reform program, where Euribor and Eonia share common administrative arrangements, have consequently also benefited Eonia.

However, in light of Eonia’s role as a major reference rate and structural and regulatory changes in the money markets which have led to a decline in relevant underlying volumes, EMMI now intends to undertake a separate, stand-alone, review of Eonia. This Eonia Review is aimed at enhancing the transparency, robustness and reliability of the benchmark. Through the Eonia Review program, EMMI seeks to ensure that the administration, governance, design, and control environment of Eonia meet global standards and regulatory expectations, commensurate with its role as a major benchmark. By establishing or enhancing stand-alone arrangements for Eonia, EMMI wishes to evidence its strong commitment to ensuring the adherence of EMMI’s benchmark families with the IOSCO Principles for Financial Benchmarks, the recently published European Regulation on indices used as benchmarks in financial instruments and financial contracts, and the requirements of competent authorities. EMMI will work with stakeholders to implement reforms and enhancements arising from the Eonia Review that are deemed necessary or appropriate.

a) Eonia Review Objectives and Governance framework

Seen in the context of EMMI’s business and operational activities, the Eonia Review represents a critical element of EMMI’s efforts to contribute to the stability and transparency of the Euro area financial markets. The primary focus areas of the Eonia Review are:

- **Establishment of a stand-alone Eonia Code of Conduct and associated Code of Obligations of Panel Banks** that are consistent with regulatory expectations and industry best practices related to Codes of Conduct, and that formally document the operational and control arrangements to ensure the integrity and robustness of the Eonia benchmark, including requirements for Panel Banks in respect of data controls, recordkeeping, and internal review;

² Financial Stability Board’s “Reforming Major Interest Rate Benchmarks,” 22 July 2014, http://www.fsb.org/wp-content/uploads/r_140722.pdf.

- **Review and enhancements, as appropriate, to the governance, organizational arrangements and policies and procedures** supporting the administration and calculation of Eonia, emphasizing transparency, the avoidance of conflicts of interest, and clarity of roles and responsibilities for all parties involved in the benchmark determination process (e.g. EMMI, Panel Banks, Calculation Agent, calculation system software provider); and
- **Review and enhancements, as appropriate, to Eonia’s technical design and methodology**, to ensure that the benchmark remains fit for purpose and reflective of the underlying interest it seeks to represent.³

To ensure that the Eonia Review and any resulting reform efforts are executed in a timely and effective manner, this review is being conducted under a robust governance structure, which includes EMMI governing bodies as well as a subject matter-specific task force.

The EMMI Board of Directors and EMMI General Assembly are responsible for reviewing and approving high-level policies and responses to critical issues related to the benchmarks provided by EMMI. The EMMI General Assembly and EMMI Board of Directors in turn delegate certain oversight responsibilities for benchmark design and monitoring to the Euribor-Eonia Steering Committee (“the Steering Committee”). In this context, the Steering Committee serves as the primary oversight body for the benchmark setting process of the Euribor and Eonia benchmarks.

Historically, Euribor and Eonia have shared the same oversight committee as they are both interest rate benchmarks from the short term unsecured money markets and have panels of contributing banks with significant common membership. The two benchmarks also have the same regulatory requirements for governance and control frameworks, as well as similar broad requirements for contributors. The Steering Committee will monitor and oversee all aspects of the Eonia Review and provide a forum for the discussion of key issues related to the benchmark governance, design and methodology. As appropriate, the Steering Committee will review reform proposals and recommend approval to the EMMI Board of Directors and EMMI General Assembly.

The EMMI Secretariat supports the activities of all three bodies and performs day-to-day project management, stakeholder engagement, and data analysis activities to ensure the execution of the Eonia Review.

In addition, EMMI has established the Eonia Task Force to support the Steering Committee and EMMI Secretariat in their responsibilities to undertake an in-depth review of the Eonia benchmark. The Eonia Task Force serves as a key forum for the discussion of issues related to the technical design and methodology of the Eonia benchmark. The membership of the Eonia Task Force includes members of the Steering Committee, Panel Bank representatives, other market practitioners and third-party experts. Public authorities also participate in the Task Force in an observer capacity.

b) Eonia Review Timeline

EMMI is taking a two-phase approach to the execution of the Eonia Review:

³ In Section 3 of this Consultative Paper, we consider one specific aspect of the technical design, namely contingency triggers and fallback arrangements to ensure the continued publication of the Eonia benchmark during periods of market stress or disruption, or periods where data sources may be absent.

Phase 1: Governance and Control Framework, 2016

During Phase 1 of the Eonia Review, to be completed by the end of 2016, EMMI will establish stand-alone arrangements and policies for the administration of Eonia. This includes the development of an Eonia Code of Conduct aligned with the IOSCO Principles and the EU Regulation on Benchmarks, and an accompanying Code of Obligations of Panel Banks. The Code will cover:

- (i) governance standards and control framework requirements for the administration, calculation, and dissemination of Eonia;
- (ii) responsibilities of Panel Banks and the Eonia Calculation Agent; and
- (iii) documentation of the Eonia benchmark methodology, including contingency triggers and fallback arrangements to be applicable in periods of market stress or periods of data insufficiency.

During Phase 1, EMMI is conducting a high-level analysis of the Eonia benchmark rate and submission activity. This analysis seeks to provide a broad understanding of shifts in the transaction activity underlying the Eonia benchmark and a preliminary basis for discussing proposals to review the Eonia determination methodology, including contingency triggers and fallback arrangements. However, beyond the Eonia calculation contingency triggers and fallback arrangements, and possible clarifications of the current specification in response to stakeholder enquiry, EMMI does not envisage any significant changes to the core Eonia determination methodology during Phase 1.

A key component of Phase 1 of the Eonia Review includes this Consultative Paper. The feedback received from stakeholders on certain topics described below will inform the finalization of the stand-alone Eonia Code of Conduct and Code of Obligations of Panel Banks to be tentatively adopted by EMMI's governing bodies by end Q3 2016.

Phase 1 of the Eonia Review is planned to be completed by the end of 2016, at which point all Eonia Panel Banks will be expected to have implemented and be in compliance with the Eonia Code of Conduct⁴ and Code of Obligations of Panel Banks.

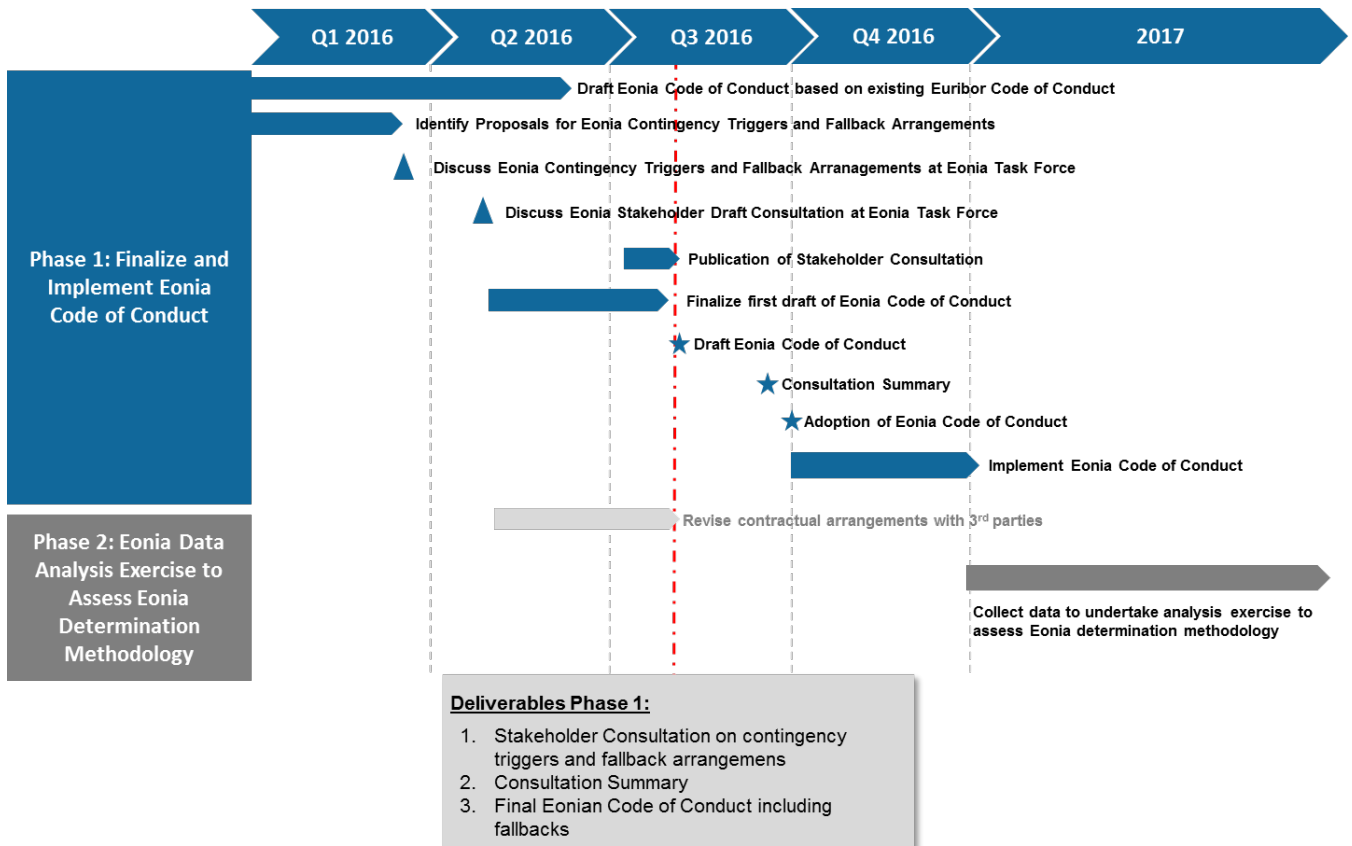
Phase 2: Market Analysis and Benchmark Methodology, 2016/17

Following the completion of Phase 1, EMMI intends to conduct an extensive data collection and analysis of unsecured short-term money market activity. This exercise is intended to provide a quantitative foundation for further evaluation of the Eonia benchmark. In turn, the analysis and resulting proposals may trigger the need for further stakeholder consultations on methodological aspects of the Eonia benchmark to ensure that it is reflective of the underlying interest it seeks to represent and to ensure the ongoing robustness and reliability of the benchmark.

⁴ It must be highlighted that the forthcoming Eonia stand-alone Code of Conduct will be based to the extent possible on the current Euribor Code of Conduct while taking into account the differences inherent to the nature of both benchmarks (i.e. quote based vs transaction based).

In order to conduct an exhaustive and representative analysis of the unsecured short-term lending money market activity, EMMI is aiming to collect the relevant data from a large sample of banks active in the Euro money markets in order to obtain the best approximation to the full market.

Phase 2 is expected to begin by the end of 2016 and to continue through 2017.



3 Eonia Contingency Triggers and Fallback Arrangements

The need for fallback arrangements as part of the Eonia determination methodology is inherent to the nature of any transaction-based benchmark. EMMI reviews submission patterns for Eonia on an ongoing basis. A summary description of aggregate submission activity is provided in the Appendix.

Based on these data, EMMI considers that transaction volumes and the number of contributions to Eonia remain adequate to support the benchmark determination. Nonetheless, the average transaction volume and number of contributors with non-zero volumes underlying the Eonia index have been on a declining trend, particularly as euro-area interest rates have fallen in the past two years. As such, the risk has increased that on isolated days there may be inadequate contributions to support a reliable determination of the benchmark. Historically, Eonia has not had formal contingency arrangements to cope with such circumstances. EMMI therefore judges that it is timely to introduce a formal mechanism to allow continued publication of the benchmark under all circumstances.

Moreover, as described above, part of EMMI's Phase 1 efforts are directed at enhancing the compliance of the Eonia benchmark with the IOSCO Principles for Financial Benchmarks and the recently adopted EU Regulation on Benchmarks. These regulations and guidance require that benchmarks should include contingency triggers and fallback arrangements for periods of market stress or disruption.

Following Article 6.3 of the EU Regulation on Benchmarks, the Administrators' control framework shall include "*contingency procedures that are in place in the event of a disruption to the provision of a benchmark*".

EMMI presents below potential options for:

- a) establishing contingency trigger thresholds, and
- b) potential fallback arrangements to be invoked when these thresholds are not met.

Upon breach of the contingency triggers, the Steering Committee shall be promptly informed. In this event, the Steering Committee shall be convened in special session within a period no longer than 5 fixing days in order to devise a resolution strategy.

Based on the feedback to this consultation, and approval of the recommended options by EMMI's governing bodies, the contingency arrangements will be incorporated in the new stand-alone Eonia Code of Conduct.

a) Eonia Contingency Triggers

EMMI has considered three different contingency thresholds that would trigger a fallback arrangement:

- i. the number of non-zero volume Panel Bank contributors on a given trading day
- ii. the aggregate level of transaction volume reported by Eonia Panel Banks on a given day; or
- iii. a combination of the number of non-zero contributors and the aggregate level of transaction volume.

i. Number of Non-Zero Volume Panel Bank Contributors

EMMI believes that establishing a contingency trigger based on a minimum number of Panel Banks contributing non-zero volume mitigates the risk of the Eonia benchmark not being representative of the market. In particular,

this contingency trigger is designed to prevent situations in which overnight transaction volume captured by the Eonia determination is high but skewed to one direction due to a small number of reporting banks.

EMMI has performed a parametrisation analysis for the Eonia contingency trigger based on recent Eonia benchmark rate and submission data. This analysis, based on data from 2004 to 2015, identified a contributor number threshold based on estimating the probability that a given number of banks participate in the calculation of Eonia (i.e., have non-zero transactional volume) on a given day. It is important to emphasize that the implementation of the Eonia fallback arrangement is intended to be an exceptional situation. In the analysis, therefore, estimates of the threshold are calibrated to occur on only rare occasions.

For the purposes of the parametrization of triggers, the participation rate is calculated as the proportion of Eonia Panel Banks contributing non-zero volume on a given day.

Looking at data spanning 12 years of Eonia contributions, we observe how participation rates typically decline at month-end dates, with a particularly pronounced fall at year-ends and on certain pre-holiday dates (e.g. 24 December):

To identify a proposed contingency trigger, EMMI made use of a simple statistical model based on a binomial distribution that calculates the probability that a given number of banks participate in the calculation of Eonia (i.e. have non-zero transactional volume) on a given day.

Table 1

Comparison of participation rates: yearly, month-end, year-end

	Average Yearly Participation Rate	Average Month-End Participation Rate	Year-End Participation Rate
2004	68%	58%	54%
2005	70%	63%	54%
2006	73%	64%	50%
2007	73%	64%	57%
2008	68%	58%	40%
2009	60%	49%	33%
2010	57%	47%	36%
2011	52%	45%	36%
2012	42%	38%	21%
2013	44%	39%	29%
2014	54%	41%	20%
2015	44%	35%	23%

2004 – 2015

(percentages)

For the purpose of this analysis EMMI only considered contribution data from January through December 2015 – in this period, there were no changes in the composition of the Eonia Panel. Using the observed participation rates for 2015 in Table 1, we assume that:

- on normal days⁵, a Panel Bank contributes with a probability of 0.44;
- at the end of the month, a Panel Bank contributes with a probability of 0.35; and

⁵ In this paper, a *normal day* is a business day that is neither an end-of-the-month day nor the last day of the year.

- at the end of the year, a Panel Bank contributes with a probability of 0.23.

Table 2 presents the number of days in 2015 the model estimates a given number of Panel Banks contributes a non-zero volume toward the determination of Eonia. For example, according to the model, one would expect to have approximately 29 days⁶ with 14 non-zero contributors. The last column shows the number of days in 2015 in which there were, indeed, 14 contributors, i.e. 33 days.

Based on this analysis, if such a contingency trigger is implemented, EMMI proposes setting this contingency trigger at **4 or fewer Panel Banks participating in the Eonia benchmark calculation on a given day**. As shown in Table 3, using data from 2015 as a baseline, such an occurrence, based on the model, may occur approximately once every 3 years⁷.

Table 2

Number of days with number of participating banks below levels: model vs. 2015 actual

No. of Participating Banks	No. of Days in which No. of Participating Banks is at Level or Lower (based on Model)				Number of Days (2015 Actual)
	Normal Trading Day	Month-End Trading Day	Year-End/Pre-Holiday Trading Day	Total Days	
0	0.0	0.0	0.0	0.0	0
1	0.0	0.0	0.0	0.0	0
2	0.0	0.0	0.0	0.0	0
3	0.0	0.0	0.1	0.1	0
4	0.0	0.0	0.2	0.2	0
5	0.0	0.0	0.3	0.3	0
6	0.1	0.1	0.3	0.5	0
7	0.3	0.3	0.3	0.9	0
8	0.9	0.5	0.3	1.7	1
9	2.3	0.8	0.2	3.4	1
10	4.9	1.2	0.1	6.2	2
11	9.1	1.4	0.1	10.6	5
12	14.9	1.5	0.0	16.5	10
13	21.6	1.5	0.0	23.1	37
14	27.8	1.2	0.0	29.0	33
15	31.8	0.9	0.0	32.8	35
16	32.5	0.6	0.0	33.2	36
17	29.8	0.4	0.0	30.1	40
18	24.3	0.2	0.0	24.6	33
19	17.8	0.1	0.0	17.9	18
20	11.7	0.0	0.0	11.7	4
21	6.8	0.0	0.0	6.8	1
22	3.5	0.0	0.0	3.6	0
23	1.6	0.0	0.0	1.6	0
24	0.7	0.0	0.0	0.7	0
25	0.2	0.0	0.0	0.2	0
26	0.1	0.0	0.0	0.1	0
27	0.0	0.0	0.0	0.0	0
Total	243.0	11.0	2.0	256.0	256.0

2015

⁶ See highlighted cell on the fifth column on Table 4.

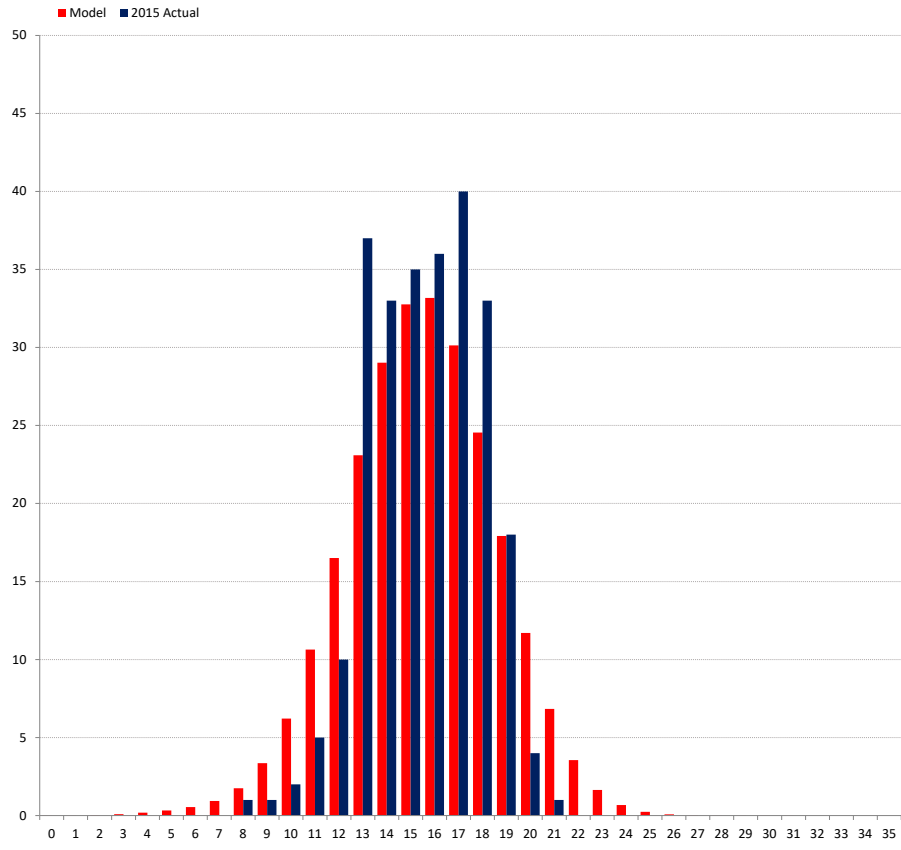
⁷ According to the model, the number of Eonia Panel Banks contributing non-zero volumes toward the determination of Eonia should occur 0.3 days per year.



Table 3

Number of Banks	Cumulative Number of Days (Model)
0	0.0
1	0.0
2	0.0
3	0.1
4	0.3
5	0.6
6	1.2
7	2.1
8	3.9
9	7.2
10	13.4
11	24.1
12	40.6
13	63.7
14	92.7
15	125.5
16	158.6
17	188.8
18	213.3
19	231.2
20	243.0
21	249.8
22	253.3
23	255.0
24	255.7
25	255.9
26	256.0
27	256.0

Participation distribution: statistical model vs. 2015 actual



2015

ii. Aggregate Level of Transaction Volume Reported by Eonia Panel Banks

EMMI has further considered establishing an Eonia contingency trigger that is reliant on the level of total transaction volume reported by Eonia Panel Banks on a given trading day. Leveraging the dataset described above, EMMI conducted an analysis to determine the effectiveness of setting an aggregate transaction volume contingency trigger.

EMMI's historical analysis indicates that a separate, independent contingency trigger for aggregate transaction volume would not trigger a fallback arrangement on any days that are not already captured by the number of non-zero volume Panel Bank contributors contingency trigger described above.

Following the analysis of the Eonia volume levels and possible volume contingency thresholds, EMMI does not believe volume represents an optimal contingency trigger for the Eonia benchmark.

iii. A combination of the number of non-zero contributors (option i) and the aggregate reported volume (option ii)

EMMI considered an additional contingency trigger option which envisages a combination of options i and ii as the approach to triggering a fallback arrangement. In such a methodology, the contingency trigger would rely on both a certain number of non-zero volume Panel Bank contributors *and* a level of aggregate transaction volume reported by these contributors. This contingency trigger design would prevent situations in which the number of contributors is high enough, but the nominal transaction amount reported by each is low enough to raise concerns about the representativeness of the Eonia benchmark.

However, after the reviewing of this approach, EMMI concluded that this trigger would not result in any additional events not already captured adequately by the simpler arrangement based on the number of contributors.

CONCLUSION OF THE ANALYSIS OF CONTINGENCY TRIGGERS:

Based on the analysis of Eonia panel bank participation and volume data, EMMI recommends setting the **contingency trigger in terms of number of banks contributing non-zero volumes on a given day** (i.e. option i. above).

EMMI considers that the representativeness of the overall market that the benchmark is attempting to capture is reflected in maintaining an adequate number of contributors rather than volume per se.

In particular, EMMI recommends **4 non-zero volume contributors** as the trigger for a fallback arrangement.

EMMI wishes to highlight that the Eonia contingency triggers will be subject to periodic revision by the EMMI Secretariat. Future reviews will consider recent rate and volume submissions, as well as prevailing market conditions. It should be further noted that possible revisions to the Eonia determination methodology resulting from the in-depth analysis of the unsecured overnight market lending activity to be conducted as part of Phase 2 of the Eonia Review, may cause EMMI to revisit the specific contingency trigger methods and thresholds.

Consultative Question #1

*Do you agree that the Eonia contingency triggers should be based on maintaining a minimum number of non-zero volume Panel Bank contributors?
If not, please elaborate your reasons and offer your preferred alternative.*

b) Eonia Fallback Arrangement

Upon breach of the contingency trigger, a fallback arrangement to calculate the benchmark will be invoked. The EMMI Secretariat assessed four different options for such an arrangement, in conjunction with the Eonia Task Force. Note that in case fallback is invoked, the Eonia rate would be published with a notation to the effect that a contingency exists. The reported volume for that day would be published without alteration – but with the respective notation. As such, EMMI will display on its website that a fallback arrangement was invoked to enable the publication of the Eonia benchmark on that given day.

The table below presents the 4 fallback arrangements which have been assessed with their respective pros and cons.

Fallback arrangements: description, pros, and cons

	DESCRIPTION	PROS	CONS
1	ECB's rate of the deposit facility	<ul style="list-style-type: none"> • Simplicity • No assumption on validity of historical trend 	<ul style="list-style-type: none"> • Potential abrupt drop of the rate • Administered vs market rate • Fallback rate known beforehand
2	Depo plus recent Eonia spread $\delta_t + \sum_{i=t-3}^{t-1} \frac{(E_i - \delta_i)}{3}$ <p>δ_t: depo rate on day t E_t: Eonia fixing on day t</p>	<ul style="list-style-type: none"> • No abrupt drop of the rate • Closer to previous Eonia rate fixings • Reacts to changes in the depo rate 	<ul style="list-style-type: none"> • Relies on previous day's transactions, affecting the O/N significance of the rate • Ignores current day's contributions • Fallback rate known beforehand
3	Formulaic approach WVAR of the current day's determined rate and volume with yesterday's Eonia rate and volume $\frac{r_t v_t + E_{t-1} v_{t-1}}{v_t + v_{t-1}}$ <p>r_t: current day's Eonia with insufficient number of contributors v_t: volume reported on day t E_{t-1}: Eonia fixing on day $t-1$</p>	<ul style="list-style-type: none"> • No abrupt drop of the rate • Closer to previous Eonia rate fixings • Uses data from the current day • Consistent with Tier 1 of transaction-based Euribor 	<ul style="list-style-type: none"> • Relies on previous day's transactions, affecting the O/N significance of the rate
4	No publication of a rate	<ul style="list-style-type: none"> • No assumption on validity of historical trend 	<ul style="list-style-type: none"> • Disruptive to the administration of outstanding contracts referencing Eonia, posing operational and legal risks to benchmark users.

All fallback arrangements above have been assessed within EMMI and there is a **strong preference for the third option, that is, using a formulaic approach in the event of data insufficiency**. The formulaic approach takes into consideration the volume reported on the determination/publication day (day t).

EMMI also analyzed variations of the formulaic approach, but extending the number of days in the formula to $t-2$, to attenuate month- and year-end effects and to reduce the potential for manipulation. However, given that

Eonia is an overnight rate, it was concluded that extending the number of days in the formula to two rather than one, could significantly decrease the responsiveness of the Eonia benchmark.

EMMI believes that while taking the ECB's deposit facility into consideration as per options 1 and 2 above could benefit from simplicity in terms of their calculation, these are not market rates. Moreover, being rates which are known beforehand, these methods could prompt manipulative activity.

While EMMI advises users of EMMI benchmarks (Euribor and EONIA) to regularly assess that the benchmark used is appropriate, suitable and relevant for the targeted market and to put in place their own contingency provisions in the event any of the benchmarks are not available, it believes that not publishing a rate (option 4) in the event of insufficient data could have a negative impact on the contracts referencing to Eonia. Some Eonia Task Force members considered that this option could therefore undermine the credibility of Eonia.

CONCLUSION OF THE ANALYSIS OF FALLBACK ARRANGEMENTS:

On the basis of the analyses performed, in the event that the contingency trigger described above is breached, **EMMI recommends the use of the formulaic approach to derive the Eonia benchmark rate in place of the standard, core transaction-based Eonia determination methodology.**

It should be highlighted that this formulaic approach relies on data already provided by the Eonia Panel Banks. Furthermore, it is in line with the contingency arrangement (Tier 1) to be invoked when evolving into a transaction-based Euribor (i.e. Euribor+ project). It should be noted that this fallback arrangement would take place in the same timeframe as the standard Eonia determination methodology and would be executed by the Eonia Calculation Agent. In addition, should a fallback be invoked, the Eonia rate will be published with the respective notation.

Fallback Arrangement – Formulaic Approach

The formulaic approach provides a volume-weighted average that incorporates volume and rates submitted on the preceding days of the contingency period to increase volume sufficiency while maintaining a view of current market conditions.

Given that v_t is the raw volume on day t ; v_{t-1} is the volume on day $t-1$; r_t is the Eonia rate calculated using only non-zero volume contributions on day t ; E_{t-1} is the Eonia rate calculated using the standard determination methodology on day $t-1$; and E_t is the final published Eonia rate on day t .

If the fallback arrangement is triggered on day t , this arrangement relies on the following formula on the first day of contingency:

$$E_t = \frac{r_t v_t + \bar{E}_{t-1} v_{t-1}}{v_t + v_{t-1}}$$

In such a scenario, note that as the ordinary volume on day t (v_t) approaches 0, the calculated rate (E_t) approaches the previous day’s rate. Critically, the formulaic approach takes into consideration the volume reported on the most current trade date. In the case of need, with the notation above, derived formulas for contingency arrangements on consecutive days are as follows:

Day t Contingency	Day $t+1$ Contingency	Day $t+2$ Contingency
$E_t = \frac{r_t v_t + \bar{E}_{t-1} v_{t-1}}{v_t + v_{t-1}}$	$E_{t+1} = \frac{r_{t+1} v_{t+1} + E_t (v_{t-1} + v_t)}{v_{t+1} + v_t + v_{t-1}}$...

Example. As an example of the formulaic approach above, let us consider the following historical Eonia fixings from the period November 30 – December 14, 2015. The third column in the table below shows what the fixing would have been in any of the days in this window, should the fallback arrangement have been triggered.

Date	ECB’s Depo Rate	Eonia fixing	Eonia volumes (EUR mio)	Formulaic approach rate
30/11/2015	-0.2	-0.127	7874	-0.13363
01/12/2015	-0.2	-0.131	8039	-0.12902
02/12/2015	-0.2	-0.132	7744	-0.13149
03/12/2015	-0.2	-0.136	8539	-0.1341
04/12/2015	-0.2	-0.138	7892	-0.13696
07/12/2015	-0.2	-0.142	8971	-0.14013
08/12/2015	-0.2	-0.147	10082	-0.14465
Depo rate cut				
09/12/2015	-0.3	-0.235	11297	-0.1935
10/12/2015	-0.3	-0.232	11422	-0.23349
11/12/2015	-0.3	-0.231	10709	-0.23152
14/12/2015	-0.3	-0.23	11883	-0.23047

As an example of the calculation of the rate using the formulaic approach: let us assume that the contingency threshold was breached on December 4 and the fallback arrangement was then triggered. The Eonia benchmark on that day would have been computed as

$$E_t = \frac{r_t v_t + E_{t-1} v_{t-1}}{v_t + v_{t-1}} = \frac{(-0.138) \times 7,892 + (-0.136) \times 8,593}{7,892 + 8,593} = -0.13696$$

Consultative Question #2

Do you agree with EMMI's recommendation that the formulaic approach (option 3) should be used as the fallback arrangement?

If not, please elaborate your reasons and offer your preferred alternative form among the other options.

4 Use of Eonia Benchmark

In evaluating and developing potential enhancements to the technical design and methodology of the Eonia benchmark (a Phase 2 objective), EMMI is committed to ensuring that the benchmark design meets the specifications established by Principle 6 of the IOSCO Principles for Financial Benchmarks. Principle 6 states that the design of the benchmark should take into account a series of factors, including notably, the size and liquidity of the relevant market the benchmark seeks to represent and the relative size of the underlying market in relation to the volume of trading in the market that references the benchmark. EMMI is seeking market input on both of these factors to supplement research and analysis undertaken by the EMMI Secretariat, which largely leveraged publicly available data.

Consultative Question #3

Please describe the types of financial contracts for which you use the Eonia benchmark as the primary reference rate (e.g. hedging fixed rate liability issuance, OIS, Loans, Issuance of floating rate notes, and asset purchases). For each class of financial contracts, please provide an estimate of your typical annual turnover.

5 Responding to this Consultation

EMMI invites all interested parties to respond to the content and questions described in Sections 3 and 4 of this Consultative Paper. In particular, EMMI would like to invite the following stakeholders to provide their feedback:

- Subscribers to EMMI benchmarks
- Eonia Panel Banks, and prospective Panel Banks
- Representative trade associations and user associations
- Regulatory Authorities (including Central Banks)

Please send your feedback by **Monday, 5 September 2016 cob.**

In addition, should there be any other aspect of the Eonia Review (Phase 1) for which you would need further clarification please contact EMMI.

By e-mail to: info@emmi-benchmarks.eu, specifying “Eonia Stakeholder Consultation” on the Subject of the e-mail

Or

**By post to: European Money Markets Institute (EMMI)
Avenue des Arts 56
1000 Brussels
Belgium**

Following the EMMI Benchmarks Consultation Policy⁸, EMMI shall address feedback received from stakeholders in a published summary of contributions, anonymized and aggregated when stakeholders have requested anonymity. EMMI will provide its rationale for the acceptance, modification or rejection of recommendations made by respondents to the consultation as part of this summary.

EMMI will publish a summary of the consultation feedback on the EMMI website. Such publication shall take place as soon as possible after the approval of the summary by the Steering Committee and the EMMI Board of Directors.

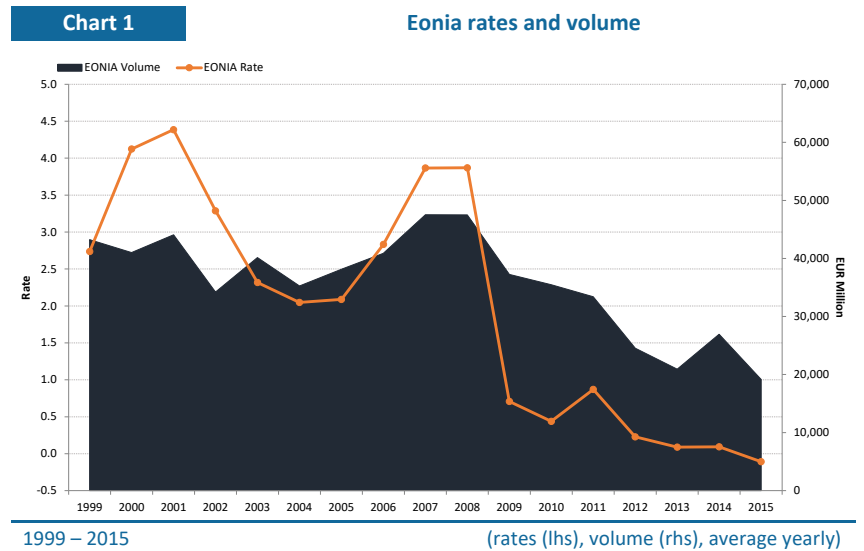
⁸ Emmi Benchmarks Consultation Policy: https://www.emmi-benchmarks.eu/assets/files/D0365C-2014-EMMI%20Consultation%20Policy-procedures_4Nov2014.pdf

APPENDIX: Analysis of Eonia Benchmark Activity

1 Analysis of Historical Eonia Benchmark Submission Activity

EMMI analyzed aggregate Eonia submission data provided by the ECB to understand whether elements of the current determination methodology should be enhanced to ensure that the Eonia benchmark remains viable and reflective of the underlying economic interest it aims to represent.

Following EMMI's study, four notable trends were identified that warrant further discussion and consideration as the Eonia determination methodology is reviewed:



- (1) Significant dispersion of Eonia submission rates in 2015;
- (2) Decreases in underlying transaction volume and increases in volume concentration;
- (3) Decreases in banks on Eonia Panel with non-zero submission volumes;
- (4) Contraction in number of countries represented in the Eonia benchmark.

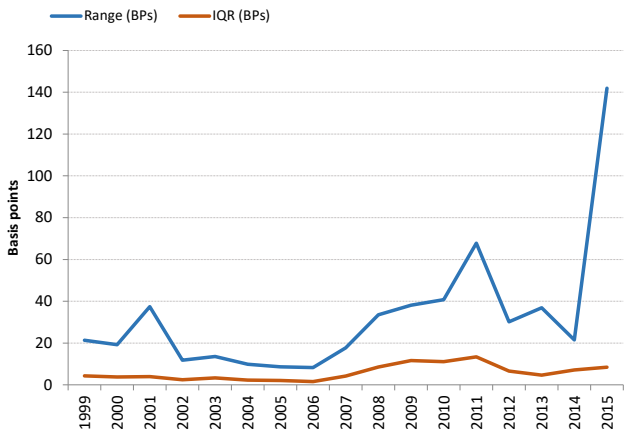
a) Eonia Submission Rate Dispersion

Between 1999 and 2007, the average interquartile range⁹ of daily rate submissions was approximately 3.1 basis points (bps). Since 2008, the average interquartile range of daily submissions increased to 9.0 bps.

EMMI observed a significant increase in the difference between the lowest and highest daily rate submissions in February 2015. Further analysis is required to identify the factors causing this increased spread.

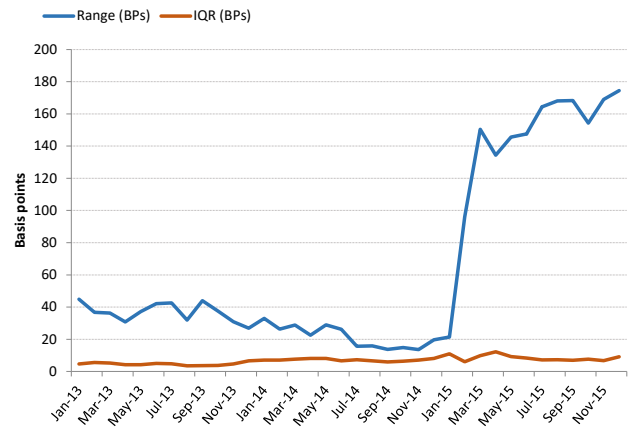
⁹ The interquartile range is defined as the difference between the first and third quartile values if the set of daily rate submissions is ordered in descending rank.

Chart 2 Eonia rate submission dispersion



1999 – 2015 (basis points, average yearly)

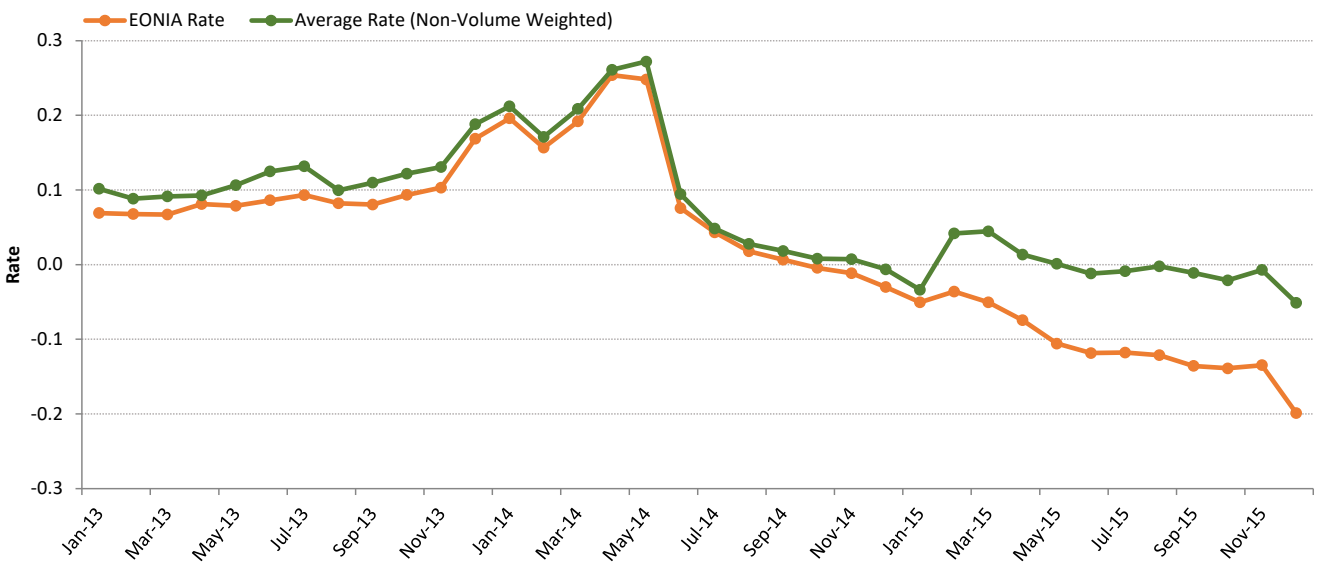
Chart 3 Eonia rate submission dispersion



2013 – 2015 (basis points, average monthly)

As a result of submissions being grounded in actual transactions, a certain level of dispersion is expected. However, further analysis is required to fully understand the dispersion in rate submissions, particularly with regard to whether the dispersion is limited to a few outlier Panel Banks.

Chart 4 Eonia vs. Average of rate submissions (non-volume weighted)



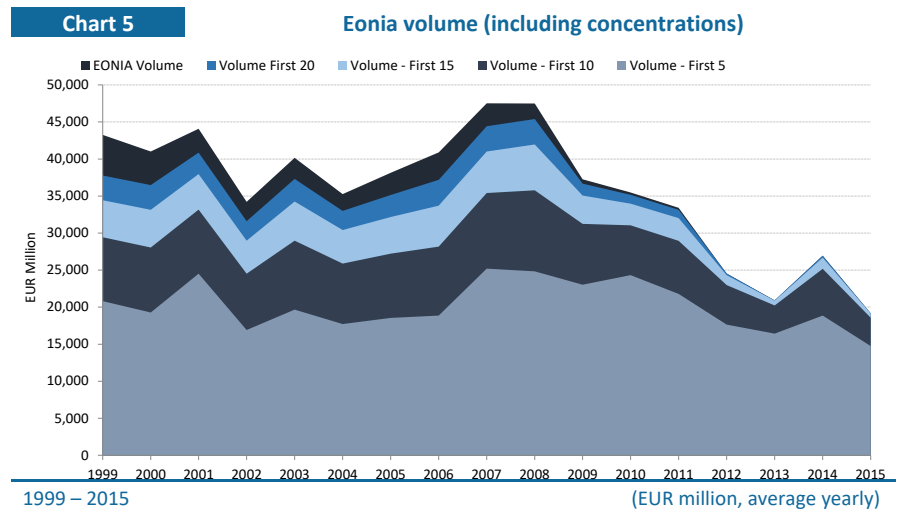
2013 – 2015 (percentage, average monthly)

Chart 4 shows a comparison of the Eonia rate against the average of daily rate submissions (non-volume weighted). The difference between these two measures was relatively minimal between 2013 and the beginning of 2015. However, the spread between these two measures beginning in February 2015 suggests that the Panel Banks with higher volumes of transactions transact at lower rates than those Panel Banks with low transaction volumes.

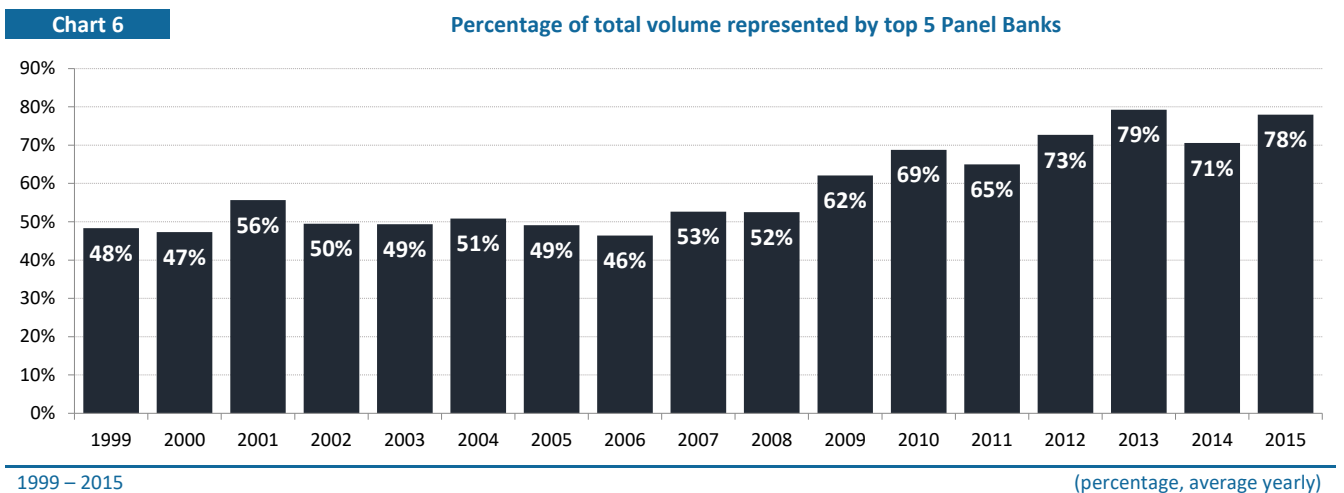
2 Eonia Volumes

In Chart 5 we can observe how yearly Eonia volumes have decreased since after the crisis years: in the early 2000's volumes never fell below 32 EUR billion, increasing up to an average of almost 48 EUR billion during 2007 and 2008. Since 2009, average volumes have gradually declined to a yearly average of 19 EUR billion in 2015.

Transaction volume appears to have increasingly been concentrated in a limited number of Eonia Panel Banks. Between 1999 and 2009, approximately 51% of total daily Eonia volume was reported by the top five Panel Banks. Between 2010 and 2015, this average increased to 72%. In 2015, almost 97% of volume was reported by the top 10 banks (with a yearly average of 16 banks reporting non-zero volume).

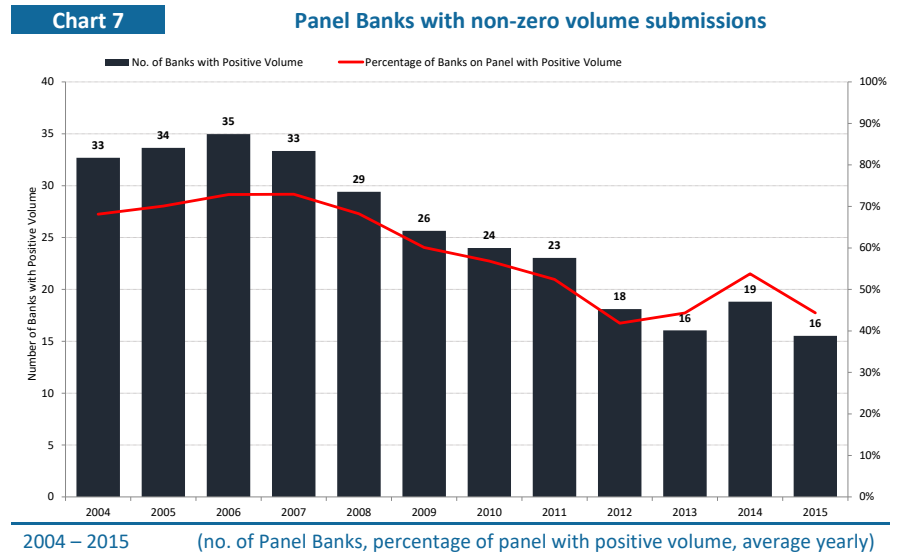


The concentration of volume in a limited number of Panel Banks is a trend that may reflect the contraction of the unsecured money markets. This level of concentration may warrant a drive to broaden of the Eonia Panel, as well as possible changes to the determination methodology, including the expansion of eligible transaction types and counterparties.



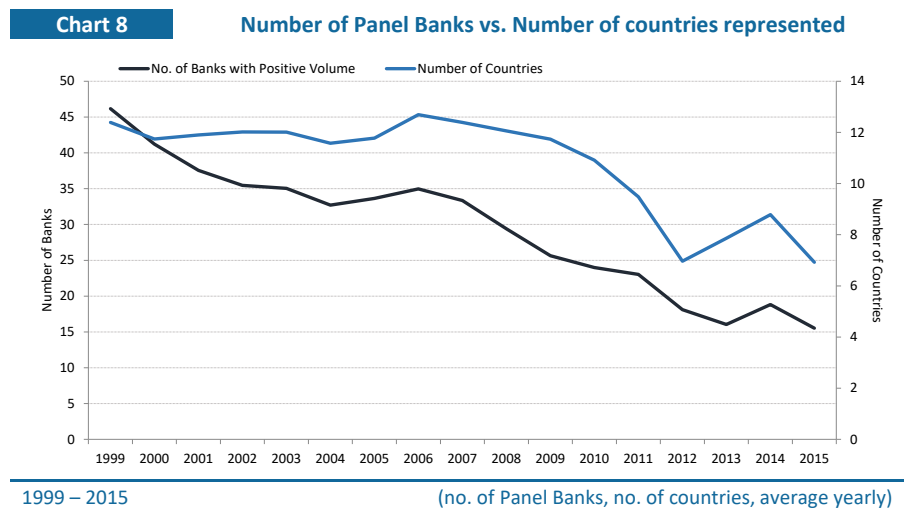
c) Panel Banks with Non-Zero Submissions

The number of Eonia Panel Banks which submit non-zero volumes has decreased significantly in the past few years. In 2014 and 2015, approximately 54% and 44%, respectively, of Eonia Panel Banks made non-zero submissions to the benchmark determination. As Chart 7 shows, this percentage has decreased from an average participation rate of 69% between 2004-2009.



A broad and diverse set of banks which contribute rates and non-zero volumes to the daily Eonia determination methodology is integral to ensuring benchmark’s market representatives and robustness. To mitigate the risk of the low number of participating banks becoming an obstacle to the calculation of a robust Eonia benchmark, EMMI has undertaken work to propose contingency triggers and associated fallback arrangements, as detailed in Section 3 in the Consultative Paper.

3 Countries Represented in Eonia Benchmark Submissions



The decrease in the number of Eonia Panel Banks with non-zero volumes will inevitably have been mirrored by a decrease in the number of countries represented. However, based on the data currently available to EMMI, the precise degree of geographic concentration cannot be estimated.