CNMV
Comisión Nacional del Mercado de Valores

Three decades of Euribor: Viability and prospects for future development

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Occasional Paper

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Occasional Paper
February 2026

Abstract

This paper analyses the evolution and current role of Euribor as a key benchmark of the European financial system following the international reform of financial benchmarks. By examining its governance, methodology, representativeness and interaction with risk-free rates based on the €STR, the analysis shows that Euribor retains a distinct economic role as a forward-looking benchmark incorporating bank credit risk, which remains particularly relevant for retail lending and for contracts with long remaining maturities. The paper identifies as the main lines of future development a potential deeper reliance on eligible transaction-based data from the ECB's MMSR, a strengthening of public supervisory arrangements relative to audit-intensive private oversight models, and the adoption of solutions aimed at enhancing the efficiency and long-term viability of the benchmark, without undermining its continuity or systemic function, in line with the European regulatory framework and financial stability objectives.

Keywords

Euribor; financial benchmarks; benchmark reform; financial regulation; BMR; €STR; money markets; financial stability.

JEL Classification: E43; E44; G18; G21; G28

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(*) The views expressed in this paper are solely those of the authors and do not necessarily reflect those of the institutions in which they carry out their professional activities. Any errors or omissions are attributable exclusively to the authors.

The authors are grateful for the valuable comments received from colleagues and experts (Adolfo Fraguas and Víctor Cancela), which have contributed to enhancing the analysis presented herein.

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ISSN (digital edition): 1989-8711

Layout: Cálamo y Cran

Table of contents

Exhibits

Index of tables

Index of figures

Illustrations

List of acronyms

€STR	Euro Short-Term Rate
AMERIBOR	American Interbank Offered Rate
ARRC	Alternative Reference Rates Committee
BBA	British Bankers' Association
BIS	Bank for International Settlements
BMR	Benchmark Regulation – Regulation (EU) 2016/1011 on benchmarks
CCP	Central counterparty
CDS	Credit default swap
CFTC	Commodity Futures Trading Commission
CHF	Swiss Franc
CJEU	Court of Justice of the European Union
CME	Chicago Mercantile Exchange
COVID-19	Coronavirus Disease 2019
CSR	Credit-sensitive rate
DFR	Deposit facility rate
DORA	Digital Operational Resilience Act – Regulation (EU) 2022/2554
EBF	European Banking Federation
ECB	European Central Bank
EFTA	European Free Trade Association
EFTERM	Euro Forward Term Rate
EMMI	European Money Markets Institute
EMS	European Monetary System
EMU	Economic and Monetary Union
EONIA	Euro Overnight Index Average
ESCB	European System of Central Banks
ESMA	European Securities and Markets Authority
EU RFR Working Group	Working Group on Euro Risk-Free Rates
EUR	Euro
EUREX	Eurex Clearing AG
EURIBOR	Euro Interbank Offered Rate
FCA	Financial Conduct Authority (UK)
FIBOR	Frankfurt Interbank Offered Rate
FOMC	Federal Open Market Committee
FRA	Forward Rate Agreement
FRN	Floating rate note
FSB	Financial Stability Board
FSMA	Financial Services and Markets Authority (Belgium)
GDP	Gross Domestic Product
GRSS	Global Rate Set Systems Ltd.
G-SIB	Global Systemically Important Bank
IBA	ICE Benchmark Administration
IBOR	Interbank Offered Rate

ICE	Intercontinental exchange
IOSCO	International Organization of Securities Commissions
IRD	Interest rate derivatives
IRPH	Mortgage loan benchmark
IRS	Interest rate swap
JPY	Japanese Yen
LCH	London Clearing House
LIBOR	London Interbank Offered Rate
LTRO	Long-term refinancing operations
MAR	Market Abuse Regulation – Regulation (EU) No. 596/2014
MIBOR	Madrid Interbank Offered Rate
MMSR	Money Market Statistical Reporting
MPG	Market Participants Group
MRO	Main refinancing operations
NCA	National Competent Authority
NIBOR	Norwegian Interbank Offered Rate
OIS	Overnight index swap
OSSG	Official Sector Steering Group
OTC	Over-the-Counter
PEPP	Pandemic Emergency Purchase Programme
RFR	Risk-free rate
SARON	Swiss Average Rate Overnight
SOFR	Secured Overnight Financing Rate
SONIA	Sterling Overnight Index Average
STIBOR	Stockholm Interbank Offered Rate
SUPTECH	Supervisory technology
TARGET	Trans-European Automated Real-time Gross settlement Express Transfer system
TFEU	Treaty on the Functioning of the European Union
TIBOR	Tokyo Interbank Offered Rate
TONAR	Tokyo Overnight Average Rate
US	United States
USD	United States dollar
WG	Working group
WIBOR	Warsaw Interbank Offered Rate

1 Introduction

Nearly three decades after the launch of Euribor and just over one year since the definitive cessation of LIBOR as a global benchmark, it is timely to reflect on the origin, evolution and current role of the principal interbank rate of the European financial system. Both benchmarks shared for decades a very similar design, economic rationale and function: to serve as a forward-looking reference for the pricing of loans, derivatives and other financial instruments, reflecting the unsecured funding costs of credit institutions. However, following the global financial crisis of 2007 and the manipulation scandals that exposed structural weaknesses in their calculation methodologies, the regulatory paths followed by LIBOR and Euribor diverged substantially.

While the UK and US authorities opted to phase out LIBOR and promote its replacement with risk-free interest rates based on observable transactions, in Europe the decision was taken to preserve Euribor, undertaking a far-reaching process of methodological, regulatory and governance reforms. This decision reflected both the European financial system's significant reliance on forward-looking rates – particularly in the field of variable-rate mortgages – and the intention to maintain a common pan-European reference in the euro money market.

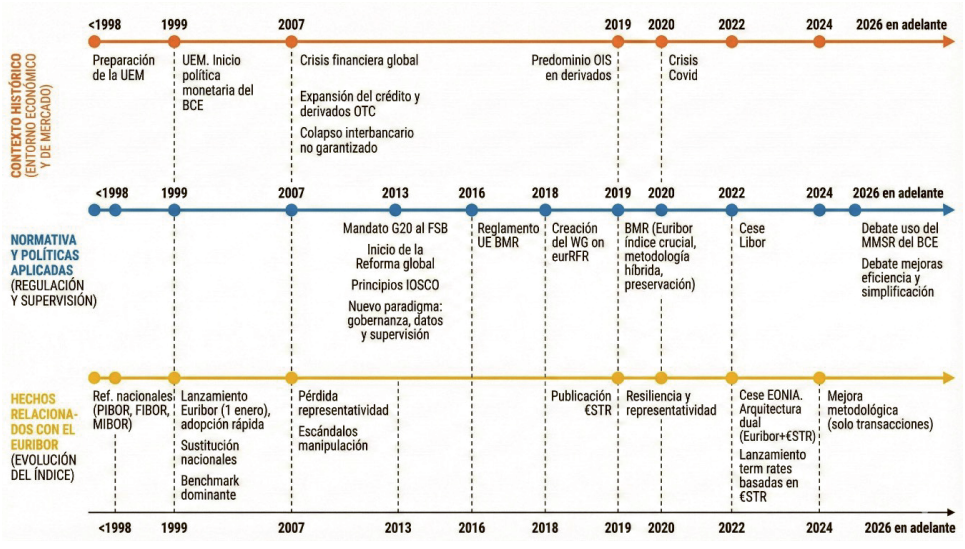
This Occasional Paper pursues a dual objective. It provides an informative and structured account of the benchmark reform process initiated in the aftermath of the global financial crisis, bringing together and organising the principal historical, regulatory and market milestones that have shaped the current Euribor framework. It also adopts an analytical and forward-looking perspective which, without calling into question the index's established soundness and credibility, seeks to assess its strengths and the challenges that continue to affect its functioning, and to explore possible avenues for development aimed at reinforcing its efficiency and continuity over the medium to long term.

The analysis is articulated around a central question: Was the distinct approach adopted in the European Union, as compared with that adopted in the UUK and US jurisdictions, the appropriate one, and, beyond that, is the continued existence of Euribor as a forward-looking benchmark still necessary and sustainable? Building on this overarching issue, the paper addresses several related questions: which economic functions Euribor continues to fulfil that cannot be fully replicated by risk-free rates; which structural limitations persist despite the reforms introduced; and what challenges its future continuity raises in terms of efficiency, operational risk, and economic, reputational and supervisory costs for contributing institutions.

The central argument of this Occasional Paper is that, despite the tensions and constraints that surround it, Euribor continues to play a necessary role in certain segments of the European financial system. In particular, it remains difficult to replace a forward-looking rate that incorporates bank credit risk in the case of very long-dated contracts still outstanding – such as mortgages with extended residual maturities – as well as for certain risk management purposes within credit institutions. That said, this continued relevance coexists with challenges that have yet to be fully resolved, including the structural scarcity of eligible transactions at specific points in the cycle, the significant costs associated with participation in the contribution panel, and the well-known "free-rider problem", whereby many institutions benefit from the index without contributing to the costs of its maintenance.

In light of these considerations, the paper explores the possibility of moving towards a Euribor calculation framework that draws more directly on the information reported under the European Central Bank's Money Market Statistical Reporting (MMSR) regime, to which all significant institutions in the European banking system are subject. The core issue is therefore not whether relevant data are available, but how to develop methodological solutions and institutional arrangements that allow these transactions to be incorporated efficiently – without increasing costs for individual institutions or for the financial system as a whole – while at the same time strengthening the index's credibility and long-term sustainability.

Evolution of Euribor: regulatory and market timeline ILLUSTRATION 1



Source: Authors' own work.

Methodologically, the analysis draws on a review of the relevant academic and institutional literature, an assessment of the principal European and international regulatory developments, and an examination of the available data on the functioning of the euro money market. The objective is to provide a comprehensive assessment of Euribor's current role, its structural constraints and the possible avenues for safeguarding its long-term sustainability as a core benchmark. This assessment is conducted in the context of Regulation (EU) 2016/1011 on indices

used as benchmarks in financial instruments and financial contracts (the Benchmark Regulation, or BMR), as well as the broader global benchmark reform agenda. Against this background, the paper also seeks to identify practical approaches to enhancing the index's efficiency and addressing structural constraints, in alignment with the European agenda on regulatory simplification and the reduction of unnecessary duplication, aimed at strengthening the European Union's competitiveness.

The paper is organised into five main sections. The first examines the origins and historical development of Euribor within the broader process of constructing Economic and Monetary Union (EMU), together with its principal similarities to and divergences from other international interbank benchmarks, notably LIBOR. The second considers the international policy response and the global and European reforms adopted in the aftermath of the global financial crisis and the benchmark manipulation episodes. These reforms established a new framework of principles, regulation and supervision, ultimately leading to the discontinuation of LIBOR and the retention of Euribor following an extensive and demanding process of reform.

The paper then turns to the current operation of Euribor, with particular emphasis on its methodology, governance arrangements and supervisory framework under the BMR. The fourth section examines the advantages of Euribor, the constraints that continue to affect it, and the potential avenues for its future development in an environment characterised by a structurally smaller money market, heightened regulatory requirements and the coexistence of risk-free rates based on the €STR. Finally, the concluding chapter summarises the study's principal findings and considers possible measures to strengthen the efficiency and continuity of Euribor as a core benchmark of the European financial system.

2 Origin and history of Euribor

Euribor, administered by the European Money Markets Institute (EMMI), is currently defined as the average interest rate at which European credit institutions obtain unsecured funding in the euro wholesale money market.[1] This definition reflects a series of refinements introduced in recent years to strengthen the index's representativeness, transparency and robustness. The move to a methodology grounded exclusively in observed transaction data has reinforced Euribor's resilience and brought it more closely into line with the market reality it is intended to capture.

Over nearly three decades, Euribor has weathered successive economic cycles, periods of financial stress and far-reaching reform processes, all of which have shaped the evolution of its original design and its function as a central benchmark within the European financial system. Today, the index continues to play a pivotal role both in the transmission of monetary policy by the ECB and in the determination of funding costs for households, firms and public authorities, notably through its widespread use in variable-rate lending and interest rate derivatives.

Its current configuration is the outcome of a historical process closely intertwined with the creation of the EMU and the need to establish a common benchmark rate for the countries adopting the euro. A proper understanding of its development therefore requires consideration of the pre-1999 background, the economic and institutional factors that shaped its initial design, and the structural changes in the European money market that accompanied its emergence and consolidation as a pan-European interbank benchmark.

2.1 Background: interbank rates prior to the euro

Interbank interest rates[2] (IBOR) are indicators designed to capture the cost at which financial institutions borrow funds from one another in the money market,

1 EMMI, as administrator of Euribor, provides the following definition on its website: "The rate at which wholesale funds in euro could be obtained by credit institutions in current and former European Union and European Free Trade Association countries in the unsecured money market" (EMMI, n.d.-a).

2 Throughout this paper, the term "interbank index" is used for convenience, even though the underlying methodology may encompass transactions with counterparties other than banks. The terminology reflects the historical origins of these benchmarks: from the outset, they were intended to measure banks' wholesale funding costs. In their early stages, such funding was predominantly conducted on an interbank basis, which explains the incorporation of the suffix "IBOR" in their designation. The subsequent evolution of this market, with the incorporation of other non-bank financial participants, has been reflected in the methodology of the indices. They now provide a broader measure of banks' wholesale funding costs and are no longer confined solely to transactions between credit institutions.

typically on a short-term and unsecured basis. They perform a fundamental function in the economy, serving as reference rates for the pricing of a broad range of financial products – from mortgages and corporate loans to derivatives and floating-rate notes – and acting as an important channel for the transmission of monetary policy. By capturing prevailing levels of confidence and liquidity among institutions, these rates provide a concise indicator of the overall condition of the financial system and of credit conditions in the interbank market.

Prior to the introduction of the euro, the European money market was structured around national benchmarks, each anchored in its own domestic financial system. Among the most relevant were the PIBOR (Paris Interbank Offered Rate) in France, which reflected the average interest rate on interbank loans denominated in French francs on the Paris market; the FIBOR (Frankfurt Interbank Offered Rate) in Germany, created in 1985 with the support of the Bundesbank as a reference for unsecured transactions in German marks; and the MIBOR (Madrid Interbank Offered Rate) in Spain, used as a reference rate on loans and mortgages denominated in pesetas.

Each of these rates was shaped by the structure and liquidity conditions of its domestic market. This fragmentation hindered price comparability and limited the scope for integrated liquidity management at European level. As economic integration advanced, the case for a single, harmonised interbank rate became increasingly compelling – one that would serve as a common benchmark for the emerging euro market and ensure the effective transmission of monetary policy across the euro area.

The Maastricht Treaty[3] laid the legal foundations for EMU, implemented in three stages and culminating on 1 January 1999 with the introduction of the euro as a single currency and the launch of a unified monetary policy under the authority of the ECB. The establishment of an integrated and efficient money market was a precondition for the success of that policy. In its report *Financial Integration in Europe*, the ECB underlines that: "[...] a well-integrated financial system enhances the smooth and effective transmission of monetary policy impulses throughout the euro area" (ECB, 2009, p. 3). This statement encapsulates the founding rationale of EMU: without a fully integrated interbank market, monetary policy impulses could not be transmitted evenly across Member States.

3 The Treaty on European Union, signed in Maastricht on 7 February 1992, laid the legal foundations for Economic and Monetary Union and the euro. The reference here is to both the original text published in the *Official Journal of the European Union* and the current consolidated version in force, which incorporates the amendments introduced by subsequent treaties (European Union, 1992; European Union, 2016).

Monetary policy of the ECB and the role of interbank rates EXHIBIT 1

The primary objective of the European Central Bank (ECB) is to maintain price stability, defined as an inflation rate of 2% over the medium term. To achieve this objective, the ECB influences liquidity conditions and short-term interest rates, which form the initial link in the transmission of monetary policy to the real economy.

The ECB has several monetary policy instruments at its disposal, most notably its key policy rates, which it implements through open market operations, standing facilities and minimum reserve requirements:[1]

i) **Open market operations,** through which the ECB steers short-term interest rates, manages liquidity and signals its monetary policy stance. These include the main refinancing operations (MROs), with a maturity of one week, and longer-term refinancing operations (LTROs), typically with a maturity of three months.

ii) **Standing facilities,** which allow counterparties to obtain or deposit overnight liquidity. The marginal lending facility establishes the upper bound of the interbank rate corridor, while the deposit facility sets the lower bound.

iii) **Minimum reserve requirements,** which banks must hold with the central bank. These contribute to stabilising money market rates by ensuring a structural level of liquidity within the system.

In this context, the three key policy rates are:

– The rate on the **main refinancing operations,** which determines the weekly cost of liquidity obtained from the Eurosystem.

– The **marginal lending facility rate,** which sets the cost of overnight borrowing from the ECB.

– The **deposit facility rate,** which determines the remuneration of overnight funds placed by institutions with the ECB.

Together with the level of liquidity in the banking system, these policy rates shape interbank rates – that is, the rates at which banks lend to one another. These include the €STR (formerly EONIA) for overnight transactions and Euribor for longer maturities, ranging from one week to twelve months.

Changes in the policy rates feed through to the interbank market and, via credit institutions, affect borrowing costs for loans and mortgages as well as the return on savings. In this way, they influence consumption, investment and, ultimately, overall economic activity.[2]

Interbank rates therefore play a central role in the transmission of monetary policy. They reflect both market expectations regarding the future path of the ECB's policy rates and the immediate response to decisions taken by the central bank. Euribor in particular tends to adjust to changes in the ECB's rates while also incorporating expectations about the future stance of monetary policy.

Interbank rates are thus more than simple market prices: they are a key mechanism through which the ECB's decisions translate into consistent financing conditions across the euro area. Their stability and representativeness are essential to the effective conduct of monetary policy and to the safeguarding of financial stability in Europe.

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1 Since the financial crisis, these instruments have been complemented by non-standard measures – such as negative interest rates, longer-term refinancing operations and asset purchase programmes – together with "forward guidance", through which the ECB signals its intended path for policy rates and the expected duration of its programmes, with a view to maintaining inflation at around 2%.

2 In recent years, the deposit facility rate has been the main driver of interbank market rates, reflecting the ample liquidity conditions prevailing in the banking system. Following the changes announced by the ECB's Governing Council in 2024 (ECB, 2024a), however, a gradual shift is anticipated. As excess liquidity declines, interbank rates are expected to be influenced to a greater extent by the rate on the main refinancing operations, as was the case prior to the financial crisis.

Source: Authors' own work based on ECB (n.d.-a) and Banco de España (n.d. and 2024).

2.2 Creation of Euribor (1998–1999)

Euribor (Euro Interbank Offered Rate) was officially introduced on 1 January 1999, coinciding with the launch of the euro and the beginning of the third stage of EMU. The initiative was led by the European Banking Federation (EBF), in cooperation with the Financial Markets Association (ACI) and with the support of the ECB, with the aim of ensuring that the single currency would, from its inception, be underpinned by a common, representative and operational benchmark rate for euro-denominated interbank transactions.

At the same time, the EBF, working alongside the ECB, introduced EONIA (Euro Overnight Index Average), intended to reflect the average rate on unsecured overnight interbank transactions in the euro area. From the outset of monetary union, Euribor-covering maturities from one week to twelve months-and EONIA for overnight transactions together formed the reference framework on which the new European money market was built.

The Euribor was initially defined as: "[...] the interest rate at which a prime bank is willing to lend funds in euro to another prime bank in the interbank market for a given term" (ECB, 2013). Although conceptually inspired by LIBOR, Euribor was designed specifically for the institutional architecture of the newly established euro area. Unlike LIBOR, which operated on a global and multi-currency basis,[4] Euribor was conceived as a benchmark exclusively for the euro. It was calculated and published under the coordination of the EBF, with governance and representativeness arrangements tailored to the specific features of the European money market.

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4 See Exhibit 3.

Its introduction addressed the need to replace the former national interbank references – such as PIBOR, FIBOR and MIBOR – with a single common benchmark. This facilitated money market convergence and supported the implementation of a coherent single monetary policy across the euro area. The shift from national benchmarks to common indices – above all Euribor and EONIA – marked a decisive stage in European financial integration, within the framework of a unified monetary policy conducted by the ECB.[5]

2.3 Development and consolidation of interbank benchmarks (1999–2007)

For many years, government bond yield curves served as the primary benchmarks for pricing in financial markets. Their high liquidity, wide range of maturities and perceived absence of credit risk made them a natural proxy for the risk-free rate. From the late twentieth century onwards, however, market practice increasingly shifted towards interbank benchmarks such as LIBOR and Euribor. This shift reflected broader structural changes in financial markets. As McCauley (2001) observes, even where sovereign debt was abundant, market participants preferred private benchmarks when these provided a closer measure of marginal funding costs and reduced basis risk[6] in the hedging of private instruments.

The sovereign debt crises of the 1980s and 1990s, the periods of liquidity stress and the increasing sophistication of derivatives markets from the 1980s onwards weakened the role of government bonds as an efficient gauge of expectations regarding future interest rates. In that setting, interbank rates provided a benchmark more closely aligned with financial institutions' actual funding costs, making them particularly well suited to the pricing and hedging of syndicated loans, interest rate derivatives and other complex instruments (Wooldridge, 2001).

Interbank benchmarks therefore came to dominate not through regulatory fiat, but through a competitive process of benchmark tipping, as market participants gravitated towards them because they offered a more practical and informative basis for pricing and risk management. As McCauley (2001) explains, this dynamic reflects a coordination effect: each individual change increases the incentive for other agents to adopt the same benchmark. Their prominence was further

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5 The replacement of national benchmarks by Euribor raised significant issues of legal certainty, given the large volume of contracts and loans referencing the former domestic interbank rates. In Spain, Article 32 of Law 46/1998, of 17 December, on the introduction of the euro (BOE-A-1998-28712) expressly set out the regime applicable to MIBOR. It provided for the continued use of MIBOR for as long as it remained technically viable and authorised the Minister of Economy and Finance to replace it, by operation of law, with a new equivalent rate "that bears the closest possible similarity" in the event of its discontinuation or loss of representativeness. This framework ensured legal continuity for mortgage contracts referencing MIBOR following the introduction of the euro. Subsequently, the Order of 1 December 1999 (BOE-A-1999-23256) formally recognised Euribor as the successor benchmark to MIBOR for new transactions, thereby completing the transition to pan-European reference rates.

6 Basis risk refers to the risk that the instrument used to hedge a financial position does not move in full alignment with the underlying asset or liability, resulting in a mismatch between the effective cost of funding and the outcome of the hedge. This risk becomes particularly relevant where the chosen benchmark does not adequately reflect the risk profile or funding conditions of the instruments being hedged.

reinforced by widespread use in financial contracts worldwide and by their role in anchoring the short end of the yield curve, thereby conveying information about expectations of monetary policy and broader macroeconomic conditions, as documented by Gyntelberg and Wooldridge (2008).

At European level, following its launch in January 1999, Euribor quickly became the principal benchmark rate in the euro area. During the first decade of the single currency – marked by strong credit growth, low volatility and narrowing risk premia – Euribor provided a consistent measure of interbank funding costs and emerged as the central reference for asset pricing and interest rate risk management. Between 1999 and 2007, it was widely adopted in mortgage and corporate lending, in floating-rate debt issuance and in derivative contracts, both on regulated markets and over the counter (OTC), effectively displacing national benchmarks such as MIBOR and PIBOR.

The rapid uptake of Euribor in Spain reflects a broader set of macroeconomic, financial and institutional developments that predated its formal introduction. During the 1980s and early 1990s, the Spanish economy experienced high inflation and elevated nominal interest rates, followed by a sharp decline in rates amid recurring exchange rate pressures and successive devaluations of the peseta. This environment fostered a structural preference for variable-rate borrowing over fixed-rate lending. At the same time, the expansion of the property market and mortgage lending increased demand for long-term financing with periodic interest rate resets, strengthening the case for benchmark rates that accurately reflected money market conditions.

Financial sector liberalisation and Spain's integration into European markets after joining the European Economic Community further encouraged the use of harmonised and comparable benchmarks across Europe. In this context, the economic authorities – and in particular the Banco de España – implicitly encouraged the use of market-based interbank rates as a means of strengthening monetary policy transmission and improving access to credit. This approach paved the way for Euribor – especially the one-year tenor – to become the dominant benchmark for retail lending in Spain following the introduction of the euro.[7]

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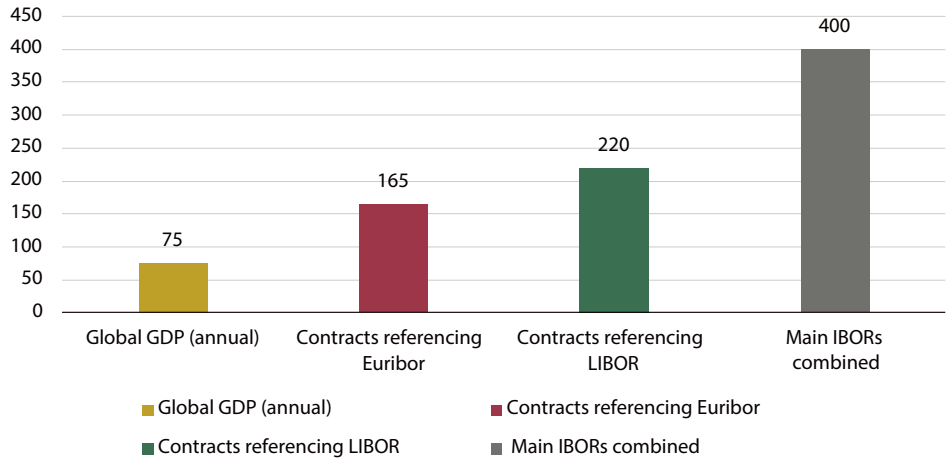
7 The Order of 12 December 1989 on interest rates and commissions, rules of conduct, customer information and advertising by credit institutions did not establish official benchmark rates. It confined itself to liberalising interest rates and strengthening transparency requirements. Official benchmark rates for the mortgage market were introduced with the Order of 5 May 1994 on transparency in the financial conditions of mortgage loans. Its second additional provision entrusted the Banco de España, subject to a prior report from the Directorate General of the Treasury and Financial Policy, with defining – by means of a circular – a set of official indices and publishing their values on a regular basis. Pursuant to that mandate, MIBOR and the various mortgage loan reference indices (IRPH) were designated as official benchmarks. Following the introduction of the euro, the one-year Euribor was added. It was calculated as the monthly arithmetic average of the daily 12-month Euribor fixings published during the relevant reference month. This regulatory approach remains in place, subject to subsequent adjustments, under Order EHA/2899/2011, of 28 October, which continues to govern the transparency, definition and publication of official benchmark rates applicable to variable-rate mortgage loans.

The prominence of interbank benchmarks was not only qualitative but also quantitative. According to estimates cited in the Financial Stability Board (FSB, 2014), the principal IBORs underpinned exceptionally large notional volumes of financial contracts worldwide (see Figure 1). In 2014, LIBOR referenced contracts with a total notional amount of close to US$220 trillion, while Euribor accounted for between US$150 trillion and US$180 trillion, mainly in loans, floating-rate debt securities and, above all, interest rate derivatives. Taken together, the three main IBORs – LIBOR, Euribor and TIBOR – served as reference rates for more than US$400 trillion in aggregate notional exposure, with a strong concentration in shorter maturities, particularly three and six months.

These figures indicate that the volume of contracts linked to the principal interbank benchmarks amounted to five to six times annual global nominal GDP, which stood at approximately US$70–75 trillion in the years preceding the global financial crisis. This scale underscores the systemic importance of these benchmarks and the critical role of their integrity in safeguarding the stability of the international financial system.

Scale of IBOR-referenced contracts compared with global GDP8[8] FIGURE 1



Sources: Financial Stability Board (2014) and World Bank (2014). Figures in trillions of US dollars.

Despite their central role, these benchmarks also embodied structural weaknesses. Prior to the reform process, indices such as LIBOR and Euribor were calculated on the basis of submitted estimates – relying on the expert judgement of a limited panel of banks – rather than on observed transactions. In periods of financial stress and limited liquidity, such as those that emerged from 2007 onwards, the gap between submitted rates and actual market conditions widened markedly. The global financial crisis brought these design shortcomings into sharp focus, prompting an extensive international effort in the years that followed to review and reform benchmark frameworks.

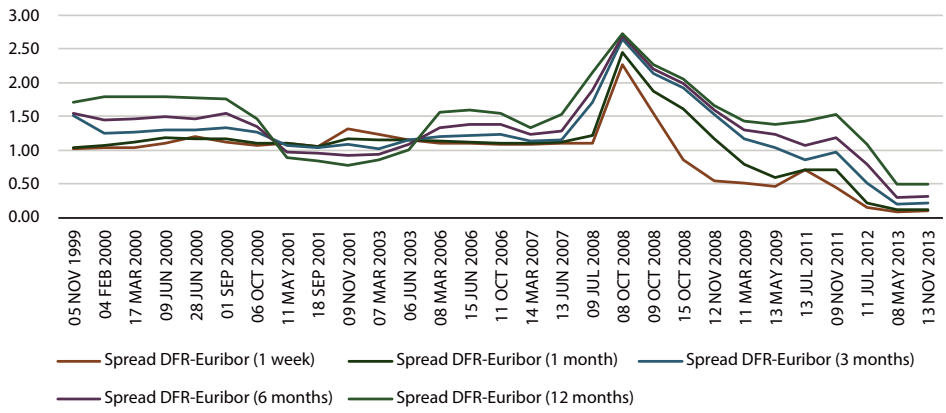
8 Global GDP is expressed in annual nominal terms (current USD), based on data from the World Bank (2014). IBOR-linked volumes refer to aggregate notional amounts of financial contracts and are not directly comparable to GDP; they are presented solely to illustrate scale.

2.4 First signs of strain and emerging concerns (2007–2013)

The global financial crisis that began in 2007 – triggered by the subprime mortgage collapse in the United States and followed by the failure of Lehman Brothers – marked a turning point for Euribor and, more broadly, for interbank benchmarks. The abrupt loss of confidence among financial institutions, combined with heightened perceptions of credit risk and a sharp reduction in system-wide liquidity, significantly disrupted money market activity.

From the summer of 2007 onwards, the spread between interbank rates such as Euribor and the policy rates of the ECB widened markedly, reflecting mounting liquidity pressures and increased counterparty risk in the European money market (see Figure 2). As the ECB observed (2009, p. 35): "the money market has been particularly hit by the turmoil. Transaction volumes, especially for longer maturities, have declined, and unsecured rates have been characterised by unusually high spreads". These developments underscored rising risk perceptions and growing funding difficulties in a context of pronounced credit contraction.

Trend in the spread between the Euribor and the deposit facility rate FIGURE 2



Source: Authors' own calculations based on data from EMMI and ECB.

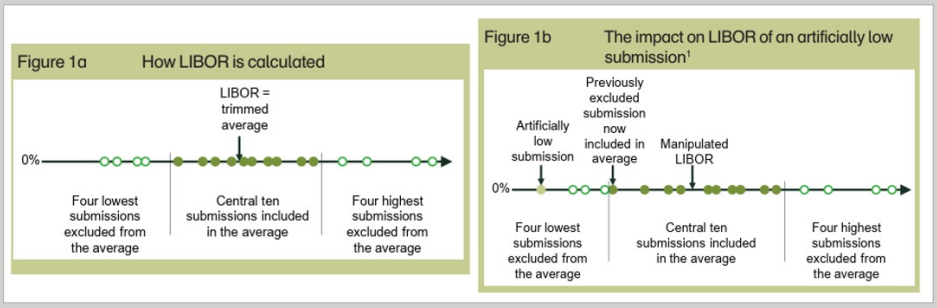
The crisis exposed a structural weakness in the calculation model: its reliance on expert judgement rather than on actual transaction data. In an environment marked by shrinking credit activity and limited underlying transactions, Euribor risked losing part of its ability to reflect interbank funding conditions accurately.

These concerns intensified with the manipulation cases uncovered between 2011 and 2013. International investigations revealed that certain panel banks – none of them Spanish – had adjusted their submissions in an attempt to influence benchmark levels and benefit from positions in derivatives markets (see Exhibit 2). The LIBOR and Euribor cases resulted in a significant loss of confidence in financial benchmarks and carried substantial reputational and financial consequences for the institutions concerned (Gómez-Yubero, 2016).

Interbank benchmarks: systemic importance, manipulation risks and enforcement response EXHIBIT 2

The crisis that began in 2007, in an environment marked by severe liquidity constraints and heightened volatility, exposed the limitations of interbank benchmarks based on submitted estimates. As Gyntelberg and Wooldridge (2008) note, although trimmed-mean methodologies were intended to limit the influence of outliers, they did not fully eliminate the risk that submitted rates could diverge from actual market conditions. Subsequent academic research and regulatory investigations showed that, in such an environment, individual incentives linked to derivatives positions, combined with institutional considerations – such as reputational signalling of financial soundness – could create conditions conducive to manipulative behaviour, in some instances involving coordination among contributors.

Vulnerability of LIBOR under a trimmed mean methodology ILLUSTRATION E2.1



Source: Based on Oxera (2014). The figure illustrates, first, the standard LIBOR calculation method, which relied on a trimmed mean – excluding the highest and lowest submissions – and second, the potential effect of an artificially low submission that falls within the retained range. Even where extreme values are removed, a strategically positioned quote within the central distribution may shift the observations included in the average and influence the final fixing. Where dispersion among submissions is limited, a single strategic contribution may suffice to affect the aggregate benchmark rate. The robustness of the mechanism therefore depends critically on both the size of the contributing panel and the degree of heterogeneity in submitted rates.

From an empirical standpoint, the pioneering study by Abrantes-Metz, Kraten and Metz (2008) provided early evidence of these risks. Their analysis identified anomalous patterns in individual banks' LIBOR submissions, including unusually low dispersion across reported rates and weak correlation with risk indicators such as CDS spreads – features that were difficult to reconcile with competitive market conditions. The authors nonetheless stressed that this evidence did not, in itself, demonstrate sustained manipulation of the published aggregate rate. They highlighted the difficulty of distinguishing between strategic individual behaviour, shortcomings in benchmark design and explicit collusion.

Clear confirmation of manipulative conduct in interbank benchmarks emerged primarily through enforcement actions by competition authorities. Investigations launched in 2011 by the European Commission into the manipulation of LIBOR and other financial benchmarks treated such conduct as prohibited

collusive practices under Article 101 of the Treaty on the Functioning of the European Union (TFEU), which outlaws cartels and anti-competitive agreements. As Oxera (2014) notes, the European Commission found indications of anti-competitive conduct involving several financial institutions and at least one intermediary in connection with the manipulation of LIBOR and Euribor between 2005 and 2010. These investigations concluded in late 2013 with a settlement decision under which the Commission imposed fines totalling approximately €1.7 billion on eight financial institutions: Barclays Bank, Deutsche Bank, Royal Bank of Scotland, UBS, JP Morgan, Citigroup, RP Martin, and Société Générale.

In the United States, the Commodity Futures Trading Commission (CFTC) addressed similar conduct under its statutory powers to combat market manipulation and false reporting. In June 2012, the CFTC determined that Barclays PLC, Barclays Bank PLC, and Barclays Capital Inc. had repeatedly submitted false LIBOR and Euribor contributions over a period of several years in order to benefit derivatives positions and to present a stronger financial profile during the crisis. The CFTC imposed a civil monetary penalty of US$200 million and required the firm to strengthen its internal controls and benchmark submission procedures (CFTC, 2012a).

The CFTC's enforcement activity went well beyond this case. In the years that followed, the US regulator imposed substantial penalties on other financial institutions, including UBS (US$700 million), Deutsche Bank (US$800 million), Rabobank (US$475 million) and Royal Bank of Scotland (US$325 million), bringing total civil penalties for similar misconduct – manipulation or false reporting of interbank benchmark rates – into the billions of dollars (CFTC, 2012b, 2013a, 2013b and 2015).

These enforcement actions complemented the European response and underscored that manipulating, or deliberately submitting false, benchmark rates may constitute not only an infringement of EU competition law, but also a serious breach of market integrity rules under legal regimes such as the Commodity Exchange Act in the United States.1 The scale of the fines imposed in both jurisdictions, together with the custodial sentences handed down in the United States and the United Kingdom to key traders involved, illustrates how seriously such conduct is treated. This reflects its potential impact on an enormous volume of global financial contracts and on confidence in the benchmark infrastructure underpinning the international financial system.

The European Commission's infringement decisions also fuelled a wide-ranging legal debate as to the reach of this conduct beyond derivatives markets. As Marcos (2021) discusses, those decisions have underpinned numerous follow-on damages claims in various Member States, particularly in relation to contracts linked to Euribor. Court practice has shown that the unlawfulness established in derivatives markets cannot simply be transposed automatically to other markets. It has also highlighted the evidential challenges involved in establishing both the existence and the quantum of harm. This experience demonstrates that administrative sanctions, while essential to restoring competitive conditions,

are not, on their own, sufficient to secure lasting confidence in benchmark rates. That objective requires structural reforms to their governance and methodology.

More broadly, the history of interbank benchmarks illustrates how instruments originally conceived as neutral technical references can become critical market infrastructures, whose malfunction or manipulation may give rise to systemic risk. In the case of Euribor, this trajectory underscores the importance of its current governance framework, the shift towards more robust methodologies, and the complementary role of financial supervision, market abuse regulation and competition law as key safeguards of confidence and stability within the European financial system.

Source: Authors' own work based on the references cited in the Exhibit.

1 It should be noted that, within the European Union, the sanctions imposed for the manipulation of interbank benchmarks were grounded in Competition Law, notably through the application of Article 101 of TFEU, on the basis that the conduct constituted collusive practices in interest rate derivatives markets. At the time of the conduct under investigation and the European Commission's infringement decisions, no specific and fully developed EU market abuse framework yet existed to address benchmark manipulation in the form now provided for under Regulation (EU) No. 596/2014 on market abuse (Market Abuse Regulation, MAR). Accordingly, the Commission's action focused on the distortion of competition in the affected markets, without prejudice to the fact that subsequent regulatory reforms have expressly addressed the integrity of benchmark indices.

3 International response and global and European reforms

The scale of the deficiencies identified prompted the G20 Leaders, at the 2013 St Petersburg Summit (G20, 2013), to mandate the FSB to undertake a comprehensive review of the most significant financial benchmarks. This marked the beginning of a coordinated international reform effort and a decisive shift in the governance of benchmarks. A framework that had relied largely on industry self-regulation gave way to one grounded in common principles and internationally coordinated regulation and supervision. Representativeness, methodological robustness and integrity were recast as core safeguards of global financial stability.

3.1 The new paradigm driven by the FSB and IOSCO (from 2013 onwards)

Amid heightened mistrust and a contraction in unsecured interbank activity, traditional calculation methods – based on panel banks' estimates rather than observed transactions – were shown to be susceptible to conflicts of interest and strategic behaviour. This undermined confidence in the reliability of benchmark rates. In response, a global reform agenda was launched to restore trust and reinforce benchmark integrity.

The G20 entrusted the FSB with leading this process. In 2013, the FSB established the Official Sector Steering Group (OSSG), bringing together central banks and supervisory authorities to coordinate reviews of the principal IBORs – LIBOR, Euribor and TIBOR – and to foster the development of alternative reference rates anchored in actual transactions (FSB, 2013).[9]

At the same time, the International Organization of Securities Commissions (IOSCO) published, in July 2013, its *Principles for Financial Benchmarks*, setting out 19 standards covering governance, methodological quality, conflicts of interest and accountability.[10] These principles became the cornerstone of subsequent reforms and marked a clear transition from a predominantly self-regulatory model to one based on public oversight.

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9 In its August 2013 report to G20 Finance Ministers and Central Bank Governors, the FSB stressed that restoring confidence in interest rate benchmarks had to be pursued "with high priority and urgency". This position echoed the G20 Leaders' statement of February 2013, which called for decisive progress in strengthening supervisory and governance frameworks for financial benchmarks, encouraged broad implementation of sound principles and good practices, and asked the FSB to report on progress at the subsequent St Petersburg Summit in September of that year (FSB, 2013).

10 In September 2012, the IOSCO had established the Board-Level Task Force on Financial Market Benchmarks. The task force was mandated to develop a set of principles to enhance benchmark reliability, address conflicts of interest in submission and administration processes, and improve methodological transparency. Following a public consultation in January 2013, this work culminated in the publication of the *IOSCO Principles for Financial Benchmarks* in July 2013.

IOSCO principles for financial benchmarks

TABLE 1

Governance	
1	Overall responsibility. The administrator remains responsible for the integrity of all aspects of the benchmark determination process, including the definition of the methodology, data collection, calculation and publication of the benchmark, as well as the associated control and accountability arrangements.
2	Oversight of third parties. The administrator must put in place written agreements governing the role of any third parties involved in the benchmark determination process, such as those responsible for calculation, data provision or publication.
3	Management of conflicts of interest. The administrator must adopt and disclose policies and procedures designed to identify, manage and, where possible, avoid conflicts of interest, so as to remove incentives that could give rise to benchmark manipulation.
4	Control framework. The administrator must establish and make public a robust control framework covering both the determination and dissemination of the benchmark. This framework should include effective arrangements for the reporting of potential misconduct.
5	Internal oversight. The administrator must ensure independent oversight of the benchmark process, including periodic review and testing of all aspects of the rate-setting methodology
Quality of the benchmark	
6	Design of the benchmark The benchmark must be designed so that it reliably reflects the economic reality it is intended to measure and is not susceptible to factors that could distort its price, rate, level or value.
7	Data sufficiency. The data underlying the benchmark should be based on prices, rates, values or other inputs formed through the forces of supply and demand in competitive markets. Wherever possible, the administrator should rely on actual transaction data.
8	Data hierarchy. The administrator must establish and publish clear policies setting out the hierarchy of data inputs and the circumstances in which expert judgement may be used.
9	Transparency. For each benchmark determination, the administrator must provide a clear and sufficiently detailed explanation of the determination process, including the use of expert judgement where applicable.
10	Periodic review. The administrator must periodically assess whether the underlying interest the benchmark seeks to measure has undergone structural changes that may warrant a revision of the methodology.
Quality of the methodology	
11	Content of the methodology. The administrator must document and publish the benchmark methodology. At a minimum, it should describe the calculation method, the basis for representativeness, the relevance of the benchmark to the relevant market segment, and its suitability as a reference for financial instruments or contracts.
12	Changes to the methodology. The administrator must disclose the rationale for any material change to the methodology, as well as the procedures followed in implementing such changes.
13	Transition and cessation. The administrator must maintain written policies and procedures to address the potential cessation of a benchmark, whether due to changes in market structure, product definition or any other development that renders the benchmark no longer representative.
1**4**	Code of conduct for contributors. The administrator must establish a code of conduct for contributors, monitor adherence to it and oversee compliance.
15	Internal controls over data collection. Where the administrator collects data from external sources, it must maintain appropriate internal controls governing data selection, collection and transmission.
Accountability	
16	Complaints procedures. The administrator must establish and publish procedures enabling stakeholders to submit complaints regarding the representativeness of the benchmark, the application of the methodology, or other decisions adopted by the administrator.
17	Audit. The administrator must appoint an independent internal or external auditor with appropriate expertise and capacity to conduct periodic reviews of compliance with the IOSCO Principles and to report its findings to the administrator.
18	Audit trail. The administrator must retain adequate records of all data and documentation necessary to support the benchmark determination process and to facilitate audit and supervisory review, for a minimum period of five years.
19	Cooperation with competent authorities. All documentation relating to compliance with the Principles must be made available to the competent authorities.

Source: International Organization of Securities Commissions (2013) and Gómez-Yubero (2016).

These Principles, formally endorsed by the FSB in its July 2014 report (FSB, 2014), became the cornerstone of international benchmark governance reform, serving as the basis for its review and inspiration for regulatory frameworks such as the BMR. The IOSCO Principles continue to serve as a global reference standard and are applied on a voluntary basis by numerous administrators in jurisdictions where no equivalent binding regulatory framework is in place.

In its 2014 report *Reforming Major Interest Rate Benchmarks*, the FSB consolidated this reform agenda, organising the overhaul of financial benchmarks along two complementary strands (FSB, 2014).

i) First, it sought **to strengthen existing interbank benchmarks, or offered rates** (IBORs), by promoting their alignment with the IOSCO Principles through substantial improvements in governance, control arrangements and methodology. The objective was to enhance their economic representativeness, reduce reliance on expert judgement and limit vulnerability to manipulation, thereby restoring confidence in these widely used benchmarks.

ii) Second, the FSB identified the need to reduce structural reliance on IBORs by encouraging the **development and adoption of alternative risk-free rates** (RFRs), particularly for use in the most liquid and standardised segments of the market, such as derivatives. This second strand of reform was intended not only to promote more robust benchmarks anchored in deep and liquid markets, but also to support an orderly transition from IBORS to alternative reference rates where necessary, covering both new contracts and, potentially, legacy exposures.[11]

The FSB subsequently published specific recommendations for both types of indices: interbank offered rates (IBORs), which continue to reflect bank funding costs, and risk-free rates (RFRs), derived from transactions with no counterparty credit risk (FSB, 2021). Within this framework, each jurisdiction was encouraged to identify an appropriate domestic risk-free rate and to establish public-private working groups to coordinate the transition process.

11 To advance this second strand of work, the OSSG established a Market Participants Group (MPG), comprising representatives from the public sector and a broad range of private market participants, including financial institutions, end users and derivatives market infrastructures. The MPG was tasked with assessing the feasibility and robustness of potential alternative reference rates, analysing the economic, operational and legal implications of a possible transition, and issuing recommendations on the design, adoption and governance of these new benchmarks. The MPG published its final report in March 2014. The report provided a comprehensive assessment of alternatives to IBORs, examining their respective advantages and drawbacks, the preferences of different market segments, and the principal risks associated with transition. It became a key reference in the global benchmark reform process (MPG, 2014).

3.1.1 Recommendations on risk-free rates. Industry working groups

Alongside the reform of traditional interbank benchmarks, the FSB from 2014 onwards actively promoted the development and adoption of risk-free rates as alternative reference rates, particularly for the most liquid and standardised segments of financial markets. These rates are typically derived from observed overnight transactions – secured or unsecured – across a broad transactional base. As such, they offer greater methodological robustness and are less exposed to conflicts of interest than IBORs previously based on submitted estimates.

The FSB uses the term "risk-free" or "near risk-free" to describe rates that are largely free from bank credit risk, even though they may still embed other components, such as liquidity or term premia (FSB, 2014). Because they are anchored in deep and observable markets, these rates are more readily aligned with the IOSCO Principles, relying on effective transaction data and stronger governance arrangements.

On this basis, the FSB encouraged each jurisdiction to identify an appropriate domestic RFR and to establish public-private working groups to evaluate available alternatives and design an orderly transition from IBORs to these new benchmarks. Such risk-free rate working groups began to emerge from 2013 onwards. Switzerland was the first jurisdiction to establish one, followed in 2014 by the United States, the United Kingdom and Japan, in line with the recommendations of the OSSG and the Market Participants Group. The European working group was created later, in 2018, as discussed below.

As a result of this process, major jurisdictions developed or reformed their overnight reference rates: SONIA in the United Kingdom, SOFR in the United States, SARON in Switzerland and TONAR in Japan. Within the euro area, the ECB led the development of the €STR (Euro Short-Term Rate), which gradually replaced EONIA and strengthened the overall robustness and representativeness of the euro area's short-term reference rates.

The FSB also stressed that priority should be given to adopting RFRs in derivatives markets, where systemic risk is more pronounced and where overnight index swap (OIS) markets provide sufficient depth for these rates to serve as reliable reference anchors (FSB, 2021). This approach did not entail the immediate discontinuation of IBORs. Rather, it pointed towards a dual-rate environment in which reformed interbank benchmarks and RFRs would coexist, each serving different products, markets and economic functions.

Working groups and recommendations on RFRs in the main jurisdictions TABLE 2

					
Working group	Alternative Reference Rates Committee (ARRC)	Working Group on Sterling Risk Free Rates	Working Group on Euro Risk Free Rates	National Working Group on Swiss Franc Reference Rate	Study Group on Risk Free Reference Rates
Alternative rate	Secured Overnight Finance Rate (SOFR)	Sterling Overnight Index Average (SONIA)	Euro Short Term Rate (€STR)	Swiss Average Rate Overnight (SARON)	Tokio Overnight Average Rate (TONAR)
Administrator	New York Federal Reserve	Bank of England	European Central Bank	SIX Swiss Exchange	Bank of Japan
Term	One day (overnight)	One day (overnight)	One day (overnight)	One day (overnight)	One day (overnight)
Counterparties	Financial entities	Financial entities	Financial entities	Banks	Financial entities
Instruments	Repos	Unsecured deposits	Unsecured deposits	Repos	Unsecured deposits

Source: Gómez-Yubero (2021).

3.1.2 Launch of the €STR and consolidation of risk-free rates in the euro area

Consistent with the recommendations of the FSB and IOSCO, in September 2018 the ECB, together with European Securities and Markets Authority (ESMA), the European Commission and the Belgian Financial Services and Markets Authority (FSMA), announced the establishment of the Working Group on Euro Risk-Free Rates (EU RFR Working Group).[12] The group's mandate was to identify and promote alternative reference rates to Euribor and EONIA, grounded in actual transactions and aligned with the IOSCO Principles and the BMR, and to support an orderly transition where appropriate (ECB, ESMA, FSMA and European Commission, 2018). It was structured as a public-private forum, led by private-sector participants, with public authorities participating as observers, and operating under governance arrangements based on consensus, transparency and safeguards relating to competition and confidentiality.

The launch took place against the backdrop of an already well-advanced regulatory and market framework. By 2016, the BMR had been adopted; in 2017, Euribor and EONIA had been designated as critical benchmarks; and EMMI, the administrator of both, was undertaking an extensive methodological review. At the same time, on 21 September 2017, the ECB announced its intention to begin calculating a new unsecured overnight rate based exclusively on actual transactions. The aim was to complement the euro benchmark ecosystem and provide a potential alternative to existing references. This announcement marked the starting point of the project that ultimately led to the Euro Short-Term Rate (€STR) (ECB, 2017).

12 Although some sources refer to 2017, it was formally constituted in 2018 (ECB, n.d.-a).

The €STR was first published on 2 October 2019, reflecting transactions reported on the previous business day by institutions subject to the MMSR. Earlier, on 13 September 2018, the EU RFR Working Group had formally recommended the €STR as the euro area's risk-free rate and as the successor to EONIA (ECB, 2018). To facilitate the transition, it was recommended that EONIA's methodology be adjusted so that it would be calculated as the €STR plus a fixed spread of 8.5 basis points. This approach was designed to preserve economic neutrality for outstanding contracts.

Following detailed legal and financial analysis, and with the launch of the €STR on 2 October 2019, EONIA began to be published on that basis. In December 2019, EMMI obtained authorisation for EONIA under the BMR. That authorisation remained in force until the benchmark's final cessation on 3 January 2022 (EMMI, 2021). From that date, and pursuant to Implementing Regulation (EU) 2021/1848, the €STR plus 8.5 basis points was designated as EONIA's statutory fallback.

Within a relatively short timeframe, the €STR was announced, developed, recommended as the euro area's risk-free rate and deployed to support the orderly wind-down of its predecessor. The position of Euribor, however, was different. Its systemic relevance, the breadth of its applications and the scale of its contractual incorporation raised far more complex issues.

3.1.3 The need for term benchmarks: alternatives based on the €STR

As the EU RFR Working Group began its work, it became apparent that although the €STR provided a robust reference for wholesale and derivatives markets, its strictly overnight nature meant that it could not serve as a direct substitute for Euribor. Euribor continued to be widely used as a forward-looking term rate, particularly in retail and corporate lending, where certainty at the start of the interest period is essential for determining payment obligations.

This issue was not specific to the euro area. The FSB acknowledged that overnight RFRs were not suitable for all financial products. In particular, it highlighted the need to develop term rates derived from RFRs that could provide ex ante certainty regarding interest payments without replicating the structural weaknesses historically associated with IBORs (FSB, 2021).

Two broad methodological approaches emerged:[13]

– **Backward-looking term RFRs,** calculated by compounding observed overnight rates. These may be determined in arrears (with the rate set at the end of the interest period) or in advance (set at the beginning of the period using a recent historical average). Because they rely exclusively on realised transaction data, they are generally regarded as more robust and better aligned with the IOSCO Principles.

13 A detailed account of the mechanics of RFR-based term rates is provided in the annex to FSB (2021), as well as in Gómez-Yubero and Palomero (2021), which explain the operational logic and calculation options of both backward-looking and forward-looking approaches.

– **Forward-looking term RFRs,** derived from expectations embedded in prices of derivatives referencing RFRs. While they allow the applicable rate to be fixed at the start of the interest period, their reliability depends on the depth and liquidity of the underlying derivatives markets, which limits the contexts in which they can be recommended.

The FSB stressed that forward-looking term rates should be used only where strictly necessary and, as a general rule, outside derivatives markets, so as not to recreate the incentive structures and vulnerabilities associated with legacy IBORs. Their use as a reference rate or fallback in certain cash products was considered compatible with financial stability, provided that the core of the financial system remained anchored in overnight RFRs or compounded backward-looking rates.

Within the euro area, the EU RFR Working Group issued its recommendations on Euribor trigger events and replacement rates on 11 May 2021. The group concluded that, from the standpoint of robustness and international consistency, the Compounded €STR Average Rates – published by the ECB since 15 April 2021 – should be regarded as the preferred fallback for most contracts. At the same time, it acknowledged the practical challenges this approach could pose in consumer contracts, where replacing a forward-looking rate with a backward-looking one may create operational and communication difficulties (Working Group on Euro Risk-Free Rates, 2021).

Accordingly, the group accepted that forward-looking term rates based on the €STR could be used for certain retail lending products, provided that an additional fallback based on compounded €STR was also included. No specific forward-looking rate was endorsed at that stage, as sufficiently established benchmarks were not yet available.

In November 2023, the EU RFR Working Group published a comparative assessment of the forward-looking €STR-based term rates then available, namely EFTERM (administered by EMMI) and the FTSE Term €STR (formerly Refinitiv Term €STR). The group did not endorse either benchmark; instead, it set out their main methodological features and market characteristics.

At present, the following forward-looking €STR-based term rates are published, summarised in Table 3.[14]

14 At the time of drafting this document, none of the forward-looking €STR-based term rates had been included in the list of official benchmarks set out in Order EHA/2899/2011, of 28 October, on transparency and customer protection in banking services. This limits the scope for Spanish institutions to implement the recommendations of the EU RFR Working Group in consumer lending.

€STR-based term rates TABLE 3

Benchmark	Administrator	Launch date	Tenors	Methodology
CME Term €STR	CME Group	2023 (beta phase)	1, 3, 6 and 12 months	Waterfall methodology based primarily on €STR futures traded on CME, incorporating interpolation mechanisms ("best fit") and adjustments between FOMC meetings where appropriate.
EFTERM	EMMI	21 November 2022 (from 1 June 2022, beta phase)	1 week; 1, 3, 6 and 12 months	Waterfall methodology based on dealer-to-client prices and volumes from Tradeweb; in their absence, end-of-day settlement prices of one-month €STR futures traded on ICE.
FTSE Term €STR	FTSE Russell	2023	1 week; 1, 3, 6 and 12 months	Waterfall methodology based on €STR OIS swap quotes from Tradeweb and executed and centrally cleared €STR OIS transactions at LCH.

Sources: CME Group (n.d.), EMMI (n.d.-b) and FTSE Russell. (n.d.).

By that stage, Euribor had completed its transition to the hybrid methodology, secured authorisation under the BMR and made clear that a broad-based migration of legacy contracts to an alternative benchmark would not be operationally feasible. This context strengthened the view that the coexistence of a reformed and robust Euribor alongside an ecosystem of €STR-based references was not only unavoidable but could also prove beneficial for European markets. The authorities endorsed this direction,[15] while stressing the importance of incorporating robust fallback provisions in Euribor-linked contracts, in line with Article 28.2 of the BMR.

3.2 The different path of LIBOR. Parallels and divergences with Euribor

Although LIBOR and Euribor shared a common starting point and were subject to the same international reform momentum, their subsequent paths diverged clearly. LIBOR, facing a structural decline in representativeness, was ultimately replaced by actual transaction-based RFRs. Euribor, by contrast, has remained a central benchmark in the euro area following substantial methodological reform and within a strengthened framework of governance and supervision.

15 "While there is currently no plan to discontinue EURIBOR, the development of more robust fallback language addresses the risk of a potential permanent discontinuation and is in line with the EU Benchmarks Regulation (BMR)". (ECB, 2021).

Brief history of LIBOR EXHIBIT 3

The London Interbank Offered Rate (LIBOR) emerged in the late 1960s and 1970s to support the growing market for international syndicated loans and to bring greater transparency to their pricing. As cross-border lending expanded and new financial instruments – particularly interest rate derivatives – gained prominence, the need for a reliable, standardised and internationally accepted reference rate became increasingly evident.

In 1986, the British Bankers' Association (BBA) assumed formal responsibility for administering the benchmark, which was published as BBA LIBOR from January 1986 until January 2014. Over time, LIBOR underwent numerous adjustments. These included changes to the composition of contributing bank panels for each currency, the addition and subsequent withdrawal or consolidation of certain currencies – especially following the introduction of the euro – and a substantial reduction in the number of available tenors, particularly after the global financial crisis of 2008.

A pivotal methodological change occurred in 1998 with the revision of the so-called LIBOR Submission Question. The original formulation, framed around the rate at which prime banks would lend to one another, was replaced by a question centred on the rate at which each panel bank could obtain funding in the interbank market. This shift increased the subjective element in submissions, as each contribution became an individual assessment of the contributor's own funding cost.

In its final configuration, LIBOR was published for five currencies (CHF, EUR, GBP, JPY and USD) and seven maturities (overnight/spot next; one week; and one, two, three, six and twelve months), resulting in 35 rates being published on each London business day. For decades, LIBOR ranked among the most widely used reference rates worldwide. It underpinned the pricing and valuation of a broad range of financial instruments, including derivatives, bonds and syndicated loans, as well as retail products such as mortgages and student loans.

Economically, LIBOR was intended to capture the average rate at which panel banks could obtain unsecured wholesale funding for a specified currency and maturity. To do so, the entities answered the following contribution question: "At what rate could you borrow funds, were you to do so by asking for and then accepting inter-bank offers in reasonable market size, just prior to 11.00?". Beyond its contractual role, LIBOR also served as a widely monitored indicator of market expectations regarding the future path of policy rates, liquidity premia in money markets and, during periods of stress, as a gauge of confidence in the banking system.

Source: IBA (2018).

Administered in its final phase by ICE Benchmark Administration (IBA), LIBOR remained the world's most widely referenced benchmark for many years, with multiple currency and tenor configurations. Following the 2008 financial crisis – and particularly after the investigations launched in 2012 uncovered manipulation – its structural weaknesses became increasingly evident. Actual transaction volumes in unsecured interbank markets had fallen sharply, creating a widening imbalance between the shrinking underlying market and the vast stock of contracts referencing LIBOR. This mismatch gave rise to what became known as the "inverted pyramid" problem.

In response, international authorities recommended reforming IBORs by anchoring methodologies, wherever feasible, in actual transactions and promoting a shift towards RFRs as alternative reference rates, alongside the introduction of robust contractual fallback provisions (FSB, 2014). Unlike other benchmarks, LIBOR's discontinuation gradually became unavoidable.

A decisive moment came in July 2017, when the Financial Conduct Authority announced that it would no longer compel panel banks to submit LIBOR quotes beyond the end of 2021, on the grounds that the underlying market was no longer sufficiently active (Bailey, 2017). To support an orderly transition, panel banks agreed to continue contributing on a temporary basis, and a waterfall methodology was introduced. This framework relied on a hierarchy of data sources, giving priority to actual transactions and resorting to expert judgement only where necessary (IBA, 2018). These measures, however, did not restore the benchmark's underlying economic foundation.

At the same time, alternative reference rates grounded in observed transactions were developed. In the United States, the Federal Reserve Bank of New York began publishing the Secured Overnight Financing Rate (SOFR) in 2018, which became the principal successor to US dollar LIBOR. In the United Kingdom, the Sterling Overnight Index Average (SONIA) was promoted as the primary alternative for sterling markets. The transition concluded with the phased cessation of LIBOR. Most currency and tenor settings were discontinued at the end of 2021. Following a transitional period during which synthetic US dollar LIBOR rates (one, three and six months) remained available, publication of USD LIBOR ceased definitively on 30 September 2024, marking the formal end of the benchmark (CNMV, 2023 and 2024).

The replacement of LIBOR has had far-reaching market implications. A substantial body of academic and policy literature (see, inter alia, Schrimpf and Sushko, 2019; Gómez-Yubero, 2021; Ehlers and Todorov, 2025) has examined its effects on instrument valuation, risk management practices and the large-scale renegotiation of legacy contracts. In this context, IOSCO (2023) has cautioned against widespread reliance on credit-sensitive rates (CSRs), which replicate certain structural weaknesses associated with LIBOR and could undermine market integrity and financial stability if broadly adopted.

LIBOR replacement rates TABLE 4

	Recommended replacement rate	Replacement date
Libor USD	SOFR	December 2021 and June 2023
Libor GBP	SONIA	December 2021
Libor CHF	SARON	December 2021
Libor JPY	TONAR	December 2021
Libor EUR	€STR	December 2021

Source: Gómez-Yubero (2021).

Against this backdrop, Euribor has taken a different course. Although it too underwent substantial reform, including the introduction of a hybrid methodology, European authorities chose to preserve the benchmark in view of the greater depth and relevance of its underlying market and its pivotal role in retail contracts, particularly mortgage lending. Accordingly, while LIBOR was fully discontinued for the US dollar, pound sterling, Swiss franc and Japanese yen by mid-2023, some jurisdictions adopted a dual framework, combining RFRs with reformed IBORs. This has been the approach in the euro area, as well as in markets such as the Australian, New Zealand and Singapore dollar.

3.2.1 The emergence of credit-sensitive rates

Following the discontinuation of USD LIBOR, some US market participants advocated the development of benchmarks that would retain an explicit bank credit risk component, absent from the new RFRs. This gave rise to so-called credit-sensitive rates (CSRs), such as AMERIBOR, BSBY and the ICE Bank Yield Index (BYI), designed to capture credit spreads and, in principle, to provide a reference rate more closely aligned with banks' asset-liability management needs. Recent analysis, however – including the empirical work of Priem (2024) and policy assessments by IOSCO (2021) – highlights significant vulnerabilities:

– CSRs rely on relatively narrow and illiquid underlying markets, such as commercial paper, certificates of deposit and segments of the bank debt market, where activity can contract sharply in periods of stress, as seen during the COVID-19 turmoil in 2020.

– As a result, they reproduce some of LIBOR's structural weaknesses: limited representativeness, dependence on markets that may dry up in stressed conditions, and the risk of "inverted pyramids", where large volumes of contracts reference a thin underlying market. This, in turn, reintroduces concerns about robustness and potential manipulation.

The IOSCO report (2021) concluded that these benchmarks do not fully satisfy Principles 6 and 7, relating to data sufficiency and data quality. It further cautioned that their use, if contemplated at all, should be confined to very specific and limited applications, subject to strict transparency requirements and clear evidence that they accurately reflect the underlying market.[16]

3.2.2 Multi-rate approach in the euro area

By contrast, the euro area adopted a multi-rate approach, maintaining Euribor while developing the €STR alongside it. Euribor's continued viability was secured through the comprehensive methodological reform undertaken by its administrator, EMMI, and its subsequent authorisation by the FSMA under the BMR.

This decision reflected not only the objective of preserving a benchmark representative of the wholesale cost of bank funding in euros, but also the need to retain a forward-looking rate, indispensable for retail lending – particularly mortgage contracts – where certainty at the start of the interest period is essential.[17] In an economy such as that of the European Union, and especially in countries with a high share of mortgages referenced to Euribor, such as Spain,[18] discontinuation would have rendered the cancellation or renegotiation of millions of retail contracts – many lacking adequate fallback clauses – operationally unmanageable.[19]

The FSB and the Working Group on Euro Risk-Free Rates (2019) continue to recommend that forward-looking benchmarks and risk-free rates coexist and evolve in a complementary manner, each aligned with the specific needs of different market segments. This balanced framework seeks to preserve contractual continuity, support sound risk management and reinforce financial stability.

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16 The BYI index was ultimately discontinued by ICE after it proved unable to ensure a sufficiently robust data foundation, while BSBY and AMERIBOR have been the subject of supervisory warnings issued by the Securities and Exchange Commission (SEC), the Federal Reserve and IOSCO. A detailed analysis of the methodology and associated vulnerabilities of these indices can be found in Priem (2024).

17 In Spain, this also constitutes a legal obligation, insofar as Article 8.1 of Royal Decree 309/2019 requires lenders to inform borrowers of changes to applicable interest rates at least 15 calendar days in advance.

18 According to data from the Spanish Mortgage Association (AHE), the outstanding stock of mortgage credit in Spain amounted to approximately €692.5 billion at end-2015 – around 64% of GDP – and more than 90% of that balance consisted of variable-rate loans, virtually all of them referenced to Euribor (AHE, 2016). As of June 2025, despite the expansion of fixed-rate and mixed mortgages, variable-rate loans linked to Euribor still account for around 46% of the outstanding mortgage stock, representing a volume in excess of €600 billion (AHE, 2025). The average remaining maturity of this portfolio was estimated at over 18 years in June 2022 (AHE, 2022).

19 In Spain, approximately half of the contracts contained no fallback clause whatsoever, while the other half referred to IRPH or to public debt yields – benchmarks significantly higher than Euribor. Absent appropriate adjustment mechanisms, this situation would have posed a serious risk both to financial stability and to consumer protection.

As recognised by the Working Group on Euro Risk-Free Rates (2021), Euribor will remain the key benchmark for retail and corporate lending, given its term structure, while €STR-based rates are primarily intended for wholesale and derivatives markets. In the same vein, the FSB (2021) notes that term benchmarks may continue to serve a useful function in jurisdictions where retail funding and lending remain closely linked to banks' funding costs.

Although Euribor incorporates bank credit risk, it is not classified as a credit-sensitive rate. Rather, it forms part of the reformed IBORs, whose continuity in the European Union has been secured through a rigorous methodological overhaul, formal authorisation under the BMR, and ongoing supervision by ESMA and the supervisory college composed of the national competent authorities of the panel banks.

The European multi-rate approach therefore combines a forward-looking benchmark incorporating bank credit risk – the reformed Euribor, fully subject to the BMR and active supervision – with a risk-free benchmark (€STR), as well as €STR-based term rates, both backward-looking (calculated by the ECB as compounded historical averages) and forward-looking (derived from €STR derivatives and administered by authorised private benchmark administrators). This architecture balances robustness, stability and economic relevance, ensuring that the European framework provides both a solid anchor for wholesale markets and an appropriate term benchmark for retail contracts and other products requiring ex ante rate certainty. At the same time, it ensures that benchmarks used in the euro area remain closely aligned with the ECB's monetary policy, allowing central bank decisions to be transmitted effectively to financial conditions and, ultimately, to the real economy.

3.2.3 Migration of derivatives markets from IBOR to the new RFRs (2019–2021)

The transition of derivatives markets from traditional interbank benchmarks (IBORs) to the new risk-free rates was implemented through a global, coordinated and highly standardised process designed to ensure contractual continuity and avoid systemic disruption. This process unfolded primarily between 2019 and 2021 under the leadership of the FSB, the International Swaps and Derivatives Association (ISDA) and the major central counterparties (CCPs).

First, the reform changed the fundamental anchoring of the discounting and projection curves used in derivatives markets. Markets progressively shifted to curves constructed on overnight RFRs, entailing structural changes to valuation models, risk management practices and collateral frameworks. This adjustment was particularly significant in a context where, following the global financial crisis, OIS discounting had become standard practice for collateralised derivatives, thereby partially preparing the market for a broader transition to risk-free benchmarks.

Second, the transition required the adoption of harmonised legal and operational mechanisms to prevent unintended transfers of value between counterparties. In this respect, ISDA played a pivotal role by incorporating, in October 2020, new fallbacks based on RFRs calculated in arrears in the ISDA 2006 Definitions, accompanied by a credit adjustment spread calculated as the five-year historical median of the spread between the corresponding IBOR and the RFR. This framework was designed to preserve, as far as possible, the economic equivalence of existing contracts and to provide the market with a consistent contractual mechanism to address the permanent cessation of IBORs (ISDA, 2020).

ISDA's role was particularly significant. It not only developed new fallbacks for use in new transactions, but also established the mechanisms required for counterparties wishing to do so to amend existing transactions in order to incorporate those fallbacks. On 10 December 2018, ISDA published the *ISDA 2018 Benchmarks Supplement Protocol*, enabling adhering parties to incorporate generic fallback provisions into both existing and future derivatives transactions governed by the ISDA Definitions, regardless of the underlying reference. ISDA subsequently published the *ISDA 2020 IBOR Fallback Protocol*, which introduced specific fallbacks for IBORs and incorporated the corresponding credit adjustment spread for each benchmark.[20]

At the same time, the major CCPs – particularly London Clearing House (LCH), Chicago Mercantile Exchange (CME) and Eurex Clearing AG (EUREX), as well as BME Clearing in Spain – implemented large-scale synchronised conversions ("big bang" transitions) between 2020 and 2021. In these exercises, IBOR-based discounting and projection curves were replaced simultaneously with curves constructed on overnight RFRs, primarily SOFR, SONIA and €STR. These conversions included compensation payments designed to neutralise any unintended transfers of value between participants, thereby preserving economic neutrality and ensuring the continuity of risk and collateral management. The transition therefore marked a structural shift in the anchoring of interest rate curves in derivatives markets, consolidating the use of RFRs as the primary reference for valuation and discounting.

Finally, support from the authorities during the transition – through the adoption of regulatory measures aimed at safeguarding the continuity of existing IBOR-linked contracts – proved decisive. In the United Kingdom, the FCA approved the temporary modification of the methodology for certain LIBOR currencies and tenors so that they would be calculated by reference to the relevant RFR plus the credit adjustment spread determined by ISDA. This approach gave market participants additional time to manage the transition of legacy contracts that had not yet been amended to incorporate RFR-based fallbacks. In the United States,

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20 ISDA protocols are standardised multilateral agreements that enable a large number of market participants to amend their existing derivatives contracts in a coordinated and efficient manner, without the need to renegotiate them individually. By adhering to a standard protocol published by ISDA, counterparties incorporate the relevant amendments into all covered contracts between them. This mechanism is particularly useful for implementing regulatory or market-wide changes in a consistent and operationally efficient way. At the time of writing, the *ISDA 2018 Benchmarks Supplement Protocol* has 897 adhering entities (ISDA, 2026a), while the *ISDA 2020 IBOR Fallback Protocol* has 16,353 adherents (ISDA, 2026b).

alongside the temporary publication of so-called "synthetic LIBOR", Congress enacted the LIBOR Act, which introduced statutory fallbacks. Under this regime, certain USD LIBOR-linked contracts were automatically transitioned, by operation of law, to SOFR plus the ISDA credit adjustment spread on the cessation date of the benchmark. A similar intervention took place in Europe in relation to EONIA, under the powers conferred on the European Commission by the BMR, as discussed in the following section.

The migration of derivatives markets to RFRs represents one of the most complex and successful structural reform processes undertaken in the recent history of the international financial system. Its implementation established the technical, contractual and operational framework within which interest rate derivatives markets have been reshaped. The implications for liquidity, price formation and market structure are examined in greater detail in the following chapter.

3.3 Development of the European framework. The European Benchmarks Regulation

In June 2016, the European Union adopted the Benchmarks Regulation (BMR), incorporating the IOSCO Principles into EU law. The Regulation introduced strict obligations for benchmark administrators, contributors and users, distinguishing between critical, significant and non-significant benchmarks and establishing a harmonised authorisation and supervisory regime. Under this framework, Euribor was designated a critical benchmark in 2016, and its administrator, EMMI, undertook a comprehensive methodological reform based on a hierarchy of data and a hybrid methodology anchored, as far as possible, in actual transactions.

3.3.1 Origin and general objectives

In most jurisdictions, the IOSCO Principles, together with the work of the risk-free rate working groups, were considered sufficient to ensure appropriate oversight of benchmarks. In the European Union, however – amid the broader post-crisis regulatory overhaul following the 2007–2008 financial crisis – this approach was regarded as insufficient.

The EU therefore pursued legislative action along two complementary tracks. First, the Market Abuse Regulation,[21] published in June 2014, introduced an explicit prohibition on benchmark manipulation and strengthened the investigative and sanctioning powers of supervisory authorities. Secondly, the EU adopted a dedicated Regulation to give binding legal effect to the IOSCO Principles, with the aim of ensuring the accuracy, integrity and reliability of benchmarks: the BMR.

21 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.

Following an extensive legislative process, the Benchmarks Regulation,[22] commonly referred to as the BMR, was published in the *Official Journal of the European Union* on 29 June 2016. It entered into force on the day following its publication, although its core obligations became applicable from 1 January 2018.

As the European Commission had already indicated in its 2012 consultation, the BMR seeks to strengthen the integrity, transparency and reliability of benchmarks used in financial markets. This overarching objective is pursued through the imposition of specific obligations on benchmark administrators, contributors and users, together with the conferral on competent authorities of supervisory powers to ensure compliance and intervention powers designed to safeguard the continuity of benchmarks where this may be at risk.

The imprint of the IOSCO Principles is clearly evident in many of the BMR's core objectives, including in particular:

– Administrator responsibility for benchmark integrity and accuracy, ensuring that benchmarks faithfully represent the underlying economic reality they are intended to measure. In view of their central role, administrators are subject to formal authorisation and ongoing supervision.

– Prevention of conflicts of interest and manipulation. To this end, Article 11.1.a) of the Regulation establishes the primacy of transaction data in the determination of benchmarks – an element that proved decisive in the subsequent reform of Euribor and its methodological evolution:

  "The input data shall be transaction data, if available and appropriate; if transaction data are insufficient or inappropriate to accurately and reliably represent the market or economic reality that the benchmark is intended to measure, input data other than transaction data may be used, including price estimates, quotes and firm quotes, or other values".

– Enhanced transparency, through the requirement to publish methodologies, data sources and calculation procedures, as well as through adequate documentation of contribution processes.

3.3.2 Scope. Types of benchmarks

Although the need to establish a more robust framework for calculating benchmarks was immediately triggered by the IBOR manipulation episodes, the initial scope of the BMR was particularly broad, to the extent that it covered virtually any index used as a benchmark in consumer loans, investment funds or

22 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.

financial instruments.[23] However, the obligations introduced by the Regulation were designed in accordance with the principle of proportionality, so that their intensity is modulated according to the systemic and economic relevance of the benchmarks subject to their scope of application.

To this end, the BMR classifies indices not only according to the nature of their underlying asset, as is the case with commodity or interest rate indices, or the type of calculation data used, as in the case of indices based on regulated data, but also according to their quantitative importance, understood as their degree of use in terms of volume and economic exposure.

Categories of benchmarks regulated under the BMR TABLE 5

Categories of benchmarks	Classification criteria	Level of requirements and supervision
Critical benchmarks: a benchmark whose malfunction or cessation could cause serious disruption to financial stability or significantly affect the real economy of the EU or of a Member State (national critical benchmarks).	— Total value of use exceeding €500 billion within the EU. — Systemic importance: a benchmark may also be designated as critical by decision of the European Commission where substitution is not feasible and its discontinuation would jeopardise financial stability.	— Enhanced supervision by the competent authority: Involving ESMA and, for EU administrators, a supervisory college. — Mandatory contingency plans, annual external audit, biennial representativeness assessment, and, where applicable, mandatory administration or contribution and statutory replacement (statutory fallback) mechanisms. — Full authorisation procedure.
Significant benchmarks: substantial use, but without systemic impact.	— Total value of use equal to or exceeding €50 billion within the EU. — Additional factors: relevance in the local market, number of users, or aggregate exposure.	— Administrator subject to authorisation. — Publication of methodology, management of conflicts of interest, and periodic assessment of volume and representativeness.
Non-significant benchmarks: limited use and low economic or geographical relevance.	— Total value of use equal to or below €50 billion within the EU. — Not designated as significant or critical.	— Administrator subject to registration. — Exemptions from certain control requirements, audits and codes of conduct. — Supervision by the competent authority on a proportional basis.

Source: Authors' own work based on the BMR.

23 This scope, initially very broad, has been adjusted by Regulation (EU) 2025/914, amending the BMR, which, inter alia, excludes non-significant benchmarks from its scope of application. The amendment entered into force on 1 January 2026 and will apply from 30 September 2026 to administrators already registered (CNMV, 2025).

Within this classification, benchmarks are ranked according to their degree of relevance and, accordingly, to the intensity of the obligations imposed by the Regulation, distinguishing between critical, significant and non-significant benchmarks. Pursuant to Article 20.1 of the BMR, a benchmark may be classified as critical only through formal designation by means of a Commission Implementing Regulation, once it has been established that the relevant criteria are met.

Euribor was the first benchmark to be designated as critical within the meaning of the BMR. This designation took place only a few weeks after the publication of the Benchmarks Regulation, underscoring its central role in the European financial system and its importance for the transmission of monetary policy.[24]

Summary of obligations for administrators of critical benchmarks TABLE 6

	Obligations of administrators of critical benchmarks under the BMR
Articles 4 to 9, 14 and 15: governance, oversight and control, accountability, and complaints	**Governance:** – Clear organisational structure with defined roles and responsibilities. – Policies and procedures for managing conflicts of interest, both internal and involving contributors and users. – Ensuring independence and integrity in the exercise of judgement or discretion. – Appropriate expertise and effective oversight of participants in the benchmark determination process. **Oversight and control:** – Annual review of the benchmark definition and methodology, and monitoring of potential methodological changes. – Establishment of a code of conduct for contributors and supervision of compliance with it, as well as of the data submitted. – Oversight of third parties involved in publication (e.g. calculation agent). – Assessment of internal and external audits of contributors and implementation of corrective measures where necessary. – Monitoring of input data and contributor behaviour, with action taken in the event of breaches of the code of conduct. – Notification to competent authorities of breaches and potential anomalies, in particular attempted manipulation. – Control systems in accordance with Regulation (EU) 2022/2554 (DORA), aimed at ensuring operational resilience and continued publication. – Contingency and cessation procedures. **Accountability and complaints:** – Verification of compliance with the benchmark methodology and with the Benchmarks Regulation. – Annual external audit of the administrator. – Making available to competent authorities and users the details of the verifications carried out. – Obligation to record and retain for five years: • All input data received, whether used or rejected, together with the corresponding justification. • The methodology applied in determining the benchmark, including any exercise of discretion (and its justification), as well as any deviations from the standard procedure. • The identities of data submitters and of the administrator's staff responsible for determining the benchmark. • Documentation relating to complaints (a formal procedure for submission and investigation must be in place). • Telephone and electronic communications with contributors or submitters concerning the benchmark (three-year retention period).

24 Euribor was designated as a critical benchmark by Commission Implementing Regulation (EU) 2016/1368, of 11 August 2016, establishing the list of critical benchmarks used in financial markets, pursuant to Regulation (EU) 2016/1011 of the European Parliament and of the Council. That list was subsequently extended to include EONIA by Commission Implementing Regulation (EU) 2017/1147, of 28 June 2017, and LIBOR by Commission Implementing Regulation (EU) 2017/2446, of 19 December 2017. It was later expanded to include the national critical benchmarks STIBOR (Stockholm Interbank Offered Rate) and WIBOR (Warsaw Interbank Offered Rate) through Commission Implementing Regulation (EU) 2019/482, of 22 March 2019. Finally, NIBOR (Norwegian Interbank Offered Rate) was designated as a critical benchmark by Commission Implementing Regulation (EU) 2021/1122, of 22 July 2021, which also removed LIBOR from the list, as its administrator was no longer established in the European Union.

Summary of obligations for administrators of critical benchmarks (*continuation*) TABLE 6

Articles 11, 12, 13, 27 and 28: input data, methodology, and transparency	**Input data:** – Publication of guidelines on input data and on the policy governing the use of expert judgement, to ensure that they reflect the underlying economic reality. – Verification of the input data received and assurance that contributors maintain adequate internal controls. – Adjustment of input data, contributors or methodology, where necessary, to preserve the representativeness of the benchmark . **Methodology:** – i) Based on clear rules governing the exercise of discretion; ii) robust and capable of validation against available data; iii) designed to allow the benchmark to be determined in most circumstances without compromising its integrity; and iv) clearly identifiable and verifiable. – Publication of the key elements of the methodology, the review process and the consultation and justification procedures applicable to any material changes, which must be notified in advance and made publicly accessible. **Transparency:** – Publication of the "Benchmark Statement", including in particular: • Definition of the market or economic reality measured. • Technical specifications and criteria governing discretion. • Warnings regarding potential changes to, or cessation of, the benchmark and their implications for financial contracts. • Description of the rationale, methodology, controls and procedures applied. • Measures applicable in the event of errors, insufficient data or market stress. – Publication of a procedure for managing modifications to, or cessation of, the benchmark.
Articles 21, 22, 40 and 46: mitigation of systemic impact	**Mandatory administration:** possibility of requiring the administrator to continue publishing the benchmark for one year (extendable by up to five additional years) where transfer to another administrator is not feasible or where orderly cessation cannot be ensured. **Enhanced supervision:** in addition to full authorisation, this includes: i) direct supervision by ESMA (for administrators established in the EU) and ii) the establishment of a supervisory college comprising the authorities of supervised contributors and of Member States potentially affected by the cessation of the critical benchmark. **Licensing:** mitigation of the administrator's market power by requiring that licences and benchmark-related information be made available to all users on a fair, reasonable, transparent and non-discriminatory basis.

Source: Authors' own work based on the BMR.

The BMR also establishes a specific set of obligations applicable to contributors to benchmarks, with particular intensity in the case of critical benchmarks (see Table 7). Compliance with these requirements is subject to supervision by the national competent authorities (NCAs), coordinated, in the case of critical benchmarks, through the supervisory college, in cooperation with ESMA.

Summary of obligations for contributors to critical benchmarks TABLE 7

Contributors to critical benchmarks	Requirements and supervision
Obligations (Article 16 and Annex I of the BMR)	– Implementation of effective internal control systems proportionate to the nature and scale of the contribution. – Periodic internal audit of contribution processes and associated controls. – External audit, where appropriate, of compliance with the code of conduct and the requirements of the BMR. – Management and mitigation of conflicts of interest, including segregation of functions and identification of inappropriate incentives. – Specific and ongoing training of staff responsible for benchmark contributions. – Documented procedures for data submission, validation and correction. – Specific policies governing the use of expert judgement, including escalation criteria and justification requirements. – Recording and retention of input data, communications and relevant documentation for the periods required under the Regulation. – Mechanisms for detecting and reporting anomalies, errors or attempted manipulation.
Supervision (Articles 40, 46, 21 and 23 of the BMR)	– Direct supervision by the NCAs of the Member States in which the contributors are established. – Coordination of supervision through the college for the critical benchmark, with the participation of ESMA and the relevant NCAs. – Possibility of mandatory contribution in exceptional circumstances.

Source: Authors' own work based on the BMR.

3.3.3 Supervision of critical benchmarks

From an institutional perspective, the BMR initially established a system of national supervision, assigning responsibility to the competent authority of the Member State in which the administrator is established (in the case of Euribor, the Belgian FSMA). Following the reforms introduced in 2021, direct supervision of administrators of critical benchmarks with pan-European relevance was transferred to ESMA, without prejudice to the essential role of the NCAs in supervising contributors and to coordination through the supervisory college for Euribor.

Given the central role assigned to benchmark administrators under both the IOSCO Principles and the BMR, the Regulation establishes a system of authorisation and registration for administrators. Entities or natural persons established in the European Union must apply to their competent authority for authorisation if they intend to act as administrators of benchmarks within the scope of the BMR. A lighter regime (registration) applies where the administrator intends to provide only non-significant benchmarks or where the entity performing the administrative function is already subject to supervision by the competent authority (supervised entities).

In Spain, Article 251 of Law 6/2023 designates the CNMV as the authority responsible for supervising compliance with the BMR. Without prejudice to this designation, the Banco de España is entrusted with supervisory, inspection and sanctioning powers in relation to contribution obligations for benchmarks produced by the Banco de España itself, as well as with supervision of the use of benchmarks in consumer loan agreements entered into by entities subject to its oversight.

Accordingly, national supervision rests primarily with the CNMV, although the Banco de España is responsible, for example, for overseeing compliance with Article 28.2 of the BMR in relation to consumer loans, including mortgage lending. Article 28.2 requires supervised entities (banks, insurance undertakings, investment funds, etc.) to maintain robust written plans setting out the actions they would take in the event of a material change to, or cessation of, a benchmark. It further provides that, where feasible and appropriate, those plans must designate one or more alternative benchmarks that may replace a benchmark that is no longer provided. In doing so, the provision gives binding legal effect to IOSCO Principle 13 and has subsequently become one of the principal levers used by national and European authorities, as well as by the EU RFR Working Group, to promote robust fallback provisions in contracts linked to Euribor.

At European level, ESMA plays a central supervisory role, which has progressively expanded since the initial version of the Regulation. In the 2016 version of the BMR, ESMA's functions were largely limited to coordination and maintaining the register of administrators. Over time, however, its powers were strengthened and, from 2022 onwards, ESMA assumed direct supervision of critical benchmarks with pan-European relevance, such as Euribor.

Given their scale and systemic importance at European level, ESMA relies on the supervisory college, a consultative body provided for in the BMR from its original version, which coordinates the supervisory activities of competent authorities in respect of certain benchmarks. A supervisory college exists for each critical benchmark with pan-European impact,[25] comprising the competent authority of the Member State in which the administrator is established (which chairs the college), the competent authorities of the principal users or supervised contributors of the benchmark, and ESMA.

Among the most significant powers conferred on supervisors by the BMR from its entry into force are the ability to impose mandatory administration on administrators and mandatory contribution on contributors to critical benchmarks. Particular attention should be paid to mandatory contribution, given its potential importance for the continuity of Euribor.

Under the mandatory contribution mechanism, the competent authority responsible for a critical benchmark may require a contributor to remain on the panel for a period of 12 months (extendable initially to a maximum of 24 months and, following the 2021 reform, up to five years) where the contributor intends to withdraw. This measure may be adopted where a current contributor seeks to cease contributing, the competent authority considers that its withdrawal could jeopardise the representativeness of the benchmark, and no viable short-term alternative exists. Mandatory contribution is therefore an exceptional tool, designed to address the risks that contributor withdrawals may pose to the benchmark's ability to measure the underlying economic reality and to safeguard the preference for transaction-based input data.

25 Following the 2019 reform, the scope of this power was extended to significant cross-border benchmarks where the NCAs consider such intervention necessary.

The 2021 reform of the BMR[26] not only extended the maximum periods for mandatory administration and mandatory contribution, but also introduced the possibility for the European Commission to designate a replacement benchmark – commonly referred to as a "statutory fallback" – for contracts linked to a reference whose cessation could pose a systemic risk to the Union's financial system. Subject to specific conditions, the Commission may exercise this power where a benchmark has ceased to be representative, where its administrator or the competent authority announces its discontinuation, or where the administrator's authorisation is withdrawn, provided that no successor administrator assumes responsibility for the benchmark. This power is likewise available to NCAs, in coordination with the European Commission, in respect of nationally critical benchmarks (for example, STIBOR, WIBOR or NIBOR).

With the 2021 reform, therefore, European legislators covered a double risk: on the one hand, they lengthened the periods of mandatory contribution in order to discourage undesirable withdrawals from the Euribor panel at a time when no viable substitutes were available. Second, it equipped the European authorities with a mechanism to manage a potential discontinuation of Euribor through the statutory fallback framework. To date, the Commission has exercised this power on two occasions: in relation to CHF LIBOR[27] and EONIA.[28] There was, however, no need to activate the mandatory contribution mechanism, although there is broad consensus that its mere availability played a meaningful role in safeguarding the continuity of Euribor by acting as a deterrent against further panel exits.

3.4 Ongoing monitoring of benchmarks (2025)

With the principal milestones of the global reform of interest rate benchmarks now completed – including the transition from LIBOR to RFR-based rates and the consolidation of a reformed Euribor coexisting alongside risk-free benchmarks – continued monitoring remains an international supervisory priority. IOSCO leads this work through the IOSCO Benchmark Network, established in 2025 and comprising 49 authorities from 28 jurisdictions. The Network serves as a permanent forum for the exchange of supervisory information and experience relating to benchmarks, as well as for tracking progress and identifying challenges in national and global benchmark reforms.

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26 Regulation (EU) 2021/168 of the European Parliament and of the Council, of 10 February 2021, amending Regulation (EU) 2016/1011 as regards the exemption of certain third-country spot foreign exchange benchmarks and the designation of replacement benchmarks in the event of cessation.

27 Commission Implementing Regulation (EU) 2021/1847, of 14 October 2021, on the designation of a statutory replacement for certain settings of CHF LIBOR.

28 Commission Implementing Regulation (EU) 2021/1848, of 21 October 2021, on the designation of a replacement for the benchmark Euro overnight index average.

Its activities focus on identifying and analysing emerging issues linked to the use of benchmarks in financial markets and on flagging potential risks that could affect market integrity or financial stability. Where appropriate, such issues are escalated to the relevant bodies, including the IOSCO Board, the Bank for International Settlements (BIS) and the FSB.

In addition, the IOSCO Benchmark Network develops capacity-building and training initiatives for IOSCO members – particularly in emerging market jurisdictions – with the aim of strengthening supervisory capabilities in the area of benchmarks and promoting consistent and coherent implementation of international standards.

The role of the CNMV in the reform and supervision of Euribor EXHIBIT 4

The CNMV has played an active and sustained role in the international and European reform of benchmarks, from the initial design of the new regulatory framework through to its implementation and ongoing supervision. This role has been reflected in its participation in international technical forums, its contribution to the development of the European regulatory framework and the strengthening of its internal capabilities to exercise the supervisory powers conferred by the BMR.

From the outset of the work initiated in the aftermath of the global financial crisis, the CNMV took part in the IOSCO working groups that led to the adoption of the *Principles for Financial Benchmarks* in 2013, as well as in the task forces and technical groups coordinated by ESMA. This early participation enabled the CNMV to contribute to the formulation of international standards on governance, methodological robustness and the management of conflicts of interest, which subsequently underpinned the European regulatory framework.

In parallel, it was involved in the negotiation of the BMR from its early stages, supporting and advising the Directorate-General of the Treasury and Financial Policy and the Permanent Representation of Spain to the European Union, and contributing to the development of Level 2 measures and subsequent implementing acts.

Prior to the full application of the BMR, the CNMV undertook preparatory work to ensure the effective exercise of its new supervisory powers, including mapping the benchmarks used in the Spanish market and the associated exposure volumes. In addition, it closely monitored the global and European reform process, fostering coordination among authorities and dialogue with the industry through the establishment of working groups,[1] the publication of communications and the organisation of technical and outreach sessions for market participants.

The CNMV's actions have also placed strong emphasis on transparency and on informing investors and consumers, as reflected in the publication of guidance and educational materials on benchmarks including an explanatory infographic on Euribor. From a supervisory perspective, the CNMV began its work with

on-site inspections of Spanish contributors to Euribor in order to assess their adaptation to the requirements of the BMR. It subsequently consolidated a model of ongoing, risk-based supervision supported by the use of SupTech tools. This work has been carried out in close coordination with the other competent authorities, through active participation in the Euribor college of supervisors, in the technical groups coordinated by ESMA and in the main supervisory processes relating to the benchmark. The CNMV currently chairs the IOSCO Benchmark Network.

Source: Authors' own work.

1 In 2017, the CNMV established a dedicated working group on benchmarks bringing together financial institutions, industry associations and competent authorities in Spain, with a twofold objective. First, to facilitate and promote the implementation of the BMR, which became fully applicable on 1 January 2018. Second, to ensure coordinated monitoring of the reform of the critical benchmarks Euribor and EONIA, which are essential to the Spanish financial system, with a view to identifying risks, anticipating impacts and defining common lines of action where necessary.

4 Current functioning of Euribor: governance, methodology, representativeness and economic relevance

This chapter examines the current functioning of Euribor from a comprehensive perspective, addressing separately its governance and supervision, the evolution of its methodology, its economic representativeness and its relevance as a benchmark within the European financial system. Building on the institutional and regulatory framework that underpins its production, the analysis then considers the methodological changes introduced following the benchmark reform, in order to assess the extent to which Euribor adequately reflects conditions in the underlying market and continues to perform a meaningful function alongside risk-free rates across different market segments.

4.1 Governance, transparency, control and supervision

The governance of Euribor is grounded in a framework designed to ensure the integrity, reliability and transparency of the benchmark, in line with the IOSCO Principles and the requirements of the BMR. This framework encompasses both the internal governance and control arrangements of its administrator and the role of contributors, as well as internal and external audit mechanisms, supervisory oversight and coordination among national and European authorities.

Euribor is administered by EMMI, a non-profit association governed by Belgian law, established in 1999 by national banking associations with the aim of facilitating the proper functioning of the euro money markets and promoting their integration. EMMI operates under its statutes, which define its purpose, governing bodies and powers, and is subject to the legal regime applicable to associations in Belgium.

4.1.1 Internal governance structure

EMMI's internal governance framework is structured around several bodies with distinct management, control and oversight functions (EMMI, n.d.-c):

– The General Assembly, composed of the national banking associations of the Member States, is responsible for approving the statutes, the budget and the strategic guidelines, as well as appointing the members of the governing bodies.

– The Board of Directors oversees the activities of the association and ensures compliance with its statutory objectives, including the development and administration of the benchmarks.

– The Oversight Committee, referred to in the following section.

– This structure is complemented by specialised committees, including the Audit and Risk Committee and the Conflicts of Interest Oversight Committee, which strengthen internal control and institutional integrity.

4.1.2 Oversight Committee

The Oversight Committee is responsible for the independent oversight of the Euribor determination process and for ensuring the proper application of its governance framework. Its establishment is required under Article 5 of the BMR, in line with IOSCO Principle 5. The Committee is composed of independent experts acting in a personal capacity, who do not represent either the administrator or the contributing institutions, thereby reinforcing its impartiality (EMMI, n.d.-d).

Its main functions include overseeing the methodology and the data hierarchy, reviewing proposed methodological changes, monitoring conflicts of interest and analysing incidents, errors or anomalies in the calculation process, together with the corrective measures adopted. It also oversees compliance with the code of conduct applicable to contributors.

The Oversight Committee complements the administrator's internal control and audit arrangements, contributing to compliance with the IOSCO Principles and the governance requirements set out in the BMR.

4.1.3 Transparency, documentation and process controls

Transparency is a cornerstone of the regulatory framework for critical benchmarks. To that end, EMMI publishes and regularly updates extensive documentation enabling users and authorities to understand the functioning of the benchmark and to assess its appropriateness (EMMI, n.d.-e).

– Key documents include the Euribor Code of Conduct, which sets out the governance principles, control arrangements and responsibilities applicable to the benchmark, and the Code of Obligations of Panel Banks, which defines the duties and standards of conduct required of contributing institutions.

– EMMI also publishes the Euribor determination methodology, detailing the procedures for data collection, validation and processing under different market conditions.

– This framework is complemented by the publication of the benchmark statement, which sets out the essential features of the benchmark, the data sources used, the methodology applied, the risks associated with its use and the procedures in place for managing errors, periods of market stress and any potential modification or cessation of the benchmark.

– In addition, EMMI publishes transparency indicators and periodic reports that enable analysis of the benchmark's evolution, underlying volumes and the use of the different methodological levels, as well as the minutes and terms of reference of the Oversight Committee.

4.1.4 Internal and external audit

In accordance with the BMR, EMMI subjects its governance and control framework to periodic internal and external review. In particular, pursuant to Article 7.3 of the BMR, an independent external auditor reviews compliance with the governance framework and assesses the effectiveness of the controls in place. According to the information published by EMMI, these reviews have concluded that the control procedures are appropriately designed and operate effectively (EMMI, n.d.-c).

4.1.5 Entities forming part of the data contributor panel

The panel banks – currently a representative group of 21 institutions active in the euro money market – are responsible for providing the market data used by EMMI to calculate Euribor (EMMI, n.d.-f).

The obligations of contributors are set out in the Code of Obligations of Panel Banks and reflect the requirements of the BMR, in particular those established in Article 16 and Annex I. These obligations include the implementation of appropriate internal controls, the management of conflicts of interest, the training and supervision of staff involved in the contribution process, the documentation and retention of relevant data and communications, and the requirement to conduct both internal and external audits.

This framework is designed to ensure that contributions faithfully reflect conditions in the underlying market and are made in accordance with the integrity standards required under European legislation and international principles.

4.1.6 External supervision and the college of supervisors

As an authorised administrator under the BMR, EMMI is subject to supervision by ESMA, which assumed this responsibility on 1 January 2022, replacing the previous supervision exercised by the Belgian authority, the FSMA. ESMA applies a risk-based and outcome-focused supervisory approach, with the objective of ensuring ongoing compliance with the regulatory obligations applicable to administrators of critical benchmarks such as Euribor.

In parallel, NCAs are responsible for supervising contributors established within their respective jurisdictions, in accordance with Article 40 of the BMR. This supervision is coordinated through the Euribor college of supervisors, comprising the competent authority of the administrator's Member State, the national authorities of the principal Member States concerned and ESMA. The college

facilitates information exchange, coordination of supervisory approaches and joint assessment of systemic risks, without replacing national competences. Within this framework, the CNMV, as the competent authority for the Spanish institutions participating in the panel, takes an active part in the college.

4.2 Evolution and strengthening of Euribor governance and methodology

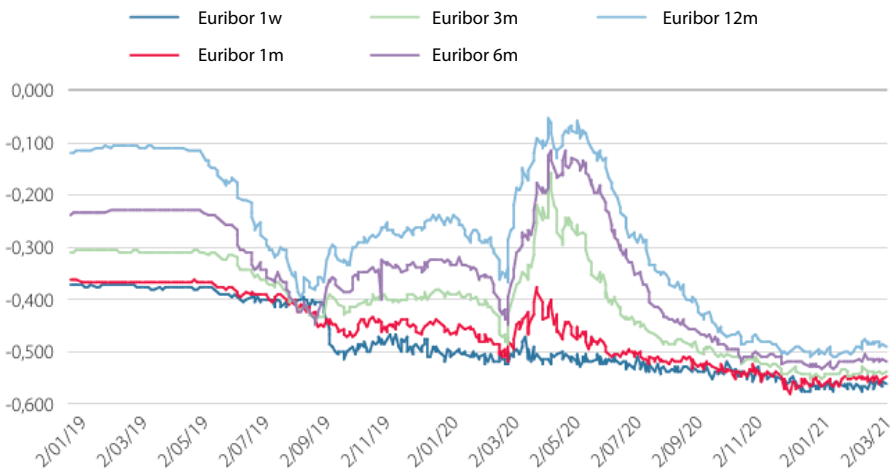
The issues brought to light during the manipulation episodes affecting the main interbank benchmarks underscored the need to review the Euribor calculation methodology. Even before the BMR entered into force, EMMI launched a process of reflection and reform aimed at enhancing the robustness of the benchmark. The core objective of this process was a gradual transition towards a methodology increasingly grounded in actual transactions, capable of capturing the underlying interest or economic reality that Euribor is intended to measure, in line with the IOSCO Principles for Financial Benchmarks.

4.2.1 From expert judgement to a hybrid methodology based on actual transactions

In its early stages, Euribor was calculated on the basis of declarative submissions from contributing institutions, reflecting their expert judgement as to the rate at which they could obtain unsecured funding in the interbank market. While this approach functioned in an environment characterised by liquid, deep and relatively stable markets, it entailed a significant degree of subjectivity and a strong reliance on the individual behaviour of panel banks. The combination of this methodological design with the absence of a specific regulatory and supervisory framework rendered the benchmark particularly vulnerable when, from 2007 onwards, money market conditions deteriorated and incentives for opportunistic conduct intensified.

The transition to a hybrid methodology structurally embedded a market-based component through the prioritised use of actual transactions as the primary basis for calculation, relegating estimates to a residual role. This reform significantly strengthened Euribor's economic representativeness and enhanced its ability to reflect prevailing money market conditions. As a result, the benchmark's behaviour became more responsive to changes in liquidity and in interbank funding costs, in contrast to the more stable dynamics observed in earlier periods. This shift is evident in the historical evolution of Euribor following the methodological reform.

Evolution of Euribor between 2019 and 2021 FIGURE 3



Source: Gómez-Yubero and Palomero (2021).

In the case of Euribor, its underlying interest is expressly included in its definition: "[...] the rate at which wholesale funds in euro could be obtained by credit institutions in the EU and EFTA countries in the unsecured money market". Determining what constitutes "wholesale funds", which transactions form part of the unsecured money market and how to capture accurately the effective cost of obtaining such funding lies at the core of the benchmark's methodology. The reform did not seek to alter this underlying economic reality, but rather to improve the mechanisms used to measure it, adapting them to the evolution of the European money market and reinforcing the weight of observable transaction data relative to declarative estimates.

The reform process, formally initiated in 2014, was completed at the end of 2019. The methodology subsequently continued to evolve, with a second substantial enhancement approved in 2024 aimed at definitively removing the use of panel banks' expert judgement from the benchmark determination process.

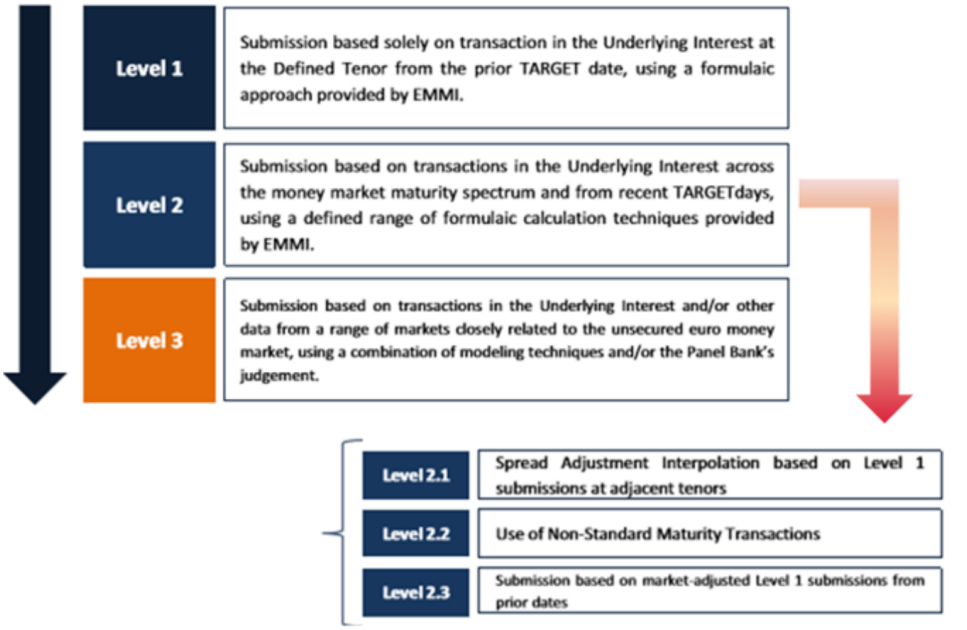
The 2019 hybrid methodology

The hybrid methodology introduced in 2019 is structured around a hierarchy of information sources (the waterfall approach), designed to maximise the use of actual transactions and restrict recourse to alternative methods to situations in which such transactions are not available. For each Euribor tenor,[29] the methodology distinguishes three levels of contribution.

29 At the time the hybrid methodology was implemented, the published Euribor tenors were one week, one month, three months, six months and twelve months. EMMI had previously discontinued publication of the two-week, two-month and nine-month tenors due to their limited operational relevance and low usage by market participants.

The following illustration provides a schematic overview of this hierarchy and of the progressive process through which Euribor contributions are determined under the hybrid methodology.

Euribor calculation methodology implemented in 2019 ILLUSTRATION 2



Source: EMMI.

At Level 1, at the top of the hierarchy, contributions are based exclusively on eligible actual transactions carried out by panel banks in the euro unsecured wholesale money market. EMMI sets detailed eligibility criteria covering, inter alia, the type of counterparty, geographical scope, nature of the transaction, tenor and minimum transaction size. Where a panel bank has conducted at least one transaction meeting these criteria, its contribution is calculated as the volume-weighted average of the observed funding costs, without recourse to lower levels.

In the absence of eligible Level 1 transactions, the methodology provides for recourse to Level 2, which is structured into three progressively applied sub-levels. Sub-level 2.1 allows the cost of funding to be interpolated from Level 1 contributions at adjacent tenors, incorporating an adjustment factor that captures the curvature of the yield curve. Sub-level 2.2 is based on actual transactions that satisfy all eligibility criteria except for the exact tenor, thereby enabling the rate corresponding to the reference tenor to be inferred. Sub-level 2.3 relies on the panel bank's own previous contributions, adjusted using factors that reflect developments in interest rates and credit risk.

Only where neither Level 1 nor Level 2 can be applied did the 2019 methodology allow recourse to Level 3, based on the contributor's expert judgement and supported by other transactions within the underlying interest or related market data. Although this level was subject to strict controls and guidance, its very existence continued to raise issues in terms of incentives, accountability and reputational risk.

The hybrid methodology was implemented gradually throughout 2019 in order to mitigate operational and technological risks for panel institutions. The process concluded on 28 November 2019, when EMMI formally announced the full application of the new Euribor calculation methodology.

The transition coincided with EMMI's formal authorisation as a benchmark administrator, granted on 2 July 2019 by the Belgian FSMA, which at that time acted as the competent supervisory authority pursuant to Article 34 of the BMR. Subsequently, in January 2022, and within the framework of the evolution of the European system of supervision of benchmarks, these functions were exercised by ESMA, which currently acts as EMMI's supervisory authority, which reinforces the European nature of the supervision and governance framework of the index.

In accordance with the BMR requirement that benchmark administrators conduct periodic methodological reviews, EMMI performs an annual review of the Euribor methodology with a dual objective. First, to verify that the benchmark remains robust, resilient and representative of the euro unsecured money market it is intended to reflect, and second, to identify potential adjustments or recalibrations capable of enhancing its functioning without undermining continuity or causing disruption to users. These annual reviews have enabled the introduction of gradual technical refinements, the strengthening of control mechanisms and the fine-tuning of certain parameters of the hybrid methodology. They therefore constitute a process of continuous enhancement that has contributed to Euribor's stability and laid the groundwork for more substantive reforms, including the methodological enhancement adopted in 2024.

The following table summarises the principal adjustments introduced as a result of these reviews.

Main annual reviews and methodological adjustments to Euribor following the introduction of the hybrid methodology TABLE 8

Year	Scope of the review	Most relevant methodological adjustments	Main objective
2019	Introduction of the hybrid methodology	Implementation of the hierarchical transaction-based approach (Levels 1, 2 and 3).	Strengthen representativeness and reduce reliance on expert judgement.
2020	Annual review	Confirmation of the robustness of the methodology, with no substantive changes.	Verify the benchmark's adequacy under normal market conditions.
2021	Annual review	Reduction of the minimum volume threshold for eligible transactions (from €20 million to €10 million); extension to transactions with T+3 settlement; adjustments to the use of historical data.	Broaden the pool of actual transactions and enhance resilience.
2022	Annual review	Technical refinements to calculation parameters and to the market adjustment factors (MAF).	Fine-tune the benchmark's sensitivity to market conditions.
2023	Annual review and public consultation	Assessment of the residual role of expert judgement and analysis of alternative approaches.	Prepare for the elimination of Level 3.
2024	Structural methodological enhancement	Removal of expert judgement; calculation based exclusively on actual transactions and automated methods.	Strengthen the benchmark's objectivity, credibility and long-term sustainability.

Source: Authors' own work based on EMMI (2024c) and EMMI (n.d.-g).

The 2024 methodological enhancement

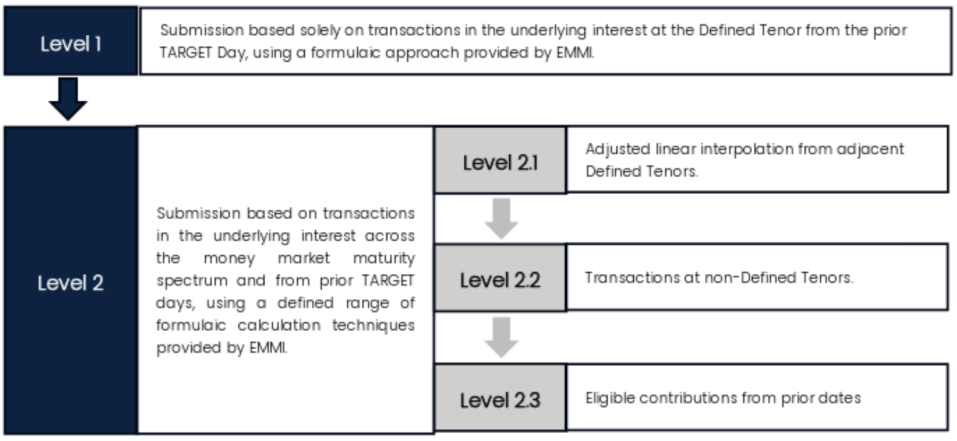
Despite the progress made with the 2019 hybrid methodology, two elements of tension persisted: the reliance on panel contributions and the responsibility associated with the use of expert judgement in certain circumstances linked to Level 3 contributions. To address these issues, EMMI initiated a new methodological review process at the end of 2021, which concluded following a public consultation in 2023.

As a result, an enhanced version of the hybrid methodology was approved in 2024. Its most significant feature is the elimination of panel banks' expert judgement in the determination of Euribor, implemented through the removal of Level 3 contributions (EMMI, 2024c). Following this reform, the benchmark is determined exclusively on the basis of actual transaction data and predefined calculation procedures applied directly by EMMI using the information reported by panel banks. This development materially strengthens the objectivity, transparency and traceability of the calculation process. At the same time, it reduces legal, reputational and governance risks for contributing institutions, as well as the operational and compliance costs associated with maintaining systems and procedures for Level 3 calculations.

As in previous reforms, the transition to the enhanced hybrid methodology – which became fully effective on 1 October 2024 – was implemented progressively in order to minimise adjustment costs and ensure the benchmark's operational continuity. Through this reform, Euribor consolidates its position as one of the few interbank reference benchmarks to have preserved continuity through deep methodological adaptation, in contrast to the discontinuation of other historical benchmarks such as LIBOR.

The following illustration provides a schematic representation of the level hierarchy and the Euribor calculation process under the methodology currently in force.

Euribor calculation methodology implemented in 2024 ILLUSTRATION 3



Source: EMMI (2024b).

As illustrated above, the current Euribor methodology is structured around a hierarchical and progressive approach designed to anchor the benchmark's calculation, to the greatest extent possible, in actual transactions in the euro money market that faithfully reflect its underlying interest. The contribution of each panel bank is first determined at Level 1, based exclusively on eligible transactions carried out in the underlying market for the relevant tenor on the preceding business day, provided the eligibility criteria defined by the administrator are met.

Only where sufficient eligible transactions are not available to apply Level 1 does the methodology provide for recourse to Level 2. This level comprises a set of predefined calculation techniques based on actual transactions at adjacent tenors, non-standard tenors or earlier dates, applied sequentially and in accordance with predetermined rules. In all cases, each panel bank's contribution is expressed as an interest rate together with an explicit indication of the methodological level applied.

A central feature of the current framework is that the final determination of contributions rests with EMMI. EMMI calculates the rates by applying the defined methodology to the transaction data reported by panel banks, while each institution remains responsible for the accuracy, integrity and traceability of the individual data it submits. This allocation of responsibilities strengthens the internal coherence of the benchmark, reduces individual discretion and contributes to safeguarding Euribor's credibility and transparency as a critical benchmark.

Since 2024, the Euribor methodology has been explicitly aligned with the taxonomy of the unsecured segment of the ECB's MMSR framework, using harmonised transaction categories and attributes to identify eligible transactions in the euro unsecured money market. This alignment anchors the benchmark's calculation in standardised data reported by significant institutions, reinforces consistency between statistical supervision and benchmark determination, and facilitates centralised, objective and traceable data processing by EMMI.

Eligible transactions and calculation of Euribor under the 2024 methodology TABLE 9

Element	Description
Underlying interest	Unsecured euro wholesale money market, in accordance with the Euribor definition.
Types of eligible transactions	Unsecured wholesale funding transactions, including interbank deposits, certificates of deposit, commercial paper and other equivalent instruments recognised by EMMI.
Eligible counterparties	Financial institutions (banks and other similar financial entities). Transactions with corporate clients, retail clients and public authorities are excluded.
Geographical scope	Euro-denominated transactions conducted within the European Union and EFTA countries.
Minimum amount per transaction	Minimum threshold of €10 million per transaction, in line with the methodological revisions introduced after 2019.
Tenors considered	The official Euribor tenors: one week, one month, three months, six months and twelve months, with defined time windows around each tenor.
Trade and settlement date	Transactions executed on the business day preceding the calculation date, subject to specific rules regarding eligible settlement dates.
Responsibility for data	Each panel bank is responsible for the accuracy and completeness of the transactions it reports; EMMI is responsible for calculating the benchmark.
Individual calculation method	For each tenor, EMMI calculates each bank's contribution on the basis of eligible transactions, applying predefined aggregation and adjustment techniques.
Index aggregation method (Euribor fixing)	Trimmed average: a specified percentage (15%) of the highest and lowest panel contributions is excluded, and the arithmetic mean of the remaining central contributions is calculated.
Purpose of the trimmed average	To reduce the influence of extreme values and strengthen the statistical robustness of the benchmark in the presence of outliers or periods of reduced liquidity.
Level of discretion	None under the 2024 methodology: no recourse is made to panel banks' expert judgement; the entire process is based on predefined rules and parameters applied by EMMI.

Source: Authors' own work based on EMMI (2024b).

Under the methodology in force since 2024, Euribor is calculated and published daily[30] for each of its current tenors (one week, one month, three months, six months and twelve months), on the basis of eligible transactions reported in accordance with the MMSR taxonomy for the unsecured segment. The benchmark is fixed for the corresponding TARGET business day and published at 11:00 CET, expressed to three decimal places, following a standardised and fully traceable procedure. Once determined, Euribor is immediately disseminated to data vendors and market participants, ensuring simultaneous and consistent availability. The methodological and operational framework also incorporates contingency, verification and ex post review procedures designed to address potential operational incidents or material errors (exceeding two basis points).

30 The daily calculation of Euribor is performed by an independent calculation agent. Since July 2014, this function has been carried out by Global Rate Set Systems Ltd. (GRSS), which acts on behalf of EMMI and is responsible for the technical execution of the calculation process in accordance with the methodology approved by the administrator (EMMI, n.d.-a).

4.3 Representativeness of Euribor

As currently reflected in the benchmark statement (EMMI, 2024a), published pursuant to Article 27 of the BMR, Euribor measures the cost of wholesale funding for credit institutions in the euro unsecured money market.

With regard to its geographical scope, the benchmark statement specifies that Euribor measures the funding costs of credit institutions established in current or former Member States of the European Union (EU), as well as in member countries of the European Free Trade Association (EFTA). Accordingly, actual and potential participants in the underlying market are credit institutions obtaining funding in those jurisdictions.

As regards the size of the market – or the economic reality – that the benchmark is intended to measure, the benchmark statement, in accordance with Article 27.1 (a) of the BMR, indicates that the total average daily volume of unsecured wholesale funding reported by the 47 institutions participating in the ECB's MMSR as of 19 December 2023 amounted to approximately €177 billion on that date.

On the basis of these elements, as set out in the benchmark statement, it is possible to assess the representativeness of Euribor both in terms of the institutions comprising the panel of contributors and in terms of the volumes and number of transactions underpinning it, relative to the broader universe covered by the MMSR dataset.

4.3.1 Composition of the Euribor panel and comparison with the MMSR universe

The daily calculation and publication of Euribor require the coordinated participation of several actors. EMMI, in its capacity as benchmark administrator, is responsible for the management, oversight and publication of the index. In performing these functions, it relies on Global Rate Set Systems Ltd. (GRSS), which processes the contributions submitted by the panel institutions and applies the official calculation methodology to generate the index values, which are subsequently validated and published by EMMI.

The third pillar of Euribor consists of the panel institutions, which are responsible for submitting on a daily basis the interest rates at which they obtain funding in the unsecured wholesale market. The representativeness and size of the panel are essential to ensuring that the index accurately reflects the reality of the underlying market. Following the latest methodological reform, only institutions with transactions eligible under the current methodology are required to submit contributions for the relevant day. In this context, a larger panel increases the likelihood of a higher volume of eligible transactions and, consequently, enhances the robustness of the Euribor calculation.

The composition of the panel has evolved over time, reflecting both market dynamics and structural changes in the European banking sector. Between 2012 and 2015, numerous institutions withdrew from the panel, partly due to the reputational impact of the Euribor manipulation cases and partly as a result of

the banking consolidation processes that took place during that period. Since the reform introduced following the entry into force of the BMR in 2016, three new institutions have joined the panel.

Beyond its size, what ultimately matters is that the institutions comprising the panel are active in the interbank market, so that they are able to report actual transactions to EMMI for the calculation of the index. In this respect, larger institutions tend to play a particularly significant role, as they manage substantial volumes of transactions and cash flows that generate continuous fluctuations in their liquidity positions. To manage these positions, they regularly access the interbank market, both to place surplus funds and to cover liquidity shortfalls. Large banks also benefit from specialised treasury functions, access to electronic trading platforms and advanced risk and liquidity management tools, enabling them to operate efficiently and to establish themselves as key liquidity providers and price formers.

At present, the Euribor panel comprises 21 institutions from 12 countries: 11 from the euro area and one based in the United Kingdom. This composition may be regarded as sufficiently representative of the European financial system. That representativeness is further strengthened by the presence of leading financial institutions from the four largest euro area economies – Germany, France, Italy and Spain – ensuring that liquidity and interest rate developments in the most relevant markets are appropriately reflected in the calculation of the index.

From a size perspective, the institutions comprising the panel accounted for approximately 47% of total euro area banking assets as of December 2024. Representation is particularly high in France, Italy and Spain, where panel banks account for between 63% and 81% of national banking assets. In Germany, by contrast, relative representation is lower, reflecting the greater fragmentation of its banking system and the withdrawal of a significant number of institutions between 2012 and 2014. This points to comparatively more limited panel coverage relative to other large European economies.

However, asset-based representativeness alone does not necessarily imply a high degree of activity in the interbank market. In this context, the presence on the panel of eight of the eleven European institutions designated as global systemically important banks (G-SIBs) by the FSB (2025) significantly enhances its relevance, given that such institutions are typically among the most active participants in wholesale money markets.

Evolution of the members of the Euribor panel and their relative weight in financial assets

TABLE 10

Country	Institution	Total assets (2024, million)	Total assets of panel institutions / Total banking assets of the country (2024 figure)	Institution	Withdrawal date
Germany	Deutsche Bank	1,387,000		BayernLB	Jan-13
	DZ Bank	659,638		Commerzbank	Oct-14
				Deka Bank	Nov-12
				Landesbank Baden-Württemberg	Jun-13
				Landesbank Berlin	May-13
				Landesbank Hessen-Thüringen Girozentrale (Helaba)	Jun-13
	Total	**7,925,126**	**26%**	Norddeutsche Landesbank Girozentrale (Nord/LB)	Jun-13
Austria	Raiffeisen Bank International AG	199,851		Erste Group	Oct-13
	Total	**1,126,488**	**18%**	RBI	Jan-13
Belgium	Belfius	187,457		KBC	Apr-14
	Total	**652,730**	**29%**		
Denmark				Danske Bank	May-15
Spain	BBVA	772,402			
	Banco Santander	1,837,081			
	Caixabank	631,003			
	Cecabank	14,624			
	Total	**4,043,051**	**81%**		
Finland	OP Corporate Bank	75,683		Nordea	Dec-15
	Total	**787,247**	**10%**	Pohjola Bank	May-16
France	BNP Paribas	2,704,908		CIC	Mar-14
	HSBC France	265,000		La Banque Postale	Apr-14
	Natixis	61,546			
	Credit Agricole	2,309,000			
	Société Générale	1,573,545			
	Total	**9,163,346**	**75%**		
Greece	National Bank of Greece	74,957			
	Total	**344,053**	**22%**		
Netherlands	ING Bank	1,020,545		Rabobank	Jan-13
	Total	**2,754,503**	**37%**		
Ireland				Allied Irish Bank (AIB)	Jun-13
				Bank of Ireland	Feb-14
Italy	Intesa Sanpaolo	933,285		Monte dei Paschi di Siena	Jan-19
	UniCredit	784,004			
	Total	**2,737,084**	**63%**		
Luxembourg	Banque et Caisse d'Épargne de l'État	56,184			
	Total	**130,927**	**43%**		
Portugal	Caixa Geral de Depósitos (CGD)	106,284			
	Total	**320,366**	**33%**		
United Kingdom	Barclays	1,518,202			
Sweden				Svenska Handelsbanken	Mar-13
Switzerland				UBS	Mar-13
International banks				London Branch of JP Morgan Chase	
				Citibank	Sep-12
				The Bank of Tokyo Mitsubishi	Jul-16
	Total assets of panel institutions (excluding Barclays)	15,653,997			
	Total assets of euro area institutions	32,971,187	47%		

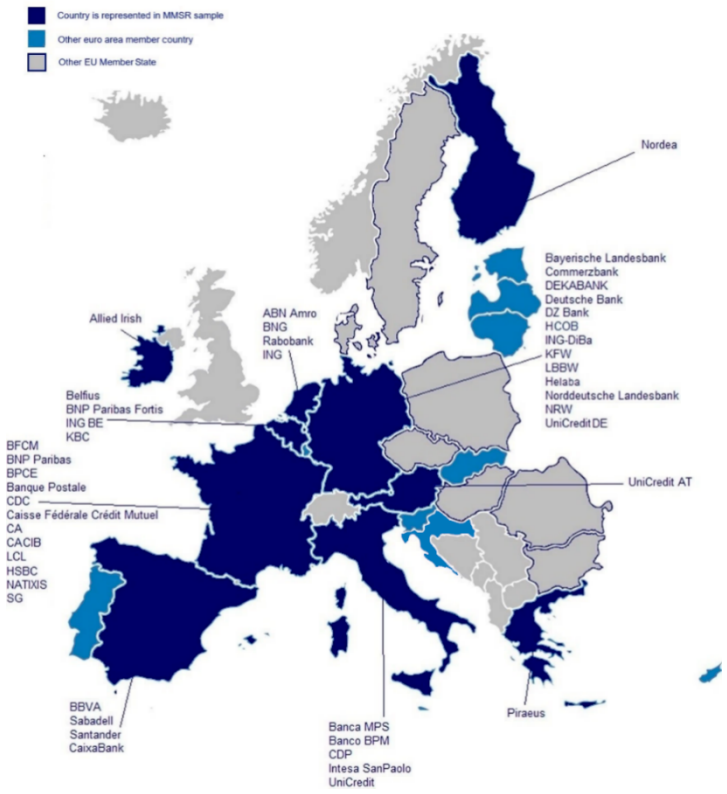
Source: EMMI, ECB, annual financial statements of the institutions for 2024 and Gómez-Yubero (2016).

The Euribor panel operates under a framework of voluntary participation. In practice, however, there is significant technical overlap between the Euribor panel and the universe of institutions subject to reporting to the ECB, insofar as panel institutions currently use the same data file that they submit to the central bank in order to comply with their statistical reporting obligations under the MMSR. This operational alignment gives rise to potential synergies between the two processes, although it is important to bear in mind that they pursue distinct objectives.

The MMSR is primarily regulatory and statistical in nature. Its main objective, as set out in recital 2 of ECB Regulation (EU) No. 1333/2014, is to provide the Eurosystem with "comprehensive, detailed and harmonised" information on euro area money markets. The data collected cover multiple segments of the money market and are essential for analysing the monetary policy transmission mechanism and monitoring liquidity conditions in the financial system.

By contrast, Euribor performs a strictly market-based function, in that it synthesises, in a single reference rate, the cost of unsecured wholesale euro funding resulting from the interaction among market participants. In this respect, while the MMSR gathers raw data for diagnostic and analytical purposes by the central bank, Euribor condenses that information into a price signal generated by the market itself. Both instruments therefore converge on the same analytical core: the measurement of the functioning of the interbank channel, a cornerstone of the ECB's monetary policy transmission mechanism.

Countries with institutions reporting to the MMSR as of June 2024 ILLUSTRATION 4



Source: ECB (2025).

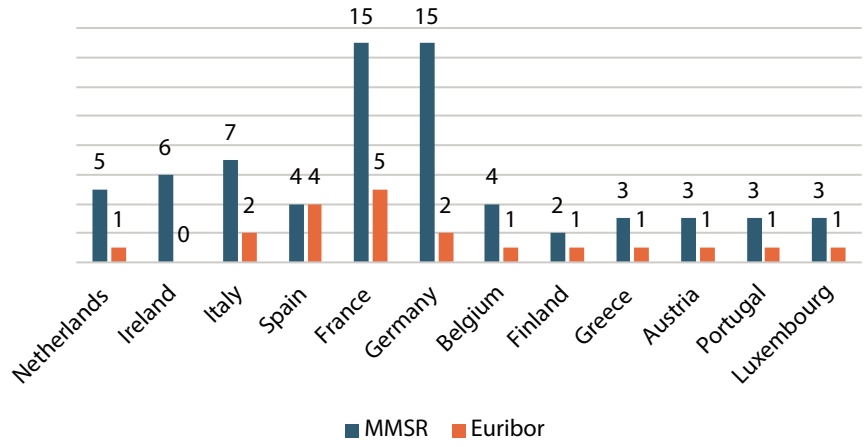
The universe of institutions required to report under the MMSR has not remained static, but has expanded significantly in recent years. On 1 April 2016, the MMSR comprised 46 reporting institutions in the euro area. This population increased substantially as of 1 July 2024, when 24 additional institutions were included, bringing the total number of entities subject to MMSR reporting to 69. This expansion also broadened geographical coverage, with the inclusion for the first time of institutions from Luxembourg and Portugal, and strengthened representation in countries that until then had only one reporting institution, such as Ireland, Greece, Austria and Finland.

With regard to the overlap between the two universes, only two of the institutions currently comprising the Euribor panel are not subject to MMSR reporting: Barclays and the Spanish institution Cecabank. The reasons differ in each case. For Barclays, the exclusion stems from the fact that its parent company is headquartered in the United Kingdom, which is not part of the euro area and is therefore not subject to MMSR reporting requirements. However, a significant portion of its euro-denominated activity is indirectly captured through its subsidiary, Barclays Bank Ireland plc, which is supervised by the ECB and subject to MMSR reporting. Cecabank's situation is different. Its exclusion reflects its classification as a less significant institution and, consequently, its exemption from this statistical reporting requirement.

This distinction highlights a key structural difference in the geographical scope of the two frameworks. By definition, Euribor seeks to reflect the functioning of the euro interbank market in a broad sense, inherently encompassing a significant share of activity conducted outside the euro area, particularly in major financial centres such as London. The MMSR, by contrast, has a territorially defined scope, determined by its regulatory mandate, which is focused on providing a comprehensive overview of the money market within the euro area.

From a comparative perspective, of the 20 countries comprising the euro area, the Euribor panel includes institutions from 11, in addition to the United Kingdom. The MMSR, for its part, covers institutions from 12 euro area countries, resulting in more homogeneous geographical coverage within the Eurosystem perimeter. Ireland constitutes a particular case, as it is represented in the MMSR but has no institutions participating in the Euribor calculation panel.

Distribution by country of the number of institutions reporting under the MMSR and participating in the Euribor panel[1] FIGURE 4



Source: ECB and EMMI.

1 It should be clarified that, in the case of Spain, four institutions currently report under the MMSR. However, one of them, Banco Sabadell, is not a member of the Euribor panel, while Cecabank, which does form part of the Euribor panel, is not subject to MMSR reporting requirements.

This broader geographical coverage of the MMSR also translates into more robust representation of certain economies, particularly France and Germany, where the number of participating institutions is significantly higher than that represented on the Euribor panel.

The MMSR also encompasses a wider range of institutions that act as regular counterparties in large-volume transactions, key transmitters of the ECB's monetary policy, recurring market makers and significant participants in major market infrastructures. Although the Euribor panel includes a notable presence of such institutions – eight in total – the MMSR provides even broader representation, incorporating a substantial number of US banking subsidiaries and other leading international intermediaries.

MMSR institutions vs. institutions of the Euribor panel TABLE 11

	Core Money Markets
Institution	**Euribor Panel**
BNP Paribas	Yes
Société Générale	Yes
Credit Agricole S. A.	Yes
Deutsche Bank AG	Yes
ING Bank N.V.	Yes
Commerzbank AG	No
Natixis (dentro del grupo BPCE)	Yes
DZ Bank AG / DekaBank	Yes
UniCredit S.p.A.	Yes
J.P. Morgan SE	No

MMSR institutions vs. institutions of the Euribor panel (*continuation*) TABLE 11

Core Money Markets	
Institution	**Euribor Panel**
Goldman Sachs Bank Europe SE	No
Bank of America Europe DAC	No
Citibank Europe plc	No
HSBC Continental Europe	No
Barclays Bank Ireland plc	Euribor includes Barclays UK

Source: Authors' own work based on data from the ECB and the EMMI.

4.3.2 Analysis in terms of volumes and transactions

The current practice whereby institutions participating in the calculation of Euribor submit to EMMI the same data file used for the unsecured segment of the MMSR reported to the ECB underscores the existence of significant operational synergies between the two reporting processes. This overlap makes it possible to consider alternative panel designs that would broaden the index's calculation base without increasing the operational burden on participating institutions.

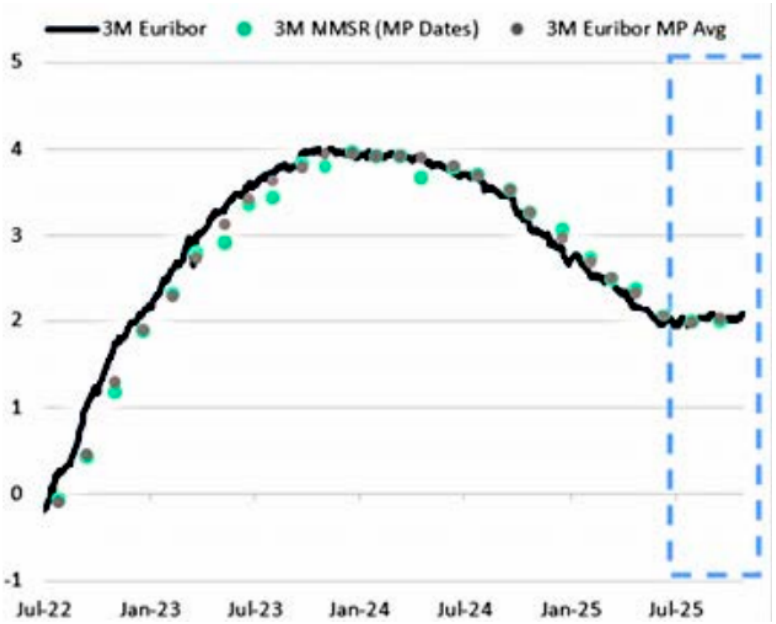
In this context, a potential expansion of the Euribor panel could be structured around the use of anonymised data relating to the 69 institutions currently participating in the MMSR, which constitute the population used for the calculation of the €STR benchmark, as described in Section 6.1. Such an approach would effectively triple the number of institutions currently represented on the Euribor panel, significantly expanding its calculation base, enhancing representativeness and strengthening its methodological robustness.

In addition, this solution would substantially reduce the costs associated with panel membership, currently estimated at up to €250,000 per institution per year, excluding any additional costs that might arise from future methodological adjustments. It would also mitigate the reputational risk that has historically been associated with participation in the panel. However, in the current context, cost is likely the most significant barrier influencing institutions' decisions on whether to join the Euribor's voluntary participation framework. Institutions can continue to benefit from using the index without becoming panel members or bearing the associated maintenance costs, thereby reinforcing the well-known free-rider problem.

Given that virtually all institutions currently on the Euribor panel report under the MMSR, and that the MMSR offers broader geographical coverage and a higher number of reporting institutions per euro area country, it is appropriate to examine alternative calculation approaches that would preserve the index without imposing additional direct costs on contributing institutions. Any modification of this nature must be based on a fundamental premise: that the resulting index remains virtually unchanged in definition and functioning, ensuring continuity and avoiding disruption to the millions of financial contracts that reference it.

To assess the current robustness and representativeness of Euribor, EMMI conducts periodic validation exercises. These involve comparing the officially published three-month Euribor with a hypothetical Euribor calculated exclusively on the basis of anonymised and consolidated MMSR transaction data. The findings are clear: under normal market conditions, the differences between the official index and the version derived from ECB data are minimal, typically remaining below three basis points.

Three-month MMSR vs. three-month Euribor FIGURE 5



Source: EMMI (2025a).

A longer-term perspective allows a comparison between the three-month Euribor, published by EMMI, and the volume-weighted average daily rate at which banks obtain unsecured wholesale funding at a three-month maturity, an indicator compiled and published by the ECB on the basis of MMSR data. The differences between the two indicators are not limited to the number of institutions included, but also relate to the range of eligible counterparties. The MMSR captures transactions with large corporates, which are explicitly excluded from the scope of Euribor. In addition, the MMSR covers a broader set of transactions, as it includes operations with amounts exceeding €1 million.

The divergences observed between the two indicators reflect two complementary dimensions: methodological and structural. At the height of the 2020 crisis, methodological factors were the primary driver. The term interbank market contracted abruptly amid large-scale liquidity injections by central banks. In that environment, the Euribor – designed to preserve robustness and continuity – activated the mechanisms embedded in its hybrid methodology (Levels 2 and 3), smoothing extreme volatility and ensuring uninterrupted publication of the index. By contrast, the ECB's purely transaction-based rate immediately reflected the elevated risk premium associated with the limited number of transactions executed under conditions of severe stress, temporarily placing it well above Euribor.

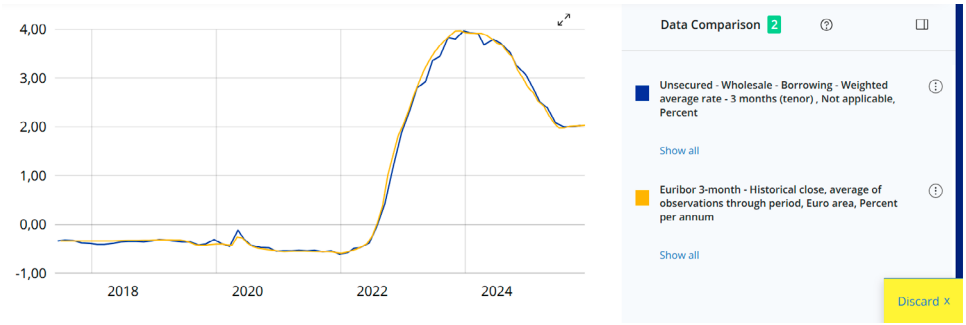
During the inflationary cycle that began in 2022, and the subsequent easing phase in 2023, the explanation for the observed differentials is primarily structural, stemming from the nature of the counterparties included in each indicator. The persistent spread between the two indices functions as a barometer of money market fragmentation, defined by a key operational boundary: direct access to the ECB's balance sheet.

Euribor reflects the cost of funding among banking participants in the system, namely financial institutions with access to Eurosystem liquidity facilities. The MMSR-based rate, by contrast, also incorporates non-financial counterparties such as large corporations and investment funds, thereby capturing funding conditions in a broader market comprising agents without direct access to a lender of last resort such as the ECB.

The spread between the two indicators is not merely statistical noise; it measures the funding cost associated with being outside the Eurosystem's liquidity perimeter – a premium that varies depending on the degree of market stress, overall liquidity conditions and the phase of the monetary policy cycle.

This consideration is central from an index design perspective. Any future evolution of Euribor – including a potential migration of its primary calculation towards consolidated MMSR data – must preserve the definition of eligible transactions and counterparties set out in its methodology, as well as the Level 2 components that safeguard continuity and representativeness, even under conditions of liquidity stress. Such safeguards are essential to prevent Euribor from becoming a purely transactional reflection of episodes of acute liquidity stress and to preserve its role as a stable reference rate for long-term financial contracts.

Three-month Euribor vs. three-month MMSR FIGURE 6



Source: ECB (n.d.-b).

The Euribor methodology establishes the criteria that determine which transactions are eligible for inclusion in its calculation. Not all transactions are incorporated into the index, as the scope defined by EMMI is intended to include only those transactions and counterparties that faithfully reflect Euribor's underlying interest.

Over time, however, this definition has been progressively refined to better capture the effective funding conditions of euro area banks at any given point, while also broadening the universe of eligible transactions and thereby increasing the weight

of Level 1 contributions. Such contributions most closely reflect actual market conditions and are, in addition, the least susceptible to manipulation.

In this regard, the main adjustments introduced have focused on expanding the set of eligible counterparties, reducing the minimum nominal threshold for transactions and widening the permissible time windows, with a view to capturing a more representative sample of interbank market activity.

Comparison between transactions eligible for Euribor and MMSR reporting TABLE 12

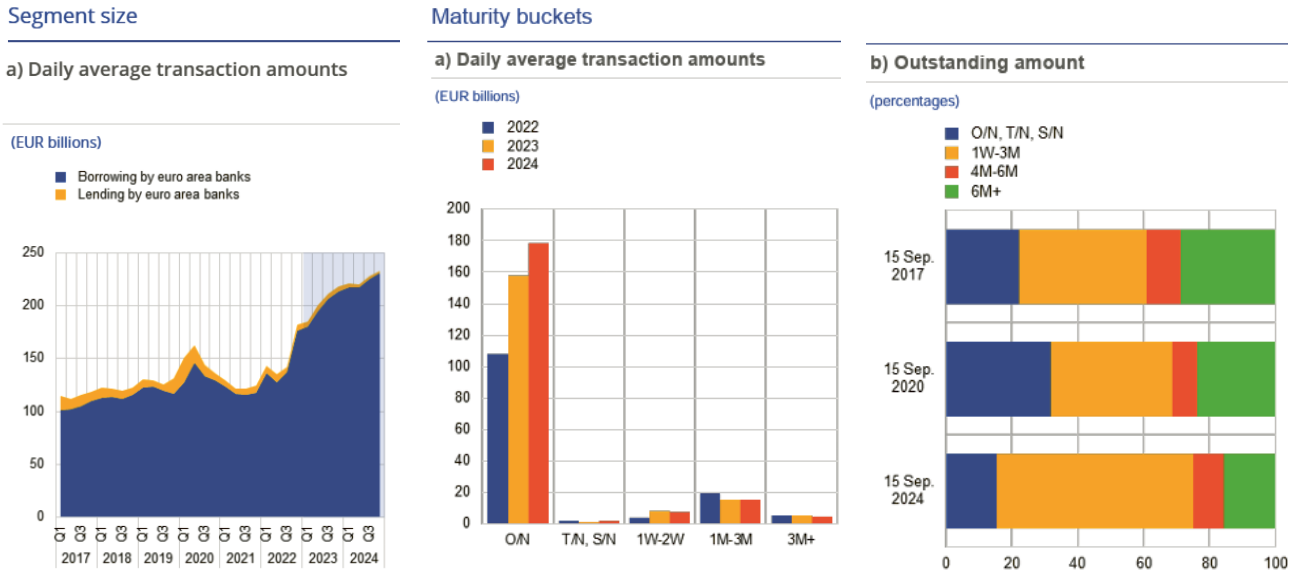
Criterion	Euribor	MMSR (unsecured) - ECB
Currency of denomination	Only transactions denominated exclusively in euros (EUR) are eligible.	Only transactions denominated exclusively in euros (EUR) are eligible.
Execution and reporting	Transactions must be executed on TARGET day T and reported to EMMI on TARGET day T+1.	Transactions must be executed and reported on the same business day (D), by 18:00 CET on the trade date.
Nature of the transaction	Only unsecured wholesale borrowing transactions conducted at arm›s length. Intragroup transactions excluded.	Unsecured wholesale borrowing and lending transactions conducted at arm's length. Intragroup transactions included (provided they are at arm's length).
Applicable interest rate	Fixed-rate transactions and floating-rate transactions referenced to an overnight rate, provided that an equivalent fixed rate can be derived.	The agreed fixed interest rate, or the full formula for floating-rate transactions, is reported.
Eligible counterparties	– Credit institutions (excluding central banks) – Money market funds and investment funds – Other financial intermediaries and financial auxiliaries – Captive financial institutions and money lenders – Insurance corporations and pension funds – Central banks and general government Excludes: non-financial corporations	– All monetary financial institutions (MFIs) – Other financial institutions (funds, insurance corporations, etc.) – Non-financial corporations (large corporates, – General government) – ECB and national central banks
Eligible instruments	– Unsecured deposits – Commercial paper (CP) – Certificates of deposit (CD) – Floating-rate notes (FRNs) with an equivalent fixed rate – Other short-term securities without embedded options Excludes: transactions with options (evergreen deposits)	– Unsecured deposits – Unsecured bilateral loans – Commercial paper (CP) – Unsecured certificates of deposit (CD) – Other unsecured short-term debt securities Excludes: secured transactions, interest rate swaps (IRS), FRAs and transactions with options
Value date (settlement)	Between T and T+3	The exact date is reported. Generally T, T+1 or T+2
Maturity date	Must fall within specific windows: – 1 week (± 2 target days) – 1 month (± 5 days) – 3 months (± 10 days) – 6 months (± 15 days) – 12 months (± 15 days)	The exact date is reported. Maximum maturity for reporting: ≤ 1 year. No tolerance windows
Minimum amount	Only transactions with a nominal amount ≥ €10 million	Only transactions with a nominal amount ≥ €1 million

Source: Authors' own work based on EMMI and ECB data.

According to the latest data published by the ECB (2025), the unsecured segment recorded an average daily transaction volume of €233 billion in the fourth quarter of 2024, representing growth of 28% and accounting for approximately 9% of the total outstanding stock. The bulk of activity related to bank funding obtained from counterparties without access to the deposit facility.

At present, 86% of the unsecured segment's volume is concentrated in overnight transactions. Since 2017, however, the share of outstanding transactions with maturities between one week and three months has increased significantly, rising from approximately 40% to 60%. The unsecured segment also exhibits seasonal fluctuations at quarter-end and year-end, primarily associated with regulatory factors.

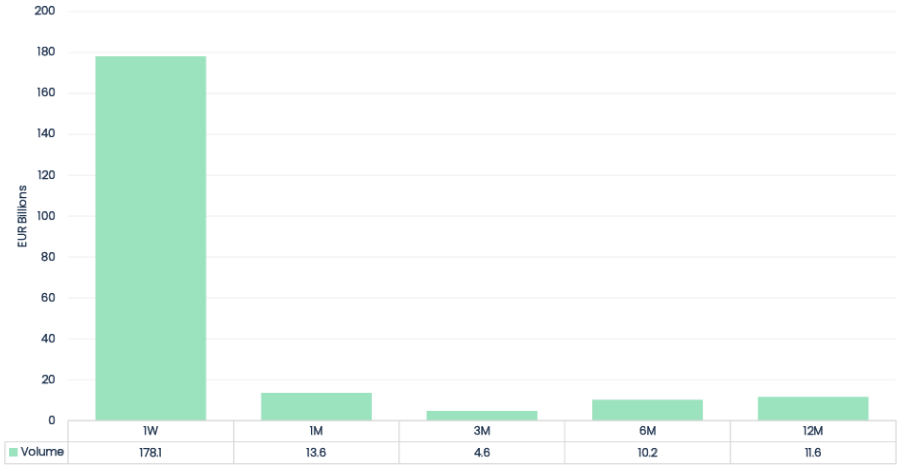
Evolution of underlying transaction volumes in the unsecured segment of the MMSR FIGURE 7



Source: ECB (2025).

According to the most recent data published by EMMI (2025c), aggregate Euribor volumes reached €218 billion in October 2025, representing an increase of €33 billion compared with the previous month. Aggregate Euribor volumes thus continue to display a clearly upward trend. By comparison, in September 2024, aggregate Euribor volumes stood at €136 billion.

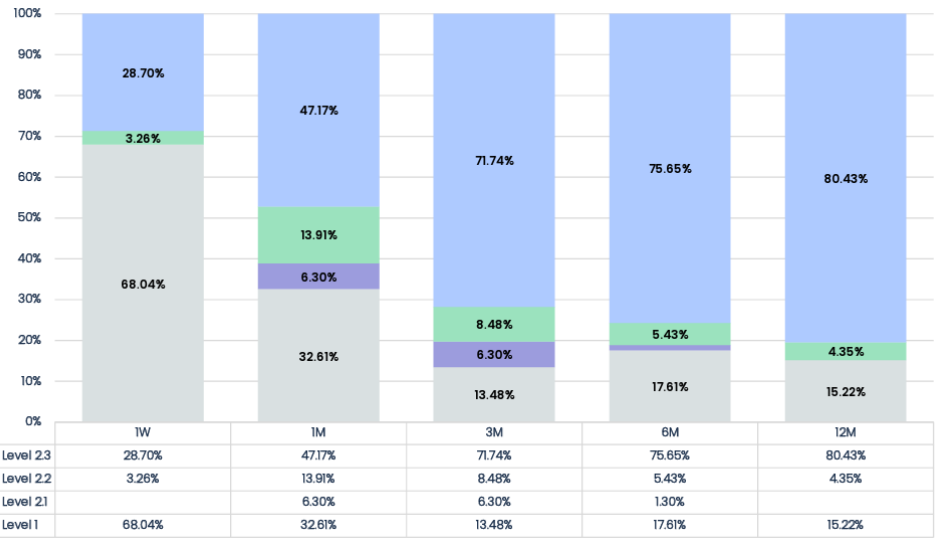
Aggregate transaction volumes used in the determination of Euribor as of October 2025 FIGURE 8



Source: EMMI (2025c).

The largest volume of transactions classified as Level 1 is currently concentrated in the shortest maturities, as shown in Figure 8, whereas for longer maturities the determination of the index relies to a greater extent on levels other than Level 1.

Use of Euribor methodology levels by maturity as of October of 2025 FIGURE 9



Source: EMMI (2025c).

Although the relative shares have varied over time in line with market dynamics, a negative correlation persists between maturity and the predominant calculation level: the shorter the maturity, the higher the volume of transactions classified as Level 1. The evolution of these shares has been closely linked both to the monetary policy stance and to institutions' access to liquidity provided by the ECB.

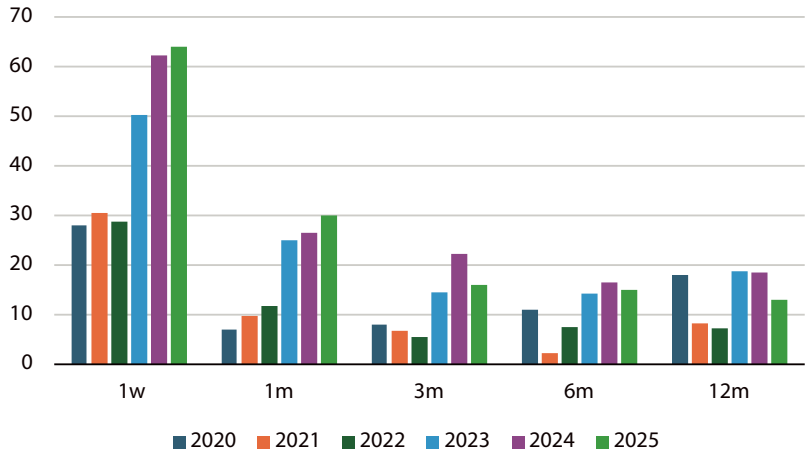
The introduction of ECB funding facilities, such as the TLTRO programmes (ECB, 2024b) – in particular TLTRO I (2014), TLTRO II (2016) and TLTRO III (2019) – facilitated access to liquidity on highly favourable terms. This environment reduced institutions' need to rely on the interbank market, thereby lowering the volume of transactions potentially eligible as Level 1.

This effect was reinforced by the ECB's response to the COVID-19 pandemic through the Pandemic Emergency Purchase Programme (PEPP) (ECB, n.d.-b), which injected additional liquidity into the system and contributed to a further contraction in interbank market activity. As a result of this markedly expansionary stance, the share of Level 1 in the one-week maturity averaged below 30%.

This situation began to reverse following Russia's invasion of Ukraine in February 2022 and the subsequent surge in inflation. The contractionary response of central banks, based on the progressive withdrawal of liquidity from the system, led to renewed activity in the interbank market, particularly at shorter maturities. In that context, the share of Level 1 in the one-week maturity rose to around 50%.

Taken together, these developments indicate that Euribor adequately reflects prevailing conditions in the money market, both through the dynamics of the index itself and through changes in the volume and composition of transactions eligible under its methodology. Accordingly, any future methodological adjustment – including a potential transfer of consolidated MMSR data from the ECB to EMMI for the purpose of calculating Euribor – must ensure that the index continues to reflect underlying money market conditions. Maintaining Level 2 within the calculation framework is therefore essential, as it allows the index to be determined even in the absence of interbank activity.

Ratio of level 1 transactions by tenor since January 2020 to January 2025 FIGURE 10



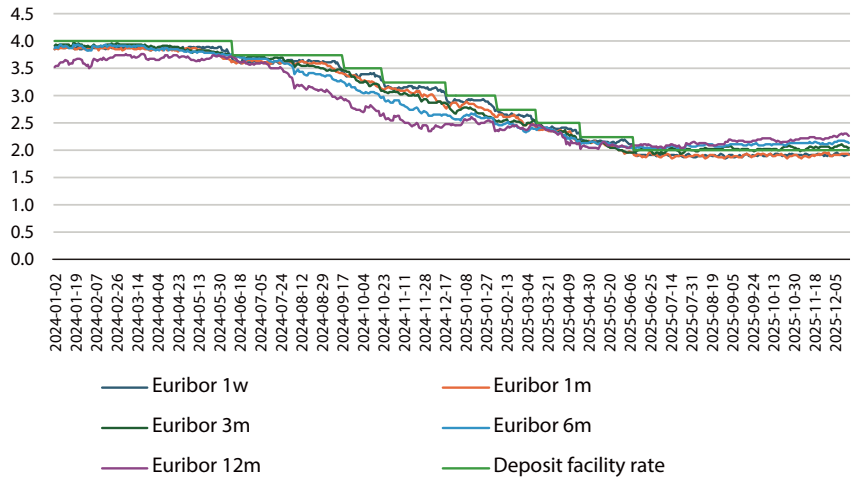
Source: Authors' own work based on EMMI data.

4.4 Economic relevance of Euribor vis-à-vis risk-free rates

The progressive adoption of risk-free rates in European financial markets – in particular €STR – has reignited the debate on the economic relevance of Euribor as a term benchmark. A functional and empirical assessment, however, indicates that Euribor continues to play a central role in the European financial system. Its function is complementary to that of risk-free rates (RFRs) and, in certain segments, not readily substitutable.

i) Euribor is a forward-looking rate, meaning that it incorporates market expectations regarding the future path of monetary policy. As evidenced by the reductions in key policy rates implemented by the ECB during 2024, Euribor – across all maturities – consistently anticipates movements in the deposit facility rate (DFR). This behaviour is not incidental but reflects the intrinsic nature of the index as a mechanism for discounting expectations.

Evolution of Euribor across all maturities compared with the deposit facility rate FIGURE 11



Source: Authors' own work based on data from EMMI and ECB.

ii) Euribor incorporates a bank credit risk premium, as it is an unsecured term rate. This characteristic makes it a direct indicator of interbank market conditions and of risk perceptions within the financial system, providing information that risk-free rates, by definition, do not capture (see Figures 13 and 14).

iii) Euribor remains the predominant benchmark in millions of outstanding contracts, particularly consumer mortgage loans with long remaining maturities. In such contracts, it is essential that the applicable interest rate be known at the beginning of the interest period, which aligns naturally with a forward-looking term index such as Euribor.

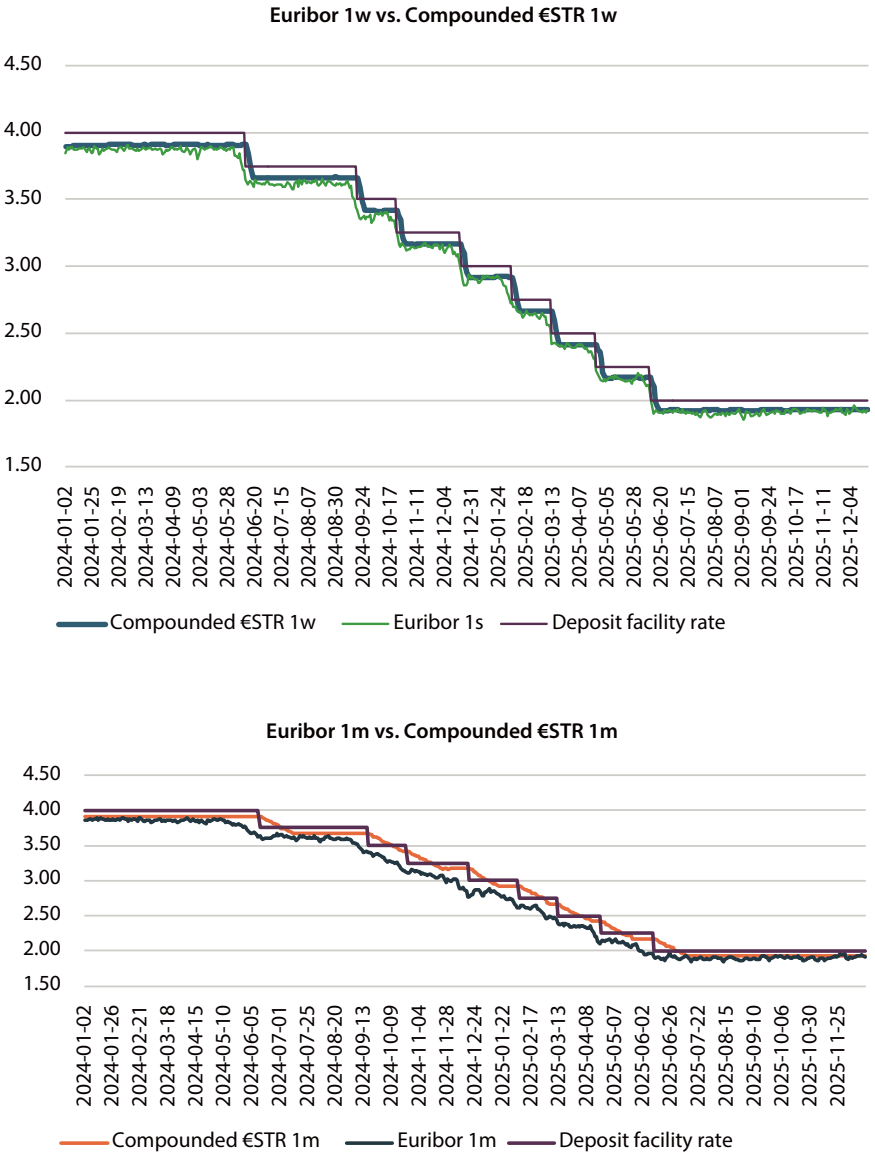
iv) Certain financial contracts and hedging strategies continue to require a term reference rate that reflects both expectations and bank credit risk, particularly for the proper management of basis risk by institutions.

4.4.1 Functional differences vis-à-vis €STR

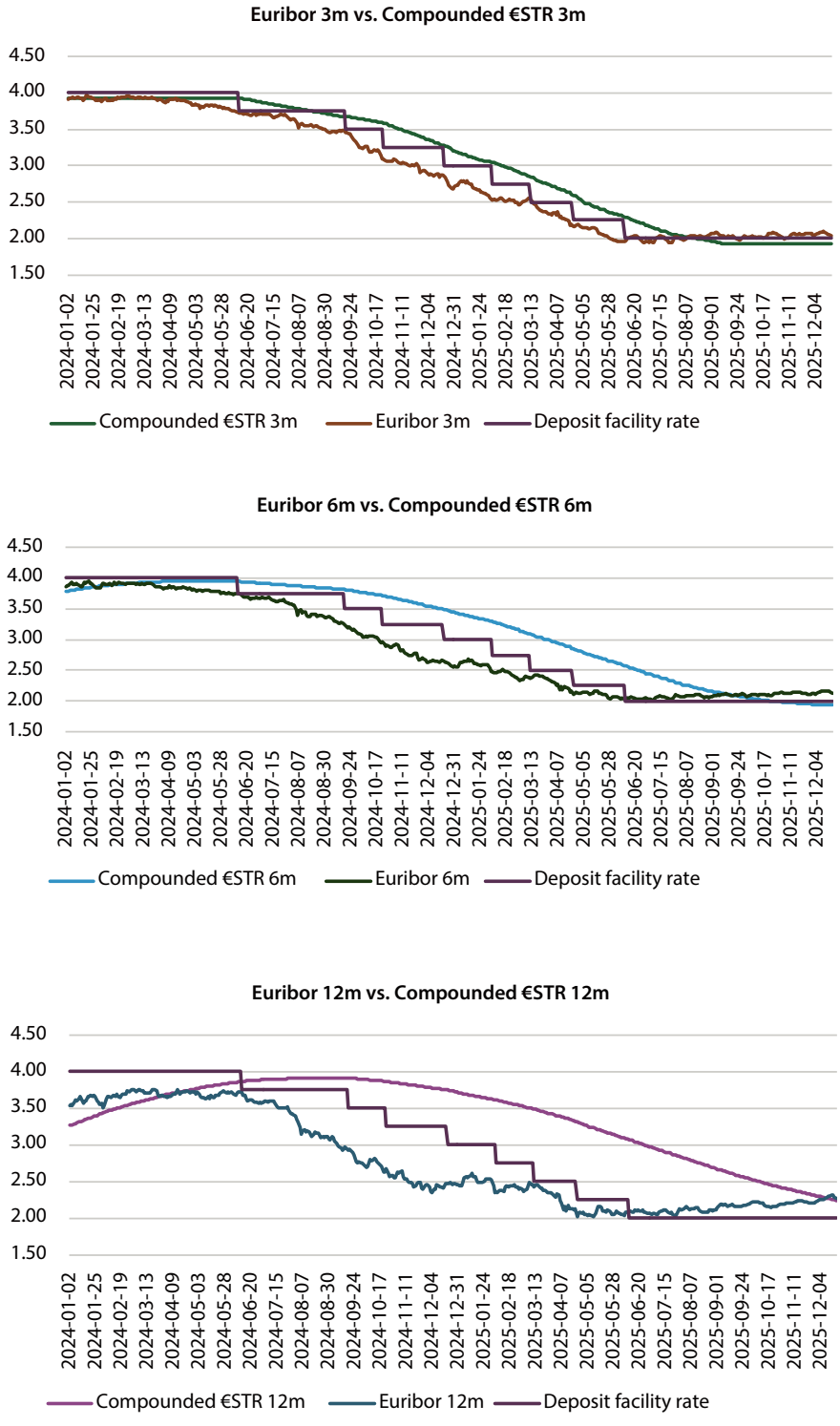
The differences between Euribor and €STR are not merely technical; they are functional and economic in nature. €STR is an overnight, credit risk-free rate. Term rates derived from it are constructed on a backward-looking basis, using the compounded average of observed rates over a prior period.

A comparative analysis between Euribor and backward-looking €STR-based term rates (Compounded €STR) highlights this fundamental distinction. Whereas Euribor acts as a forward-looking indicator that incorporates market expectations regarding future monetary policy decisions, backward-looking €STR rates display a reactive and adaptive pattern, adjusting with a lag to movements in the ECB's deposit facility rate. This lag becomes more pronounced as the tenor increases, as illustrated in Figure 12.

Comparison of Euribor and compounded €STR (backward-looking) versus the DFR FIGURE 12



Comparison of Euribor and compounded €STR (backward-looking) vs. the deposit facility rate (*continuation*) FIGURE 12



Source: Own calculations based on data from the European Money Markets Institute and the European Central Bank.

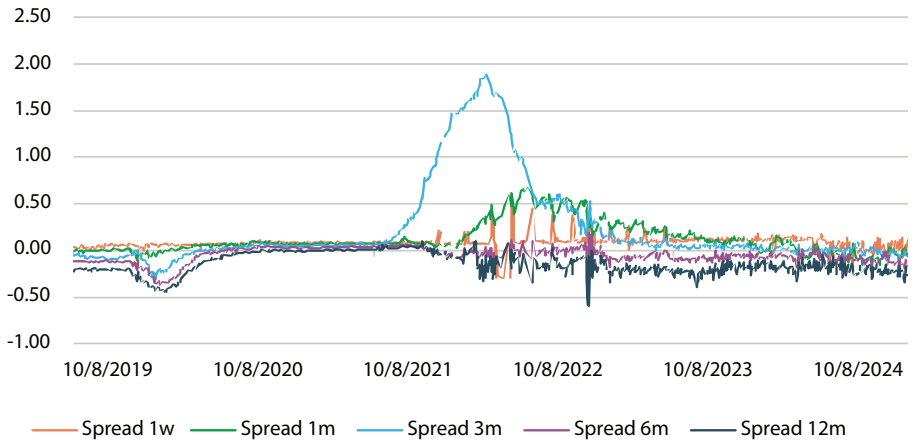
This distinction implies that, whereas Euribor functions as a barometer of future expectations, backward-looking €STR rates operate as an accurate thermometer of the recent past, lacking the forward-looking dimension that characterises the traditional interbank benchmark.

4.4.2 Credit risk and signalling of financial stress

Another fundamental difference lies in the presence or absence of credit risk. The €STR, as an overnight rate without a material credit risk premium, reflects the risk-free rate of the money market. Euribor, by contrast, incorporates bank credit risk and therefore serves as a sensitive indicator of interbank stress.

This role becomes particularly evident during episodes of market tension. During the COVID-19 crisis and the banking turmoil of March 2023 (Silicon Valley Bank and Credit Suisse), the OIS-Euribor spread widened abruptly, reflecting an increase in the bank credit risk premium. The subsequent narrowing of that spread, following ECB intervention, signalled a restoration of confidence in the financial system.

Evolution of the Euribor-OIS spread FIGURE 13



Source: Authors' own work based on EMMI and Reuters data.

4.4.3 Comparison with EFTERM and contractual implications

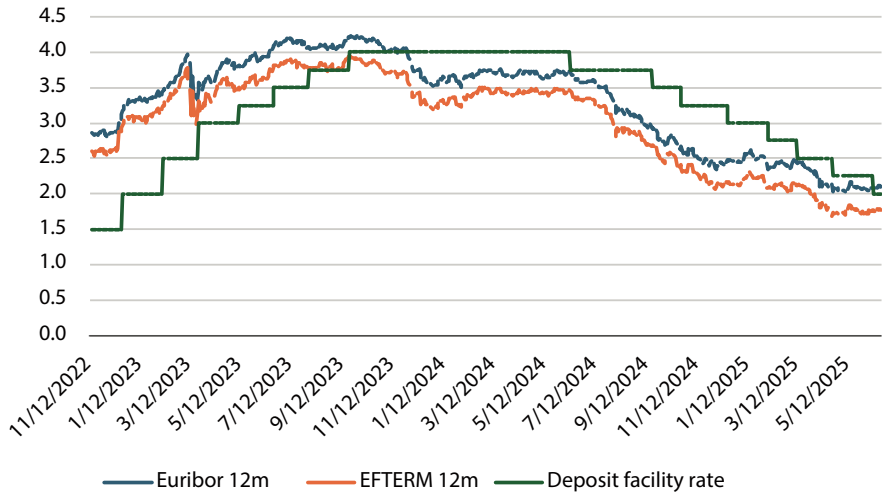
In consumer loan agreements, EU legislation and – more explicitly – Spanish mortgage credit and banking transparency rules require that the interest rate applicable to each interest period be determined prior to the start of that period by reference to an objective, public and verifiable index.[31] This requirement, stemming

31 At EU level, this principle derives from the transparency and predictability requirements set out in Directive 2014/17/EU, particularly with regard to pre-contractual information and interest rate adjustment mechanisms under Article 27. In Spanish law, the requirement is reinforced through: i) Law 5/2019, of 15 March, on real estate credit agreements, which mandates that variable rate

from the principles of transparency and economic predictability, favours the use of forward-looking term rates, such as Euribor, over backward-looking references, whose value is only known once the calculation period has elapsed.

A comparison between Euribor and the forward-looking term rate EFTERM, based on €STR, shows a very high degree of correlation between the two indices. The level difference observed between them largely reflects the credit premium embedded in Euribor.[32]

Comparison 12-month Euribor vs. EFTERM at 12 months and DFR FIGURE 14



Source: Own calculations based on data from EMMI, the ECB and Reuters.

This result has important contractual implications. Any potential use of EFTERM as the primary reference rate or as a fallback in loan agreements would necessarily require the addition of a credit spread in order to preserve economic neutrality and enable institutions to manage their risks appropriately, in particular basis risk.[33]

adjustments be based on an index that is "clear, accessible, objective and verifiable by the parties to the loan agreement and by the competent authorities"; ii) Article 8 of Royal Decree 309/2019, which requires that borrowers be notified of the new interest rate at least 15 calendar days in advance; and iii) Order EHA/2899/2011, of 28 October, on transparency and customer protection in banking services, which requires institutions to inform clients, at each interest settlement, of the nominal rate "to be applied in the period that begins".

32 Moreover, the most recent version of the Euribor methodology (2024) includes, within Level 2.3, an adjustment mechanism linked to the evolution of implicit credit risk, operationalised through changes in the Euribor-EFTERM spread between two consecutive TARGET dates. This component is applied only where at least one panel bank submits a valid contribution under Levels 1, 2.1 or 2.2 for the relevant tenor; otherwise, it is set to zero (EMMI, 2024c).

33 As noted in footnote 14, Order EHA/2899/2011, of 28 October, on transparency and customer protection in banking services should be amended to incorporate forward-looking € STR-based term rates. This would facilitate the inclusion by Spanish financial institutions of appropriate fallback clauses in consumer contracts, in line with the recommendations of the EU RFR Working Group and Article 28.2 of the BMR.

A comparison between Euribor and risk-free rates – both backward-looking and forward-looking – confirms that Euribor remains economically necessary. Its forward-looking nature, its incorporation of bank credit risk and its suitability for contracts that require the applicable rate to be known at the beginning of the interest period make it a benchmark that is not easily replaceable, particularly in consumer lending and certain financial contracts. Even in transition scenarios or where RFRs are used as alternative references, it is essential to preserve these characteristics through explicit adjustments, such as the inclusion of credit spreads, in order to avoid economic and contractual disruption.

4.4.4 Comparison between 12-month Euribor, mortgage Euribor and 12-month compounded €STR

In Spain, 12-month Euribor is the main benchmark for variable-rate mortgage loans to consumers. In contractual practice, however, the rate applied at each mortgage reset is not the daily 12-month Euribor, but the so-called "one-year" or mortgage Euribor, calculated as the monthly average of the 12-month Euribor for the most recent available month.

This methodological distinction is relevant in terms of volatility and its impact on mortgage borrowers. In general, the mortgage Euribor exhibits slightly lower volatility than the 12-month Euribor. This lower volatility is explained by its own calculation method: averaging the 12-month Euribor over a full month introduces a smoothing effect that reduces short-term variability and dampens sharper market movements.

As a result, the mortgage Euribor adjusts more gradually to changes in financial conditions, helping to cushion episodes of heightened volatility and providing a more stable reference for long-term retail contracts such as mortgage loans. This feature is particularly relevant given that variable-rate mortgages in Spain are typically reset annually or semi-annually. An index based on a monthly average therefore offers a more representative measure of borrowers' effective funding cost than reliance on individual daily observations, which may be affected by temporary market tensions.

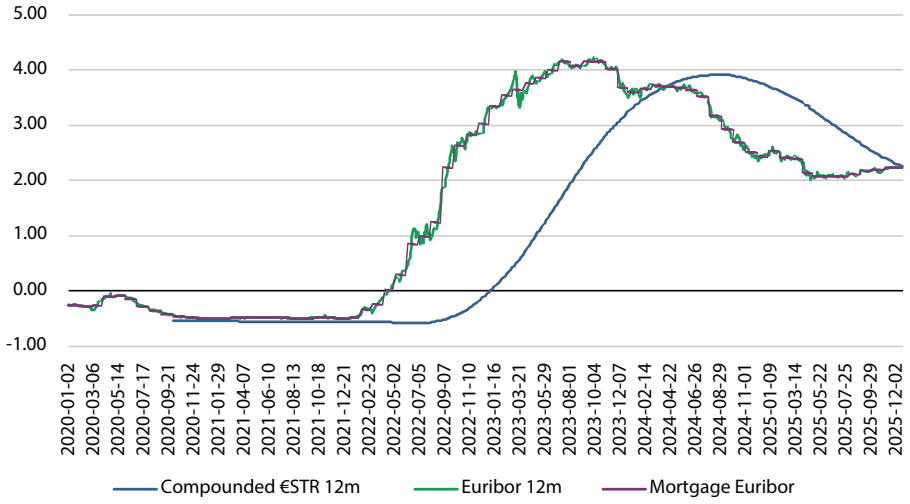
Despite this lower volatility, the relationship between the two indicators is extremely close. Indeed, the correlation between the volatility of 12-month Euribor and that of the mortgage Euribor is virtually perfect (0.99). This implies that when volatility in 12-month Euribor increases, the difference between the two indicators tends to narrow, whereas in lower-volatility environments the gap widens slightly. A clear example is 2022 – a year marked by Russia's invasion of Ukraine and the rapid tightening of monetary policy – when the volatility gap between the two indices was the smallest observed over the period analysed (2020–2025).

By contrast, 12-month compounded €STR exhibits a differentiated pattern, with a clear time lag in both levels and volatility relative to forward-looking indices. As a backward-looking rate constructed through the daily compounding of €STR over the preceding 12 months, its evolution incorporates past information only gradually. This methodological feature means that changes in volatility materialise with a delay: whereas 12-month Euribor and mortgage Euribor reached their volatility

peaks in 2022, coinciding with the onset of the rate-hiking cycle, 12-month compounded €STR peaked in 2023, once the index calculation had fully absorbed the sharp movements in €STR recorded during the previous year.

Taken together, the use of a hybrid index such as the mortgage Euribor – based on a monthly average – is fully consistent with financial stability and consumer protection objectives. It preserves the core market signal regarding the direction of interest rates while reducing very short-term noise. Although the volatility differential relative to 12-month Euribor is modest, the very high correlation between the two confirms that the smoothing mechanism does not eliminate relevant information but instead helps to mitigate the impact of episodes of extreme volatility on indebted households.

Comparison of 12-month Euribor, mortgage Euribor and compounded 12-month €STR FIGURE 15



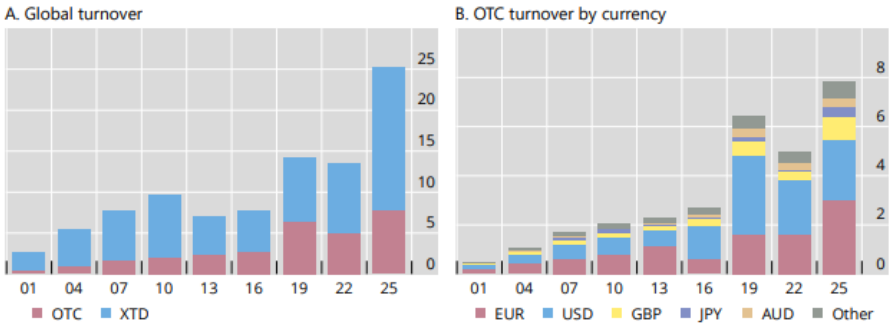
Source: EMMI, ECB and Banco de España.

4.5 Structural changes in derivatives markets following benchmark reform

The transition from traditional interbank offered RATES (IBORs) to risk-free rates (RFRs) has had a particularly profound impact on interest rate derivatives markets. This segment accounted for a very significant share of the global notional amount referenced to LIBOR and other IBORs. Unlike cash markets, it was characterised by a high degree of contractual standardisation, operational centralisation and intensive use of market infrastructures, which facilitated an early, coordinated and, overall, orderly transition.

As noted by Ehlers and Todorov (2025), interest rate derivatives markets – both exchange-traded and OTC – have experienced strong growth in recent years, particularly between 2022 and 2025, when global trading volumes increased by around 87%, reaching approximately US$25 trillion per day. This expansion reflects a combination of cyclical and structural factors: on the cyclical side, the normalisation of monetary policy and the rise in interest rate volatility; on the structural side, the completion of benchmark reform and the widespread adoption of RFRs as the primary anchor for derivatives markets.

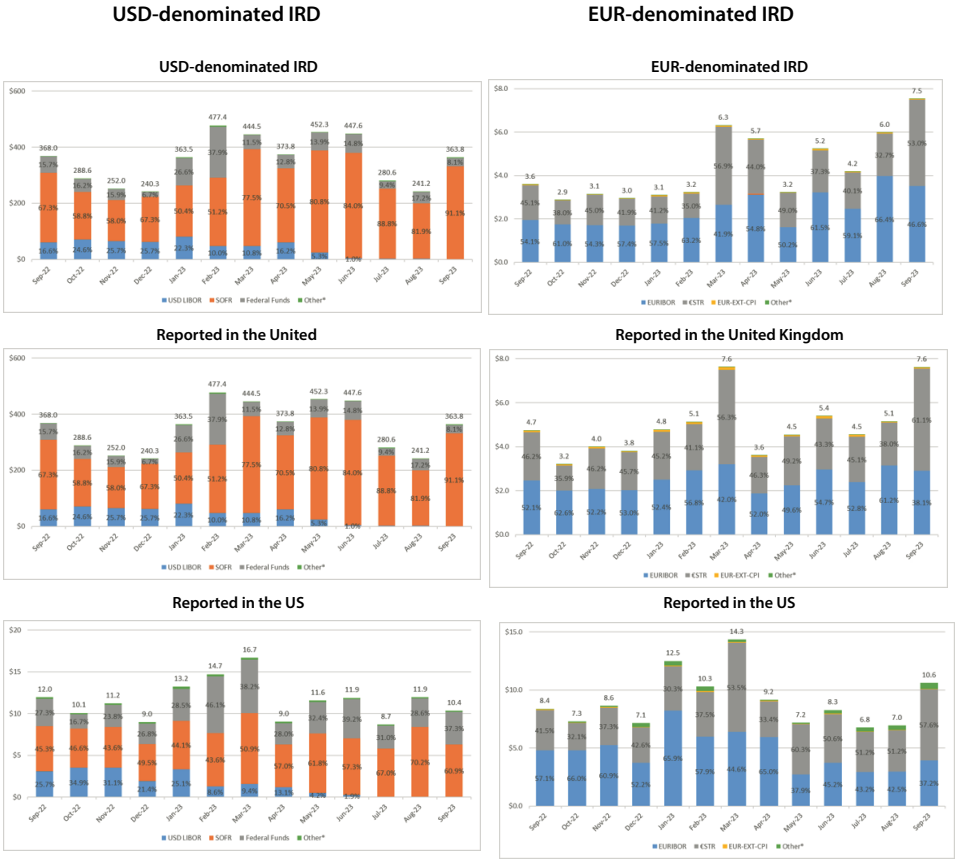
Evolution of total notional volumes traded in exchange-traded and OTC interest rate derivatives FIGURE 16



Source: Ehlers and Todorov (2025). Data in billions of US dollars.

In jurisdictions historically linked to LIBOR, the weight of that index declined progressively until its effective cessation in mid-2023, being replaced primarily by SOFR in US dollars and SONIA in pounds sterling. As a result, the volume of swaps referenced to RFRs surpassed that of derivatives linked to traditional IBORs as early as 2020, consolidating RFRs as the dominant benchmarks in these markets.

Notional volume of euro-denominated IRD traded and reported in the EU, the United Kingdom and the United States between 2022 and 2023 FIGURE 17

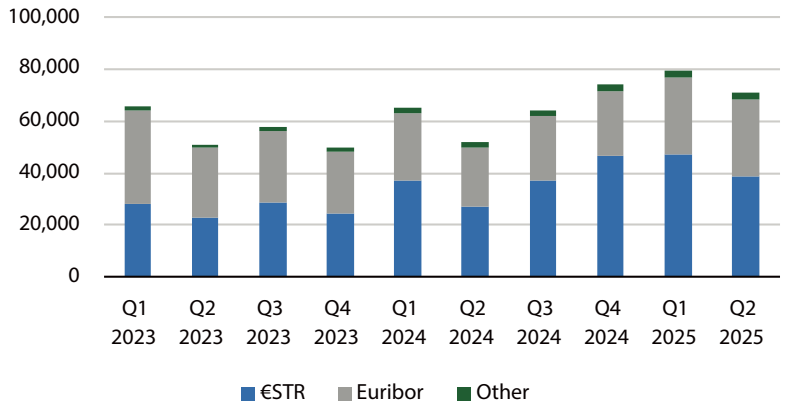


Source: ISDA. Data in billions of US dollars.

By contrast, in euro-denominated transactions the transition followed a different path. Although €STR became firmly established as the reference RFR, Euribor has continued to play a significant role in derivatives markets, particularly in certain segments. This accounts for a more gradual transition and a distinct pattern of instrument usage.

Notional volume of euro-denominated IRD traded and reported in the EU, the United Kingdom and the United States, at aggregate level between 2023 and 2025

FIGURE 18



Source: Authors' own work based on ISDA data. Data in billions of US dollars.

One of the most visible effects of benchmark reform, in jurisdictions that adopted an RFR-only model following the cessation of LIBOR, has been a very significant reduction in both fixing risk[34] and structural basis risk. This shift has led to the near disappearance of forward rate agreements (FRAs) and basis swaps, alongside the clear predominance of OIS as the primary instrument for hedging interest rate risk.

The euro area, where Euribor and RFRs coexist, once again constitutes an exception. In this context, fixing risk does not disappear, although it declines progressively as exposure to Euribor is reduced. This explains the continued presence of euro-denominated FRAs, which still account for a substantial share of the global market (around 80%), reflecting the ongoing use of Euribor as a term rate incorporating a bank credit risk component. Even so, their relative importance has diminished: the share of FRAs in total euro-denominated derivatives volumes declined from approximately 25% in 2022 to 17% in 2025, indicating gradual adaptation to the new environment. Similarly, basis risk persists as a result of the coexistence of benchmarks, although its aggregate relevance has also declined as the transition towards RFRs advances.[35]

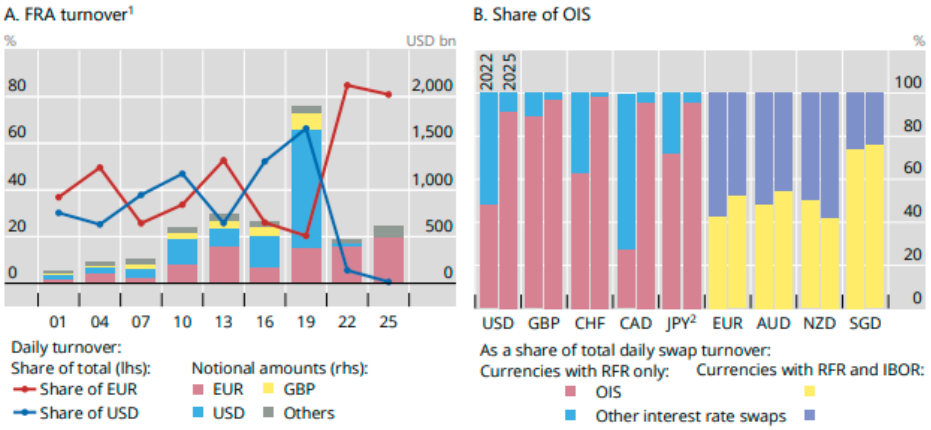
34 Fixing risk: the risk arising from the determination of the benchmark rate on a specific date, whereby differences in fixing dates across related financial instruments may generate mismatches in interest cash flows and result in imperfect hedging, particularly in contracts referenced to term rates such as IBORs. This differs from basis risk, which does not stem from the timing of the fixing but from the use of different reference indices whose spreads may vary over time (see footnote 8).

35 See Huang and Todorov (2022), who illustrate how the transition from LIBOR to so-called "near risk-free" rates (RFRs) has led to structural changes in risk profiles and in the use of instruments in interest rate

As documented by Ehlers and Todorov (2025), beyond the contractual risk adjustments associated with benchmark reform, the transition to RFRs has also had important implications for the structure of derivatives markets. In particular, the predominance of OIS and the expansion of government bond futures markets have supported the growth of basis arbitrage strategies, especially between sovereign bonds and futures, typically undertaken by leveraged investors. Although this phenomenon is not directly linked to benchmark design, it illustrates how reform has shifted part of the risk away from rate fixing towards areas such as liquidity risk, leverage and margin management.

The sharp increase in basis trading has been concentrated primarily in the USD market, where the scale of the sovereign debt market, the depth of futures markets and access to repo funding have enabled a significant expansion of such strategies. In other jurisdictions, including the euro area, similar transactions exist, but on a smaller scale and with lower systemic relevance.[36]

Evolution of interest rate derivatives, with breakdown by OIS and FRA FIGURE 19



FRA = forward rate agreement; IBOR = interbank offered rate; IRDs = interest rate derivatives; OIS = overnight index swaps; RFR = risk-free rate.

[1] Adjusted for local and cross-border inter-dealer double-counting, ie "net-net" basis; daily averages in April. [2] JPY has also an IBOR (Tibor), but it is rarely used (see main text).

Source: Ehlers and Todorov (2025).

The role of central counterparties was decisive in the transition process. The synchronised conversion events ("big bang transitions") executed by the main market infrastructures enabled the simultaneous replacement of IBOR-based

derivatives markets. Based on statistics from the BIS Triennial Survey, the authors document, among other aspects, the effective obsolescence of FRAs as a result of the reduction in fixing risk, the increase in RFR-referenced swaps (OIS), changes in the geographical distribution of trading volumes, and the emergence of new instruments designed to manage emerging basis risks (basis swaps) arising from the coexistence of different types of benchmark rates.

36 This is explained by the smaller scale and greater fragmentation of sovereign debt markets, the lower aggregate depth of futures markets, and differences in access to and functioning of repo markets, which constrain leveraged strategies. In the euro area, this is compounded by the coexistence of Euribor and RFRs (€STR), which fragments hedging strategies and reduces the attractiveness of large-scale basis arbitrage.

curves with OIS discounting curves. This coordinated approach significantly reduced operational and legal risks, avoided market fragmentation and ensured a smooth, large-scale transition consistent with the financial stability objectives pursued by the authorities.

The experience of derivatives markets demonstrates that the transition to RFRs is feasible and efficient where contractual standardisation, robust central infrastructures and sufficient market depth are in place. At the same time, it highlights that not all financial segments share these characteristics – notably cash markets and, in particular, consumer loan contracts. This structural difference helps explain why, in the euro area, it remains necessary to preserve term benchmarks incorporating a credit risk component, such as Euribor, provided that they are supported by sound methodologies and a strengthened governance framework.

As anticipated by Huang and Todorov (2022): "Following regulatory initiatives aimed at promoting the adoption of RFRs, OTC interest rate derivatives markets have become strongly anchored to overnight benchmarks and largely insensitive to bank funding costs. This may result in a shortage of appropriate benchmarks capable of capturing term liquidity premia and credit risk – factors that may be relevant for financial intermediaries active in both funding and lending. Striking an appropriate balance between maintaining robust benchmarks and developing new instruments that 'complete the market' is an essential step towards ensuring the orderly functioning of fixed income markets in the post-LIBOR environment".

5 Advantages, persistent limitations and possible future developments

The analysis presented in the preceding chapters shows that, despite the profound transformations in financial markets and the regulatory push towards risk-free interest rates, Euribor continues to play a significant role in the European financial system. Its survival – in contrast to the discontinuation of other interbank benchmarks such as LIBOR – reflects both economic and institutional factors.

That relevance, however, coexists with structural limitations which, without challenging the index's established soundness and robustness, raise challenges in terms of improving its efficiency and structural adequacy over the medium and long term. This chapter first examines the main advantages of Euribor relative to alternative benchmarks and then considers the persistent limitations that warrant an assessment of potential avenues for future development, which are addressed in the following chapter.

5.1 Advantages of Euribor relative to alternative benchmarks

As discussed in the previous sections, Euribor remains a necessary benchmark in the European context and offers clear advantages over other available references, particularly risk-free rates based on overnight transactions:

i) Euribor is distinguished by the strength of its regulatory, supervisory and governance framework. Unlike other historical benchmarks that were discontinued, Euribor has undergone a deep and continuous process of reform in response to regulatory developments, strengthening its methodology, transparency and internal controls. Its compliance with the BMR, its designation as a critical benchmark and the supervision exercised by ESMA, together with a college of competent authorities, reinforce its institutional credibility. The transition to a hybrid methodology and, subsequently, to a calculation framework based exclusively on actual transactions has significantly reduced reliance on expert judgement and brought the index fully into line with the IOSCO Principles.

ii) Euribor retains a key distinguishing feature relative to risk-free rates: it is forward-looking and incorporates a bank credit risk component. These characteristics are essential for certain economic uses, particularly in retail and corporate lending, where the ex-ante determination of the applicable rate is crucial for contractual certainty and is often required by regulation. Euribor also remains a valuable reference for credit institutions in managing interest rate risk and net interest margin risk, as it helps mitigate mismatches between interest income and funding costs, including basis risk arising from the use of

different benchmark rates. It should be emphasised that, although Euribor incorporates credit risk, it cannot be regarded as a credit-sensitive rate in the strict sense of the term. It is not based on narrow or illiquid underlying markets, nor does it replicate the vulnerabilities observed in CSR initiatives developed in other jurisdictions (see Section 3.2.1).

iii) Euribor enjoys a high degree of market acceptance and consumer recognition, which has reinforced its reputation. Its use is deeply embedded in mortgage lending and other long-term contracts in many Member States, particularly Spain. This entrenched position reduces transition costs, limits the legal risks associated with large-scale amendments to existing contracts and supports financial stability. From this perspective, Euribor functions not only as a financial benchmark but also as a reference infrastructure with a significant social and economic dimension.

5.2 Structural challenges facing Euribor

Alongside these advantages, Euribor exhibits certain structural limitations which, while not calling into question its robustness or integrity, affect its operational efficiency and raise challenges for its future development.

A first challenge relates to the size and composition of the panel of contributing institutions. A relatively small panel increases the index's sensitivity to participant withdrawals and limits the diversity of data sources, potentially affecting representativeness in specific market conditions. This issue is particularly relevant in an environment where activity in the unsecured interbank market has declined structurally since the global financial crisis.

Closely linked to this is Euribor's reliance on an underlying market that does not always generate a sufficient volume of eligible transactions, particularly at certain maturities and during specific phases of the monetary cycle. Although methodological reforms have mitigated this constraint, the structural scarcity of observable transactions remains a potential vulnerability, requiring ongoing adaptation by the administrator.

A further challenge concerns the potential underutilisation of the information contained in the ECB's MMSR. This framework collects detailed data on euro money market transactions reported by a broad set of significant institutions, raising the question of whether Euribor could, in future, draw more directly and systematically on this dataset. Greater integration would make it possible to reduce duplication in reporting and calculation processes, while enhancing the efficiency and coherence of the index determination framework.

At the same time, the operational, technological and compliance costs associated with contributing to Euribor are highly concentrated among panel institutions. These costs include not only ongoing investments in systems, internal control processes and specialised personnel, but also substantial upfront costs linked to adapting to the data contribution process. According to internal estimates, cross-checked with technical teams from contributing institutions, the annual cost of participation for a large institution may amount to around €250,000, even under conservative assumptions. This figure excludes potential future methodological adjustments and

other indirect costs. This concentration of costs reinforces the well-known "free-rider problem", whereby a broad range of institutions and users benefit from the index without bearing the costs associated with its maintenance.[37]

In addition, Euribor is exposed to cyclical pressures stemming from the monetary environment. During periods of stress or abrupt shifts in monetary policy, heightened volatility in the wholesale money market and reduced transaction volumes may constrain its functioning, notwithstanding the safeguards introduced following the reforms. This helps explain why, despite the continued efforts of its administrator, EMMI, gains in efficiency and cost reduction have at times been gradual and of limited magnitude.

Taken together, these limitations do not call into question Euribor's robustness as a regulated, supervised and methodologically sound benchmark. They do, however, affect its economic and operational efficiency and warrant consideration of potential alternatives or avenues for further development aimed at strengthening its long-term sustainability.

Advantages and limitations of Euribor: robustness versus efficiency TABLE 13

Dimension	Advantages of Euribor	Persistent limitations
Regulatory and supervisory framework	Critical benchmark under the BMR, collegiate supervision and high transparency	High regulatory and compliance burden
Methodology	Evolution towards real transaction data and a clear hierarchy	Dependence on a limited number of entities and constrained data from the underlying market
Economic function	Forward-looking rate with a credit risk component, useful for lending and risk management	Cyclical sensitivity and reduced flexibility in certain environments
Market manipulation	Broad use and acceptance among consumers and institutions	Concentrated maintenance costs
Operational efficiency	High credibility and stability	Free-rider issues and limited use of MMSR data

Source: Authors' own work.

37 In order to mitigate the free-rider problem, the possibility of the index administrator imposing significant usage fees has been considered.– in the form of licences – on entities that, while subject to MMSR reporting obligations, do not participate as panel contributors. This option is not without controversy in light of Article 22 of the BMR, which requires that licences and information relating to a critical benchmark be provided on fair, reasonable, transparent and non-discriminatory (FRAND) terms. That said, arguments could be advanced in support of its compatibility with that provision. In particular, a model under which larger entities or those making more extensive use of the index would bear a proportionally higher cost could be regarded as consistent with the principles of fairness and reasonableness, without necessarily constituting discriminatory treatment. Similarly, the exemption from, or reduction of, such fees for entities that actively contribute to the production and maintenance of the index could be viewed as compensation for a service effectively rendered to the administrator, provided that participation under such terms remains open on equal conditions to any entity willing to assume that role. From this perspective, such an approach might even be considered more equitable than the current arrangement.
Nonetheless, this avenue raises potential legal and competition concerns. It has not to date been pursued by the Euribor administrator, and its viability would require careful assessment under competition law and the applicable regulatory framework.

6 Outlook and possible avenues for the evolution of Euribor

The analysis in the previous sections shows that the future of Euribor should not be approached as a question of abrupt replacement. Rather, the focus should be on gradual evolution aimed at strengthening its efficiency, continuity and credibility, while preserving the features that underpin its economic value and its deep integration within the European financial system.

6.1 Euribor calculation model based on eligible MMSR transactions

One plausible avenue for development is a more direct and systematic use of MMSR data as the basis for calculating the index. The MMSR is the most comprehensive database available on euro money market transactions, as it captures transactions reported by a broad group of credit institutions within a harmonised statistical framework. Making greater use of this dataset would reduce reliance on individual contribution processes and help address some of the constraints linked to panel size and the limited volume of eligible transactions in certain market segments.

In this context, consideration has been given to moving towards a more centralised calculation of Euribor, based on identifying and aggregating eligible transactions from consolidated MMSR data. Such an approach could deliver significant efficiency gains by reducing operational duplication and compliance burdens for contributing institutions. It would also strengthen the representativeness of the index by drawing on a broader and more diversified data pool.

However, any future evolution of Euribor – including a possible migration of its core calculation to MMSR-derived data – must preserve the existing Level 2 mechanisms in the methodology, which perform a crucial stabilising function. These components ensure the continuity of the index in times of market stress or liquidity tightening, preventing its value from being determined solely by a small number of transactions carried out during periods of stress. Preserving these Level 2 mechanisms is essential to ensure that Euribor remains publishable and representative even during periods of crisis, and that it retains its usefulness as a stable and predictable benchmark in long-term contracts, particularly in retail lending.

From an institutional perspective, such an evolution raises important governance and allocation-of-responsibility challenges. The ECB owns and operates the MMSR, but it cannot assume responsibility for calculating a forward-looking term benchmark such as Euribor, given the potential conflicts of interest with the conduct of monetary policy. Accordingly, any model based on MMSR data must

continue to rely on an independent third party – such as EMMI – to act as the benchmark administrator under the Benchmark Regulation.

This, in turn, requires identifying legal and operational arrangements that would allow such a third party to access the relevant data appropriately, while fully respecting confidentiality and data protection requirements. Possible options include targeted legislative amendments, institutional agreements between authorities, explicit authorisations from participating entities, or the provision of sufficiently anonymised and aggregated data. Each of these avenues would require careful legal and technical feasibility analysis, together with close coordination among the competent authorities.

Legal and institutional feasibility of a calculation model for Euribor based on MMSR data EXHIBIT 5

The possibility of calculating Euribor on the basis of a more direct use of eligible transaction data drawn from the Money Market Statistical Reporting (MMSR) framework raises not only technical and operational considerations, but also important legal and institutional questions. In particular, the analysis must assess the compatibility of such an approach with the existing regulatory framework governing benchmarks, data protection, statistical confidentiality and the allocation of competences among authorities.

From the perspective of the Benchmark Regulation (BMR), there is no conceptual obstacle to a critical benchmark being based on consolidated transaction data, provided that the principles of representativeness, transparency, data traceability and sound governance of the calculation process are respected. The BMR does not prescribe a specific data sourcing model. Rather, it prioritises the use of actual transactions where these are available and appropriate to reflect faithfully the underlying market or economic reality.

The principal legal challenges therefore stem less from the BMR framework itself and more from the conditions governing access to and use of MMSR data. The collection and management of these data fall within the remit of the European Central Bank (ECB), in the exercise of its statistical and monetary policy functions. In its capacity as the authority responsible for the MMSR, the ECB is subject to strict confidentiality and statistical secrecy obligations, which restrict the direct reuse of those data by third parties. Moreover, direct involvement of the central bank in the calculation of a forward-looking term benchmark such as Euribor could raise concerns regarding the principle of separation between monetary policy and other functions, given the potential for actual or perceived conflicts of interest.

In this context, it is important to clarify that, although the ECB previously acted as calculation agent for EONIA and currently serves as the administrator responsible for calculating and publishing the €STR, both indices differ materially from Euribor in their design and function. In particular, they are overnight indices based on actual transactions, whose values reflect prevailing very short-term funding conditions and do not directly incorporate expectations regarding the future path of interest rates.

This distinction is institutionally significant. Unlike overnight benchmarks, forward-looking term indices such as Euribor necessarily embed market expectations about future funding conditions. That feature strengthens the case for maintaining a clear institutional separation between the conduct of monetary policy and the administration of forward-looking market benchmarks.[1]

Legal analysis nevertheless indicates that there may be viable avenues for structuring indirect or mediated access to relevant MMSR data in a manner consistent with confidentiality requirements and the preservation of the central bank's institutional independence. Possible approaches include: i) adapting the applicable regulatory framework; ii) entering into specific institutional agreements; iii) obtaining explicit authorisations from reporting entities; or iv) providing sufficiently anonymised and aggregated datasets that enable eligible transactions to be identified without disclosing sensitive institution-level information.

In such a model, the role of an independent administrator – such as EMMI – would remain essential in assuming responsibility for calculating and publishing the index in accordance with the BMR. Likewise, oversight of the model should continue to rest with the competent authorities, coordinated by ESMA, in order to ensure consistent standards and effective management of legal and operational risks.

Against this background, the following section outlines two more concrete alternatives that could serve as a starting point for more detailed analysis.

1 Transfer of information derived from the MMSR

Neither Regulation (EC) No. 2533/98 concerning the collection of statistical information by the ECB nor Regulation (EU) No. 1333/2014 establishing the MMSR contains an express prohibition preventing the ECB from transferring statistical information of a derived nature. An initial reading of both Regulations supports the view that the transfer of MMSR-derived data could be legally feasible, provided that certain conditions are satisfied: i) the use of the information is linked to the performance of the tasks of the European System of Central Banks (ESCB); ii) it does not permit the direct or indirect identification of reporting entities; and iii) it is subject to strict safeguards concerning confidentiality and purpose limitation. On that basis, the transfer of information derived from the MMSR would appear legally possible, provided it is structured within an appropriate formal framework – a condition which, prima facie, could be regarded as fulfilled in the scenario under consideration.

– In particular, Article 5 of the Statute of the European System of Central Banks and of the European Central Bank empowers the ECB not only to collect statistical information, but also to compile, process and disseminate it, insofar as such activities are necessary for the performance of its tasks and fall within its field of competence.

– Article 127 of the Treaty on the Functioning of the European Union (TFEU) assigns to the ESCB both the definition and implementation of the Union's monetary policy (Article 127.2 FEU) and the task of contributing to the stability of the financial system (Article 127.5 TFEU).

Viewed in that light, the transfer of MMSR-derived information to the Euribor administrator could be regarded as compatible with both functions. Euribor constitutes a relevant channel for the transmission of the ECB's monetary policy and, as a critical benchmark, is closely linked to the stability of the European financial system.

As noted above, one of Euribor's principal challenges lies in the potential scarcity of transactions reported by contributing banks. A calculation model supported by a broader base of transactions – including, indirectly or through mediated access, those captured in the MMSR – would strengthen the index's grounding in actual market activity, enhance its representativeness and help contain volatility. This, in turn, would reinforce its effectiveness as a monetary policy transmission mechanism.

Moreover, broadening the underlying data base would reduce the index's reliance on a limited number of contributing institutions, thereby enhancing its structural resilience. In this sense, a methodological strengthening of Euribor may be characterised as a measure that is instrumental and functionally connected to the ECB's mandate, insofar as it supports both the effective conduct of monetary policy and the stability of the European financial system.[2]

To formalise this possibility – and given that the transfer of MMSR information would constitute a qualified exception to the principle of statistical confidentiality, justified by the existence of an overriding public interest – it may be appropriate for the ECB Governing Council to adopt a formal decision. Such a decision should expressly identify the legal basis for the transfer and clearly define its public interest purpose. That purpose could, where appropriate, extend to other interest rate benchmarks classified as critical and making a significant contribution to the transmission of the ECB's monetary policy.

The formal decision could be complemented by the conclusion of memoranda of understanding with the administrators of the benchmarks concerned – EMMI, in the case of Euribor – in order to specify the categories of information eligible for transfer, establish strict safeguards governing confidentiality and data use, and expressly exclude any responsibility of the ECB for the calculation, administration or publication of the benchmark.

Finally, this option could be triggered or reinforced through a formal request addressed to the ECB by entities subject to the MMSR reporting framework. On that basis, such entities could request that the ECB provide EMMI with the information necessary for the calculation of Euribor and grant explicit authorisation for the transfer of data relating to their transactions, always in a duly anonymised format.

2 The ECB as calculation agent for Euribor

Under this option, the ECB would act solely as the technical calculation agent[3] for Euribor, applying a methodology defined and overseen by the benchmark administrator, without assuming responsibilities relating to administration, governance, validation, publication or ultimate accountability for the index.

The legal basis for this alternative would, in essence, mirror that of the previous option. It would rest primarily on Article 127 TFEU and Article 5 of the Statute of the European System of Central Banks, supported by a formal decision of the ECB Governing Council and the signing of a memorandum of understanding with the benchmark administrator – in this case, EMMI. Under this model, the underlying data would not need to leave the ECB's institutional environment, as no transfer of information would occur in the strict sense. The ECB itself would perform the calculation in accordance with the methodology defined by EMMI from time to time. That said, the requests and authorisations from contributing institutions referred to in the previous section could be maintained – suitably adapted – in order to strengthen the legal and operational coherence of the arrangement.

The viability of this model is further supported by the historical precedent of EONIA, for which the ECB formally acted as calculation agent, while administration of and responsibility for the index remained in private hands. That function was carried out in a pre-BMR context, in which no formal legal designation as a "critical benchmark" existed. The current regulatory framework does not introduce additional constraints of relevance in this respect. On the contrary, it reinforces the public interest associated with financial stability and provides a clearer and more structured legal environment for the performance of such technical functions.

Elements common to both alternatives

Under either of the two options analysed:

– EMMI would continue to apply Level 2 of the Euribor methodology where necessary. The index would therefore retain contingency procedures for situations in which, even with MMSR-derived data, calculation under Level 1 of the methodology would not be possible.

– The role of contributors would diminish in importance, at least as currently defined under the BMR. Banks would continue to report information on their transactions, and those data would continue to be used in the calculation of Euribor. However, the framework would more closely resemble that applicable to the €STR, under which entities subject to MMSR reporting obligations are not formally classified as contributors for the purposes of the BMR. Such an evolution would generate clear benefits for institutions, particularly through the reduction of operational burdens and costs associated with contribution. It would eliminate the current duplication

of reporting and address, at its root, the free-rider problem identified above. This approach would also be fully aligned with the European Union's broader objectives of regulatory simplification and enhanced competitiveness.

– Without prejudice to the foregoing, a scenario of this kind could require certain regulatory adjustments, albeit of limited scope, particularly to the BMR and the MMSR framework. At a preliminary level, consideration could be given to introducing a new category of data contributor reflecting the specific position of entities that report information pursuant to sectoral legislation – such as the MMSR – and whose data are subsequently used in the calculation of a critical benchmark. This solution would also enable ESMA and the competent national authorities to retain supervisory oversight of the benchmark and of this new category of data contributor, thereby ensuring continuity of a supervisory model that has proven both robust and proportionate.

Alternatively, entities providing data under the MMSR framework could be excluded from the scope of the BMR – that is, they would not be classified as contributors for the purposes of that Regulation – with their supervisory regime governed exclusively by the MMSR framework, in a manner analogous to the structure currently applicable to the €STR.

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1 The ECB's institutional framework expressly provides for the separation of its monetary policy functions from its other functions, in particular banking supervision, so that neither interferes with or constrains the other. The objective is to prevent conflicts of interest and preserve distinct functional mandates. This principle has been formalised, inter alia, in the European Central Bank Decision, of 17 September 2014, on the implementation of the separation between monetary policy and supervisory functions (ECB, 2014).
Academic literature on central bank governance has also emphasised the importance of institutionalising this separation in order to prevent the exercise of heterogeneous functions from undermining the credibility and effectiveness of monetary policy (see, for example, Bordes and Clerc, 2010).

2 This interpretation is consistent with the case law of the Court of Justice of the European Union (*Gauweiler*, C-62/14 (CJEU, 2015), and Weiss, C-493/17 (CJEU, 2018)), which recognises that competences not expressly enumerated may be exercised where they are functionally necessary, proportionate and directed towards the objectives of the ESCB.

3 This role is currently performed by Global Rate Set Systems Ltd., pursuant to the outsourcing arrangements permitted under Article 10 of the BMR. Global Rate Set Systems Ltd. performs these functions in accordance with the Euribor Code of Obligations of Calculation Agent published by EMMI (EMMI, 2025).

Source: Authors' own work.

6.2 Euribor control model: public supervision versus private audit

Another possible avenue for development concerns the framework for oversight and verification of the index. This option may be conceived as an autonomous alternative to those discussed in the previous section, as it focuses not on the calculation model of Euribor but on its supervisory and control regime. In this context, consideration could be given to replacing the current annual external audit requirement with a strengthened model of direct supervision by the NCAs, coordinated by ESMA.

Such an approach could significantly reduce costs, enhance the consistency of controls and make better use of the specialised expertise of supervisory authorities regarding both the functioning of the index and the underlying market. It would also address certain shortcomings observed in external audits, particularly in terms of consistency and sector-specific expertise. High annual contribution costs may act as a barrier to entry for new contributors. Measures aimed at reducing those costs – provided that the robustness and integrity of the index are fully preserved – therefore warrant careful consideration.

Although the option outlined above may be preferable, it is not mutually exclusive with the alternative based on greater use of MMSR data. Should that alternative be implemented, the current external audit mechanisms and other control requirements applicable to contributors could be adapted to align with the model described in Exhibit 5, while maintaining an appropriate level of oversight and safeguarding the integrity, reliability and proper functioning of the index.

Taken together, these possible avenues of development are consistent with the European agenda on regulatory simplification and the reduction of unnecessary burdens, without compromising the objectives of integrity and financial stability. Rather than calling Euribor's continuity into question, they point towards a model in which the index is supported by broader and more efficient data infrastructures, distributes maintenance costs more evenly and strengthens its long-term sustainability as a key benchmark within the European financial system.

7 Conclusions

The reform of benchmark rates was one of the most significant regulatory and market challenges addressed in the aftermath of the global financial crisis. The loss of confidence in certain key benchmarks revealed the need for a fundamental reassessment of their design, governance and supervision, given their central role in price formation, risk management and financial stability. The reform process undertaken over the past decade may be regarded as a clear success. It was the product of sustained cooperation between public authorities, supervisors, central banks, benchmark administrators and market participants. This public-private effort has preserved critical benchmarks where they remained economically necessary, while materially strengthening standards of integrity, transparency and resilience. In doing so, it has laid the foundations for a more robust and durable benchmark framework.

The central aim of this work has been to assess whether Europe's decision to preserve Euribor – in contrast to the discontinuation of LIBOR in other jurisdictions – was justified, and whether, beyond its formal continuity, Euribor remains necessary and sustainable as a forward-looking benchmark within the European financial system. The historical, regulatory, methodological and market analysis set out in the preceding chapters supports a number of key conclusions.

First, the evidence supports the view that the distinct approach adopted in Europe, as compared with the UK and US jurisdictions, was justified in light of the structural characteristics of the European financial system. Unlike certain other markets, the euro area displays a high degree of reliance on term interest rates in retail and corporate credit contracts, particularly in the mortgage segment, where ex ante certainty regarding the applicable rate is often required under the governing regulatory framework. In this context, an abrupt discontinuation of Euribor would have entailed significant contractual disruption, with material legal, economic and social implications. The European approach was therefore not the result of regulatory inertia, but a deliberate policy choice grounded in considerations of financial stability and proportionality.

Second, the analysis confirms that Euribor continues to perform economic functions that cannot be fully replicated by risk-free rates, even following the consolidation of the €STR and compounded rates derived from it. Its forward-looking nature and the inclusion of a bank credit risk component remain relevant for certain applications, both in credit pricing and in the management of interest rate risk by credit institutions. At the same time, the reformed Euribor does not exhibit the vulnerabilities associated with so-called credit-sensitive rates developed in other jurisdictions. It is anchored in a broader underlying market and operates within a significantly more demanding regulatory and supervisory framework.

Third, the analysis shows that the preservation of Euribor has been made possible by a rigorous programme of methodological, regulatory and governance reforms that have fundamentally reshaped its original design. The shift from a model based largely on estimates to a methodology grounded in actual transactions, the introduction of a clear data hierarchy, the strengthening of internal and external controls, and its incorporation within the framework of the European Benchmark Regulation have restored confidence in the index and safeguarded its integrity as a critical benchmark. In qualitative terms, the Euribor of today is markedly more robust than its pre-crisis predecessor.

Nevertheless, the analysis also indicates that structural challenges remain. These relate primarily to the index's efficiency and operational sustainability rather than to its robustness. They include reliance on an unsecured money market that does not consistently generate sufficient transaction volumes, the limited size of the panel of contributing institutions, the concentration of operational and compliance costs among panel members, and the persistence of the free-rider problem. These limitations do not undermine the representativeness or credibility of Euribor. They do, however, point to the need for continued refinement aimed at reducing burdens, improving efficiency and strengthening its long-term sustainability.

In that context, one of the principal forward-looking contributions of this work is the identification of potential avenues for development based on more effective use of existing data infrastructures, in particular the MMSR. The analysis indicates that there is scope to move towards more centralised and representative calculation models, provided that the stabilising mechanisms embedded in the current methodology are preserved and the necessary institutional separation between monetary policy and benchmark administration is maintained. These proposals are also consistent with the European agenda on regulatory simplification and burden reduction, promoted by the European Commission. By enabling more efficient use of data already reported for statistical purposes, they would avoid parallel reporting and contribution obligations for institutions and enhance the proportionality of the framework governing benchmarks.

Taken together, the findings of this work support the initial hypothesis: Euribor remains necessary within the European financial system, but its future continuity cannot be assumed as automatic. It will depend on the ability of the institutional and regulatory framework to continue adapting it to an environment characterised by structurally smaller money markets, heightened regulatory requirements and increasing pressure for efficiency and simplification. The European model of coexistence between a reformed Euribor and a set of €STR-based references emerges, in light of the analysis, as a balanced solution combining stability, economic relevance and regulatory robustness.

More broadly, the case of Euribor illustrates how benchmark rates have evolved beyond purely technical instruments to become critical financial infrastructures. Their governance, methodology and supervision now carry direct implications for financial stability, consumer and investor protection, and the effectiveness of monetary policy. The debate on Euribor's future therefore extends beyond the index itself. It forms part of a wider reflection on how to design benchmarks

that are viable, efficient and credible within a transforming financial system – benchmarks capable of preserving both continuity and systemic relevance in an environment characterised by evolving money markets and regulatory demands.

References

Abrantes-Metz, R. M., Kraten, M., and Metz, A. D. (2008). *LIBOR manipulation?* SSRN, Working paper, August. http://dx.doi.org/10.2139/ssrn.1201389

Asociación Hipotecaria Española (AHE) (2016). *Informe económico*. 9 June. https://www.ahe.es/informes/ahe/archivos/informe-economico-asamblea-general-2016.pdf

Asociación Hipotecaria Española (AHE) (2022). *Un análisis dinámico de la cartera hipotecaria española: Primer semestre de 2022*. https://www.ahe.es/informes/ahe/archivos/analisis-cartera-hipotecaria-2T2022.pdf

Asociación Hipotecaria Española (AHE) (2025). *Cartera hipotecaria a junio de 2025: Nota de evolución (segundo trimestre)*. https://www.ahe.es/estadisticas/actividad-hipotecaria/archivos/actividad-crediticia-2S2025.pdf

Bailey, A. (2017) "The future of LIBOR" [Speech] Financial Conduct Authority. 27 July. https://www.fca.org.uk/news/speeches/the-future-of-libor

European Central Bank (ECB) (n.d.-a) "Introduction to the ECB's monetary policy" https://www.ecb.europa.eu/mopo/intro/html/index.en.html

European Central Bank (ECB) (n.d.-b). "Our response to coronavirus (COVID-19)". https://www.ecb.europa.eu/home/search/coronavirus/html/index.en.html

European Central Bank (ECB) (2014) *European Central Bank Decision (2014/723/EU) of 17 September 2014 on the implementation of the separation between monetary policy and supervisory functions* (Decision 2014/723/EU). *Official Journal of the European Union* https://eur-lex.europa.eu/eli/dec/2014/723/oj/eng

European Central Bank (ECB) (2024a). "Changes in the operational framework for the application of monetary policy". March 13. https://www.ecb.europa.eu/press/pr/date/2024/html/ecb.pr240313-807e240020.en.html

European Central Bank (ECB) (2024b). "What are TLTROs?" 13 September. https://www.ecb.europa.eu/ecb-and-you/explainers/tell-me/html/tltro.en.html

Banco de España (2024). "¿Cuál es el tipo de interés del BCE relevante para mi crédito o hipoteca?". *Blog del Banco de España.* February 29. https://www.bde.es/wbe/es/noticias-eventos/blog/cual-es-el-tipo-de-interes-del-bce-relevante-para-mi-credito-o-hipoteca.html

Banco de España (n.d.). "¿Cuáles son los instrumentos de política monetaria del BCE?". https://www.bde.es/wbe/es/areas-actuacion/politica-monetaria/politica-monetaria-area-euro/cuales-son-los-instrumentos-de-politica-monetaria-del-bce/

Bordes, C., and Clerc, L. (2010). *The ECB art of central banking and the separation principle.* Banque de France, Working Paper No. 290. https://publications.banque-france.fr/sites/default/files/medias/documents/working-paper_290_2010.pdf

CME Group (n.d.). "CME Term €STR rate". Retrieved 22 December 2025, from https://www.cmegroup.com/market-data/cme-group-benchmark-administration/term-estr-rate.html

Comisión Nacional del Mercado de Valores (CNMV) (2023). "*Information about the status of the LIBOR index*". 17 July. https://www.cnmv.es/Portal/verDoc.axd?t={aef56b9c-05f0-40af-93bf-3dd17221f7d2}

Comisión Nacional del Mercado de Valores (CNMV) (2024). "*Information about the status of the LIBOR index*". 10 October. https://www.cnmv.es/webservices/verdocumen-to/ver?t= %7b64a05ff6-174b-4c51-b59c-1bb083boca60 %7d

Comisión Nacional del Mercado de Valores (CNMV) (2025). *Información sobre la reforma del Reglamento Europeo de Índices de Referencia (BMR)*. https://www.cnmv.es/docportal/benchmark/ReformaBMR.pdf

Commodity Futures Trading Commission (2012a). "CFTC orders Barclays to pay $200 million penalty for attempted manipulation of LIBOR and EURIBOR benchmark interest rates". 27 June. Press release No. 6289–12. https://www.cftc.gov/PressRoom/PressReleases/6289-12

Commodity Futures Trading Commission (2012b). "CFTC orders UBS to pay $700 million penalty to settle charges of manipulation, attempted manipulation and false reporting of LIBOR and other benchmark interest rates". 19 December. Press release No. 6472–12. https://www.cftc.gov/PressRoom/PressReleases/6472-12

Commodity Futures Trading Commission (2013a). "CFTC orders The Royal Bank of Scotland plc and RBS Securities Japan Limited to pay $325 million penalty to settle charges of manipulation, attempted manipulation, and false reporting of Yen and Swiss Franc LIBOR". 6 February. Press release No. 6510–13. https://www.cftc.gov/PressRoom/PressReleases/6510-13

Commodity Futures Trading Commission (2013b). "CFTC Order Finds that for Nearly Six Years, Rabobank Engaged in Acts of Manipulation, Attempted Manipulation and False Reporting of U.S. Dollar, Yen and Sterling LIBOR and Euribor." 29 October. Press release No. 6752–13. https://www.cftc.gov/PressRoom/PressReleases/6752-13

Commodity Futures Trading Commission (2015). "CFTC orders Deutsche Bank AG to pay $800 million penalty to settle charges of manipulation, attempted manipulation, and false reporting of LIBOR and Euribor". 23 April. Press release No. 7159–15. https://www.cftc.gov/PressRoom/PressReleases/7159-15

Court of Justice of the European Union (Grand Chamber) (CJEU) (2015). *Peter Gauweiler and others v Deutscher Bundestag* (Case C-62/14, EU:C:2015:400). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62014CJ0062

Court of Justice of the European Union (Grand Chamber) (CJEU) (2018). *Heinrich Weiss and others v Bundesrepublik Deutschland* (Case C-493/17, EU:C:2018:1000). https://curia.europa.eu/juris/document/document.jsf?docid=208741&doclang=ES

Ehlers, T., and Todorov, K. (2025). "Goodbye Libor, hello basis traders: unpacking the surge in global interest rate derivatives turnover". *BIS Quarterly Review* December 8. https://www.bis.org/publ/qtrpdf/r_qt2512c.htm

European Central Bank, European Securities and Markets Authority, Belgian Financial Services and Markets Authority, and European Commission (2018). Terms of reference for the Working Group on Euro Risk-Free Rates. 26 February. https://www.ecb.europa.eu/paym/interest_rate_benchmarks/WG_euro_risk-free_rates/shared/pdf/2017_11_29_terms_of_reference.pdf

European Central Bank (2009). *Financial Integration in Europe*. https://www.bde.es/f/webbde/GAP/Secciones/SalaPrensa/ComunicadosBCE/NotasInformativasBCE/09/Arc/Fic/financialintegrationineurope20094.pdf

European Central Bank (ECB) (2013). "Reference interest rates: Role, challenges and outlook". *ECB Monthly Bulletin*, October, pp. 69–84. https://www.ecb.europa.eu/pub/pdf/other/art2_mb201310en_pp69-84en.pdf

European Central Bank (ECB) (2017). "ECB to publish new unsecured overnight interest rate" 21 September. Press release. https://www.ecb.europa.eu/press/pr/date/2017/html/ecb.pr170921.en.html

European Central Bank (ECB) (2018). "Private sector working group on euro risk-free rates recommends €STR as euro risk-free rate". 13 September. Press release. https://www.ecb.europa.eu/press/pr/date/2018/html/ecb.pr180913.es.html

European Central Bank (ECB) (2021). "Private sector working group on euro risk-free rates publishes recommendations on EURIBOR fallbacks" 11 May. Press release. https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210511%7E7cce4a1370.en.html

European Central Bank (2025). *Euro money market study 2024: Money market study 2024 trends as observed through MMSR data (first quarter of 2023 to fourth quarter of 2024)*. https://www.ecb.europa.eu/press/euromoneymarket/pdf/ecb.euromoneymarket202504.en.pdf

European Central Bank (ECB) (n.d.-a). "Milestones of the Risk-Free Interest Rate Working Group." Accessed 26 December 2025. https://www.ecb. europa.eu/stats/euro-short-term-rates/interest_rate_benchmarks/WG_euro_risk-free_rates/html/milestones.es.html

European Central Bank (n. d.-b). "ECB Data Portal". Accessed 26 December 2025. https://data.ecb.europa.eu/

European Money Markets Institute (2025b). *Euribor Code of Obligations of Calculation Agent* (EMMI Reference D0015D-2019, version approved 2 December 2025). d0015d-2019-euribor-code-of-obligation-of-calculation-agent.pdf

European Money Markets Institute (EMMI) (2021). "Planned cessation of EONIA® on 3 January 2022". 12 February. Public Statement. https://prep.emmi-benchmarks.eu/globalassets/documents/pdf/eonia/public-statement-eonia-demise_final.pdf

European Money Markets Institute (2024a). *Euribor benchmark statement* (D0246E-2019, updated 25 April 2024). https://www.emmi-benchmarks. https://www.emmi-benchmarks.eu/globalassets/documents/pdf/euribor/d0246e-2019---euribor-benchmark-state- ment.pdf

European Money Markets Institute (EMMI) (2024b). Blueprint for the hybrid methodology for the determination of Euribor (D0191-2024). June 20. https://www.emmi-benchmarks.eu/globalassets/documents/pdf/euribor/d0191-2024---blueprint-for-the-euribor-hybrid-methodology.pdf

European Money Markets Institute (EMMI) (2024c). Benchmark determination methodology for Euribor (EMMI Reference D0016F-2019). https://www.emmi-benchmarks.eu/globalassets/documents/pdf/euribor/d0016f-2019-benchmark-determination-methodology-for-euribor.pdf

European Money Markets Institute (EMMI) (2025a). *Newsletter,* No. 14, December. https://www.emmi-benchmarks.eu/globalassets/documents/pdf/communication/publications/december-2025-newsletter.pdf

European Money Markets Institute (EMMI) (2025c). *Euribor® transparency indicators* (D0312-2025). October. https://www.emmi-benchmarks.eu/globalassets/docu-ments/pdf/euribor/transperancyindicator/d0312-2025---euribor-transparency-indicators---october-2025.pdf

European Money Markets Institute (EMMI). (n.d.-a). "About Euribor®". Retrieved 22 December 2025, from https://www.emmi-benchmarks.eu/benchmarks/euribor/

European Money Markets Institute (EMMI) (n.d.-b). "EFTERM". Retrieved 22 December 2025, from https://www.emmi-benchmarks.eu/benchmarks/efterm/

European Money Markets Institute (EMMI) (n.d.-c). "Governance". Retrieved 22 December 2025, from https://www.emmi-benchmarks.eu/the-institute/governance/

European Money Markets Institute (EMMI) (n.d.-d). "Oversight Committee". Retrieved 22 December 2025, from https://www.emmi-benchmarks.eu/benchmarks/euribor/governance/oversight-committee-members/

European Money Markets Institute (EMMI) (n.d.-e). "Governance of EURIBOR®". Retrieved 22 December 2025, from https://www.emmi-benchmarks.eu/benchmarks/euribor/governance/

European Money Markets Institute (EMMI) (n.d.-f). "Panel Banks de EURIBOR®". Retrieved 22 December 2025, from https://www.emmi-benchmarks.eu/benchmarks/euribor/panel-banks/

European Money Markets Institute (EMMI) (n.d.-g). "Euribor® Reform". Retrieved 22 December 2025, from https://www.emmi-benchmarks.eu/benchmarks/euribor/reforms/

Financial Stability Board (FSB) (2014). Reforming Major Interest Rate Benchmarks. 22 July. https://www.fsb.org/wp-content/uploads/r_140722.pdf

Financial Stability Board (FSB) (2021). *Interest rate benchmark reform: Overnight risk-free rates and term rates*. 2 June. https://www.fsb.org/uploads/P020621-2.pdf

Financial Stability Board (FSB) (2013). *Progress report on the oversight and governance framework for financial benchmark reform: Report to G20 Finance Ministers and Central Bank Governors*. 29 August. https://www.fsb.org/wp-content/uploads/r_130829f.pdf

Financial Stability Board (FSB). (2025). *2025 list of global systemically important banks (G-SIBs)*. Financial Stability Board. 27 November. https://www.fsb.org/uploads/P271125.pdf

FTSE Russell (n. d.). "FTSE Term €STR". London Stock Exchange Group. Retrieved 22 December 2025, from https://www.lseg.com/en/ftse-russell/bench-marks/termestr

G20. (2013). *G20 Leaders' Declaration: Saint Petersburg Summit, 5–6 September 2013*. https://www.g20.utoronto.ca/2013/Saint_Petersburg_Declaration_ENG.pdf

Gómez-Yubero, M. J. (2016). "La regulación de los índices de referencia y la reforma del Euribor". *Revista de Estabilidad Financiera,* No. 31, pp. 11–26. https://www.bde.es/f/webbde/GAP/Secciones/Publicaciones/InformesBoletinesRevistas/RevistaEstabilidadFinanciera/16/NOVIEMBRE 2016/restfin2016311.pdf

Gómez-Yubero, M.J. (2021). "Adiós al LIBOR". *Revista del Instituto Iberoamericano de Mercados de Valores,* No. 64/2021. https://www.cnmv.es/docportal/Benchmark/ADIOS_AL_LIBOR.pdf

Gómez-Yubero, M.J. and Palomero, M. (2021). "Status of interest rate benchmark reform". CNMV Bulletin. Quarter I, pp. 103 et seq. https://www.cnmv.es/DocPortal/Publicaciones/Boletin/Boletin_I_Tri_2021_ENen.pdf

Gyntelberg, J., and Wooldridge, P. (2008). "Interbank rate fixings during the recent turmoil". BIS Quarterly Review. March, pp. 59–72. https://www.bis.org/publ/qtrpdf/r_qt0803g.pdf

Ehlers, T., and Todorov, K. (2022). "The post-Libor world: A global view from the BIS derivatives statistics". BIS Quarterly Review. 5 December. https://www.bis.org/publ/qtrpdf/r_qt2212e.htm Banco de Pagos Internacionales

ICE Benchmark Administration Limited (IBA) (2018). ICE LIBOR evolution report. Intercontinental Exchange. 25 April. https://www.theice.com/publicdocs/ICE_LIBOR_Evolution_Report_25_April_2018.pdf

International Organization of Securities Commissions (IOSCO) (2013). Principles for Financial Benchmarks. July. https://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf

International Organization of Securities Commissions (IOSCO) (2021). "Statement on Credit Sensitive Rates". 8 September. https://www.iosco.org/library/pub-docs/pdf/IOSCOPD683.pdf

International Organization of Securities Commissions (IOSCO) (2023). "Statement on alternatives to USD LIBOR". 3 July. https://www.iosco.org/library/pubdocs/pdf/IOSCOPD738.pdf

International Swaps and Derivatives Association (ISDA) (2020). "IBOR Fallbacks Supplement and Protocol". 23 October. https://www.isda.org/2020/10/23/isda-launches-ibor-fallbacks-supplement-and-protocol/

International Swaps and Derivatives Association (ISDA) (2026a). *ISDA 2018 Benchmarks Supplement Protocol – Adhering parties*. Accessed 19 December 2026, from https://www.isda.org/protocol/isda-2018-benchmarks-supplement-protocol/adhering-parties

International Swaps and Derivatives Association (ISDA) (2026b). *ISDA 2020 Benchmarks Supplement Protocol – Adhering parties*. Accessed 19 January 2026, from https://www.isda.org/protocol/isda-2020-ibor-fallbacks-protocol/adhering-parties

Marcos, F. (2021). *Acciones indemnizatorias por la manipulación de los índices de tipos de interés en hipotecas referenciadas al Euribor*. IE Law School, Working Paper AJ8–269. December. http://dx.doi.org/10.2139/ssrn.3990103

Market Participants Group (MPG) (2014). Market Participants Group on Reforming Interest Rate Benchmarks Final Report. Financial Stability Board. March 2014. https://www.fsb.org/uploads/r_140722b.pdf

McCauley, R. N. (2001). "Benchmark tipping in the money and bond markets". BIS Quarterly Review. March, pp. 39–45. https://www.bis.org/publ/r_qt0103e.pdf

Oxera (2014). *LIBOR manipulation: Implications of damages claims*. Oxera Consulting LLP, February. https://www.oxera.com/wp-content/uploads/2018/07/LIBOR-damages-claims-1.pdf-1.pdf

Priem, R. (2024). *Credit-sensitive rates: Why they should be used with great caution*. 30 September. SSRN: https://doi.org/10.2139/ssrn.4971400

Schrimpf, A., and Sushko, V. (2019). "Beyond LIBOR: A primer on the new reference rates". *BIS Quarterly Review*, March 5, pp. 29–47. https://www.bis.org/publ/qtrpdf/r_qt1903e.htm

Wooldridge, P. D. (2001). "The emergence of new benchmark yield curves". *BIS Quarterly Review,* December, pp. 48–57. https://www.bis.org/publ/r_qt0112f.pdf

Working Group on Euro Risk-Free Rates (2021). *Recommendations on EURIBOR fallback trigger events and €STR-based EURIBOR fallback rates.* European Central Bank. 11 May. ecb.recommendationsEURIBORfallbacktriggereventsandESTR.202105~9e859b5aa7.en.pdf

World Bank (2014). *World Development Indicators: GDP (current US$).* https://data.worldbank.org/indicator/NY.GDP.MKTP.CD

Regulatory references

European Central Bank (ECB) (2014) *Regulation (EU) No 1333/2014 of the European Central Bank of 26 November 2014 on money market statistics (ECB/2014/48). Official Journal of the European Union,* L 359, 16.12.2014, pp. 97–127. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R1333

Council of the European Union (1998). *Council Regulation (EC) No 2533/98 of 23 November 1998 on the collection of statistical information by the European Central Bank. Official Journal of the European Communities,* L 318, 27.11.1998, pp. 8–19. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31998R2533

Law 46/1998, of 17 December, on the introduction of the euro. https://www.boe.es/buscar/doc.php?id=BOE-A-1998-29216

Law 5/2019, of 15 March, regulating real estate credit agreements. https://www.boe.es/buscar/act.php?id=BOE-A-2019-3814 &tn=1&p=20231228

Law 6/2023, of 17 March, on Securities Markets and Investment Services. https://www.boe.es/buscar/act.php?id=BOE-A-2023-7053 &tn=1&p=20240802

Order of 12 December 1989 on interest rates and commissions, rules of conduct, customer information and advertising by credit institutions. https://www.boe.es/diario_boe/txt.php?id=BOE-A-1989-29754

Order of 5 May 1994 on transparency in the financial conditions of mortgage loans. https://www.boe.es/buscar/doc.php?id=BOE-A-1994-10577

Order of 1 December 1999 on the formula for calculating the one-year interbank market interest rate (Mibor). https://www.boe.es/diario_boe/txt.php?id=BOE-A-1999-23256

Order EHA/2899/2011, of 28 October, on transparency and customer protection in banking services. https://www.boe.es/buscar/act.php?id=BOE-A-2011-17015&tn=1&p=20200727

Royal Decree 309/2019, of 26 April, partially implementing Law 5/2019, of 15 March, regulating real estate credit agreements and adopting other measures in financial matters. https://www.boe.es/buscar/doc.php?id=BOE-A-2019-6299

Regulation (EU) 2016/1011 of the European Parliament and of the Council, dated 8 June 2016, concerns benchmarks used in financial markets and for financial contracts. *Official Journal of the European Union* L 171, 29.06.2016, pp. 1–68. Retrieved from https://eur-lex.europa.eu/eli/reg/2016/1011/oj

Regulation (EU) 2021/168 of the European Parliament and of the Council of 10 February 2021 amending Regulation (EU) 2016/1011 as regards the exemption of certain third-country spot foreign exchange benchmarks and the designation of replacement benchmarks in the event of cessation. *Official Journal of the European Union* L 49, 11.02.2021, pp. 1–22. Retrieved from https://eur-lex.europa.eu/eli/reg/2021/168/oj

Regulation (EU) 2022/2554 of the European Parliament and of the Council of 14 December 2022 on digital operational resilience in the financial sector and repealing Directive (EU) 2013/36/EU. *Official Journal of the European Union* L 322, 21.12.2022, pp. 1–127. Retrieved from https://eur-lex.europa.eu/eli/ reg/2022/2554/oj

Regulation (EU) 2025/914 of the European Parliament and of the Council, of 7 May 2025, amending Regulation (EU) 2016/1011 as regards the scope of the rules applicable to benchmarks, the use in the Union of benchmarks prepared by an administrator established in a third country and certain reporting requirements. *Official Journal of the European Union* L 914, 19.05.2025. Retrieved from https://eur-lex.europa.eu/eli/ reg/2025/914/oj

Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse and repealing Directive 2003/6/EC and certain acts of Directives 2003/124/EC, 2003/125/EC and 2004/72/EC (Market Abuse Regulation). *Official Journal of the European Union* L 173, 12.6.2014, pp. 1–61. Retrieved from https://eur-lex.europa.eu/eli/reg/2014/596/oj

Commission Implementing Regulation (EU) 2016/1368 of 11 August 2016 establishing a list of critical benchmarks used in financial markets, pursuant to Regulation (EU) 2016/1011 of the European Parliament and of the Council. *Official Journal of the European Union* L 217, 12.8.2016, pp. 1–13. Retrieved from https://eur-lex.europa.eu/eli/reg_impl/2016/1368/oj

Commission Implementing Regulation (EU) 2017/1147 of 28 June 2017 amending Implementing Regulation (EU) 2016/1368 establishing a list of critical benchmarks used in financial markets, pursuant to Regulation (EU) 2016/1011 of the European Parliament and of the Council. *Official Journal of the European Union* L 165, 29.7.2017, pp. 1–17. Retrieved from https://eur-lex.europa.eu/eli/reg_impl/2017/1147/oj

Commission Implementing Regulation (EU) 2017/2446 of 19 December 2017 amending Implementing Regulation (EU) 2016/1368 establishing a list of critical benchmarks used in financial markets, pursuant to Regulation (EU) 2016/1011 of the European Parliament and of the Council. *Official Journal of the European Union* L 350, 29.12.2017, pp. 1–58. Retrieved from https://eur-lex.europa.eu/eli/reg_impl/2017/2446/oj

Commission Implementing Regulation (EU) 2019/482 of 22 March 2019 amending Implementing Regulation (EU) 2016/1368 establishing a list of critical benchmarks used in financial markets pursuant to Regulation (EU) 2016/1011 of the European Parliament and of the Council. *Official Journal of the European Union* L 83, 27.3.2019, pp. 1–12. Retrieved from https://eur-lex.europa.eu/eli/reg_impl/2019/482/oj

Commission Implementing Regulation (EU) 2021/1122, of 22 July 2021, amending Implementing Regulation (EU) 2016/1368 to add the Norwegian interbank offering rate to the list of critical benchmarks used in financial markets established in accordance with Regulation (EU) 2016/1011 of the European Parliament and of the Council and to delete the London interbank offering rate therefrom. *Official Journal of the European Union* L 248, 31.07.2021, pp. 1–84. Retrieved from https://eur-lex.europa.eu/eli/reg_impl/2021/1122/oj

Commission Implementing Regulation (EU) 2021/1847 of 14 October 2021 designating a statutory replacement benchmark for certain CHF LIBOR settings. *Official Journal of the European Union* L 380, 29.10.2021, pp. 1–3. Retrieved from https://eur-lex.europa.eu/eli/reg_impl/2021/1847/oj

Commission Implementing Regulation (EU) 2021/1848 of 21 October 2021 on the designation of a replacement for the benchmark Euro overnight index average. *Official Journal of the European Union* L 374, 22.10.2021, pp. 6–9. Retrieved from https://eur-lex.europa.eu/eli/reg_impl/2021/1848/oj

European Union (1992). *Treaty on European Union* (signed in Maastricht on 7 February 1992). Official Journal of the European Communities, C 191, 29.07.1992. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A11992M%2FTXT

European Union (2016). *Protocol (No. 4) on the Statute of the European System of Central Banks and of the European Central Bank. Official Journal of the European Union* L 202, 07.06.2016, pp. 230–250. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016E%2FPRO%2F04

European Union (2016). *Treaty on the Functioning of the European Union (consolidated version). Official Journal of the European Union* L 202, 07.06.2016, pp. 47–200. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016E%2FTXT