HYBRID METHODOLOGY AND MATERIAL CHANGE OF INTEREST RATE BENCHMARKS

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Abstract: *The development of financial markets over the past several decades pointed out a very important role of financial benchmarks, which are used as a reference price for financial instruments or to determine interest payments. However, after the global financial crisis, allegations emerged that interbank interest rate benchmarks had been manipulated. A significant decrease in the size of interbank transactions was observed as well. Both elements lower the credibility of the interest rate benchmarks used so far. Taking into account the responsibility for financial stability, the EU bodies adopted a regulation on benchmarks (BMR) in 2016. The main purpose of this paper is to provide an analysis of this piece of legislation from the perspective of legal continued viability of interest rate benchmarks. The main subject of the analysis was the development of the EURIBOR and LIBOR methodology. The results of the analysis showed that the new hybrid methodology, which utilises eligible transaction data, transaction-derived data, and databased expert judgement, is a robust evolution of the quote-based methodology. It means that administrators did not change benchmark's underlying interest, and no one should diagnose the risk to the continued viability of EURIBOR and LIBOR rates.*
Keywords: *Interest rate benchmark, EURIBOR, LIBOR, material change.*

INTRODUCTION

The increasing importance of interest rate benchmarks has been keeping pace with the development of the financial market. These rates are the basis for derivatives (Klein 2004), but they are also used to calculate the cost of credit and to measure the performance of investment fund. In addition, the channel of the monetary policy transmission to the real sphere of economy is based on the behaviour of such interest rates (Creel, Hubert, and Viennot 2016). During almost the entire period of interbank interest rates functioning, setting of these rates was never regulated by public law. However, the financial crisis proved how susceptible these benchmarks were to manipulation, undermining confidence in the market mechanism and leading to a drop in liquidity. This created a regulatory gap, which the Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO) had taken upon themselves to fulfil - as one of their tasks as global standard and rules setters.

Both institutions issued recommendations, which started of a large-scale reform of benchmarks. More demanding rules for setting reference rates have already been introduced in countries such as Australia, Japan, Canada as well as the EU. The purpose of this article is to analyse the continuity of the provisions of interest rate benchmarks, which have had to be modified in the light of changes in economic reality and the EU regulatory requirements. This problem is presented in relation to LIBOR and EURIBOR, focusing on continuity, the breach of which, due to a potential material change in the methodology for determining the benchmark, could prevent their use in financial contracts.

ORIGINAL METHODOLOGY FOR DETERMINING LIBOR AND EURIBOR

The methodology for determining European interest rates benchmarks was based on the London Interbank Offered Rate. It is believed to have been used for the first time in 1969, when a shah of Iran was offered a loan at an interest rate calculated as the arithmetic mean of the rates used by participants in the consortium (Vaughan and Finch, [2017]). It was not until 1986 that the rules for calculating LIBOR were written down and the LIBOR banks' panel was established. The British Bankers' Association (BBA) managed the process. At the start of 2008, LIBOR was calculated for as many as 10 currencies, and rates were set for 15 maturities - or tenors (Gyntelberg and Wooldridge, 2008).

Countries acceding to the euro area have recognised that the new currency implies the abandonment of domestic interest rate benchmarks, for example German FIBOR or Dutch AIBOR. The European Banking Federation (EBF) in Brussels has taken responsibility for the development of a continental benchmark referring to the euro. The current administrator is the European Money Market Institute (EMMI). EURIBOR was first published for value at 4 January 1999. The panel at that time was made of 53 banks, with geographical parity (Hörth, [1998]). Since May 2019, the panel is made of 18 banks.

The most important, for the original methodology of setting LIBOR, was the question asked to the panel banks. In addition, that question was: "At what rate could you borrow funds, were you to do so by asking for and then accepting interbank offers in a reasonable market size just prior to 11 a.m.?" (BBA, 2013). To answer, the banks had to provide their expert judgement – called quotation. EURIBOR was defined as the interest rate at which euro interbank term deposits were being offered within the European Monetary Union (euro) zone by one prime bank to another at 11.00 am Brussels time (EMMI, 2013).

Despite their linguistic similarity, certain subjective difference of these definitions should be considered. LIBOR banks should indicate via their quotes how costly it would be to secure funding for themselves, so they acted on its own behalf. EURIBOR panel banks, on the other hand, shared what they thought would be the interest rate offered by a hypothetical prime bank. At the same time, the phrase "rate at which deposits are being offered" was unclear and open for subjective interpretation.

From the quantitative point of view, both LIBOR and EURIBOR were calculated as the arithmetic mean of the quotes contributed to the calculation agent, who was required to reject 25% (LIBOR) or 15% (EURIBOR) of the highest and lowest quotes (Eisl, Jankowitsch, Subrahmanyam, 2017).

FSB-IOSCO RECOMMENDATIONS AND THE EU LAW

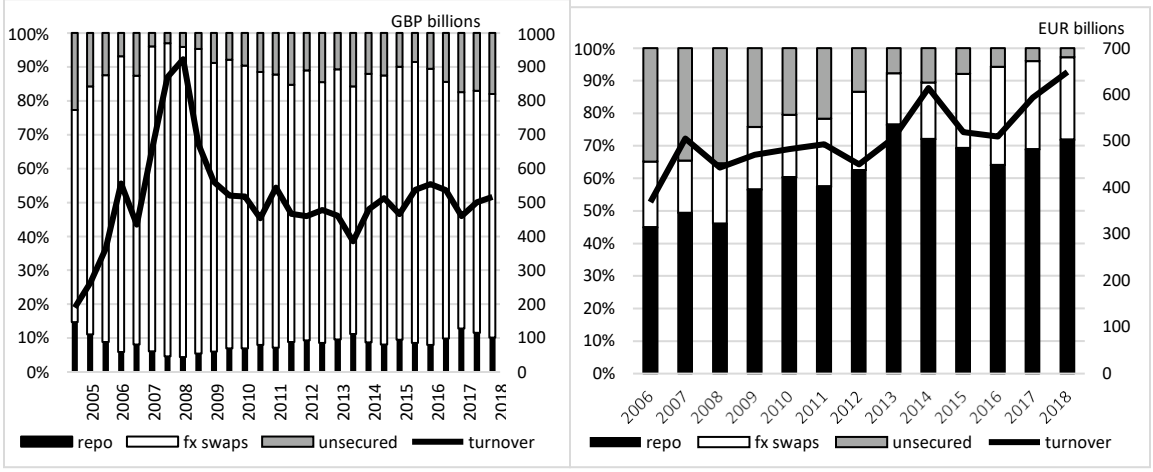
Since 2008 financial activity and financial services based on interbank interest rates benchmarks had to face two challenges. One of them is the change in the structure of the money market, ie.financial market segment in which instruments with an original maturity of up to 12 months are traded (Mishkin and Eakins, 2015), for deposit transactions, particularly evident in the Euro zone. While the value of daily average volume is steadily increasing and reached EUR 650 billion in 2018, the share of unsecured transactions dropped. Before the financial crisis that share was almost 35%, against only

3% in 2018 (Figure 1). Additionally, liquidity was concentrated in the shortest maturities (Table 1).

Three factors could be identified as the main drivers of this continued decline in volume and liquidity concentration. The first one is a post-crisis aversion to counterparty credit risk. The second: activity of the European Central Bank related to almost unlimited liquidity injection. In addition, the third one: the need to comply with new requirements (LCR, and NSFR) coming from the Basel III regulatory framework which partially penalize wholesale funding (Tabb and Grundfest, 2013).

Figure 1 Money market structure and daily average volume

a) UK b) the Euro area



Source: Author based on Bank of England and ECB data.

Table 1. Maturity structure of interbank unsecured transactions

Period	volume per maturity bucket [%]					
	overnight		T/N-2W		1M-6M	
	UK	Euro area	UK	Euro area	UK	Euro area
H1 2008	n/a	14,62	n/a	12,12	n/a	47,25
H2 2016	91,54	56,05	6,42	7,22	1,72	36,75
H1 2018	89,77	59,03	8,29	5,42	1,50	34,97

Notes: UK – only GBP transactions; shares do no add to 100; n/a-not available.
Source: Author based on Bank of England and ECB data.

The other challenge was the vulnerability of interbank interest rates to manipulation. This vulnerability originated from using quotes not related to any transactions. So why certain banks would be interested in determining an interest rate that was out of market equilibrium? This question seems to have two answers. One of them is the desire to generate profits on interest rate derivatives. The unfair cooperation of derivatives traders and the quoting money market dealers may lead to higher profits on acquiring derivatives (Ashton and Christophers 2015; Martin 2013). The other reason may have been the desire to demonstrate that the costs of financing in the interbank market are lower than those of competitors, which means higher credibility.

Some concerns that interbank interest rate benchmarks behaviour is not reasonable appeared in 2008 (Ewerhart et al, 2007; Mollenkamp and Whitehouse, 2008; Gyntelberg and Wooldridge, 2008). Based on these signals and their own analyses, supervisory authorities commenced investigations. As a result 10 global banks were punished for inappropriate practices in setting both IBOR rates; total fines amounted to some USD 9 billion (McBride, 2016).

The threat to the stability of the financial system forced introduction of measures to prevent manipulation. The Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO) (IOSCO, 2013; Berman, 2015) recommended appropriate changes. Both standards setters underlined that interest rate benchmarks should to be largely based on transaction data. Therefore, the LIBOR and EURIBOR methodology required modifications.

FSB and IOSCO standards, as a "soft law", are not legally binding (Brummer, 2015), so no sanctions were imposed for ignoring IOSCO or FSB recommendations. This is the reason why the European Commission decided to convert global best standards into "hard law". This move was also done to avoid regulatory arbitrage, seen as a threat to the European financial market consistency considering the British and Belgian rules already introduced. It is worth noting that the Belgian parliament voted on the relevant legislation in December 2015, but due to the adoption of BMR, it was never implemented.

The relevant EU legal act is 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 (OJEU L171/1 as of 29.6.2016) - hereinafter: BMR. According to BMR Article 3(1)(3), a benchmark is any index by reference to which the amount payable under a financial instrument or a financial contract, or the value of a financial instrument, is determined or an index that is used to measure the performance of an investment fund, define the asset allocation or compute the performance fees. BMR defines financial contract as a consumer credit agreement and consumer credit agreements which are secured either by a mortgage. According to BMR definitions financial instruments as any of the instruments listed in MiFID directive and admitted to a trading venue.

Under BMR supervised entities (such as banks or investment funds) may only use benchmarks provided by administrators included in the relevant register. The administrator must be authorised by the national competent authority and only then can it be disclosed in the register of the European Securities and Markets Authority (ESMA) – see: BMR Article 36.

EVOLUTION OF THE METHODOLOGY FOR DETERMINING INTEREST RATE BENCHMARKS

The process of modifying the LIBOR methodology of computation started following publication of the Wheatley Review (HM Treasury, 2012). The recommendations of this review included: public supervision over LIBOR determining, change of the LIBOR setting entity, improved administrator's corporate governance, extensive use of transaction data and setting benchmarks alternative to LIBOR.

The successor to the BBA was elected by a committee of the UK Government. In January 2014 the ICE Benchmark Administration Ltd (IBA - a subsidiary of the ICE, US

based stock exchange) was established, which assumed BBA's rights to LIBOR. From that moment, the IBA is responsible for the evolution of LIBOR. Administrator of LIBOR started with limiting the tenors of deposit transactions and abandoned calculations for non-liquid currencies. Therefore, LIBOR is provided since 2014 for CHF, EUR, GBP, JPY and USD only. Then the IBA (as a new administrator of LIBOR) proceeded with improving corporate governance, for instance by establishing the permanent Oversight Committee. However, the most important change was introduction of the waterfall methodology.

Its purpose was to fulfil the requirements of BMR Article 11(1), according to which the input data must be sufficient to represent accurately and reliably the market or economic reality that the benchmark is intended to measure. BMR Annex I, the *lex specialis* for interest rate benchmarks, requires that the administrator adopt a hierarchy of input data where transaction data take priority. Should this information prove insufficient, transactions in related markets must be used and expert judgements should be given less priority.

The assumptions and the algorithm of the LIBOR waterfall methodology were established in 2016 (IBA, 2016). It means the IBA decided that LIBOR would be a wholesale funding interest rate, anchored in LIBOR panel banks' unsecured wholesale transactions to the greatest extent possible. The narrowing of the source of funding was therefore abandoned and information on market operations took priority. This means that expert assessment - in the form of quotes - is only appropriate if it is not possible to refer to transactions actually concluded on the unsecured segment of money market.

The LIBOR waterfall methodology defines the hierarchy of information contributed by the LIBOR panel banks. The most important is the volume-weighted mean interest rate on deposits in the wholesale money market. This segment covers transactions with central and development banks, public institutions, non-banking financial institutions and non-financial enterprises. If no such transactions are available, the panel bank should use historical data. The third level is an expert judgment, based on market data assessment.

Using this hierarchy, the panel bank is required to provide the IBA with interest rate calculations. The information is averaged, after rejecting the extremes. Thus, the numerical algorithm for setting LIBOR is unchanged – compering the pre-crisis time, although the input data is different. Having established these rules, IBA proceeded with operational and statistical tests (IBA, 2018). Since the panel banks managed to demonstrate their ability to use the waterfall methodology, the IBA applied to the British Financial Conduct Authority (FCA) to be officially appointed the administrator and obtained relevant authorisation in April 2018 (IBA, 2018a).

It took a bit longer to adapt EURIBOR to BMR requirements. Initially, EMMI decided that computing new EURIBOR (so-called EURIBOR+) solely based on the unsecured deposits was possible (EMMI, 2016). It is likely that EMMI was prompted to do so due to its belief that the activity of 31 banks in 12 euro zone states (this is, a wider group that concurrent panel) would be sufficient to obtain enough transactions. Arguing that the expert judgement (quoted) based EURIBOR would be similar to EURIBOR+, EMMI opted for substitution of both rates. This substitution was called "seamless transitions" (Mielus, 2016).

The report summarised this phase of EURIBOR evolution was published in 2017 (EMMI, 2017). According to this report the activity in the euro interbank market was negligible. As it turned out that majority of the banks participating in the study did not

accept deposits defined by EMMI. Another finding of the report was that "seamless transition" to EURIBOR+ could not be ensured. According to the Author's opinion, it is likely that EURIBOR+ featured too high volatility that could affect the continuity of existing contracts.

The failure of this phase of EURIBOR modification prompted EMMI to declare that it was proceeding with efforts aimed at merging transaction data with quotes. In order to use the data waterfall (hybrid), EURIBOR had to redefine. EMMI clearly separated market description (underlying interest) from measurement method. In the methodology currently in, force (EMMI, 2019): EURIBOR is defined as the interest rate that measures the cost of wholesale funding of EU and EFTA credit institutions in the unsecured euro money market.

The waterfall methodology for determining EURIBOR also comprises three levels. The first one is the (volume-weighted) mean interest rate on unsecured deposits. Other banks, financial institutions and public institutions (non-financial corporations are excluded) make deposits. The second level involves extrapolated data on historical transactions. Yet another level involves information on operations from related markets, such as derivative marker, as well expert judgement. Ultimately, the panel bank is required to provide EMMI with the interest rate on euro wholesale deposits that was calculated using the hybrid (waterfall) methodology.

It is necessary to underline that the waterfall methodologies of both interest rate benchmarks currently use "time windows" for data collection. This means that banks report on transactions concluded in previous, predetermined periods. This replaces measurement on a given day and makes manipulation for individual bank difficult (Duffie and Stein, 2015).

EMMI also ran a test of computation of EURIBOR using the waterfall (hybrid) algorithm. The results revealed similarity of the data obtained using the previous methodology and using the algorithm adapted to BMR (EMMI, 2019a). Hence, in April 2019, EMMI chose to apply for authorisation, which was granted on 2 July 2019 by decision of the Belgian supervisory authority (FSMA, 2019). Following that decision, EMMI was included in the ESMA register of administrators.

Modifications adapting the methodology for determining of LIBOR and EURIBOR to BMR requirements should be assessed in view of their potential material change. This is a key aspect of the reform from the perspective of benchmark users and retail clients, as such change may raise doubts about the validity of contracts that refer to a given interest rate benchmark. It is important to underline that BMR (Article 13(1)(c)) uses the term "material change in the methodology", but does not indicate the elements determining its occurrence.

Therefore, the analysis should be carried out in a multidimensional manner. The first dimension is a formal one. Article 13(1)(c) of BMR requires the administrator to establish procedures for consulting on any proposed material change in the methodology for determining benchmark, including the circumstances in which the administrator is to notify users of any such changes.

One should also note BMR Article 28(1) on administrator's obligation to publish a procedure to be followed in the event of a material change of a benchmark. This obligation was fulfilled by both the IBA and the EMMI (IBA, 2019; EMMI, 2019b). The

administrators have not launched such procedures (as of June 15th, 2020), which means that they believe that no material change has occurred.

The second dimension should be a quantitative. It is necessary to compare the behaviour of quoted based benchmark and benchmark determined by means of the hybrid methodology. This is a reason why changes in their levels and correlations have been analysed (Fig. 2 and Table 2).

Table 2. Spearman's rank correlation coefficient for quoted based and hybrid interest rate benchmarks

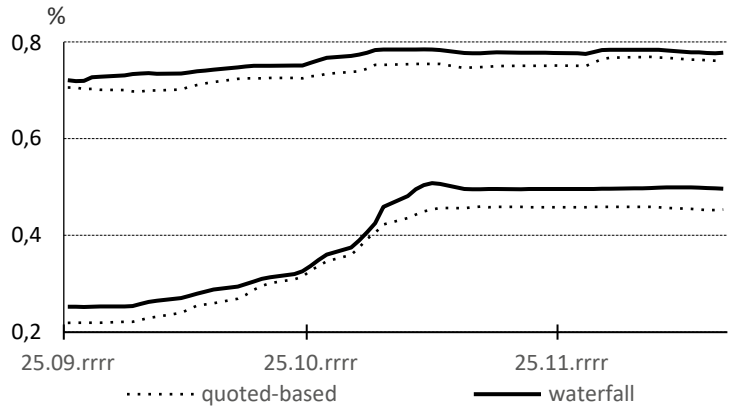
Interest rate benchmark	Tenor			
	1M	3M	6M	12M
EURIBOR	0,572	0,642	0,683	0,879
LIBOR	0,842	0,956	0,917	0,908

Note: only LIBOR GBP was taken into account.
Source: Author.

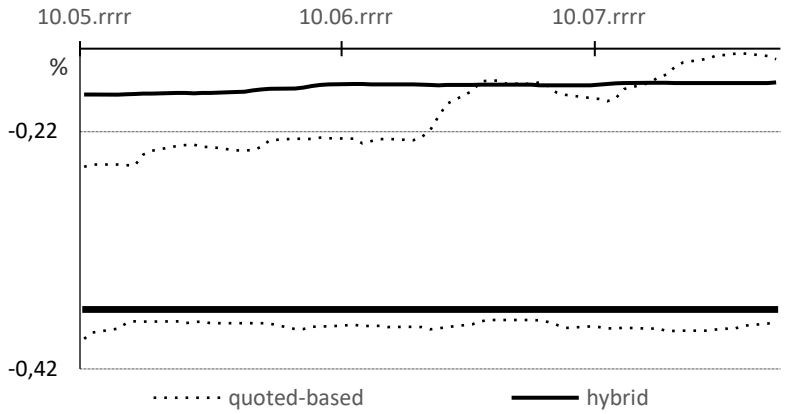
The calculations indicated that hybrid (waterfall) methodology yields rates, which presented a natural in finance market-driven volatility. However, for the individually captured tenors, in none of the cases has there been a difference of more than 10 basis points. At the same time, there has been a downward shift of the band, which bounds all analysed tenors. Such conclusion is valid for both interest rate benchmarks. This should be linked to a more detailed definition, indicating the essence of LIBOR and EURIBOR: cost of wholesale funding received via deposit taking.

Figure 2. The range of benchmarks tenors

a) LIBOR



b) EURIBOR

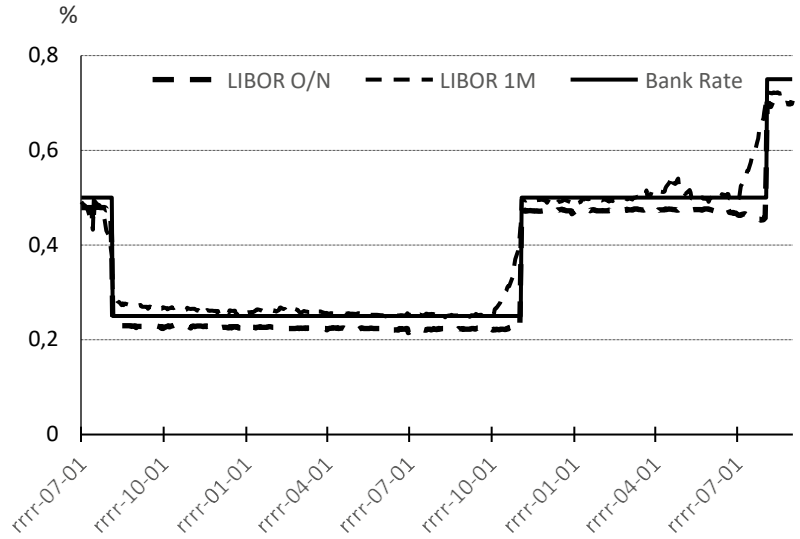


Note: Tenors from 1M to 12 M; 5-day moving average was used.
Source: Author.

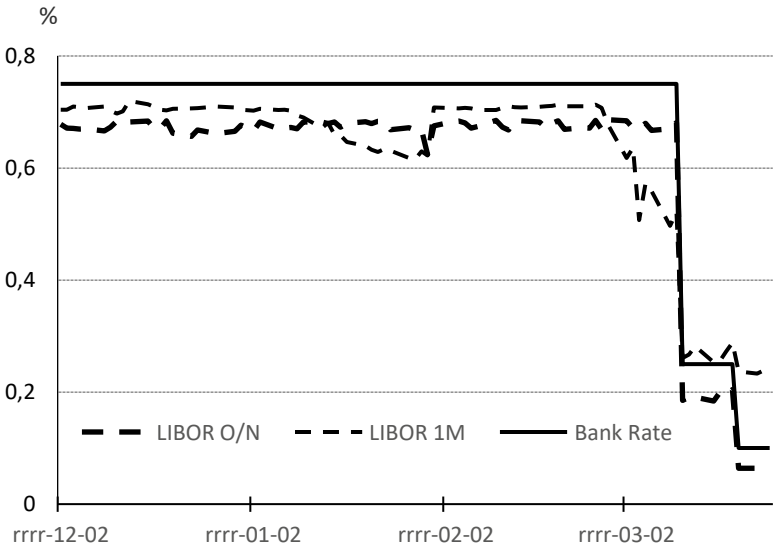
The behaviour of interest rate benchmarks, previously narrowed to interbank interest rates, has been always perceived as one of the main channels through which the official interest rates set by central banks are transmitted further to commercial bank rates and to the real economy (Lešanovská and Geršl, 2014). The fact that interest rate benchmark determined by means of the hybrid methodology does not respond to monetary policy impulses any longer should be treated as an important factor constitutes a material change of the methodology. This aspect is illustrated in Figure 3, which shows reaction of quoted – based LIBOR and waterfall – based LIBOR on changes in official rate of Bank of England (Bank Rate). EMMI confirmed on November 28, 2019 that it had completed the phase-in of all panel banks to the EURIBOR hybrid methodology. Since then the ECB has not change its key interest rates. Therefore, the analyses of response of benchmark using the waterfall methodology is limited to LIBOR only.

Figure 3. LIBOR and Bank Rate

a) quoted-based LIBOR, July 2016 – August 2018



b) waterfall-based LIBOR, December 2019 – March 2020



Note: On April 1, 2019, IBA announced that it had completed the transition of all panel banks to the LIBOR waterfall methodology.
Source: Author based on IBA and Bank of England data.

Once more it is clear that waterfall methodology presents a market-driven volatility. It is a natural consequence of fact that currently made LIBOR submission should be determined based on data from a range of relevant transaction types instead of pure expert judgement. But the ability of capturing modifications in Bank Rate has not been changed. The waterfall-based LIBOR is still an efficient channel of monetary policy impulses transmission.

The formal reasons and the results of quantitative analysis indicate that there should be no concerns related to the legal continuity of LIBOR or EURIBOR. Such conclusion is also supported by economic characteristics of the underlying interest of analysed benchmarks. The underlying interest defines the market or economic reality that the benchmark seeks to measure. It represents the most fundamental element of a benchmark's specification, as it defines the objective for establishing the benchmark, so it is intended to be an essence of the economic concept of what the benchmark seeks to represent (EMMI, 2019; BoE, 2019).

For both benchmarks, the reference to the interest rate on unsecured deposits has not changed. Initially, they were recommended to be anchored in the interbank market. Now this recommendation has been shifted to the wholesale market, of which the interbank segment is a subset. This approach reflects changes in the money market structure. In addition, panel participants were required to present (as a last resort) quotes based on an algorithm indicating their relation to the realities of the related market for collateralised transactions (repo and derivatives). Thus, the quotes became economically verifiable.

Further to that, the interest rate benchmark is still contributed by the banks that are included in the panel because of their activity on the market concerned. Therefore, as the author believes no material change, referred to in BMR Article 13(1), has been introduced to LIBOR and EURIBOR methodology, despite modifications to the input data. Thus, a broader list of counterparties indicated as eligible providers of wholesale unsecured

funding and the use of the "time window" should be seen as an evolution forced by changes in economic realities, which is even recommended by the BMR. Therefore, one should not raise concerns regarding the continued viability of any of these interest rate benchmarks, especially in the context of the validity of existing contracts, e.g. mortgage credits.

For the financial stability perspective, and non-professional participant of financial market point of view, rather than focusing on the repercussions of a possible material change in the methodology for determining the interest rate benchmark, it is worth noting that the determining of such indexes is currently a supervised activity. This provides retail borrowers with a kind of "legal guarantee" that the interest payments are in line with regulatory requirements.

REGULATORY MEASURES PREVENTING CESSATION OF PROVIDING CRITICAL BENCHMARK

According to BMR, the benchmark can be considered as critical when it is used as a reference for financial instruments or financial contracts or for measuring the performance of investment funds, having a total value of at least EUR 500 billion. Unfortunately, no standardised data are available on the scale of using a given benchmarks. It seems that the most frequently quoted document on this subject is the report drafted under FSB auspices (MPG, 2014). In 2012, the value of contracts using LIBOR was at least USD 220 trillion, with USD LIBOR accounting for some 70% of them. Based on more recent estimates of ARRC (2018), in 2016 the exposure to USD LIBOR was close to USD 200 trillion, ie the value of 11 times larger than the US GDP of that period. Given the 2012 currency proportions, the total exposure to LIBOR should be close to USD 300 trillion. The European Central Bank (ECB, 2018) reported that in 2018 the value of EURIBOR based derivatives was at least EUR 110 trillion. The value of loans was close to EUR 10 trillion, and the issue of debt securities amounted to some EUR 1.5 trillion. The total exposure of about €122 trillion is also about 11 times higher than the GDP of the euro area at the end of 2017. Although exact data are not available, it seems correct to assume that the threshold referred to in BMR art. 20(1)(a) - EUR 500 billion - has been exceeded. This is why the European Commission considers both LIBOR and EURIBOR to be critical benchmarks.

The fact the LIBOR and EURIBOR are both critical benchmarks is important in the context of the supervisory powers to block sudden cessation of provision such benchmark. The most significant of them are defined in BMR Article 21 and 23. Article 21 defines mandatory administration of a critical benchmark. If an administrator of a critical benchmark intends to cease its activity (for instance because they generate no profits), the competent supervisory authority has the power to compel the administrator to continue publishing the benchmark until such time as the benchmark has been transitioned to a new administrator or the benchmark can be ceased to be provided in an orderly fashion. Such mandatory administration may last up to 5 years (such amendment was introduced on December 2019; the previous limit was 2 years).

According to BMR Article 23, if a contributor to critical benchmark intends to cease contributing input data, such entity must notify the benchmark administrator, who in turn must notify, immediately, its competent supervisory authority. If the supervisory authority believes that the representativeness of a benchmark is put at risk, it may require that input

data be supplied. Such an obligation can be imposed on the institution that intends to cease contributing data and or entities that have not yet involved. Such mandatory contribution may last up to 5 years.

Both these measures became a part of empowerment of supervisory authorities as of 30 June 2016. Since then the composition of the LIBOR panel has not changed; in 2017 the LIBOR panel banks even submitted a written commitment to participate in this group until the end of 2021 (FCA, 2017). Most likely, such declaration was made because of the awareness of the powers offered by BMR to the supervisory authority. It seems that the FCA used so called "moral suasion" as a supervisory measure (Norton, 1991; Becker and Ivashina, 2018).

Probably the same mechanism was used in case of EURIBOR, as between 2016 and 2018 the composition of the panel remained unchanged. It was only in the first half of 2019 that the Monte dei Paschi di Siena and the National Bank of Greece left the panel. In both cases, the FSMA chose not to exercise the powers bestowed on it in BMR Article 23. It was motivated by the insignificant activity of both banks on the money market.

The possible use of administrative compulsion as a measure preventing leaving the financial market is very rarely foreseen in the EU law. In this regard, the ability to impose mandatory contributions or mandatory administration for five years (as opposed to two) showed that the European Commission was taking the public interest imperative seriously. It means critical benchmarks, including LIBOR and EURIBOR cannot be ceased to be provided in a disorderly fashion.

YEAR 2021 AND BMR PROVISIONS

The Benchmark Regulation (BMR) does not contain any provision indicating "pre-cessation" trigger for determining benchmark. The way the BMR is constructed implies that competent authorities can only contemplate withdrawing the authorisation granted to the administrator of benchmarks after deployment of remedial measures, in accordance with BMR Article 35 (ECB, 2020). From this perspective, it is difficult to accept the position publicly presented by the former CEO of FCA Andrew Bailey (2017).

Andrew Bailey stated that low activity on the interbank market meant that LIBOR is sustained by the use of expert judgement by the panel banks to form many of their submissions. He also added it is not right to require, that panel banks continue to submit expert judgements indefinitely. Therefore, the FCA has no intention to support publishing LIBOR beyond the end of 2021 and the financial market must start using a different interest rate benchmark. The Bank of England, with the approval of the FCA, nominated SONIA, as a (credit) risk-free-rate, as an alternative to LIBOR (Schrimpf and Sushko, 2019).

FCA opinions are not fully precise. SONIA cannot directly replace LIBOR because it is calculated only for the shortest maturity, ie *overnight*. Until a term structure is developed, SONIA cannot be considered an economic substitute for LIBOR. Also, LIBOR is published for 5 currencies, while SONIA only describes the market for deposits denominated in GBP. Finally, the regulatory aspect is almost omitted in FCA's opinions. Importantly, GBP money market interest rate benchmark, including term rates (until Brexit is legally finalised) must be published according to BMR rules. So until the FCA authorises the potential administrator, it is not acceptable to use rates based on SONIA.

The FCA position also shows some kind of the inconsistency of the supervisory authority. If the sense of measuring the money market was questioned in 2017, why was

the IBA authorised in 2018? The need to maintain the stability of existing agreements could be ensured by Article 51(4) of the BMR, which explicitly gives the supervisory authority the power to take such a decision. Under this Article, a reference index that does not meet BMR requirements can be used for existing contracts but no new ones can be concluded.

Andrew Bailey (2019) admitted publicly that the representativeness of the LIBOR panel might be a concern. Therefore, he assumes that after 2021 the banks will leave it. None of the participants in the panel has spoken on this topic so far. Under such circumstances, the FCA's statements can be seen as a form of pressure for the banks to do so, despite the lack of "pre-cessation" provision in the BMR. Finally yet importantly, FCA ignores the fact that the waterfall methodology anchors LIBOR also in transactions out of the interbank market. It is true that banks in London occasionally accept unsecured deposits from other banks, but it is also irrelevant to the modified LIBOR calculation rules. Current LIBOR submission at level 3 describe interest rate with reference to the unsecured wholesale funding market. In order to determine this rate the panel bank must follow its internally approved procedure agreed with IBA. It means that submissions are robust and verified.

In its opinions, the FCA also refers to BMR Article 28(2), which compels supervised entities to draft a plan to be followed in the event that a benchmark materially changes or ceases to be provided; such plan may nominate an alternative benchmark. FCA explicitly suggests that LIBOR users should consider SONIA as a substitute, which will make SONIA a legally sanctioned replacement of LIBOR after 2021. FCA explicitly recommends an alternative to LIBOR but does not indicate an "emergency" index for SONIA. It seems that the design of individual benchmarks should depend on economic realities and in particular on the liquidity of individual markets. In many financial sectors, this is possible (see capital or commodity market). Therefore, the attitude of British regulators, where the use of one of the benchmarks is imposed, is somewhat incomprehensible.

The opinions on EURIBOR are entirely different. The administrator, authorised since July 2019, has made it clear that EURIBOR calculated by means of hybrid methodology is a continuation - according to BMR - of the benchmark published since the late 1990s (EMMI, 2019a). Any financial market supervisory or regulatory authority (ECB, 2019) does not challenge this view.

In addition, the Belgian supervisory authority competent for EMMI rejects the FCA approach. Obviously, the fact remains that the volume of unsecured trade in the euro zone interbank market has decreased significantly - see Figure 1b. But this is the very reason why EMMI chose to extend the definition of eligible transactions to non-banking institutions in order to counteract such deficiencies.

For the Euro zone efforts have also been made to establish a *risk-free-rate*. In September 2017, the ECB announced its intention to establish a rate for the *overnight* market. The input data for this benchmark will originate from reports of 54 largest euro zone banks. The new index (€STR) was used to replace panel – based EONIA, the previously established *overnight* reference rate (EMMI, 2019c). In addition, if market participants will accept mechanism to generate the term structure and the administrator, acting in accordance with BMR, starts publishing these rates, a EURIBOR alternative will be established. However, according to both the ECB and the market participants, new benchmarks are not intended to replace EURIBOR.

Hence, the author of this article believes that it is vital to remember that the end of 2021 is not a limit date under BMR. No legal requirements exist that would require to cease publishing EURIBOR or LIBOR. Furthermore, the process of publishing both benchmarks already follows the rules of Regulation 2016/1011. Thus, the FCA created the 2021 „problem". Economic reasons and - before everything else - legal reasons, may raise doubts, in particular when considering BMR Article 51(4), which provides that use of the benchmark that fails to meet BMR in contracts concluded before 1 January 2020 shall be permitted by the competent authority.

CONCLUSIONS

The experience of the financial crisis clearly demonstrated that setting interest rate benchmarks based on expert judgements is flawed. Such benchmarks were susceptible to manipulation because quotes were not linked to transactions. It is therefore fully understandable that the process for determining IBOR rates should be thoroughly modified, according to recommendations by FSB-IOSCO and, in the case of the European Union, according to Regulation 2016/1011.

For LIBOR and EURIBOR a very important stage in this process has already been completed. Benchmark administrators have been authorised. As the competent supervisory authorities believe, establishing a methodology, which reflects the reality of the money market in a reliable and sustainable manner, was successful. In addition, for both the euro area and London, it became clear that that data on unsecured transactions in the wholesale market still had to be supplemented by expert judgements. On the one hand, this indicates that the market is significantly less liquid, while on the other hand, it is acceptable in the regulations. Modified rules for determining the discussed rates should be viewed as a successful compromise in striving for the highest possible degree of transparency of the benchmark supported by transactions whenever available and care to avoid a situation where publication of a benchmark is ceased.

The evolution of computation LIBOR and EURIBOR must raise questions about the continuity of the benchmarks determined based on quotes only and the waterfall methodology currently used. Considering the underlined arguments, both economic and legal, the author points out lack of grounds for claiming that the material change of the methodology, referred to in BMR Article 13(1)(c) actually took place. Furthermore, Regulation 2016/1011, importantly, bestows powers on financial supervisory authorities, aimed at preventing a disorderly departure from publishing critical benchmarks. The implementation of these powers is intended to safeguard the stability of financial transactions and contracts and the interests of, in particular, non-professional market participants.

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