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IMPACT OF JPY LIBOR RATE CHANGES ON REGULATIONS AND DEVELOPMENT OF ALTERNATIVE BENCHMARKS IN JAPAN

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Abstract

The purpose of the article/hypothesis: The considerations presented in this article aim to focus on the final choice of benchmarks in Japan, which operated the LIBOR rate expressed in Japanese yen. In turn, the main purpose of the article is to try to answer whether the newly selected alternative benchmarks in the Tokyo market meet the characteristics of an ideal rate.

Methodology: The paper reviews the literature, studies of regulators and index administrators, presenting the stages of reform, the selection of alternative reference rates and making a comparative analysis with the previously functioning LIBOR rate. Due to the subject of the analysis, basic statistical methods were used.

Results of the research: The course of benchmark reform in the Japanese market indicates that the reform has been successfully thought out and implemented, and the rates proposed as alternatives are well able to replace the JPY LIBOR rate. However, it should be noted that in this market it was decided that there are three alternatives to choose from covering both interbank rates and risk-free rates. These rates are referred to as: TONA, TIBOR and TORF. Under these circumstances, market participants must consider the optimal choice of comparative options depending on their financial products, the nature of the transactions they are dealing with and their own individual business needs. However, judging whether they are better than the LIBOR rate, the answer is positive because they are based on acts.

Keywords: benchmark interest rate, LIBOR, alternative rate, TONA, TIBOR, TORF.

JEL Class: E43, E44, G21, G28, G23.

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INTRODUCTION

In the financial world, the IBOR (Inter-Bank Offered Rate) is a generic term for a number of different interest rate benchmarks, which historically derive from the rate at which banks could borrow from other banks, in particular markets and currencies (Citi Treasury and Trade Solutions, 2022). IBOR-type rates have played an important role in international financial markets for decades, as they are widely used as benchmarks in setting interest rates on a wide range of financial products (Kubacki, 2023).

For almost the entire period of their existence, IBORs were set by index compilers according to a specific methodology. Their determination was an unregulated activity, which took place in the OTC (Over The Counter) market. However, the financial crisis exposed their vulnerability to manipulation, undermining confidence in the market mechanism (Kruszka, 2020) and revealing significant systemic risk (Liszewska, 2019). As a result, a regulatory gap became apparent, causing confidence in the credibility and robustness of the main reference rates to decline.

As a result, recommendations were made on actions to be taken to restore the credibility of interest rate indices. These actions taken by international regulators, known as 'interest rate benchmark reform', were intended to guide change. They are referred to as the 'reform of interest rate benchmarks', which were intended to guide the change.

This was not an easy task as the overriding aim of this reform was to find benchmarks that possessed as many of the characteristics of a good (or even ideal) rate as possible, were adapted to market realities and could serve any possible purpose and, above all, were widely accepted by market participants.

The literature indicates that an ideal rate should have at least three characteristics (Schrimpf and Suschko, 2019):

i) provide a robust and accurate representation of interest rates in the underlying money markets that is not susceptible to manipulation;
ii) offer a reference rate for financial contracts beyond the money market. Such a reference rate should be usable for discounting and for pricing cash instruments and interest rate derivatives;
iii) serve as a benchmark for term loans and financing.

Given that financial intermediaries are both lenders and borrowers, they require a credit benchmark that does not behave too differently from the rates at which they raise funds.

The above issue is of particular significance in the context of the nearing completion of the reform of the LIBOR rates for the five major currencies, which was to result in the selection of new benchmarks. The axis of considerations in this article is the final choice of benchmark(s) by one jurisdiction – Japan, which

operated a LIBOR rate expressed in Japanese yen (LIBOR JPY). In contrast, the main objective of the article is to try to answer whether the newly selected alternative benchmarks in the Tokyo market meet the characteristics of an ideal rate.

The first part of the article reviews the literature on the origins of the LIBOR rate, and its role in modern markets. This is followed by a presentation of why the rate reform was needed. The next section identifies the basic assumptions behind the reform of money market indices, together with an analysis of current developments in reference rates in Japan. Finally, a comparison of the new indices with the JPY LIBOR rate is made.

1. THEORETICAL BACKGROUND

1.1. The origins of LIBOR and the expansion of its use

The most widely used rate in financial transactions worldwide has been LIBOR (London Interbank Offered Rate) for the past several decades. According to the BMR (Benchmark Regulation)[1], it is the key interest rate benchmark, the origin of which is attributed to a Greek banker named Minos Zombanakis. The first use of this indicator is believed to have originated in 1969, providing an $80 million syndicated loan to the Shah of Iran based on the reported financing costs of a consortium of reference banks (Ridley and Jones, 2012; Kirti, 2022). This arrangement was intended to ensure that the risk of the loan was spread across multiple lenders and that interest rate risk was controlled through variable rate loans. Thus, a convention was established to set the base lending rate as the average USD funding rate for foreign deposits by banks participating in syndicated loans (Hou and Skeie, 2014). Thanks to this initiative, the rate that was then used to price these loans became the most important interest rate benchmark in the world over the next 4 decades[2].

To support the burgeoning syndicated loan market, it was decided that the British Bankers' Association would take control of the LIBOR rate in 1986 and set a standard for data collection. The data was to represent the floating rates at which the largest and leading banks doing business in London (the so-called rate contributors)[3] claimed they could obtain wholesale, unsecured funding from other

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

[2] In the late 1990s, USD swaps totaled $15 trillion before jumping to well above $100 trillion in he late-2000s (Morgan, 2019).

[3] These banks formed a so-called LIBOR panel for each currency.

banks. This data was then subjected to a fixing process before 11 AM local time each business day[4]. Official LIBOR was calculated using a 'trimmed arithmetic mean' calculation method, whereby the administrator ranks the submissions in descending order, then filters out the 25% highest and lowest rates to finally calculate a simple average of the remaining rates (Monticini and Thornton, 2013; Tabb and Grundfest, 2013; Coulter et al., 2017; Chen, 2021; ICE Benchmark Administration, 2022) to two decimal places (Deloitee, 2018). This mechanism made LIBOR a very convenient benchmark and allowed it to be published for up to 10 currencies (see Table 1) and 15 maturities (see Table 2).

Table 1. LIBOR rates for various currencies and publication end dates

Currency LIBOR	Year of publication end
United States dollar (USD)	2021/2023
Pound sterling (GBP)	2021
Euro (EUR)	2021
Japanese Yen (JPY)	2021
Swiss Franc (CHF)	2021
Canadian dolar (CAD)	2013
Australian dollar (AUD)	2013
New Zealand dollar (NZD)	2013
Danish Krone (DKK)	2013
Swedish Krona (SEK)	2013

Source: Own study.

Table 2. Maturity dates of LIBOR rates for different currencies

Maturity dates of LIBOR rates
1D, 1W, 2W, 1M, 2M, 3M, 4M, 5M, 6M, 7M, 8M, 9M, 10M, 11M, 12M[5]

Source: Own study.

[4] Access to individual bank data, were not freely available through the website, but only through paid subscription-based services such as Thompson Reuters or Bloomberg (ICAEW, 2021).
[5] 1D – one-day, 1W – one-week, 1M – one-month, 3M – three-month etc.

1.2. The role of the LIBOR index

LIBOR, as a money market index, has served two primary purposes in modern financial markets: as a reference rate and as a benchmark rate (benchmark) (SBI, 2021). In the first case, LIBOR served as a rate that allowed the terms of the contract in financial instruments to be determined. The benchmark rate reflected a relative measure of performance, often in relation to investment returns or financing costs. LIBOR served as the main reference rate for short-term[6] floating-rate financial contracts such as swaps and futures, variable-rate loans – mortgages and private student loans (McConnell, 2013). More generally, benchmark rates allowed for easier standardization of financial contracts while reducing the complexity with which the terms of floating rate components are set. As a benchmark rate, it was an indicator of the health of financial markets. It influenced the pricing of various financial transactions and affected, through investment and financing activities, the economic activities of a wide range of participants in that market (Amamiya, 2020). The spread between LIBOR and other benchmark rates could signal changes in the broad financial environment (Chailloux et al., 2009; Gensler, 2012; Duffie and Stein, 2015).

The rationale for the widespread use of LIBOR in contracts stems from its design. Because LIBOR represents the terms on which the world's largest and most financially stable institutions are able to obtain short-term financing, it has served as a floor for the lending rate of other institutions and less creditworthy individuals. Rates were typically expressed as 'LIBOR + x', where x is the premium charged in basis points to any particular borrower over the LIBOR rate for the relevant maturity. Financial contracts most commonly linked to LIBOR included interest rate swaps and other derivatives, fixed income securities, and ARMs. In this sense, floating rate lending banks were able to guarantee a positive net interest margin by ensuring that the interest rates they charged were linked to their cost of funds, with a positive premium built in (Hou and Skeie, 2014).

To better understand the behaviour (factors) and characteristics of the LIBOR rate[7], it can be viewed as a combination of a forward spread and a risk spread (Hou and Skeie, 2014):

LIBOR = overnight risk free rate over the term + term premium + bank term credit risk + term liquidity risk + term risk premium

The first term is the traditional hypothetical overnight interest rate at which a risk-free institution could expect to borrow during the LIBOR credit period. The term

[6] At its peak, such contracts were estimated to be worth $300 trillion.

[7] You can read more about the factors and characteristics of LIBOR rates (Kubacki, 2019).

premium represents the intertemporal substitution rate for the loan period. As LIBOR banks are not inherently risk-free borrowers, we must add a counterparty credit risk component in proportion to the maturity of the loan. Term liquidity risk offsets the maturity risk incurred by the lender in tying up funds for a longer period. Finally, the term risk premium compensates for the risk that any of these components may materialise in a manner different from that expected (Hou and Skeie, 2014).

2. WHY WAS LIBOR REFORM NEEDED?

The fact that the mechanism for setting the interbank market rates is not perfect was demonstrated by regulators and other market participants during the financial crisis of 2007–2009. The interbank market rates ceased to reflect the true cost of funding the banking sector as a result of the crisis of confidence in the interbank market. The crisis of confidence in the interbank market indices deepened in 2012 with the discovery of irregularities in the LIBOR rates declared by some of the banks participating in the quotes (Hansen, 2010; Pawłowicz, 2010; Liszewska, 2019). This crisis highlighted that these indices are prone to distortion and manipulation, as they are not determined by actual transactions, but by declarations. The process of determining the indices itself has proven to be irresistible to attempts to shift values in favour of the banks on the panel in order to favour trading positions and reduce costs for the banks determining the index (Abrantes-Metz et al., 2012). From June 2012 onwards, LIBOR came under public scrutiny due to controversy with individual submissions from panel banks. There were allegations that banks were deliberately understating the cost of borrowing by significant amounts in order to project financial strength in an environment of market uncertainty (Kumar, 2022). In addition, it has been alleged that banks manipulated the interest rate to profit from LIBOR-based contracts (Hou and Skeie, 2014). The first to publicly report that there was an abnormal market situation with the LIBOR rate was the Wrightson ICAP bulletin. The analysis noted that there was a low LIBOR fixing in the market and that the reason for the observed divergence in rates was the lack of interbank activity and the stickiness of the official fixings (Wrightson ICAP, 2007). However, it was only articles published by the Wall Street Journal and the Financial Times that revealed that in the LIBOR rate market, there may be actual manipulation (Mollenkamp and Whitehouse, 2008; Mollenkamp, 2008; Tett, 2008). Subsequent investigations by US and foreign regulators revealed clear manipulation by banks to influence the rate in order to ensure financial health during the crisis and to profit from their own trading positions in

the derivatives market. Investigations by the Commodity Futures Trading Commission (CFTC) found that these firms[8] acted in violation of the Commodity Exchange Act's false reporting provisions (Gensler, 2012).

The manipulation of LIBOR, revealed in 2012, fundamentally shook confidence in the financial sector and the soundness of the main reference rates – for as it later emerged, the problem also affected other reference rates such as EURIBOR – Euro Interbank Offered Rate and TIBOR – Tokyo Interbank Offered Bank Rate (Read and Beißer, 2021). The outbreak of the financial crisis triggered the emergence of two parallel phenomena: on the one hand, the credibility of financial institutions declined, manifested by a sharp increase in credit spreads, on the other hand, the cost of longer-term funding increased, indicated by an increase in the liquidity premium. As a result of the overlap between these two processes, IBOR rates began to be quoted at a level that diverged from both the cost of funding for the banking sector (represented by corporate and retail deposits) and the expected cost of overnight liquidity (represented by OIS contracts). Thus, IBOR rates have lost the informational value they had before the outbreak of the financial crisis (Mielus, 2016).

The distrust in the market that the scandal caused drew regulators' attention to the flawed mechanism for setting this benchmark, which relied on a subjective survey of future rates rather than the actual transactions that take place in the market. In addition to the distrust that the scandal engendered, it has resulted over time in a reduction in the number of panel banks that began to report their borrowing costs to the LIBOR administrator, and those that did so increasingly relied on "market and transaction-based expert judgment". Furthermore, five of the ten currencies that were once quoted have since ceased to be reported (see Table 1) and several maturities have been withdrawn (Tuckman, 2023). In addition, regulations imposed in the aftermath of the global financial crisis discouraged the use of unhedged interbank funding. At the same time, liquidity for longer maturities deteriorated after the crisis, as banks generally shifted towards funding sources with shorter maturities (National Bank of Canada, 2022).

3. TOWARDS REFORM OF INTEREST RATE BENCHMARKS

As a result, there have been calls for initiatives to ensure the robustness of interest rate benchmarks. This started with an independent review by Martin Wheatley (HM Treasury, 2012), which became the seedbed for subsequent benchmark reform efforts by national authorities and international organisations. One initiative, was the agreement of financial regulators around the world, including

[8] Penalties imposed on financial institutions for index manipulation can be found (Łogin and Strucka, 2015).

the International Organisation of Securities Commissions and the BIS, to make a coordinated effort to reform benchmark rates (Hou and Skeie, 2014). At the center of these deliberations was the Financial Stability Board, which developed its recommendations. These recommendations included a multi-step approach, through the following actions (FSB, 2014):

i) improving the credibility and robustness of existing interbank offered rates (IBORs);
ii) developing near-risk-free reference rates (RFRs) without credit risk;
iii) promoting the use of existing IBORs and RFRs in a manner tailored to the characteristics of financial instruments and financial transactions.

This was turned upside down in July 2017 when the head of the UK's Financial Conduct Authority (FCA) Andrew Bailey announced the possibility of permanently discontinuing the LIBOR benchmark after the end of 2021 (Bailey, 2017).

The speech shifted the focus from seeking to strengthen LIBOR to withdrawing it, in favour of a move to new interest rate benchmarks (FCA, 2017a). In doing so, Bailey indicated that such a change should be planned and orderly, so that markets would avoid undue risks and costs associated with abruptly ceasing to publish LIBOR rates (FCA, 2017b). The FCA Director's statement caused the focus to shift from a broader, global analysis to individual jurisdictions. Since then, central banks have taken a leading role in the reforms, acting as existing benchmark administrators as well as developing plans for a gradual transition from LIBOR rates towards overnight rates based on actual transactions.

The final phase of the LIBOR transition began in March 2021. This was the announcement that all 35 LIBOR settings published by the IBA would be permanently discontinued in the future or lose their representativeness (see Table 3).

Table 3. Cessation and non-representation guidelines issued by ISDA

Currency and LIBOR	Tenors	Cessation immediately after 31.12.2021	FCA may require continued publication on a synthetic basis beyond 31.12.2021	Cessation immediately after 30.06.2023	FCA may require continued publication on a synthetic basis beyond 30.06.2023
GBP	ON, 1W, 1M, 2M, 3M, 6M,12M	ON, 1W, 2M, 12M	1M, 3M, 6M		
USD	ON, 1W, 1M, 2M, 3M, 6M,12M	1W, 2M		ON, 12M	1M, 3M, 6M
CHF	SN, 1W, 1M, 2M, 3M, 6M,12M	All 7 settings			

JPY	SN, 1W, 1M, 2M, 3M, 6M,12M	ON, 1W, 2M, 12M	1M, 3M, 6M		
EUR	ON, 1W, 1M, 2M, 3M, 6M,12M	All 7 settings			
Total	**35**	**24**	**6**	**2**	**3**

Source: FCA (2021).

As a result of the action taken, today we have alternative reference rates (ARRs) in five currency areas (see Table 4) as the basis for the new regime. ARRs are considered to be more robust and reliable interest rate indicators than LIBOR because their calculation is based on actual transactions in the underlying market. Being based on actual transactions rather than expert judgement makes ARRs more representative of the actual cost of funding in the underlying markets. It also makes it more difficult to manipulate such an index because shifting the transactional index requires transactions of significant denominations, which involves risk and exposes the bank to potential losses from open exposure (Mielus, 2016). ARRs have separate properties and a separate administrator, whereas LIBOR was managed by a single administrator for all currencies.

Table 4. Overview of benchmarks by country

Conutry/ Jurisdiction	IBOR rate	Alternative RFR (nature of the rate)
United Kingdom	GBP LIBOR	SONIA (Unsecured)
United States	USD LIBOR	SOFR (Secured)
Euro area	EUR LIBOR	ESTR/EuroSTR (Unsecured)
	EURIBOR	
TONA	JPY LIBOR	TONA (Unsecured)
	TIBOR	
	EUROYEN TIBOR	
Switzerland	CHF LIBOR	SARON (Secured)

Source: Read and Beißer (2021).

If we compare the introduced ARRs to LIBOR rates we can identify differences in terms of various parameters (see Table 5).

In addition to risk-free rates, some currencies have other IBORs, such as EURIBOR in the euro area and TIBOR in Japan, which are used as other substitutes

instead of LIBOR in these jurisdictions. In addition, various authorities and industry working groups have set out contingency arrangements for IBORs that apply if the reference rate underpinning the product is permanently discontinued, ceases to be available or, prior to discontinuation, it is announced that the rate is no longer or at some point in the future will no longer be representative.

Table 5. Features of LIBOR and ARR rates

LIBOR rate features	ARR features
1. Forward looking. 2. Based on a consistent methodology across the five currencies. 3. Fixing in advance at 11 am GMT. 4. Cashflows based on Libor rates are known in advance. 5. Cashflows can be paid in any number of intermediate installments. 6. Reflects the cost of borrowing by panel banks and, therefore, includes a credit premium component. 7. Libor derivatives can very volatile especially near a fixing date. 8. Rates are less reflective of actual borrowing levels. 9. Submissions from panel banks. 10. Rates do not reflect broad demographics and geographies	1. Backward looking. 2. Based on different methodologies for each currency. 3. Rates are published the following day by noon for the previous day. 4. ARR term rates are daily averaged rates. 5. Averaging of term rates makes them less volatile. 6. Term rates not known in advance. 7. ARR fixing tables are required. 8. Are approximated by risk-free rates and therefore have no credit premium. 9. Rate is subject to supply/demand fluctuations and jumps. 10. Based on actual transactions in liquid markets

Source: Burgess (2020).

3.1. The course of interest rate benchmark reform in Japan

Let us turn to the initiatives undertaken in Japan. When interest rate benchmark reform began, the standard interest rate benchmarks for the Japanese yen were JPY LIBOR published by the British Bankers Association (BBA) and TIBOR published by the Japanese Bankers Association (JBA). When the first stage of benchmark reform began in London, parallel steps were taken in Japan to increase the credibility of the existing Tokyo Interbank Overnight Rate (TIBOR)[9].

[9] The TIBOR benchmark is a twin benchmark to LIBOR, which was established in 1995 in the Tokyo market following the success of LIBOR. The benchmark, is widely used as an interest rate benchmark for domestic credit and other transactions. The administrator of the benchmark from the beginning was the Japan Bankers Association, which began calculating and publishing the index.

The first was the transfer of authority for the Japanese TIBOR benchmark to the JBA TIBOR Administration (JBATA), which was established in 2014 within the JBA. This made the TIBOR benchmark subject to regulation by the Financial Services Agency (JFSA) under the Financial Instruments and Exchange Law (Amamiya, 2020). One of the key concepts of the reform completed in 2017 was to standardise and clarify the processes for calculating/defining submission rates to make the JBA TIBOR more anchored to actual transactions.

At the same time, discussions on the identification of a near-risk-free rate in Japanese yen (JPY) were ongoing within the framework of the JBA TIBOR Study Group, which has been active since April 2015. Reference Rate Study Group, as recommended by the Financial Stability Board (FSB) in its *Reforming Major Interest Rate Benchmarks*. It resulted in the announcement in December 2016 of the decision to become the unhedged overnight call rate calculated and published by the Bank of Japan (Study Group on Risk-Free Reference Rates, 2016).

In the second stage of the reform (Bailey's speech in 2017), the Interbank Japanese Yen Interest Rate Benchmark Committee was established, consisting of financial institutions, institutional investors and non-financial corporations and chaired by the Bank of Japan (Amamiya, 2020). During the public (market) consultation conducted by this Committee in 2019, it was decided that one of the alternatives in the market would be the unhedged Tokyo Overnight Average Rate (TONA), which would be the rate for the Japanese yen without credit risk. AS this rate did not provide market participants with prior knowledge and certainty of their interest obligations, the JFSA decided to develop a term risk-free rate called the Tokyo Term Risk Free Rate (TORF) based on the OIS rate.

The third stage of the reform, which can be dated to 2021 (the announcement of the permanent cessation of LIBOR quotations), was the actual implementation of the JPY LIBOR transition measures by each individual market participant. Each participant had to consider the optimal choice of benchmark options depending on the financial products they own, the nature of the transactions they are dealing with and their own individual business needs. In order to support each market participant's initiatives, the Committee provided the results of various discussions and considerations, as well as several recommendations regarding the transition to LIBOR. Among those provided by the Committee is the 'Roadmap for Preparing for the Removal of Japanese Yen LIBOR' (Cross-Industry Committee on Japanese Yen Interest Rate Benchmarks, 2021). It identifies milestones that market participants should consider when developing their own transition plan.

3.2. Alternative interest rate benchmarks to JPY LIBOR

As shown in Table 1 in the appendix, there are three alternatives available in Japan after the reform, including interbank rates as well as risk-free rates.

The first option is the TIBOR benchmark, which has been in place since 1995, when the Japan Bankers Association began calculating it. Currently, TIBOR is available in two currencies in yen and EUROYEN. It is calculated and published by JBATA as the prevailing market rate based on quotes for 5 different maturities (1W, 1M, 3M, 6M, 12M) provided by reference banks, most of which are Japanese banks (www1) as of 10:00 a.m. each business day (Bank of Japan, 2017a).

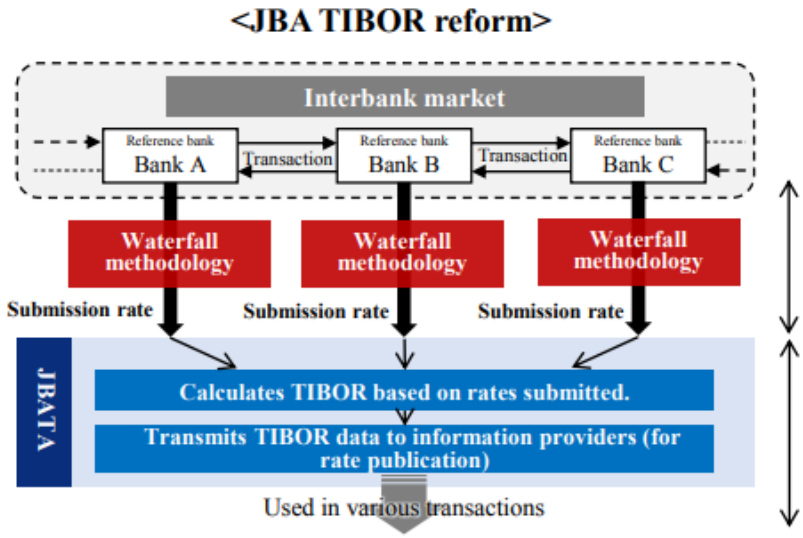

Figure 1. Mechanism for determining JBA TIBOR rates

Source: JBA TIBOR Administration (2021).

JBA TIBOR is calculated based on JPY money market data, using the "waterfall methodology" under the JBA TIBOR reform carried out between 2014 and 2017. This methodology standardized and clarified the calculation/determination processes for rates submitted by reference banks, eliminating any arbitrarily manipulated rates to the greatest extent possible (JBA TIBOR Administration, 2021) (see Figure 1).

JBATA excludes the two highest and two lowest reference rates for each maturity and takes the average of the remaining rates.

JBA TIBOR is supported by market participants as one of the main alternative benchmarks to "JPY LIBOR," especially for loans. Once JPY LIBOR is discontinued, TIBOR is expected to be more widely used in the lending market, as it provides certainty of upfront cash flow, and has basic characteristics similar to LIBOR such as exposure to bank credit risk (JBA TIBOR Administration, 2021).

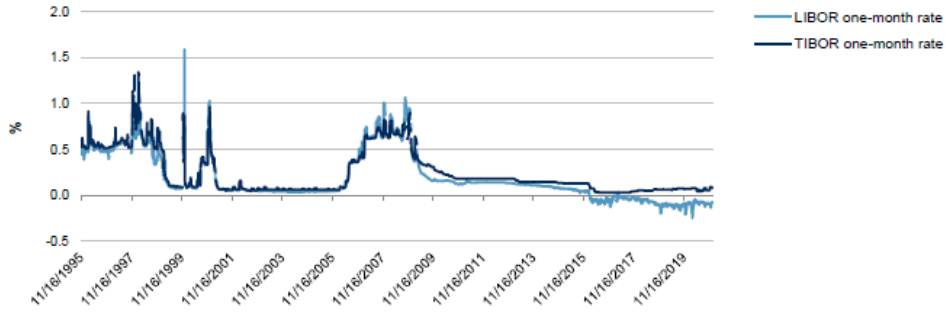

Chart 1. Historical results for TIBOR 1M and LIBOR 1M rates

Source: S&P Global Ratings (2021).

Table 6. Difference between TIBOR and LIBOR

	TIBOR 1M minus LIBOR 1M (%)	TIBOR 3M minus LIBOR 3M (%)	TIBOR 6M minus LIBOR 6M (%)
Mean	0,051	0,070	0,064
Median	0,037	0,069	0,066
Observation period	16.11.1995 – 30.12.2020		

Source: S&P Global Ratings (2021).

Comparing TIBOR and LIBOR, the former rate tends to be higher than LIBOR for all tenor categories, but their historical movements are similar (see Chart 1 and Table 6). Looking at data over the past 25 years, the gap between the two rates widened between 1997 and 1998, during which time large Japanese financial institutions declared bankruptcy, and uncertainty about the credit risk associated with the financial sector increased (S&P Global Ratings, 2021).

The second option available is the risk-free rate (RFR) for the Japanese yen, the Tokyo Overnight Average Rate (TONA)[10]. TONA is a benchmark interest rate, also known as a reference rate or benchmark rate. TONA is a benchmark interest rate that serves as a measure of the cost of borrowing in the Japanese yen

[10] Sometimes referred to as TONAR.

unsecured money market according to which selected financial institutions lend to each other with a maturity of one day (Bank of Japan, 2017b). It represents the volume-weighted average of the rates of all overnight transactions settled on the same day as the transaction day, but with a maturity date of the next business day (Bank of Japan, 2017a). It is calculated to three decimal places. TONA was officially introduced in 2016 and is administered and published in arrears at 10 a.m. Tokyo time by the Bank of Japan (Bank of Japan, 2017a). Unlike LIBOR, TONA is less sensitive to the credit risk of financial institutions and does not contain significant forward risk.

In order to use TONA as a successor to LIBOR, the compound rate must be generated in a period corresponding to the corresponding maturity setting of LIBOR. If we compare LIBOR and TONA rates with each other over the past 25 years, we can see that all 1M, 3M, 6M LIBOR rates have trended higher than the corresponding TONA compounded rates (see Chart 2 and Table 7).

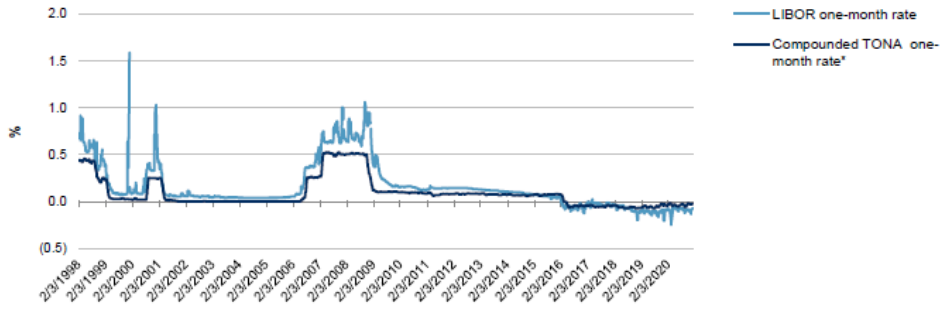

Chart 2. Comparison of TONA 1M and LIBOR 1M rates for composite rates

Source: S&P Global Ratings (2021).

Table 7. Difference between composite TONA and LIBOR

	LIBOR 1M minus TONA 1M (%)	LIBOR 3M minus TONA 3M (%)	LIBOR 6M minus TONA 6M (%)
Mean	0,066	0,113	0,172
Median	0,047	0,067	0,090
Observation period	03.02.1998 – 30.12.2020	04.03.1998 – 30.12.2020	06.07.1998 – 30.12.2020

Source: S&P Global Ratings (2021).

The averages and medians of long-term historical LIBOR rates are higher than the compounded TONA rates. This should be attributed to the credit risk reflected in market rates. On the other hand, since 2016 we have observed compound TONA exceeding LIBOR, mainly LIBOR 1M, with the spread limited to about 10 basis points. The correlation between compounded TONA and LIBOR was relatively high. Between 2007 and 2009, LIBOR increased more than the composite TONA. However, this should be attributed to the increased credit risk of financial institutions during the financial crisis (S&P Global Ratings, 2021).

The FCA, as well as the Bank of Japan, expects the vast majority of Japanese yen markets to be based on Compound TONA from below, i.e., backward looking rates. Compounded TONA[11] is recommended as an alternative interest rate benchmark to JPY LIBOR for loans, bonds and derivatives.

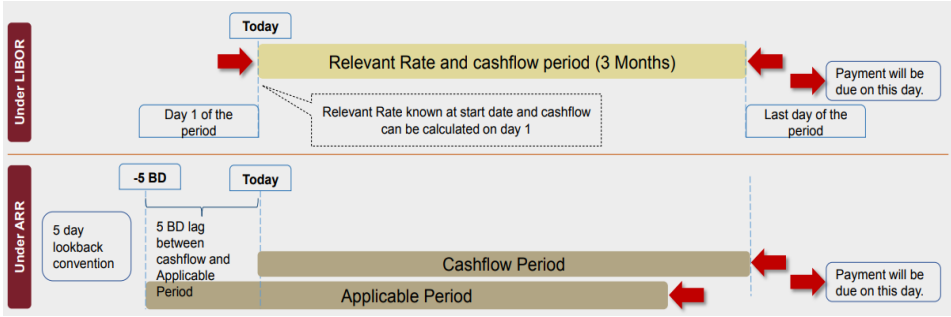

Figure 2. Illustration of the difference in the relevancy rate and the method of calculating the RFR compared to LIBOR

Source: Japanese Bankers Association (2021).

If the Compounded O/N RFR on loans is used, the rate for the entire period is not known here until the end of the period. Under the retrospective approach, interest payable during the interest period is determined by the RFR within the "observation period" instead of the interest period. The observation period begins and ends within a few business days before the actual interest period. This allows the parties to know the interest that will be payable at the end of that interest period a few days before the due date – see Figure 2 (Japanese Bankers Association, 2021).

[11] Interestingly, the Compounded TONA was introduced as early as 1997 as a financial instrument reflecting the Bank of Japan's monetary policy and was then referred to as the Overnight Index Swap (OIS). At the time, it was a short-term financial instrument with a limited transaction period. It is currently referred to as the TONA swap (Takata, 2021).

The third option, in the Japanese market, is the Tokyo Term Risk Free Rate (TORF). This rate received the most support in a public consultation held in November 2019 by the Inter-Industry Committee on Japanese Yen Interest Rate Benchmarks. The TORF is an interest rate benchmark based on the overnight index swaps (OIS) rate, a fixed interest rate exchanged in interest rate swaps (IRS) for a floating rate calculated using a capitalization in arrears for each coupon period (Amamiya, 2021). The TORF rate is calculated by QUICK Benchmarks Co., Ltd (QBS) at around 5:00 p.m. on the same day, on business days in Tokyo only, based on data on derivative transactions whose underlying asset is an unsecured overnight call rate that hardly contains the credit risk of financial institutions. Quick calculates interest rates for periods such as 1M, 3M and 6M based on data on derivative transactions (www2; www3). The company that administers TORF publishes the production index starting in April 2021.

The first reason for market participants to choose the TORF is that the reference index adopts "up-fixing," whereby the applicable interest rate is set at the beginning of the period. The second reason is that the definition of TORF has been standardized in line with LIBOR (except for some aspects), so that the previous system can be adapted to the new application with minor modifications. Third, TORF is more robust because it is calculated based on the execution data observed in the market, rather than the type of "compounding" used by conventional LIBOR.

Theoretically, TORF is risk-free and should be lower than LIBOR because it does not involve the credit risk of a financial institution. A comparison of published prototype TORF and LIBOR data in 2020 shows that the prototype TORF remained higher than LIBOR rates in the 1M term category. However, for 3M and 6M terms, LIBOR was higher (S&P Global Ratings, 2021).

In addition to the characteristics of the new RFR-based benchmarks discussed above, transitional issues are of great importance. The most pressing of these was the migration of existing exposures tied to the critical LIBOR index[12] to the new benchmarks. This is because trillions of dollars worth of contracts will still be in effect during this time. Of some convenience, it should be noted that the FCA, in accordance with Article 23d(2) of the BMR (OJ L 171, 29.6.2016), has authorized the temporary use of synthetic LIBOR yen rates in all legacy LIBOR contracts, hard legacy contracts, other than cleared derivatives that have not been amended on or before the end of 2021[13].

The LIBOR methodology applicable to JPY LIBOR immediately prior to the designation of 1M, 3M and 6M JPY LIBOR interest rates as Article 23A (OJ L 171, 29.6.2016) benchmarks became effective on January 1, 2022 and will last for

[12] LIBOR has been designated as a Critical Reference Indicator for BMR purposes.

[13] Note, however, that synthetic LIBOR settings are no longer representative of the market or economic reality as measured by JPY LIBOR.

one year. It was designed to produce an average rate for those LIBOR settings at which large, internationally active leading banks with access to the wholesale unsecured funding market could fund themselves. The FCA requires the IBA to determine 1M, 3M and 6M LIBOR in JPY in accordance with the BMR Article 23d notice using Tokyo Term Risk Free Rates (TORF) data provided by QUICK Benchmarks Inc. plus an appropriate ISDA fixed spread adjustment (median of the last five years) for each LIBOR setting.

CONCLUSIONS

The evolution that has taken place in recent years (from LIBOR to alternative risk-free rates) has required some planning and a great deal of work to be done in each country, adding to the difficulty of the reform as a large-scale project involving a huge number of stakeholders. The project was demanding if only because stakeholders had different needs and it was necessary to identify an interest rate benchmark as a common infrastructure. Importantly, global coordination was crucial to the reform of interest rate reference indices due to the wide range of agreements. This collective preparation enabled a smooth transition in legal and economic terms and ensured the uninterrupted functioning of the market (Amamiya, 2020).

In light of the above, the questions arise: was it possible to find a benchmark that was both better than LIBOR and had the characteristics of an ideal benchmark, which were mentioned in the introduction of the article? In answering these questions, the Japanese market described here will be used. Then the first question could be answered yes, the second question no longer.

Expanding on the presented statement, the following analysis should be shown starting with the JPY LIBOR rate. LIBOR, although imperfectly, fulfills the second and third characteristics of an ideal benchmark mentioned above, serving as both a real reference rate and a forward benchmark that reflects fluctuations in banks' marginal funding costs. However, it does not meet the first criterion for several reasons. First, the LIBOR benchmark had a design flaw in that its value reflects the declaration of its participants rather than actual transactions. Second, the low activity in the interbank deposit markets stood in the way of creating a viable benchmark based on transactions using interbank rates. Third, the increased dispersion of individual banks' credit risk since 2007 has undermined the adequacy of the aforementioned benchmark. In addition, money market prices have become more sensitive to liquidity and credit risk, as banks reduce their term lending to each other and increasingly turn to non-bank institutions for unsecured term funding.

Turning now to the described benchmark reform in the Japanese market, it should be noted that in this market there are three alternative options to choose

from including both interbank rates and risk-free rates. These rates are referred to as: TONA, TIBOR and TORF. Under these circumstances, market participants must consider the optimal choice of comparative options depending on their financial products, the nature of the transactions they are dealing with and their own individual business needs. So, the key conclusion is that the ending rate reform in Japan did not opt for a single reference rate that could serve every possible purpose. As a result of this solution, new alternative benchmark rates (TIBOR, TONA, TORF) are now available in the Tokyo market, providing robust and reliable rates well suited to a variety of purposes and market needs.

Thus, summarizing the benchmark reform in the Japanese market, it can be mentioned that the reform has been carried out quite well, and the rates proposed as alternatives are well capable of replacing the JPY LIBOR rate. However, judging whether they are better than the LIBOR rate, we can say yes because they are based on actual transactions, so they appear to be more robust. With that conclusion it is important to bear in mind that there is not just one rate in the market, but several of them.

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APPENDIX

Table 1. JPY LIBOR and alternative reference rates

	JPY LIBOR	JBA TIBOR	Euroyen TIBOR	TONA O/N	TONA (Compound in Arrears)	TORF	Synthetic LIBOR
Method	Forward looking	Forward looking	Forward looking	Backward looking	Backward looking	Forward looking	Forward looking
Published rate	S/N, 1W, 1M, 2M, 3M, 6M, 12M	1W, 1M, 3M, 6M, 12M	1W, 1M, 3M, 6M, 12M	O/N	Calculated average term 30D, 90D, 180D	1M, 3M, 6M published term	1M, 3M, 6M
Known at start/end of the interest period	Start (in advance)	Start (in advance)	Start (in advance)	End (in arrears)	End or shortly before (in arrears)	Start (in advance)	Start (in advance)
Credit component	Yes	Yes	Yes	No	No	No	TORF *(360/365) plus ISDA fixed spread adjustment
Publication	Daily in advance	Daily in advance	Daily in advance	Daily in arrears	Daily in arrears by QUICK Calculated	Daily by QUICK In advance	ICE BA
Use cases							
Derivatives	End of validity December 31, 2021	An existing rate in a multi-rate environment	An existing rate in a multi-rate environment (it will be phased in 2024 r)	Input into TONA average use case shown to the right	The main alternative rate in a multi-rate environment	May be used, although primary rate for derivatives should be TONA	The FCA has confirmed to permit legacy use of synthetic yen LIBOR in all tough legacy contracts, expect cleared derivates, from 1 January 2022 until 31 December 2022. The synthetic rates will not be available for use in any new contracts.
Bonds	As above	As above	As above	As above	Alternative rate in a multi-rate environment	Alternative rate in a multi-rate environment. Primary rate for recommended fallbacks	
Loans and other cash products	As above	As above	As above	As above	As above	As above	

Source: PwC, 2021.

WPŁYW ZMIAN STAWEK LIBOR JPY NA REGULACJE I ROZWÓJ ALTERNATYWNYCH BENCHMARKÓW W JAPONII

Streszczenie

Cel artykułu/hipoteza: Osią rozważań prowadzonych w niniejszym artykule jest ostateczny wybór benchmarków przez Japonię, w której funkcjonowała stopa LIBOR wyrażona w jenie japońskim. Natomiast głównym celem artykułu jest próba odpowiedzi czy nowo wybrane alternatywne wskaźniki referencyjne na rynku tokijskim spełniają cechy idealnej stopy.

Metodyka: W opracowaniu dokonano przeglądu literatury, opracowań regulatorów i administratorów indeksów, prezentując etapy reformy, wybór alternatywnych stóp referencyjnych oraz dokonując analizy porównawczej z dotychczas funkcjonującą stopą LIBOR. Ze względu na przedmiot prowadzonej analizy skorzystano z podstawowych metod statystycznych.

Wyniki/Rezultaty badania: Przebieg reformy benchmarków na rynku japońskim wskazuje, że została ona przemyślana i wdrożona z sukcesem, a stawki zaproponowane jako alternatywy są w stanie dobrze zastąpić stopę LIBOR JPY. Należy jednak odnotować, że na rynku tym zdecydowano się na istnienie trzech alternatywnych opcji do wyboru obejmujące zarówno stawki międzybankowe, jak i stopy wolne od ryzyka. Mowa tu o stopach: TONA, TIBOR i TORF. W tych okolicznościach uczestnicy rynku muszą rozważyć optymalny dobór opcji porównawczych w zależności od posiadanych produktów finansowych, charakteru transakcji, z którymi mają do czynienia oraz własnych indywidualnych potrzeb biznesowych. Oceniając jednak czy są lepsze od stopy LIBOR można powiedzieć, że tak ponieważ są oparte na rzeczywistych transakcjach, więc wydają się być solidniejsze.

Słowa kluczowe: referencyjna stopa procentowa, LIBOR, alternatywna stopa, TONA, TIBOR, TORF.

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