Appendix

Appendix 1-a: Outstanding volume of transactions referencing JPY LIBOR, etc.

Outstanding volume of transactions referencing key IBORs

(tril. U.S. dollars)

Currency	Volume
USD LIBOR	150
GBP LIBOR	30
CHF LIBOR	6.5
EUR LIBOR	2
JPY LIBOR	30
Ref. EURIBOR	150
Ref. TIBOR	5

Assets referencing JPY LIBOR

(tril.yen)

Asset class		Volume
Loans	Corporate loans(bilateral)	68
	Syndicated loans	75
Bonds	Floating rate notes	3
OTC derivatives	IR swaps	2,453
	Swaption	235
	Basis swaps	197
	X-currency swaps	108

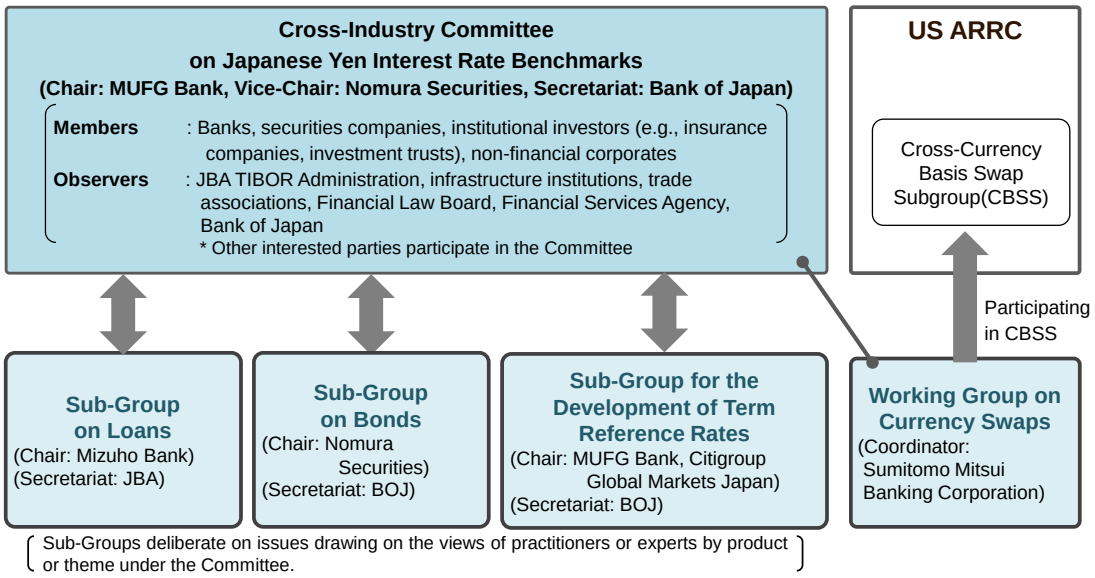
Note: Figures include transactions overseas. The volume of OTC derivatives shows the outstanding notional amount.
Source: “Market Participants Group on Reforming Interest Rate Benchmarks” (Mar.2014).

Appendix 1-b: Risk-Free Reference Rates in LIBOR Currencies

Currency Note 1	USD <FRB・FRBNY>	GBP <BOE・FCA>	CHF <SNB>	EUR <ECB>	JPY <Bank of Japan>
Identified RFR	Overnight Treasury GC repo rate (SOFR)	Uncollateralized overnight rate (SONIA)	Overnight GC repo rate (SARON)	Uncollateralized overnight rate (€STR) Note 2	Uncollateralized overnight call rate (TONA)
Date of identification of RFR	June 2017	April 2017	October 2017	September 2018	December 2016
Secured or unsecured	Secured	Unsecured	Secured	Unsecured	Unsecured
Administrator	NY Fed	Bank of England	SIX Swiss Exchange	ECB	Bank of Japan
Alternative Benchmarks for LIBOR	Term reference rates based on SOFR	Term reference rates based on SONIA	SARON (Compounding)	Term reference rates based on €STR and EURIBOR	Term reference rates based on TONA and TIBOR

Note:1. < > shows the Secretariats of each deliberating body.
2. To be published in Oct. 2019.

Appendix 1-c: The Framework for Deliberation in Japan



Members and Observers of the "Cross-Industry Committee on Japanese Yen Interest Rate Benchmarks"

Members

(Banks)
- MUFG Bank（Chair）
- Mizuho Bank
- Sumitomo Mitsui Banking Corporation
- Bank of Yokohama
- Bank of Nagoya
- Deutsche Bank

(Institutional investors)
- Japan Post Bank
- The Norinchukin Bank
- Shinkin Central Bank
- The Dai-ichi Life Insurance Company
- Tokio Marine Holdings
- Daiwa Asset Management

(Securities companies)
- Nomura Securities（Vice-Chair）
- Daiwa Securities
- Goldman Sachs
- Morgan Stanley MUFG Securities

(Non-financial corporates)
- Marubeni Corporation
- Mitsui Fudosan
- East Japan Railway Company
- Mitsubishi UFJ Lease & Finance
- Nippon Telegraph and Telephone Corporation

Observers

- JBA TIBOR Administration
- International Swaps and Derivatives Association
- Financial Law Board
- Tokyo Financial Exchange
- Japan Securities Clearing Corporation
- Japanese Bankers Association
- Japan Securities Dealers Association
- Financial Services Agency
- Bank of Japan

Appendix 1-d: Overview of Deliberation by Currency (Development of Term Reference Rates)

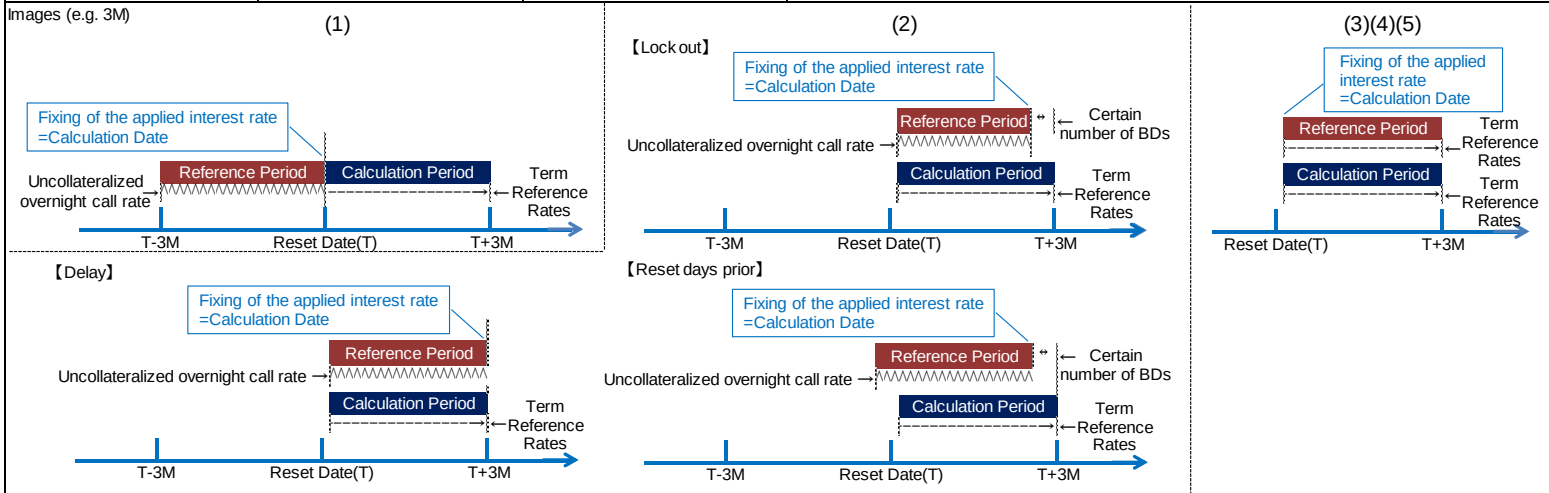
Currency	Status of Deliberation
USD	・ The ARRC is deliberating to develop a term reference rate based on future or OIS referencing RFR (SOFR). ・ The term reference rate is recommended to be prioritized as a replacement benchmark of USD LIBOR when fallbacks are triggered.
GBP	・ The Working Group on Sterling Risk-Free Reference Rates is deliberating to develop a term reference rate based on OIS referencing RFR (SONIA).
CHF	・ The National Working Group on Swiss Franc Reference Rates recommended using O/N RFR (SARON) compounding as term reference rates (while shelving the development of term reference rates based on OIS referencing SARON).
EUR	・ The Working Group on Euro Risk-Free Rates recommended calculating a term reference rate based on OIS referencing RFR (€STR). ・ The term reference rate is assumed to be used as a replacement benchmark for EURIBOR when fallbacks are triggered[1].
[Reference] ISDA (Derivatives)	・ ISDA conducted a public consultation on fallbacks for JPY, GBP, and CHF LIBOR (the overwhelming majority of respondents preferred O/N RFR Compounding (Fixing in Arrears)). ・ ISDA is now conducting a supplemental consultation for USD LIBOR and others.

[1] This issue comes from the context of the EU Benchmark Regulation which requires inclusion of a fallback provision.
https://www.ecb.europa.eu/paym/initiatives/interest_rate_benchmarks/WG_euro_risk-free_rates/shared/pdf/20190227/2019-02-27_WG_on_euro_RFR_meeting_Minutes.pdf

Appendix 2-a: Alternative Benchmarks Overview

Item \ Option	(1) O/N RFR Compounding (Fixing in Advance)	(2) O/N RFR Compounding (Fixing in Arrears)	(3) Term Reference Rates (Swap)	(4) Term Reference Rates (Futures)	(5) TIBOR
Underlying rate	Uncollateralized overnight call rate (TONA)		JPY OIS	Overnight call rate futures	TIBOR
Fixing (Advance / Arrears)	Fixing in advance	Fixing in arrears	Fixing in advance		
Reference Period	Certain period dating back from the Reset Date	Certain period from the Spot Date based on the Reset Date			
Consistency with the Calculation Period for interest on financial instruments	No match	Near match (However, there may be restrictions on the Reference Period)	Match in principle		
End Date	Reset Date	Certain number of business days prior to the Calculation Period End Date/ Same date as the Calculation Period End Date			

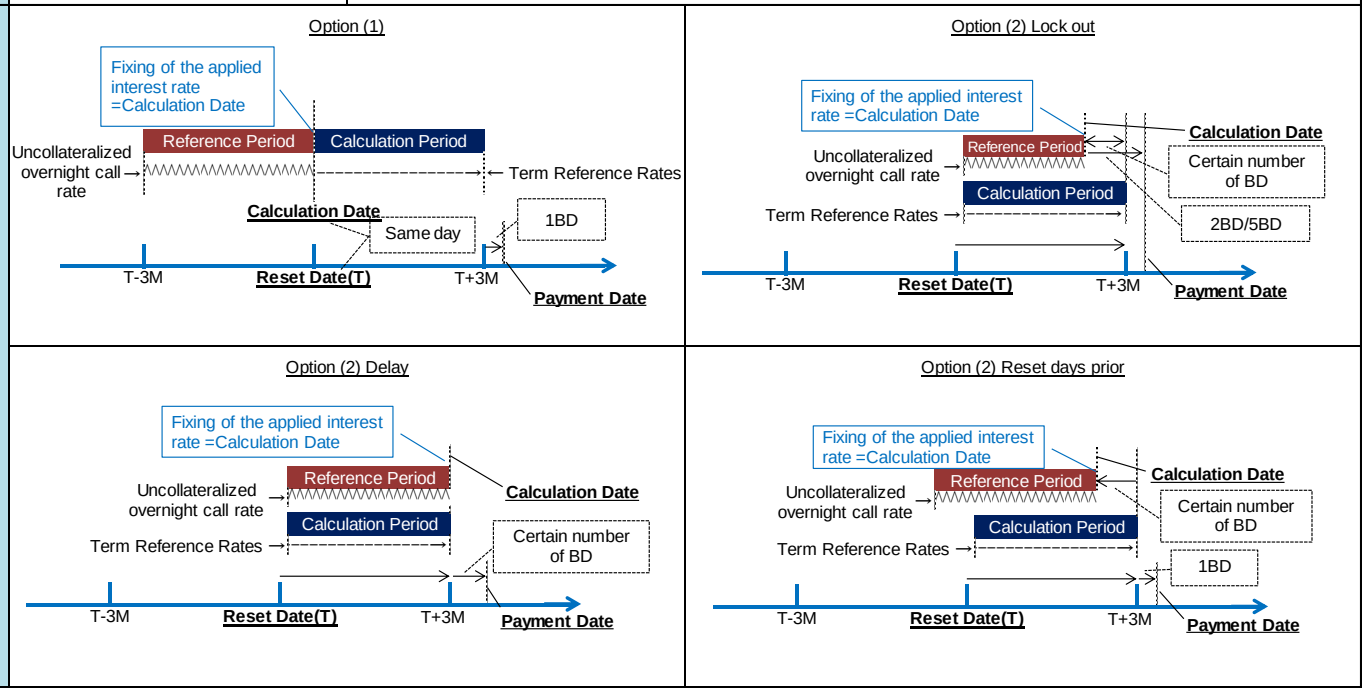
Images (e.g. 3M)



* The final requirements will be decided based on the conventions for other currencies and for cross-currency basis swaps.

* As for the calculation methodologies for options (1) and (2), the "simple average" could also be used in addition to "compounding," taking account of precedents overseas. However, the final requirements will be decided based on the conventions for other currencies and for cross-currency basis swaps.

Appendix 2-b: Details of Option (1) and Option (2)

<table>
<tr><td rowspan="2">Item</td><td rowspan="2">Option (1)</td><td colspan="3">Option (2)</td></tr>
<tr><td>Lock out</td><td>Delay</td><td>Reset days prior</td></tr>
<tr><td>Interval between the Calculation Date and the Reset Date or the Payment Date</td><td>Calculation Date = Reset Date</td><td>2-business day and 5-business day interval between the Calculation Date and the Payment Date</td><td colspan="2">(The number of business days is not relevant to the calculation of interest rates)</td></tr>
<tr><td>Calculation methodology for interest rates and daycount fraction</td><td colspan="4">Calculate by compounding RFR without adding spreads*
Act/365</td></tr>
<tr><td>Calculation Period</td><td>—</td><td colspan="3">Set the Calculation Period based on the Reset Date and tenor</td></tr>
<tr><td>Images</td><td colspan="4"> 
</td></tr>
</table>

* When the final requirements are decided, it is necessary to be aware that there are cases overseas where the simple average is used, in addition to compounding and that there are several cases overseas regarding the number of business days from the last day of the Calculation Period to the Payment Date.

Appendix 2-c: Requirements[2] and Practical Issues for Option (3)

Item	Requirements	Practical issues
1. Data	・Spot-starting outright OIS transactions (tenor: 1M, 3M, 6M) ・Executed transactions on a Tokyo business day ・Centrally-cleared transactions (JSCC and LCH) ・Executed rates, notional amounts, executed date and time [executed transactions] ・Best bids and offers and other data, date and time of submission, dealer name [quote data]	・Quote data digitization by voice brokers [quote data] ・Development of a framework for data provision from voice brokers to the aggregator ・Elimination of duplicate data among voice brokers [quote data] ・Transition to CLOBs when they become available [quote data]
2. Calculation date and time / publication time	・Phase 1 and 2: Calculation date and time: 15:00 JST on a Tokyo business day ・Publication time: 17:00 JST on the same day	—
3. Data capturing time window	・Phase 1: All day (24 hours[3]) ・Phase 2: A specific time window or all day (24 hours)	・At the beginning of Phase 2, it will be deliberated whether the time window should be changed, taking account of the market conditions and for smooth transition from Phase 1 to 2.

[2] The above requirements do not deny measures taken mainly by brokers to increase OIS liquidity (e.g., introduction of auctions).
[3] From 15:01 on the previous business day to 15:00 on the calculation date. The time window will be deliberated by the minute for the time being, considering that the time window for TIBOR executed transaction data (calculation time is 11:00 JST) is from 11:01JST on the previous day to 11:00 JST on the calculation date. On the other hand, the time window for LIBOR (calculation time is 11:00 GMT) is from 11:00:01 GMT on the previous business day to 11:00:00 GMT on the calculation date.

Item	Requirements	Practical issues
4. Data capturing method	・Phase 1: Capture all data (threshold will be zero) ・Phase 2: Capture all data (threshold will be zero for the time being)	・It will be deliberated whether a threshold should be applied to each transaction data when liquidity increases. ・It will be deliberated whether a threshold should be applied to each quote data when data on notional amounts become available.
5. Calculation methodology	・If the total notional amount of executed transactions is equal to or greater than the threshold, executed transaction data will only be used. Otherwise, only quote data will be used (waterfall method). ・In the waterfall method, it is assumed that data will be prioritized for use in the order below (See Supplement for the details). (1) Executed transaction data (2) Tradeable quote data on CLOBs (3) Pair of tradeable quote data on voice brokers (bid and offer) (4) Tradeable quote data on voice brokers (5) Pair of quote data on voice brokers (bid and offer) ・An appropriate contingency plan will be deliberated in advance when the benchmarks cannot be calculated by the above waterfall (e.g., continuous use of preceding benchmarks).	・The specific threshold including the necessity of applying a threshold will be deliberated, taking account of future market conditions and the result of data validation.

Item	Requirements	Practical issues
6. Outlier check	・ Phase 1 and 2: Statistical method (percentile estimation)	・Specific percentile level will be deliberated. ・Measures to address a lack of data will also be deliberated
7.Quality-weighted average	・ Phase 1 and 2: Quote data on voice brokers will be weighted by the inverse of the spread between best bid and offer.	—
8. Data sources	Around 3 voice brokers	—

Supplement to Appendix 2-c: Details of Waterfall for Option (3)

Priority	Data	Data details	Calculation methodology	Threshold criteria moving down the hierarchy
1	Executed transaction data	Executed transaction data (notional amount is equal to or greater than the threshold) via voice brokers and/or CLOBs	Notional weighted trimmed average	Total notional amount
2	Tradeable quote data on CLOBs	Data which cumulatively fills the SMS (Standard Market Size)[4] on both the bid and offer sides will only be used. (It is necessary to set a data capturing time window. A randomized snapshot in time could be used for each subdivided time window, referring to the calculation of the ICE swap rate[5].)	Referring to the ICE swap rate and discussions in the EURWG, (1) data on each CLOB will be integrated, (2) (with respect to data at a randomized snapshot in time, for example,) volume weighted bid (VWB) and the volume weighted offer (VWO) will be calculated based on the data which cumulatively fills trades of up to the SMS, and (3) the simple average of VWB and VWO will be calculated as the volume weighted average mid-rate (VWAM). Outliers in the VWAM data will be discarded and the remaining VWAM data will be	Number of the time window in which data cumulatively fills the SMS on both the bid and offer sides

[4] The criteria that determine the range of data (bid and offer) used for the calculation of benchmarks based on notional amounts, in light of market volume.
[5] https://www.theice.com/publicdocs/ICE_Swap_Rate_Full_Calculation_Methodology.pdf

Priority	Data	Data details	Calculation methodology	Threshold criteria moving down the hierarchy
			weighted by the quality-weighted average with the inverse of the spread between VWB and VWO.	
3	Pair of tradeable quote data on voice brokers (Bid and offer)	The bid-offer pair when tradeable quote data (both bid and offer) with a specified notional amount are presented at the same time on each voice broker. The data will be treated as new data if either best bid or best offer is updated.	The simple average of best bid and best offer will be calculated as the mid-rate. All data will be weighted by the quality-weighted average with the inverse of the spread between bid and offer. (Only the notional amount of best bid and best offer are available on voice brokers. The notional amount will not be considered because it is impossible to apply the SMS for each data in the subdivided time window.)	Number of data
4	Tradeable quote data on voice brokers	Tradeable quote data on voice brokers with a specified notional amount. The data will be treated as new data if either quoted rate or notional amount is updated.	The simple average of best bid and best offer in the entire data capturing time window (e.g., all day) will be calculated.[6]	Total notional amount

[6] It could be also be an option to calculate VWB and VWO based on quote data which cumulatively fills trades of up to a certain threshold in the entire data capturing time window, and obtain VWAM by taking the simple average of VWB and VWO when the number of data becomes sufficient.

Priority	Data	Data details	Calculation methodology	Threshold criteria moving down the hierarchy
5	Pair of quote data on voice brokers (bid and offer)[7]	The bid-offer pair when quote data (both bid and offer) tradeable under a certain set of criteria such as a minimum notional amount are presented (to the same or different market participants) at the same time on each voice broker. The data will be treated as new data if either best bid or best offer is updated. The third priority data in the hierarchy which are not used because the threshold (the number of data) is not met will be added to the fifth priority data in the hierarchy.	The simple average of best bid and best offer will be calculated as the mid-rate. All data will be weighted by the quality-weighted average with the inverse of the spread between bid and offer.	Number of data

[7] Indicative quotes without a specified notional amount and which are not necessarily “tradeable under a certain set of criteria such as a minimum notional amount” could be used to ensure the sufficiency of data in Phase 1. However, additional deliberation will be conducted on whether this is the case for Phase 2.

Appendix 2-d: Comparison of Requirements for Option (3) with IOSCO Principles for Financial Benchmarks

Overview[8]	Option (3)	Reference: Implementation of IOSCO Principles by the JBA TIBOR administration[9]
Quality of the Benchmark		
Principle 6. Benchmark Design		
・The design of the Benchmark should seek to achieve an accurate and reliable representation of the economic realities of the Interest it seeks to measure, and eliminate factors that might result in a distortion of the price, rate, index, or value of the Benchmark.	・Based on the premise of adopting the waterfall method which prioritizes executed transaction data and quote data if there are no executed transaction data. ・Ensures the objectivity of quote data to some degree because the design makes use of quote data on CLOBs or, in principle, uses the best bid and best offer on voice brokers. ・Outlier data are eliminated by statistical methods (percentile estimation) and quote data on voice brokers are weighted by the quality-weighted average. ・It may be possible to verify that Term Reference Rates (Swap) appropriately reflects	・The waterfall method was introduced with a view to realizing a benchmark that is “better anchored in actual transactions.” Reference banks calculate and determine their submission rates using a calculation method that does not give rise to arbitrariness. ・Calculated as the simple average of interest rates submitted by reference banks which excludes two highest quotes and two lowest quotes from reference banks. ・Reference banks are obliged to conduct external and internal audits on an annual basis, in principle. ・The Oversight Committee performs monitoring

[8] “Principles for Financial Benchmarks Final Report” (https://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf).

[9] “Compliance with ”IOSCO Principles for Financial Benchmarks (19 Principles)” ” (published on March 7, 2019) (http://www.jbatibor.or.jp/english/%E3%80%90%E8%8B%B1%E8%AA%9E%E7%89%88%E3%80%91IOSCO%E5%8E%9F%E5%89%87%E3%81%AE%E8%87%AA%E5%B7%B1%E8%A9%95%E4%BE%A1%E7%B5%90%E6%9E%9C%20.pdf).

Overview[8]	Option (3)	Reference: Implementation of IOSCO Principles by the JBA TIBOR administration[9]
	the Interest by comparing the level of Term Reference Rates (Swap) with the compounded actual rate in the uncollateralized overnight call market.	to ensure that JBA TIBOR appropriately reflects "underlying interest" which it seeks to measure by comparing data of transactions collected from reference banks with each reference bank's submission rates.
Principle 7. Data Sufficiency		
・The data used to construct a Benchmark determination should be sufficient to accurately and reliably represent the Interest measured by the Benchmark and should be (a) based mainly on prices in an active market, and (b) anchored by observable transactions entered into at arm's length between buyers and sellers[10] in the market for the Interest *This does not mean that every individual Benchmark determination must be constructed solely of transaction data. It could result in an	・Based on the premise of adopting the waterfall method which prioritizes executed transaction data and quote data if there are no executed transaction data. ・The design makes use of quote data on CLOBs or, in principle, uses the best bid and best offer, on voice brokers. (According to the IOSCO Principles, [firm] bids and offers could be used as an adjunct to the low number of transactions.) ・No expert judgment.	・The waterfall method applies a calculation method that is based on actual transaction data of the underlying market and other relevant data, and one that avoids arbitrariness. In particular, the use of expert judgment is completely removed from 1st level to 3rd level. ・For Japanese Yen TIBOR, the amount of the transaction balance in the Japan unsecured call market (i.e., the underlying market) temporarily decreased due to the introduction of Quantitative and Qualitative Monetary Easing with Negative Interest Rates in

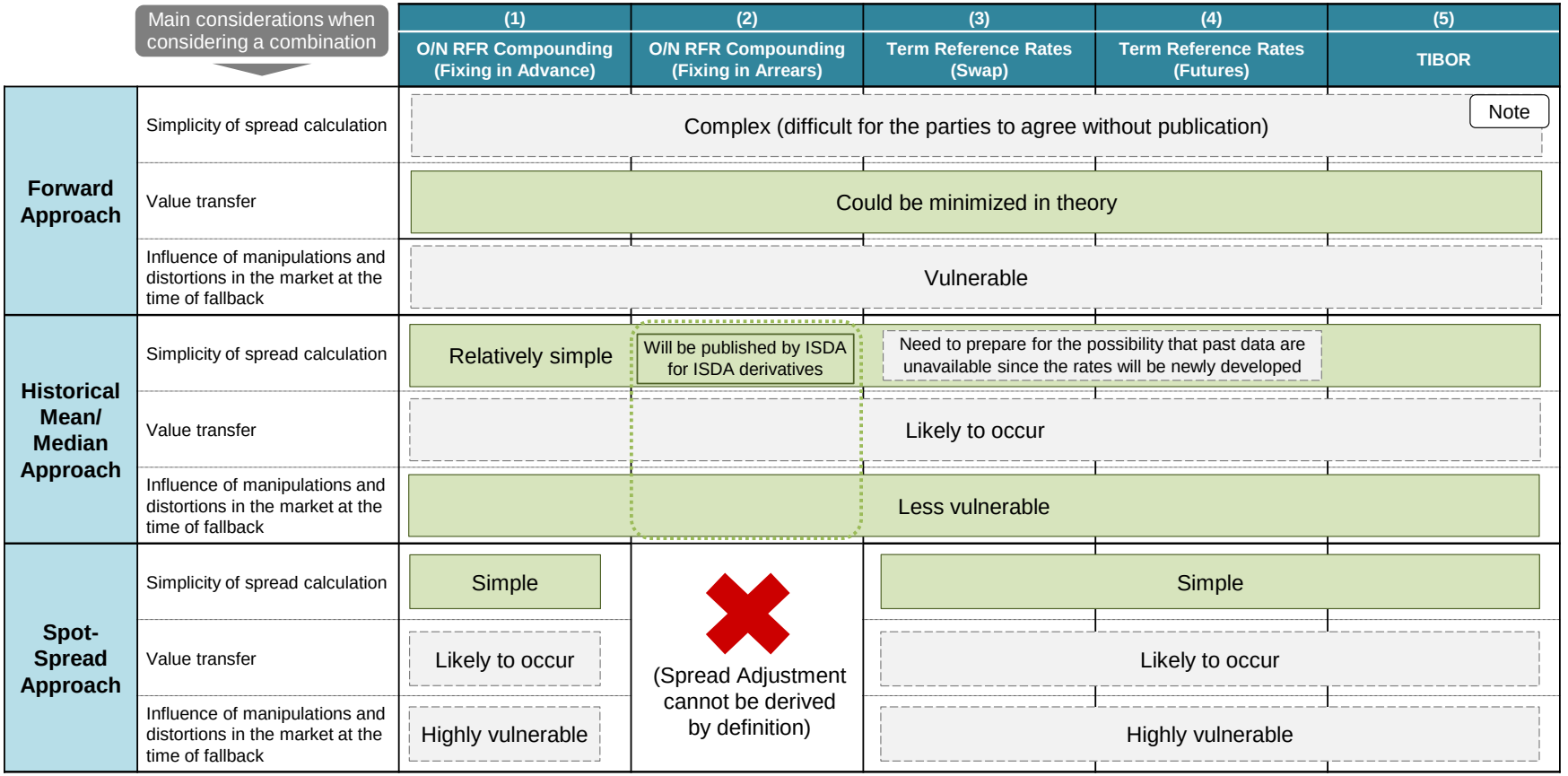
[10] A transaction between two parties that is concluded on terms that are not influenced by a conflict of interest (e.g., conflicts of interest that arise from a relationship such as a transaction between affiliates).

Overview[8]	Option (3)	Reference: Implementation of IOSCO Principles by the JBA TIBOR administration[9]
individual Benchmark determination being based predominantly, or exclusively, on bids and offers or extrapolations from prior transactions. It could be appropriate in a market where overall transaction volume is high over sustained periods, though on any given day there might be more firm bids and offers than posted transactions taking place. *A low liquidity market that reflects the commercial realities of a market and functions as a price discovery market could support a Benchmark consistent with this Principle, even though non-transactional data such as verifiable (firm) bids and offers might be used as an adjunct to the low number of transactions in compiling a Benchmark.		February 2016 but has recovered to JPY18.6 trillion (as of July 31, 2018) which is the level before the introduction of such policy. ・For all tenors, reference banks almost always determine their submission rates in the "level in which data of the underlying market (including committed quotes, indicative quotes, and linear interpolation) are used." ・There were no cases where "expert judgement" was used to calculate and determine reference rates as of the date of the self-assessment. Submission rates are calculated and determined based on various data including actual transaction data in the underlying market and other relevant data.
Principle 8. Hierarchy of Data Inputs		
・An Administrator should establish, publish, or make available clear guidelines regarding the hierarchy of data inputs and the exercise of expert judgment used for the determination of	・Based on the premise of adopting the waterfall method which prioritizes executed transaction data and quote data if there are no executed transaction data.	・JBATA sets out the waterfall method as the hierarchy of data inputs. The waterfall method is a mechanism where data of the underlying market placed at the top of the hierarchy are

Overview[8]	Option (3)	Reference: Implementation of IOSCO Principles by the JBA TIBOR administration[9]
Benchmarks. In general, the hierarchy of data inputs should include (excerpt): a) reported or observed concluded Arm's-length Transactions in the underlying interest; and b) firm (executable) bids and offers. *"IOSCO recognizes that there might be circumstances (e.g., a low liquidity market) where a confirmed bid or offer might carry more meaning than an outlier transaction. Under these circumstances, non-transactional data such as bids and offers and extrapolations from prior transactions might predominate in a given Benchmark determination.	・ The design makes use of executed transaction data if the total notional amount of executed transactions is equal to or greater than the threshold. Otherwise, only quote data are used. ・ Regarding quote data, the design prioritizes data for use in the below order. (1) Tradeable quote data on CLOBs (2) Tradeable quote data on voice brokers (3) Quote data on voice brokers ・ It is assumed that contingency plans (e.g., continuous use of preceding benchmarks) will be implemented when quote data are not updated.	referenced first, followed by data of those relevant markets highly similar to the underlying market.

Appendix 2-e: Pros and Cons of Spread Adjustment Methodologies

Spread Adjustment Methodologies	Pros	Cons
(1) Forward Approach	✓ It prevents value transfers near the date the fallback is triggered because the spread adjustment matches the expected market prices as of the business day before the fallback is triggered.	✓ Market data may not be readily available. ✓ It may be vulnerable to manipulations and distortions in the market in the run-up to the fallback. ✓ Building a model with high objectivity could be challenging in some situations. ✓ It entails a heavy administrative burden. ✓ It cannot be applied to certain replacement benchmarks.
(2) Historical Mean/Median Approach	✓ It will be determined by ISDA. ✓ It transitions to longer-term average market conditions as time passes. It captures the tendency of interest rates to fluctuate around the long-term average and ultimately ameliorates the effects of market distortions, etc. at the time of triggering. ✓ It is based on readily available information and produces objective results.	✓ It is unlikely to be present-value neutral. ✓ It entails a heavy administrative burden. ✓ It requires long time series of IBORs and replacement rates, and thus obtaining data could be difficult depending on replacement benchmarks.
(3) Spot-Spread Approach	✓ It is simple to implement and understand. ✓ It entails minor administrative burden.	✓ It could differ from expected market conditions in the future. ✓ It is unlikely to be present-value neutral. ✓ It is highly vulnerable to manipulations, etc. ✓ Possibility of diverging from actual market conditions cannot be eliminated. ✓ It cannot be applied to certain replacement benchmarks.

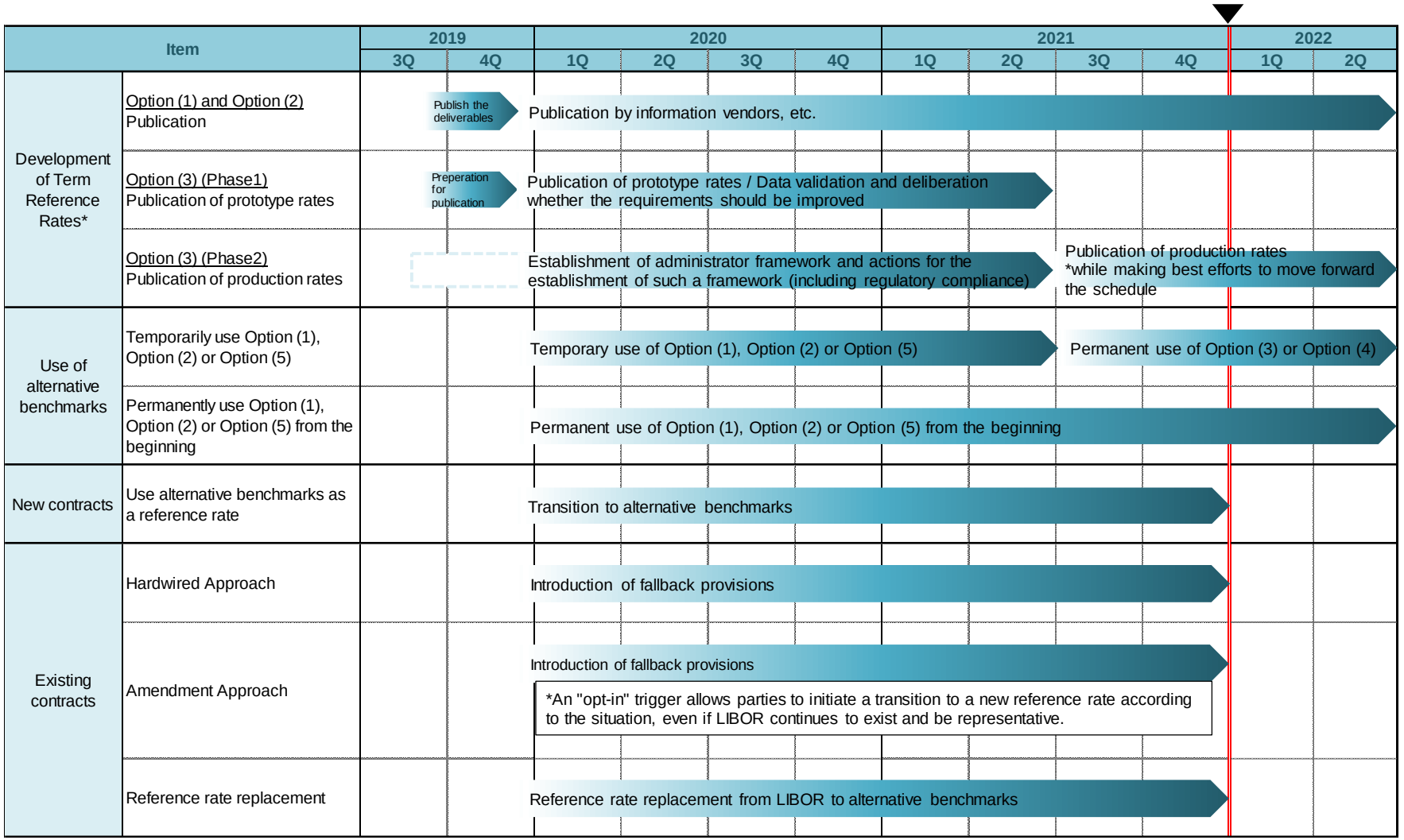


Legends: positive aspects negative aspects supported by the majority in ISDA's public consultation on IBOR fallback for ISDA derivatives

Note: Although the data is readily available from the LIBOR-TIBOR spread trading market, there will be substantial risk of being affected by manipulations and market distortions when anticipating the market condition at the time of triggering.

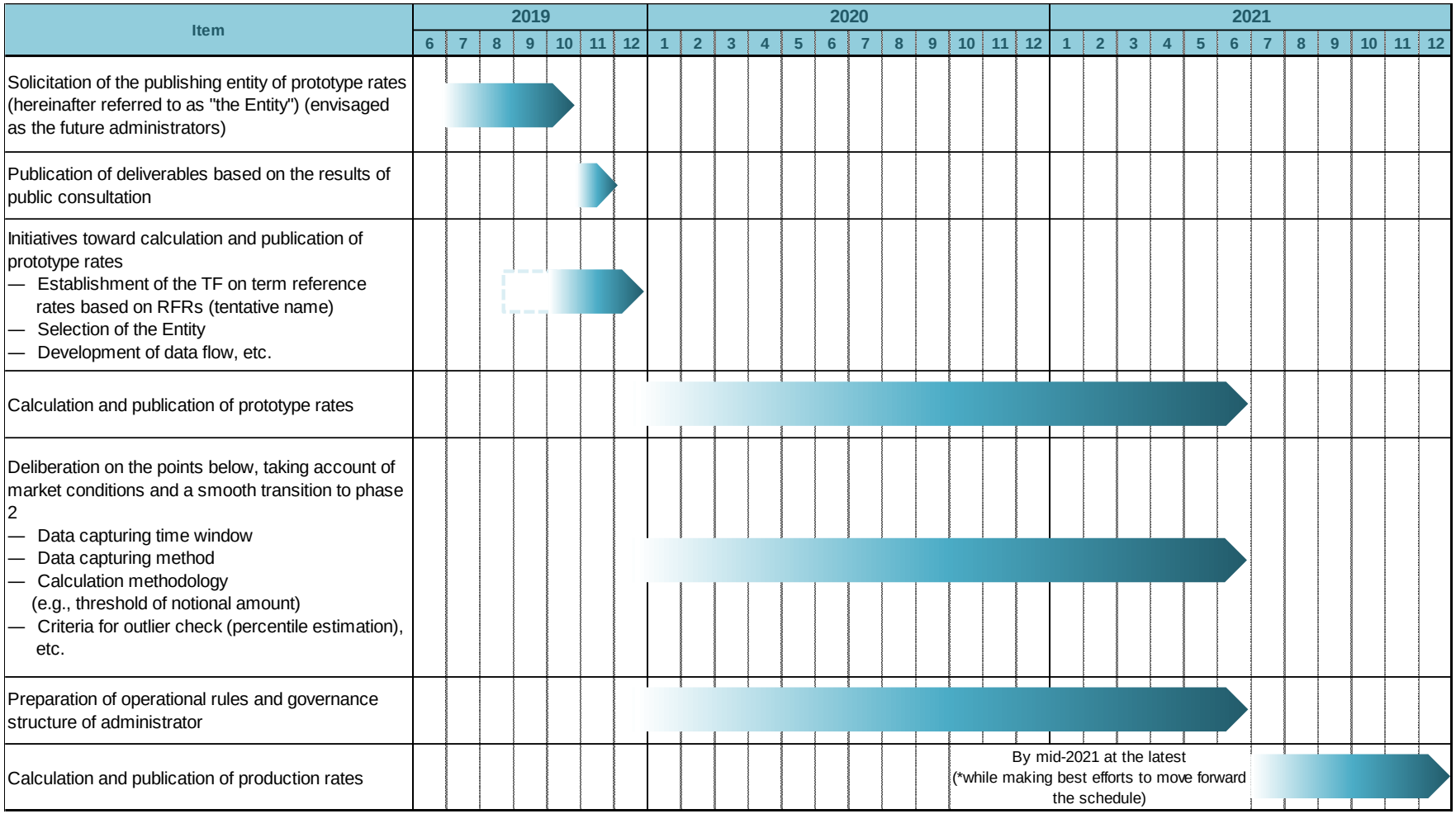
* Regarding hedging relationship in economic terms, complete consistency with ISDA derivatives could be virtually achieved if (2) O/N RFR Compounding (Fixing in Arrears) and Historical Mean/Median Approach are chosen as a combination of the replacement rate and spread adjustment. It would be also necessary to consider and assess the consistency of other combinations with ISDA derivatives by taking due account of actual data. On the other hand, regarding the application of hedge accounting, it would be appropriate to take into consideration the future deliberation by the ASBJ.

Appendix 3-a: Transition Plan



*The publication timing may be moved around depending on the progress made in preparation by information vendors, and the administrator, etc. It is necessary to continue monitoring the progress made in deliberation about Option (4).

Appendix 4-a: Efforts Toward Calculation and Publication of Option (3)



*The above is a plan as of now.

Appendix 4-b: Initiatives of Each Company Toward the Permanent Discontinuation of JPY LIBOR (example)

(1) Management-level and firm-wide initiatives (example)

Development of organizational and governance structure	• Establishment of sections and responsible persons dedicated to addressing the permanent discontinuation of JPY LIBOR • Establishment of internal governance structure including development of policymaking process • Securing internal resources (staff, budget, etc.) to realize the initiatives
Identification of instruments, transactions, and operations referencing JPY LIBOR	• Comprehensive identification of financial instruments and transactions referencing JPY LIBOR from among the company's entire inventory • Identification of original contracts and provisions for financial instruments and transactions referencing JPY LIBOR • Identification of operations referencing JPY LIBOR in the areas other than financial transactions (e.g., financial accounting and management accounting)
Deliberation of firm-wide measures	• Development of policy (with an eye on end-2021) • Choosing of alternative benchmarks for JPY LIBOR • Assigning all tasks to the administrative level for each department

(2) Tasks in each department (example)

Client services (financial institutions, etc.) **Financing and accounting (non-financial corporates)** **Sales (investor services)**	• (The client services departments of financial institutions, etc.) Preparation of FAQs for explanation to clients, training, etc. • (For bilateral contracts) Consultation of regimes between borrowers and lenders ⇒ Deliberation on the transition to alternative benchmarks at an early stage by contract amendments before fallback • Implementation of contract amendments (introduction of a fallback provision, etc.) • (For securities companies, in addition to the above) Implementation of efforts for investors in coordination with issuers ⇒ (If deemed necessary) Holding investor meetings, supporting issuers to hold Bondholders' Meetings, preparing FAQs, etc.
Financing (financial institutions, etc.) **Financing and accounting（non-financial corporates）**	• Identification of issues for financial accounting and deliberation on measures to solve the issues • Checking the possibility of whether the replacement benchmark of a hedged item and that of its hedging instruments differ • Deliberation with the auditor on whether it is possible to apply hedge accounting • (In case of using Option (2)) Deliberation on treatment of accrued interest
System **Operation**	• Assessment of impact on system and identification of requirements for system development based on firm-wide policy • Establishment of administrative procedures and company rules based on the content of system development • Establishment of administrative procedures in case of fallback which requires exceptional treatment
Risk management **Markets**	• Deliberation on modification of models using JPY LIBOR (fair value calculation, VaR calculation, etc.) • Management of operational risk including administrative and system risk • Deliberation on redeveloping methods for risk management and ALM for the cases where assets and liabilities referencing RFRs are on the balance sheet
Legal	• Deliberation on measures to contain legal risk (risks arising from flaws in contracts or insufficiency in explanation to clients, conduct risk arising from sales of instruments referencing JPY LIBOR, etc.) • Revision of formats for loan and bond contracts, preparation of formats for amendment agreement

Appendix B1-a: Overview of JPY LIBOR

Overview

Item	JPY LIBOR
Calculation time	11:00 am (GMT) (using data from 11:00 on the previous business day to 11:00 on the calculation date)
Publication time	11:55 am (GMT)
Panel banks	12 banks ・4 Japanese banks ・8 Foreign banks
Calculation methodology	・Calculated under waterfall method using data provided by panel banks ・The upper and lower quartiles are excluded to remove outliers and the relevant rate is then calculated as the trimmed arithmetic mean of the remaining submissions.
Administrator	ICE Benchmark Administration (IBA)

Waterfall Structure

Level	Reference data
1	・Transactions in unsecured deposits, and primary issuances of CD and CP
2	・OIS ・Interest rate futures ・short-term government bonds ・Repos ・Policy rate
3	・Transactions not eligible for use in Level 1 or 2 ・Interest rate futures ・Observed third party transactions ・Broker quotes etc.

Panel Banks

Barclays Bank plc
Deutsche Bank AG (London Branch)
HSBC Bank plc
JPMorgan Chase Bank,N.A.London Branch
Lloyds Bank plc
Mizuho Bank,Ltd
MUFG Bank,Ltd
National Westminster Bank plc
Société Générale (London Branch)
Sumitomo Mitsui Banking Corporation Europe Limited
The Norinchukin Bank
UBS AG

Note: As of end-March 2019.
Source: ICE.

Appendix B1-b: Overview of JPY TIBOR[11],[12]

Overview

Item	Japanes Yen TIBOR
Calculation time	11:00 am (JST) (using data from 11:00 on the previous business day to 11:00 on the calculation date)
Publication time	13:00 am (JST)
Panel banks	15 banks ・14 Japanese banks ・1 Foreign bank
Calculation methodology	・Waterfall method ・Average of interest rates which exclude two highest quotes and two lowest quotes from reference banks
Administrator	JBA TIBOR Administration

Waterfall Structure

Level	Reference data and others
1	・Actual Unsecured Call transactions ・Committed Quotes of Unsecured Call transactions ・Indicative Quotes of Unsecured Call transactions
2	・Data in the Japan Offshore Market ・Data in the Interbank NCD market
3	・Actual transactions in the NCD market (other than the Interbank NCD market) ・Actual transactions in large term deposits ・Quotes in the short-term government bonds market ・Quotes in the GC repos market ・Quotes in the OIS market
4	・A rate is submitted based on expert judgment by a Person Responsible for Rate Submission and Staff Performing Rate Submission Tasks at reference banks.

Panel Banks

Mizuho Bank, Ltd.	The Bank of Yokohama, Ltd.	Aozora Bank, Ltd.
MUFG Bank, Ltd.	Mitsubishi UFJ Trust and Banking Corporation	BNP PARIBAS S.A.
Sumitomo Mitsui Banking Corporation	Mizuho Trust and Banking Co., Ltd.	Shinkin Central Bank
Resona Bank, Ltd.	Sumitomo Mitsui Trust Bank, Ltd.	The Shoko Chukin Bank
Saitama Resona Bank Limited	Shinsei Bank, Limited	The Norinchukin Bank

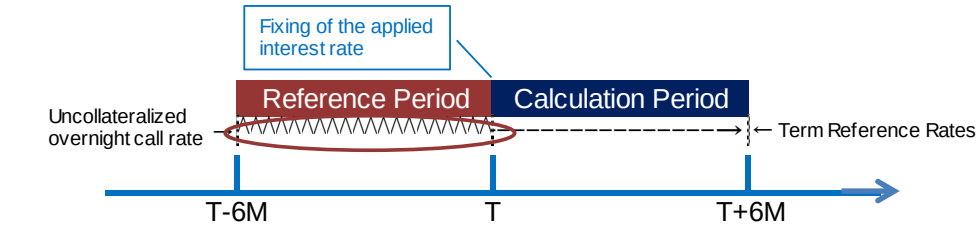
Note: As at end-March 2019. Source: JBA TIBOR Administration.

[11] There are two types of TIBOR; one is JPY TIBOR of which the underlying market is the Japan unsecured call market, the second is Euroyen TIBOR of which the underlying market is the Japan Offshore Market (market in which financial institutions including banks and non-residents execute yen transactions). They differ in that, whereas, JPY TIBOR is widely used as a base rate for bank loans in Japan including syndicated loans and is often used for loan transactions, Euroyen TIBOR is mainly used for derivatives and is not used as often for loan transactions.

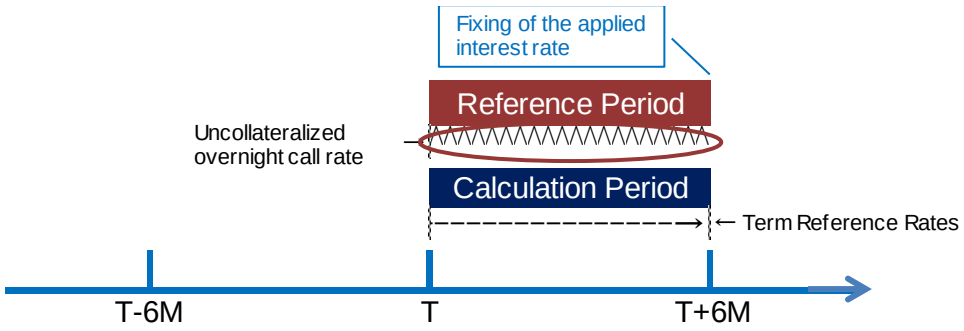
[12] In October 2018, JBATA published its first public consultation document called "Approach for Integrating Japanese Yen TIBOR and Euroyen TIBOR" as a part of the TIBOR reform. While there may recently be a considerable number of cases where interest rate swap transactions which reference Euroyen TIBOR are used to hedge loans which reference Japanese yen TIBOR, it should be noted that the consultation indicates the possibility that Euroyen TIBOR could be integrated with JPY TIBOR and Euroyen TIBOR due to the prolonged downsizing of the Japan Offshore Market that is the underlying market of Euroyen TIBOR. For details, see the following.
http://www.jbatibor.or.jp/english/%E7%AC%AC%EF%BC%91%E5%9B%9E%E5%B8%82%E4%B8%AD%E5%8D%94%E8%AD%B0%E6%96%87%E6%9B%B8%EF%BC%88%E8%8B%B1%E8%AA%9E%E7%89%88%EF%BC%89.pdf

Appendix B3-a: Preconditions on Calculating Each Data Series

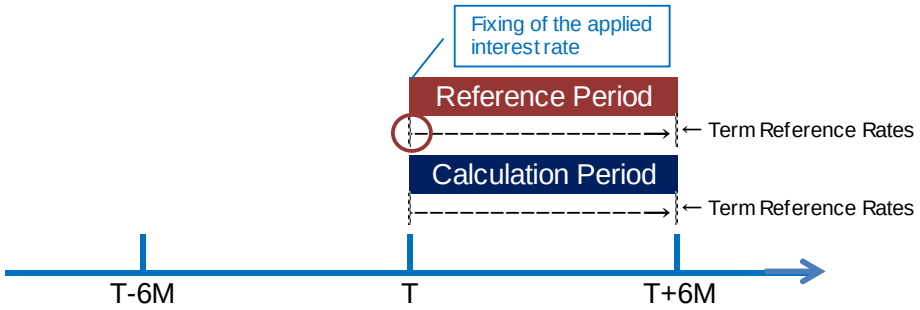
Option (1) O/N RFR Compounding (Fixing in Advance)



Option (2) O/N RFR Compounding (Fixing in Arrears)



Option (3) JPY OIS, Option (5) TIBOR, JPY LIBOR



Option	Used Rate (Reference Period)	Calculation Period
Option(1) O/N RFR Compounding (Fixing in Advance)	The compounded uncollateralized overnight call rate from T-6M to T	T to T+6M
Option(2) O/N RFR Compounding (Fixing in Arrears)	The compounded uncollateralized overnight call rate from T to T+6M	
Option(3) Term Reference Rates (Swap)	The rate published on T	
Option(5) TIBOR		
JPY LIBOR		