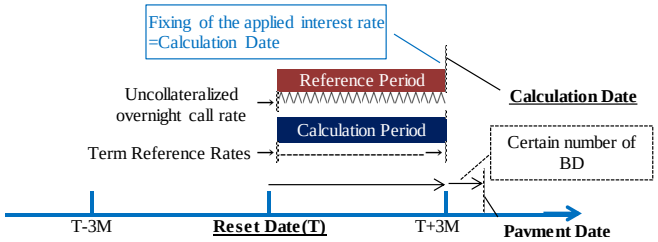
(Tentative translation)

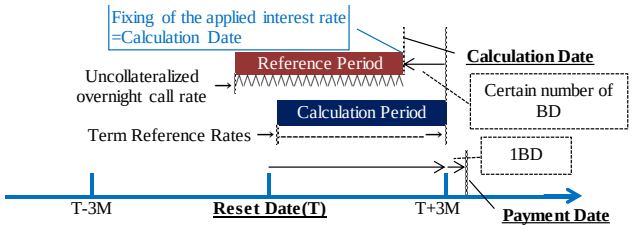
[I] Proposed requirements for option (2) O/N RFR Compounding (Fixing in Arrears) and option (3) Term Reference Rates (Swap)

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

【Delay】



【Reset days prior】



【Common requirements】

Calculate by compounding RFR without adding spreads
Act/365
Set the “Calculation Period” based on the Reset Date and tenor (prioritize standardization)

*The number of business days from the “Calculation Date” to the “Payment Date” is not relevant to the calculation of interest rates.

The Sub-Group for the Development of Term Reference Rates has discussed that the Calculation Date will be set a certain number of business days prior to the end of the Calculation Period (“lockout” methodology) and additional deliberation will be conducted if deemed necessary, taking account of the progress of deliberation in other currencies and on cross-currency basis swaps.

The current calculation methodologies considered in the deliberation on cross-currency basis swaps are “lockout,” and “delay,” a methodology used as the market convention for OIS in which the Payment Date is delayed by a certain number of business days.

Also, it is heard that buy-side players in the United States prefer the delay because it is difficult to hedge by the lockout methodology. In Switzerland, the Capital and Derivatives Market sub-working group in the National Working Group on Swiss Franc Reference Rates analyzed different compounded SARON options for the use in floating rate notes, with a preference for the “reset days prior” methodology, in which the Reference Period starts and ends a certain number of business days prior to the Calculation Period[1].

Taking account of the above situation, it is appropriate to consider all methodologies: lockout, delay, and reset days prior. It is also necessary to be aware of cases overseas where the simple average is used, in addition to compounding. The final requirements will be decided taking account of the conventions for other currencies and for cross-currency basis swaps.

[1] https://www.snb.ch/n/mmr/reference/minutes_20190205/source/minutes_20190205.n.pdf

(Tentative translation)

II. Option (3) Term Reference Rates (Swap)

1. Basic concept

Taking account of the deliberation in the sub-group, it is appropriate that executed transaction data are used if they are available, and that quote data are used if the executed transaction data are unavailable. However, both executed transaction data and quote data will be used for developing term reference rates because it is not practical to use only executed transaction data considering the current OIS trading volume.

It is assumed that the average of fixed rates (mid-rates of quote data) of OIS referencing the uncollateralized overnight call rate in a specific time window will be calculated by using the above data.

2. Data sources

(1) Executed transactions

Phase	Source	Data (Details)	Practical issues
Phase 1 and 2	Around 3 voice brokers	・ 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	・ Development of a framework for data provision to the aggregator

(2) Streamed indicative quotes on voice RFQ

Phase	Source	Data (Details)	Practical issues
Phase 1 and 2	Around 3 voice brokers	・ Spot-starting outright OIS transactions (tenor:1M, 3M, 6M) ・ Quotes on a Tokyo business day ・ Centrally-cleared transactions (JSCC and LCH) ・ Best bids and offers and other data, date and time of submission, dealer name	・ Quote data digitization ・ Development of a framework for data provision to the aggregator ・ Elimination of duplicate data among voice brokers ・ Transition to CLOBs when they become available

(3) CLOBs

・ Establishment of CLOBs will be deliberated in the medium and long term.

3. Calculation methodology

(1) Appropriate use of executed transaction data and quote data

The methods for using executed transaction data and quote data in combination (waterfall method / composite method) has been deliberated as follows.

・ In the “composite method”, data in the lower hierarchy that are relatively unreliable (e.g., quote data) are used even if there are sufficient data in the upper hierarchy (e.g., executed transaction data) because data in all hierarchies are used. In the “waterfall method”, on the other hand, only the data in the applicable hierarchy are used. Therefore, the “waterfall method” is more suitable than the “composite method” when there are sufficient data in the upper hierarchy, and is considered to conform to a greater extent to the IOSCO Principles for Financial Benchmarks (Principle 7).

- The sub-group will at first proceed with discussions on the premise of adopting the "waterfall method" because the sub-group considers feasibility to be an important factor when developing term reference rates, in addition to the abovementioned factors. However, deliberation on the composite method will be conducted if deemed necessary, taking account of future market conditions and the result of data validation.
- Regarding quote data, tradeable data will be prioritized upon use, and quote data on voice brokers will be weighted by the inverse of the spread between bid and offer.

(2) Requirements

Item	Proposed measures	Practical issues
1.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	-
2.Data capturing time window	・ Phase 1 : All day (24 hours[2]) / 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.
3.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.

[2] 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.

(Tentative translation)

Item	Proposed measures	Practical issues
		・ It will be deliberated whether a threshold should be applied to each quote data when data on notional amounts become available.
4.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 annex for 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.
5. 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

(Tentative translation)

Item	Proposed measures	Practical issues
		deliberated.
6. Quality weighting	・ Phase 1 and 2: Quote data on voice brokers will be weighted by the inverse of the spread between bid and offer.	-

* The above requirements do not deny measures taken mainly by brokers to increase OIS liquidity (e.g., introduction of auctions).

* In phase 1, data validation will be conducted and it will be deliberated, if deemed necessary, whether the requirements should be changed for a smooth transition to phase 2.

Annex

(Tentative translation)

Proposed waterfall for option (3) Term Reference Rates (Swap)

Priority	Data	Data details	Calculation methodology	Threshold criteria moving down the hierarchy
1	Executed transaction data	Executed transaction data (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)[1] 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.)	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 weighted by	Number of the time window in which data cumulatively fills the SMS on both the bid and offer sides

[1] 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.

Priority	Data	Data details	Calculation methodology	Threshold criteria moving down the hierarchy
			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 bid or offer 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.[2]	Total notional amount
5	Pair of quote	The bid-offer pair when quote data (both bid and	The simple average of best bid and best offer will	Number of

[2] 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.

(Tentative translation)

Priority	Data	Data details	Calculation methodology	Threshold criteria moving down the hierarchy
	data on voice brokers (Bid and offer)[3]	offer) tradeable under a certain set of criteria such as a minimum 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 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.	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.	data

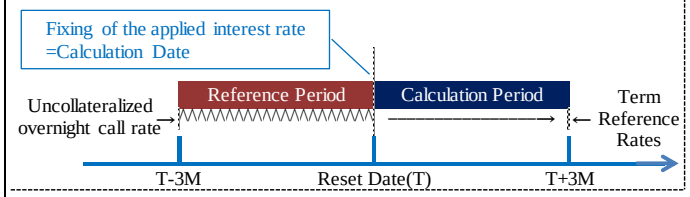
[3] Indicative quotes without a specified notional amount and which are not necessarily "tradeable under a certain set of criteria such as a minimum notional amount" could be used to ensure the sufficiency of data in phase 1. However, additional deliberation will be conducted on whether this is the case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

Alternative Benchmarks Overview

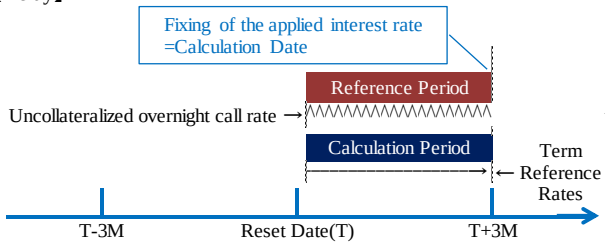
Item \ Option	(1) O/N RFR Compounding (Fixing in Advance)	(2) O/N RFR Compounding (Fixing in Arrears)	(3) Term Reference Rates (Swap)	(4) Term Reference Rates (Futures)	(5) TIBOR
Underlying rate	Uncollateralized overnight call rate (TONA)		JPY OIS	Overnight call rate futures	TIBOR
Fixing (Advance / Arrears)	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)

(1)

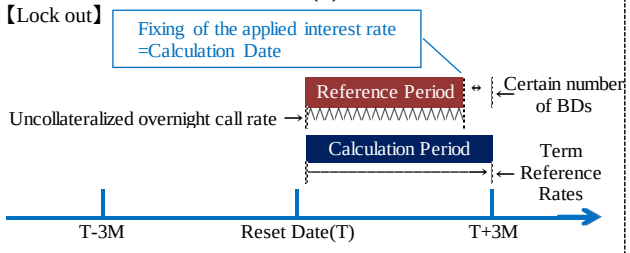


【Delay】

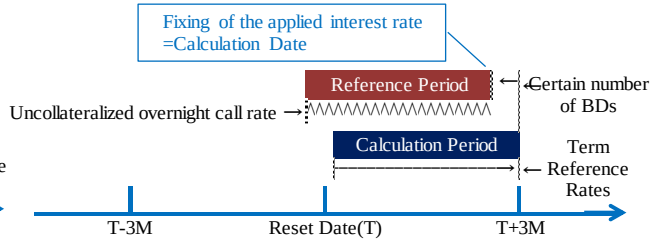


(2)

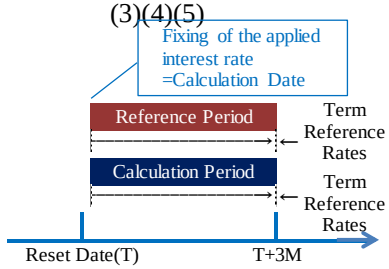
【Lock out】



【Reset days prior】



(3)(4)(5)



* 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.