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Mizuho Economic Outlook & Analysis

Developments in interest rate benchmark reform
- Responses to the discontinuation of LIBOR are urgently needed -

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Mizuho Research Institute

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≪ **Summary** ≫

- Since the summer of 2012, the revelation of attempted market manipulation and false reporting of major interest rates such as London Interbank Offered Rate (LIBOR) by European and US banks have undermined confidence in the reliability, fairness and robustness of Interbank Offered Rates (IBORs), which are major interest rate benchmarks. In response, international studies have progressed on interest rate benchmark reform.

- Initially, these studies were directed toward the multiple rate approach ((1) reform of IBORs (IBORs +), (2) development of risk-free rates (RFRs) to replace IBORs). Following the speech of the UK regulator, however, the likelihood of discontinuation of LIBOR from the end of 2021 emerged.

- Following this, as responses to the discontinuation of LIBOR, (1) development of the mechanism to smoothly change reference interest rates (fallback), and (2) identification of and transition to RFRs, came under consideration.

- Since RFRs are different in nature from IBORs, such as not having a term structure, both financial institutions and corporations need to review their actual business practices, etc. in changing reference interest rates. While discontinuation of LIBOR is not decided yet, there is an urgent need to respond given the fact that LIBOR is being used widely.

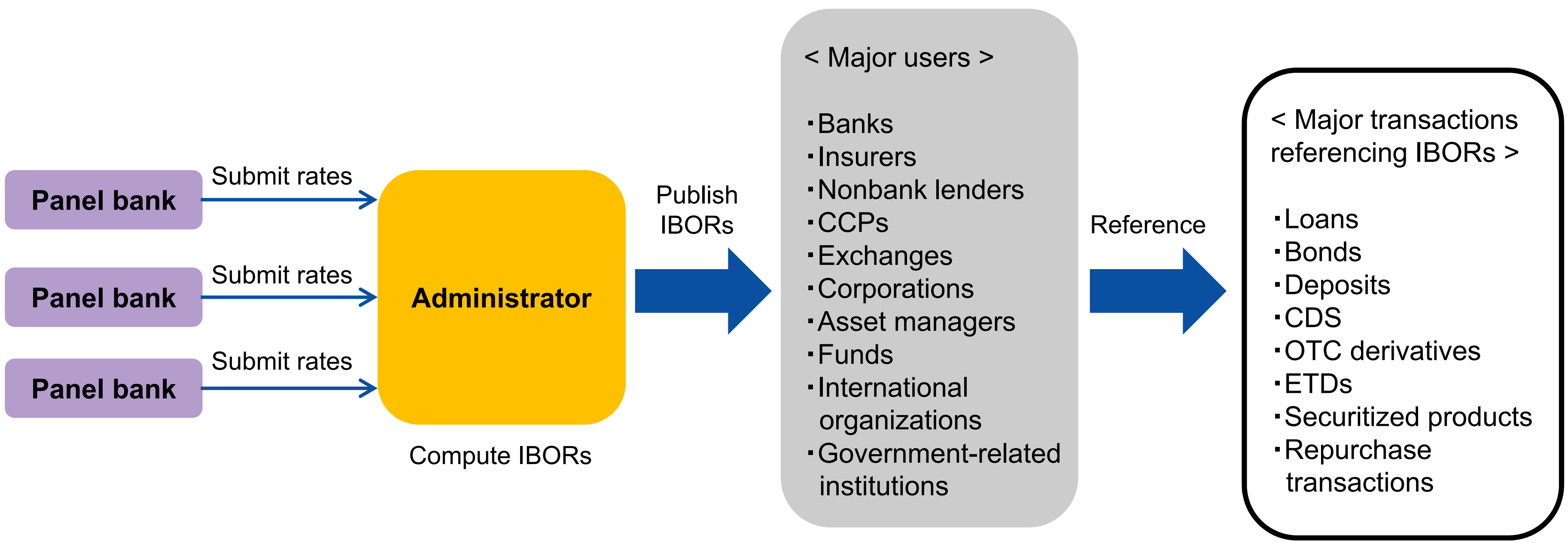
1. What are IBORs?

- Major interest rate benchmarks referred to in a large number of financial transactions

(1) Overview of IBORs

- IBORs are interest rates at which banks borrow short-term funds on the interbank market. The administrator computes and publicize IBORs based on interest rates submitted by panel banks.
- IBORs are referenced in a large number of financial transactions, with diverse parties involved.
  - For example, IBORs are used to calculate the interest rate for loans and the amount of money to be paid in derivatives transactions.

[Overview of IBORs]



Note: CCPs: Central Counterparties, CDS: Credit Default Swap, ETDs: Exchange Traded Derivatives
Source: Made by MHRI

(2) Major IBORs

- Among major IBORs are LIBOR, EURIBOR and TIBOR.
  - IBORs are published for a broad range of tenors from overnight to 12 months.

[Major IBORs]

	LIBOR (London Interbank Offered Rate）	EURIBOR (Euro Interbank Offered Rate)	TIBOR (Tokyo Interbank Offered Rate)
Description	The benchmark interest rates that shows prevailing market rates for fund transactions on the London interbank market.	The benchmark interest rates that shows prevailing market rates for fund transactions on the eurozone interbank market .	The benchmark interest rates that shows prevailing market rates for fund transactions on the Japanese unsecured call market (for Japanese yen TIBOR) or the offshore market (for Euroyen TIBOR).
Administrator	IBA (ICE Benchmark Administration）	EMMI (European Money Markets Institute)	JBATA (JBA TIBOR Administration)
Currencies	Five currencies (GBP, USD, EUR, CHF and JPY)	EURO only	There are two types: Japanese yen TIBOR and Euroyen TIBOR (the integration of the two is currently under consideration).
Tenor	Seven tenors (Overnight, one week, one month, two months, three months, six months and 12 months)	Five tenors (one week, one month, three months, six months and 12 months)	Five tenors (one week, one month, three months, six months and 12 months)
Notional volumes of outstanding financial contracts	USD: $150 trillion to $160 trillion; GBP: $30 trillion; JPY: $30 trillion; CHF: $6.5 trillion; and EUR: $2 trillion	$150 trillion to $180 trillion	$5 trillion

Source: Made by MHRI based on materials of Market Participants Group on Reforming Interest Rate Benchmarks

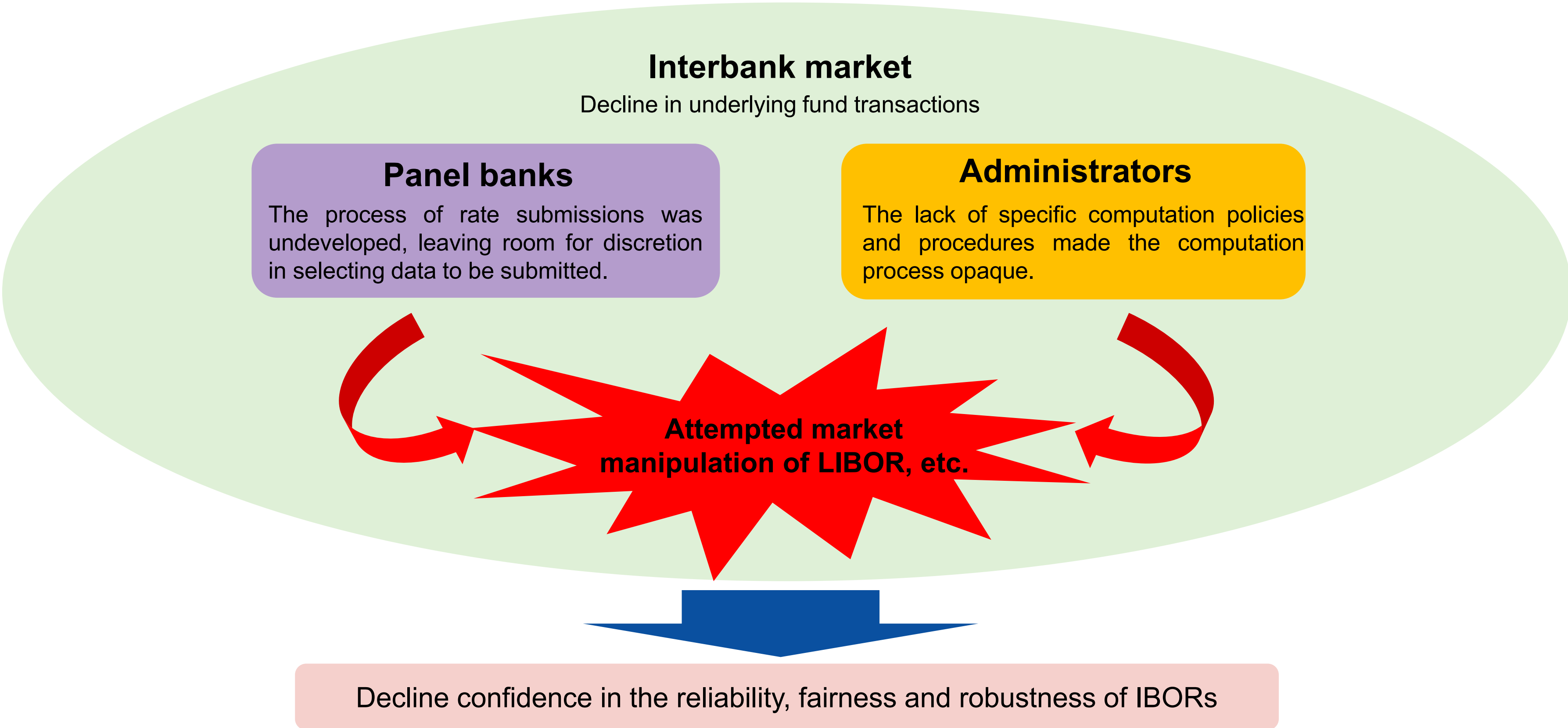
2. What is interest rate benchmark reform?

- Initiative to enhance the reliability, fairness and robustness of interest rate benchmarks

(1) What is interest rate benchmark reform?

- Interest rate benchmark reform refers to the initiative to enhance the reliability, fairness and robustness of interest rate benchmarks.
  - In addition to decline in volume of underlying unsecured fund transaction on the interbank market, attempted market manipulation of LIBOR, etc. at European and US banks that acted as panel banks have undermined confidence in the reliability, fairness and robustness of IBORs. (1) The undeveloped rate submission process at panel banks and (2) the lack of transparency in the process of IBOR computation by the administrators caused such market manipulation.

[Problems related to IBORs]



Source: Made by MHRI

(2) Attempted market manipulation of LIBOR, etc.

- Since the summer of 2012, a spate of manipulations related to rate submissions for LIBOR, etc. were revealed at European and US banks.
  - Such manipulations include (1) the case where a trader unjustifiably tried to influence a colleague in charge of submitting interest rates in favor of bank's own positions in derivatives transactions, and (2) the case where a bank official submitted lower interest rates than prevailing market rates in bid to make the bank's creditworthiness look better at the time of the financial crisis.

[Cases of unfair manipulation of LIBOR, etc.]

Timing of administrative disposition		Financial institution	Interest rate benchmark	Description
2012	Jun	Barclays	LIBOR, EURIBOR	• A trader asked to submit unjustifiable rates in favor of own positions. • The bank submitted unjustifiable rates for the maintenance of its reputation.
	Dec	UBS	LIBOR, EURIBOR, TIBOR	• A trader asked to submit unjustifiable rates in favor of own positions. • The bank submitted unjustifiable rates for the maintenance of its reputation.
2013	Feb	RBS	LIBOR	• A trader asked to submit unjustifiable rates in favor of own positions. • A bank official tried to prompt other banks to submit unjustifiable rates.
	Apr	RBS Securities	LIBOR	• A trader asked to change submitted rates in favor of own positions.
	Oct	Rabobank	LIBOR, EURIBOR	• A trader asked to change submitted rates in favor of own positions.
	Dec	Barclays, RBS, five other banks	LIBOR, EURIBOR	• Cartel behaviors, including unjustifiable exchanges of information and concerted actions in submitting rates
2014	Jul	Lloyds, Bank of Scotland	LIBOR	• A trader asked to submit unjustifiable rates in favor of own positions. • The bank submitted unjustifiable rates for the maintenance of its reputation.
	Oct	RBS, JP Morgan Chase	LIBOR	• Cartel behaviors, including unjustifiable exchanges of information and concerted actions in submitting rates
2015	Apr	Deutsche Bank	LIBOR, EURIBOR	• A trader asked to submit unjustifiable rates in favor of own positions. • A bank official tried to prompt other banks to submit unjustifiable rates.
2016	May	Citigroup	LIBOR, TIBOR	• A trader asked to submit unjustifiable rates in favor of own positions. • The bank submitted unjustifiable rates for the maintenance of its reputation.

Source: Made by MHRI based on materials of JBA TIBOR Administration

(3) History of international discussions (overview)

- In the wake of attempted manipulation of LIBOR, etc., the Financial Stability Board (FSB) recommended the multiple rate approach in July 2014.
  - The multiple rate approach is the approach where either IBORs or alternative reference rates may be used appropriately depending on financial instruments (premised on the continued existence of IBORs).
- In July 2017, meanwhile, the UK Financial Conduct Authority (FCA) Chief Executive announced that financial institutions will no longer be compelled to publish LIBOR rates after December 2021 in his speech. After the speech, how to respond to the discontinuation of LIBOR became an urgent issue.

[History of international discussions (overview)]

Summer 2012
- Unjustifiable manipulation of LIBOR, etc. by European and US banks was exposed.

Sept 2012
- HM Treasury published the final report of **The Wheatley Review of LIBOR.**
  - The report supported the maintenance of LIBOR and called for strengthening of governance.

July 2013
- IOSCO published **Principles for Financial Benchmarks**.
  - 19 principles concerning the governance of benchmark administrators and the quality of financial benchmarks, etc.

July 2014
- FSB published the report on **Reforming Major Interest Rate Benchmarks (FSB Report)**.
  - Recommended the **multiple rate approach**.

July 2017
- FCA Chief Executive's speech ➡ **LIBOR publication may be ceased after end-2021.**
  - "We don't think it right to ask, or to require, that panel banks continue to submit expert judgements (rates for LIBOR) indefinitely…I and my colleagues have therefore spoken to all the current panel banks about agreeing voluntarily to sustain LIBOR for a four to five year period, i.e. until end-2021."

July 2018
- FSB issued the statement on **Interest rate benchmark reforms – overnight risk-free rates and term rates (FSB Statement)**.
  - "In the markets which face the disappearance of IBORs, **notably markets currently reliant on LIBOR, there needs to be a transition to new reference rates.**"

Note: FCA: UK Financial Conduct Authority, IOSCO: International Organization of Securities Commissions
Source: Made by MHRI

(4) Major initiatives in interest rate benchmark reform

❑ Currently under consideration as initiatives to prepare for the discontinuation of LIBOR are developing a mechanism to smoothly change reference interest rates (fallback, to be described later) and identifying and transition to RFRs (to be described later) as an option for an alternative benchmark. In addition, the IBOR reform to seek the improvement of IBORs themselves also remains to be implemented.

[Major initiatives in interest rate benchmark reform]

Initiatives to prepare for the discontinuation of LIBOR

◆ **Developing a mechanism to smoothly change reference interest rates (fallback)**

- Consideration related to the developing a fallback system in preparation for the permanent cessation of the publication of LIBOR
- ISDA is considering the fallback related to derivatives transactions, while industrial bodies etc., are considering the fallback for loans, etc.

◆ **Identifying and transition to RFRs**

- Alternative RFRs have already been identified for LIBOR for major currencies (to be described later).
- Considering the way to adjust differences between IBORs and RFRs depending on financial instruments and transactions.

◆ **IBOR reform (improvement to IBOR＋)**

- Initiative to enhance the reliability, fairness and robustness of IBORs themselves
- The TIBOR reform was completed in 2017, while the EURIBOR reform is set to be completed by the end of 2019 (to be described later).

Source: Made by MHRI

3. History of international discussions (details)

- Moves being accelerated toward the discontinuation of LIBOR

(1) The Wheatley Review of LIBOR (September 2012)

- In September 2012, HM Treasury released the final report of The Wheatley Review of LIBOR by Mr. Martin Wheatley, a former executive of the Financial Services Authority, that summarizes the recommendations for the reform of LIBOR.
  - The report supported the maintenance of LIBOR and recommended the introduction of statutory regulations on LIBOR administration and rate submissions from the standpoint of strengthening institutional governance.

[Overview of the final report of The Wheatley Review of LIBOR]

<table>
<tr><td rowspan="3">Conclusions</td><td>1</td><td colspan="2">There is a clear case in favor of comprehensively reforming LIBOR, rather than replacing the benchmark.</td></tr>
<tr><td>2</td><td colspan="2">Transaction data should be explicitly used to support LIBOR submissions.</td></tr>
<tr><td>3</td><td colspan="2">Market participants should continue to play a significant role in the production and oversight of LIBOR.</td></tr>
<tr><td rowspan="10">Key points in LIBOR Reform</td><td>1</td><td>Regulation of LIBOR</td><td>The authorities should introduce statutory regulation of administration of, and submission to, LIBOR.</td></tr>
<tr><td>2</td><td rowspan="2">Institutional reform</td><td>The British Bankers' Association (BBA) should transfer responsibility for LIBOR to a new administrator.</td></tr>
<tr><td>3</td><td>The new administrator should fulfil specific obligations as part of its governance and oversight of the rate, having due regard to transparency and fair and nondiscriminatory access to the benchmark.</td></tr>
<tr><td>4</td><td rowspan="2">The rules governing LIBOR</td><td>Panel banks should immediately look to comply with the submission guidelines presented in this report, making explicit and clear use of transaction data to corroborate their submissions.</td></tr>
<tr><td>5</td><td>The new administrator should, as a priority, introduce a code of conduct for panel banks.</td></tr>
<tr><td>6</td><td rowspan="4">Immediate improvements to LIBOR</td><td>The BBA and should cease the compilation and publication of LIBOR for those currencies and tenors for which there is insufficient trade data to corroborate submissions,</td></tr>
<tr><td>7</td><td>The BBA should publish individual LIBOR submissions after three months.</td></tr>
<tr><td>8</td><td>Banks, including those not currently submitting to LIBOR, should be encouraged to participate as widely as possible in the LIBOR compilation process.</td></tr>
<tr><td>9</td><td>Market participants using LIBOR should be encouraged to consider and evaluate their use of LIBOR.</td></tr>
<tr><td>10</td><td>International coordination</td><td>The UK authorities should work closely with the European and international community and contribute fully to the debate on the long-term future of LIBOR and other global benchmarks.</td></tr>
</table>

Source: Made by MHRI based on materials of HM Treasury

(2) Principles for Financial Benchmarks (IOSCO Principles) (July 2013)

- In July 2013, IOSCO published Principles for Financial Benchmarks.
  - The Principles were set for the purpose of enhancing the reliability of the benchmark determination process and strengthening the governance and accountability of benchmark administrators as well as the quality of benchmarks.
  - At the G20 St. Petersburg Summit held in September 2013, an agreement was reached to implement reform of major financial benchmarks in line with the IOSCO Principles.

[Overview of IOSCO's Principles for Financial Benchmarks]

Vulnerabilities of financial benchmarks

• There may be opportunities for manipulative conduct created by (1) the lack of the well-developed rate submission process, and (2) the discretion in the selection of data to be submitted.	• The possibility of the ability of stakeholders to evaluate the credibility of a benchmark becoming restricted due to the lack of adequate details in the determination procedures and policies. • The lack of transparency may allow abusive conduct to influence benchmark determinations.	• Panel banks or administrators may attempt to manipulate a benchmark by submitting false or misleading data or by attempting to influence personnel at the administrator level who are responsible for the exercise of expert judgment.

IOSCO Principles

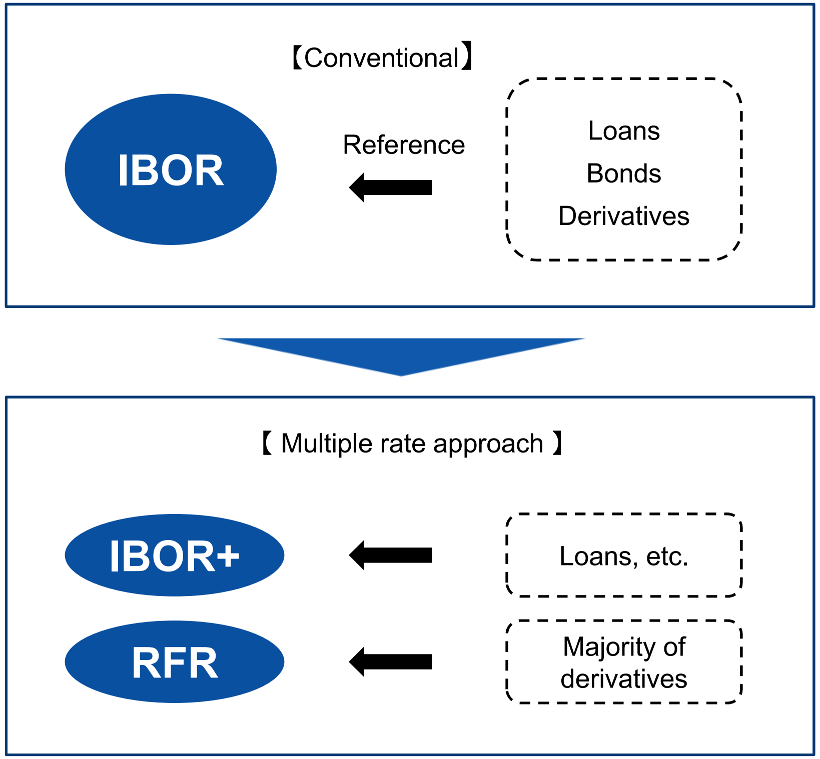
I. Governance of administrator	II. Quality of the benchmark
• The administrator has primary responsibility for the definition, determination and publication of the benchmark as well as for credible and transparent governance. • The administrator should develop and implement clearly defined written rules for the identification, disclosure, management and avoidance of conflicts of interest. • The administrator should develop a control framework for the process of determining and distributing the benchmark. • The administrator should establish a section with an oversight function to review the benchmark determination process.	• The design of a benchmark should take into account factors that reflect the economic realities of the interest. • The data used to construct a benchmark should be anchored by observable transactions. • The administrator should publish clear guidelines regarding the hierarchy of data inputs and exercise of expert judgment used for the determination of benchmarks.
III. Quality of the benchmark determination methodology	**IV. Accountability of administrator**
• The administrator should publish the methodology used to make benchmark determinations and should provide the rationale for adopting a particular methodology. • The administrator should publish procedures for making change in its methodology for benchmark determinations as well as for a possible cessation of benchmarks. • The administrator should develop and publish the code of conduct for panel banks and should appropriately monitor their compliance with the code of conduct.	• The administrator should establish and publish rules for handling complaints. • The administrator should appoint an independent auditor with the capability to periodically review and report on the status of the administrator's adherence to its Principles. • The administrator has an obligation to retain written records on data, etc. used for benchmark determinations for five years.

Source: Made by MHRI based on materials of IOSCO, materials of Financial Services Agency, and materials of JBA TIBOR Administration

(3) Report on Reforming Major Interest Rate Benchmarks (FSB Report) (July 2014)

- In July 2014, the FSB published the report on Reforming Major Interest Rate Benchmarks, which recommended the multiple rate approach.
  - In order to allow market participants to choose appropriate interest rate benchmarks depending on financial instruments, the report recommended (1) the reform of IBORs (improvement to IBOR+) to make them anchored by actual transactions to the extent possible, and (2) construction of RFRs that replace IBORs.

[Image of the interest rate benchmark reform under the FSB Report]



Source: Made by MHRI based on materials of FSB, materials of Bank of Japan

[Overview of the multiple rate approach]

Overview		• Approach to develop multiple interest rate benchmarks. • Benefits of the multiple rate approach include: (1) by seeking to preserve a set of rates with bank credit risk (IBOR+), it would help to mitigate a costly transition of existing legacy contracts to a RFR; and (2) by moving away from an excessive reliance on a single financial benchmark, the financial system as a whole would be more resilient.
Options for alternative benchmarks	IBOR+	• Improved versions of existing IBORs based on banks' costs of procuring unsecured funds by underpinning them to the greatest extent possible with transaction data. — For loans, etc., it is desirable to reference benchmarks that reflect bank credit risks.
	RFR (to be described later)	• Benchmark that is closer to risk-free. It is based on the markets to procure secured funds, fund procurement by the government, and central bank interest rates, etc. — For a large number of derivatives transactions, it is desirable to reference benchmarks closer to risk free.

Source: Made by MHRI based on materials of FSB

(4) Speech by the FCA Chief Executive (July 2017)

- In July 2017, FCA Chief Executive Andrew Bailey voiced serious concern about the sustainability of the LIBOR benchmarks. Following this, the likelihood of discontinuation of LIBOR from the end of 2021 emerged.
  - FCA expressed the view that it would be inappropriate to indefinitely force the panel banks to submit rate based on the use of "expert judgement" because the underlying market that LIBOR seeks to measure, the market for unsecured wholesale term lending to banks, is no longer sufficiently active.
- In July 2018, Bailey delivered a speech that strongly encouraged market participants to prepare for the transition from LIBOR to RFRs on the assumption that the discontinuation of LIBOR will occur in the future.

[Key points of FCA Chief Executive Bailey (July 2017)]

Recent developments in LIBOR	• Since April 2013, significant improvements have been made to LIBOR through the work of its administrator and panel banks. In addition, the quality of governance around submissions to this reference rate has been improved. • On the other hand, it is more difficult to anchor LIBOR submissions and rates to the greatest extent possible to actual transactions than the governance improvements. • The underlying market that LIBOR seeks to measure is no longer sufficiently active. LIBOR is sustained by the use of "expert judgement" by the panel banks.
Sustainability of LIBOR	• It is undesirable for market participants to rely indefinitely on reference rates that do not have active underlying markets to support them. • As well as an inherently greater vulnerability to manipulation when rates are based on expert judgements (rather than the real price of term funding), there are a host of questions about whether and how such reference rates can respond to stressed market conditions. • For many of the contracts for which LIBOR is used as a reference, there is not a real need to capture in the reference rate a measure of term or bank credit risk premium. • The most common reasons for using LIBOR reference rates are that (1) others already use LIBOR, that (2) alternative reference rates are less well established, and that (3) contracts referencing alternative reference rates are less liquid.
Transition to alternative benchmarks	• The market disruption that would be caused by an unexpected and unplanned disappearance of LIBOR could not be accepted. • An orderly transition away from the current widespread use of LIBOR to alternative benchmarks could probably be achieved within four or five years, but not less. All the current panel banks agreed to voluntarily sustain the rate submission concerning LIBOR until end-2021, making the planned and smooth transition possible. • The continued existence of LIBOR beyond end-2021 will depend on the administrator and panel banks. But the survival of LIBOR on the current basis could not and would not be guaranteed. • Work must begin in earnest on planning transition to alternative reference rates that are based firmly on actual transactions.

Source: Made by MHRI based on materials of FCA

(5) Statement on interest rate benchmark reform (FSB Statement) (July 2018)

❑ In July 2018, the FSB issued a statement on interest rate benchmark reform and recommended the transition from IBORs to RFRs.

- The FSB recommended the multiple rate approach in its July 2014 report, but made a policy reversal.
- The FSB believes that RFRs are most suitable as reference interest rates for the majority of derivatives transactions, but pointed out that for some transactions, term RFRs derived from RFRs and other term rates computed based on other highly liquid markets are more suitable.

[Key points of the FSB Statement (July 2018)]

Transition to RFRs	• The FSB welcomes the progress made on the identification and development of overnight risk-free, or nearly risk-free, rates (RFRs). • These overnight RFRs are anchored in active, liquid underlying markets and are sufficiently robust for such extensively used interest rate benchmarks. • In the markets which face the disappearance of IBORs, notably markets currently reliant on LIBOR, there needs to be a transition to new reference rates. • It will be important in the period ahead to have a full discussion and establish further clarity among affected end users on how this transition should take place. • RFRs are most suitable as reference rates for the majority of derivatives transactions.
Necessity of term RFRs	• The FSB recognizes that in some cases, there may be a role for term rates, including RFR-derived term rates, or other term rates derived from other liquid markets. • Term RFRs should be used only where necessary as activity on the underlying derivatives market is relatively thin. • Term rates can be valuable to some market participants who want or need to plan cash flow.

Source: Made by MHRI based on materials of FSB

4. Response to the discontinuation of LIBOR and expected impacts

- Necessary to monitor developments and begin an impact analysis promptly

(1) Selection of alternative benchmarks

- In changing reference interest rates from LIBOR, it is necessary to choose an appropriate alternative benchmark depending on financial instruments and transactions.
  - The assumed options include (1) RFR reference interest rates adjusted for differences from IBORs (interest rates computed based on RFRs), and (2) TIBOR, EURIBOR and other IBORs that are expected to remain in force going forward.

[Options of alternative benchmarks for transactions referencing LIBOR]

Options of alternative benchmarks

(1) RFR reference interest rates

Choose appropriate RFR reference interest rates depending on financial instruments and transactions

- O/N RFR compounded in arrears (to be described later) is recommended for existing ISDA derivatives transactions.
- New benchmarks derived from RFRs (term RFRs) are recommended for loans and bonds.

(2) IBORs other than LIBOR

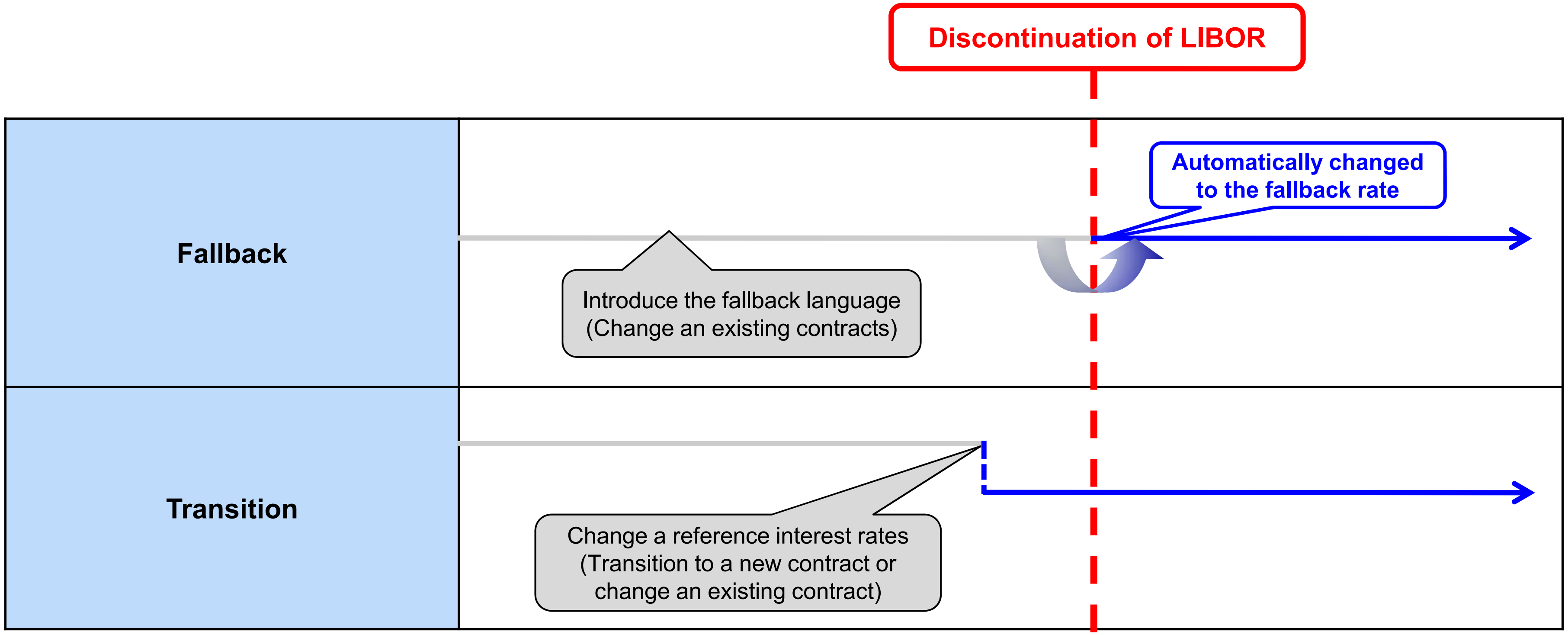
Choose TIBOR, EURIBOR and other IBORs that are expected to remain in force going forward.

Source: Made by MHRI

(2) Changes in reference interest rates

- There are the two methods to change a reference interest rate from LIBOR to an alternative benchmark. “Fallback” and “Transition” .
  - In the “Fallback,” parties to a contract agree on an interest rate to be referenced after the discontinuation of LIBOR (the fallback rate) in advance. This is the method to smoothly change the reference interest rate upon the discontinuation of LIBOR.
  - The Transition” is the method to change the reference interest rate in advance prior to the discontinuation of LIBOR.

[Image of the methods to change the reference interest are (“Fallback” and “Transition”)]



Source: Made by MHRI based on materials of Bank of Japan

(3) Points to be noted in choosing RFR reference interest rates (1)

- RFRs that serve as the basis for computing RFR reference interest rates, one of the options for alternative benchmarks, are assumed the overnight interest rate when the credit risk of a transaction party is as close to zero as possible.
  - They are characterized by the high liquidity, fairness and robustness of the underlying markets and also by having no term structure (there is no term interest rate).
- There are a number of differences between IBORs and RFRs, so it is necessary to adjust these differences when the reference interest rate is changed.

[Differences between IBORs and RFRs]

IBOR	Includes credit risk premium of the banking system.	There are term interest rates, such as one month and three months.	For many IBORs, the applicable interest rate is determined prior to the commencement of the interest computation period. (In advance)
RFR	Does not include credit risk premium of the banking system.	There are no term interest rates.(Overnight rates only)	For many RFRs, the applicable interest rate is determined on the following business day (after the date of the termination of the interest computation period). (In arrears)

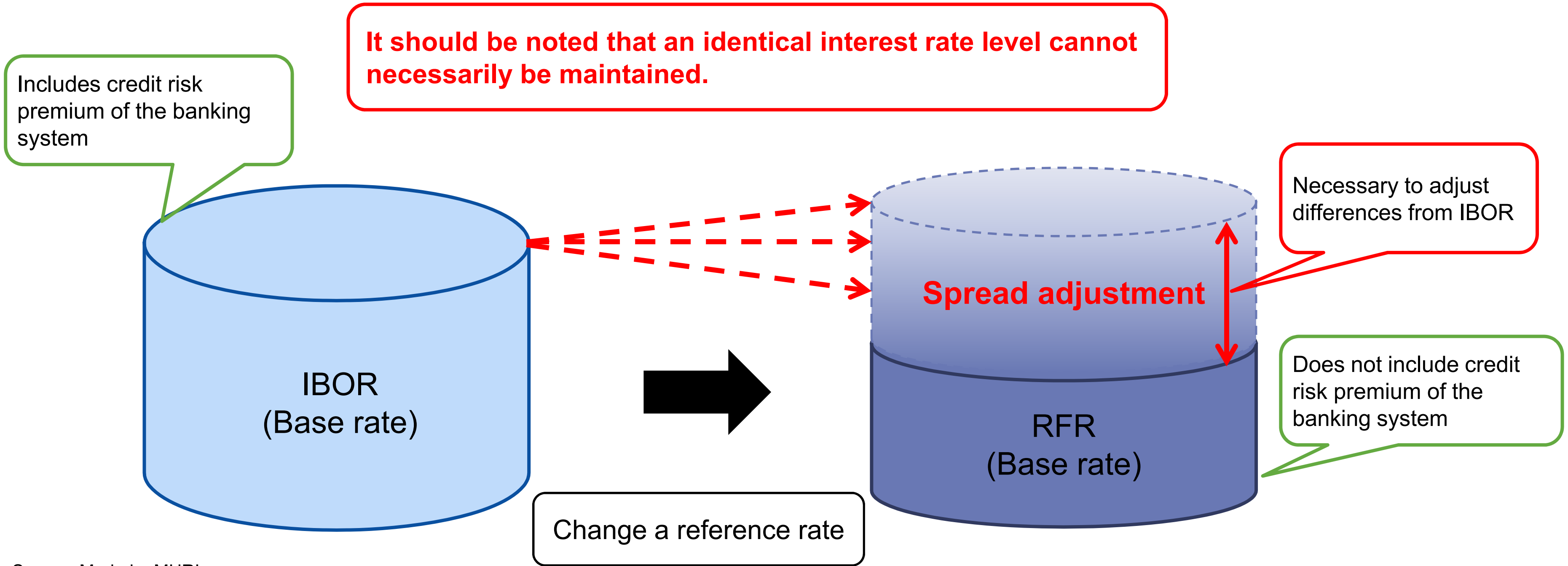
It is necessary to adjust these differences when the reference interest rate is changed

Source: Made by MHRI

(3) Points to be noted in choosing RFR reference interest rates (2)

- In changing the reference interest rate, it is necessary to make spread adjustments based on differences between IBOR and RFR to curb the change-related impact as much as possible.
  - However, it should be noted that even if spread adjustment is made, an identical interest rate level may not necessarily be maintained.
- From the perspective of reducing the workload associated with the change in the reference interest rate, the development of term RFRs with a term structure is considered.
  - For term RFRs, it is possible to determine the applicable interest rate in advance. Therefore, it is assumed to be suitable for some financial transactions, including loans and bonds.

[Image of the interest rate level in case of changing a reference interest rate]



Source: Made by MHRI

(Reference) Consideration of matters regarding the identification of RFRs

- For LIBOR of major currencies, the work on the identification of alternative benchmarks RFRs has been completed.
- Currently, various countries are in the process of considering the development of term RFRs.

[Status of consideration related to RFRs that replace LIBOR of major currencies]

Currency	Sterling	US dollar	Euro	Japanese yen
Working group	Working Group on Sterling Risk-Free Reference Rates	Alternative Reference Rates Committee (ARRC)	Working Group on Euro Risk-Free Rates	Study Group on Risk-Free Reference Rates
RFR	SONIA＋ (Sterling Overnight Index Average＋)	SOFR (Secured Overnight Financing Rate)	€STR (Euro Short-Term Rate)	TONA (Tokyo Overnight Average Rate)
Collateral	Unsecured	Secured	Unsecured	Unsecured
Administrator	Bank of England (BOE)	Federal Reserve Bank of New York	European Central Bank (ECB)	Bank of Japan (BOJ)
Timing to begin publication	Already published	Already published	October 2019	Already published
Status of consideration of term RFRs	The Working Group proposed the development of term RFRs based on spot OIS swap quotes (in public consultation, together with a blend of futures and OIS swap data were supported).	The development of term RFRs based on a combination of SOFR futures and SOFR OIS transactions is under consideration.	The Working Group recommended the development of term RFRs based on the OIS tradable quotes.	The development of term RFRs based on futures market or OIS market is under consideration.

Note: OIS：Overnight Index Swap (a type of interest rate swaps)
Source: Made by MHRI based on materials of Bank of Japan, materials of ARRC, materials of ECB

(4) Status of consideration of the fallback in derivatives transactions

- Regarding derivatives transactions based on the ISDA master agreement, ISDA conducted a study on the development of the fallback mechanism ((1) developing successor rates, (2) setting triggers, and (3) addressing contractual measures).
  - The development of successor rates would require term adjustment and spread adjustment of RFR.
- On the other hand, regarding loans and bonds, countries are conducting studies on the fallback mechanism on an individual basis.

[Overview of the fallback mechanism for derivatives transactions being studied by ISDA]

Successor rate	**Fallback rate** + **Spread adjustment** • As a result of public consultation, it is likely that the O/N RFRs compounded in arrears, to be used by compounding the actual values of RFRs released daily, will be adopted. • Spread for adjusting differences between LIBOR and the alternative benchmark
Triggers	• Triggers for the cessation of the publication — When a public statement or publication of information by or on behalf of the administrator of the IBOR announcing that it has ceased or will cease to provide it permanently or indefinitely, provided that, at that time, there is no successor administrator that will continue to provide it, — When a public statement or publication of information by the regulatory supervisor for the administrator of the IBOR, the central bank for the currency of the IBOR, an insolvency official with jurisdiction over the administrator for the IBOR, a resolution authority with jurisdiction over the administrator for the IBOR or a court or an entity with similar insolvency or resolution authority over the administrator for the IBOR, which states that the administrator of the IBOR has ceased or will cease to provide it permanently or indefinitely, provided that, at that time, there is no successor administrator that will continue to provide it. • Another round of public consultation has been conducted on triggers prior to the cessation of the publication — Solicit comments on the method of responses, etc. when the supervisory authorities of the IBOR judges that the IBOR is non-representative of the prevailing market conditions.
Contractual measure	• Revisions to the 2006 edition of the ISDA Definitions • Development of a protocol to apply the revisions to legacy contracts

Source: Made by MHRI based on materials of ISDA, materials of Bank of Japan

(5) Anticipated impacts and problems going forward

- While the discontinuation of LIBOR is not decided yet, it may significantly affect business operations given the fact that LIBOR is being used widely.

- Not only financial institutions but also corporations should promptly commence the work to identify the extent of impacts on them (including the identification of transactions referencing LIBOR).
  - In addition, it is also important to make preparations for the selection of alternative benchmarks ((1) RFR reference interest rates or (2) IBORs that are likely to remain in force going forward, such as TIBOR and EURIBOR) and for the change in reference interest rates.

[Anticipated major impacts of the discontinuation of LIBOR on financial institutions and corporations]

Changes in values of existing transactions	• The values of existing transactions may change following the change of reference interest rates. • The changes of the prices of assets/liabilities following the change in reference interest rates may cause the decline in the collateral ratio, etc. This may conflict with the triggers of the existing contracts.
Review of trading practices and systems	• When the reference interest rate is changed to the RFR reference interest rate, the applicable interest rate may be determined after the date of the termination of the interest computation period. Therefore, the operational workload may be increased. This may also require broad remediation of systems.
Contractual measures	• The need arises to take contractual measures toward the change in the referent interest rate, including (1) introduction of the fallback language in existing contracts, and (2) transition to new contracts.
Validity of hedge accounting	• Hedge accounting may not be allowed (1) if the reference interest rates differ between hedged items and hedging instrument after the fallback, and (2) if triggers are different between hedged items and hedging instrument to cause the difference in the timing of fallback.

Source: Made by MHRI based on materials of Bank of Japan

(Reference) Developments in interest rate benchmark reforms in various countries

- Development of term RFRs is a challenge

(1) Japan (i) Revision of the Financial Instruments and Exchange Act

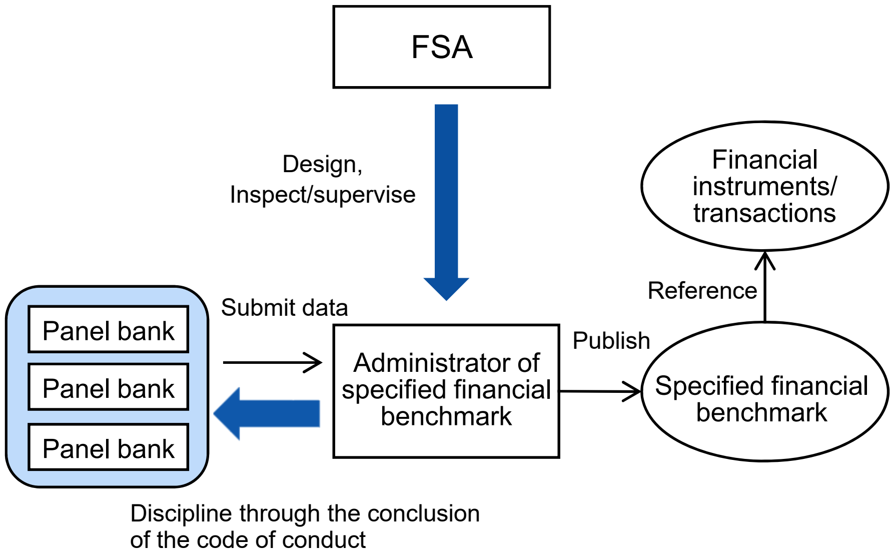
- Domestic regulation for the purpose of enhancing the reliability of interest rate benchmarks has been introduced.
  - In November 2013, the Financial Services Agency (FSA) established the Study Group on Regulation of Financial Benchmarks in response to the IOSCO Principles. The FSA released a report of the Study Group in December 2013.
  - Based on the above report, in order to ensure the reliability of financial benchmarks widely used for financial transactions, the Financial Instruments and Exchange Act was revised in 2014 for enforcement in May 2015.

[Overview of the regulation of financial benchmarks]

Purpose of the regulation		Ensure the reliability of specified financial benchmarks widely used as the foundation of financial transactions.
Regulation on the administrator of specified financial benchmarks	Framework of regulation	“Designate” the administrator of specified financial benchmarks (for the time being, the administrator of TIBOR is assumed to be subject to the regulation).
	Formulation/ compliance with operational rules	The designated administrator is required to formulate and adhere to “operational rules” in line with the IOSCO Principles.
	Framework of inspection/ supervision	Develop the framework for inspection and supervision, including requests for reports and on-site inspections.
Discipline of panel banks		Indirectly discipline the administrator of specified financial benchmarks and panel banks by having them conclude the “code of conduct” between them.
		Prohibit fraudulent data submissions.

Source: Made by MHRI based on materials of FSA

[Image of the regulation of financial benchmarks]



Source: Made by MHRI based on materials of FSA

(1) Japan (ii) TIBOR reform and an initiative toward the transition of yen LIBOR to alternative benchmarks

- TIBOR reform ensured the reliability of TIBOR.
  - In April 2014, the JBA TIBOR Administration was established from the perspective of the fair determination and publication of TIBOR. Subsequently, the JBA TIBOR Administration carried out the TIBOR reform, including the clarification of the processes of the calculation and determination of interest rates submitted by panel banks.
- Regarding the yen LIBOR, the consideration of the selection of appropriate alternative benchmarks (see the following slide) and the development of the fallback mechanism is currently under way.
  - In December 2016, TONA was identified as the RFR alternative to yen LIBOR.

[Overview of TIBOR reform (carried out in July 2017)]

Enhanced transparency	• Integrate and clarify the processes of calculating and determining submitted rates at panel banks. • Set the waterfall methodology (priorities) and limit the utilization of expert judgments to emergencies where no data is available from the relevant markets. —In the case of yen TIBOR, top priority is given to data in the observable unsecured call market.
Change in the time for rate publication	• The publication time was changed from "Until noon on the day" to "Until 1 p.m. on the day."
Abolition of some tenors	• The tenor of two months was abolished in April 2019.
Termination of the simultaneous publication of rates submitted by panel banks	• In order to avoid the inference of the credit status of panel banks, the publication time of submitted interest rates was changed from "Simultaneously with the announcement of rates" to "the final business day of the corresponding three months later."

Source: Made by MHRI based on materials of JBA TIBOR Administration

[Developments in discussions about the transition of yen LIBOR to alternative benchmarks]

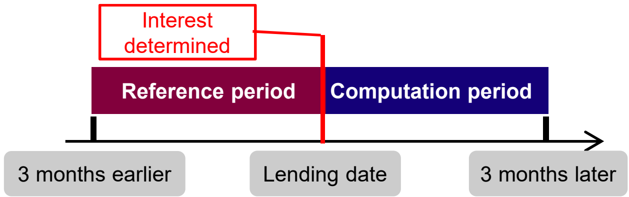
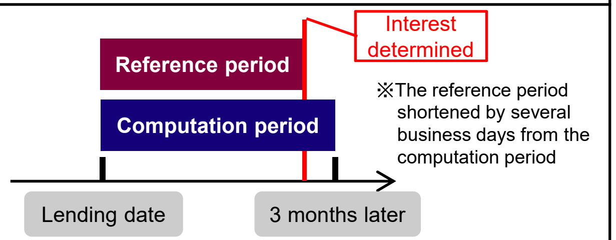
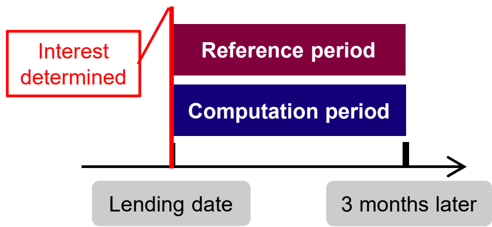
Jun 2015	• The Study Group on Risk-Free Reference Rates was set up under the Bank of Japan. —The purposes of the Study Group are: (1) Identification of RFRs and the consideration of the administrator, and (2) Consideration of the development of market practices and contract practices in view of the assumed utilization of RFRs.
Dec 2016	• TONA was identified as the RFR.
Aug 2018	• The Cross-Industry Committee on Japanese Yen Interest Rate Benchmarks was set up under the Bank of Japan. —The Committee is designed to consider the appropriate selection and utilization of Japanese yen interest rate benchmarks and also to consider responses in preparation for the permanent discontinuation of LIBOR, etc.
Jul 2019	• Release "Public Consultation on the Appropriate Choice and Usage of Japanese Yen Interest Rate Benchmarks" (the deadline for comment submissions: September 30, 2019).

Source: Made by MHRI based on materials of Bank of Japan

(1) Japan (Reference) Options for benchmarks alternative to yen LIBOR

- ❑ Multiple RFR reference interest rates, in addition to TIBOR, are under consideration for alternatives to yen LIBOR.
  - TIBOR and term RFRs are assumed to be alternative benchmarks suitable for loans, while O/N RFRs compounded in arrears or term RFRs are assumed to be suitable for bonds.
  - However, as the development of term RFRs requires considerable time, O/N RFRs compounded in arrears may be used as a temporary alternative benchmark for loans as well.

[Options for benchmarks alternative to yen LIBOR]

	Alternative benchmark	Reference rate	Image of reference period and computation period (Example: three months)	Feasibility	Problems
RFR reference interest rates	O/N RFRs compounded in advance	TONA		Already currently available for use	• Need to consider the specifications of interest rate benchmarks by taking into account the gap between the reference periods and computation periods.
	O/N RFRs compounded in arrears	TONA			• Need to review the existing operations and systems as the required daily compound interest calculation imposes a heavy workload.
	Term RFRs (swaps)	Japanese yen OIS		Need for new development	• Need to establish the computation process. • Need to enhance market liquidity by increasing actual transactions to ensure the reliability of interest rate benchmarks.
	Term RFRs (futures)	TONA futures			
TIBOR		TIBOR		Existing interest rate benchmarks	—

Source: Made by MHRI based on materials of Bank of Japan

(2) US

- Given the absence of IBORs for the US dollar that can replace LIBOR, discussions on the identification of RFRs progressed much earlier than in other countries.
  - SOFR was identified as the RFR in June 2017.
  - The Paced Transition Plan was adopted with specific steps and timelines designed to encourage adoption of SOFR in October 2017. Consideration is under way toward the orderly transition to SOFR, including the development of term SOFR.
  - Consideration is also under way on the development of the fallback mechanism for each financial instrument.

[Developments in the US toward the transition to SOFR and the development of the fallback mechanism]

Nov 2014	• ARRC (Alternative Reference Rates Committee) was established.
Jun 2017	• SOFR was identified as the RFR.
Oct 2017	• The Paced Transition Plan was adopted. —The plan covers the schedule, etc. related to the commencement of transactions referencing SOFR for the development of the SOFR market. —The development of term SOFR is set until the end of 2021.
Jul 2018	• The guiding principles for the development of fallback language for new contracts for cash products referencing LIBOR were released. —They are the guidelines for the successor rates, spread adjustment and triggers, etc.
Sep 2018	• Conducted public consultation on the fallback language related to floating-rate notes and syndicated loans.
Dec 2018	• Conducted public consultation on the fallback language related to bilateral business loans and securitizations.
Apr 2019	• Published “A User’s Guide to SOFR” for the use of SOFR in cash products (loans, securitization and floating-rate notes, etc.). —For term SOFR, the consideration is under way on their development based on a combination of SOFR OIS and SOFR futures transactions. • Published the final recommended language for the fallback related to floating-rate notes and syndicated loans.
May 2019	• Published the final recommended language for the fallback related to bilateral business loans and securitizations.
Jun 2019	• The regulatory authorities indicated that they are considering regulatory changes to exclude existing derivatives contracts not subject to the central clearing obligation from the application of margin requirements.

Source: Made by MHRI based on materials of Bank of Japan, materials of ARRC

(3) UK

❑ The study on the identification of RFRs made headway in view of the possible discontinuation of LIBOR.

- SONIA was identified as the RFR in April 2017. Subsequently, the SONIA reform (SONIA＋) was carried out to make SONIA further anchored by actual transactions.
- Currently, the study is under way toward the development of term SONIA+.

[Developments in the UK toward the transition to SONIA＋, etc.]

Mar 2015	• The Working Group on Sterling Risk-Free Reference Rates was established.
Apr 2017	• SONIA was identified as the RFR. At the same time, the implementation of the SONIA reform (SONIA＋) was recommended. —Also recommended were (1) the transfer of the administrator of benchmarks to the Bank of England, and (2) the rate is computed on the basis of data on actual transactions collected by the Bank of England.
Apr 2018	• The SONIA reform (SONIA+) was completed.
Jul 2018	• Conducted public consultation on the development of term SONIA＋. —In the public consultation, the conclusion was presented that it is appropriate to develop term SONIA＋ based on spot OIS swap quotes. But a large number of comments supported to develop term SONIA＋ based on together with a blend of futures and OIS swap data.
Sep 2018	• The UK authorities issued the Dear CEO letters. —The supervisory authorities requested the management of major banks and insurance companies to assess the key risks relating to discontinuation of LIBOR and to develop specific plans for transition to alternative benchmarks.
Dec 2018	• On the basis of the results of public consultation on the development of term SONIA＋, the next steps were released. —For many current users of LIBOR, overnight SONIA＋ may be a more appropriate than a term alternative. —It was encouraged such LIBOR users to progress their transition from LIBOR to the greatest extent possible, independently of any further progress on the development of term SONIA＋.
Apr 2019	• The major parts of the LIBOR reform carried out in a phased manner were completed. —LIBOR panel banks compute rates they submit in line with the waterfall methodology (priorities) prepared by the LIBOR administrator, IBA.

Source: Made by MHRI based on materials of Bank of Japan, materials of Bank of England

(4) EU (i) Introduction of EU Benchmarks Regulation

- Following the attempted manipulation of LIBOR, etc., efforts toward the enhancement of the robustness and transparency of financial benchmarks have moved ahead.
  - In September 2013, the European Commission proposed the draft of EU Benchmarks Regulation. A large part of regulatory rules in this regulation started in January 2018.
  - Regarding critical benchmarks, such as LIBOR and EURIBOR, there is the provision that calls for the compulsory continuation of the operation and data submissions.

[Overview of the EU Benchmarks Regulation]

Date of entry into force	• June 30, 2016
Date that the rules apply	• January 1, 2018. However, the application of the compulsory continuation of the operation and data submissions for critical benchmarks commenced upon the enforcement of the regulation. • The transition period is two years. However, the period was extended to four years until the end of 2021 for requirements of critical benchmarks and third-country benchmarks (third-country regime).
Objectives	• Address problems of the conflict of interest, governance and discretion in the calculation of benchmarks and reduce the risk of the manipulation of benchmarks.
Subject	• Not only interest rate benchmarks but also other financial benchmarks used in financial transactions (foreign exchange, securities and commodities, etc.) are covered.
Key regulations	• Administrators must be authorized or registered. • Administrators are required to improve governance, such as the management of the conflict of interest and enhance the transparency in the computation of benchmarks. • Supervised entities (banks, investment companies and insurance companies, etc.) must not use unregulated financial benchmarks in certain transactions, including transactions of derivatives and securities within the EU.
Interest rate benchmark requirements	• Administrators are required to give priority to input data from actual transactions in the underlying market over observations of third-party transactions, committed quotes or indicative quotes or expert judgments.
Requirements for critical benchmarks	• The administrators' home state regulator must establish a college of supervisors to oversee the benchmark, including the regulators of member states where the benchmark is significant. • The regulators have the power to delay the discontinuance of the benchmark by requiring the administrators temporarily to continue the provision of the benchmark. • The regulators may require supervised entities temporarily to contribute input data to the benchmark.
Third-country regime	• It is necessary to take either of the methods of (1) equivalence, (2) recognition, or (3) endorsement to allow third-country benchmarks to be used within the EU.

Source: Made by MHRI

(4) EU (ii) Third-country regime of the EU Benchmarks Regulation

❑ In order to enable supervised entities within the EU to use a financial benchmark provided by an administrator of a third country, it is necessary to register the benchmark with the EU authorities through either of the ways shown in the table below.

- While the transition period is set to run until the end of 2021, some point to the difficulty in practical responses, raises the possibility that some third-country benchmarks may become unable to be used within the EU.

[Ways to make a third-country benchmark usable within the EU (the third-country regime)]

	Descriptions
Equivalence	• The equivalence decision of the European Commission in terms of the regulation and supervision of administrators and benchmarks. • A third-country administrator must be authorized or registered in the respective third country and subject to its supervision. • A third-country administrator needs to notify the European Securities and Markets Authority (ESMA) of its consent to the use of its benchmarks within the EU by supervised entities. • There must be a cooperation agreement between ESMA and the third country authorities.
Recognition	• The recognition of regulators of an EU member state to be determined depending on a third-country administrator and its benchmark. It is a temporarily way until the equivalence decision is adopted. • A third-country administrator must adhere to the requirements for an administrator, except for some of them, under the EU Benchmarks Regulation. • A third-country administrator must have its legal representative in that EU member state who performs an oversight function and is accountable to the regulators. • When a third-party administrator is subject to the supervision in the third country, there must be a cooperation agreement in place between ESMA and the third country regulators.
Endorsement	• The endorsement by an administrator and/or a supervised entity within EU to their home-country regulators. • An endorsing entity must have the expertise to monitor effectively the activity of the provision of a benchmark in a third country and to manage the associated risks. • An endorsing entity must verify that the third-country benchmark fulfils, on a mandatory or on a voluntary basis, requirements which are at least as stringent as the requirements of the EU Benchmarks Regulation. • There must be an objective reason to provide the third-country benchmark in a third country and to be endorsed for their use in the EU. • An endorsing entity takes full responsibility for compliance with the obligations under the EU Benchmarks Regulation.

Source: Made by MHRI

(4) EU (iii) The status of EURIBOR reform and consideration toward the transition to alternative benchmarks

❑ EURIBOR reform and the study on the identification of RFRs made headway.

- Major interest rate benchmarks in the eurozone are EURIBOR and EONIA (Euro OverNight Index Average). While EONIA has been widely used as the risk-free overnight interest rate until now, a study on an alternative benchmark was launched based on the judgment that EONIA would face the difficulty complying with the EU Benchmarks Regulation.
  - ✓ In September 2018, €STR was identified as the RFR (with the publication set to start in October 2019). The EURIBOR reform is scheduled to be completed by the end of 2019.
- Currently, (1) the smooth transition from EONIA to €STR and (2) the study on the development of term RFRs are under way.

[Developments in the EU toward the transition to €STR and the development of the fallback mechanism, etc.]

Feb 2018	• The European Money Markets Institute (EMMI) gave up on the EONIA reform. Following this, the Working Group on Euro Risk-Free Rates was established.
Jun 2018	• The Working Group conducted public consultation on the EURIBOR reform. —The Working Group proposed the hybrid methodology (which allows the use of expert judgements in the absence of actual transactions).
Sep 2018	• €STR was identified as the RFR.
Oct 2018	• The Working Group conducted the second public consultation on the EURIBOR reform.
Dec 2018	• The Working Group conducted public consultation on the development of term €STR, intended as the fallback rate of EURIBOR. —The Working Group presented the conclusion that the method based on the OIS tradable quotes is highly likely to be the most appropriate as the method to develop term €STR.
Jan 2019	• The Working Group published the guiding principles for fallback provisions in new contracts for euro-denominated cash products (loans, floating-rate notes, securitizations and deposits, etc.).
Mar 2019	• The Working Group recommended that term €STR, designed to be the fallback rate of EURIBOR, should be developed by the method based on the OIS tradable quotes.
May 2019	• The Working Group published a draft legal action plan for transition from EONIA to €STR. —The Working Group proposed responses to (1) the change in the computation method for EONIA (after October 2019) and (2) the discontinuation of EONIA (at the end of 2021).

Source: Made by MHRI based on materials of Bank of Japan, materials of European Central Bank, and materials of EMMI