# ICE LIBOR Evolution

April 25, 2018

# Contents

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## Executive summary

In February 2014, ICE Benchmark Administration Limited ("IBA") became the administrator of LIBOR.

Since then, IBA has worked closely with market participants, regulators and other stakeholders to strengthen LIBOR, investing significantly to establish new governance, oversight, controls and technology for the benchmark. This work has been guided by the principles and recommendations put forward in "The Wheatley Review of LIBOR: final report", the International Organization of Securities Commissions' "Principles for Financial Benchmarks: Final Report", and the Financial Stability Board's paper on "Reforming Major Interest Rate Benchmarks".

Building on these developments, IBA continues to seek to evolve LIBOR so that it remains a robust and sustainable benchmark providing an indication of the average rate at which LIBOR panel banks could obtain unsecured, wholesale funding.

In March 2016, following input from the LIBOR Oversight Committee and a broad consultation with stakeholders from around the world, IBA published the "Roadmap for ICE LIBOR". Guided by the recommendations in the Wheatley Review of LIBOR, the IOSCO Principles for Financial Benchmarks and the FSB's paper on Reforming Major Interest Rate Benchmarks, the Roadmap for ICE LIBOR contains a framework to evolve LIBOR through the adoption of the "ICE LIBOR Output Statement".

The ICE LIBOR Output Statement sets out a single LIBOR definition and a more standardised, transaction data-driven methodology for LIBOR panel banks' submissions in place of the existing LIBOR submission question. Each LIBOR panel bank's submissions in response to the ICE LIBOR Output Statement will be determined through the use of a "Waterfall Methodology", which utilises eligible transaction data where available, transaction-derived data otherwise, and, if neither is available, market and transaction data-based expert judgement, appropriately framed, using the bank's own internally approved procedure (based on a set of permitted inputs and agreed with IBA).

IBA's objective in evolving LIBOR through the use of the ICE LIBOR Output Statement is to publish, in all market circumstances, a wholesale funding rate anchored in unsecured, wholesale funding transactions to the greatest extent possible.

Following the publication of the Roadmap for ICE LIBOR, IBA worked with the LIBOR panel banks during the remainder of 2016 and the first half of 2017 to help develop and implement the necessary infrastructure and systems to make LIBOR submissions using the Waterfall Methodology. IBA then conducted a three-month period of production-standard testing between September 15 and December 15, 2017, during which all 20 LIBOR panel banks were required to make parallel LIBOR submissions using the Waterfall Methodology. The test LIBOR rates calculated by IBA using the testing period submissions were published on March 17, 2018, alongside previously published LIBOR calculated using the existing methodology for the same period.

IBA now intends, in the coming weeks, to begin the process of transitioning LIBOR panel banks to the Waterfall Methodology. LIBOR panel banks will transition on a gradual basis, in order to minimise operational and technology risks. IBA expects the transition to be completed by no later than the first quarter of 2019.

As part of LIBOR's ongoing development, IBA will continue to work with regulators, banks, market participants and other stakeholders regarding the future of the benchmark beyond the end of 2021. The UK Financial Conduct Authority has advised that its intention is that it would no longer be necessary to sustain LIBOR through its influence or legal powers beyond this time. Through this work, IBA hopes to identify a framework to seek to continue to publish the LIBOR rates that are critical to the global financial system and which banks are willing to support, alongside the alternative risk-free rates that are being developed.

## A brief introduction to LIBOR

LIBOR originated in the late 1960s and 70s in order to facilitate syndicated loan transactions and increase the transparency of their pricing. Following growth in the loan market and in new financial instruments (particularly derivatives), which required reliable interest rate benchmarks, the British Bankers' Association (the "BBA") assumed control of the rate in 1986. The benchmark was published as "BBA LIBOR" from January 1986 until January 2014.

LIBOR has been the subject of various changes throughout its history. There have been adjustments made to the memberships of the panels for each currency rate. Additional currency rates have been added, whilst others have been removed or integrated into the Euro rates. The number of tenors has also changed, and has been reduced considerably since the 2008 financial crisis.

In 1998, the submission question (the "LIBOR Submission Question") asked of LIBOR panel banks ("Panel Banks") was updated from:

*"At what rate do you think interbank term deposits will be offered by one prime bank to another prime bank for a reasonable market size today at 11 am?",*

to:

*"At what rate could you borrow funds, were you to do so by asking for and then accepting interbank offers in a reasonable market size just prior to 11 am?".*

With this change, each submission became a subjective determination of the rate at which a given Panel Bank could transact.

## The mandate for reform

| 2008 | 2012 | 2013 | 2014 |
|---|---|---|---|
| Financial crisis starts | Findings of LIBOR misconduct | LIBOR becomes regulated by the FCA | IBA becomes the administrator for LIBOR |
| | HM Treasury publishes the Wheatley Review of LIBOR | IOSCO publishes its Principles for Financial Benchmarks | FSB publishes its paper on Reforming Major Interest Rate Benchmarks |

| 2016 | 2017 | 2018 |
|---|---|---|
| IBA publishes the Roadmap for ICE LIBOR | FSB publishes its most recent progress report on Reforming Major Interest Rate Benchmarks | IBA publishes the test rates calculated from the production-standard test period |
| | IBA conducts a three-month period of production-standard testing | |

Following the start of the financial crisis in 2008, a number of Panel Banks were fined for misconduct in relation to the benchmark. Unsecured interbank lending activity also declined noticeably, as banks increased their reliance on a broader range of wholesale, unsecured and secured financing transactions with a wider variety of counterparties.

In June 2012, HM Treasury commissioned Martin Wheatley, then CEO-designate of the Financial Conduct Authority (the "FCA"), to establish an independent review into a number of aspects of the setting and usage of LIBOR. "The Wheatley Review of LIBOR: final report"[1] (the "Wheatley Review") was published in September 2012, setting out a 10-point plan for the comprehensive reform of the benchmark. Recommendations from the Wheatley Review include:

- Statutory regulation of the administration of, and submission to, LIBOR, including civil and criminal enforcement;
- Transferring responsibility for LIBOR from the BBA to a new, private administrator;
- Introducing a code of conduct to provide guidance for submitting banks (including the use of a hierarchy of unsecured interbank lending and other relevant transactions to assess the interbank funding market); and
- Appointing an oversight committee of market participants to assist with decisions relating to the definition and calculation of the benchmark.

As a result, in April 2013, LIBOR became regulated by the FCA. In July 2013, the BBA introduced an oversight committee and implemented a code of conduct for Panel Banks, with submission guidelines based on those in the Wheatley Review.

Also in July 2013, the International Organization of Securities Commissions ("IOSCO") published its "Principles for Financial Benchmarks: Final Report"[2] (the "IOSCO Principles"), with the objective of creating an overarching framework of principles for benchmarks used in financial markets. Practices recommended by the IOSCO Principles include:

- Implementing an appropriate control framework at the administrator for the process of determining and distributing the benchmark;
- Establishing an appropriate oversight function to review and challenge all aspects of the benchmark determination process;
- Using data based on prices, rates, indices or values formed by the competitive forces of supply and demand, anchored by observable transactions in an active, reliable market, entered into on an arm's length basis;
- Establishing clear guidelines regarding the hierarchy of data inputs and the exercise of expert judgment used to determine the benchmark; and
- Developing a code of conduct to provide guidance for submitting banks.

As noted above, the Wheatley Review concluded that a private organisation should administer LIBOR, rather than a public body. Following a rigorous tender process run by the independent Hogg Tendering Advisory Committee (the "Committee") mandated by HM Treasury and the FCA, ICE Benchmark Administration Limited ("IBA") was recommended and accepted as the new administrator[3]. The Committee concluded that IBA was best placed among the candidates to achieve an orderly transition to an effective new regime for LIBOR and restore its international credibility. IBA formally assumed its position as administrator of LIBOR in February 2014.

Publication of the Financial Stability Board's (the "FSB") paper on "Reforming Major Interest Rate Benchmarks"[4] (the "FSB report") followed in July 2014. The FSB Report proposes the implementation of the IOSCO Principles by benchmark administrators as the starting point for robust reference rates. In addition, in guiding reform, it highlights certain additional principles for change, including:

- The importance of grounding rates in transaction data; noting that dependence on transactions will be based on currency, market liquidity and depth and data sufficiency, and that market conditions may necessitate the use of a waterfall and expert judgement;
- Minimising transition risks and cost; and
- Designing benchmarks that are resilient to market stress and adaptable to varying market conditions.

[1] The Wheatley Review of LIBOR: final report.
[2] Principles for Financial Benchmarks: Final Report.
[3] IBA was named NYSE Euronext Rate Administration Limited at the time of the tender process and when it was recommended and accepted as the new administrator.
[4] Reforming Major Interest Rate Benchmarks.

IBA has invested significantly and put in place new governance, oversight, controls and technology to strengthen the benchmark

Various progress reports have been published in relation to the implementation of the recommendations in the IOSCO Principles and the FSB Report. Most recently, in October 2017, the FSB published a progress report[5] noting that IBA has commenced a variety of measures to test and improve the robustness of the LIBOR methodology and has made adjustments to account for a lack of substantial transaction data. It also notes that underlying reference transactions in some currency and tenor pairs remain scarce and submissions therefore necessarily remain based on a mixture of factors including transactions and the judgement of submitters. Despite steps taken by regulators to address these issues, the FSB acknowledges the challenges faced by administrators to ensure the integrity and robustness of benchmarks based on expert judgement submissions, including the uncertainty over whether Panel Banks would continue to submit rates based on such judgements over the medium or longer-term.

## IBA's work to strengthen LIBOR

**IBA's developments**
IBA has invested significantly and put in place new governance, oversight, controls and technology to strengthen the benchmark. This process, and IBA's continued development of LIBOR, has been guided by the principles and recommendations put forward in the Wheatley Review, the IOSCO Principles and the FSB Report. Set out below are some important improvements IBA has made to LIBOR.

**LIBOR code of conduct**
IBA has developed a revised code of conduct for the Panel Banks (the "Code")[6]. This sets out the framework within which Panel Banks operate and make submissions, and includes governance requirements and submission methodology guidelines. The Code also serves to assist benchmark users in assessing the appropriateness of referencing LIBOR in their contracts.

**LIBOR oversight committee**
IBA maintains an oversight committee for LIBOR[7] (the "LIBOR Oversight Committee"), which has responsibility for:

- Reviewing the methodology, scope and definition of the benchmark (including assessing its underlying market and usage);
- Overseeing any changes to the benchmark; and
- Overseeing and reviewing the Code.

The committee has broad market representation, being comprised of Panel Banks, benchmark users, market infrastructure providers, independent non-executive directors and management of IBA and other relevant experts. Representatives from the Board of Governors of the Federal Reserve System, the Swiss National Bank and the Bank of England also sit on the committee as observers.

[5] FSB Progress Report.
[6] The LIBOR Code of Conduct can be found on the ICE website. A code of conduct for LIBOR is a requirement under current UK benchmark regulation (FCA Handbook Market Conduct MAR 8) and under the European Benchmarks Regulation (Regulation 2016/1011) (the "EU BMR").
[7] An oversight committee is a requirement under current UK benchmark regulation and the EU BMR.

Used globally, LIBOR is often referenced in derivative, bond and loan documentation, and in a range of consumer lending instruments such as mortgages and student loans. It is also used as a gauge of market expectation regarding central bank interest rates, liquidity premiums in the money markets and, during periods of stress, as an indicator of the health of the banking system.

**Technology and processes**
IBA has made significant investment in new technology and processes associated with LIBOR. These include:

- Redesigning and automating the LIBOR submission process to run on modern technology;
- Implementing real-time validation checks to help identify errors before the rate is calculated;
- Developing purpose-built surveillance technology, operated by a dedicated team of analysts, to examine Panel Bank submissions and trading activity; and
- Ensuring market data redistributors receive LIBOR data at the same time and from the same place, to provide consistency in publishing the benchmark.

IBA's technology and processes are fully auditable and benefit from robust contingency and business continuity arrangements, which are designed to allow for continuous operation to the greatest extent possible in case of disaster or disruptive events.

## LIBOR today

**Today's LIBOR rates**
Today, LIBOR is a widely used benchmark for short-term interest rates. It is produced for five currencies (CHF, EUR, GBP, JPY and USD) and seven tenors (Overnight/Spot Next, 1 Week, 1 Month, 2 Months, 3 Months, 6 Months and 12 Months), resulting in the publication of 35 rates every applicable London business day.

Used globally, LIBOR is often referenced in derivative, bond and loan documentation, and in a range of consumer lending instruments such as mortgages and student loans. It is also used as a gauge of market expectation regarding central bank interest rates, liquidity premiums in the money markets and, during periods of stress, as an indicator of the health of the banking system.

**Underlying interest and the current LIBOR submission question**
LIBOR provides an indication of the average rate at which Panel Banks could obtain wholesale, unsecured funding for a given period, in a given currency.

Today, in order to produce LIBOR for each currency and tenor pair, Panel Banks are asked to base their submissions on the following LIBOR Submission Question:

*"At what rate could you borrow funds, were you to do so by asking for and then accepting interbank offers in a reasonable market size just prior to 11 am?"*

**Calculation methodology**

LIBOR is calculated as of 11.00 am every applicable London business day, based on submissions from a reference panel of between 11 and 16 banks for each currency. Panel Banks make their submissions in the form of an annualised interest rate in response to the LIBOR Submission Question between 11:05 am and 11:40 am.

The Code currently provides that LIBOR submissions should be determined based on data from a range of relevant transaction types. These may also utilise qualitative criteria such as the expert judgement of the submitter. Each Panel Bank must ensure that its submissions are determined using an effective methodology based on objective criteria and relevant market information.

The received submissions for each currency and tenor pair are ranked by IBA and trimmed by the exclusion of the upper and lower quartiles to remove outliers[8]. The relevant LIBOR rate is then calculated as the arithmetic mean of the remaining submissions, rounded to five decimal places. Each Panel Bank's submission carries an equal weight, subject to the trimming[9].

**LIBOR panel composition**

| Bank/Currency | USD | GBP | EUR | CHF | JPY |
|---|---|---|---|---|---|
| Bank of America N.A. (London Branch) | ● | | | | |
| Barclays Bank plc | ● | ● | ● | ● | ● |
| BNP Paribas SA, London Branch | | ● | | | |
| Citibank N.A. (London Branch) | ● | ● | ● | ● | |
| Cooperatieve Rabobank U.A. | ● | ● | ● | | |
| Crédit Agricole Corporate & Investment Bank | ● | ● | | | |
| Credit Suisse AG (London Branch) | ● | | ● | ● | |
| Deutsche Bank AG (London Branch) | ● | ● | ● | ● | ● |
| HSBC Bank plc | ● | ● | ● | ● | ● |
| JPMorgan Chase Bank, N.A. London Branch | ● | ● | ● | ● | ● |
| Lloyds Bank plc | ● | ● | ● | ● | ● |
| Mizuho Bank, Ltd. | | ● | ● | | ● |
| MUFG Bank, Ltd | ● | ● | ● | ● | ● |
| Royal Bank of Canada | ● | ● | ● | | |
| Santander UK Plc | | ● | ● | | |
| Société Générale (London Branch) | | ● | ● | ● | ● |
| Sumitomo Mitsui Banking Corporation Europe Limited | ● | | | | ● |
| The Norinchukin Bank | ● | | | | ● |
| The Royal Bank of Scotland plc | ● | ● | ● | ● | ● |
| UBS AG | ● | ● | ● | ● | ● |

[8] The number of submissions that are excluded depends on the total number of submissions received. Please see the ICE website for further details.

[9] If IBA receives fewer than the expected number of submissions in respect of a particular currency by the time the relevant LIBOR rates are due to be published, the ICE LIBOR Reduced Submissions Policy will apply to those rates.

IBA, with input from the LIBOR Oversight Committee, has consulted widely on the evolution of LIBOR

**Publication**
LIBOR is normally[10] published for each currency and tenor pair at 11:55 am London time on each applicable London business day[11].

Many market data redistributors publish LIBOR under licence from IBA.

Users that redistribute LIBOR to clients, create derivative products referencing LIBOR on trading venues, use LIBOR in providing products for clearing, valuation or pricing, or reference LIBOR in transactions and financial products, require a direct licence from IBA[12].

LIBOR is made available to the public via the ICE Report Centre[13] 24 hours after initial publication. Individual Panel Bank submissions are also made public on a non-attributed basis three months following submission.

## The evolution of ICE LIBOR

**A roadmap for ICE LIBOR**
IBA, with input from the LIBOR Oversight Committee, has consulted widely on the evolution of LIBOR. Numerous stakeholders from around the world have been involved in the process[14], culminating in the publication of the "Roadmap for ICE LIBOR"[15] (the "Roadmap") in March 2016.

Guided by the recommendations and principles in the Wheatley Review, the IOSCO Principles and the FSB Report, the Roadmap sets out IBA's framework to evolve LIBOR so that it continues to provide an indication of the average rate at which Panel Banks could obtain wholesale unsecured funding.

IBA's objectives for the Roadmap were to:

- Produce a wholesale funding rate, anchored in unsecured, wholesale funding transactions to the greatest extent possible;
- Publish a standardised, transparent and robust LIBOR methodology and a single, clear and comprehensive LIBOR definition;
- Ensure the rate can adapt to changing market conditions and stakeholder needs; and
- Evolve LIBOR through a seamless transition.

**Underlying interest and the ICE LIBOR output statement**
The Roadmap contains a framework to evolve LIBOR through the adoption of the "ICE LIBOR Output Statement" (the "Output Statement")[16], included as Appendix 1 to this report. This sets out a single LIBOR definition and a standardised waterfall methodology for submissions in place of the existing LIBOR Submission Question.

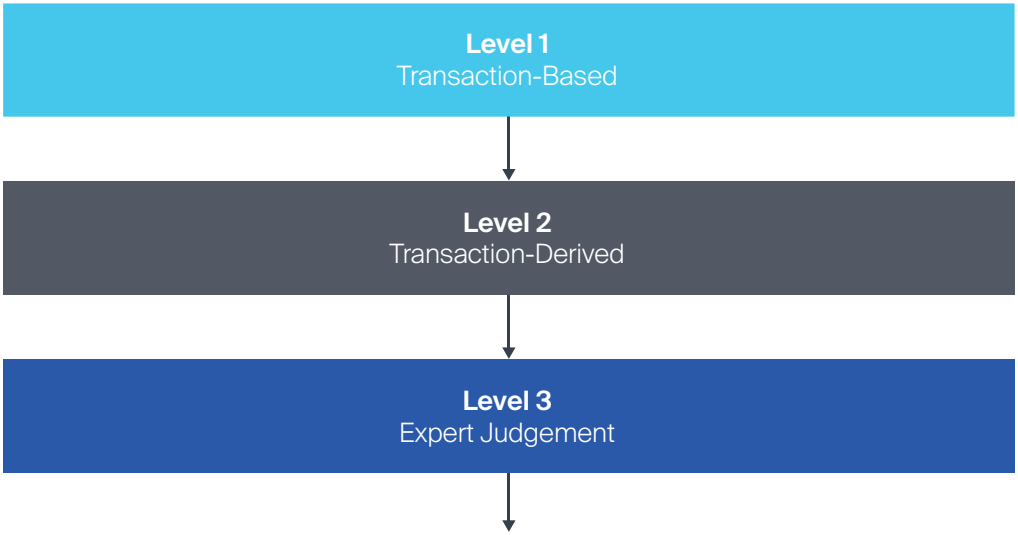
The Output Statement defines LIBOR as:

*"A wholesale funding rate anchored in LIBOR panel banks' unsecured wholesale transactions to the greatest extent possible, with a waterfall to enable a rate to be published in all market circumstances".*

[10] IBA is able to delay publication in exceptional circumstances.
[11] Please see the ICE website and The LIBOR Holiday Calendar for further details.
[12] Please direct any licensing queries to IBA-Licensing@theice.com.
[13] ICE Report Centre.
[14] Please see the ICE website for further details.
[15] Roadmap for ICE LIBOR.
[16] The Output Statement in the Roadmap was updated pursuant to a further consultation and feedback statement. Please see the ICE website for further details. The final Output Statement can also be found at The ICE LIBOR Output Statement.

The Waterfall Methodology requires Panel Banks to base their LIBOR submissions in eligible wholesale, unsecured funding transactions to the extent available

## The Waterfall Methodology




LIBOR under the Output Statement will continue to be based on Panel Bank submissions. These will be determined in response to the Output Statement through the use of a standardised, transaction data-driven waterfall methodology (the "Waterfall Methodology"), as set out below:

**Level 1 (Transaction-Based)**
Where a Panel Bank has sufficient eligible transactions, a volume weighted average price ("VWAP") of such eligible transactions, with a higher weighting for transactions booked closer to 11:00 am London time. Eligibility criteria for transactions are specified by IBA.

**Level 2 (Transaction-Derived)**
Where a Panel Bank has insufficient eligible transactions to make a Level 1 submission, it will seek to make a submission based on transaction-derived data, including time-weighted historical eligible transactions adjusted for market movements and linear interpolation. Eligibility criteria for transaction-derived data are specified by IBA.

**Level 3 (Expert Judgement)**
Where a Panel Bank has insufficient eligible transactions or transaction-derived data to make a Level 1 or a Level 2 submission, it will submit the rate at which it could fund itself at 11:00 am London time with reference to the unsecured, wholesale funding market. Each Panel Bank agrees its defined Level 3 submission methodology with IBA, basing its rate on transactions, related market instruments, broker quotes and other market observations.

The Waterfall Methodology requires Panel Banks to base their LIBOR submissions in eligible wholesale, unsecured funding transactions, to the extent available. The use of expert judgement, appropriately framed, at Level 3 is designed to ensure that LIBOR submissions can be made, and consequently that LIBOR can be published, on every applicable London business day, even when liquidity and transactions in particular currencies and tenors are such that a Panel Bank has insufficient eligible transactions or transaction-derived data to make a Level 1 or a Level 2 submission[17].

The trimmed arithmetic mean calculation methodology used to calculate LIBOR as it is currently published will not change for LIBOR calculated using submissions made in accordance with the Waterfall Methodology.

[17] Individual Panel Bank submissions in accordance with the Waterfall Methodology will continue to be made public on a non-attributed basis three months following submission. These may be generated through Level 1 (Transaction-Based), Level 2 (Transaction-Derived) or Level 3 (Expert Judgement) of the waterfall. Such submitted rate data should not be taken as indicative of the rates at which any particular counterparties could or may have transacted with any particular Panel Bank.

IBA expects, in the coming weeks, to begin the process of transitioning Panel Banks from submitting in accordance with the current LIBOR methodology to the Waterfall Methodology

**Standardised input criteria**
As well as providing a standardised hierarchy for the treatment of transaction data in the submission process, the Waterfall Methodology prescribes standard eligibility criteria for transaction and other data that can be used to calculate submissions at each level of the waterfall[18]. The criteria are designed to include a broad range of transactions, wholesale market counterparty types and funding locations to reflect the changes seen in the wholesale, unsecured funding market since the financial crisis and each Panel Bank's individual geographic profile. Please see Appendix 2 to this report for further details.

**Exceptional market events**
If a rare and unexpected circumstance occurs with evidence of material and widespread market impact, then IBA may declare an "Exceptional Market Event" or "EME". Following an EME, IBA would advise Panel Banks as to the action they should take regarding their submissions, the practical effect of which may be the making of exceptional submissions that override the normal waterfall.

## Testing of the waterfall methodology

Since publishing the Roadmap, IBA has worked with the Panel Banks to help develop and implement the necessary infrastructure and systems to make submissions using the Waterfall Methodology. From August 2016, Panel Banks started producing test LIBOR submissions using the Waterfall Methodology in parallel with their current LIBOR submissions. Methodological and technological refinements were made to the banks' submission processes through the remainder of 2016 and the first half of 2017, with all Panel Banks able to provide test submissions to the same standard as their existing LIBOR submissions by the second half of 2017.

Between September 15 and December 15, 2017 (the "Production Standard Test Period"), IBA conducted a test during which all 20 Panel Banks were required to make additional LIBOR submissions using the Waterfall Methodology to the same production standard as, and in parallel with, their existing LIBOR submissions (the "Production Standard Test").

Using the Production Standard Test submissions made in accordance with the Waterfall Methodology, IBA calculated a test LIBOR rate for each of the 35 currency and tenor pairs for every applicable London business day of the Production Standard Test Period (the "Test Rates")[19]. These calculations applied the same trimmed arithmetic mean approach used to calculate LIBOR as it is currently published. On March 17, 2018, IBA published the Test Rates alongside previously published LIBOR calculated using the existing methodology for the same period[20].

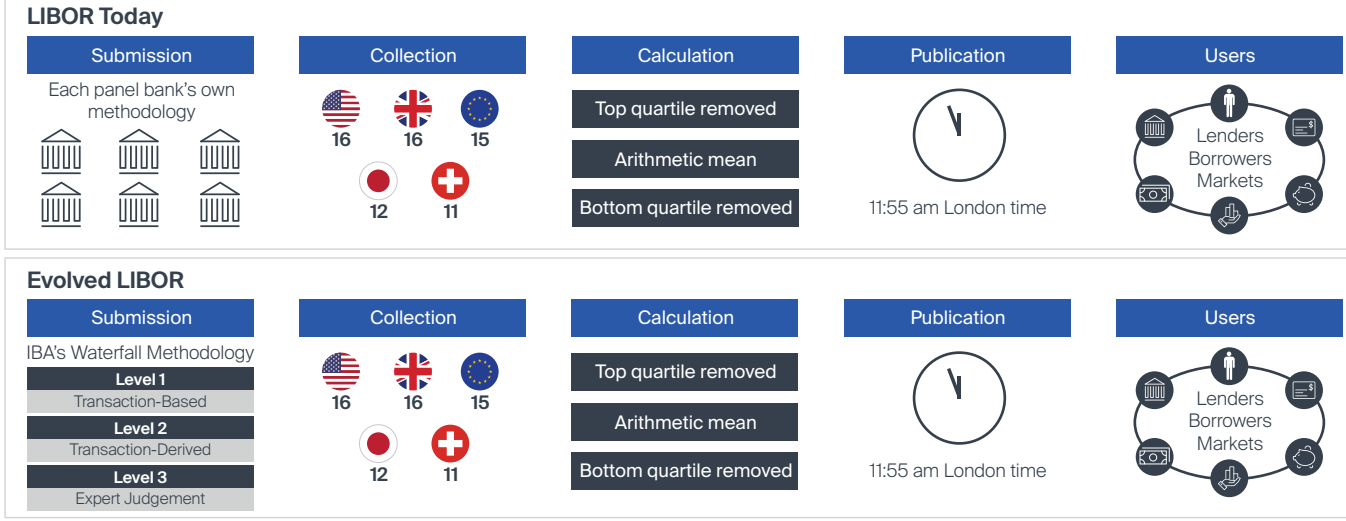
Today, IBA is also publishing a report of the proportion of the Production Standard Test submissions that were made under Level 1 (Transaction-Based), Level 2 (Transaction-Derived) or Level 3 (Expert Judgement) of the Waterfall Methodology for the Production Standard Test Period. Please see Appendix 3 to this report for further details.

## Transition to the waterfall methodology

IBA expects, in the coming weeks, to begin the process of transitioning Panel Banks from submitting in accordance with the current LIBOR methodology to the Waterfall Methodology. Panel Banks will transition on a gradual basis in order to minimise the potential operational and technology risks associated with making the change. Transition dates will be selected to avoid month and quarter-ends, currency bank holidays and relevant central banks' scheduled meeting dates.

IBA expects the transition to be completed by no later than the first quarter of 2019, and will announce the completed transition to the market.

[18] Consultation feedback statements (which can be found on the ICE website), the Roadmap and the Summary of ICE LIBOR Evolution provide further details on transaction and other input data parameters. The criteria and parameters that Panel Banks must adhere to are specified by IBA for each of Levels 1, 2 and 3 of the waterfall.
[19] The Test Rates calculated using the Waterfall Methodology are referred to in this report as LIBOR for convenience, even though they were not calculated and published as LIBOR by reference to the existing LIBOR Submission Question. The Production Standard Test submissions used to calculate the Test Rates are similarly referred to as LIBOR submissions.
[20] See Press Release March 17 2018. The Test Rates are available at LIBOR Waterfall Methodology Test Rates. The Test Rates are historical, relate to a three-month testing period and have been provided for information purposes only. Historical data may not be indicative of future data, and none of the data is intended to constitute any invitation or inducement to engage in any investment activity. Neither IBA, ICE nor any of its or their affiliates will be liable to any person in connection with this data.




## Planning for LIBOR beyond 2021

In his speech entitled "The Future of LIBOR" delivered in July 2017, Andrew Bailey[21], the CEO of the FCA, stated that it was the FCA's intention that it would no longer be necessary for it "to persuade, or compel, banks to submit to LIBOR" or "to sustain the benchmark through [its] influence or legal powers" after the end of 2021.

Mr Bailey also announced that the FCA was seeking Panel Banks' agreement to sustain LIBOR voluntarily to the end of 2021. The FCA subsequently confirmed this agreement in November 2017[22]. IBA welcomed this development, which brought an element of certainty in the near-term while the work to enhance and evolve LIBOR continues.

Following this speech, many stakeholders, particularly those that use LIBOR to price loans, have expressed a desire to see LIBOR's continued publication beyond the end of 2021 alongside the alternative risk-free rates that are being developed[23]. Reasons for wanting LIBOR to continue that have been communicated to IBA include:

- The incorporation of bank credit risk;
- The multiple-tenor structure of LIBOR, which allows for the term-fixing of short-term interest rates; and
- The large number of financial contracts referencing LIBOR that mature after the end of 2021[24].

IBA intends to continue developing and evaluating frameworks that would enable the continued publication of a robust and sustainable LIBOR. Although there is no guarantee that LIBOR will continue to be published after the end of 2021, as this will require voluntary support from the banking industry, the majority of market participants that IBA has engaged with, including lenders, corporate borrowers and investors, have encouraged IBA to identify a framework to enable the continued publication and use of LIBOR over the longer term.

IBA will continue to engage with Panel Banks, other global banks, market participants, corporate borrowers and other stakeholders to identify the currency and tenor pairs that are most important to the users of LIBOR and which submitting banks are willing to support. IBA will do this through the use of surveys and an extensive outreach programme.

Based upon the feedback received in these surveys and during the outreach programme, IBA will engage with stakeholders to identify a framework to seek to continue to publish the LIBOR rates that are critical to the global financial system beyond the end of 2021, alongside the alternative risk-free rates that are being developed. Any such publication will be based on voluntary submissions from banks and, as a result, may not include all of today's published LIBOR currency and tenor pairs. IBA intends to keep the market informed as this work progresses.

[21] "The Future of LIBOR" speech delivered in July 2017 by Andrew Bailey, CEO of the FCA.
[22] FCA Statement on LIBOR Panels.
[23] For example, see Bank of America Merrill Lynch Global Rates Viewpoint: "Survey shows demand for LIBOR to stay alongside alternative" published October 25, 2017.
[24] Counterparties to contracts referencing LIBOR rates that mature after the end of 2021 should consider their requirements going forwards, in particular in case the rate referenced is no longer published after the end of 2021 and they are required to negotiate amendments and amend associated documentation accordingly (including amendments to transition to an appropriate alternative rate).

IBA is committed to delivering a seamless transition to LIBOR generated in accordance with the Waterfall Methodology

## Conclusion

The evolution of LIBOR through the introduction of the Waterfall Methodology is the result of a comprehensive and collaborative process, designed to ensure that LIBOR continues to provide an indication of the average rate at which Panel Banks could obtain wholesale unsecured funding.

This evolution has been developed through a broad market consultation involving multiple stakeholders, with input from the LIBOR Oversight Committee, and guided by the principles and recommendations put forward in the Wheatley Review, the IOSCO Principles and the FSB Report.

IBA is committed to delivering a seamless transition to LIBOR generated in accordance with the Waterfall Methodology, which aims to deliver a rate anchored in unsecured, wholesale funding transactions to the greatest extent possible. The approach is based on a standardised, transparent and robust methodology which is capable of adapting to changing market conditions and stakeholder needs.

As part of LIBOR's ongoing development, IBA will continue to work with regulators, banks, market participants and other stakeholders regarding the future of the benchmark beyond the end of 2021. Through this work, IBA hopes to identify a framework to seek to continue to publish the LIBOR rates that are critical to the global financial system and which banks are willing to support, alongside the alternative risk-free rates that are being developed.

Further details about IBA and ICE LIBOR can be found at theice.com/iba

## Further information

**ICE Benchmark Administration**
iba@theice.com
+44 (0)20 7065 7700

## Media contact

**Claire Miller**
claire.miller@theice.com
+44 (0)20 7065 7745

## Disclaimer

This report sets out the background to ICE Benchmark Administration Limited's ("IBA") proposals to evolve LIBOR and provides a summary of those proposals. More detailed information regarding LIBOR and its evolution can be found at theice.com/iba/libor.

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## Appendix 1

**ICE LIBOR output statement**
ICE LIBOR is the benchmark published under that name or as "LIBOR" and calculated by ICE Benchmark Administration Limited (IBA) on London business days.

It is a wholesale funding rate anchored in LIBOR panel banks' unsecured wholesale transactions to the greatest extent possible, with a waterfall to enable a rate to be published in all market circumstances:

**Level 1:**
A volume weighted average price (VWAP) of transactions in unsecured deposits and primary issuances of commercial paper and certificates of deposit since the previous submission, with a higher weighting for transactions booked closer to 11:00 London time.

Eligible counterparties are providers of wholesale unsecured funding including:

- banks
- central banks
- governmental entities
- multilateral development banks
- non-bank financial institutions
- sovereign wealth funds
- supranationals, and
- corporations as counterparties to a bank's funding transactions for maturities greater than 35 days.

Transactions in approved major funding centres are taken into account without price adjustment, subject to minimum transaction sizes and number of trades as specified by IBA.

**Level 2:**
Transaction-derived data, including time-weighted historical transactions adjusted for market movements and linear interpolation.

**Level 3:**
If the LIBOR panel bank has insufficient Level 1 and Level 2 transactions, it should submit the rate at which it could fund itself at 11:00 London time with reference to the unsecured wholesale funding market. In order to determine this rate the bank should follow its internally approved procedure agreed with IBA.

LIBOR is calculated as of 11.00 every London business day and normally published by IBA at 11.55 London time; it is a trimmed arithmetic mean that excludes the highest and lowest quartile of submissions. Each panel bank's submission carries an equal weight, subject to the trimming.

The panel banks' individual submissions are published by IBA after three months on a non-attributed basis.
Further details are published at theice.com/IBA.

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## Appendix 2

**Standardised inputs**
The Waterfall Methodology prescribes standard eligibility criteria for transaction and other data that can be used to calculate submissions at each level of the waterfall.

The parameters for transactional data that Panel Banks are able to use in the waterfall are set out in the table below.

| Transaction types | Counterparty types | Funding location[25] |
|---|---|---|
| Unsecured term deposit | Banks | Canada |
| Commercial paper - fixed rate and primary issuance | Central banks | USA |
| Certificate of deposit - fixed rate and primary issuance | Governmental entities | EU |
| | Multilateral development banks | EFTA |
| | Non-bank financial institutions | Hong Kong |
| | Sovereign wealth funds | Singapore |
| | Supranationals | Japan |
| | Corporations[26] | Australia |

There are minimum eligibility thresholds of 10 million per transaction in USD, EUR, GBP and CHF (or 1,000 million in JPY) and transactions with a minimum of two different counterparties at Level 1 and Level 2. Forward starting transactions are not eligible at Level 1 or Level 2. Internal transactions (e.g. with a subsidiary) are not eligible.

Level 1 is a volume weighted average price (VWAP) of transactions in unsecured deposits and primary issuances of commercial paper and certificates of deposit since the previous submission, with a higher weighting for transactions booked closer to 11:00 am London time. Maturity range thresholds apply to the eligibility of transactions as inputs for each LIBOR tenor, as specified in the table below.

| LIBOR tenor | Permitted maturity range of transaction | |
|---|---|---|
| **Overnight/Spot next** | 1 business day, and must be an overnight/spot next transaction, respectively[27] | |
| **1 week** | 5 business days | |
| | **From (calendar days)** | **To (calendar days)** |
| **1 month** | 25 | 35 |
| **2 months** | 50 | 70 |
| **3 months** | 80 | 100 |
| **6 months** | 150 | 210 |
| **12 months** | 330 | 390 |

At Level 2, eligible historical transactions are used to determine submissions for the 1 month, 2 months, 3 months, 6 months and 12 months tenors. The maximum number of LIBOR submission days for which historical transactions may be "rolled" from their booking date and used as part of a historical submission is set out in the table below.

[25] Each Panel Bank's funding centres for eligible transactions are agreed with IBA from this list. The list of approved funding centres may be updated by agreement with the LIBOR Oversight Committee. Exceptionally, individual Panel Banks may also include additional funding centres not on this list where these have been agreed with IBA and the LIBOR Oversight Committee.
[26] Funding transactions with corporations as counterparties with maturities greater than 35 days may be used at Level 1 or Level 2. Transactions with maturities of 35 days or less may only be included at Level 3, if they form a part of the bank's agreed methodology.
[27] Additional rules apply to the eligibility of overnight and spot next submissions around month ends and effective dates of policy/base rate changes.

| Tenor/Currency | Maximum number of LIBOR submission days transaction may be rolled | | | | |
|---|---|---|---|---|---|
| | USD | EUR | GBP | CHF | JPY |
| **1 month** | 3 | 3 | 3 | 5 | 5 |
| **2 months** | 3 | 3 | 3 | 5 | 5 |
| **3 months** | 3 | 3 | 3 | 10 | 10 |
| **6 months** | 5 | 5 | 5 | 10 | 10 |
| **12 months** | 10 | 10 | 10 | 15 | 15 |

Eligible historical transactions falling within the Level 1 maturity range thresholds are adjusted by reference to the change in correlated market data provided by the relevant Panel Bank (e.g. OIS curves, interest rate futures etc.) over the relevant period, and weighted depending on currency, tenor and proximity in time to 11:00 am on the publication date.

Where eligible historical transactions are not available for a particular currency in the 2 months, 3 months and 6 months tenors, linear interpolation is used to derive submissions from eligible transactions in adjacent tenors (including tenors falling outside the Level 1 maturity range thresholds[28]). Historical transactions in adjacent tenors may also be used for interpolation, which would be adjusted and weighted in the same manner noted above.

At Level 3, expert judgement, appropriately framed, is used by each Panel Bank to submit the rate at which it could fund itself at 11:00 am London time with reference to the wholesale unsecured funding market. This rate must be based on the bank's internally approved methodology, which must be agreed with IBA and formulated using the permitted inputs set out in the table below.

| Parameters | Permitted inputs |
|---|---|
| **Funding transactions** | Transactions not eligible for use in Level 1 or Level 2<br>Adjusted historical transactions exceeding maximum rolling periods<br>(Internal transactions are not eligible) |
| **Related market instruments** | Interest Rate Futures<br>FRAs<br>Interest Rate Swaps<br>FRNs and FRCDs<br>FX (forwards, swaps)<br>OIS curves<br>Repos |
| **Market observations** | Observed third party transactions<br>Broker quotes<br>Observed third party levels |
| **Macro-economic factors** | e.g. Policy rate changes |
| **Credit standing** | A published and verifiable change in the credit standing of the bank |
| **Other** | Other factors that can be evidenced and verified, if agreed with IBA<br>This will not include any factors that cannot be evidenced and verified or that might present the bank with a conflict of interest |

[28] These are 4 months, 5 months, 7 months, 8 months, 9 months, 10 months and 11 months. These tenors are also subject to maturity range thresholds and maximum rolling periods.

## Appendix 3

**Weekly and quarterly submission reports today**
Currently, IBA publishes weekly and quarterly reports[29] for each LIBOR currency and tenor pair setting out the percentages of Panel Bank submissions that are:

1. Transaction-Based;
2. Transaction-Derived; or
3. Market Data-Based.

These reports are produced using information provided by Panel Banks to IBA specifying whether a particular LIBOR submission is evidenced or informed by:

A. Inter-bank and/or non-interbank unsecured transactions, which are reported as Transaction-Based;
B. Indirect transactional factors (such as interpolation), which are reported as Transaction-Derived; or
C. Other factors (such as a financial model, third party trade observations and quotes, market and derivatives data and expert judgement), which are reported as Market Data-Based.

Each Panel Bank currently determines its LIBOR submissions using its own methodology in response to the LIBOR Submission Question. These methodologies utilise data from a range of transaction types together with qualitative criteria, such as expert judgement.

**Production standard test period report**
As described above, IBA conducted a Production Standard Test between September 15 and December 15, 2017. IBA published the resulting Test Rates on March 17, 2018[30].

Below, IBA is also publishing a report of the proportion of Panel Bank submissions used to calculate the Test Rates that were made under Level 1 (Transaction-Based), Level 2 (Transaction-Derived Data) or Level 3 (Expert Judgement) of the Waterfall Methodology for the Production Standard Test Period. These are shown alongside a report of the proportion of Panel Bank submissions used to calculate published LIBOR using the existing methodology that were Transaction-Based, Transaction-Derived or Market Data-Based for the same period[31].

Under the Waterfall Methodology, Panel Bank submissions will be made using a standardised process. As such, the level of a particular submission in the waterfall used to produce the reports will depend only on the data available to support such submission.

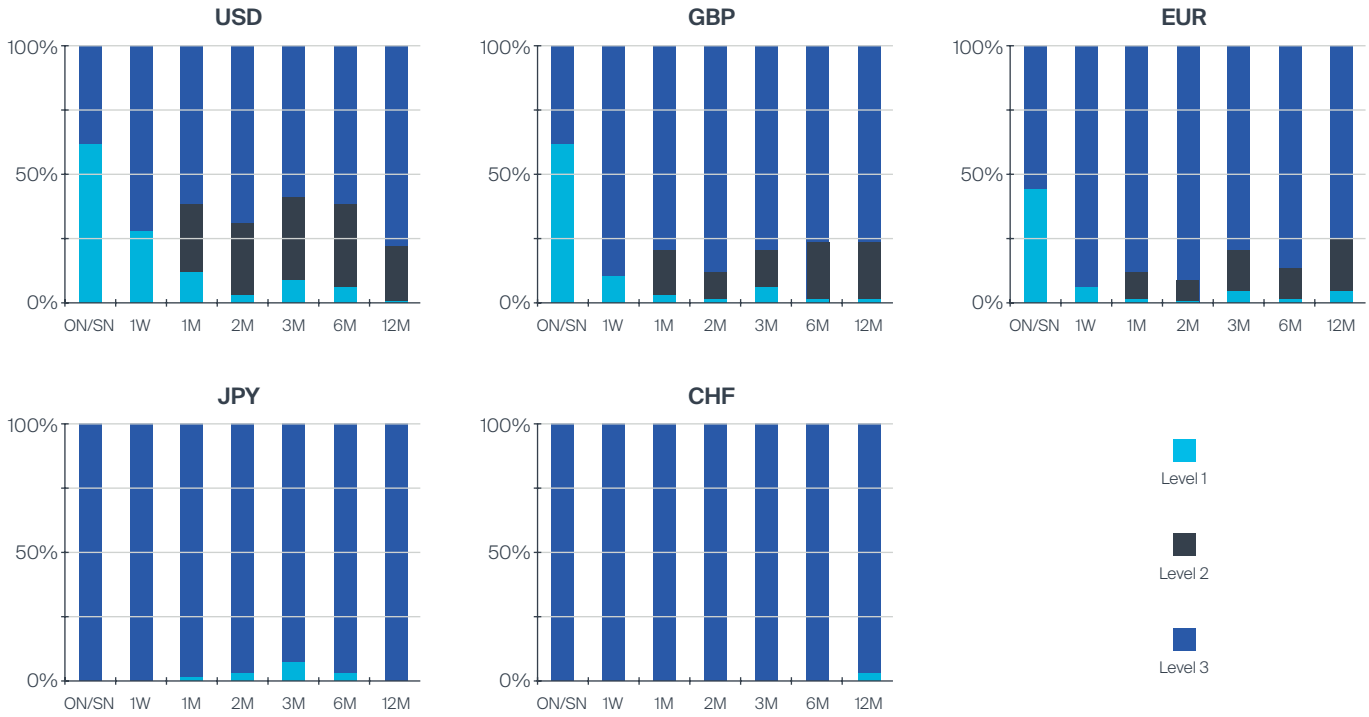
Due to the differences in methodology and categorisation used to produce the reports for LIBOR as it is currently published and LIBOR determined under the Waterfall Methodology, no direct comparison can or should be made between such reports for any period, including the Production Standard Test Period. Each report should be considered separately on the basis of the underlying methodologies, categorisations and other information used to produce it.

**Weekly and Quarterly Submission Reports Upon Transition**
IBA will not publish any reports from today's date until the process of transitioning Panel Banks to the Waterfall Methodology is completed, during which some Panel Banks may be submitting using their existing methodology and others using the Waterfall Methodology.

Once the transition of all Panel Banks to the Waterfall Methodology is completed, IBA will start publishing weekly and quarterly reports for each LIBOR currency and tenor pair setting out the percentages of Panel Bank submissions that are made under Level 1 (Transaction-Based), Level 2 (Transaction-Derived) or Level 3 (Expert Judgement) of the Waterfall Methodology. This information will be provided by Panel Banks to IBA alongside their submissions.

[29] The reports are available on the ICE website.
[30] See Press Release March 17 2018. The Test Rates are available at LIBOR Waterfall Methodology Test Rates.
[31] The data is historical, relates to a three-month testing period and has been provided for information purposes only. Historical data may not be indicative of future data, and none of the data is intended to constitute any invitation or inducement to engage in any investment activity. Neither IBA, ICE nor any of its or their affiliates will be liable to any person in connection with this data.

**Report of the proportion of Panel Bank submissions used to calculate the Test Rates that were made under Level 1, Level 2 or Level 3 of the Waterfall Methodology for the period September 15, 2017 to December 15, 2017.**



**Report of the proportion of Panel Bank submissions used to calculate published LIBOR using the existing methodology that were Transaction-Based, Transaction-Derived or Market Data-Based for the period September 15, 2017 to December 15, 2017.**