

THE IMPACT OF THE END OF IBORs ON RISK MANAGEMENT AND TREASURY

PREPARING FOR THE END OF IBOR

Inter-Bank Offered Rates (IBOR, of which LIBOR is one example) are being forced out due to regulatory pressure following a series of scandals. This transition will have significant ramifications as these rates are used as references in many wholesale transactions (e.g. derivatives, bonds, loans, securitisations and deposits) and some retail transactions (e.g. credit cards, mortgages or student loans). Also, the rates underpin many financial models for valuation and risk management.

Following industry and regulatory consultations, new Risk-Free Rates (RFR) are replacing IBORs. In this publication, Advantage Reply will explore the impacts of this transition on banks.

This publication covers the following questions:

- What is IBOR?
- Why is IBOR being forced out?
- What will replace IBOR?
- How should banks prepare?



WHAT IS IBOR?

IBOR refers to the Inter-Bank Offered Rate, a series of interest rates currently referenced by transactions; these rates are used to determine the pay-off of a wide range of products and are embedded in financial models. Originally, IBORs were supposed to represent the unsecured funding cost between good quality banks.

London Inter-Bank Bank Offered Rate (**LIBOR**) is set daily in five currencies (USD, EUR, GBP, JPY and CHF) as the average interest rate at which banks borrow money from each other over various maturities. The maturities available have evolved over time but currently cover overnight, one week, one month, two months, three months, six months and one year. The rate is calculated as the 'trimmed average' rate (average after removing the top and bottom 25 percentiles of the submissions) provided each day by LIBOR submitting banks at 11 am GMT. The rate submitted by banks is supposed to represent the cost of actual transactions but can be an estimate when no transactions are available¹. Currently, 16 banks participate in LIBOR submissions.

Euro Inter-Bank offered rate (**EURIBOR**) is published by European money market institute based on the average interest rate at which major Eurozone banks offer to lend unsecured funds to other banks in the euro money market. The 'trimmed average' for EURIBOR removes the top and bottom 15 percentile of the submission.

Euro OverNight Index Average (**EONIA**) is technically not an IBOR but will also be replaced as it does not meet new regulatory requirements that all benchmarks must meet following the EU Benchmarks Regulation² (see the box in next section for an overview of the EU Benchmarks Regulation). EONIA is computed as the weighted average of overnight unsecured lending transactions in the Inter-Bank market. The same panel of banks provides submissions for the EONIA and EURIBOR rates.

Reference rate	Administrator	Currencies	Methodology	Fixing	Publication
LIBOR	ICE Benchmark Administration	USD, EUR, GBP, JPY and CHF	Waterfall method; trimmed average at 25%	11 am GMT	11:55 am GMT
EURIBOR	European Money Markets Institute	EUR	Trimmed average at 15%	10:45 am CET	11 am CET
EONIA	European Money Markets Institute	EUR	Volume-weighted average	6 pm CET	7 pm CET

IBOR is supposed to represent the cost of a bank's unsecured funding. Consequently, one development has been to issue loans and other products that charge customers LIBOR plus a spread. This approach guaranteed banks that they would earn a fixed spread (assuming no early termination of the contract or payment problems, e.g. a default) irrespective of future interest rate changes. Over time, LIBOR has been increasingly used for setting the pay-off of a wide range of financial products (e.g. loans, derivatives, structured notes) as well as became one of the main input into numerous valuation and risk management models used by banks.

¹ LIBOR the submissions are now based on a waterfall method and allows for non-Inter-Bank transactions to be used, see documentation on ICE Libor (https://www.theice.com/publicdocs/ICE_LIBOR_Evolution_Report_25_April_2018.pdf) and the "Wheatley Report" of 2012 (ISBN 978-1-909096-01-1).

² State of Play of the EONIA Review, European Money Market Institute, ref: D0030D-2018 AF



WHY IS IBOR BEING FORCED OUT?

IBORs reputation took a hit during the 2008 financial crisis when some major banks misreported the number for their advantage. One enabler was that the unsecured Inter-Bank market size had declined such that submissions had become to a large extent expert judgement based rather than derived from market transactions.

Originally, LIBOR was designed to measure the banks' cost of funding in the Inter-Bank market, which was a significant source of funding for banks. However, since the financial crisis, banks have been encouraged to use sources of funding other than the Inter-Bank market, which has resulted in the sharp decline in the number and volume of the transactions underpinning IBORs. This is well illustrated by Graph One, which shows that unsecured funding (IBOR is unsecured) has decreased since the crisis while secured funding has grown³.

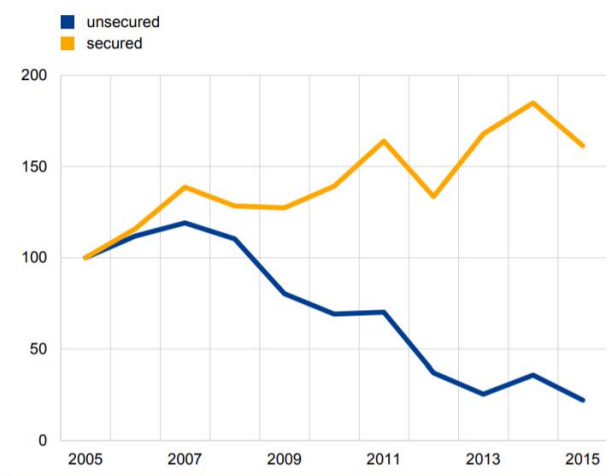
Because of the declining importance of unsecured funding, the IBOR rates are increasingly set based on expert judgement instead of being derived from transactions. Graph 2 breaks down the source of USD 3M LIBOR submissions over time and demonstrates that the submission is primarily expert judgment based⁴. The results are similar for other tenors and currencies, except for the overnight tenors where transaction-based submission still outweigh estimates.

At the same time, as a decrease in transactions supporting IBOR submissions, the volume of transactions referencing IBOR to set the pay-off has considerably increased. In the USD market, only about \$500 million worth of daily trades⁵ underpin the LIBOR rates that are referenced by approximately \$200 trillion in derivatives, loans, securities and mortgages. The lack of actual transactions (in the Inter-Bank market) to support the rate-setting together with the increased importance of the rate in setting the payoff of products have made it vulnerable to manipulation.

Since its inception, LIBOR has been the epicentre of controversy on several occasions. During the 2008 financial crisis, some banks misreported LIBOR rates to give a false impression that they were more creditworthy, while in other instances submissions were altered to generate profits for traders⁶.

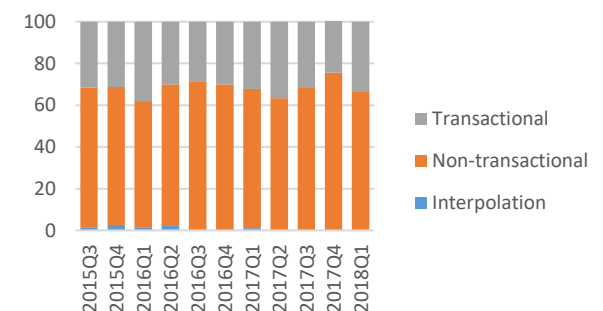
In 2014, the G20 asked the Financial Stability Board ("FSB") to conduct a fundamental review of the major benchmark

Graph 1 - Euro area money market volumes
(annual indices, 2005=100)



Source: ECB.

Graph 2 - Libor submission sources



³ Source: European Central Bank, Recent developments in the composition and cost of bank funding in the euro area, ECB Economic Bulletin, Issue 1 / 2016

⁴ Data retrieved from ICE quarterly volume reports available at: <https://www.theice.com/iba/historical-data>

⁵ JPMorgan, Leaving LIBOR: A Landmark Transition, <https://www.jpmorgan.com/global/markets/libor-sofr>, last consulted 17 March 2019

⁶ UK Parliament, Treasury Select Committee, Libor report, 18 August 2012; UK Government, The Wheatley Review of LIBOR, September 2012; Reuters, UBS traders charged, bank fined \$1.5 billion in Libor scandal, 19 December 2012



reference rates⁷. FSB then established a high-level Official Sector Steering Group (“OSSG”) of regulators and central banks. As requested by the FSB, OSSG established a Market Participants Group (“MPG”) to look further into the matter. In March 2014, MPG then submitted its report⁸ suggesting a further strengthening of existing IBORs by underpinning them to the greatest extent possible with real transactions and developing new risk-free rates.

Following, these reports and others, the industry has improved the governance of IBOR submissions and attempted to base them on actual transactions. However, the underlying market is not sufficiently active, nor is it representative of overall funding activities. This lack of representativeness has led regulators to decide that the preferred solution is replacing IBORs with new indices. Furthermore, over the years the Inter-Bank unsecured market (on which IBORs are based) has become a less important source of funding for banks, while IBORs have been increasingly used for other purposes. This has led regulators to support the replacement of IBORs by alternative reference rates. After some consultations, risk-free rates (“RFR”) have emerged as the preferred solution.

One key regulatory development that has created a strict timeline for the creation of the new RFR is the EU Benchmarks Regulation⁹, which was published in June 2016. A very high-level summary is provided in the box; however, this regulation, which is applicable since 1 January 2018, sets essential requirements that indices such as IBORs must meet. The key issue with the existing IBORs and EONIA is that they are not sufficiently representative of the markets.

London Inter-Bank Offered Rate (“LIBOR”) received a final blow when in July 2017 the CEO of the Financial Conduct Authority (“FCA”), Andrew Bailey, announced that the FCA would no longer persuade or compel the panel banks to submit LIBOR quotes beyond the end of 2021¹⁰. Since then all the panel banks have agreed to contribute LIBOR quotes until the end of 2021 to ensure the smooth transition towards risk-free alternative rates.

EU Benchmarks Regulation

The EU Benchmark Regulation is applicable since 1 January 2018 and has three key components:

- Requiring benchmark administrators to have an adequate governance and controls framework. It also sets requirements regarding the quality of data and methodologies used.
- Requiring benchmark contributors to have adequate controls, in particular to avoid conflicts of interest.
- Providing protection to consumers and investors.

Transitional provisions apply until 1 January 2020 at which time all EU benchmarks must comply with the Regulation.

Benchmarks are defined as an index used as a reference to:

- determine the amount payable under a financial instrument or a financial contract index, or
- determine the value of a financial instrument, or
- measure the performance of an investment fund, or
- define the asset allocation of an investment fund, or
- compute the performance fees of an investment fund.

⁷ Reforming Major Interest Rate Benchmarks, Financial Stability Board, July 2014

⁸ Final Report of the Market Participants Group on Reforming Interest Rate Benchmarks, March 2014

⁹ The European Parliament and the Council, Regulation 2016/1011, 8 June 2016

¹⁰ Bailey Andrew, Speech by Andrew Bailey, The future of LIBOR, 27 July 2017



WHAT WILL REPLACE IBOR?

The Risk-Free Rates that will replace IBORs are less homogeneous in their construction as different regulators have decided to create replacements for their home markets. It remains to be seen if adoption will be strong enough to create liquid indices to replace IBORs.

Different jurisdictions around the world have come up with different RFRs, so there won't be a single approach replacing IBORs. In the US, the ARRC committee has recommended Secured Overnight Financing Rate ("**SOFR**") to replace USD LIBOR while in the UK a reformed Sterling Overnight Inter-Bank Average rate ("**SONIA**") has been selected by the Bank of England to replace GBP LIBOR. The EU has decided to use the European Short-Term Rate ("**ESTER**") as the new risk-free rate.

All the new RFRs will be based on actual transactions, consequently removing the major deficiency of IBORs that are sometimes based on estimates. This will make manipulation more painful and make the new RFRs will be more transparent. As RFRs are nearly risk-free, their value also will be lower than that of IBORs, which inherently include credit risk associated with "good quality" banks.

Below is the table that summarises the distinguishing factors between the different USD, EUR and GBP IBORs and RFRs.

	LIBOR IBOR	EURIBOR IBOR	EONIA IBOR	SOFR RFR	SONIA RFR	ESTER RFR
Type						
Near risk-free	X	X	X	✓	✓	✓
Secured	X	X	X	✓	X	X
Term rates	✓	✓	X	X (planned)	X (considered)	X
Based on	Unsecured Inter-Bank transactions	Unsecured Inter-Bank transactions	Unsecured Inter-Bank transactions	Repo rates	Short-term wholesale transactions	Short-term wholesale transactions
Source	Based on current data	Based on current data	Based on current data	Based on previous day data	Based on last day data	Based on previous day data
Time of publication	11:30 GMT	11:00 (GMT+1)	19:00 (GMT+1)	8:00 (GMT-5)	9:00 GMT	9:00 (GMT+1)
Data source ¹¹	Inter-Bank lending rates (Can be based on expert judgement)	Inter-Bank lending rates from 20- panel banks	Inter-Bank overnight unsecured lending	Based on repos	Overnight transactions negotiated bilaterally and brokered in London by WMBA ¹²	Wholesale euro unsecured overnight borrowing costs of euro area banks
Start date	n.a.	n.a.	n.a.	April 2018	Reformed in April 2018	October 2019 (expected)
End date	01/01/2022 (expected)	01/01/2022 (expected)	01/01/2022 (expected)	n.a.	n.a.	n.a.

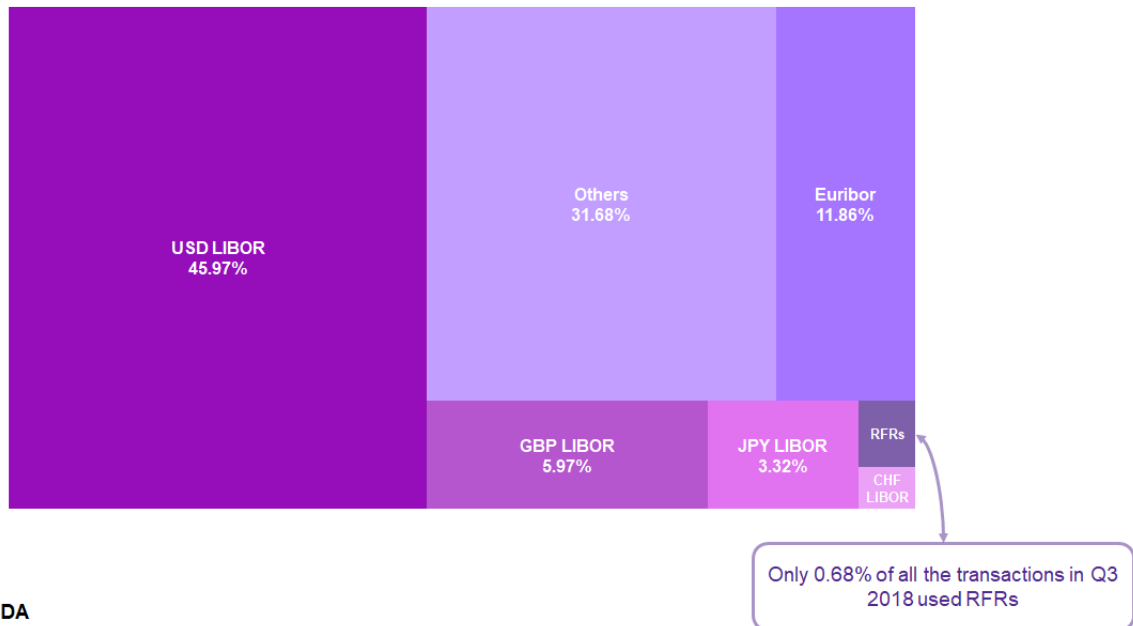
The adoption of the RFR is only just starting in Q3 2018 with less than 1% of floating rate transactions being estimated to use an RFR.

¹¹ This is a summarized description as the rules include various complexity to include only arms-length transactions.

¹² Wholesale market brokers association



USD LIBOR is still the most commonly used rate counting the number of transactions (Q3 2018), while RFRs adoption is still very low



Source: ISDA



HOW SHOULD BANKS PREPARE?

The ubiquity of the IBOR rates throughout banks will create challenges for banks. Everything from pricing, to booking systems and risk management, must be adapted. As such, regulatory pressure has been building up, including a Bank of England letter asking bank CEOs to appoint a senior manager to oversee the transition¹³.

Banks have mobilised internal working groups to plan for the IBOR to RFR transition. This section outlines key areas of focus that we have observed with a focus on risk management and treasury activities.

Product payoff

Standard payoff terms are still being defined for sterling and dollar rates, and none exist yet for euro rates. Furthermore, the approach for creating a term rate structure is still under discussion. Various options exist to create term rates, for example, forward vs backward looking compounding or term funding based on derivatives¹⁴, but official guidance is incomplete.

Payoff terms directly impact the set-up of the whole front-to-back IT change, which must correctly convene that information. Also, the terms must be managed in the ALM systems to ensure that liquidity and interest rate risk is fully captured and where necessary hedged.

To illustrate some of the challenges, currently, EURIBOR is quoted and usually used as a forward-looking rate, e.g. the three-month EURIBOR rate is the interest rate to be paid in 3 months for a position entered today. Backward looking rates are paid based on all the rates observed between today and the maturity (e.g. three months) by compounding these rates. Currently, not all IT systems within banks are set-up to manage both types of pay-offs.

Hedging strategies

The evolution in the payoff structures will impact both products that need to be hedged and the products used to hedge them. The management of this evolution will be a key risk for banks that both traders and the ALM function should monitor carefully.

One risk that banks can already assess without needing to clarify the payoff structures of RFRs is the use of fall-back clauses. These clauses are embedded in many products to specify how the payoff will be computed if IBORs are discontinued. However, for older positions, these clauses were not necessarily written with the expectation of permanent discontinuation, but rather with the expectation of a temporary issue. As such, banks should assess how the discontinuation of IBORs will impact existing positions and potentially break the offsetting relationship between positions and their hedges.

Valuation / discounting

IBORs underpin most discounting models used to determine the present value of products and contracts. After their discontinuation, the models will most likely be based on RFRs. However, the approach to creating discount curves is still work in progress as it will depend on the payoff structure of the products used to calibrate the discount curves. This methodology is based on the hypothetical hedging methodology, which itself depends on the product payoff

¹³ Bank of England, Firms' preparations for transition from LIBOR to risk-free rates, <https://www.bankofengland.co.uk/prudential-regulation/letter/2018/firms-preparations-for-transition-from-libor-to-risk-free-rates>

¹⁴ The merits of the various approaches are explained in "Beyond LIBOR: a primer on the new benchmark rates" (from Andreas Schrimpf and Vladyslav Sushko in BIS Quarterly Review, March 2019).



rules and the availability of a term structure.

Two complicating factors are:

- Publication times of the RFRs are not aligned, therefore creating a bias if they are used for the calibration of certain cross-currency products.
- The volatility of RFRs is higher than IBORs because supply and demand change more directly influence them. For example, SOFR spikes at the end of most months (due to cash preferences by market participants) which is not observed for IBORs.

Without clarity on the new RFRs, it is difficult for banks to progress. In certain currencies the adoption of the RFR is already sufficiently advanced that market standards have emerged, e.g. the SOFR. LCH, a Central Counterparty and a key market participant for many banks have indicated that it will start paying interest and discounting based on SOFR in 2020¹⁵. The adoption of SOFR discounting by LCH and other financial intermediaries will improve the market liquidity of products supporting the transition to SOFR based discount curves can.

Existing products

Existing products which are expected to mature beyond the end of IBOR date must have fall-back rules such that payments can be determined. If no fall-back rules exist, re-papering will be required, which implies agreeing on new terms with the counterparty.

The approach taken by banks should be different for products defined or manufactured by the bank as compared to products defined by third parties. The bank should proactively identify the former products that reference IBORs and start planning a transition (e.g. floating rate deposits that reference an IBOR). For the latter, e.g. a third-party structured note sold to customers, it should engage with the third party to plan to collaborate on the transition.

For trading contracts, ISDA is developing fall-back rules for inclusion in the definitions of its contracts¹⁶. However, not all trading contracts are ISDA contracts, and ISDA can only suggest that counterparties use these definitions, but cannot mandate their use.

Banks are currently in the process of identifying all products that reference IBOR and reviewing them for fall-back clauses. Separately the front office is working on creating new products based on RFRs with appropriate pricing terms. However, it is essential to enlarge the discussion to include back and middle office to ensure that they can manage the planned evolutions and that the timelines for transitioning are aligned.

Banks should pay extra attention to retail products because changing the terms of a product is more difficult (e.g. structured notes or term deposits) and the potential conduct risk associated with IBOR-referencing products with a maturity beyond the end of IBOR date.

¹⁵ <https://www.risk.net/derivatives/6385026/lch-plans-2020-switch-to-sofr-discounting>

¹⁶ International Swaps and Derivatives Association, <https://www.isda.org/2018/12/20/isda-publishes-final-results-of-benchmark-fallback-consultation/>



CLOSING REMARKS

If not yet created, banks should create an internal programme with a double objective:

- (i) coordinate the transition from IBORs to RFRs, and
- (ii) disseminate the information regarding the adoption of RFRs.

For the coordination, banks must ensure an in-depth review of the existing products, systems, processes and models that use IBORs is performed with the aim to:

- Identify all the impacts
- Assess the impacts against the likely key changes, such as ESTER publication time, forward-looking vs backward looking pay-off etc. The assessment should clarify where and what changes might be needed, action owners and an estimate of the effort required to make the changes.
- With this review, banks can prioritise any changes based on the market developments regarding the use of the new RFR.

A major challenge remains understanding the market adoption of RFRs. The internal programme should engage with the front office and teams in charge of hedging to remain up to date regarding the development of the Risk-Free Rates with a focus on understanding:

- Understanding the development of future hedging products that will be used by your bank.
- Understanding how the new discount curves will be constructed



CONTACTS



Oscar McCarthy
Avantage Reply (Amsterdam)

The Atrium | Strawinskylaan 3051
1077 ZX Amsterdam
Netherlands
Tel: +31 (0) 20 301 2123
E-mail: o.mccarthy@reply.com



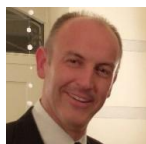
Gwenaël Gavray
Avantage Reply (Luxembourg)

21-25 Allée Scheffer
L-2520 Luxembourg
Luxembourg
Tel: +352 286 843 1
E-mail: g.gavray@reply.com



Nicolas Pavlovitch
Avantage Reply (Brussels)

5, rue du Congrès/Congresstraat
1000 Brussels
Belgium
Tel: +32 (0) 2 88 00 32 0
E-mail: n.pavlovitch@reply.com



Paolo Fabris
Avantage Reply (Milan)

Via Castellanza, 11
20151 Milano
Italy
Tel: +39 02 535761
E-mail: p.fabris@reply.it



Dean Mitchell
Avantage Reply (London)

38 Grosvenor Gardens
London SW1W 0EB
United Kingdom
Tel: +44 (0) 207 730 6000
E-mail: d.mitchell@reply.com



Stephan de Prins
Avantage Reply (Paris)

3 rue du Faubourg Saint-honoré
75008 Paris
France
Tel: 33 (0) 1 71 24 12 25
E-mail: s.deprins@reply.com



Rob Konowalchuk
Avantage Reply (London)

38 Grosvenor Gardens
London SW1W 0EB
United Kingdom
Tel: +44 (0) 207 730 6000
E-mail: r.konowalchuk@reply.com



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