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The Rise and Fall of LIBOR and Its Alternatives

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For forty years, LIBOR was the dominant benchmark interest rate for various financial products, playing a central role in global financial markets. LIBOR was available in 10 currencies and 15 maturities, fulfilling two primary roles: acting as a reference rate for financial contracts and serving as a benchmark for evaluating financing costs. However, these rates were not based on actual transaction data but were instead calculated from surveys of participating panel banks. Thomson Reuters computed the rates using a trimmed mean. The LIBOR scandal involved three forms of manipulation by panel banks: under-reporting, over-reporting, and maintaining artificial stability in the rates. The Wheatley Review recommended reforming LIBOR instead of replacing it. In March 2021, the UK Financial Conduct Authority (FCA) officially confirmed the gradual elimination of all LIBOR settings. By June 30, 2023, the remaining U.S. dollar LIBOR settings were discontinued. Fines related to the LIBOR scandal surpassed $10 billion. In July 2021, the World Bank announced the transition from LIBOR to new reference rates for both new and existing loans. The main alternatives to LIBOR include SOFR, SONIA, €STR, SARON, TONAR, and AONIA.

Keywords: LIBOR, reference rate, benchmark rate, interbank rate, SOFR
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1 Introduction

For over forty years, the London Interbank Offered Rate (LIBOR) was the dominant short-term reference interest rate globally. However, the LIBOR scandal brought an end to its long-standing use. Regulators decided to phase it out in favor of a benchmark rate that could be derived from actual transactions, rather than based on a survey.

A widely followed reference rate is crucial for economic efficiency and information content. It streamlines financial transactions and provides a benchmark for pricing financial instruments and managing risk, ultimately contributing to a more stable and predictable financial system.

On efficiency, a reference rate reduces transaction costs and simplifies financial contracts by providing a benchmark for interest payments, reducing the need for parties to negotiate rates for every transaction. Also, it enhances the liquidity of financial instruments, making it easier for investors to buy and sell assets and enables effective hedging and risk management for financial institutions.

Reference rates like LIBOR contributed to economic efficiency in several ways: First, LIBOR provided a common benchmark for pricing trillions of dollars in financial contracts—loans, derivatives, bonds, etc. This standardization reduced transaction costs, simplified contract design, and facilitated comparability across instruments and institutions. Second, reference rate as a widely accepted rate, encouraged market participation, and increased liquidity. Efficient markets require deep and active trading, which is supported when participants trust and use a common reference. Third, LIBOR enabled hedging and risk transfer by serving as the floating leg in interest rate swaps and other derivatives. This improved allocative efficiency, allowing capital to flow to its most productive uses while managing interest rate risk. Fourth, when all parties use a transparent and widely accepted rate, it reduces information asymmetries between borrowers and lenders. This led to more efficient credit allocation and pricing (Duffie & Stein, 2015).

On information content, a reference rate reflects prevailing market interest rates and signals changes in liquidity, and credit risk. It is utilized to price a wide range of financial instruments, including loans, bonds, and derivatives, providing a common basis for valuation. Investment funds and other market participants use it as a benchmark to evaluate their performance against market averages. Furthermore, a reference rate by providing a

standardized measure of interest rates, promotes transparency in financial markets.

LIBOR carried significant informational value for market participants and policymakers: First, LIBOR reflected the cost of unsecured borrowing among major banks. Rising LIBOR may signal tightening credit conditions, increased counterparty risk, or stress in the banking system. Second, LIBOR acted as a transmission channel for central bank policy. Changes in policy rates (e.g., Fed Funds Rate) influenced LIBOR, which in turn affected borrowing costs across the economy. Third, LIBOR embedded expectations about future interest rates, inflation, and risk. Analysts and investors use LIBOR trends to infer market sentiment and forecast macroeconomic conditions. Fourth, a widely followed rate like LIBOR contributed to price discovery in money markets. It aggregated dispersed information from multiple banks, offering a consensus view of short-term funding costs.

In the post-LIBOR era, financial markets faced one of their most significant and complex challenges. Given the far-reaching implications of the transition due to the pivotal role benchmarks play in financial markets, it is essential to examine the history of LIBOR to better inform the choice of a new benchmark. Benchmarks contribute to market efficiency by reducing information asymmetry and facilitating trade. Understanding the background and processes that led to LIBOR's discontinuation is crucial in addressing this challenge. One of the key issues is choosing between a single or multiple benchmark system, a decision that requires careful consideration and preparation. Overcoming the post-LIBOR hurdles necessitates a deep understanding of the issue, and this paper aims to contribute constructively to this ongoing conversation.

Previous studies such as Kiff (2012) and Hou and Skeie (2014) reviewed the life of LIBOR from its emergence up to the scandal. Studies like Huan et al. (2023) and Monticini and Thornton (2013) focused on the scandal phase of LIBOR. This study discusses the life cycle of the LIBOR from its beginning to its end in chronology with scrutinized manner. It also includes the transition from LIBOR to its alternative in the case of the World Bank Group.

As a research-based article, it follows an analytical method which includes historical analysis and monography examining regulatory documents and reports (such as the Wheatley Review), and academic literature to understand the origins and evolution of LIBOR. As a case study, this paper analyzes LIBOR manipulation. The paper includes an analysis of

the press release for the World Bank related to LIBOR to understand its narrative.

This approach can answer the research question about the factors that led to LIBOR's decline, and the challenges of transitioning to alternative rates which allows for a more nuanced understanding of the life cycle of LIBOR. By understanding the factors that influenced LIBOR's rise and fall, researchers can develop more robust and resilient alternative rates for the future.

The paper addresses research questions as follows. What were the evolutions of LIBOR from its emergence to its end? What were the main vulnerabilities of LIBOR that led to its manipulation and eventual decline? How was the transition from LIBOR to its alternatives managed in the case of the World Bank Group? What alternative reference rates were considered?

The paper is structured as follows: after the introduction, section 2 discusses the emergence and scope of LIBOR's application. Section 3 examines LIBOR's role and lifecycle from 1986 to 2023. Section 4 focuses on LIBOR as both a reference rate and a benchmark. Section 5 outlines the LIBOR inquiry and its calculation method. Section 6 details the LIBOR scandal. Section 7 reviews the efforts to repair LIBOR instead of replacing it. Section 8 marks the turning point in the transition to new reference rates. Section 9 explores the transition at the World Bank Group. Section 10 introduces the alternatives to LIBOR. Finally, section 11 concludes the paper.

2 Emergence and Scope of LIBOR's Application

The origins of the London Interbank Offered Rate (LIBOR) can be traced back to 1969 when a Greek banker, Minos Zombanakis, facilitated an $80 million syndicated loan from Hanover industrialists (now part of JPMorgan) to Iran. The financing was based on the interest rates reported by a group of banks (Hou and Skeie, 2014, p. 7821). Over the next four decades, LIBOR became a key set of short-term reference rates used worldwide, continuing until its discontinuation in June 2023. LIBOR was tied to interest rates for various financial instruments, including business loans, adjustable-rate mortgages, floating-rate corporate bonds, and interest rate derivatives, such as futures contracts, options, forward contracts, and swaps (Tuckman, 2023).

According to a report from the UK Treasury, $300 trillion in financial contracts were linked to LIBOR, excluding the rates used for billions of dollars in adjustable-rate mortgages and other consumer loans globally that were also based on LIBOR (Kiff, 2012). For four decades, LIBOR was the key benchmark interest rate for numerous financial products, dominating

global financial markets. It was the most widely used reference rate for short-term interest rates during that period.

3 The Role and Lifecycle of LIBOR (1986-2023)

LIBOR rates were first introduced by the British Bankers' Association (BBA) in 1986, with the average rates being calculated and published daily. Initially, LIBOR was provided for three currencies: the US dollar, British pound, and Japanese yen. Over time, LIBOR expanded to include five currencies — Euro, US dollar, Japanese yen, Swiss franc, and British pound — as well as seven "loan or financial contract maturities" (overnight, one week, one month, two months, three months, six months, and twelve months). Eventually, LIBOR was available in 10 currencies and 15 maturities.

LIBOR played a crucial role in global markets, functioning as a reference rate in financial contracts and as a benchmark for financing costs assessments and investment returns across a broad array of financial instruments. This includes adjustable-rate mortgages, credit cards, currency swaps, interest rates, and floating-rate bank loans.

The London Interbank Offered Rate (LIBOR) was utilized across a broad range of financial instruments and markets. It served as the benchmark for unsecured interbank financing rates in various currencies and was also applied as a reference rate for syndicated loans, floating-rate mortgages, bonds, securities, and deposits. Additionally, LIBOR functioned as a benchmark for derivatives and as a discount rate for evaluating various financial positions. The LIBOR-OIS (Overnight Index Swap) spread became a critical tool for assessing the health of banks, evaluating maturity premiums (tenor premiums), and providing regulators with an indicator of financial stability. Moreover, LIBOR was integrated into the Foreign Exchange Regulations of the Central Bank of Iran. For instance, the six-month LIBOR rate for relevant currencies was used to determine the interest rates on loans, with a fixed premium applied (e.g., LIBOR plus two percent for standard loans and LIBOR plus three percent for short-term loans) (Central Bank of Iran, 2022).

4 LIBOR as a Reference Rate and Benchmark

LIBOR fulfilled two primary roles in financial markets: as a reference rate and as a benchmark rate. A reference rate is used to establish the terms of financial contracts. LIBOR, as a reference rate, was designed to reflect the full cost of funds for banks, including the credit premium (Kirti, 2022).

As a reference rate, LIBOR provided the foundation for the valuation of financial products and determined the terms of short-term contracts and floating-rate agreements, such as interest rate swaps and futures contracts. Reference rates are critical in supporting credit markets and derivatives. They reflect the cost of funds for banks, accounting for credit risk.

LIBOR was widely used in financial contracts as a reference rate and as a benchmark for measuring financing costs and investment returns across various financial products, including adjustable-rate mortgages, credit cards, floating-rate bank loans, and interest rate or currency swaps.

A benchmark rate represents a measure of relative performance, often indicating the return on investment or financing costs. Benchmark rates serve as a foundation for many financial contracts, including mortgages, bank overdrafts, and more complex financial transactions (European Central Bank, 2024).

LIBOR was an index widely used for interbank market financing. It supported a range of financial contracts, including swaps and futures contracts, as well as adjustable-rate mortgages and student loans. Rates were expressed as "LIBOR + x," where "x" represents the premium added for each specific borrower, calculated in basis points, based on the maturity of the LIBOR rate.

Since LIBOR reflected the conditions under which the largest and most stable financial institutions could secure short-term financing, it acted as a lower bound for borrowing rates for other institutions and individuals with lower creditworthiness, assuming all other factors remained constant.

LIBOR, a set of rates first published by the BBA in 1986, represented the cost of short-term wholesale funds for major banks in the London interbank market. It included 15 tenors: overnight, one week, two weeks, one month, two months, three months, four months, five months, six months, seven months, eight months, nine months, ten months, eleven months, and twelve months. LIBOR was published in 10 currencies: Australian dollar, Canadian dollar, Swiss franc, Danish krone, Euro, British pound, Japanese yen, New Zealand dollar, Swedish krona, and U.S. dollar.

5 LIBOR Inquiry and Calculation Method

LIBOR rates were not derived from transaction data but were instead calculated based on the responses from participating panel banks. The question posed to the banks was, *"At what rate could you borrow funds if you were to do so by asking for and accepting interbank offers in a reasonably sized market just before 11 a.m.?"* The banks submitted their

responses between 11:00 a.m. and 11:10 a.m., and the final LIBOR rates were published at noon (Monticini and Thornton, 2013).

The responses from the banks were collected between 11:00 a.m. and 11:10 a.m., with the final LIBOR rates being published at noon. Thomson Reuters calculated the LIBOR rates for ten currencies and spanning fifteen maturities, from overnight to twelve months. Each business day, LIBOR was computed and published by Thomson Reuters based on the rates submitted by major banks. These rates reflected the cost of borrowing unsecured funds in the specified currencies and maturities.

For the US dollar, the panel banks that participated in LIBOR submissions were listed in Table 1 below:

Table 1
LIBOR Panel Banks for the US Dollar

1	Credit Suisse
2	Barclays Bank
3	Bank of America
4	HSBC
5	Bank of Tokyo-Mitsubishi UFJ
6	Lloyds Banking Group
7	Citibank N.A.
8	Royal Bank of Scotland
9	Credit Agricole CIB
10	UBS AG
11	Deutsche Bank
12	JPMorgan Chase
13	Rabobank
14	Royal Bank of Canada
15	Société Générale
16	Sumitomo Mitsui Banking Corporation Europe Ltd
17	Norinchukin Bank

Source: https://www.theice.com/iba/libor

Mechanism for Calculating LIBOR

Thomson Reuters, a leading financial news agency collected the rates reported by the group of bankers and removed the four highest and four lowest rates, then averaged the remaining rates. The average rate was then announced, reflecting the rate at which banks stated they could borrow dollars for each of the fifteen loan maturities. This process was also performed for the other nine currencies. The average for these 150 LIBOR rates was then published. Thomson Reuters, by removing the highest and

lowest four rates, averaged the remaining rates, which were then published as LIBOR rates and made available to the world around noon London time.

Given London's position as a major international financial hub, LIBOR held significant importance, with more than 20% of all international bank lending and over 30% of global foreign exchange transactions occurring in London (Eichengreen, 2022). As a result, LIBOR became deeply integrated into the international financial system, functioning both as a reference rate and a benchmark rate.

At its peak, LIBOR was referenced in transactions totaling at least $300 trillion—roughly three times the global GDP, which was approximately $105.4 trillion in 2023. LIBOR was one of the most crucial global reference rates and was used in various transactions. It was often tied to variable-rate loans, such as adjustable-rate mortgages, credit cards, and private student loans. As a benchmark for financing costs and investment returns, LIBOR also served as a performance measure and an indicator of the health of financial markets and businesses.

6 The LIBOR Scandal

LIBOR started showing irregular behavior in August 2007, coinciding with the onset of the financial crisis. Following the global financial crisis of 2007-2009, several articles published by *The Wall Street Journal* in April and May 2008 revealed that panel banks were under-reporting their actual funding costs when submitting LIBOR rates. The scandal came to light on May 29, 2008, when *The Wall Street Journal* reported a significant divergence between LIBOR rates and the credit default swap (CDS) market's rates, suggesting that banks were potentially understating their borrowing costs during the 2008 credit crunch (Mollenkamp and Whitehouse, 2008).

On June 27, 2012, it was revealed that Barclays had been fined for manipulating both LIBOR and Euribor rates. Investigations confirmed that LIBOR manipulation was not an isolated case but a systemic, intentional practice by banks to alter loan interest rates. It became apparent that numerous financial institutions had engaged in the manipulation of their reported LIBOR submissions, both to downplay their financing costs during the financial crisis and to gain an advantage in LIBOR-linked positions over an extended period.

Barclays admitted to its role in manipulating LIBOR on June 27, 2012, agreeing to a $453 million fine imposed by the UK's Financial Services Authority (FSA), the US Commodity Futures Trading Commission (CFTC),

and the US Department of Justice. The bank confessed to three types of manipulation: under-reporting, over-reporting, and keeping rates steady. The motivations behind these manipulations varied, from benefiting from derivatives to avoiding the perception of financial weakness during the global crisis.

Further investigations in the Swiss financial market uncovered that UBS had faced improper incentives for rate manipulation. Compensation for rate providers and traders at UBS was found to be 200 to 500 percent of their base salaries, creating personal incentives to submit false data. During the peak of the financial crisis, each panel bank deliberately underreported its borrowing costs to project financial strength amid market uncertainty, and this behavior was reflected in their LIBOR submissions (Huan et al., 2023).

In response to the scandal, the UK government tasked Martin Wheatley, the then CEO of the Financial Conduct Authority (FCA) and former CEO of the FSA, to conduct an independent review of the LIBOR-setting process. Wheatley's review recommended a thorough revision of LIBOR instead of advocating for its replacement.

Regulatory authorities across the globe-imposed fines exceeding $10 billion on the banks and brokers involved in LIBOR manipulation (excluding legal costs), as detailed in Table 2. LIBOR, for each currency and maturity, had been calculated as a "trimmed average" of survey responses. By the mid-1980s, banks that determined LIBOR rates through interest rate submissions had begun to engage heavily in borrowing using LIBOR-based contracts, thus incentivizing them to underreport their financing costs. To address this, the British Bankers' Association (BBA) assumed control over the rate in 1986 to regulate the process of data collection and ensure proper governance.

In early 2012, the Wheatley report called for the BBA to stop publishing LIBOR for currencies and maturities where there was insufficient transaction data to verify the submitted rates (FCA, 2012). As of October 2013, the BBA ceased formulating and publishing LIBOR, and Thomson Reuters began handling the data collection and rate calculation. The LIBOR rate was then calculated each business day as the trimmed mean of the submissions.

The survey-based methodology for calculating LIBOR proved to have significant flaws. The trimmed mean was intended to reflect actual market transactions, but since LIBOR was not based on real transactions, it relied heavily on "expert judgment," making it somewhat disconnected from the actual market. Instead of reflecting actual interbank borrowing rates, LIBOR

was based on estimates provided by panel banks, raising questions about its reliability.

By April 2012, controversy intensified regarding the integrity of the LIBOR submission process. Banks were accused of deliberately underreporting their borrowing costs to present a stronger financial image during market uncertainty. Moreover, there were allegations of manipulation for the benefit of LIBOR-linked contracts.

While many banks were implicated in the scandal, the most prominent institutions fined for their involvement were Barclays, UBS, RBS, and Rabobank. UBS, for example, paid a total of $1.52 billion in fines on December 19, 2012, including $700 million to the CFTC, $500 million to the US Department of Justice, $259 million to the UK Financial Services Authority, and $64 million to the Swiss Financial Market Supervisory Authority.

Two main motivations for misreporting were suggested: First, desire to appear financially strong: Banks had an incentive to report lower LIBOR rates to create the appearance of financial health. Lower rates helped prevent market speculation about their financial stability, particularly during the crisis. LIBOR was viewed as a reflection of default risk, and reporting a lower rate made a bank seem less risky. Second, manipulation for derivative positions: Some banks were found to have instructed their staff to report lower LIBOR rates to benefit from their derivative positions. Evidence shows that certain banks were manipulating LIBOR as early as August 2007, right at the start of the financial crisis.

7 Efforts to Reform LIBOR Instead of Replacing It

In response to the LIBOR scandal, one of the earliest official actions was the publication of the Wheatley Review by the Financial Services Authority (FSA). However, after the FSA was dissolved on April 1, 2013, its responsibilities were transferred to the newly established Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA). The Wheatley Review recommended that non-liquid currency-maturity pairs be removed from the LIBOR calculation. Instead, the focus should shift to currencies and maturities with sufficient transaction data to support a more robust, transaction-based approach, even in times of market instability.

The review also recommended transferring the management of LIBOR, from the British Bankers Association (BBA) to a government-backed administrator with the legal powers to ensure increased transparency and enhance its credibility. Additionally, it proposed that bank-level submissions

of LIBOR be published with a three-month delay and that the number of banks in the LIBOR panel be expanded to reduce the impact of any misreporting.

Several proposals aimed at reforming LIBOR rather than replacing it were also put forward. A key suggestion was to shift LIBOR to a transaction-based rate, where the rate would be calculated using a weighted average of actual borrowing rates. However, these reform efforts ultimately faltered for several reasons. Most notably, the volume of short-term, unsecured interbank borrowing — which was essential to the reformed LIBOR model — continued to decline. Moreover, as the financial penalties associated with the LIBOR scandal mounted, many banks became reluctant to continue submitting rates.

Banks had strong incentives to report biased or distorted interest rates for two main reasons. First, during times of economic stress, reporting lower borrowing rates allowed banks to project greater financial strength. Second, certain derivative positions would become more profitable if LIBOR rates were skewed in favor of specific positions held by the banks.

To combat these manipulation risks, financial regulators globally began recommending a shift from benchmark rates based on estimates to those based on actual transactions and market activity. In 2017, the Financial Conduct Authority (FCA), which regulated LIBOR, announced that it would no longer encourage or require panel banks to submit rates necessary for calculating LIBOR after the end of 2021.

On March 5, 2021, the Financial Conduct Authority (FCA),officially laid out the timeline for phasing out LIBOR. By December 31, 2021, most non-US dollar LIBOR settings (including those for the British pound, Japanese yen, and others), as well as the one-week and two-month US Dollar LIBOR rates, would transition to non-LIBOR alternatives. Bank regulators urged the cessation of new LIBOR-based contracts after December 31, 2021. On June 30, 2023, the remaining US dollar LIBOR settings — including those for overnight, one-month, three-month, six-month, and twelve-month maturities — were completely discontinued.

As a result of the LIBOR scandal, the total fines levied on involved institutions exceeded $10 billion U.S. (as shown in Table 2).

Table 2
Financial Penalties Resulting from the LIBOR Scandal

Bank name	Settlement date	Settlement amount (USD million)
Barclays	27 June 2012	454
UBS	19 December 2012	1500
RBS	6 February 2013	612
ICAP	25 September 2013	87
Rabobank	29 October 2013	1070
Deutsche Bank	4 December 2013	971
Société Générale	4 December 2013	604
RBS	4 December 2013	530
JPMorgan	4 December 2013	108
Citigroup	4 December 2013	95
RP Martin	4 December 2013	0.3
RP Martin	15 May 2014	2.3
Lloyds Banking Group	28 July 2014	370
JP Morgan	21 October 2014	117
UBS	21 October 2014	16
Credit Suisse	21 October 2014	11.7
Deutsche Bank	23 April 2015	2500
Barclays	20 May 2015	60
UBS	20 May 2015	203
Barclays	8 August 2016	100
HSBC	29 March 2018	100
Société Générale	4 June 2018	750
Citigroup	15 June 2018	100
$10.4 billion	Total	

Source: Huan et al. (2023)," Understanding the LIBOR scandal: the historical, the ethical, and the technological", p.408

8 Transition to the New Reference Rate

The transition away from LIBOR prompted the formation of the Alternative Reference Rates Committee (ARRC) to introduce viable alternatives. This shift led to the revision of numerous financial contracts, with U.S. and UK regulators emphasizing the potential risks tied to the LIBOR transition. The Financial Stability Board (FSB) played a key role in coordinating international efforts for benchmark reform and the gradual phasing out of LIBOR. (FSB,2022).

The Secured Overnight Financing Rate (SOFR) was introduced as the primary alternative to U.S. dollar LIBOR. Defined by the ARRC, SOFR is based on daily transactions in the multi-trillion-dollar U.S. Treasury repurchase agreement (Repo) market, making it a reliable benchmark. For the Eurozone, the Euro Short-Term Rate (ESTR) replaced EURIBOR. In the United Kingdom, the Sterling Overnight Index Average (SONIA) became the alternative to LIBOR. SONIA is calculated as the weighted average of all overnight unsecured sterling money market transactions in London. The

Bank of England assumed responsibility for SONIA in 2016 and updated its methodology in 2018.

9 LIBOR Transition to the New Reference Rate at the World Bank Group

On July 22, 2021, the World Bank issued a statement regarding the end of LIBOR. To prepare for this transition, the World Bank approved new reference rates for both new and existing loans. This shift required adjustments for loans under the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA).

The newly adopted reference rates include SOFR for U.S. dollar loans, SONIA for British pound loans, the Tokyo Overnight Average Rate (TONA) for Japanese yen loans, and the Euro Interbank Offered Rate (EURIBOR) for euro loans.

New Loans: Starting January 1, 2022, new variable spread loans granted by IBRD are now based on SOFR for U.S. dollar loans, SONIA for British pound loans, and TONA for Japanese yen loans. For existing loans tied to LIBOR, the reference rate was replaced by SOFR, SONIA, or TONA, as appropriate. For loans in euros, EURIBOR replaced LIBOR as the reference rate.

Existing Loans: For loans with variable spreads, the reference rates were updated to SOFR (for U.S. dollars), SONIA (for British pounds), and TONA (for Japanese yen). For loans in euros, EURIBOR replaced LIBOR. Fixed-spread loans in U.S. dollars, pounds, yen, and euros were also transitioned to the respective new reference rates.

The World Bank's adoption of these new reference rates aligns with the timeline set by the UK Financial Conduct Authority (FCA) for LIBOR's cessation (World bank,2021).

Additionally, the International Finance Corporation (IFC), which had based its entire balance sheet on LIBOR reference rates, ceased offering LIBOR-based financial products as of December 31, 2021. By June 30, 2023, the IFC discontinued the 3-month and 6-month LIBOR for U.S. dollars. Transition efforts at the IFC had begun as early as August 2019, with new loans priced using SOFR plus a transfer pricing spread, alongside a customer spread.

10 LIBOR Alternatives

The extinction of LIBOR marks a fundamental change in global finance. Understanding why a replacement system is still necessary and how it might

be constructed requires a look at the function LIBOR served and the challenges of replacing it. We still need a similar system, since LIBOR was not just a rate. It was a benchmark used to price hundreds of trillions of dollars' worth of financial contracts. With LIBOR discontinued, we still need reference rates for pricing financial products such as loans, floating-rate bonds, swaps; benchmarking returns for investment performance comparisons; risk management and hedging for derivative pricing and valuation; and global consistency and interoperability which provide a common language for global markets. Without a reliable benchmark system, markets face increased uncertainty, fragmentation, and inefficiency.

An alternative benchmark rate should be constructed as a risk-free rate based on actual market transactions, in contrast to LIBOR, which relied in part on judgment-based estimates. The construction approach is based on real, observable overnight transactions, often in repo or money markets. It is calculated and published by central banks or recognized institutions. LIBOR alternatives are calculated and published by central banks or other recognized institutions, and are therefore free from the manipulation concerns that plagued LIBOR. A robust alternative rate must be based on real transactions, remain reliable during market stress, have clear oversight and methodology, be able to support different instruments (loans, bonds, derivatives), and be interoperable across borders and currencies. (Corporate Finance Institute, 2026).

Therefore, we need a LIBOR replacement because financial markets require consistent, transparent, and robust benchmarks to function effectively. The emerging system is based on transaction-based reference rates.

Several alternative reference rates have emerged to replace LIBOR, each tailored to specific currencies. The most important alternatives to LIBOR are SOFR (Secured Overnight Financing Rate) for U.S. dollars; SONIA (Sterling Overnight Index Average) for British pounds; €STR (Euro Short-Term Rate) for euros; SARON (Swiss Average Rate Overnight) for Swiss francs; TONAR (Tokyo Overnight Average Rate) for Japanese yen; and AONIA (AUD Overnight Index Average) for Australian dollars.

i) SOFR (Secured Overnight Financing Rate): In response to the LIBOR scandal, U.S. regulators recommended a shift to risk-free reference rates that are based on actual transactions, free from manipulation. The SOFR emerged as the replacement for U.S. dollar LIBOR. The SOFR is calculated based on U.S. Treasury repurchase agreement (repo) transactions, where U.S.

Treasury securities are used as collateral for overnight borrowing and lending between banks. This makes it a risk-free rate.

Key differences between SOFR and LIBOR include: i) SOFR is entirely based on transaction data from the U.S. Treasury repo market, whereas LIBOR incorporated expert judgment and relied on estimates. ii) LIBOR published rates for multiple maturities (e.g., overnight, one-month, three-month), while SOFR is currently available only as an overnight rate. iii) LIBOR includes a component for credit risk, reflecting unsecured borrowing, whereas SOFR is risk-free and backed by Treasury securities, making it less sensitive to credit risk. This can lead to differences in how both rates react to market stress (Gellert & Schlögl, 2021).

SOFR's reliance on actual transactions in the Treasury repo market makes it a robust benchmark. The average daily transaction volume in the SOFR market reached around $1 trillion in December 2021, increasing to $1.5 trillion by May 2023. The World Bank issued its first bond linked to SOFR in August 2018, raising $1 billion from global investors.

However, SOFR has limitations, including: i) Unlike LIBOR, which offers rates for various maturities, SOFR is only an overnight rate, which complicates its use for long-term financial products. ii) SOFR may exhibit higher volatility compared to LIBOR due to the nature of the repo market. iii) SOFR reflects secured transactions, making it less responsive to changes in credit risk, which may affect its reliability during times of financial stress.

ii) SONIA (Sterling Overnight Index Average): SONIA is the alternative to LIBOR for the British pound, reflecting the average of overnight unsecured lending transactions in the sterling money market. Managed by the Bank of England, SONIA is based on a wide range of market transactions, ensuring it is grounded in actual data.

iii) €STR (Euro Short-Term Rate): The €STR is the eurozone's alternative to LIBOR, reflecting the cost of overnight unsecured borrowing in euros by banks within the region. Managed by the European Central Bank, €STR is based on actual market transactions, providing a more transparent and reliable reference rate for euro-denominated financial products.

iv) SARON (Swiss Average Rate Overnight): SARON serves as the reference rate for the Swiss franc. Based on transactions in the Swiss repo market, SARON is managed by the Swiss National Bank in cooperation with the Swiss Stock Exchange (SIX). It is derived from actual market transactions, ensuring robustness and transparency.

v) TONAR (Tokyo Overnight Average Rate): For Japan, TONAR is the alternative reference rate, representing the cost of overnight unsecured

borrowing in the Japanese yen market. Managed by the Bank of Japan, TONAR reflects a broad volume of transactions in yen-denominated financial products, providing an accurate benchmark for the Japanese financial market.

vi) AONIA (AUD Overnight Index Average): AONIA is Australia's overnight reference rate, also known as the cash rate. Managed by the Reserve Bank of Australia, AONIA is based on a weighted average of overnight unsecured interbank loans. It is nearly risk-free and is widely used in financial contracts, particularly in Australia. The Australian Securities Exchange (ASX) calculates and publishes AONIA, making it an essential reference for Australian dollar-denominated financial agreements.

The importance of the discussion is as follows: First, understanding the factors that led to LIBOR's fall is crucial because it enables policymakers to select more robust and resilient alternative rates. Learning the life cycle of LIBOR and its alternatives is crucial because it highlights the risk of relying on subjective benchmarks. It underscores the importance of transparency and data integrity in financial systems, flaws in benchmark design and oversight, and overall, provides historical insight on the life of a global reference rate.

Second, the LIBOR scandal is a cautionary tale about conflicts of interest, poor oversight, and moral hazard in one of the biggest financial scandals in modern history. It emphasizes the need for strong governance and regulatory frameworks and the impact of flawed rates on contracts and institutions.

Third, it equips us to make informed decisions on choosing between LIBOR alternatives. Without this knowledge, our financial decisions could be misinformed or outdated.

11 Conclusion

The rise and eventual discontinuation of LIBOR underscore critical policy lessons for global financial governance. LIBOR's centrality in global finance, spanning over three decades, was enabled by its flexibility and market-driven design. However, its structural reliance on self-reported estimates—rather than observable market transactions—rendered it vulnerable to manipulation and created significant systemic risk. The resulting scandal, regulatory investigations, and erosion of trust prompted policymakers and financial regulators worldwide to confront a fundamental question: how to rebuild benchmark integrity without destabilizing markets? This paper has traced the multifaceted role of LIBOR, its lifecycle, and the pivotal moments that shaped global policy responses. The failure of incremental reforms to restore confidence in LIBOR highlighted the limitations of soft regulatory

oversight in managing critical financial infrastructure. It became evident that a full transition to alternative reference rates, grounded in transparent, transaction-based methodologies, was not only necessary but urgent. Policymakers, regulators, and standard-setting bodies responded with coordinated strategies aimed at minimizing disruption while accelerating benchmark reform. The adoption of new risk-free rates (RFRs), such as SOFR, SONIA, €STR, and others, reflects a shift toward more resilient and accountable financial benchmarks. Institutions like the World Bank Group have also played a proactive role in supporting the transition, underscoring the importance of institutional readiness, cross-border coordination, and comprehensive risk assessments.

The eventual fall of LIBOR exposed critical deficiencies in both economic efficiency and information content. From an efficiency standpoint, LIBOR's reliance on subjective bank estimates rather than actual market transactions introduced vulnerabilities to manipulation, opacity, and systemic risk. The lack of transactional depth and the limited number of contributing banks undermined its reliability as a universal pricing tool. These inefficiencies became particularly pronounced during periods of market stress, when LIBOR failed to reflect true funding conditions. In terms of information content, LIBOR's embedded credit risk premium once offered valuable signals about interbank trust and liquidity. However, this informational value was compromised by the non-transparent and discretionary nature of rate submissions. Ultimately, the LIBOR experience underscored the importance of designing reference rates that balance economic functionality with informational integrity. As global markets adapt to new benchmarks, the lessons of LIBOR serve as a cautionary tale and a blueprint for reform.

Going forward, the LIBOR experience offers essential policy guidance. First, the governance of financial benchmarks must be transparent, robust, and subject to meaningful regulatory oversight. Second, contingency planning and transition frameworks should be embedded within financial regulation to anticipate future structural changes. Third, financial market participants must be held accountable for aligning practices with evolving benchmark standards and risk management protocols. Ultimately, the LIBOR transition is not merely a technical adjustment—it represents a broader rethinking of how trust and integrity are built into global financial architecture. For policymakers, it serves as both a warning and a mandate to ensure that critical market infrastructure remains fit for purpose, especially in an era of heightened complexity and interconnectedness.

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