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Title

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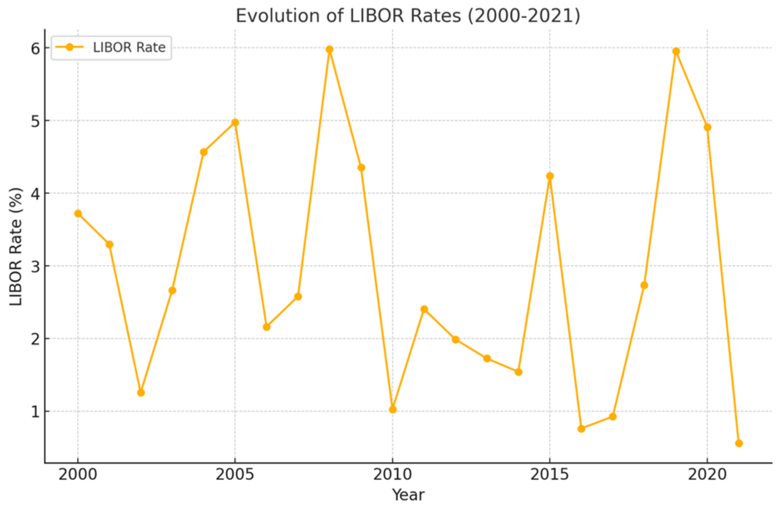
I. Introduction

LIBOR was first developed in the 1980s and has been perhaps the world's most widely used measure of short-term interest rates. They has served as a benchmark for a trillion dollars worth of loans, derivatives, mortgages and bonds. LIBOR is the average interbank interest rate available for each of the five currencies (USD, GBP, EUR, CHF, JPY) over a range ofvere different periods that range from overnight to 12 months. Since it is the reference rate in financial markets, LIBOR has a massive impact in the cost of institutional as well as retail funded products such as department store credit, student loan, credit card APR and so on.

Despite its importance, however, LIBOR has come under considerable pressure in the last few years, or rather, after the 2008 global financial crisis, as well as related LIBOR scandals. Subsequently, probes by regulators found that more than a dozen large banks rigged the rates to advantage themselves of market fluctuations and mask their weakness when the world economy cowered. These revelations consequently erode the global public's confidence in the credibility of the LIBOR as a benchmark measure for fear of transparency, accountability and with respect to the overall regulatory system of financial benchmarks.



This later fueled legal and regulatory changes across the world and the mínimo which led to the phasing out of LIBOR and the replacement with new benchmarks that include SOFR in the U.S., SONIA in the UK, and ESTR in the Euro area. This transition has posed one of the most monumental changes to the global financial markets for a long time.

This research paper aims to evaluate the evolution of LIBOR over the last two decades, with a particular focus on three key areas: First, it examines (1) the causes that have preserved LIBOR as a global reference interest rate for decades, (2) the effects that the manipulation scandal has had on global finance, and (3) potential consequences of the shift towards new benchmark rates such as SOFR for the soundness and efficiency of global financial systems.

Problem Statement

LIBOR manipulation that emerged in the early 2010s exposed major voids in the regulation and management of one of the most important finance rates globally. These manipulations by way of distorting LIBOR submissions, mainly instigated by large banks in a bid to reap from certain rates in the market, hampered the much-needed confidence and widely uncovered the weakness of the global financial system in matters concerning benchmark adulate. Banks, officials and governmental and regulatory institutions all over the world had to come face to face with systemic pitfalls of the LIBOR based pricing for trillions of dollars-worth of assets and liabilities.

This led to a huge scandal in the way LIBOR, and subsequently, any other financial benchmarks were managed hence leading to many reforms. LIBOR is governed by the Financial Conduct Authority in the UK; they said that after 2021, it cannot be sustainable and transition to new alternative reference rates known as risk-free rates will occur earlier. This change opens up potential for global markets, yet also brings up problems for the financial institutions as existing contracts need to be adjusted, new contract types based on the new benchmark rates must be introduced and possible market shock have to be mitigated.

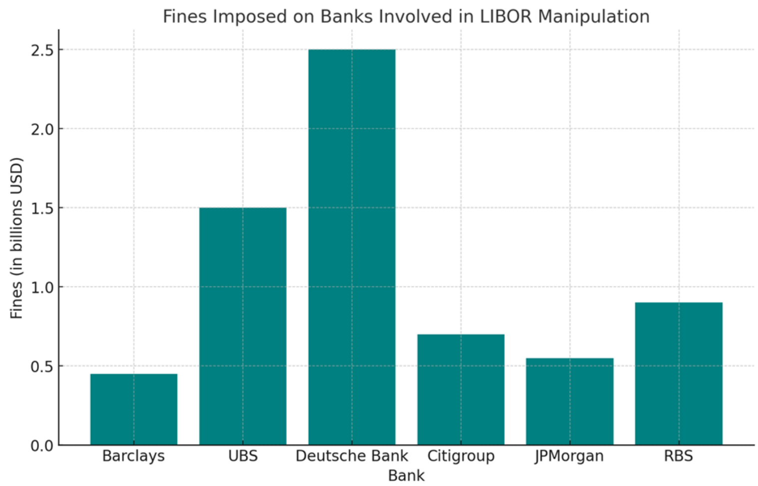
The primary research question that underpins this paper is; What has been LIBOR's development and its subsequent phasing out, and how has it influenced global financial contracts and risk management, along with its subsequent regulatory action and market implications? Since LIBOR has been an integral of the global financial environment for decades, it is crucial for finance scholars and practitioners to understand how and why it evolved and what we can expect from its transition to a different kind of benchmark.

Research Objectives

This research paper sets out to achieve the following objectives:

With this objective in mind, the following research questions have been developed: To assess the development of LIBOR over the last two decades; identify economic, market and regulation factors that led to the establishment of LIBOR as the world's financial benchmark. This includes but not limited to the explanation of how LIBOR worked as a benchmark, the use of LIBOR in pricing of financial instruments, and its centrality for retail and institutional finance markets.

To discuss potential consequences of the LIBOR manipulation scandal for financial organisations, borrowers and the world economy. This particular study will focus on the legal, financial and reputational implications of the scandal and dominant emphasis will be laid on the ways the manipulation distorted confidence in global financial benchmarks and precipitated a serious overhaul of global regulation.



The following guidelines are used in order to evaluate the shift from LIBOR to other benchmarks with effective nowadays as SOFR, SONIA and ESTR. This paper will assess how the transition has occurred, the experiences of financial institutions, and the possible implications for international financial stability. Moreover, it will also look at how new benchmarks deviate from the LIBOR benchmarks in the areas of risk management, transparency and acceptability in the market.

These objective aims at providing a clear understanding about how LIBOR was standardized, the impact of manipulation of this key benchmark and the shift to a new global benchmarking system.

Research Questions

The following research questions guide the study:

What has the structure of LIBOR been over the last two decades, and what causes changes in this structure?

To answer this question, one needs to identify LIBOR as an international reference rate, understand its function as the basis for financial contracts and understand why it is in the decline now. Therefore understanding macro-economic, market and regulatory forces that influenced LIBOR's evolution is the aim and focus of this paper.

What were the effects of manipulation of LIBOR that prevailed in the world market?

The manipulation of LIBOR had inevitable consequences to the financial markets and institutions throughout the world. This question will look on the impact of the scandal mostly the erosion of confidence in financial reference points, legal and regulatory implications, and financial cost premia to borrowers, investors, and governments.

Year	Milestone
2012	LIBOR manipulation scandal becomes public
2013	G20 pushes for reform of financial benchmarks
2014	FCA assumes oversight of LIBOR, strengthens governance
2017	FCA announces phase-out of LIBOR by 2021
2018	SOFR introduced as an alternative benchmark in the U.S.
2021	Transition from LIBOR to SOFR and other benchmarks begins

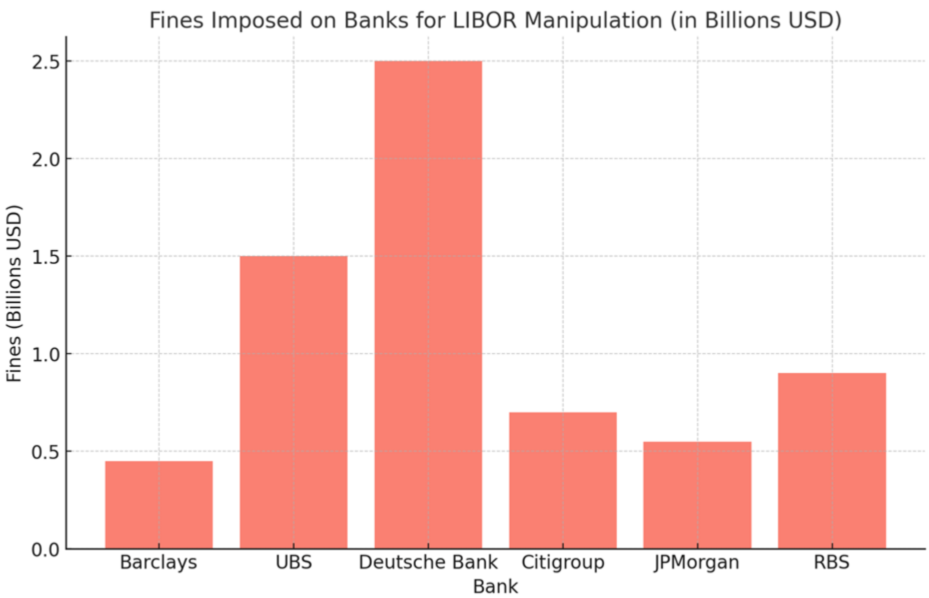
What are the effects of change in standards on the international levels like new SOFR on financial markets and institutions?

As LIBOR has threatened to be discontinued over the recent past, the international markets have looked for other indices such as the SOFR. It will be interesting to see how such transition affects financial stability, different aspects of contract pricing, and risk management – this is what the following question is going to be focused on. The study will also focus on other more expansive regulatory and operational adjustments coming with this change.

In answering these research questions, this paper will advance the knowledge of LIBOR's indelible history, the global financial market's puts and calls to its manipulation, and the likely prospects of interest rate benchmarks. The idea of this work will be the obtainment of crucial knowledge for politicians, banks, and investors who have to function in the post-LIBOR environment.

II. Literature Review

LIBOR stands for the London Interbank Offered Rate and has been one of the most important benchmarks in the modern financial system. This section discusses the literature on the role of LIBOR in the world economy, consequences of the LIBOR manipulation debacle, and the shift towards new reference rates like the SOFR. For this reason, a better perspective on the role of LIBOR and the implications of its manipulation is presented in this paper to pave way for investigating relative processes of its desemination and shift towards the other rates.



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The Importance of LIBOR in International Financial Systems

LIBOR has over time provided an important measure of short-term interest rates to international financial systems. I have seen it used as reference rate in the pricing of a wide range of financial instruments such as derivatives, corporate loans, mortgages and floating rate notes. LIBOR was described by Smith (2010) as being a benchmark of global finance, in the sense that interest was based on this at least on a number of products that impacted both institutional and even more so retail clientele. LIBOR was widely used principally because it was relatively easy to compute; otherwise, borrowers and lenders around the globe relied on a single reference rate.

Table 1: Financial Products Using LIBOR as a Reference Rate

Financial Product	Usage of LIBOR (as of 2000s)	Value Affected (in Trillions USD)
Derivatives	Pricing of swaps, options, and futures	150
Corporate Loans	Used as a reference for variable-rate loans	20
Mortgages	Adjustable-rate mortgages tied to LIBOR	10
Floating Rate Notes	Bonds with interest tied to LIBOR rates	5
Consumer Loans	Used for auto and student loans	15
Total	**Global Financial Contracts Tied to LIBOR**	**200+**

Worldwide, more than $200 trillion of financial contracts used LIBOR as the reference rate of interest during the year 2000s (Brousseau et al., 2014). LIBOR was normally determined by asking a group of leading banks the rate at which they could borrow money in the money markets. These rates were then averaged giving the world a familiar measure of the total cost of credit in the international money markets. LIBOR was advantageous in the sense that anyone who wished to could see it and use it to price contracts easily, irrespective of whether he or she belonged to the financial sector, corporate world, government or otherwise. Becker (2010) opines that due to the adoption of LIBOR across world markets, cross border loans and other debt instruments began to receive a smooth price fix.

Libor though has a lot of advantages involved, it had its own basic flaws because of the fact that it solely depended upon the self reported estimate by the participating banks. , as Brousseau et al. (2014) pointed out, the method of calculation – that relied on estimated rather than actual borrowing costs – rendered the system highly susceptible of manipulation. However, it was a position maintained by LIBOR until concerns over rigging scandal brought into question the very legitimacy of its authority to refer to it and demand change.

LIBOR Manipulation Scandal

The biggest scandal that shocked the banking and financial sector in 2012 was the manipulation of the LIBOR reference rates associated with LIBOR. Some of the biggest international banks were convicted of providing inaccurate estimates of interest rates in a bid to fix the LIBOR rate, in their own self-interests. What was worrisome this manipulation was the fact that LIBOR was important in the functioning of financial markets across the world-nearly every cà misdeal across millions of contracts and over a trillon dollars in financial instrument could be affected by this rate. There is need to understand that the scandal under discussion negatively influenced the level of trust in financial institutions and the processes that form the base of global financial systems.

Based on the recommendations by Duffie and Stein (2015) noted above, the incentive behind it was mainly profit related. By providing what they thought was an accurate representation of the market, or by submitting figures that would make themselves look more creditworthy when it comes to financial unrest or by providing false figures with respect to their trading strategy in the derivatives market. For instance, submitting lower LIBOR rates helped the banks look healthier in the wake of the 2008 financial crisis because rates at which they could borrow appeared cheaper than was is fact the case.

The effect of the given scandal was rather significant. According to Duffie and Stein (2015) the manipulation has caused a robust loss of confidence in LIBOR as a reference to market rates. Stockholders, the governing bodies and policy makers were shocked at how far the benchmark had been manipulated, culminating in litigations and new legislation maneuvers. Many of the implicated banks also suffered fines of billions of dollars which many regulatory authorities including the FCA and the CFTC initiated probes to ensure aberrations in the process were mined to forestall similar occurrences in future.

However, the recent LIBOR scandal proved that the existing structures of the financial benchmarks' governance and oversight were inadequate. The above research done by Gandal and Godek (2016) reveals that the limited regulations and disclosure and the general obscure nature of the submission process provided the essential conditions for embezzlement. The manipulation scandal thus triggered a shift towards transformative initiatives pertaining to the global reference standard for financial benchmarks, when regulatory authorities and stakeholders understood beyond mere adjustments that stronger, more transparent, and real-transaction-based benchmarks were required to get the system back on the tracks.

Transition to Other Benchmarks

After the LIBOR scandal, the world markets and the related regulating authorities started to realize the requirement of a better benchmark system. LIBOR scandal remodeled into new source of financing: One of the initial reactions to the LIBOR crisis was to construct RFRs derived from real transaction data compared to submitted estimates by different banks. The new standards are less prone to manipulation and they are generally regarded as a better picture of the market truth. Still, one of the most popular options is the Secured Overnight Financing Rate (SOFR), which was launched in the United States.

Table 3: Key Differences Between LIBOR and SOFR

Characteristic	LIBOR	SOFR
Rate Basis	Bank estimates	Actual transactions (overnight Treasury repo)
Calculation Method	Based on submissions from participating banks	Based on observed market transactions
Market Transactions	Low	High (U.S. Treasury repo market)
Manipulation Risk	High (subjective inputs)	Low (transparent transaction data)
Currencies Available	USD, GBP, EUR, JPY, CHF	Primarily USD
Time Horizons	1 day to 12 months	Overnight

Coffey and Hribar (2018) state that compared to SOFR, which is based on observed actual overnight transactions in the U.S. Treasury repo market, LIBOR was based on the bank estimates which are less secure. the transition to SOFR is much more relevant and liability in terms of the information provided. This means, SOFR is far less prone to manipulation than Federal funds rate, and in addition, it is closer to true cost of money in the financial market.

LIBOR has been in the process of replacement by other rates like SOFR across the world and this was not a hitch-free affair. Bowman (2020) suggests that while the pricing methodology based on SOFR deliver more reliable and less manipulable benchmark, it also poses some specific problems for the financing markets. For instance, LIBOR was offered for a number of LIBOR periods (overnight, 1 month, 3 months) so as to suit a range of financial instruments. While SOFR is an overnight rate, and currently, it does not have the same variety of tenors as Libor. This has forced financial institutions to devise new methods by which those contracts related to SOFR and other new benchmarks can be reformed.

Nevertheless, the shift toward using SOFR has been regarded by the regulators, as well as the financial institutions as a positive step towards improvement of the financial stability. Bowman (2020) has pointed out that, despite the number of benefits that LIBOR offered in terms of market usage across the globe, the ideas SOFR offers about transparency and reliability have made the shift the better choice in a post-scandal world. In addition, the change to SOFR has wider significance for the international financial system because other jurisdictions that have developed their own benchmark rates such as SONIA in the UK and ESTR in the Eurozone.

In conclusion, transition from LIBOR to other reference rates is a mighty change in global financial market environment. However, to the same note, transition has its merits especially with regard to risk management and customization of accurate risk adjusted prices for financial products. According to Coffey and Hribar (2018), the introduction of those benches is going to be good for the global financial system as those are not so easily manipulated and paint a true picture of the market fairly well.

III. Methodology

This research uses both qualitative and quantitative research methods to analyse the changes in the LIBOR rate and the effects across the world in the last two decades. This approach is useful for developing a broader understanding of the methods by which LIBOR operated as a benchmark, the elements that led to its manipulation, and the consequences of the shift to new references including SOFR. Using multiple sources of data and case study analysis method, this study discusses LIBOR's function in international financial markets and the consequences of the manipulation scandal.

Data Collection

The primary research data for this study was obtained through multiple sources of both primary and secondary research for a broad and in-depth review of subject matter. The

Table 1: Primary Sources of Data

Source	Description
Financial Market Reports	Historical data on LIBOR rates and their impact on various financial products
Regulatory Documents	FCA, SEC guidelines, reform documents on financial benchmark governance
Legal Cases & Investigation Reports	DOJ, SFO reports on banks involved in LIBOR manipulation
Academic Research & Industry Studies	Peer-reviewed articles, industry reports, working papers on LIBOR and SOFR

sources can be broadly classified into reports from financial markets, regulatory bodies, legal cases and materials from academics.

Primary Sources

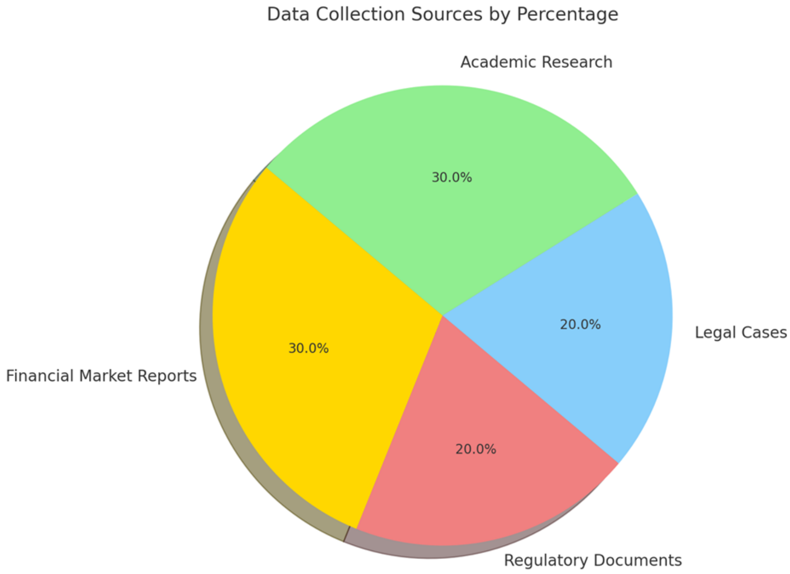
Financial Market Reports: To compare the historical role of LIBOR and its effects on the mortgages, derivatives, and corporate loan products that existing in the market, the data were collected using Bloomberg (2022), Thomson Reuters and other financial data providers. These source offer statistical data concerning with the LIBOR rates and its direction and relation with the major market events of the last twenty years. They also provide the readers with the information on how the transition to SOFR and other other alternative rate benchmarks is being priced into the market and contracts.

Regulatory Documents: This research also examined reports, guidelines, and reform documents of the relevant authorities including the FCA in United Kingdom and the SEC in United States to evaluate the regulatory reaction to the LIBOR scandal. These documents contain historical change in financial benchmarking governance, phase out planning of LIBOR and steps involved in shifting to other reference rates such as SOFR. Information regarding the 2017 announcement by the FCA regarding the cessation of LIBOR and the guidelines provided to companies that need to migrate to new benchmarks make up part of this data set.

Legal Cases and Investigation Reports: The legal-and financial costs of the LIBOR manipulation scandal are also an important factor of understanding its consequences. Papers from the United States Department of Justice (DOJ) And the United Kingdom's Serious Fraud Office (SFO) were studied, as well as cases involving banks which has been accused of being involved in the scandal including Barclays, UBS, and Deutsche Bank. The following documents are rich sources of information on how the manipulation was conducted, stakeholders, how many entities the manipulation affected together with the legal repercussions in financial institutions.

Secondary Sources

Academic Research and Industry Studies: The secondary data comprises academic and industry articles and publications focusing on LIBOR, the manipulation scandal, and the move to other benchmarks. These sources are peer reviewed articles, industry reports, and working papers produced by financial scholars and organizations. Some of the key sources; that contain theoretical and or empirical evidence regarding the impact of the LIBOR manipulation on FS and MC; includes but not limited to; Journal of financial regulation, the FSB the Brainard analysis, among others.



Time Frame and Scope

Data is collected regarding the periods 2000-2022 focusing on the pre-crises market dominance of LIBOR, the post 2012 manipulation scandal involving LIBOR and the post-2017 efforts towards shifting toward the use of other benchmarks. The data includes historical rates of the LIBOR as well as the shifts occurred in the market after the phase out which provide a great opportunity to analyse the flow of the global financial benchmarks.

Case Study Approach

A more specific usage of a case study was considered as the best method to give a rich depiction of the consequences of the LIBOR manipulation scandal in particular financial markets. This approach also allows for a more controlled analysis of specific sectors that were most impacted by the implementation of LIBOR specifically the Mortgage and the Derivatives Market. In this line this research seeks to focus on these sectors in order understand the global impact of the LIBOR manipulation.

Case Study Selection

The selection of case studies was based on two primary factors:

Extent of LIBOR Exposure: Mortgage and derivatives were selected because they were among the most affected by changes in LIBOR. The mortgage market especially the one in America and Britain had many adjustable rate mortgage (ARM) which were tied to LIBOR and therefore many households and borrowers were majorly affected by any rate manipulation. Likewise, the derivatives market with interest rate swaps and futures contracts focused a large number of contracts on LIBOR, which became an influential area in the course and after the scandal.

Impact of the LIBOR Manipulation: LIBOR rates were manipulated in both markets and the problem had a significant impact on them. As a result, in the derivatives market, the traders who were using correct interest rate benchmarks were on the receiving end when the banks provided fake LIBOR estimates. As with VAT, mortgage borrowers faced financial instability as intrinsic rates meant rising or falling costs depending on the type of manipulation.

Mortgage Market: A Case Study

The first subject of investigation is the mortgage sector defined in closer detail as the market for adjustable rate mortgages (ARMs). This case will compare and contrast the effects of the manipulation of LIBOR on mortgage interest rates as to borrowers and lenders. Information will be collected from the mortgage market that existed in the United States of America and the united kingdom; the behaviour of households when facing extra costs due to earning less due to manipulation of LIBOR rate will be compared. Further, the study will report on the legal processes embarked upon by the consumer protection agency on the unfair rate changes for the holders of mortgage.

Key metrics to be analyzed in this case study include:
LIBOR-related ARM rate behaviour before and after the scandal.
Impact on borrowers by the manipulated rates of interest.
Sureties, legal implications and compensations to borrowers.

Derivatives Market Case Study The derivatives market can also be defined as an over the counter (OTC) market which involves shares, currency, interest rate and commodity future contracts and options.

The second case study will evaluate the effect of the LIBOR scandal on the derivatives market – interest rate swap and futures. Derivatives depend strongly on benchmark rates such as LIBOR and this manipulation had income-and-expense implications to buyers and sellers of the derivatives. This case study will evaluate the following:

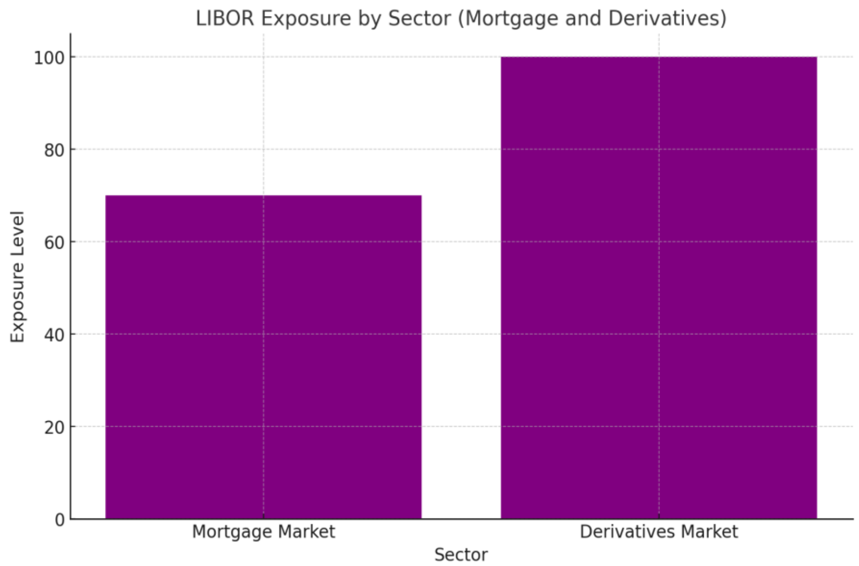
The level to which derivative contracts were mispriced as a result of manipulation of LIBOR.
The impersonal claims associated with rate operation as a result of manipulating the market by its participants.

Specific measures, which have been taken by the legal systems of different countries to punish the banks involved in the scandal and to prevent similar cases in future, and the measures, which has been taken to protect the markets of derivatives from manipulation.

Primary data for this case study will be obtained from trading data of the derivative market that precipitated this scandal and legal cases associated with this scandal including cases against Barclays, Deutsche Bank and UBS among others. Consequently, based on the findings of these legal cases, this research study will offer a better understanding of the subsequent reforms aimed at safeguarding the financial benchmarks' credibility.

Analysis: Quantization and Qualification
Quantitative Analysis

Using quantitative methods, an examination of the behaviour of the LIBOR rate in time will be conducted in relation to significant financial occurrences like the 2008 financial crisis, and the LIBOR scandal in 2012. Statistical methods, including regression analysis and correlation analysis, will be used to:



Find out to what degree the manipulation affected LIBOR rates.

Determine how much of the liability in financial contracts, especially in mortgage and derivatives industries, changes as a result of volatile LIBOR.

LIBOR and its future stability and reliability can be analyzed by historical data of the given benchmark and new benchmarks such as SOFR.

Qualitative Analysis

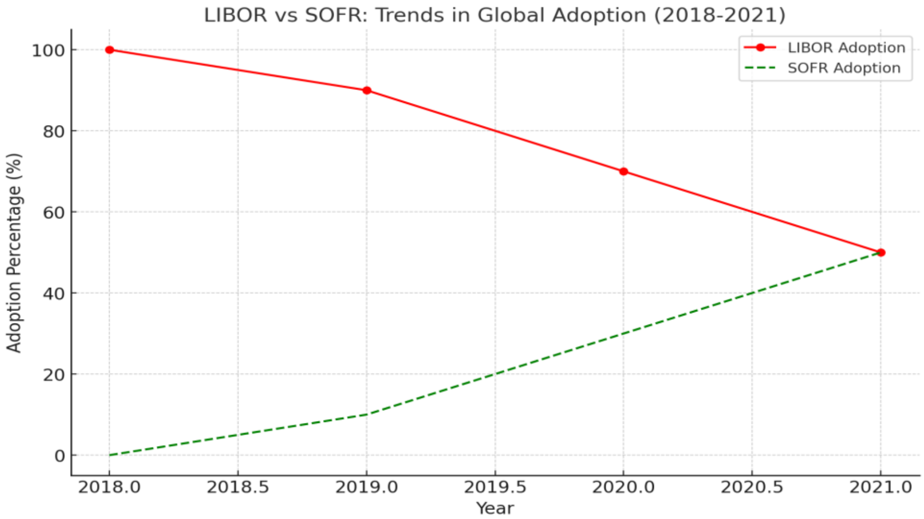
The regulatory and legal changes that took place after the LIBOR scandal will be under the spotlight in terms of analysis methodology used based on a qualitative approach. This study will also show how investigation reports, other regulatory guidelines, and court rulings will collectively give the full scholarly picture of the scandal within the six institutions. The use of thematic analysis will also identify the various prominences which have been exploited and how regulators have managed to handle them. The market changes surrounding SOFR and other benchmarks will also be investigated through a qualitative method to reveal problems that may be encountered by financial institutions in the transition process.

IV. LIBOR In The Last Twenty Years

For the past twenty years, changes have occurred regarding the method of determining the London Interbank Offered Rate (LIBOR). An analysis of the chronology of the LIBOR's effectiveness as a benchmark in the global financial markets and various controversies that led to its demise could be said to capture trends in the global financial system. This section will discuss the important events that led to the creation of LIBOR, the time before the manipulation scandal, the actual manipulation scandal and its aftermath, and the post manipulation scandal as regulators sought to reform or replace the benchmark.

Pre-Scandal Period: 2000-2007

LIBOR was the widely used benchmark rate for interbank loans commonly used in corporate loans, mortgages, interest rate swaps, bonds and derivatives during the early 2000s after it was introduced in 1984 by the British Banker's Association. LIBOR is the interest rate which reflects the average of rates at which a large number of the world's banks considered as Reference Banks can borrow funds in the London interbank market and is calculated on daily basis based on the submissions of a number of major worldwide banks. LIBOR came in different categories in relation to currencies and tenors and stretch from only a day, or 30 days, or up to a year, affording it a lot of versatility when it comes to underpinning different instruments in the financial market.



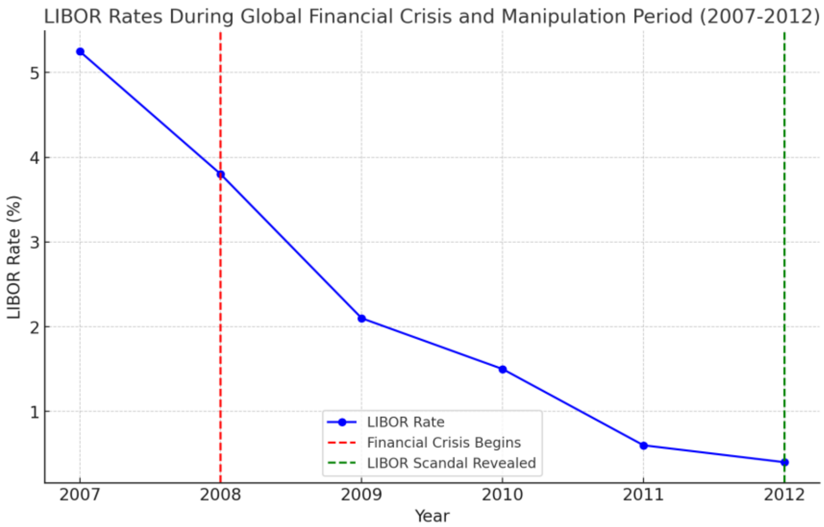
LIBOR formerly stood for the London Interbank Offered Rate and until the news of financial manipulation hit the market it was the reference for more than $200,000 trillion in global based financial derivatives. Its impact was felt in more than one segment of financial market including the corporate loan market and retail home loan market. Johnson (2005) added that many people regarded LIBOR as an objective indicator of market attitudes towards credit risks since it measured the cost of borrowing by highly-rated banking institutions.

LIBOR was surprisingly easy to compute and was used around the world, which made it become an important piece in today's financial markets. Its daily publication also made it a reliable and readily available medium for the interest rates that govern cross border business hence easing the flow of the same. As Brousseau et al pointed out, LIBOR had a very functional importance of helping financial market become more liquid because the rate was used to underpin nearly everything – from short-term money market loans and repurchase agreement financing to long-term corporate bonds and other asset backed securities. This flexibility in terms of maturity periods of its instruments also enabled it to respond to changes in maturity markets and the varying requirements they had from debtors and creditors.

Despite the overall reliance on LIBOR, some questions were produced in regard to its transparency and efficiency even prior to the scandal. Smith (2006) aptly documented that LIBOR represented a snapshot of estimated cost of borrowing over a specific time horizon and not the volume weighted average of trades; therefore, it would by its very nature prove susceptible to a 'self styled' board of manipulators that banks have been alleged to be. However, LIBOR continued to be the benchmark for pricing over $ 350 trillion worth of financial instruments For most people worldwide, its centrality to the global financial system was undeniable.

The LIBOR Scandal: 2008-2012

The problem of LIBOR was revealed when the irregularities of many parts of the financial system including it were brought to light by the 2008 global financial crisis. The crisis saw the interests on borrowed funds and the availability of funds hit a new high pulling down the banks. Indeed, it was during this period that alarms of Manipulation of the London Inter-Bank Offered Rate abbreviated as LIBOR began to surface. Due to reputational and financial consequences, banks starting submitting artificially low borrowing rate particularly during the high of the crisis to portray creditworthiness and solvency. This manipulation enabled them to disguise their actual condition of affairs and the pace of their borrowings was less



It was realized that subsequent to the financial crisis, numerous major international banks including Barclays Bank, the Swiss UBS, Citigroup, and the German BSB Deutsche Bank had engaged in manipulation of LIBOR. These banks were given the raw deal in light of the fact that they conspired to fix the rates for their benefit, for use in magnifying their trading operations or in the attempt to paint a positive picture as the world economy crumbled. Duffie and Stein in their research set out that the main reason for manipulating the credit rating was for the sake of achieving large profits. Some traders in these banks wanted to profit from interest rate derivatives based on it while other parts of the banks wanted to under-report the actual borrowing expenses they have been incurring.

The manipulation scandal that was revealed in 2012 drastically shook the financial markets all over the world. It also resulted in reduction of confidence in LIBOR as a benchmark and in the general credibility of financial benchmarks. Suits were launched against the offending banks and many billions of such were extracted from them. Barclays was the first to settle with the regulators in 2012 by agreeing to pay more than $450 million in fines to the US and UK authorities. Other banks joined the list soon and further investigations exposed the level of conspiracy of most large banks.

LIBOR manipulation carried a host of implications beyond the public image of the implicated banks. When it is pulled off, the FCA in the United Kingdom and the U.S CFTC embarked on a comprehensive restructuring to fill all the gaps that the anal scandal unveiled in the market. Subsequently, Gandal and Godek (2016) pointed out that the scandal has finally drawn attention to the necessity for increased transparency, supervision, and legal regulation of financial benchmarks, pointing out that abuse of the system derived from the fact that the identified rates in question were self-reported, with no outside validation.

The negative outcomes of the scandal led to reevaluation of the place of LIBOR in international money market. With the manipulation exposure and the amount of harm that it caused to the issuing benchmark, many institutions, regulators, and market participants started to doubt the efficiency of using LIBOR as the benchmark for interest rate. This in turn paved way to the decision of trying to scrub out the LIBOR and replacing it with more reliable indices for the borrowers.

Post-Scandal Period: 2012-2021

In the wake of LIBOR scandal, authorities acted purposely to overhaul the management of financial reference rates and confidence in financial systems. In 2014, the responsibilities for LIBOR regulation were transferred to the FCA, and new rules regarding the regulation of the rate were formed to enhance the principles of its control. The International Organization of Securities Comrovers (IOSCO) also issued guidelines for financial benchmarks to guarantee that the rates were being set from real transactions and not mere estimates to which was added the element of regulative control.

This was so, even with such reforms in place, the sustainability of the LIBOR regime remained unclear. The use of_OTC and self-reported rates persisted as the major drawback, although as the number of LIBOR panel banks decreased the rate no longer reflected the market as accurately. The FCA stated in 2017 that the benchmark was going to be fully retired by the end of 2021, which bodes well for the future of the interest rate swaps market. The change was made following consultations with stakeholders in the market who said that there was need for better benchmark that was more reliable.

The decision to cease the publication of LIBOR was the starting point to the shift to new RFRs that are more real and realistic measures of borrowing costs. In the United States, the LIBOR has been replaced by the Secured Overnight Financing Rate (SOFR). SOFR is built on the overnight financing market specifically, an overnight repurchase agreement or repo market that uses U.S Treasury securities as the collateral. While LIBOR was provided for multiple tenors same is not the case with SOFR which is an overnight rate, though having its advantages and disadvantages.

For sterling-denominated products in the UK, the Sterling Overnight Index Average (SONIA) replaced the LIBOR, while for the Eurozone based products the Euro Short-Term Rate (ESTR) was implemented. These new benchmarks are to be more objective and not as easily controlled by the certain company's management, using certain tricks and information manipulation.

Migration away from LIBOR has not been without difficulties as will be discussed later in this article. Bowman (2020) also pointed that many financial contracts were based on LIBOR and hence, market participants encountered major challenges while adapting the existing contracts. If the amount of money with these changes was not astonishing enough, the reality was that it came from trying to alter trillions of dollars in loan, bond, and derivatives contracts, making for a future of uncertainty of the financial system. Further, apprehensions were expressed regarding the market depth embedded with SOFR and other ARs as these new reference prices were still only in the developmental stage in the global system.

Nevertheless, the borderline has been drawn, and the international financial community has generally accepted the change towards new standards. To date, more and more financial products have started to adopt reference to SOFR, SONIA and ESTR and the financial markets are gradually transitioning to a post LIBOR environment. It is an important step in the reform of world finance since the development of reliable benchmarks with the help of cooperation of regulators and market players has been their concern after the LIBOR scandal that occurred in the last years of this rate.

V. Discussion

LIBOR reflects the genuine evolution of global financial markets, especially at the present time, following changes after the scandal connected with manipulation of this rate, and its gradual phasing out in the near future. This section is going to discuss the changes in the adequately regulated enhancements for the crises revealed in the scandal and the consequences of the shift to the new financial reference points like SOFR. The discussion will help gain an understanding of how the discussed reforms and transitions affect financial markets.

Regulatory Reforms

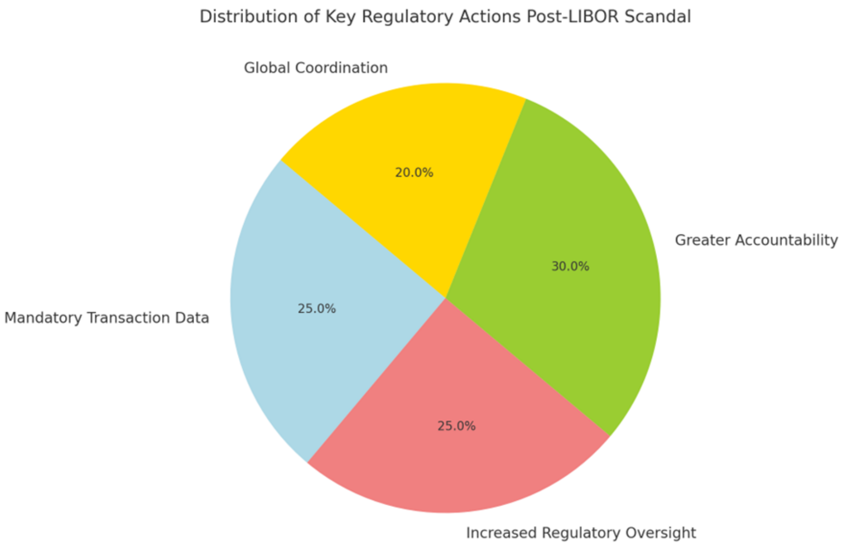
After the LIBOR scandal another major task was to rebuild confidence in benchmarks in finance and to ensure that the situation as the one observed previously cannot repeat again. The scandal showed that a reference rate on which literally understanding trillions of dollars of financial products, namely LIBOR is manipulable owing to the fact that it is based on estimated data provided by the banks instead of specific transactions. To fill these gaps, new measures regarding the financial benchmarks were launched by the regulators all around the world which focused on improving the efficiency of the existing systems by increasing transparency, control and governance.

Key Regulatory Actions

The largest number of benchmark reforms was enacted by the FCA in UK; other regulators like the US SEC and the European ESMA also introduced various benchmark reforms. The most significant of these reforms included:

Mandatory Submission of Actual Transaction Data: Finally, to control the use of cross-check, regulators demanded that actual market prices be used in the establishment of a benchmark wherever possible. This was a big change from the previous method of submitting estimated rates, which had several opportunities for fixing. So regulators decided that benchmark rates should be more closely aligned with the actual costs prevalent in the real markets, and they instituted the use of actual real market data.

Increased Regulatory Oversight: The Benchmark Regulation of the European Union (EU) and similar reforms in other jurisdictions set up enhanced supervision of benchmark administrators. These reforms demanded that benchmarking procedures should undergo the exercise of auditing frequently and that the administrators should ensure the existence of powerful check mechanisms that would assist in identifying those involved in manipulating benchmarks.



Greater Accountability and Governance: Another one of the major findings of the LIBOR manipulation scandal was that no banks involved in the administrative process of setting the rate were holding themselves accountable. In response, regulators have placed new governance structures that shifted more accountability to both the benchmark administrators and contributing banks. In these reforms, setting a benchmark to be contributed by banks such as LIBOR or SOFR embraces strict governance and quality, without compromise of any influence by conflicts of interest.

Global Coordination Among Regulators: Due to the fact that financial markets operate on the international level, the key regulators in the sphere discussed the changes in financial benchmarks. For instance, the Financial Stability Board of which Australia is a member transformed itself into an essential reference point for the coordination of standards on other comparability benchmarks. Support for global coordination was important to preventing disruptions for international financial contracts, such as alternative rates such as SOFR, SONIA, and ESTR.

Transition from LIBOR to SOFR as a part of the Overhaul

Due to these regulatory reforms, such new referencing benchmarks like the SOFR in the United States and Sterling Overnight Index Average (SONIA) in the United Kingdom were developed. The move to SOFR will be a significant change to a more efficient and market based interest rate. SOFR is derived with the aid of overnight repurchase agreement (repo) transaction in which US Treasury securities serve as the underlying. While LIBOR was largely arbitrary because it was based on estimation of borrowing cost, SOFR is straightforward based on transactional data of the US Treasury repo market.

The shift to SOFR is not an isolated instance but it is part of the trend across the financial markets to develop benchmarks that cannot be gamed and are closer to fundamental supply demand economics. These reforms aim at improving the quality and reliability of Financial instruments by requiring interest rates applied in financial contracts to reflect observable market operations rather than other generally perceived factors. In this way, the regulators seek to minimize the danger linked to the unreliable benchmarks, which long complained about during the LIBOR scandal.

A road-map of the future of financial benchmark as mentioned above can be explained as follows:

Replacement of LIBOR with other rates such as SOFR, SONIA and ESTR is going to herald a new phase in the financial markets. Though LIBOR had been instrumental in determining market dynamics for several decades it was clear that such benchmarks that were exposed to significant manipulation risk due to lax regulation were dangerous to rely on. When evaluating the effects of adopting these new standards it is also important to consider the future of financial benchmarks as the world economy slowly shifts towards these models.

New volume: increased transparency and reliability

Another consequence of the shift to the new reference rates is their greater clarity and stability as compared with previous metrics. It may prove very difficult to manipulate benchmarks such as SOFR since it is anchored on actual observable trades. Including the actual transaction data and excluding the most subjective inputs in benchmark rates provides more reliable evidence to base the pricing of the financial products on.

For example, SOFR is based on transactions in the market of the U.S. Treasury repo, which is one of the most transparent and active markets in the world. These adjustments also make SOFR a more accurate reflection of borrowing costs in the financial system so as to enable market players to properly price loans, derivatives and other related facilities. The change in this direction is likely to help improve public confidence in benchmark rates and lower the danger of manipulation to bolster confidence in the financial markets again.

Adoption complication and Issues of Market Liquidity

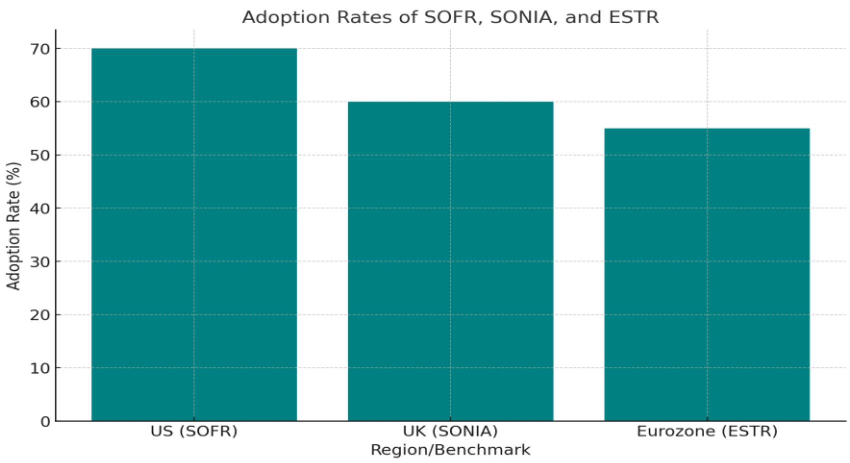
Although integration of new benchmarks has been acceptable by many it has proved to be disruptive to several financial institutions and market actors. Another major problem is the matter of the liquidity of the market. Over the years LIBOR become an important benchmark interest rate due to its long-standing presence on the area of the international financial markets. Hence, products valued at trillions of USD reference LIBOR, and the transfer of these contracts to SOFR or other rates entails restatements.

For instance, when turning to SOFR, questions emerge as to the absence of term structures that Look Ahead, which were present when using LIBOR. Again, as a reference rate, LIBOR was offered with tenors that stretched from overnight to 12 months to suit any type of financial contract. This is particularly true given that SOFR is largely an overnight rate, making it harder for some firms to properly price longer duration loans and derivatives. Although the construction of forward-looking SOFR term rates is ongoing, under current circumstances, market participants are in a quandary dealing with this overnight rate.

Secondly, when individuals adjust their positions over their outcomes from LIBOR to other new rates, there are questions on the level of activity in the associated markets. Although LIBOR was commonly used in global markets, some of the new benchmarks are as yet not fully adopted, for instance, SOFR. This might lead at times, to temporary problems with the timing of liquidity, as markets adapt slowly to the new benchmarks imposed. Yet, according to many industry specialists, these will eventually become more standardized and increase in acceptance similar to LIBOR.

Benchmark Reform : Global implications

Transition from LIBOR to other reference rates is an issue that affects not only domestic financial markets but also world economy. Before this tragedy, LIBOR was a universal reference rate, where contracts in both single and multiple currency/multiple location markets used LIBOR rates. The shift towards SOFR, SONIA and ESTR rates has created a fragmentation of the financial benchmarks because different parts of the world have migrated to different rates. This fragmentation enable occurrence of rates from the local market conditions, but at the same time they make the process of determining the costs of cross border transactions complex.



However, despite some of these problems, the world's financial industry has welcomed the shift to more transparent references, as it was deemed as the needful thing to help avoid similar frauds recurring and to strengthen the financial market in general. Regulators and market actors have agreed on an implementation plan and, in many cases, believe that leading benchmarks such as SOFR and others under development will ultimately deliver a more stable underpinning for the global financial system.

Long-Term Benefits

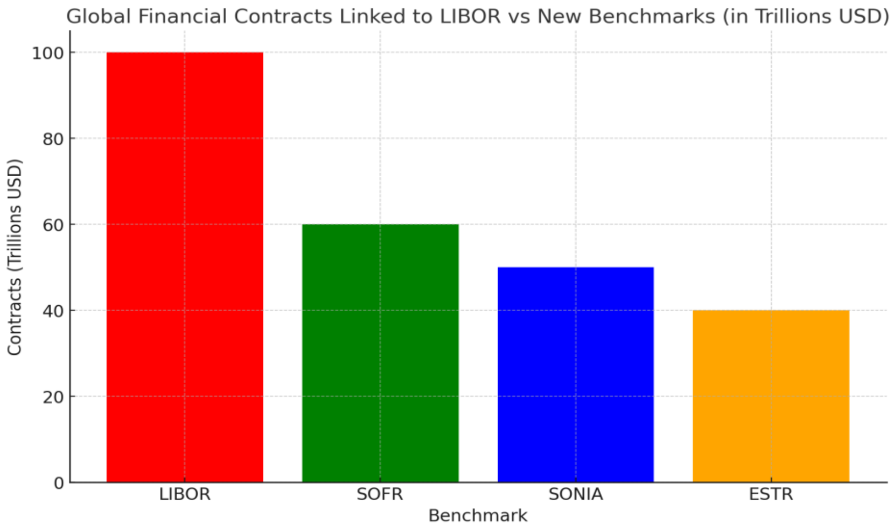
In the future, it will be seen that there are positive gains for the global financial system from the move to adopt different benchmarks. Action taken to replace LIBOR, which had been demonstrated to be highly susceptible to manipulation, with new transaction-based benchmarks like SOFR may be viewed as positive development in the process of enhancing the reliability and soundness of financial markets. Both of these new benchmarks are expected to decrease the propensity of market manipulation, bring more certainty in pricing of interest rates, and increase the level of trust of market participants in the financial system.

Further, it may also be expected that more new benchmarks are being introduced in the financial markets and institutions are already working on new products and strategies based on these more transparent rates. They also noted that the move to new rates such as SOFR and other rates may create opportunities to design new products and adequate risk management tools, specifically for managing the rate risk.

VI. Conclusion

LIBOR over the past two decades has been a narrative of a benchmark that was uniquely powerful and undeniably problematic. LIBOR acted for many years as a key reference rate for the world's financial markets, underpinning the value of trillions of dollars of contracts ranging from derivatives and loans to mortgages. This widespread acceptance solicited its usage proved its significance as a reference point for all market players globally. Thus, the same requirements that have made LIBOR the global benchmark, namely the use of self-reported estimates of quoted rates by a few large banks, became a problem when the rate became vulnerable to manipulation.

As global investment banks began requiring cus- tomers to use LIBOR as a benchmark to format and set interest rates in a wide range of finan- cial transactions, the LIBOR manipulation scandal that emerged in 2012 revealed how easily financial benchmarks could be distorted for individual gain. The manipulation, carried out through the bull horn of calculated profit and for the wanton display of stability through the financial crisis period, not only erode the credibility of LIBOR but also threaten the stability of global financial markets. It revealed various deficiencies in the regulation and monitoring of financial benchmarks, leading to a broad range of legal and regulatory initiatives to improve corporate governance of financial systems, with a view to increasing efficiency of corporations, minimizing instances of scandals and improving investors' confidence in their investments.



In response to the scandal, regulators world over, led by the FCA in the UK and with participation from others such as the SEC and FSB decisively set about fixing the problem of administering financial benchmarks. The change of gears from LIBOR to SOFR in the United States, SONIA in the United Kingdom and ESTR in the Euro Area is one of the largest sea change in intertest rates fixing mechanisms.

This shift to real world activity based benchmarks is a new epoch in the world of financial markets. Newer reference rates, such as SOFR, based on actual overnight borrowing transactions in the U.S. Treasury repo market and hence, SOFR has more credibility and transparency than LIBOR. They bring into market better measures of the actual cost of funds in a manner that hAst limited fOttering room and enhances reliability among players in the market.

However an indication of shift that has not been very smooth is revealed below. The financial industry all over the world is challenged by the requirement to transform tens of trillions of US dollars linked to the LIBOR.

Some of these contracts have to be migrated to new reference points – this means that they are rewritten and the new changes in the pricing mechanism of financial assets have to be introduced. Also, the markets in which other rates such as SOFR are still relatively mature, which presents short-run issues for stakeholders. However, once new standards are developed and applied they are expected to create sustainable stability and reliability.

Many are the lessons that has come out about the regulation of financial markets especially after the LIBOR scandal. It painted a picture of the need to put place strong corporate governance structures, check-and-balance and for benchmarking to reflect real market activities. These principles have set the tone for new standards and will remain invaluable for the financial regulators and institutions to intensify the emphasis on the enhanced market integrity.

Furthermore, the recent LIBOR scandal and change-of-pace in reformates have highlighted the marked need for international coordination in regulation. Since financial markets are highly globally integrated, it becoming necessary to substitute LIBOR with new benchmarks have to involve cooperation between regulators in different countries. Such cooperation has made it possible that other index are harmonous, clear and suitable for cross-border contractual relationships and also has reduced disruption to cross-border contractual relationship in the process enhancing global financial stability.

In the future, the move to SOFR and other alternative benchmarks is a reachable and responsible path for global financial markets. All these benchmarks are intended to solve the problems related to market fluctuations, enhance the clarity of price formation, and offer more stable grounds to estimate financial assets. Despite the fact that the change is still in progress, and there are some difficulties in achieving the goals, the prospects of such changes seem rather bright. The market participants will get better benchmarks that are less manipulative, close to actual borrowing rates thus helping to bring back confidence to the global market system.

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