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Transitioning From the LIBOR

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Transitioning From the LIBOR

Thesis Submitted to Levy Economics Institute of Bard College

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ABSTRACT

The focus of this thesis will be on the policy implications surrounding the mandated transition from the London Interbank Offered Rate to Secured Overnight Financing Rate. This discussion will begin by explaining the genesis of the LIBOR in the development of the Eurodollar market. Next, this paper will present the LIBOR manipulation scandal and the effects on the financial system. An analysis of the differences between SOFR and LIBOR will provide the basis of an assessment of the impact of the change on financial institutions. Finally, the effectiveness of the SOFR as a benchmark will be evaluated, along with the changes banks need to make to conform to this new economic standard. In the end, this study concludes that there are better options than the proposed SOFR benchmark. These alternative options will facilitate more responsible growth for financial products that are pegged to benchmark rates.

Keywords: Financial Innovation, SOFR, Interest Rates, Financial Sector, Crisis, Benchmark, Economic Fluctuations, LIBOR, Eurodollar Market, Eurodollar Deposit, Federal Reserve, Dodd Frank, Derivatives, Macroeconomic Policy, Diversification, Risk Hedging, Self-Regulation, Financial Market Policy, Financial Regulation, Financial Intermediaries, Financial Risk.

JEL Classification: E32, E40, E41, E42, E43, E44, E50, E51, E52, E58, E60, E62, E63, F33, G11, G12, G14, G18, G21, G23, G24, G28

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Introduction:

The London Interbank Offered Rate (LIBOR) is a benchmark rate based on the average of selected interest rates at which many international banks lend money to one another. Abbreviated as LIBOR, it was initially instituted by banks operating in the Eurodollar market. However, since its inception the LIBOR rate has come to be used more broadly as a reference or benchmark rate on a variety of products that range from adjustable-rate mortgages, home equity loans, lines of credit, auto loans, student loans, and credit cards. Thus, LIBOR has a key role in many types of financial securities, in particular those with adjustable or floating interest rates. Rather than having fixed coupon payments, the adjustable rates on these investments are linked to a short-term reference rate, usually the three-month LIBOR, plus a spread. The spread is compensation for the counterparty risks.

Eurodollars are bank funds denominated in U.S currency but are not subject to U.S financial regulations (Sundaresan 2009). Typically, these funds are mediated by institutions located outside the United States which exempts them from U.S regulation. The Eurodollar market can be characterized as an interbank market where financial institutions borrow and lend to one another. LIBOR was created as a benchmark to reflect the rate at which banks offer Eurodollar loans to one another. As one of the largest financial markets in which all major financial institutions participate, it has accompanied the tremendous growth in world trade and investment, as well as financial innovations such as interest rate swaps, Eurodollar futures, and other derivative contracts (Dufey, Giddy 1978). These transactions also all use the LIBOR as their main reference rate.

While the Eurodollar market offers financial flexibility that augments revenue generation, the absence of prudential regulation makes it a catalyst for instability. A full regulation would require more effective monitoring, compliance, and enforcement mechanisms adhered to by all banks. As a result of the lack of regulation, banks have increasingly attempted to manipulate their LIBOR submissions to benefit the performance of their own and clients' investment portfolios. These abuses became evident during the investigations of the causes of the recent financial crisis and U.S policymakers decided that it was in the best interest of financial system stability to eliminate the use of LIBOR completely and to institute a new benchmark rate called the SOFR. Over the past couple years, the LIBOR has slowly been

phased out. Many short-term floating-rate investments have been issued with LIBOR, with the intention to completely replace it in 2023.

The effects of phasing out such a long-standing benchmark rate are unpredictable. Each investment, security, or loan whose performance is tied to the LIBOR reference rate has its own contractual conditions. Unless a back-up rate is listed in a prospectus or contract, the new rate and terms will need to be agreed upon between the borrowers and lenders. The good news is many LIBOR related investments tend to be short term in nature and should mature before the transition to the SOFR is made. While many of these investments may simply mature before the phase-out occurs, there are still a number of long-term contracts that still reference LIBOR and whose outlook is more uncertain. A switch to a new reference rate can have an impact on the spreads and the valuations of these floating-rate investments creating stability issues for global markets.

There are numerous legal and operational risks that come with moving various contracts over to a new benchmark. In a worst-case scenario, the implementation of a new rate could lead to a complete capital market failure which would adversely affect banks' balance sheets and possibly cause solvency issues depending on exposures in the market. For example, when a corporation issues an investment vehicle tied to SOFR, older investments that are still tied to LIBOR may be less desirable and could potentially experience a loss of liquidity once LIBOR is officially retired. In addition, if the switch to the SOFR lowers liquidity, creating a large gap between what a security, such as bond, can be bought or sold for, it will instantly increase the overall price volatility in the market. Hence, one of the focuses of this discussion will be on how global monetary and fiscal authorities should regulate the contracts that banks enter that are set to transition to the SOFR.

The first part of this paper will provide a critical evaluation of how the lack of regulations within the markets gave rise to LIBOR manipulation, creating financial instability. The second part of the thesis will contain a critical evaluation of whether the SOFR can serve as an adequate replacement for the LIBOR, in terms of financial instruments and financial stability. Lastly, this discussion will conclude by analyzing whether replacing the LIBOR with the SOFR is the most effective regulatory policy, in terms of preventing financial instability, and offer alternatives to the current plan the Federal Reserve has proposed.

Chapter 1: The Unregulated Growth of Euro Markets

London developed geographically as the financial center for the Eurodollar market, but the institutions that operated within these markets did so outside the regulatory authority of the United Kingdom. In other words, the Eurodollar market existed outside traditional regulated markets of national financial centers. This market quickly expanded across Europe and even into parts of Asia. By the mid-1970s, the Eurodollar market became larger than most domestic financial centers. The precipitous growth of Eurodollar transactions can be attributed to U.S. balance of payments deficits, international interest rate differentials, plan uncertainty, and foreign financial relationships (Dufey, Giddy 1978).

Within the Eurodollar market, currency is exchanged directly between lenders and borrowers. A reporting area bank (say in Germany) may obtain domestic currency which it switches into a foreign currency and then deposits in the Eurocurrency markets in another reporting area bank (say in London). Similarly, “a German bank could borrow dollars from a London bank and then switch into the domestic currency and lend it in the German domestic market. The volume of such swapped positions is estimated by the BIS and included in their ‘net’ concept” (Macmillian 1989). Financial institutions also borrow or lend domestic currency to a reporting bank in another country on behalf of domestic customers (Macmillian 1989).

Beginning in 1970, numerous governments and corporations both borrowed Eurodollar deposits from banks and started issuing securities in Eurodollars at rates that were lower than domestic borrowing rates. They were able to do this because the Eurodollar market gave financial participants, the ability to avoid onerous prudential banking regulations (Ojo 2014). Essentially, banks were able to avoid the restrictions that existed in traditional financial centers and saw increased profits through domestic currency swaps and third-party lending. The advantage of operating within the Eurodollar market was the easy access to cheap funds for borrowers. However, at the same time, the market was subject to financial instability as parties often entered contracts where the borrowers' sources of income were not steady (Huan, Previtis, Parbonetti, 2015).

Outside of the sphere of the Eurodollar market, this type of instability, in most cases, can be alleviated when both domestic and international financial authorities exercise an oversight role on banking operations. The combination of the two authorities creates a situation where interbank mechanisms are able to channel funds from initial depositors to borrowers with

limited risk. However, in the Eurodollar market, the interbank mechanism can multiply risks, because this market accounts for most of the the participating banks' liabilities (Macmillian 1989). To put this into perspective, in U.S. domestic markets, the Federal Funds interbank mechanism accounts for only 12.5% of the aggregate liabilities of U.S. banks while the Eurodollar market interbank mechanism used to contain 70% of its bank's aggregate liabilities (Macmillan 1989). The existence of such a large interbank market allowed banks to match the inflow and outflow of funds from deposits and loans by lending excess funds or borrowing to meet lending commitments. This reduced the need to maintain a stock of liquid assets which would act as a safety margin.

The interbank mechanism within the Eurodollar market performs a necessary and valuable role in linking non-bank depositors and lenders in different parts of the world (Macmillian 1989). Moreover, the interbank mechanism is key to the overall efficiency of the Eurodollar market system as this mechanism gives member banks the ability to access funds with relative ease. Specifically, it allows them to acquire and place funds in the market for short periods to earn interest, while also reducing transaction and information costs, thus, allowing them to operate on smaller margins (Macmillian 1989). With that being said, the increased dependence banks have on the interbank system, along with the fact the majority of their debt is pooled together in this market, also increases the speed at which crises might spread through the system.

The movement to the Eurodollar market can be considered an original model of the free enterprise global financial system, as it marked the beginning of an exodus away from the restrictions placed by the United States on international capital. In fact, the development of the Eurodollar market can be characterized as a movement fueled by liberal internationalism and a laissez-faire mandate of private and central bankers.

Interest Rate Swaps and Financial Securitization:

As the Eurodollar market grew, it created numerous arbitrage opportunities for financial intermediaries. Specifically, banks began to use the Eurodollar market to trade various derivative products, such as Interest Rate Swaps. An Interest Rate Swap can be defined as a contractual agreement between two financial parties to exchange interest payments on different contractual liabilities with the same principal amount. However, this principal amount is not subject to exchange. Instead, parties agree to pay each other interest that would be due on the

principal as if the underlying securities were bought and sold (Bradford 1986). Interest Rate Swaps have two forms of payment streams associated with them: a floating interest rate, and a fixed interest rate.

In order to illustrate how interest rate swaps function in the Eurodollar market, consider two financial entities, Firm 1 and Firm 2, that purchase this type of swap. For the sake of the example, Firm 1 will be making floating payments while Firm 2 will be making fixed payments. In a situation where no other trades occur in the secondary market interest rate swaps require Firm 1 to make a floating payment to Firm 2 for a set amount of time, while Firm 2 makes a fixed payment to Firm 1. Simply put, this means if Firm 1 issued a \$23 million floating rate bond that Firm 2 purchased, Firm 2 would also issue a bond with a fixed rate of the same value. The valuation of the swap is simply determined by the spread between the fixed and floating rates (Cornell 1986). In terms of its relation to LIBOR, the interest payments stream is tied to the LIBOR benchmark as a short-term money market rate and adjusted as the market evolves. However, the pricing of these swaps does vary overtime and during the LIBOR crisis these prices experienced substantial volatility.

Banks who offered to negotiate Interest Rate Swaps for clients had presented them as risk-free. In other words, the payments exchanged in an Interest Rate Swap would be identical to the payouts from investment of the principal. Despite these arguments, Interest Rate Swaps are not immune to volatility, mostly because actual interest rate movements do not always match the expectations of the parties involved. Simply put, the counterparty receiving the fixed income stream profits if interest rates fall, while the counterparty paying the fixed interest rate profits if rates rise (PIMCO 2020). Hence, the entire transaction is based on speculation as neither counter party is certain how interest rates will change. Interest Rate Swaps are also subject to the counterparty's credit risk as there is the possibility that the other institution named in the contract will default on its obligation.

By the mid-1980s, the Interest Rate Swap market had grown to a point where a financial benchmark was needed (Huan, Previtis, Parbonetti, 2015) because they were becoming extremely attractive because of the low transaction and information costs associated with them (Sundaresan 2009). UK financial authorities ordered the British Bankers Association (BBA) to develop a mechanism that could quantify the interbank lending, trades, and contractual obligations that occurred within the Eurodollar market. The BBA called this rate, LIBOR, and it quickly became the main benchmark rate for short term floating contracts. As the LIBOR grew

in significance, it amassed outstanding values up to at least \$300 trillion dollar, approximately four and half times the global GDP (Huan, Previtis, Parbonetti, 2015). Moreover, as financial innovation expanded the use of derivative products the LIBOR was subsequently adopted as the main benchmark rate for these financial contracts. With such a large amount of interrelated funds tied to this one rate, any economic instability with LIBOR pegged contracts would have a massive impact on the global economy. Hence, the LIBOR became not only a performance measure for funding costs and investment returns, but also an indicator of global economic stability.

The Creation of the LIBOR:

Due to the increase of financial volume and innovation brought on by the expansion of the Eurodollar market, a benchmark rate was required to track the valuation of different financial transactions and positions. Original forms of this benchmark rate can be attributed to a Greek Banker named Minos Zombankis, who proposed the creation of such a rate, by arranging syndicated loans amounting to \$80 million dollars from Manufacturers Hanover to be given to the Shah of Iran (Huan, Previtis, Parbonetti, 2015). The funding costs for this \$80 million dollar loan would come from a set of reference banks.

Eventually, the LIBOR was created to provide a benchmark for the Eurodollar market. The acronym stands for the London Interbank Offer Rate as the rate is set in London and tracks the costs of borrowing of 16 main member banks for their best (least risky) counterparties. In other words, the LIBOR tracks the rate at which banks offer loans to other member banks that operate with this financial benchmark (Sundaresan 2009). Moreover, banks also peg their positions in the market to the LIBOR rate to track their profitability. Prior to the LIBOR crisis, the British Bankers Association (BBA) determined the LIBOR by averaging the interbank borrowing rate of select member banks in each major currency. Since it is an average, in a situation where a crisis occurs and credit risks increase, the LIBOR would increase, as financial participants would require high compensation for undertaking riskier debt. In addition, the LIBOR benchmark allows banks to earn income on rate spreads. Therefore, the calculation of an offer rate requires LIBOR member banks to evaluate their own borrowing costs for specific currencies and maturities. Once the submissions are collected, the BBA would then trim the rates by removing the top and bottom 25 percent and then average the remainder in order to derive the final LIBOR rates which are made available to the public (Huan, Previtis, Parbonetti,

2015). By the end of the year 1986 the BBA had full control over LIBOR. Major banks would submit their borrowing costs to the BBA who would calculate the rate and publish it each business day for public consumption (Huan, Previtis, Parbonetti, 2015).

Before LIBOR manipulation was discovered, instability began to rise for contracts pegged to this benchmark rate. This was evident from analyzing the spreads between the LIBOR and the Eurodollar Bid Rate.¹ Through most of the history of the LIBOR, the Eurodollar Bid rate has often had a historically tight relationship with the LIBOR as banks usually submitted their cost of borrowing six to twelve basis points above the Eurodollar Bid rate (Snider, Youle, 2010). However, the instability that arose from this LIBOR system made this relationship collapse between the LIBOR and the Eurodollar Bid Rate.

Table 2: Structural Break Test

	U.S. Libor	
	Levels	Differences
Eurodollar Bid Rate	0.608 (0.033)	0.696 (0.031)
U.S. Libor	0.392 (0.033)	-0.123 (0.032)
Eurodollar Bid Rate * 1(After August 2007)	-0.605 (0.034)	-0.589 (0.034)
U.S. Libor * 1(After August 2007)	0.600 (0.034)	0.586 (0.034)
<i>N</i>	1911	1392
<i>R</i> ²	1.000	0.423
Chow Test Statistic	175.07	148.5

Dependent variable is the current days Libor. All right hand side variables are lagged.

The table shows that prior to the crisis banks were merely observing the preceding days Eurodollar Bid Rate and were adding it to the fixed spread for their LIBOR submission, rather than rigorously evaluating their respective credit risks (Snider, Youle, 2010). This damaged the integrity of the LIBOR and, as a result, financial participants were led to believe credit risk was lower than in reality.

¹ The Eurodollar Bid Rate is a market rate for Eurodollar deposits.

The lack of regulation for LIBOR bench-marked contracts created an incentive for banks to manipulate the benchmark to enhance the value of their own proprietary and market-making positions. Crisis was inevitable as unregulated banks increasingly participated in risky behavior which led to destabilizing effects throughout the entire global economy. The next chapter will cover the details of the crisis, by outlining the risky practices money managers, traders, and corporate leaders undertook which eventually led to the decline of the LIBOR benchmark. Moreover, it will outline the failures of the regulatory agencies tasked to monitor the practices of banks that had securities pegged to the LIBOR. Lastly, this chapter will detail the post scandal effects along with alternative benchmarks that have been suggested in terms of reforming LIBOR.

Chapter 2: The LIBOR Manipulation Crisis

In the financial period after the Great Financial Crisis, numerous outside agencies investigated suggestions that LIBOR submissions had been manipulation to benefit the submitting banks against their clients. LIBOR rates uncharacteristically did not spike in relation to the Fed Funds rate after many major investment banks became insolvent. (Brill 2020, 2). While the BBA denied that information based on the LIBOR was being manipulated, it nonetheless undertook an extensive review of the reporting methods. This prompted investigations by the *Wall Street Journal*, Britain's Financial Services Authority, the US Commodity Futures Trading Commission, and other parties in the subsequent years. Prior to the inception of the crisis, financial participants operated under the assumption that the interbank lending market was thriving. The Great Financial Crisis exposed the fact that LIBOR's prominence in derivatives markets had given way to a clear complacency to guard against risk because those banks contributing to each day's report had securities positions that whose value would be affected by LIBOR's movements over time (Yu 2013, 1281).

Moreover, given the fact that LIBOR's reports are attributed to member bank balance sheet conditions such as liquidity access and credit risk, LIBOR movements can easily affect the perception of the credit worthiness of the institutions making the submissions. During the financial crisis banks had the incentive to underreport their true borrowing costs to not only influence their security positions, but also to maintain investor confidence. Banks did not want investors to think they had difficulty raising funds due to market's perception of the risks they faced. Although this incentive for manipulation has received less public attention than the

traders' explicit wrongdoings, its ultimate effect on LIBOR during the financial crisis is likely the larger of the two. This is because all banks underreported their cost of borrowing, to some extent, throughout the financial crisis whereas the trader's rate fixing practices likely did not last as long and offset each other at times. This problem was made worse by the fact that interbank lending largely disappeared during the financial crisis, making it more difficult for regulators to reference market transactions to determine the extent to which banks were being truthful in their LIBOR submissions (Brill 2020).

Due to the self-reporting nature of the LIBOR, banks could easily manipulate the rate to increase profitability or presence in the market. There are two main ways in which member banks could manipulate LIBOR to influence their performance. First, during the crisis in order to benefit from higher profits on their LIBOR-related products banks would manipulate rates by aligning their submission with their individual market positions or collude with other banks with similar positions and profit from their LIBOR-related positions (Gandhi 2016). Banks would thus manipulate their rate submissions to help increase their profitability by analyzing their position in the market and those of competitors to align their submissions with their respective market exposures. By submitting their reports based on their respective market positions, financial institutions would be able to benefit their shareholders through higher bank valuations, while their own traders and managers would benefit through increased pay and bonuses (Gandhi 2016). This type of manipulation was mostly performed by banks who owned currency-maturity pairs and traded high volumes of interest rate derivatives.

Banks could also manipulate their LIBOR submission to alter their credit riskiness. Member banks' submissions are supposed to reflect their offers to their best clients and thus also reflect their funding costs. This allows other economic agents in the market to infer individual bank riskiness from their LIBOR submissions. A bank with a high submission relative to other member banks would indicate that lenders to the institution believe it has higher risk. Banks with higher credit risks have lower valuations and increase the need to have a source of collateral from other sources in case the bank defaults. Therefore, LIBOR member banks have the incentive to report submissions that underestimate their true lending offers in order to maintain their image of financial stability. This type of manipulation was frequent among LIBOR member banks and most regulatory agencies were aware of this fraudulent behavior (Kregel 2012). During the Great Financial Crisis (GFC), most market participants knew that

most banks were underestimating their risk profile which is why most financial authorities made them take government bailout money.

When LIBOR manipulation became apparent, many private and public regulatory agencies investigated the institutions who were supposed to be monitoring and reporting the rate to market participants. The most famous case regarding the illegal activity surrounding the LIBOR was Barclays, as the trial exposed the discrete fraudulent behaviors that bankers who worked for the company were undertaking. At Barclays, bankers who worked for the internal derivative trading desk, put pressure on the bank's money market desk to report rates to the BBA that would benefit the bank's derivative positions (Yu 2013). This practice was not just limited to Barclays as numerous LIBOR related banks were responsible for misreporting the cost of their debt based on the request of their derivatives traders, who were trying to manipulate the market to have a favorable effect on their trading positions. The Barclays case also brought to light the collusion that existed amongst banks in "trading circles", as traders from different banks collaborated to fix the LIBOR to make the benchmark favorable to their market positions.

Last, upper management manipulated their institution's risk profile in order to disguise their lack of creditworthiness (Yu 2013). Member banks, such as Barclays, were suffering from solvency problems because of the lack of interbank lending in the short-term money markets. Banks were dependent on these markets to replenish short-term capital which was needed in order to run their daily operations. If Barclays made a submission reflecting their actual underlying cost of borrowing to the BBA, it would have caused alarm to their investors who would demand a higher interest to cover the increased risk which Barclays did not want to pay.

It is easy to blame the banks for the instability and the fraudulent behavior that arose surrounding LIBOR, but the regulators are also equally responsible for letting this scandal occur. The lack of oversight by the BBA among other regulatory bodies allowed LIBOR member banks to essentially self-regulate themselves causing inevitable corrupt practices to become ingrained throughout the system. Overall, there was a lack of accountability and transparency between the regulators and the banks, creating a situation where financial instability was allowed to grow unchecked through the economic system.

Prior to the turn of the century the Bank of England was the main economic regulatory agency in England. Their relationship with their member banks was very informal (Hall 2013).

The hesitancy of the Bank of England to take quick action essentially set the precedent for the self-regulatory nature of the LIBOR. When the FSA (Financial Service Authority) was established, it took overregulating the LIBOR benchmark from the Bank of England. Unlike the Bank of England, the FSA consists of a Treasury-appointed board that is governed by an executive chairman. It is actually funded by the banks that it is supposed to regulate (Hall 2013). Prior to the LIBOR scandal, FSA officials proudly touted their laissez-faire approach to economic regulation which essentially set the stage for systemic destabilization to occur. Economic agents had no financial constraints and had the freedom to participate in any market-based activities. When volatility began to arise in the markets, due to banks fraudulent activities, many regulatory members refused to acknowledge the existence of a speculative excess. The only aspect that they did acknowledge was that there were stability issues within the asset markets but claimed their role was not to overrule the views of millions of financial market participants, even if they were engaging in speculative behavior (Mitchell, Wray, Watts, 2019).

While financial regulators became a scapegoat for the LIBOR scandal as their lack of oversight provided an avenue for banks to participate in speculative activities, upper management as well as traders who work at LIBOR member banks evaded the majority of the blame. The reason for this discrepancy derives from a fundamental misunderstanding of the LIBOR scandal. Traders and bank leaders primarily participated in two types of manipulation of the LIBOR mentioned above in two different economic periods. Prior to the LIBOR scandal, individual traders were designing their submissions to gross higher profits. Upper management seemed to have knowledge of their employees rigging their LIBOR submissions, in terms of fixing the rates for increased profitability. However, regulators were unaware of the fraudulent nature of the individual traders at these banks, thus could not put a stop to their corrupt behavior. Meanwhile, the manipulation that occurred during the GFC was based on the major bank's responses to the economic collapse of short-term money markets (Kregel 2012). Banks wanted to maintain an aura of stability, so they were submitting rates that were not accurate in terms of their cost of borrowing. The upper management of most banks was actively participating in rigging their submissions to skew their credit risk. When the system crashed big banks were hardly criticized for their role, while regulators were forced to take responsibility for the LIBOR scandal, as according to the public these organizations should have been more involved in daily banking operations to prevent these fraudulent practices from

occurring. The public response to the crisis incorrectly assumed that regulators were aware of both types of fraudulent behavior where in reality, regulatory agencies were only aware that LIBOR submissions were being reported inaccurately. This misrepresentation unfairly shifted the blame towards the regulators, while somewhat absolving the upper management of the member banks, who knew about and participated in both types of manipulation.

After the financial crisis, Barclays was a prominent concern for the Bank of England because it had opted not to accept the bailout money that most major banks were accepting due to solvency issues. However, this was not an indicator that Barclays was performing well since Barclays had no measures to respond to the crisis in money markets. The Bank of England's solution was to focus on their LIBOR submissions because it provided an indication of their risk profile (Kregel 2012). During the crisis, Barclays' rate submissions had been higher than those of other banks, which had caught the attention of the Bank of England that there might be funding issues at the institution. Hence, the Bank of England decided to investigate whether upper management was aware that their submissions were higher than market LIBOR submissions. Barclays upper management responded that the reason their LIBOR submissions were higher than the rest of the market is because the other member banks were manipulating the rates in their own favor. When the Bank of England proclaimed that they did not know that LIBOR rate manipulation was occurring, the public thought they were completely unaware of the submitting banks fraudulent activities (Kregel 2012). Most people did not differentiate between the LIBOR rate manipulation traders were doing and the fraudulent nature that the upper management of member banks were performing (Kregel 2012). Regulators knew that banks might be understating their LIBOR submissions which is why they wanted the government to intervene in order to assist the banks. However, the Bank of England nor any other regulatory authority had received information regarding the fraudulent activities. Upper management likely knew about the collusion their traders and rate submitters were involved in but since fixing the rates in terms of helping their position in the market positively affected their respective solvency, they did not intervene. More than likely, they had the incentive to keep this information from regulatory authorities, as these authorities might have sanctioned them for irresponsible financial practices. United States monetary authorities reached the same conclusions as the Federal Reserve and provided further information that the Bank of England knew about the practice misreporting, but not the collective internal collusion (Kregel 2012).

Government regulatory agencies ignorance regarding the trader's manipulation does not absolve of them of their role in creating the scandal. Clearly, letting big banks self-regulate their financial practices can no longer exist as the Great Financial Crisis proved these profit seeking institutions will ultimately create instability in the system through their speculative business practices. Thus, regulatory agencies need to be more integrated with the daily financial practices of banks. In the case of the LIBOR scandal, member banks' upper management were more than likely aware of both types of manipulation that was occurring. Ultimately, their fraudulent risk management practices show that to some extent, they played a greater role in creating the LIBOR crisis than the federal regulatory agencies that were supposed to police them.

LIBOR member banks that participated in manipulating the rates to their advantages had to endure many consequences. Regulatory agencies imposed historically high penalties, totaling up \$8 billion worth of fines on banks who were found manipulating the benchmark (Gandhi 2016). The widespread nature of the manipulation still has regulatory agencies investigating several banks for fraud while, at the same time, some civil lawsuits are still in the process of being settled. It is possible that more lawsuits might emerge as a result of this scandal, as more investigations wrap up regarding LIBOR related fraud. Moreover, banks that participated in LIBOR fixing have also lost some legitimacy in terms of their reputation, which, to some degree, outweighs the cost of the penalties they were forced to pay. Perhaps, with the new stringent laws against LIBOR manipulation, along with the fact it is being phased out in 2023, will create a disincentive to manipulate rates. The question is why these penalties were not put into place earlier into the LIBOR timeline, especially when regulatory agencies knew that there was rate manipulation occurring within the financial system. In the end, the lack of harsh penalties on rate manipulation, created incentives for manipulation since there were no criminal penalties for the practice of rate fixing. Now with the new credible threat of prosecution, along with the potential of dealing with high financial and reputation costs, some financial regulators predict LIBOR manipulation to consequently subside, making it possible to maintain this benchmark as part of the global economic system. However, this hypothesis fails to include the fact that most regulators and banks have completely lost faith in the LIBOR benchmark system. Even harsher penalties cannot help save the integrity of the rate which is why it needs to be reformed and replaced with a more accurate benchmark rate.

Replacing the LIBOR:

The LIBOR manipulation scandal made apparent three distinct problems associated with this benchmark rate. First, the close relationship between LIBOR submitters and the traders, who benefit from the submissions through the assets they have tied to the benchmark, create a conflict of interest. These personal relationships incentivize rate manipulation as fixing the rate will lead to personal gains (Hall 2013). Consider the example presented in the previous section where Barclay's traders were influencing submitters to alter their LIBOR submissions so their positions in the market would be more profitable. Upper management was aware of these questionable practices but did not intervene to halt their destabilizing behavior as stopping this market manipulation would adversely affect earnings. Second, there is a public image issue as banks want to give the impression that they are financially stable. Hence, financial institutions tied to the LIBOR have the incentive to manipulate their respective submissions to enhance perceptions of financial stability. During the GFC, many banks were attempting to understate their LIBOR submissions to seem more stable than they were. At the same time, they were underestimating their own lending rates as these same banks were taking bailout money from the government to assist with their insolvency issues. The last problem that was made apparent from the crisis was there is a clear identifiable accuracy problem that stems from the notional nature of the LIBOR rates reported in the submission process (Hall 2013). Regulatory authorities in England such as the Bank of England and the FSA were aware that most member banks were understating their rates. Moreover, during the crisis, these regulatory agencies realized that banks LIBOR submissions would not be accurate due to their lack of liquidity and, thus, ordered banks to give their best guess of what their risk profile. The fallout from the crisis has created a complete decline in the interbank lending market tied to the LIBOR, mostly due to the fact most economic agents have lost faith in LIBORs integrity. Specifically, banks sharply curtailed their lending practices within the interbank market, as they were wary about the extent of subprime exposures and false reporting of other participating banks (Sundaresan 2009). As a result, interest rates in benchmark markets increased relative to the target Fed Funds rate. The spread on one month LIBOR increased from a stable 7 basis points spread to the Fed Funds rate to a massive 35 basis points (Sundaresan 2009). In the current economic climate, the spread between the two rates has decreased due to improving economic conditions but there are still volatility risks within the contracts tied to this benchmark. The essential problem with LIBOR is the inherent fragility in pricing hundreds of trillions of dollars of financial instruments based on

the expert judgment of relatively few individuals, informed by a small base of unsecured interbank transactions (Putnam 2019).

As the LIBOR scandal became more public, U.K financial regulators commissioned a review and investigation of potential reforms of the LIBOR. The investigation produced a report called the Wheatley Review, which focused on implementing the proper sanctions for member banks that participated in LIBOR manipulation (Hall 2013). The committee commissioned to review the LIBOR's integrity as a benchmark found that the structure of the LIBOR gave banks the incentive to manipulate their submissions for both credit stability purposes and to enhance their positions in the market. Moreover, the review also found that the interbank lending market that the LIBOR was founded on had completely dissipated prior and during the crisis. Therefore, it was difficult to accurately determine the member banks exact credit risk.

It should be also noted that the report addressed the systematic issues that need to be dealt with when reforming the LIBOR, including reducing the opportunity for manipulation, increasing government oversight, and increasing the penalties for fraudulent behavior. The commission directly suggested various new laws to prevent such a crisis from occurring again. First, the commission argued that the FSA should be able to directly regulate LIBOR submissions and, in turn, eliminate their policy of self-regulation as clearly the banks cannot be trusted. New criminal offenses regarding LIBOR manipulation were introduced, giving the FSA the proper tools to fight corruption. Prior to the harsher sanctions, the FSA was limited to what charges they could bring against known LIBOR manipulators, in the sense, the worst penalties they could prosecute a corrupt banker with were strictly limited to the civil side of the law (Hall 2013). Lastly, the review suggested that member banks submit with transparency, which means these banks must use actual transaction data in order to confirm the legitimacy of their rate submissions. Moreover, there should be a three-month delay before the BBA publishes any individual bank's LIBOR submissions in order to guard against any institutions trying to alter their risk profile.

The Wheatley Review made apparent numerous problems with the LIBOR and gave possible avenues for reform. However, some policy makers did not think its suggestions diverged enough from the hands-off approach regulatory agencies had taken prior to the crisis. Even though the Wheatley review suggested that the self-regulatory approach that incited the

scandal should be replaced, the commission still suggested that the cooperative relationship between regulatory agencies and firms remained an important aspect of the LIBOR benchmark (Hall 2013). For instance, although the Review calls for more transparency and accuracy of LIBOR submissions, it also recommends that the regulatory agencies should work with the member banks in the LIBOR rate setting process. Hence, the review contradicts itself as it suggests greater control over the banks submission methods but also wants them to be part of the rate submitting process.

Since these issues regarding the Wheatley Commission have come to light, many economists have suggested alternative benchmarks. In the reformation process, some economists have suggested a two-benchmark approach in order to mitigate risks that arise from the single benchmark approach. One rate would consist of an improved version of the original LIBOR. It would continue to be based on banks' wholesale unsecured funding costs and would be appropriate for applications that rest on the credit risk component, such as hedging the revenues of balance-sheet lenders (Duffie, Stein, 2014). The second benchmark would be based on a riskless or near-riskless rate that is established in a broad and deep market (Duffie, Stein, 2014). This banking-oriented benchmark would be reformed similar to what the Wheatley review called for; to be purely transaction-based and subject to a tougher monitoring regime. Since the majority of the manipulation that occurred with the LIBOR was due to positions banks had with interest rate swaps and other derivatives, the goal with the second alternative rate would be to give pure interest rate traders a large portion of the derivatives market to fit their risk exposures. Although this two-rate plan seems like a feasible avenue to take for reform, the large stock of legacy contracts already tied to LIBOR, make switching to such system difficult. Not to mention, there are numerous legal challenges among other contractual obligations that are difficult to alter if the LIBOR rate were to be changed into a two-rate system.

Others have suggested merely switching the benchmark to an existing one is a feasible option. Overnight Index Swap (OIS) rates have been put forth as a candidate to replace the LIBOR by policy makers. This rate can be described as an interest rate swap agreement where a fixed rate is swapped against a pre-determined published index of a daily overnight reference rate (ICAP 2020). Many derivative contracts have been tied to OIS rates, making a seamless transition from the LIBOR benchmark to an OIS rate possible. The OIS would utilize discount payments on financial contracts to mitigate the reliance on reference rates with a significant

credit risk component (Hou, Skeie, 2014). However, the issue with this proposal is that longer term OIS rates are not available for financial securities which make transitioning long-term LIBOR tied investments to an OIS rate difficult. Another suggestion that has been proposed by regulators is to use general collateral repo rates as a possible replacement for the LIBOR. Under the framework of this plan, the General Collateral Finance Repurchase Agreement Index (GCF® Repo Index) would be utilized to track the value of securities instead of the LIBOR. Regulators believe that the GCF® Repo Index, since it is transaction-based, would better reflect the true funding costs of banks. The index itself is calculated as the weighted average interest rate paid on overnight GCF® repo transactions. These GCF® repo transactions are fully collateralized by U.S. Treasury securities, agency debt, and agency Mortgage-Backed Securities (MBS) (Hou, Skeie, 2014). Hence, it would demonstrate stronger resilience to illiquidity under financial fragility and more effectively fend off attempts at manipulation due its centralized or highly regulated nature (Hou, Skeie, 2014). Lastly with the GCF® Repo Index, there would be no need to create a new agency to regulate this rate as the Depository Trust & Clearing Corporation (DTCC) currently calculates the index and could continue in this role. Ultimately, for these reasons, GCF® repo transaction market was chosen to be the underlying market for the new U.S. benchmark.

As a result of the crisis, the BBA gave up control of the LIBOR and NYSE Euronext won the competitive bid for LIBOR for a nominal price of 1 pound (Hou, Skeie, 2014). The crisis caused by LIBOR manipulation had caused many investors and banks to lose faith in the rate, thus, most policy makers concluded that it must be replaced. Cooperating with the Office of Financial Research, created under Dodd Frank legislation, whose main function is to promote economic growth and maintain stability by improving the quality and transparency of financial data, the Federal Reserve, announced its intention to produce three new reference rates based upon trade-level data from various segments of the repo market: TGCR – Tri-party General Collateral Rate, BGCR – Broad General Collateral Rate, and Secured Overnight Financing Rate (SOFR) (Frost 2017). The SOFR is set to replace the LIBOR in 2023 as the new benchmark rate for the Eurodollar market. It is the broadest of the three financial rates detailed above and its aim is to give better transparency for market participants and prevent against the fraudulent behavior that undermined the credibility of the previous LIBOR based system. Since the transition has been gradual, policymakers argue that the possible negative effects on

investors should be minimal. However, even with a smooth transition, valuation differences are likely to arise, particularly for interest rate swaps, mortgage-backed securities, and derivatives. For this reason, investors with sizable books of LIBOR tied assets will want to carefully manage their risk before the transition and will have to begin to prepare to start trading with SOFR-linked products. The next section will detail the SOFR, and the potential challenges financial participants are going to face with such a major transition.

Chapter 3: The SOFR

Introduction to the SOFR:

After the LIBOR scandal, the Federal Reserve decided to transition LIBOR tied securities to an alternative benchmark rate called the SOFR. The overall goal of the SOFR is to replace the LIBOR as the main benchmark rate for financial participants who trade these floating rate securities. The SOFR can be described as a benchmark rate that is determined based on Treasury repo transactions. Moreover, the rate is supported by extremely liquid markets and can be concretely determined based on market transactions (Jermain 2019). Unlike the LIBOR, which relies on the integrity of reporting member banks, the SOFR is created by concrete market data which closes any loophole for banks to misreport their risk profile. The Federal Reserve argues that Treasury repo markets make a safe economic indicator because, during the recent financial crisis, these repo markets stayed relatively stable while most aspects of the global economy suffered a major downturn. By replacing the LIBOR with the SOFR, the Federal Reserve expects this reference rate to be less volatile to market disruptions and manipulation, because of the low-risk nature of its underlying market². However, with the recent securitization of LIBOR assets, the question remains whether the SOFR will adequately manage the financial participants who undertake these transactions.

Explaining Repo Markets:

A repo market is an abbreviation for the banking process known as a repurchase agreement which can also be described as a short-term secured loan. In this market, financial institutions sell securities to each other and agree to repurchase those securities later at a higher

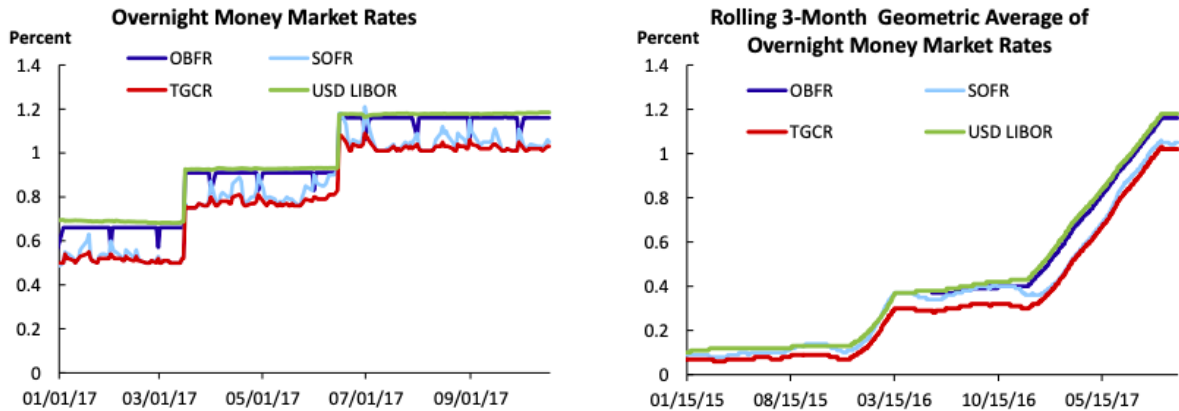
² Treasury General Collateral Repo market

price (Cheng and Wessel 2020). Since this transaction is a short-term loan, the securities act as collateral, allowing the loan to be complete. Repo rates are calculated by considering the difference between the securities' initial price and their repurchase price. The repo market is an important market for financial institutions that own lots of securities as it gives them the ability to borrow funds cheaply. Generally, financial institutions are averse to the idea of holding cash because it does not pay interest. However, these transactions allow parties with lots of liquidity to earn a small return on that cash without much risk, because U.S. Treasury securities serve as collateral (Cheng and Wessel 2020). The Federal Reserve also uses the repo market to conduct monetary policy. When the Fed buys securities on the repo market from a financial institution who agrees to repurchase them, it is injecting reserves into the financial system (Cheng and Wessel). Conversely, if the Federal Reserve wants to drain reserves from the financial system it merely must sell securities with an agreement to repurchase. As a result of the crisis, repos have taken on new importance as a monetary policy tool, because it became increasingly important for the Federal Reserve to affect member bank behavior. However, the SOFR's dependence on repo rate behavior can have negative effects on member banks. If banks default premiums increase, the repo markets can be adversely affected which can cause the SOFR to decline (Jerman 2019). Therefore, there are many questions regarding whether the repo market can safely act as the underlying market for the SOFR.

Characteristics of the SOFR:

The Federal Reserve created the SOFR with the emphasis on two characteristics. First, it will be a fully transaction-based overnight rate which encompasses a robust underlying market. This differs from the LIBOR, in the sense, submissions to the LIBOR are still based on notional transactions, while the transaction nature of the SOFR will offer a more accurate submission of banks' lending standards. Second, it will cover multiple repo market segments allowing for further expansion (Frost 2017). The SOFR will correlate closely with other money benchmarks such as the USD LIBOR, the overnight bank funding rate (OBFR), and the Tri party collateral rate (TBFR), both in the short run and in the long run. The relationship between the given rates

can be demonstrated by the chart below.



Due to the SOFR’s dependence on the repo market, the Federal Reserve decided, in order to keep the integrity of the rate, there needed to be some alterations to repo market so it could adequately serve the new benchmark. Specifically, any Federal Reserve transactions will be removed from this market along with any arm’s length transactions between affiliated entities. Trades that are characterized as “open” which are economically like overnight trades will be allowed to be pegged to the SOFR benchmark. By trimming the functions of the bilateral repo market to serve the SOFR needs, businesses can invest cash in a market where specific Treasury issues are denoted, to minimize risk (Frost 2017). Moreover, financial institutions who want to acquire specific Treasury issues with scarcity value will have the ability to do so. Hence, by altering the bilateral repo market, the SOFR will offer a reasonable balance between special trading activities and maintaining financial volumes for banks. With the failures of the LIBOR reporting process, the Federal Reserve in its creation of the SOFR emphasized a better financial structure. In order to accurately collect data, regulatory agencies who govern the SOFR will mandate widespread data collection, oversight, and transparency. In the case this reporting process fails, there will also be a daily survey of primary dealers who will work with overnight repo borrowing transactions that will act as a potential contingency data source. Banks who operate under the SOFR will be subject to new extensive regular reviews by oversight agencies to ensure these institutions are not undertaking risky financial practices. Specifically, to prevent collusion between the reporters of the rates and the individual traders of member banks, staff who work for the oversight committee will be subject to ethical oversight reviews that will identify any conflict of interests that could lead to fraud. The task of regulating, reporting, and

providing transaction-level data for the SOFR has been given to The Bank of New York Mellon (BNYM) and the Depository Trust and Clearing Corporation (DTCC) (Frost 2017).

Fundamentally, the SOFR differs from LIBOR, which will create some challenges in terms of transitioning LIBOR tied securities towards this new rate. The valuations of these securities will fluctuate because the SOFR is an overnight rate while the LIBOR is reported on a more long-term basis. Thus, a focus of the Federal Reserve, in terms of dealing with the transition to SOFR, will center around replacing short term LIBOR rates in cash products and derivative contracts. A more glaring difference can be seen in the fact that the SOFR is based on secured borrowing while LIBOR is based on unsecured borrowing (Jerman 2019). When member banks operated under the benchmark rate of the LIBOR, loan rates were able to provide a hedge for lenders' fluctuating funding costs. SOFR does not have this property, and it operates under the pretense of secured borrowing to mitigate the risk that resulted from risky hedges by member banks with the LIBOR.

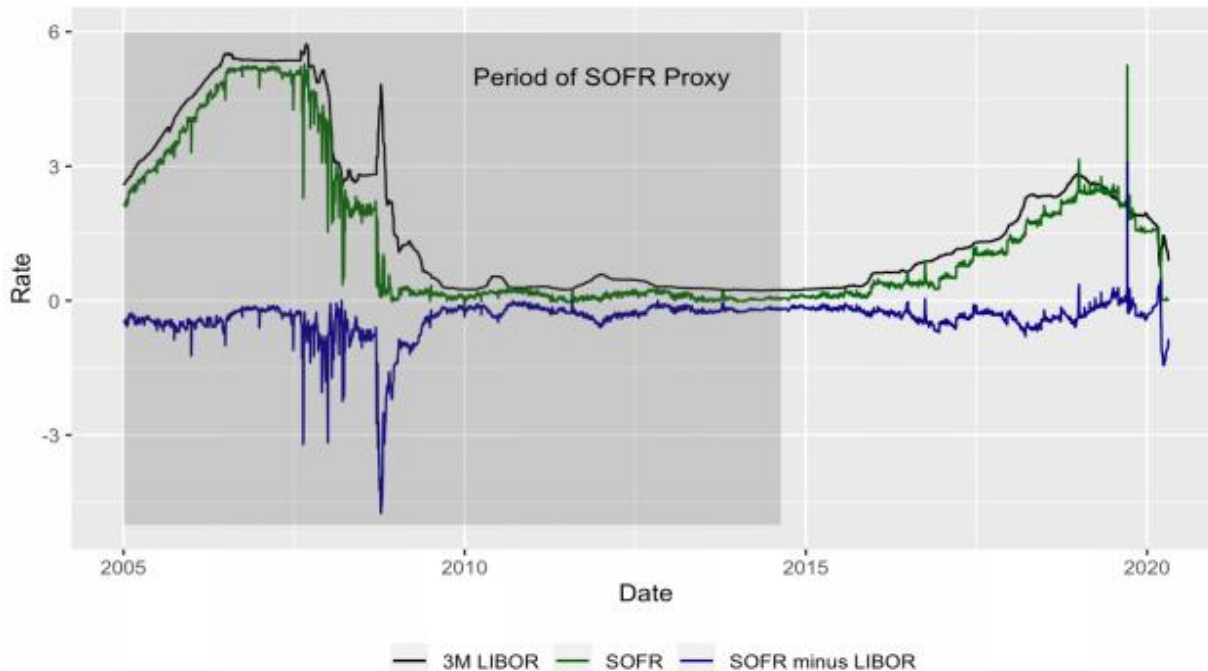
The charts above show that the early projections of SOFR portray its behavior as synonymous with repo rates. Hence, based on repo rates' behavior during the recent financial crisis, SOFR can be expected to decline at times when banks' default premiums increase (Jerman 2019). Member banks who operated under the LIBOR are accustomed to these fluctuations, so this type of benchmark volatility will be easy for financial institutions to factor into their risk management practices. However, with the Federal Reserve continuing to delay this transition, it is currently uncertain to what extent these changes could affect banks' balance sheets and to what degree this transition will impact global markets.

Due to the Federal Reserve's new position to delay the transition, there are limited economic projections regarding the global market effects of the SOFR. Experts conclude that a key difference between the rates is how they react in the event of funding shocks. With the LIBOR benchmark, the interest rate index increases in correlation with increasing bank defaults (Jerman 2019). Conversely, when the cost of lending increases for the SOFR, the risk-free rate declines mildly (Jerman 2019). Moreover, in the event of a funding shock, some policy makers are concerned that the SOFR lacks the safety measures to replace the LIBOR. Unlike the SOFR, the capital gains related to outstanding LIBOR pegged loans, to some extent, offset the negative effects caused by the increasing risk to banks. This safeguard is not built into the SOFR due to

the fact its creators wanted to limit the member banks' ability to hedge their risk within the new benchmark. Ultimately, projections of the current LIBOR show that during a funding shock member banks default less, cut loan volumes by less, and cut investment by less in the domestic economy. These projections conclude that the LIBOR index would be a better choice to offset the negative effects of a funding crisis than the SOFR. However, it should be noted, that quantitatively, the LIBOR's success in managing the effects of this type of shock are only slightly better than the SOFR index.

In some cases, the loans indexed to LIBOR can offer insurance to lenders against adverse funding shocks. The SOFR does not reference banking solvency costs directly, making it difficult to guard against banking funding issues. Thus, the viability of pegging loans to a rate that does not reference bank funding costs directly, such as SOFR, is up for debate. However, bank solvency issues have only recently been a major factor in the United States economy, such as the 2008 financial crisis. Under normal economic circumstances, the aggregate economy will not have issues indexing loans to the SOFR. However, if another crisis, like the GFC occurs, the loss of this automatic stabilizer created by the LIBOR might make recovery difficult. Therefore, when the switch to the SOFR begins, banks may need to change their risk management practices to account for these differences.

Some analysts have created SOFR proxies to quantitatively define the differences between the LIBOR and the SOFR. Specifically, these projections show how these benchmarks might behave in a situation like the GFC. It is evident from the chart below that from the years 2007-2010 where the GFC was at its height that there is a clear dichotomy between the behavior of SOFR rate and LIBOR rate. This chart further supports the argument that these rates respond differently to periods of economic volatility (Brill 2020).



The explanation for this difference is centered on the transaction-based nature of the SOFR. During periods of the financial recession, lenders are more inclined to increase the rate at which borrowers and financial institutions with high-risk profiles will be charged. However, in especially unstable financial conditions, such as the Great Financial Crisis of 2008, lenders also have the option to halt lending to market participants with these highly risky profiles. Effectively this stoppage induced by lenders drives down the median rate paid which, consequently, drives down the SOFR benchmark.

Is the transition ill advised?

The initial announcement by the Federal Reserve and U.K. regulatory agencies declared that the LIBOR will be phased out in 2021. However, as a result of the increased volatility in financial markets, stemming from the Covid pandemic, global banking regulators agreed to push the proposed transition to 2023. During the year 2021, the Federal Reserve is encouraging banks to not engage in any new LIBOR pegged financial contracts thereby, ensuring a seamless transition to the SOFR in 2023. While the Federal Reserve has yet to release a complete plan for transitioning existing banks LIBOR tied contracts to the SOFR which is creating uncertainty among investors and financial institutions alike. Some economists are calling this proposed

transition ill-advised and are explicitly stating the “2017 decision by the Fed to do away with LIBOR is one of the most ill-considered and thoughtless actions taken by the US central bank in many years” (Whalen 2020). They also argue that the Federal Reserve has displayed a lack of understanding of capital markets in the process of making this decision. The following section will analyze the arguments made by SOFR critics and detail the Federal Reserve’s response to these anxious financial participants.

As stated above the Federal Reserve believes the SOFR can act as a broad and safe measure of the cost of borrowing as it is collateralized by Treasury securities (Whalen 2020). However, the main issue with transitioning to the SOFR is that there is no discernable market for it. Simply put, there is already a market for the LIBOR where financial institutions can conduct financial transactions in USD. SOFR has interesting research perspectives, in terms of creating a risk-free rate, but one that lacks actual liquidity, making it increasingly difficult to move LIBOR tied contracts to a market that does not exist yet. For example, an unsecured loan pegged to the LIBOR is going to be priced considerably differently when pegged to the SOFR as the SOFR utilizes repo transactions as collateral and is margined every night (Whalen 2020).

Economists and regulators who doubt the feasibility of transitioning to a new rate, argue that the best solution for fixing the LIBOR is to fix the existing benchmark. To them, the idea of a “risk free rate” seems like a fallacy and trying to utilize insured depository institutions to fund the SOFR for actual risk-taking practices seems financially misguided. Specifically, some investors are especially worried about the effects this transition will have on the futures contracts and the housing market, especially mortgage-backed securities (MBS). Different securitized products have diverging references within the LIBOR in terms of their underlying loans. These contracts could be even more complex in the sense that they might have swap deals and other financial instruments tied to them. With all these different complexities, critics argue that there is a dangerous component of asking banks to undertake billions of dollars of risk using SOFR as the pricing mechanism, especially when no investors have pegged contracts or traded utilizing the new benchmark. In response to these criticisms the Federal Reserve cites that the SOFR is built upon highly liquid markets and that the transition will be relatively seamless if banks avoid engaging in new LIBOR pegged contracts. However, the real issue is that there is much uncertainty regarding not only the financial terms of contracts but also their

legal terms. Questions remain whether long term LIBOR contracts will still have legal standing with the SOFR and the uncertainty behind these legal issues is worrying financial participants.

As of the year 1998, markets trade a daily average of \$155 billion in interest rate swaps and \$10 billion in currency swaps. In terms of options and derivatives, the average daily volume of trades was valued at approximately 87 billion dollars (Walmsley 2000). Hence, it is evident that traders see the financial returns from these types of trades and are transitioning their financial activities to deal in these types of securities. Futures contracts are popular derivative contract among investors who trade utilizing the LIBOR as their primary benchmark. These contracts are standardized agreements to buy as well as sell a specific commodity at a specific time, at a price established through a central authority (Walmsley 2000). For traders, the attraction to futures contracts and other derivatives is the leverage that is associated with these deals. Consider a situation where a trader takes a future position based on either speculation or arbitrage. The trader wants to back his position as he stands to make a profit if his information is correct. Hence, the trader will trade on margin giving them a high degree of leverage. The trader can make a healthy profit off their position compared to the amount of money that is committed to the trade. However, the concept of leverage can also work against the trader as it is possible to lose more money than what was committed if prices move against the traders' position. Futures contracts also give traders the ability to offer hedges to their customers who want to borrow and help them trade against other markets, such as the interest rate swap market (Walmsley 2000.) Lastly, they are also extremely liquid which adds to their desirability. The risky nature of futures contracts tends to make them unsuccessful which is why many traders colluded with reporting agencies to make sure the LIBOR would shift to make their contracts profitable. With the transition to the SOFR, there are still many uncertainties regarding the pricing of futures contracts that have long term implications. The Federal Reserve is emphasizing banks should stop issuing long term futures contracts to ensure a smooth transitional period but there is no current incentive to discourage the banks from continuing to get involved in these lucrative deals. Essentially, the ability to lock in futures rates for banks might be too attractive to halt until the transition in 2023. Currently, banks seem to be acting responsibly by sticking with shorter term contracts until the transition is complete as there has not been much recent volatility with LIBOR index. However, this does not rule out the

possibility that the transition to the SOFR could cause significant price fluctuations within the futures market, where banks could see major losses.

Legacy non-agency residential mortgage-backed securities otherwise known as, RMBS, are the most exposed due to the transition (Morgan Stanley 2019). However, the volume of RMBS contracts being traded within the market has shrunk significantly, especially after the Great Financial Crisis. Morgan Stanley has the non-agency RMBS market valued at more than \$2 trillion at its peak but today most analysts have the total market valued at a rough outstanding value of \$400 billion (Morgan Stanley 2019). More importantly, only a small share of these current contracts is still pegged to the LIBOR. Recently issued RMBS securities already have clauses detailing out how rates will be handled during the transition from LIBOR to SOFR. Despite these contingency plans, communicating these rate changes to borrowers still pose an issue for financial agents. Since the SOFR is an overnight rate, MBS products that are transitioned to this new benchmark will still have varying interest rate fluctuations. Hence, when the switch occurs, initially lenders will need to estimate interest rates for consumers who wish to borrow using a prior compounding period.

The main issue SOFR critics have when it comes to this transition is the risk of switching such a complex, highly securitized market to an unknown rate, where the effects of such a shift are relatively unknown. They suggest that when the Federal Reserve made the decision to eliminate the LIBOR, it failed to account for the legal risk, operational risk, credit risk, regulatory risk, and reputational risk for banks. In other words, there is a possibility that the transition to the SOFR results in a complete capital market failure which would cause widespread financial instability throughout global economic system. To safeguard against such an event from happening, LIBOR supporters argue that the best way to move forward is to fix the process of reporting for the current LIBOR benchmark by increasing financial oversight to limit collusions and other fraudulent behavior. By forcing banks to transition over to a new benchmark rate, the Federal Reserve is creating more issues for financial institutions and participants. If the Federal Reserve is indeed focused on repealing the LIBOR, opponents of SOFR argue that a more feasible option is to price LIBOR related products against the forward market, rather than creating a new benchmark (Whalen 2020). Ultimately, participants who are against the SOFR state that the Federal Reserve's approach to stabilize capital markets through

the implementation of a new benchmark is completely misguided, as forcing US banks and investors to adopt the SOFR standard would put the entire global economy at risk.

The financial agents who are actively against the switch to the SOFR fail to acknowledge, in their arguments, the lack of faith financial participants have in the LIBOR. The LIBOR Scandal exposed the fraud and manipulation that traders, CEO's and credit agencies committed. Hence, the LIBOR benchmark is no longer treated with the same financial trustworthiness as it once was, prior to GFC. In fact, the United States is not the only country that is transitioning away from the LIBOR. The table below portrays four major global financial powers and the rates that they are adopting to replace the LIBOR. Considering the LIBOR has lost its creditworthiness in the global economy, it does not make any sense for the United States to keep a benchmark rate in place where financial participants do not trust the actual reporting.

Country	LIBOR Rate	New Risk-Free Rate
United States	USD LIBOR	SOFR
United Kingdom	GBP LIBOR	SONIA
Japan	TIBOR, JPY LIBOR and Euroyen TIBOR	TONA
Europe	EURIBOR and EUR LIBOR	ESTER

In fact, the number of banks that report to the LIBOR have dwindled significantly since the GFC and the volume of trading with LIBOR based securities has also shrunk significantly (Brill 2020). Moreover, many of the banks that still operate with the LIBOR benchmark no longer use the rate to swap Euro deposits but use it to value their derivative contracts as well as other high-risk securities.

Many economists seem to have a “disaster mindset” when it comes to the transition to the SOFR. These economists are not completely incorrect that there could be operational, legal, and financial risks in terms of shifting the benchmark rate to the SOFR, but it seems overreaching to argue that the shift could result in a complete failure for global capital markets. The purpose of the fallback clauses in recently issued LIBOR contracts is to act as a safeguard that minimizes the risk of the transition to the financial system. Valuation fluctuations are inevitable particularly for interest rate swaps, derivatives and other long-term contracts but if these contingency clauses are written in, volatility will remain at a minimum. Perhaps the biggest risk is that LIBOR will end prematurely, either because the number of member banks falls below the required minimum or because regulators trigger an early end. This would make banks have to change their financial practices earlier than expected which could create market volatility.

Although reforming the LIBOR seems like the easier, more efficient route for the global economy, replacing the benchmark seems like a more adequate solution, as there is no need to keep a rate around where the financial participants are wary of its accuracy, along with the fact its initial function of serving as an interbank mechanism for Euro deposits has mostly vanished. If member banks continue to plan for the transition and regulators remain vigilant in terms of evaluating LIBOR tied contracts, the switch should occur without much market disruption. Market fluctuations will occur in the short run but, in the long run, SOFR offers a low-risk alternative to LIBOR that has the potential to maintain financial stability to an existing market with lots of growth and risk potential.

SOFR’s Impact on the Basel Accords:

The Basel Accords are a set of sequential banking laws that are adopted internationally by all banks that operate within global capital markets. Specifically, the accords emphasize banking discipline in the areas of capital adequacy, supervisory regulation, and speculative risk taking. Theoretically, following the Basel Accords is a voluntary practice for banks. However, the reality is, banks do not have much of a choice in abiding by these regulations. Countries whose banks do not implement the risk management practices recommended by the Basel Committee are subject to numerous sanctions. “Most notably, the lending programmes of the IMF and World Bank come with conditions attached, and these conditions include compliance

with this international regulatory committee” (Ward 2002). The importance of the Basel Accords to the global economic make it necessary to analyze the impact the transition to the SOFR will have on these policies.

Like the mandates given by the Federal Reserve, the Basel Committee is recommending that banks alter their risk management practices to account for the shift from the LIBOR. Their first mandate is for banks to phase out all LIBOR tied contracts to ensure a seamless transition. By phasing out these contracts’ banks will be able avoid the high operational, financial and legal risk that is involved with such a complex market transition. In cases where banks have long term contracts tied to the LIBOR, the Basel Committee takes a stance that is like the Federal Reserve, encouraging these financial institutions to add contingencies in the form of robust fall-back language to help mitigate any valuation risk (BIS 2020). The committee recommends that the fallback language in these contracts should try to estimate how these contracts would run when the SOFR fully replaces the LIBOR. To make sure banks do not succumb to the operational as well as the legal risks from the transition, the committee also advises financial institutions to ensure that their internally developed systems are prepared fully to accommodate the new reference rate. Thus, it is imperative that the United States financial authorities monitor the internal systems set up by member banks to handle the transition. Given the profit seeking nature of large financial institutions, it would be ill advised for regulatory agencies to not increase their oversight on these long-term LIBOR pegged contracts. If banks decide to neglect their risk management practices pertaining to the transition, solvency issues could arise, and capital market failures could spread throughout the economic system.

Any reclassification of assets will have an impact on the balance sheet of banks, which, if there is a capital market failure, could affect banks overall solvency. Hence, in response to these potential negative economic effects, the Basel Committee has hired accounting standard setters to analyze the accounting effects from the transition to the alternative reference rate. The committee has commissioned the International Accounting Standards Board’s (IASB) to monitor the ongoing transition and help banks develop high quality accounting standards to assist in the process. In the words of the Basel Committee, “accounting treatments regarding issues that may arise from benchmark reform are important for most banks, given that the interest rates subject to reform are widely used in a large volume and broad range of financial products and contracts” (Hernández de Cos 2019). The IASB made certain recommendations to

banks regarding how they should alter their accounting methods to manage the increased risk during this transitional period. Moreover, the IASB's draft also states that their organization intends to monitor any ongoing developments pertaining to this transition. Currently, the issues the IASB are focusing on are centered around the valuations of hedged instruments and the liquidity of the alternative benchmark. With hedged securities, the IASB is trying to ascertain if the new benchmark rate leads to a discontinuation of the previously agreed upon LIBOR pegged contract. In terms of liquidity, the IASB is making sure all global alternative benchmark rates have the necessary liquidity to handle the contracts that were pegged to the LIBOR.

The last issue that the Basel Committee raises is whether the new valuations of contracts on banks' balance sheets affect their capital requirements. A valuation of LIBOR tied security under the SOFR could be classified as a newly created instrument, which breaches the minimum maturity and call date clauses that are part of the regulatory guidelines enforced by the Basel Committee (BIS 2020). Moreover, there is the potential that existing capital instruments that fall under the LIBOR could also fail to meet eligibility requirements if they are treated as new instruments (BIS 2020). With the transition imminent, the committee is emphasizing their stance on this issue. They have reiterated their commitment to upholding their regulatory guidelines by stating any amendments to capital instruments solely to account for the transition will not result in them being treated as new financial securities (BIS 2020). This ensures that these securities will still abide by the minimum maturity and call date requirements that the Basel Committee enforces (BIS 2020). Even though banks cannot treat their old LIBOR contracts as completely new financial instruments, it is still imperative that banks amend their financial instruments to accommodate for the transition to lessen any risk of a capital market failure. Since financial institutions are inherently profit seeking mechanisms, it is again important to emphasize that both domestic and international regulatory agencies remain involved in monitoring these firms' risk management practices, which will ensure the transition happens efficiently.

The next chapter, will discuss policy recommendations that will help maintain financial stability through the transition. More importantly, it will also analyze the different viable options for reforming the LIBOR and come to a conclusion on what the best course of action is regarding the future of benchmark rates.

Chapter 4: Policy Implications

Big Government and Big Banks is the Path to Reinforcing Financial Stability:

Many regulators and economists have come forward with plans of how to best regulate the highly securitized public capital market industry to prevent financial incoherence. However, these plans will be ineffective if both the Federal Government and the Federal Reserve do not take a more vested interest in regulating these markets. With the innovation of financial instruments, the government can no longer continue to use the mainstream, laissez-faire attitude towards regulating banks, especially ones that currently operate with contracts pegged to the LIBOR. Perhaps, in the 1960's when LIBOR tied banks were mainly trading Euro deposits, this laissez faire policy was acceptable but with the increased securitization of the LIBOR benchmark, this mandate is no longer acceptable for ensuring financial stability. The LIBOR scandal is a perfect example of the economic effects of self-regulation. When profit seeking banks are allowed to self-regulate themselves, they become more inclined to undertake complex hedging techniques along with unnecessary risk which can cause financial incoherence. Movements in the price of LIBOR tied securities were amplified due to the dynamic hedging and collusion many traders were involved in. At the same time, these practices increased the systemic risk as well. (Vrolijk 1997). When institutions try to hedge their entire risk exposure, as in the LIBOR crisis, the failure of a single dealer can generate a system wide collapse (Vrolijk 1997). Even if the Federal Reserve shifts the LIBOR market to another benchmark rate but continues to let banks operate unregulated, the same speculative practices involving risky contracts, will continue to cause fragility within the financial system.

Regulation is intended to make financial markets more stable by ensuring banks stay within their margins of safety. Both the Federal Reserve and the Federal Government can achieve this through passing policy that focuses on liquidity requirements and increased capital requirements. However, the implications of creating an over stringent banking policy could result in increasing systemic risk as these policies reduce banks' profit margins which creates a situation where they might become inclined to undertake bigger risks in order to make up for the loss of profits. Other problems that arise from trying to regulate banks include issues relating to conflicts of interest and unregulated shadow banks. There is an inherent conflict of interest that exists between banks and consumers as well as banks and regulatory authorities (Kregel 2009).

Essentially, banks forget their fiduciary responsibilities to clients and focus on profit seeking practices to enhance their respective bottom lines which can result in their customers losing their savings. Banks also have a direct relationship with many regulatory authorities which makes it difficult for these agencies to unbiasedly govern these financial institutions. Lastly, the vast size and interconnectedness of banks is an issue. Regulatory agencies struggle to resolve any speculative practices with large financial institutions as their positions are exposed to numerous unrelated shadow banks and financial institutions that are unable to be regulated or tracked by institutional authorities (Kregel 2009). These shadow institutions were often used to store Eurodollar deposits in offshore markets in order to help facilitate risky, unregulated deals. The combination of these issues creates an environment that encourages fraudulent behavior and creates more systematic risk.

Unfortunately, even if the government and the Federal Reserve coordinate their economic policies effectively, it is difficult to ensure complete financial stability. For example, in the Fed's current role as a monetary authority, its function as the lender of last resort, can perpetuate risky behavior by financial institutions. In times of crisis, the Fed has the option to bail out their member banks to mitigate solvency issues. If banks know that they will be bailed out, as in the LIBOR scandal, these institutions will be more inclined to ignore their fiduciary responsibilities and engage in risky financial behavior. Hence, institutions will focus their positions in financial instruments that compromise their solvency. The Federal Reserve cannot afford to let banks go insolvent for the negative economic effects it will have on deposit and savings accounts (Minsky 1985). Moreover, with the introduction of TAF's (Term Auction Facility), banks have found another source of funding to assist them in their risky behavior. TAF's were first established as a mechanism for banks to borrow from the Federal Reserve during the GFC and LIBOR scandal for a term of approximately one month by posting a variety of collateral products. Most posted mortgage-backed assets as collateral as no financial participants in the private market wanted these contracts due to their instability during the GFC. Banks have now taken advantage of these short-term loans by creating products that are only used for collateral which gives them access to these short-term loans while, at the same time, leaving the Federal Reserve and ECB holding assets that are difficult to value and have no reliable price in secondary markets (Sundaresan 2009). The challenge for the regulators of the

SOFR will be to find solutions that can placate the issues that arise from this new wave of financialization.

The Federal Reserve believes that transitioning to the SOFR will create better regulation of these institutions. However, it is difficult to foresee how much better the Bank of New York Mellon (BNYM) and the Depository Trust and Clearing Corporation (DTCC) will do in terms of regulating the SOFR benchmark. The current regulation standards that govern large banks that committed fraudulent behavior under the LIBOR, such as Barclays, will more than likely not be sufficient to deal with the systematic financial risk that arises from benchmark tied banking. Perhaps, a solution the government and the Federal Reserve could use to better regulate these financial institutions is to revert to the stringent financial regulation that characterized the “New Deal” era. In this specific period, the Federal Reserve and the Federal Government both took an active role in regulating financial markets. These practices provide a functional base the current monetary and fiscal authorities could utilize to regulate the SOFR benchmark. It should be noted though that the processes of multifunctional banking and securitization were not as prominent during the New Deal era, so the laws need to be updated to account for the changes in the global financial system (Kregel 2009). In other words, as the process of financialization, evolves, the role of financial authorities and their policy tools need to evolve as well.

A simple regulatory procedure the Federal Reserve could impose on banks to better monitor their financial activity is the discount window. If the Federal Reserve lends through the discount window, their ability to monitor the banks’ balance sheets increases. Moreover, the discount window allows the Federal Reserve to be involved in banks everyday activities, giving them more institutional control. Currently, the Federal Reserve continues to lend through open market operations. Banks that will operate utilizing the SOFR benchmark will bid on reserves utilizing this process. Transitioning the reserve lending policy to the discount window might give the Federal Reserve more insight to the financial contracts banks are entering and prevent them from taking on unnecessary risk exposure. Another issue that the U.S. government has had regarding monitoring benchmarks is centered around their inability to regulate transactions within the underlying market. Large financial institutions, with their numerous shadow bank arms, were extremely difficult to regulate under the traditional LIBOR benchmark as all transactions were cleared in external markets. The switch to SOFR will make these transactions

clear within U.S, markets which will hopefully give regulatory authorities more financial oversight. To further ensure financial stability, the U.S. government could supplement the switch to the new clearing method by also reducing the size of these big banks. An act, like the repealed Glass-Steagall legislation, could be implemented in order to hold large financial institutions to their fiduciary responsibilities. It would also break up their relationships with their shadow bank arms. When Glass-Steagall regulated the financial industry, it helped direct investment towards productive activities that would help generate future income and employment (Kregel 2012). By reducing the size of these banks through an act like Glass-Steagall, the Federal Reserve and the Federal Government could allow banks to fail without generating a system wide collapse and make banks a more productive asset to the overall economy. The risky nature of the securities SOFR member banks engage in also makes transparency an issue. In order to ensure accountability and to help with regulatory practices, both the Federal Reserve and the Federal Government should ensure that banks make their positions public. Moreover, regulatory agencies should require banks to calculate their exposure tied to interest rates in a more accurate fashion. Both regulatory entities, the Bank of New York Mellon (BNYM) and the Depository Trust and Clearing Corporation (DTCC), involved in monitoring the SOFR are making banks report their positions more accurately with the new benchmark. However, whether these transactions will be made more public to investors, is not yet completely known.

Although there have been some promising steps to ensuring stability regarding the SOFR benchmark, it is slightly worrisome that both monetary and federal authorities find it acceptable that a large private financial institution, like the Bank of New York Mellon (BNYM), can monitor SOFR transactions unilaterally. In 1985, BNYM had flaws in their internal systems which caused its monitoring controls to fail (Ennis and Price 2015). The software failure was due to the large volume of transactions that the bank was trying to clear. BNYM systems simply could not handle the immense volume of financial transactions, which caused their database of accounts to be damaged (Ennis and Price 2015). The system failure prevented their internal database to direct transaction information to the New York Fed and hence, BNYM was not receiving any payments to offset the debits that the New York Fed was taking out of its account. “As transactions flowed in for which BoNY could not make redelivery, the bank rapidly accumulated day-light overdrafts with the New York Fed, totaling more than \$20 billion” (Ennis

and Price 2015). Ultimately, the Federal Reserve had to utilize to discount window to support BNYM during this software failure. The SOFR's integrity is completely dependent on the BNYM's ability to clear and report transactions. If the bank has experienced issues in the past with handling large transaction volumes, similar issues could arise from handling transactions related to the SOFR benchmark. By being more involved in the SOFR clearing process, the Federal Reserve and the Federal Government could prevent these market failures from happening and ensure financial stability with this new benchmark.

From an outside perspective, the current regulatory framework that have been proposed to govern the SOFR benchmark is not stringent enough to facilitate responsible growth within global financial markets. Some changes have been made, in terms of regulation, but the Federal Government and Federal Reserve seem content in leaving the majority of the SOFR's regulation to private authorities. If both arms of the government continue to shirk their regulation responsibilities for this new benchmark, similar fraudulent and risky practices will occur, leading to widespread economic destabilization.

Two Rate System:

Economic forecasters are concerned about the SOFR's ability to remain stable in times of increased volatility and its capacity to monitor complex level securitization. Many forecasters argue that the proposition of a second benchmark rate acting as a complement to the SOFR would help alleviate volatility within public capital markets. In this proposal, one of the benchmark rates would be like the LIBOR as it would be based on banks unsecured funding and would index the credit risk of member banks (Duffie and Stein 2015). The structure of second benchmark is like the proposed version of the SOFR, as it would be based on a near-riskless rate and purely transactions-based. However, unlike the proposed version of the SOFR, its only function will be to track the values of the securities being traded within this space. Regulation of the interbank lending market will be strictly left the other benchmark. Since the second benchmark rate will be based on a thinner underlying market, the incentive to manipulate and commit fraud will decrease. Moreover, this second benchmark would also be subject to a tougher monitoring regime, compared to the initial version of the LIBOR (Duffie Stein 2015). Supporters of the two-rate benchmark further suggest that the combination of these two rates, will be able to alleviate any economic volatility and create nearly riskless growth.

The idea of a two-rate system is appealing as it essentially separates the interbank lending aspect of the current LIBOR from the securitization aspect. To increase efficiency, regulators could focus their efforts within the market where there is more securitization. With the Federal Reserve continuing to limit their oversight regarding the financial practices associated with these benchmarks, perhaps, minimizing their responsibility and the size of the market they would have to monitor would create an incentive for them to increase institutional control. The “risk free” benchmark rate creates a clear market where all the risky securities are pooled, making it easier for the Fed to monitor. If there is a period of instability, the effects would not impact the interbank lending market directly and with increased regulation there is a possibility a crisis could be quelled before it completely crashes the system. The two-rate proposal would also guard against the possibility of a capital market failure, as the LIBOR would still essentially exist but only as a benchmark for interbank lending. The contracts banks have tied to risky securities would be transitioned over to a new, underlying market. Fluctuations in the valuations of securities contracts would most likely still occur but supporters of this proposal argue that these fluctuations would be less volatile than if the market was completely transferred over to the current proposed version of the SOFR.

SOFR is Provides Better Stability than the Two Rate System:

Given the above analysis, switching to the two-rate system seems like a more viable option for the Federal Reserve to consider but there is absolutely no reason to keep a version of the LIBOR around, in any form. Member banks hardly use the LIBOR for its function as an index for interbank lending which has caused this market to essentially stagnant. In other words, the current version of the LIBOR reflects a market that no longer exists, where rate submissions consist largely of estimates rather than real market data. The only function the LIBOR serves now is for monitoring various securities contracts that member banks still have pegged to the benchmark. It cannot adequately function in this role as evident by the manipulation scandal that occurred which caused the decline of this rate. The strongest policy implication that proponents of the two-rate system present is associated with the theory that the spread of current LIBOR contracts might increase dramatically when the transition finally occurs. This would cause valuations for contracts to fluctuate immensely, increasing economic volatility within global markets. However, valuations are going to fluctuate regardless of the new system the Federal Reserve decides to adopt. The only situation where valuations of these securities would not

fluctuate is if the Federal Reserve decided to preserve the current LIBOR benchmark, which is already in the nascent stages of being phased out, as, come January 2022, member banks will no longer need to feed daily numbers for the LIBOR calculation (Stafford 2021). If banks include contingency clauses that account for this switch, the transition should progress with ease. Ultimately, the two-rate system is not a feasible alternative to the SOFR as it relies too much on remnants of the LIBOR. It makes more sense to transition the market to a new benchmark rate instead of recycling the properties of one that is associated with scandal and cannot accurately report the financial activities that are occurring by its member banks. SOFR utilizes a better system along with a tougher monitoring regime and does not carry the negative economic connotation that is often associated with the LIBOR.

To ensure the most efficient transition, the Federal Reserve delayed the switch to the SOFR to 2023, as the COVID-19 pandemic caused an unprecedented recessionary period which would have created massive fluctuations in LIBOR tied securities, if they were moved to the SOFR, during this economic slowdown. Essentially, by delaying this transition, the Federal Reserve was ensuring that capital markets maintained their stability. With the introduction of the vaccine, the United States economy should be able to recover from this recessionary period and create a relatively stable transitional period. Moreover, any long-term LIBOR contracts that were set to transfer over to the SOFR in 2021 have more time to possibly run out before the new 2023 transition. This would allow for less volatility as there might be less long-term contracts to transfer to the SOFR. Regulators are making it emphasis to force firms to conform to the new SOFR tied market. Hopefully, banks are following the Federal Reserve's mandates and preparing their balance sheets for the switch. It is in the banks own self-interest to limit their long-term exposure within the LIBOR benchmark, as they run risk of experiencing massive losses in the event, they ignore the Fed's mandate.

The UK Financial Conduct Authority (FCA), the regulatory agency that oversees the global benchmarks, stated that reporting based on LIBOR would be phased out at the end of 2021 for certain currencies, such as, Sterling, Euro, Swiss franc and Japanese yen. One-week and two-month US dollar reports will also be phased out at the same time. With these currencies moving out of the LIBOR market, global authorities have pushed member banks and investors to stop using the rate completely and temporarily utilize benchmarks based on overnight rates. In response to regulatory agencies request, financial participants state that the sudden transition

away from US dollar LIBOR could potentially jeopardize financial stability. Again, the best solution to quell these concerns is for financial participants to establish “fallback language” to assign a new benchmark rate to contracts that currently reference LIBOR. In other words, “new contracts entered into before December 31, 2021 should either utilize a reference rate other than LIBOR or have robust fallback language that includes a clearly defined alternative reference rate after Libor’s discontinuation” (Rennison and Smith 2020). Due to the delay of the transition, the safest option for banks, investors, and risk managers is to avoid long term LIBOR contracts. After the transition is complete, these financial participants can go back to a more normalized structure of benchmark tied investments.

The current transitory period still gives banks until June 2023 “to extricate themselves from \$200tn of US dollar contracts tied to the benchmark” (Stafford 2021). Hopefully, the phasing out of various major currencies in terms of the LIBOR benchmark will deter institutions from entering any new LIBOR tied financial contracts. At the same time, member banks should continue to attempt to shed any positions that could expose them financially when the transition is complete. The issue plaguing U.S. markets in this transition is the switch to SOFR has been slower than other countries switch to their alternative benchmark, mostly due to the fact the SOFR is a new and unique rate, not an existing one (Rennison and Smith 2020). However, if the Federal Reserve and SEC hold banks accountable for their risk exposures within the current LIBOR benchmark, the deliberate nature of the USD phase out will not cause any financial incoherence. In order to ensure banks are being safe with their positions that are pegged to the LIBOR, the Federal Reserve should emphasize transparency. If the Federal Reserve can monitor the U.S. member banks positions, they can be better prepared for the economic effects that the SOFR transition will cause in capital markets. Moreover, any risky long-term positions that banks have can be dealt with before the LIBOR is phased out.

LIBOR supporters want to keep the benchmark rate around because they claim that with new regulations and harsher penalties for fraudulent behavior, the speculative behavior by economic agents can be halted. However, they continuously gloss over the fact that the LIBOR is an out-of-date mechanism, that cannot effectively act as a benchmark within financial markets. With that being said, monitoring a pool of risky assets is no small feat and there are significant concerns regarding the SOFR’s ability to prevent further capital market incoherence.

Moving towards the Transition:

The Federal Reserve is adamant that the SOFR possesses a better regulatory impact than the LIBOR. One of their main points is that the SOFR's underlying market (Treasury GC repo market) is safer than the prior system. However, the idea that Treasury GC repo transactions provide a measure of safety is extremely misguided. These assets also have a history of being fixed, as seen in the Long-Term Capital Management (LTCM) bankruptcy. LTCM, in order to maximize short term returns, would manipulate the benchmarks by considering the underlying Treasury bonds will be more liquid than bonds of similar but shorter maturities that were issued in prior periods. The newly issued benchmarks often traded more expensively than the less liquid older bonds, but this condition had only limited duration. New benchmarks issued by the Treasury would shift trading away from the old benchmark and move it to the more recently created security. Traders would focus their transactions within these benchmark bonds, by strategically purchasing the old benchmark, which no longer had a significant premium, and then consequently open a short position on the newly issued benchmark (Sungard 2006). Over time, the valuations of the two bonds would converge, as the value of the previously new benchmark faded once a more current benchmark was issued, hence allowing them to influence the market.

The speculative positions of LTCM almost crashed the entire financial system, as this fund related to many large financial institutions. Ultimately, the traders at LTCM did not consider that if the financial participants within the market shifted their preferences towards more liquidity, it would cause these positions to require increasing liquidity to be maintained. Specifically, within U.S. markets, many investors shifted their investments into the most liquid parts of the U.S. Treasury market, which were the most recently issued securities that LTCM had sold short. Moreover, the spreads between the yields of the old benchmarks and the newly issued ones widened significantly (Sungard 2006). As a result, liquidity became more valuable causing their short positions to increase in price relative to their long positions, essentially creating a massive, unhedged exposure within their balance sheet. The crisis with LTCM should remind financial participants that any asset market is subject to instability. Essentially, any market that has benchmarks backed by securities is essentially subject to risk, as all aspects of the market have the potential to be traded for profit by financial institutions. This is just one of

the many reasons the Federal Reserve needs to reevaluate whether the SOFR will provide the adequate financial protection desired to stabilize financial markets.

With the Biden Administration taking power, the newly appointed SEC chief Gary Gensler, is set to install “new discipline and rules for governing the multi-trillion-dollar derivatives market, including reintroducing the 2010 Dodd Frank regulatory reforms enacted in response to the 2008 financial crisis (Moyer 2021). The law also provides new litigation regarding company liquidations or restructurings. This aspect of the legislation was established to assist with the dismantling of shadow financial companies and prevent tax dollars from being used to prop up these types of firms (Moyer 2021). More importantly, this allows for regulatory authorities to break up banks that have grown too large and force them to increase their reserve requirements. The Dodd Frank laws also enact regulations on credit rating agencies who were accused of contributing to the financial crisis by giving out misleading favorable credit ratings. Now there is an office that is charged with ensuring rating agencies report accurate and reliable credit ratings of the entities they are tasked with evaluating. The Biden administration's emphasis on bringing back the Dodd Frank reforms means that there will be better financial oversight within capital markets. Hence, it makes the most sense to let the securities such as derivatives and futures to be traded within the wider-known market and subject the banks who choose to deal with these speculative deals to face regulation from the Federal Government and Federal Reserve. Moving these speculative transactions to the lesser known SOFR benchmark could give banks the regulatory arbitrage they need to be financially irresponsible again and cause economic instability to spread throughout the system. It is important for regulatory authorities to consider the possibility that the SOFR could be a vessel that financial institutions utilize in order subvert financial regulation. Therefore, it is imperative that both the Federal Reserve and the Federal Government monitor the market within the SOFR benchmark and hold banks accountable to the Dodd Frank reforms that are being instituted.

A better option the Federal Reserve should consider is to eliminate benchmark rates for capital markets. The reality is with the decline of the interbank lending market, which was the main catalyst behind the creation of the LIBOR, there is no longer any role for these benchmark rates. Recall that the LIBOR was created in response to the rise of the Eurodollar market which became known for its unregulated nature. Hence, when securitization within global markets increased, the Eurodollar market became an ideal place to trade high risk securities. With

LIBORs' original function essentially nullified, there is absolutely no need to keep it around or a benchmark rate like it, such as the SOFR. Simply put, the Federal Reserve along with the Federal Government should just monitor the different transactions that would have been tied to a benchmark rate. By consolidating regulatory agencies within the market, Federal authorities could create an efficient system that would have the ability to prevent significant market instability. Under the current system, the Federal Government along with the Federal Reserve have created many sub-regulatory organizations that all perform different functions. The various agencies often make regulation convoluted and difficult to achieve. Streamlining these agencies and taking people from each regulatory authority to create an independent organization that could monitor the securities that are traded under the LIBOR benchmark would reinforce financial stability more effectively than the SOFR. However, regulatory participants would have to be carefully vetted to make sure they have no direct ties to any of the financial institutions. This is imperative to keep the integrity of organization, so it does not manipulate the market to benefit the banks they are supposed to be regulating. The securities that are traded within these financial spaces would be just pegged to the overarching market. Even if the Federal Reserve did not want to eliminate benchmarks completely, this independent organization could essentially set the benchmark for the market. Leaving implementation of SOFR to private institutions gives market participants incentive to collude and manipulate. Creating an unbiased organization lessens the chances of a crisis like the LIBOR Fixing Scandal from occurring again.

There is a precedent for the use of autonomous organizations to regulate financial markets. As a response to the LIBOR fixing scandal, economic reforms established independent clearing houses for derivative transactions to occur. The independent nature of these clearing houses ensure that no arm's length transactions could take place, eliminating any collusion between financial institutions. Therefore, it is completely viable for the Federal Reserve and the Federal Government to create an autonomous organization to monitor all transactions that would be pegged to a benchmark rate. This organization would also be able to set the benchmark for the market and function as its main monitoring regime. In this scenario, there are no underlying assets to peg these securities to, which will decrease the risk of benchmark fixing. Moreover, forming this type of independent organization is not as convoluted as policy makers argue as it already exists within the U.S. economy in its role as the main monetary authority. In

other words, the Federal Reserve could perform the necessary functions to monitor these trades that are set to be pegged to the SOFR. Prior to the switch to open market operations, the Federal Reserve utilized the discount window in which it set the benchmark rate for lending reserves to its member banks. This process allowed them to monitor these institutions balance sheets and gave them the ability to be involved in all daily bank transactions. A similar process could be utilized to monitor the securities that are set to be pegged to the SOFR. Simply put, the Federal Reserve could set the benchmark and monitor the deals banks undertake that are pegged to this rate. The autonomy of the Federal Reserve as regulator would remove any chance of collusion that could take place between banks and financial authorities. In addition, the benchmark itself will be supported by the power of the Federal Reserve, so no underlying assets will be needed to back it, unlike the SOFR. Under this proposed system the Fed as well its constituents can anticipate any financial instability related to this benchmark and, hence, can quell any economic incoherence before it cripples the entire system.

Conclusion:

Regardless of the positions of different analysts regarding this transition, neither the SOFR nor the reformed USD LIBOR will be effective in bringing financial stability to capital markets if the Federal Government and the Federal Reserve do not increase their financial oversight on the institutions that operate within these markets. During the manipulation scandal the informal nature of the LIBOR reporting process created an incentive for banks to undertake speculative activities that created incoherence within the markets. If these laissez faire conditions remain intact, it is irrelevant to transition the benchmark system. Regardless of what benchmark is used, laissez-faire conditions will eventually cause instability. With reinstatement of the Dodd Frank reforms, it should be harder for financial institutions to undertake speculative activities to increase their profit margins. Moreover, these reforms should, hopefully, prevent any misreporting that banks have done in the past to cover the fact they were losing money on these risky transactions. However, just because these reforms are being reinstated does not mean the Federal Reserve and the Federal Government can let the SOFR benchmark self-regulate itself for numerous reasons. First, it is unclear how the SOFR will act in times of recession and indicators say it will have different effects than the LIBOR. If there is another economic recession volatility for securities tied to the SOFR could increase, causing widespread market incoherence. Second, it is unclear how efficient the transition will be, as many financial

participants are wary about the value of their existing LIBOR contracts. It is still difficult to project whether banks will suffer losses on long-term contracts once the USD LIBOR is completely phased out. Lastly, it is a cause for concern that the United States is behind other countries in phasing out USD for the LIBOR. If this is not done in a timely manner, the transition might not go as smoothly as the Federal Reserve is anticipating, leading to capital market failures.

In the end, due to the unstable nature of capitalism and the power of money, it is only natural for the economy to divert from a position of stability. Hence, an economic approach with more regulation needs to be adopted in order to extinguish the incoherent nature of capitalism and ensure economic prosperity. The orthodox assumptions that argue lenders will never lend to unqualified borrowers and all borrowers will eventually pay their debts can no longer be assumed when monitoring the SOFR rate.

There is still much uncertainty regarding the economic effects this switch will have on both U.S markets and global markets. In the short run, banks and investors will see slight valuation differences in their formerly tied LIBOR contracts. However, if they include robust fallback language detailing the conditions of the rate change in these contracts, the transition will go smoothly with limited long-term affects. The biggest long-term risk to the SOFR benchmark is if Federal and private authorities get complacent in their monitoring methods. If the transactions related to this new benchmark to go unregulated, similar financial instability to the LIBOR scandal will arise. Ultimately, there are still better options that the Federal Reserve could explore to make the benchmark system even safer, and it would be in the best interest of the global economy if they pursued these alternative options.

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UNITED STATES DISTRICT COURT SOUTHERN DISTRICT OF NEW YORK. *PUTNAM BANK, on Behalf of Itself and All Others Similarly Situated, Plaintiff, v. Case No. CLASS ACTION COMPLAINT JURY TRIAL DEMANDED INTERCONTINENTAL EXCHANGE, INC., INTERCONTINENTAL EXCHANGE HOLDINGS, INC., ICE BENCHMARK ADMINISTRATION LIMITED (f/k/a NYSE EURONEXT RATE ADMINISTRATION LIMITED), ICE DATA SERVICES, INC., ICE PRICING AND REFERENCE DATA LLC, BANK OF AMERICA CORPORATION, BANK OF AMERICA N.A., MERRILL LYNCH, PIERCE, FENNER & SMITH INC., CITIGROUP INC., CITIBANK, N.A., CITIGROUP GLOBAL MARKETS INC., JPMORGAN CHASE & CO., JPMORGAN CHASE BANK, N.A., J.P. MORGAN SECURITIES LLC, BARCLAYS PLC, BARCLAYS BANK PLC, BARCLAYS CAPITAL INC., BNP PARIBAS SA, BNP PARIBAS SECURITIES CORP., CRÉDIT AGRICOLE S.A., CRÉDIT AGRICOLE CORPORATE AND INVESTMENT BANK; CRÉDIT AGRICOLE SECURITIES (USA) INC., CREDIT SUISSE GROUP AG, CREDIT SUISSE AG, CREDIT SUISSE SECURITIES (USA) LLC, DEUTSCHE BANK AG, DEUTSCHE BANK SECURITIES INC., HSBC HOLDINGS PLC, HSBC BANK PLC, HSBC BANK USA, N.A., HSBC SECURITIES (USA) INC., LLOYDS BANK PLC, LLOYDS SECURITIES INC., MUFG BANK, LTD., THE BANK OF TOKYO-MITSUBISHI UFJ LTD., MITSUBISHI UFJ FINANCIAL GROUP INC., MUFG SECURITIES AMERICAS INC., THE NORINCHUKIN BANK, COÖPERATIEVE RABOBANK U.A.,*

ROYAL BANK OF CANADA, RBC CAPITAL MARKETS, LLC, [Caption Continued on Following Page] Case 1:19-Cv-00439 Document 1 Filed 01/15/19 Page 2 of 117 ROYAL BANK OF SCOTLAND GROUP PLC, ROYAL BANK OF SCOTLAND PLC, NATIONAL WESTMINSTER BANK PLC, NATWEST MARKETS SECURITIES INC. (f/k/a RBS SECURITIES, INC.), SOCIÉTÉ GÉNÉRALE S.A., SG AMERICAS SECURITIES, LLC, SUMITOMO MITSUI BANKING CORPORATION, SUMITOMO MITSUI FINANCIAL GROUP INC., SUMITOMO MITSUI BANKING CORPORATION EUROPE LTD., SMBC CAPITAL MARKETS, INC., UBS GROUP AG, UBS AG, and UBS SECURITIES LLC. 15 Jan. 2019.

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