

LIBOR and SOFR: Dilemmas and Solutions

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Abstract:

This paper examines the flaws of the London Interbank Offered Rate (LIBOR) and its replacement, the Secured Overnight Financing Rate (SOFR). As a key benchmark in global finance, LIBOR faced a crisis of confidence due to manipulation and inaccuracy, particularly during the 2008 financial crisis. Its subjective determination process, based on bank estimates rather than actual transactions, made it vulnerable to exploitation, as evidenced by the 2012 LIBOR scandal. The article explores LIBOR's role in the Eurodollar market, highlighting how its pricing mechanism allowed for manipulation. In response, SOFR was adopted in 2022 as a more transparent and transaction-based alternative. However, SOFR presents challenges, including higher volatility and a lack of term structure. Despite transition difficulties and market inertia, SOFR is emerging as the dominant benchmark for USD-denominated assets, signaling an irreversible shift in financial markets.

Keywords: LIBOR; SOFR; benchmark rate; Eurodollar market; financial reform; rate manipulation

The London Interbank Offered Rate (Libor), which serves as the benchmark interest rate for a wide range of financial instruments traded globally, has long been a crucial pillar of the international financial system. A loss of confidence in this important benchmark has been caused by incidents of manipulation and inaccuracy, which have cast doubt on the legitimacy and trustworthiness of Libor. Notably, the issues with Libor have considerably impacted the American dollar market, one of the most critical organizations in global banking. This essay seeks to explore the Libor-related concerns, with a particular emphasis on how they affect the US dollar market. The Libor manipulations that have come to light in a string of scandals since 2008 have sparked intense

discussion among economists, decision-makers, and business professionals. This discussion focuses mostly on the issues of transparency, governance, and the general efficacy of such benchmark rates in the modern, changing financial environment. Understanding Libor's influence and eventual demise offers crucial insights into the structural flaws in the existing global financial system as well as the possibilities for its future improvement, particularly in terms of the US dollar market.

The influence of LIBOR cannot be discussed without the Eurodollar. The Eurodollar is the market, and LIBOR is the benchmark rate used to borrow and lend in the market. The origins of the Eurodollar market can be traced back to the Cold War in the 1950s when the Soviet Union began to transfer its dollar-denom-

inated revenues (from the sale of commodities such as crude oil) out of US banks. This was done to prevent the United States from being able to freeze its assets. Since then, the Eurodollar has become one of the world's largest short-term currency markets, and its interest rates have become a benchmark for corporate finance. The price of the

Eurodollar futures can reflect the expected 3-month USD LIBOR on the contract settlement date as Eurodollar futures prices are expressed as 100 minus the implied 3-month USD LIBOR. From this, we can see that LIBOR plays a pricing role in Eurodollar futures. But how is LIBOR determined?

In practice, the determination of the LIBOR benchmark is highly subjective, and it is determined daily by the 18 international banks submitting the interest rate they believe they would have to pay if they had to borrow money from another bank in the London Interbank Lending Market. Although to avoid extremes, ICE removes each of the four highest and four lowest values before calculating the average, we can still question the fact that LIBOR is not based on the actual borrowing rate, but rather on what banks think it costs them to borrow, which is fraught with subjectivity and therefore a lot of room for manipulation. The tiny exposure to LIBOR can also make manipulation of LIBOR hugely profitable, given the large notional value of futures trading. For instance, in the first quarter of 2009, Citigroup participated in interest rate swaps with a notional value of \$14.2 trillion, and according to its report, a quarterly decline in interest rates of 0.25 percentage points would have resulted in net interest income of \$936 million for the quarter, while an instantaneous decline in interest rates of 1 percentage point would have resulted in \$1,935 million for the quarter. As interest rates can be reflective of risk, banks have also been questioned for deliberately lowering LIBOR to hide poor financial conditions and high risk to attract more depositors. The possibility of such manipulation is not just theoretical. The LIBOR scandal came to light in 2012, when several banks were investigated and fined for allegedly manipulating LIBOR, including many major financial institutions such as Deutsche Bank (DB), Barclays (BCS), Citigroup (C), JPMorgan Chase (JPM),

and the Royal Bank of Scotland (RBS). Moreover, the evidence suggests that manipulation of LIBOR may have been going on since 2003, and the validity of LIBOR is questionable. Not only that but during the financial crisis, banks were reluctant to lend and collectively raised LIBOR, which made capital flows even more restricted and caused the crisis to spread more widely. As a result of the financial crisis, the volume of unsecured break-ups between banks has declined sharply, with fewer and fewer participants willing to lend on an unsecured basis, especially for longer than overnight maturities. This further

makes LIBOR more a figment of the banks' imagination than an exact fact. To summarise, the hugely subjective LIBOR also became an unrealistic interest rate.

LIBOR has been criticized for a long time for the various problems mentioned above, and in December 2022, a new guideline was adopted and the new benchmark (Secured Overnight Financing Rate) SOFR replaced LIBOR. The SOFR, as a benchmark rate for pricing U.S. dollar-denominated loans and derivatives, is based on the transaction data of the three major U.S. Treasury repo markets, and takes the interest rate indicator corresponding to the median transaction volume, which is the data of the real transaction, reflecting the real demand for funds in the financial market, and has a strong market foundation as it has a wide coverage and is a good reflection of the money situation. Unlike artificially estimated forward-looking data like the LIBOR benchmark, the SOFR is determined by the active US Treasury market, meaning it's determined by real market exchanges. The sheer size of the market makes it highly unlikely that it would be feasible to manipulate the SOFR with the massive amounts of money required. Under these conditions, SOFR better reflects the economic costs of all parties involved in financing activities.

However, it is worth noting that SOFR is not perfect, and there are still some issues with it. Firstly, compared to the survey-determined LIBOR, the SOFR, which is closely linked to the market, has higher volatility, especially during tight funding periods such as month-end and quarter-end, which poses certain challenges for financial product pricing. Second, because SOFR is an overnight rate concept, it does not have its term structure like LIBOR, which makes the effective interest rate for SOFR-based contracts backdated at the average daily SOFR after the contract expires. And we all know that in practice, we need to have interest rate curves to price different products due to their different maturities. To address this issue, there have been several conventions designed to allow for a longer notice of payment within the in-arrears framework. Many contracts allow for longer payment notice periods. These include payment delays, look-backs, and lock-outs. There are also advanced structures available for reference. This refers to the average of SOFRs observed before the start of the current interest period by reference and is available as Last Reset and Last Recent.

According to a report released by the ARRC (Alternative Reference Rates Committee) in March of this year, there will still be a lot of work to be done for the shift, as there are still \$74 trillion assets linked to LIBOR that are maturing after March 2023, even though institutions no longer link new issuance to LIBOR. It is difficult to measure the size of the stock of financial contracts that do not include "fallback clauses" after LIBOR ceases to be issued. With such a volume of contracts, a smooth transition is difficult.

The difficulty of the shift has also led to a low level of acceptance by market participants and a certain amount of market inertia. For example, you need to explain to your clients why such a shift is necessary.

As painful and laborious as the shift is, we are seeing the market struggle to embrace such a change, with a strong push from the U.S. government. First and foremost, the U.K.'s Financial Conduct Authority (FCA) announced on July 3 that overnight and 12-month U.S. dollar London Interbank Offered Rate (LIBOR) settings have now been permanently discontinued. Eurodollar futures, which are priced and traded on LIBOR, as indicated in Chart 1, over the past period, both the trading volume and the number of open positions have shown a downward trend until the market is completely closed. With the cessation of LIBOR publication, the Eurodollar market is now history. In contrast, in Chart 2, we can see that derivatives priced in SOFR SR1 and SR2 are showing an upward trend in trading volume. Such an active market for SOFR-priced derivatives would in turn facilitate the construction of the SOFR rate curve, thus resolving the difficulty of having only overnight rates for SOFR.

To summarise, LIBOR has played a very important role on the stage of history as a benchmark interest rate to which many financial assets are linked. However, its subjective nature makes LIBOR vulnerable to manipulation for profit. Therefore, the choice was made to replace LIBOR with the new SOFR, which is market-based but has its shortcomings. However, these shortcomings can theoretically be solved through active promotion. Therefore, SOFR is the best choice for now, and more USD assets will be based on SOFR in the future. Change is unstoppable, and only by embracing change can we gain a new life.

Appendix:

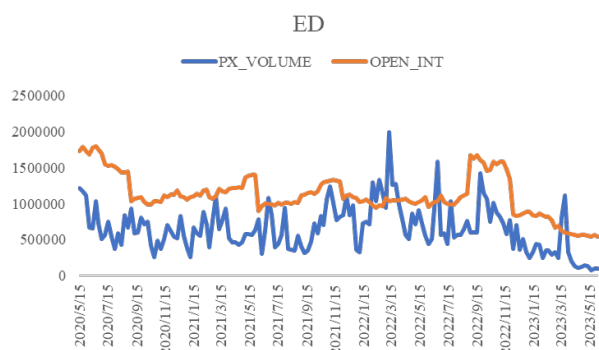


Chart 1 Eurodollar Market Situation

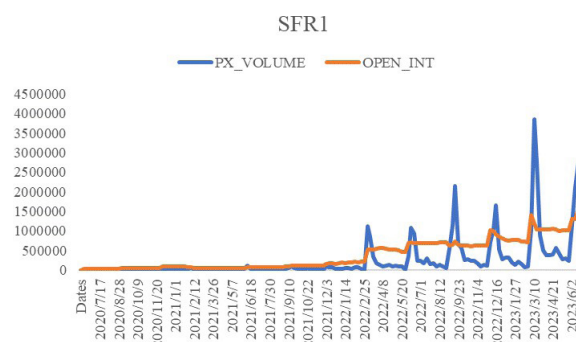


Chart 2 SFR1 Market Situation

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