SOFR Dynamics Are Not What You Wished

Marco Macchiavelli*

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Executive Summary

- SOFR dynamics are heavily influenced by regulatory window-dressing incentives at month-ends and by Treasury net issuance;
- none of these factors are related to bank funding risk, which is what a LIBOR replacement should capture;
- AMERIBOR, a credit-sensitive reference rate, is not contaminated by either month-end or Treasury net issuance dynamics;
- with ever-increasing federal budget deficits, the growth in Treasury net issuance may induce unnecessary volatility in SOFR that is unrelated to bank funding risk.

*University of Massachusetts Amherst. Email: mmacchiavelli@isenberg.umass.edu. Disclaimer: Marco Macchiavelli serves as external consultant for American Financial Exchange (AFX).

Searching for a LIBOR replacement, the Alternative Reference Rate Committee (ARRC) prioritized a rate based on high transaction volumes which would then be challenging to manipulate. Based on daily trades ranging from $800 billion to $1.8 trillion, the Secured Overnight Financing Rate (SOFR) was the chosen candidate. However, SOFR falls short in a very consequential way as a LIBOR replacement. While LIBOR captured bank funding costs, SOFR is an overnight risk-free rate collateralized by Treasuries. As such, SOFR captures dynamics that are unrelated to bank funding risk.

In this note we highlight two of the main factors that drive SOFR pricing, namely month-end window dressing and Treasury net issuance. In addition, we show that AMERIBOR, a credit-sensitive reference rate based on interbank transactions, is not affected by these two factors that contaminate SOFR. Our findings complement a previous study (Macchiavelli, 2024) which shows that AMERIBOR has better credit-sensitive properties than SOFR and therefore helps banks better manage interest rate risk and maintain positive net interest margins at all times.

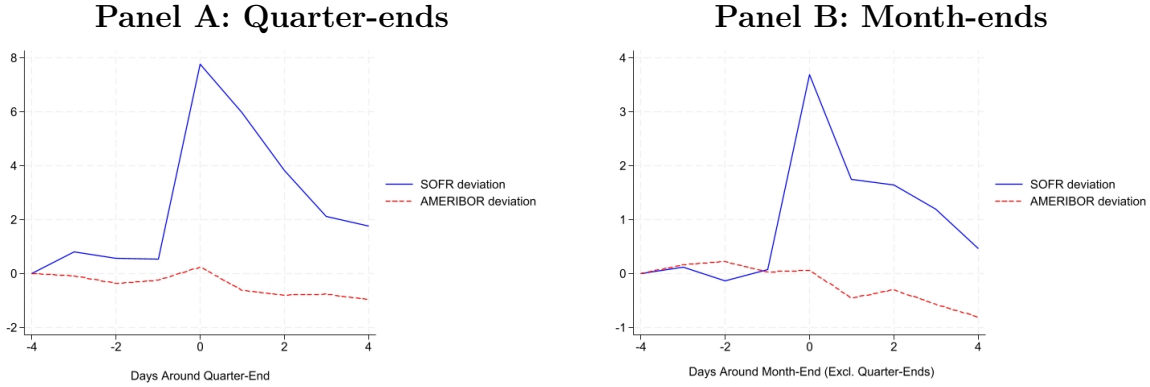
1 Background: What is behind SOFR?

We start with a brief overview of the broker-dealer business model and the economic reason for the repo trades underlying SOFR. More details can be found in Macchiavelli (2024). Dealers primarily make markets and provide leverage to hedge-fund clients via secured lending transactions (reverse repo and margin loans). To finance these activities, dealers raise repo funding from money markets. When large amounts of Treasuries are issued, some of them are taken up by dealers as inventories, which are then partly funded in repo markets, and some are bought by asset managers and hedge funds with the use of leverage (Fleming, Nguyen and Rosenberg, 2024; Kruttli et al., 2023). To obtain leverage in Treasuries, hedge fund clients raise reverse repo funding from dealers which in turn finance it via repos from money markets. For both of these reasons, increases in Treasury net issuance are accompanied by increases in repo funding needs.

SOFR includes repo rates at which dealers borrow from money markets as well as repo rates at which dealers lend to other smaller dealers and hedge funds (Anbil, Anderson and Senyuz, 2020). The segment where dealers borrow from money market is the triparty repo segment, where large dealers pledge general collateral to money funds to raise cash.

This segment trades within a very narrow range of rates. The other major segment is the FICC-cleared bilateral one, which displays a much wider range of rates. In this segment, the cash lenders tend to be large dealers and money markets via the sponsored repo program, while borrowers are usually smaller dealers and hedge funds. This last segment has a wider rates distribution in part because of the lower creditworthiness of the borrowers and in part because some of these trades are for specific CUSIPS to be shorted (specials). Currently, transactions at rates below the 25^{th} volume-weighted percentile of the overall centrally-cleared bilateral distribution are removed to prevent specials from contaminating the posted rate.

Figure 1: SOFR and AMERIBOR Around Window Dressing Days. Figure 1 displays the dynamics of SOFR and AMERIBOR in a 8-day window around quarter-ends (Panel A) and non-quarter-end month-ends (Panel B) Blue lines represent the deviation of the SOFR spread to ONRRP relative to its value 4 days before each month- or quarter-end. Similarly, the dashed red lines represent the deviation of the AMERIBOR spread to ONRRP relative to its value 4 days before each month- or quarter-end. Spreads to ONRRP are used to avoid contamination from changes in monetary policy in proximity of month- or quarter-ends.



2 Month-End Dynamics

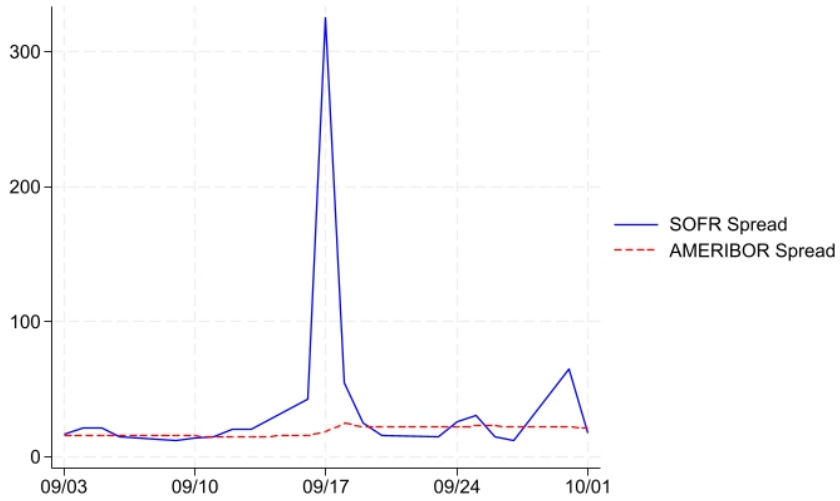
At month–ends and in particular at quarter-ends, dealers (especially foreign ones) deleverage their repo books to window-dress their regulatory requirements (Anbil and Senyuz, 2022). To be enticed to intermediate repo funding at month-ends, dealers require a much higher compensation, resulting in a sudden increase in SOFR. The effect of window-dressing at month-ends and especially at quarter-ends is apparent in Figure 1. Panel A shows that on the average quarter-end, SOFR is 8 basis points higher than just 4 days prior. The spike occurs one day prior to quarter-end and takes more than 4 days to

dissipate. Indeed, SOFR remains elevated even two days after quarter-end. Panel B shows similar dynamics for non-quarter-end month-ends. Furthermore, the dashed red lines in both panels show that AMERIBOR does not display any window-dressing dynamic. In sum, AMERIBOR displays much less non-fundamental volatility than SOFR.

3 Treasury Net Issuance

The infamous SOFR spike of September 2019 as been attributed to a concomitance of several factors (Anbil, Anderson and Senyuz, 2020), all of which unrelated to bank funding risk. On September 17, 2019, SOFR increased by about 300 basis points while AMERIBOR remained stable. On that day, money markets received large withdrawals from investors paying for corporate taxes, which reduced the amount of repo funding available to dealers. At the same time, outsized Treasury issuance increased the amount of repo funding required by dealers. The concomitance of both events led to the SOFR spike shown in Figure 2.

Figure 2: SOFR and AMERIBOR in September 2019. Figure 2 displays the evolution of selected overnight rates around the September 2019 repo spike. On the y-axis, spreads to ONRRP are in basis points.



The effect of outsized Treasury issuance on SOFR is not relegated to the September 2019 SOFR spike only. On the contrary, it is a systematic factor for the pricing of SOFR. As previously discussed, repo volumes go up when larger amounts of Treasuries need to be financed. As a result, SOFR pricing is connected to Treasury net issuance. To

formally prove this assertion, we estimate the following time series specification:

$$\Delta Spread_t = \alpha + \beta \times Net\ Issuance_t + \epsilon_t, \tag{1}$$

where $\Delta Spread_t$ is the weekly change in the spread of either SOFR or AMERIBOR to ONRRP (in basis points) and $Net\ Issuance_t$ is the weekly net issuance of Treasuries (in \$ billion), computed as the amount of Treasuries issued in week t minus the amount of Treasuries maturing in week t. In some specification, we use the hyperbolic sign transformation of net Treasury issuance, h(Net Issuance), which is akin to a logarithmic transformation for both positive and negative numbers. We use Newey-West standard errors with 4 lags. Under the hypothesis that higher net Treasury issuance is associated with higher SOFR pricing, we expect $\hat{\beta}_{SOFR} > 0$. On the other hand, under the hypothesis that higher net Treasury issuance does not affect AMERIBOR pricing, we we expect $\hat{\beta}_{AMER} = 0$.

The results are displayed in Table 1. The first two columns show that higher Treasury net issuance is associated with significantly higher SOFR spreads. More Treasury collateral coming to market and requiring financing leads to higher repo rates, as measured by SOFR. On the other hand, the last two columns show that net Treasury issuance is not correlated with AMERIBOR. Indeed, AMERIBOR is an unsecured interbank reference rate and, as such, is not mechanically affected by Treasury collateral dynamics.

Table 1: Reference Rates and Treasury Net Issuance. Table 1 presents estimates of the correlations between weekly changes in reference rates and Treasury net issuance, as in Equation 1. SOFR Spread is the difference between SOFR and ONRRP while AMERIBOR Spread is the difference between AMERIBOR and ONRRP. The weekly sample goes from April 2018 to September 2024. Newey-West standard errors with 4 lags are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

	(1)	(2)	(3)	(4)
	Δ SOFR Spread		Δ AMERIBOR Spread	
Net Issuance	0.014***		-0.002	
	(0.003)		(0.001)	
h(Net Issuance)		0.286***		-0.029
		(0.088)		(0.020)
Obs.	328	328	328	328

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