

US fixed income

LIBOR-SOFR: Be aware and prepare | 16 August 2018

Chief Investment Office Americas, Wealth Management

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Around 15 million retail customers globally, in addition to most corporations and financial institutions,¹ currently use financial products based upon the London interbank offered rate (LIBOR). In this piece, we review why LIBOR's reign may be ending, the mechanics of the new reference rate SOFR (secured overnight financing rate), and what the potential market implications might be if LIBOR is discontinued as a basis for pricing financial instruments.

What is LIBOR?

LIBOR is a widely used interest rate benchmark. In general, it measures the cost of unsecured funding for global banks. It is calculated daily in five currencies, for maturities ranging from overnight to one year. LIBOR is based on the quoted rates that a standing panel of banks submits to the ICE Benchmark Administration. This reported rate has been used as a measure of the health of the banking system, a benchmark rate for swaps and Eurodollar futures, and a benchmark for pricing interest rates for many other non-derivative financial instruments such as home mortgages and auto and student loans. In fact, LIBOR is linked to approximately USD 370 trillion of financial products across the globe, around USD 200 trillion of which are in US dollars (Fig. 1).¹

What is the current issue with LIBOR?

For decades, LIBOR proved to be a reliable index. Following the Great Recession, however, its validity began to shift dramatically (see Fig. 2). Since the global financial crisis, banks have reduced their interbank borrowing, so trading volumes and liquidity have become severely limited. As a result, only about USD 500 million of three-month interbank loans are trading on any given day. Since these trades serve to provide the informational quotes used to create the LIBOR curve, this illiquidity has increasingly become an issue. As shown in Fig. 3, some USD 200 trillion worth of LIBOR-based contracts are reliant on a very small, illiquid, and shrinking base rate.

How to resolve the illiquidity issue

After the UK Financial Conduct Authority (FCA) adopted a recommendation to reform the benchmark in July 2017, Andrew Bailey, its chief executive, surprised the markets last year by stating that LIBOR will be transitioned to an alternative reference rate over the next few years. During his speech, Bailey said that after 2021, the FCA, the regulator of the LIBOR panel banks, would no longer require the banks to submit daily LIBOR rates.

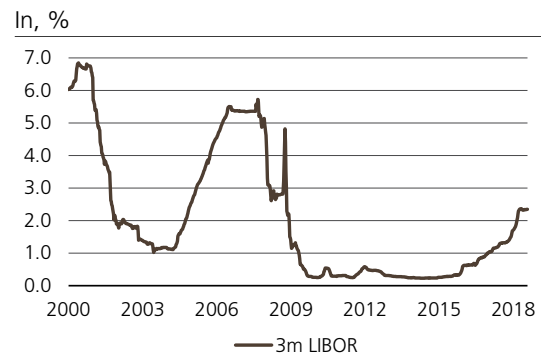
Fig. 1: Estimated USD LIBOR Market Footprint by Asset Class

		Volume (Trillions USD)
Over-the-Counter Derivatives	Interest rate swaps	81
	Forward rate agreements	34
	Interest rate options	12
	Cross currency swaps	18
Exchange Traded Derivatives	Interest rate options	34
	Interest rate futures	11
Business Loans ¹	Syndicated loans	1.5
	Nonsyndicated business loans	0.8
	Nonsyndicated CRE/Commercial mortgages	1.1
	Retail mortgages	1.2
Consumer Loans	Other Consumer loans	0.1
	Floating/Variable Rate Notes	1.8
Bonds Securitizations	Mortgage-backed Securities (incl. CMOs)	1
	Collateralized loan obligations	0.4
	Asset-backed securities	0.2
	Collateralized debt obligations	0.2
Total USD LIBOR Exposure:		199

¹The figures for syndicated and corporate business loans do not include undrawn lines. Non-syndicated business loans exclude CRE/commercial mortgage loans.

Source: The Alternative Reference Rates Committee, Federal Reserve Staff calculations, BIS, Bloomberg, UBS, as of 8 August 2018. Data are gross notional exposures as of year-end 2016.

Fig. 2: 3-month Libor collapses during financial crisis



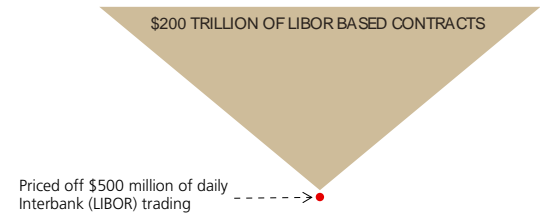
Source: Bloomberg, UBS, as of 8 August 2018

¹For the purposes of this report, we will be focused on the US marketplace.

Although these banks can voluntarily remain on the panel and continue to submit rates past the 2021 deadline, it is highly possible that they will choose not to, given the litigation risk and the lack of unsecured short-term borrowing. Since the financial crisis, and due to the regulatory changes in the banking sector and in money markets, banks have shifted away from unsecured short-term borrowing, instead preferring repo,² bond, and other forms of financing.

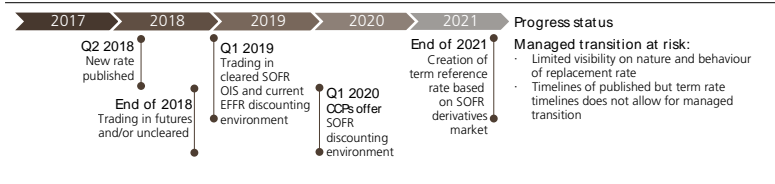
In 2014, the Federal Reserve Bank of New York convened the Alternative Reference Rate Committee (ARRC) in order to identify best practices for US alternative reference rates and contract robustness, and to develop and implement a plan with metrics of success and a feasible timeline (see Fig. 4).

Fig. 3: The fundamental problem with Libor



Source: LSTA, UBS, as of 8 August 2018

Fig. 4: Progress status timeline is currently on time



Source: Oliver Wyman; UBS August 2018

Although the majority of existing exposure to LIBOR will mature before the December 2021 deadline, Fig. 5 shows that there is still a sizable amount of LIBOR-based products – from floating-rate notes to business and consumer loans – that extend beyond that date (see Fig. 6). Given the large amount of LIBOR-based issues that will remain outstanding, the ARRC has teamed up with the Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO) to create a benchmark that will be useful to financial market participants while maintaining market depth and liquidity. Enter SOFR – the secured overnight financing rate.

² US Treasury repo rates are simply rates that are charged in the market to borrow or lend money versus US Treasury collateral.

Fig.6: Estimated USD LIBOR Market Footprint by Asset Class

		Volume (Trillions USD)	End 2021	End 2025	Share Maturing By:	
					After 2030	After 2040
Over-the-Counter Derivatives	Interest rate swaps	81	66%	88%	7%	5%
	Forward rate agreements	34	100%	100%	0%	0%
	Interest rate options	12	65%	68%	5%	5%
	Cross currency swaps	18	88%	93%	2%	0%
Exchange Traded Derivatives	Interest rate options	34	99%	100%	0%	0%
	Interest rate futures	11	99%	100%	0%	0%
Business Loans*	Syndicated loans	1.5	83%	100%	0%	0%
	Nonsyndicated business loans	0.8	86%	97%	1%	0%
	Nonsyndicated CRE/Commercial mortgage:	1.1	83%	94%	4%	2%
Consumer Loans	Retail mortgages**	1.2	57%	82%	7%	1%
	Other Consumer loans	0.1	--	--	--	--
Bonds	Floating/Variable Rate Notes	1.8	84%	93%	6%	3%
Securitizations	Mortgage-backed Securities (incl. CMOs)	1.0	57%	81%	7%	1%
	Collateralized loan obligations	0.4	26%	72%	5%	0%
	Asset-backed securities	0.2	55%	78%	10%	2%
	Collateralized debt obligations	0.2	48%	73%	10%	2%
Total USD LIBOR Exposure:		199	82%	92%	4%	2%

*The figures for syndicated and corporate business loans do not include undrawn lines. Non-syndicated business loans exclude CRE/commercial mortgage loans.

**Estimated maturities based on historical pre-payment rates.

Source: The Alternative Reference Rates Committee, Federal Reserve Staff calculations, BIS, Bloomberg, CME, DTCC, Federal Reserve Financial Accounts of the United States, G.19, Shared National Credit, and Y-14 data, and JPMorgan Chase, UBS, as of 8 August 2018. Data are gross notional exposures as of year-end 2016.

What is SOFR?

In 2017, the AARC identified SOFR as "the most appropriate for a widespread and long-term adoption reference rate." In April 2018, the New York Fed began publishing the SOFR rate.

SOFR is a composite rate from various segments of the US Treasury repurchase agreement (repo) market.ⁱⁱ This combination of repo transactions will add depth and liquidity to the marketplace. As Fig. 7 shows, the average daily trading volume of SOFR, which represents a combination of three Treasury repo rates, is USD 754 billion – an amount that overshadows all other money market instruments, particularly the 3-month LIBOR, which averages only USD 500 million.

What are the structural differences between LIBOR and SOFR?

There are vast differences between SOFR and LIBOR. Fig. 8 outlines the most significant ones.

1) First off, SOFR is a secured – i.e. "risk free" – rate, since it is backed by US Treasuries. LIBOR is an unsecured rate, calculated based on two components: the expectation of where the effective federal funds rate (EFFR) will be over a certain time period, plus a credit premium.

The effective fed funds rate component of LIBOR is also deemed a risk-free rate. Investors often calculate this component through the Overnight Index Swap (OIS), which prices the expected path of the effective fed funds rate. The difference, therefore, between LIBOR and OIS is the credit premium banks are paying above the risk-free rate for funding.

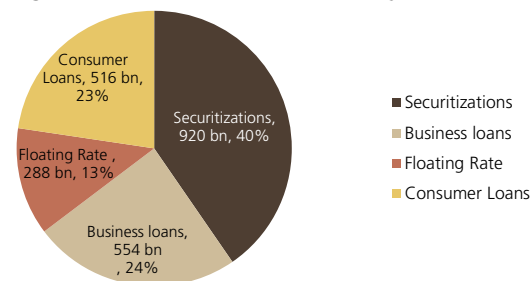
Fig. 9 shows the effective fed funds rate versus the SOFR rate. As shown, the effective fed funds rate (i.e., OIS) and SOFR are very highly correlated given they are both risk-free rates. Fig. 10 shows the difference between the SOFR and LIBOR rates. Given that SOFR is a secured rate, it normally will yield below the LIBOR rate. The spread differential between the two is the credit premium.

Therefore, in times of financial stress, LIBOR would rapidly rise as a signal of credit weakness, as the bank cost of funds widens. By contrast, SOFR would remain flat or even decline.

In the US, calculating a bank credit risk component will be necessary for the adoption of SOFR by asset classes that currently rely on LIBOR. The credit element serves an important market function in hedging and securities pricing that will need to be addressed and replaced.

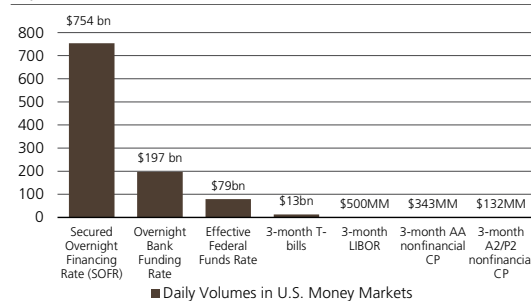
For example, SOFR (a short-term safe haven) and rates with a credit component will move in opposite directions at times of financial stress. This will increase market risk.

Fig. 5: Trillions of loans extend beyond 2021



Source: BR, NYFRB, UBS March 2018

Fig. 7 SOFR daily trading volume versus Libor in, bn



Source: Bloomberg, LSTA,UBS, as of 8 August 2018

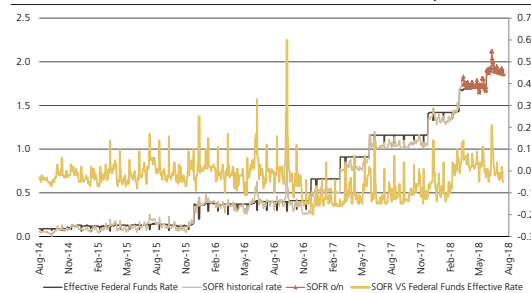
Fig. 8: Differences between Libor and SOFR

LIBOR	SOFR
Term Structure	Overnight (to begin)
Established and well understood	New and not well understood
In millions of long-dated contracts	Not in contracts yet
Not liquid, deep, transparent	Is liquid and deep
\$500 million of daily trading	Over \$700 billion of daily trading
Easily manipulated	Not easily manipulated
Unsecured	Secured
Reflects bank cost of funds(ish)	Risk-free rate
Widens to reflect COF in stress periods	Will not widen in periods of credit stress

Source: LSTA, UBS, as of 6 August 2018

Fig. 9: SOFR and the Effective Fed Funds rate are highly correlated and both are considered a risk free rate

lhs: EFFR. SOFR in, %; rhs: difference in bp



*Historical SOFR was calculated by the NY Fed until it was published live in April 2018.

Source: Bloomberg, UBS, as of 8 August 2018

2) Another difference between SOFR and LIBOR is that SOFR is an overnight rate, while LIBOR has maturities from one month to 12 months. These various tenors are needed to satisfy the borrowing needs of businesses, consumers, and financial assets.

The *credit spread adjustment* and the developments of a complete term structure are two important issues currently being addressed to ensure SOFR becomes the likely replacement to LIBOR.

SOFR credit risk premium and the term structure curve

1) *Credit spread adjustment (CSA)*: Because SOFR is a secured rate, it may never behave exactly like LIBOR. However, according to the Loan Syndication and Trading Association (LSTA),ⁱⁱⁱ three potential types of CSA are being discussed.

The first is simply a static CSA, which would try to measure the difference between the LIBOR and SOFR either at cessation, for a period of time before cessation, or on a forward-looking basis. Once calculated, the static CSA wouldn't change.

CIO calculated the general credit risk premium based on the above. In Figs. 11 and 12, we looked at the forward curves from the swaps market for 3-month LIBOR versus OIS, and 3-month LIBOR versus 3-month SOFR. We then calculated the average delta and the rolling two-year average between LIBOR and SOFR/OIS. As shown, as a general guide, the first methodology will result in a general credit spread adjustment of around 33 basis points (bps). Therefore, given that the overnight SOFR rate is 1.88%, adding 33bps for the credit premium, the base rate would now be 2.2%. Currently 3-month LIBOR is 2.3%. Again, the above is a general example of what this potential spread adjustment may look like under this methodology.

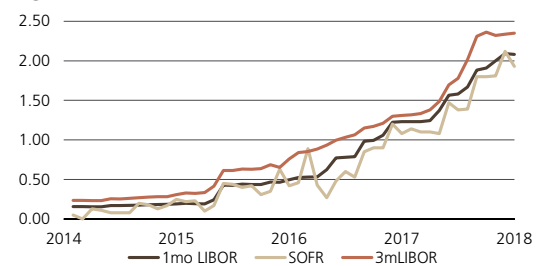
The second approach under discussion is a dynamic CSA that would attempt to measure the difference between LIBOR and SOFR on an ongoing basis. This methodology would be more accurate, but harder to calculate.

The third option is a static CSA with a "break the glass" component. In effect, if there is considerable credit stress in the marketplace, as measured by an external variable, a temporary additional spread could be added by the Alternative Reference Rate Committee to the CSA to account for the current stress.

The decision on the methodology for an appropriate credit spread adjustment remains a work in progress. Although adding a static CSA to the floating-rate SOFR appears to be the simplest methodology, credit conditions and severities are not constant. However, the third option of adding an extra spread during times of credit stress may also cause undue market tensions unless there is a clear methodology of how this credit-stress spread is calculated.

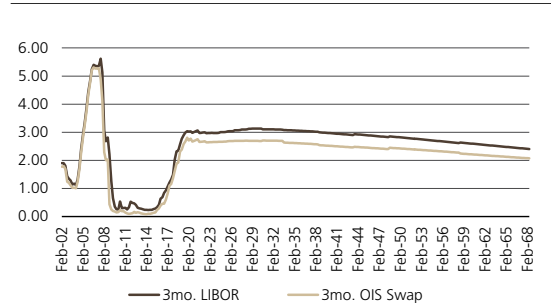
2) *Term structure*: In May 2018, the Chicago Mercantile Exchange (CME) began trading one-month and three-month SOFR futures contracts. This is critical to establishing a term structure similar to LIBOR's one-, three-, six-, and 12-month contracts. These term reference rates

Fig. 10: One and three month Libor versus SOFR



Source: Bloomberg, UBS, as of 9 August 2018

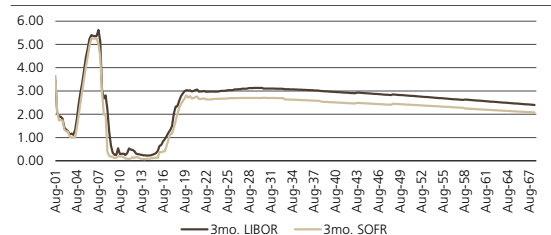
Fig. 11: 3-month OIS and Libor forward curves in, %



Average delta between 3 mo. LIBOR and 3 mo. OIS Swap
35bp
Average 2-year rolling difference
33bp

Source: Bloomberg, UBS, as of 8 August 2018

Fig. 12: 3-month Libor and 3-month SOFR curves in %



Average delta between 3 mo. LIBOR and 3 mo. SOFR
36.000
Average 2yr rolling difference
33.000

Note: Effective Federal Funds Rate used as a proxy for SOFR in the absence of a published alternative rate.

Source: Bloomberg, UBS, as of 8 August 2018

need to be established prior to the 2021 cessation of LIBOR so both lenders and borrowers would be able to use a forward-looking curve when pricing loans and notes.

Both the term reference rates and the credit spread adjustments are not small matters, and will need to be resolved well before the potential cessation of LIBOR. It may appear that a static spread adjustment (option one) is the easiest to implement.

Shifting LIBOR to SOFR

Shifting the LIBOR rate to the SOFR rate will require more than applying a simple conversion rate to the values in products to economically arrive at an equivalent contract. Transition challenges are bound to occur.^{iv} Consider:

- communicating a shift in the loan terms to millions of retail customers;
- the need for customer approval on all potential transition changes, the need for investor approval on individual security changes;
- reputational risk if the new reference rate works against the customer;
- issuing LIBOR-linked mortgages in the near future knowing that LIBOR may be transitioned; and
- the need for a functioning basis market to adequately support the securitization market – these are only a few of the transitional hurdles.

These are just some of the prospective issues. But what happens to the contracts and agreements currently in place, otherwise known as "legacy"?

The fallback language

The issue of "fallback language" for legacy deals has caused a point of concern. According to the New York Fed, some USD 36 trillion in notional outstanding will not mature prior to the end of 2021. Although this may pale in comparison to the USD 200 trillion currently outstanding, given the continuation of current deals and loans priced off of LIBOR, this amount is an underestimation.

Many contracts address what the alternative rate benchmark could be if there is a disruption in LIBOR, but not a complete elimination. Understanding the potential risks within legacy contracts is key to risk management, regardless of whether or not the 2021 deadline is achieved.

For example, does the contract state that if LIBOR is disrupted, the rate will be determined based on the last published LIBOR rate? If so, it is worth understanding that, over time, a once-floating-rate coupon security may now become a fixed coupon subject to different cash flow payments and risk characteristics.

Other contracts may state that the prime rate will become the alternative reference rate for disruptions in LIBOR. Currently, the prime rate is around 5%, well above the LIBOR rate (by about 200bps). A longer-term move to a prime rate would add substantial hardship to borrowers.

The rate-setting mechanisms of other legacy contracts are simply undetermined.

Regardless of the probability that a complete 2021 deadline is reached – which at this point is no certainty – investors need to understand the language within their legacy contracts as a prudent precaution.

In October 2017, Bank of America solicited various asset managers and banks for their opinion and potential reaction to a transition from LIBOR to SOFR. It is worth mentioning that given the progress with SOFR in 2018, the potential for transition is higher today than in 2017. However, Figs. 13 and 14 show the results of the survey. Banks represented the largest percentage in terms of maintaining LIBOR positions and using the fallback. Meanwhile, over 55% of asset managers stated that they would unwind their LIBOR positions prior to the new reference rate being implemented, with only a small percentage waiting until after implementation.

Fig. 14 outlines the market’s expectations of moving away from LIBOR. The majority of investors believed that credit premiums, (spreads), would widen for longer-dated maturities, and as a result the credit premium curve would steepen.

A recent Moody's publication " Uncertainty over future Libor is broadly credit negative" concluded that although the uncertainty over Libor is an overall credit negative, they also concluded that there is a low likelihood of defaults on individual instruments. We concur that overall default risk is low, however, widening credit spreads will most likely result as the cessation date draws closer.

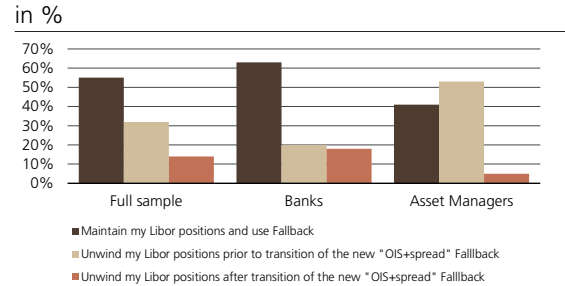
Conclusion

Libor's footprint on the financial markets is large. And although SOFR is currently pegged as the most likely replacement, officials face ongoing hurdles to meet their 2021 deadline. To date, there have been three deals, two from FNMA and one from the World Bank, that used SOFR as the base rate to their floating rate securities. Although these deals priced into the marketplace without a hitch, there are still several hurdles that need to be overcome before the cessation of Libor. Although we cannot say with certainty that the 2021 deadline will be met, it is better to be aware and prepare.

End Notes

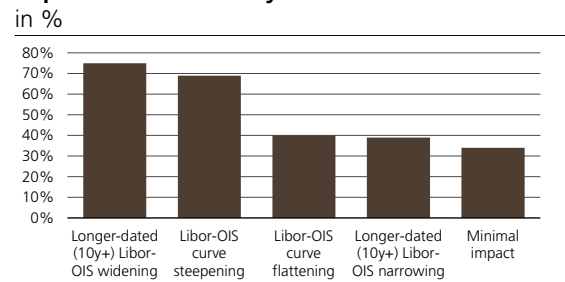
ⁱWhy LIBOR will disappear; Oliver Wyman
ⁱⁱFederal Reserve Bank of New York, Introducing the Secured Overnight Financing Rate, (SOFR) November 2017
ⁱⁱⁱAs of May 2018.
^{iv}LIBOR Transition: Marsh and McLennan 2018

Fig. 13: If Libor is discontinued and falls back to OIS+spread what is your likely response?



Source: BAML, UBS as of October 2017

Fig. 14 What do you expect to be the market impact of a move away from Libor?



Source: BAML; UBS as of October 2017

Appendix

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