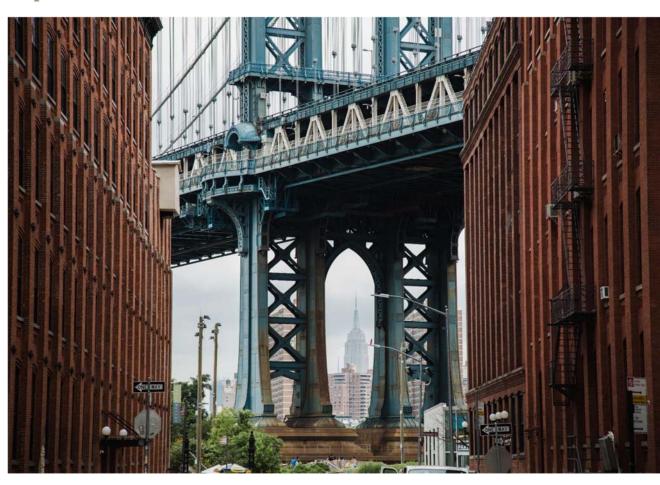
LIBOR Transition Series

Perspectives on SOFR and SONIA Indexed Debt Issuances

September 2018







Many in the debt capital markets hold the view that the development of a forwardlooking term structure for a replacement reference rate is fundamental to the transition away from LIBOR. However, recent debt issuances from the European Investment Bank (£1B SONIA-linked), Fannie Mae (\$6B SOFR-linked), World Bank (\$1B SOFR-linked) and others have been able to be executed with resets in arrears.

Recent Debt Issuances Without a Forward-Looking Term Structure

Many in the debt capital markets have long held the view that borrowers and lenders need to know at the beginning of each current interest period the exact rate at which they are borrowing and lending. The availability of forward looking term benchmark rates would likely ease the operational challenges in transitioning to overnight risk-free rates ("RFRs") such as SOFR and SONIA. As a result, some market participants believe transition away from LIBOR for many cash floating rate instruments is dependent upon the development of a forward-looking term structure.

Not all market participants are taking a wait and see approach, however. In June, the European Investment Bank ("EIB") issued a £1 billion SONIA-linked bond1 using overnight reformed-SONIA as the reference rate. The terms of the SONIA-linked EIB issuance provides for quarterly interest payments at the applicable compounded daily SONIA rate plus 35bps per annum (with an observation period beginning and ending five London business days before the start and end of the interest period). As the first SONIA floating rate note issued since 2010, the debt offering by the EIB was significantly oversubscribed.

Similarly, in the US, Fannie Mae ("FNMA") issued \$6 billion of SOFR-linked bonds² on July 26th, the first of its kind. The \$6 billion FNMA issuance was offered in three maturities consisting of six-month notes priced at SOFR+8 bps, 12-month notes at SOFR+12bps, and 18-month notes at SOFR+16bps. The quarterly interest payments are based off an average daily rate using each day's spot rate during the interest period (with a four day suspension period). This type of interest rate calculation is not new to FNMA investors – a similar

coupon convention is used for FNMA Fed Funds floaters³, floating rate notes linked to the overnight Fed funds rate. This offering equally drew significant investor interest from market participants.

More recently, the World Bank became the first supranational issuer of SOFR floating rate debt on August 14, 2018 when it issued \$1 Billion of 2-year SOFR-linked bonds⁴. The \$1 billion issuance has a maturity date of two years and pays average daily SOFR + 22bps, paid on a quarterly basis. These issuances were followed shortly thereafter with SOFRlinked issuances from Credit Suisse, Barclays, and Metlife. None of these issuances rely upon 'forwardlooking' term rates. Refer to the table below for terms of the EIB, FNMA, and Worldbank issuances.

Issuer	EIB	FNMA	World Bank
Issuance date	June 29, 2018	July 26, 2018	August 14, 2018
Principal	£1 billion	\$6 billion	\$1 billion
Benchmark	Sonia	SOFR	SOFR
Coupon	Compounded Daily SONIA +35bps (calculated over an observation period beginning and ending 5 business days before the start and end of the interest period)	SOFR +applicable spread, reset daily and paid quarterly with a 4 day suspension period ⁵	SOFR +22bps, reset daily and paid quarterly with a 4 day lockout ⁵
Payment frequency	Quarterly	Quarterly	Quarterly
Tenors & pricing	5 yrs & +35bps	6 mths & +8bps 12 mths & +12bps 18 mths & +16bps	2 yrs & +22bps

¹ http://www.eib.org/en/investor_relations/press/2018/fi-2018-12-EIB%20issues%20markets%20first%20SONIA%20GBP%20benchm ark%20with%20GBP%201bn%205y%20issuance.htm

² http://www.fanniemae.com/portal/media/financialnews/2018/fannie-mae-pioneers-sofr-securities-6736.html

³ https://www.lsta.org/news-and-resources/news/sofr-terms-ofendearment

⁴ https://www.worldbank.org/en/news/pressrelease/2018/08/14/world-bank-launches-markets-first-ssasecured-overnight-financing-rate-sofr-bond 5 The four day suspension/lockout period holds the rate constant to facilitate calculating the coupon payment prior to the end of the period

Observations on Interest Terms

While these replacement RFR bond issuances have demonstrated the issuance of floating rate debt referencing overnight rates is operationally achievable despite coupon calculation and payment processing timing pressures at period end, some market participants may still determine that knowing coupon payments in advance is preferable. However, while it is not possible to know the applicable rate for the period at the start of the coupon period, as discussed below, as time progresses the applicable interest rate for the period becomes more defined and less subject to variability.

SOFR-Linked Issuances

To demonstrate the applicable rate for the period becomes more and more defined as time progresses, we charted the progression of the period-to-date average rate over the term of the coupon period. Using a hypothetical three-month coupon period beginning April 30, 2018 and ending July 30, 2018⁶ and leveraging the interest calculation convention outlined in the FNMA debt issuance, the applicable average rate for the coupon period (excluding spread) would have been 1.8278%. As shown in the table below, the observed period-to-date average throughout the period is within 12 basis points, with the widest gap occurring at the end of the first month with two months remaining in the coupon period.

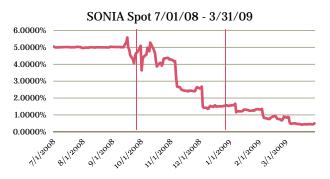
	Period -to-date Average	Applicable Rate at Period End	Abs Diff (bps)	Relative Diff (%)
Start of Coupon Period	1.7700%	1.8278%	5.78	-3.16%
Two Months Remaining	1.7120%	1.8278%	11.58	-6.34%
One Month Remaining	1.7757%	1.8278%	5.21	-2.85%
Coupon Period End	1.8278%	1.8278%	-	0.00%

SONIA-Linked Issuance

A similar observation is made on the SONIA-linked EIB debt issuance. Using Q1 2018⁷ as a hypothetical example, the applicable compounded rate for the first quarter (excluding spread) would have been 0.4638%⁸. As shown in the table below, the observed period-to-date compounded rate throughout the period was within 0.2 basis points, with the widest gap occurring at the start of the period with three months remaining in the coupon period.

	Period -to-date Compounded Rate	Applicable Rate at Period End	Abs Diff (bps)	Relative Diff (%)
Start of Coupon Period	0.4619%	0.4638%	0.19	-0.41%
Two Months Remaining	0.4630%	0.4638%	0.08	-0.17%
One Month Remaining	0.4635%	0.4638%	0.03	-0.07%
Coupon Period End	0.4638%	0.4638%	-	0.00%

To demonstrate that interest payments can be reasonably estimated even in more volatile interest rate environment, we calculated the applicable interest rate had the debt been outstanding during Q4 2008. During that period, as shown in the graph below, SONIA rates dropped by as much as 392bps throughout the quarter.



 $^{^6}$ April 30, 2018 through July 30, 2018 was used as the observation period since it provided three months of available SOFR data.

 $^{^7}$ Q1 2018 was used as the observation period to reflect a recent interest period while excluding the impact of conversion to reformed SONIA in April 2018

⁸ Market data used in calculations was source via Bloomberg

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As shown in the table below, the period-to-date compounded rate throughout the coupon period becomes more defined and less susceptible to volatility as time progresses. Even in a severe economic downturn, with one month remaining in the coupon period, the period-to-date compounded rate is within 48.74 bps of the applicable rate at period end. This also illustrates how the use of an averaging or compounding interest rate approach can produce a smoothing effect compared to the variability observed in a volatile interest rate environment.

	Period -to-date Compounded Rate	Applicable Rate at Period End	Abs Diff (bps)	Relative Diff (%)
Start of Coupon Period	4.6216%	3.2912%	133.05	40.43%
Two Months Remaining	4.4912%	3.2912%	120.01	36.46%
One Month Remaining	3.7786%	3.2912%	48.74	14.81%
Coupon Period End	3.2912%	3.2912%	-	0.00%

This exercise does not take into account that estimates of the applicable rate would have likely incorporated expectations of further declining interest rates. Therefore, it is likely that estimates of the applicable compounded rate throughout the interest period would have been even more accurate in predicting the applicable average rate than relying solely on monitoring the period-to-date compounded rate throughout the coupon period.

The EIB, FNMA, and World Bank issuances demonstrate that cash products can be issued indexed to overnight RFRs. Although the applicable interest rate for the period is not known in advance, the variability in the current period cash flow is relatively small compared to actual cash flows and shrinks as you approach the payment date. As illustrated above, even in periods of stress, the variability of the applicable rate is less than the month-to-month volatility observed. Furthermore, SOFR and SONIA swaps/futures pricing can also help users forecast coupon payments.

As part of its SOFR-linked debt issuance, the World Bank also entered into a float-to-float interest rate swap effectively converting its exposure from SOFR back to three-month LIBOR. These hedging counterparties likely offset their exposure with SOFR futures. On August 20, 2018 Credit Suisse became the first bank to issue SOFR-linked debt with a \$100 million, 6-month certificate of deposit⁹. Shortly thereafter, Barclays issued SOFR-linked commercial paper (\$525 million)¹⁰ and Metlife issued 2-year SOFR-linked debt (\$1 Billion)¹¹. This demonstrates liquidity in the derivative and cash instruments market indexed to RFRs is continuing to increase.

Conclusion

 $^{^9}$ https://www.ft.com/content/a7f5b21c-a4cd-11e8-8ecfa7ae1beff35b

 $^{^{10}}$ https://www.bloomberg.com/news/articles/2018-08-27/libor-challenger-embraced-in-debut-commercial-paper-transaction

 $^{^{11}}$ https://www.bloomberg.com/news/articles/2018-08-30/metlifebreaks-ground-with-benchmark-bond-based-on-libor-heir

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