Lag in the SOFR-linked non-linear derivatives market Three barriers to transition

Risk.net explores three themes in SOFR non-linear derivatives discussed by experts in a webinar sponsored by Numerix

Banks are adopting the secured overnight financing rate (SOFR) as the primary interest rate benchmark for derivatives in preparation for the cessation of the most widely used USD Libor tenors in June 2023. A strong regulatory push has triggered a rapid switchover in swaptions and other non-linear markets activity. However, there are unique challenges in adapting products that are built for a forward-looking term rate, such as Libor, to overnight rates such as SOFR.

In a *Risk.net* webinar sponsored by Numerix, an industry panel discussed how liquidity has developed in SOFR-linked non-linear products. They discussed what structural adaptations have taken place in the transition and the impact on behaviours of the instruments; the challenges of valuing SOFR-linked products; as well as the potential for a relaxation of the restrictions in the use of the SOFR term in derivatives. Here we explore three themes that emerged from the discussion.

THE PANEL

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Moderated by: Helen Bartholomew, Editor-at-large, *Risk.net*

New overnight behaviour

Although many mutual funds aren't yet performing SOFR swaptions, swap data repository (SDR) data shows that most investment banks are trading non-linear products on SOFR. However, a poll taken during the webinar showed that only 13% of participants had fully transitioned to SOFR in non-linear products.

The volatile rates market has triggered concerns around investors trading these rates. Markets in general are experiencing low liquidity overall, and not just in rates. But the webinar's panellists said these concerns were compounded by the introduction of a rate that many traders and portfolio managers still don't fully understand. World liquidity issues are amplified by a lack of familiarity with the repo market and an understanding of why SOFR is a reference rate and what it measures. This makes linear trades more difficult to execute and to hedge. This, in turn, has impacted non-linear trades and created an overall lag in the market, which could explain the low adoption by webinar participants.

Traders and portfolio managers are still familiarising themselves with the new overnight behaviour of SOFR, which is quite different from that of Libor. Ping Sun, senior vice-president of financial engineering at Numerix, explained: "The structural adaptations that have taken place to hitch products to this backward-looking rate have given rise to the daily compounding nature, recycling and reuse. This is quite different from the behaviour banks were used to with Libor, which makes it quite difficult for the SOFR-linked non-linear market to pick up."

This is not completely new behaviour: the panellists noted that US Federal Reserve funds are also daily compounded. Some banks have traded overnight indexed swaps (OIS) against the Fed funds rate for a long time and are familiar with that structure, which is similar to that of SOFR. Nevertheless, the Fed funds market has been very small compared with the Libor market, and volumes for OIS are tiny in SDRs. So, general familiarity with an OIS swap structure and swaptions on those is still low.

Those behaviours manifest through vanilla non-linear products, such as caps and floors. Ping Sun said: "When these are switched to SOFR, the nature of the daily compounding affects the volatility. As more and more fixings are contributed over the period, the volatility decreases. Banks will need to incorporate their valuations into their risk management analytics so they can capture the new behaviour.

"As well as for vanilla non-linear products, this poses problems for some more exotic ones such as range accruals or callable swaps," he added. For those more exotic products, the daily compounding nature of the underlying makes it quite different from the behaviour banks were used to with Libor, especially in the absence of the term rate. They will need to understand how this contributes, for example, to range accruals and to certain callability.

SOFR swaps market data

One of the main barriers to the transition to SOFR in the non-linear derivatives markets is the availability of market data. According to Ping Sun, the liquidity of the trading space has not yet reached the vendor side. So, SOFR swaptions market data is not yet generally available from major vendors. When it is available, liquidity is a concern.

Currently, the options market is still split and Libor and SOFR swaptions are being actively traded. And Libor swaptions offer more market data to the end-user. So it is common practice now for banks to use the volatility data from Libor-based swaptions and map it to that of SOFR swaptions.

Ping Sun said: "In mapping the data, banks might need to apply a proxy for the strike. As there is a defined spread, they can use it to convert the Libor strike to the SOFR strike. The volatility value will need to be interpolated."

This creates challenges in managing basis risk. He continues: "When you convert the volatility surface or cube from Libor-based swaptions, the actual spread might be different from the fallback one published. On top of that, SOFR swaptions have already been traded. So, if there's some mismatch, although the quote might not be as liquid, banks need to handle the mismatch of the volatility. They may need to apply some spread on the volatility itself besides the spread on the strike. They may need to convert and combine these two from now to the end of this year."

There are many proxies of this type involved in mapping the data. But, if banks need to trade and they are without the market data, they have no other choice. This is a painful transition, especially while SOFR swaptions market liquidity continues to develop. "This will probably improve gradually," said Ping Sun, "but there's no guarantee exactly when reliable SOFR swaptions market data will be available to traders and portfolio managers to use."

SOFR began publication in 2018 and, although the Federal Reserve Bank of New York published SOFR fixings prior to its official inauguration following the same methodology, there is no corresponding derivatives data one can reference. However, there are some workarounds because SOFR is so close to Fed funds OIS, as discussed. This can offer a historical analysis going back beyond 2018 concerning the derivatives. The fact that one is secured and one is unsecured doesn't make much difference for overnight rates.

Term SOFR

"The restrictions on the use of term SOFR are another reason traders and portfolio managers are hesitating to start using SOFR-linked products until market liquidity is better," said Ping Sun. Currently, there is a strong bar against term SOFR in the derivatives market. Term SOFR swaps can only be traded to hedge a cash loan. No speculation or hedging of just interest rate risk for asset managers can be done outright, and term SOFR cannot be traded in an interdealer broker market. The term SOFR swaps market is close to zero, with the only real activity being from banks and corporations wanting to hedge one-off loans against SOFR. There isn't yet any demand for term SOFR swaptions, caps and floors. The panel believed the market needs term SOFR swaps first and trading desks on the short end to be able to freely move within term SOFR products.

Regulators may have concerns allowing the term SOFR rate to be used in derivatives because it is the same kind of term rate Libor was defined on. The SOFR underlying market is huge – roughly $1 trillion a day – but the derivatives market is not necessarily as solid. So there could be issues with liquidity or the market could suffer similar problems to those encountered with Libor in the past. Regulators may have put in place the initial restriction to avoid complicating the transition process with many different options. Either way, a lot of traders haven't transitioned fully to SOFR, as the webinar poll reflected. According to the panel, regulators are focused first on getting the market fully functioning and adopting the overnight reference rate and all the products based on that.

Responses to the poll reflect the market's desire for more term SOFR use in non-linear markets. Just over one-quarter said it is critical to lift trading restrictions, and just over half said it would be helpful. "Not only would a term version of SOFR help to encourage traders or portfolio managers who lack confidence in this market to start using SOFR-linked products," said Ping Sun, "it would also help with some of the technical difficulties posed by daily compounding for valuations for risk management plans. Term SOFR would behave in the same way as term Libor, to which the market is accustomed. So the product definitions would be more familiar for term SOFR."

Reducing restrictions on term SOFR and allowing different segments of SOFR swaps and swaptions to trade would open the market to a range of non-linear derivatives. For example, traders typically want to do forward rate agreements on a three-month rate. Therefore, once term rates open up, those could be linked to risk-free rates. It would also potentially include the likes of the Bloomberg Short-Term Bank Yield Index, which is hardly trading despite the lack of any real restrictions on it. Potentially, the market could use 30- and 90-day backward-moving average rates published by the Fed. And there would certainly be scope for the kinds of swaps visible on the euro short-term rate.

There has been no regulatory discussion about relaxing some of the restrictions on term SOFR,

Ping Sun, Numerix

but panellists said this is inevitable because the market needs its various risk profiles and products. Once liquidity is improving and the transition to the overnight rate has progressed, regulators will perhaps extend the use of term SOFR from direct hedging of cash products to derivatives and allow the market to develop all the necessary machinery for what is going to be a large term SOFR swaps and swaptions market.

CME has been publishing a term SOFR rate since April 2021, and ICE also started publishing term SOFR rates in March 2022.

"One of these may become the rate every trade will be referenced to or they may converge," suggested Ping Sun. "Currently, the SOFR swaps market is still not as liquid as that of futures, which CME's term SOFR rate is based on. So the SOFR swaps market is still evolving, but hopefully, traders will get a solid definition of the term SOFR rate soon. And, once linear products have been adopted, many new non-linear products can pick up as well."

A multi-phased transition

The SOFR market will potentially continue to evolve along with the term SOFR market. Meanwhile, banks are adapting existing markets to get the best results given the restrictions they are under. However, the webinar raised some interesting questions about how firms can approach the challenges in data analytics and modelling of SOFR-linked products.

More reference rates and term exposure are required to cater for the different needs of traders. This is expected to develop naturally. In time, this will allow for the availability of swaps, swaptions and more products, including range accruals and other exotics. But this will be a multi-phased transition over several years.