SOFR Discounting
Auction Process Technical Specification

PRIVATE AND CONFIDENTIAL
LCH plans to switch discounting on all SwapClear USD-discounted products, including non-deliverable currencies and MXN, from Fed Funds to SOFR.

DISCLAIMER — PLEASE NOTE THAT THIS DOCUMENT IS NOT INTENDED TO BE LEGALLY BINDING

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As previously announced in July 2019, LCH plans to switch discounting (and PAI/PAA) on all SwapClear USD-discounted products, including non-deliverable currencies and MXN, from Fed Funds to SOFR. The conversion is planned to take place starting on 16th October 2020.

As part of the conversion process, LCH plans to provide risk compensation in the form of Fed Funds vs. SOFR basis swaps. The purpose of these compensating swaps is to reverse the change in discounting risk that will happen as a result of the update to the discounting curve, and to prevent any short-term distortions in market levels being permanently crystallised as cash in customer accounts.

Client accounts will be able to opt out of the risk compensating swaps (for the avoidance of doubt, member accounts will not be able to opt out). All swaps that are opted out of by clients will be subject to a close-out process using an auction, to be run by LCH. The purpose of this document is to provide members and clients with a detailed description of this close-out process. Please note that detailed plans in this document will be reflected in the rulebook of LCH Limited and are subject to legal and regulatory approval and may therefore be subject to further change.

Executive Summary

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THE PROCESS STEPS DESCRIBED IN THIS DOCUMENT ARE AS FOLLOWS:

01. Specifying the compensating swaps
    Calculating the compensating swap notional; compensating swap trade details;
    02. Client opt-outs
        Communicating opt-out decisions; calculating the opted out portfolio;
    03. Auction logistics
        Participation; timing; bidding logistics; determining the auction winner(s); auction winner allocations;
    04. Auction mid price
        Calculation of auction mid price; use of auction mids in end-of-day pricing;
    05. Auction proceeds
        Calculating the auction proceeds; allocating to individual accounts; auction proceeds cap and partial fill scenario;
    06. Post-auction events
        Trade repository reporting; creating the compensating swaps; processing the auction proceeds; auction bid reporting;
    07. Further information
        Where to find other resources; contact details.

01. Specifying the Compensating Swaps

CALCULATING THE COMPENSATING SWAP NOTIONALS

The first step of the process is to evaluate the change in discounting risk as a result of the switch from Fed Funds to SOFR discounting. LCH will calculate the overall SOFR risk ladder under both regimes. The difference between these risk ladders is then the change in discounting risk, which we would plan to compensate for. The SOFR risk has increased, with an equal and opposite decrease in the Fed Funds risk, or vice versa.

The second step is to aggregate the required compensating risk into the compensating swap tenors: 2Y, 5Y, 10Y, 15Y, 20Y and 30Y. In this calculation any granular bucket containing risk between these main pillar points will be allocated to the nearest two pillars in proportion to the time difference between the relevant pillar points (for example 12Y risk will be allocated 60% to 10Y and 40% to 15Y, exact day counts will be used).

Finally, the required notional size for each compensating swap is calculated to match the required risk sensitivity (i.e. the delta) in each of the compensating swap tenors.

These calculations will be performed at the account level for any account with USD discounting risk with reference to the cleared trade population as at close of business on Wednesday, 14th October 2020. Any trades cleared after this point will not be included in the compensating swap calculations, though they will be included in the value compensation calculations up to close of business on 16th October 2020. LCH will not accept any backloads or portfolio transfers during 15-16th October 2020. All trades with USD-linked discounting are included in this calculation: USD LIBOR, Fed Funds, SOFR, USD Inflation, MXN and non-deliverable swaps in THB, KRW, CNY, INR, TWD, BRL and COP interest rates. The results are calculated on a fully netted basis.

COMPENSATING SWAP TRADE DETAILS

The swaps will be ‘at market’ and hence have zero NPV at inception (cash/value compensation being provided separately). The compensating swap is a SOFR vs. Fed Funds basis swap. However, for operational reasons the swap will be provided as a pair of fixed vs. floating swaps:

- 01. The Fed Funds leg will reference the Floating Rate Option “USD-Federal Funds-H.15-QIS-COMPOUND”, payable annually on an ACT/360 basis, versus an annual fixed rate on the same basis.
- 02. The SOFR leg will reference the Floating Rate Option “USD-SOFR-COMPOUND”, payable annually on an ACT/360 basis, versus an annual fixed rate on the same basis.
- 03. Both trades will be spot starting with a natural maturity date linked to the associated tenor.

Notionals will be rounded to discrete quantities using the rounding convention below. All computed notionals will therefore be an integer multiple of the quantities below. Any notional falling below half these figures will be rounded to zero, i.e. no compensating swaps will be created in those tenors for the relevant account.

<table>
<thead>
<tr>
<th>Rounding</th>
<th>2Y</th>
<th>5Y</th>
<th>10Y</th>
<th>15Y</th>
<th>20Y</th>
<th>30Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notional</td>
<td>5,000,000</td>
<td>2,500,000</td>
<td>1,250,000</td>
<td>500,000</td>
<td>500,000</td>
<td>500,000</td>
</tr>
</tbody>
</table>

*Price Alignment Interest / Price Alignment Amount.

*For detail please see disclaimer note on the contents page.

*Equally LCH could look at this calculation with reference to Fed Funds risk, but the calculation with respect to Fed Funds is more straightforward this way due to the relatively much smaller number of existing SOFR trades in the clearing service.
Client Opt-outs

COMMUNICATING OPT-OUT DECISIONS
Opt-out decisions must be communicated to LCH by clearing brokers no later than 4th September 2020 using the LCH Portal. Please contact SwapClear.ClientServices@lch.com for further information on accessing the LCH Portal.

Opt-out decisions are made at the account level. Clients with multiple accounts may choose which accounts they intend to opt out. Clients may not opt in or out of specific tenors.

LCH will attempt to close out all opted out compensating swaps by running a process described in the next sections. Note that if there are insufficient bids for the opted out portfolio within a predetermined range (the ‘auction proceeds cap’), opted out clients will, notwithstanding their election to receive cash only, still receive part or all of their compensating swap allocation (see section 5 for details).

CALCULATING THE OPTED OUT PORTFOLIO
For the client accounts opting out, the compensating swap positions will be aggregated and netted into six single compensating swaps across all such client portfolios, to become the auction portfolio.

Auctions will be held during the morning of Friday, 16th October 2020.

Auction Logistics

PARTICIPATION
Members who are large, active participants in the USD swaps market will be required to use all reasonable efforts to bid in the auction. LCH has defined the threshold for requiring auction participation as those member groups having cleared at least $1 trillion notional of USD-denominated swaps at LCH in Q1 2020. There are 16 member groups above this threshold. We anticipate that auction participation will be open to other SwapClear participants. Other members or clients wishing to participate as auction bidders should contact LCH by emailing SwapClearRisk@lch.com.

All auction participants will be expected to demonstrate connectivity to LCH’s auction platform, which is based on the existing LCH Portal. Any client participants may not opt out of their own compensating swaps (i.e. they cannot be a beneficiary of the auction as well as a participant).

Auction participants will be informed of the indicative size of the auction portfolio (but not the direction) 4 weeks before the auction takes place. This is to ensure they have time to obtain the necessary trading and risk limits.

TIMING
Auctions for the opted out swaps will be held during the morning of 16th October 2020 (in New York business hours). The bidding for each of the six compensating swaps will be separate (i.e. LCH will not support bids for packages of trades), though for logistical reasons LCH may decide to run multiple auctions at the same time.

The precise timing and ordering of individual tenor auctions will be agreed with the group of auction participants in advance. We also expect to convene this group to discuss feedback on this document, and to organize and take feedback on the planned dress rehearsal exercise.

LCH expects that each auction will have a bidding window of approximately 15 minutes. All participants may amend or remove their bids during this time. The open bids present in the platform at the close of the auction window will be considered as final, executable bids. There will be a break between the end of one auction and the start of the next to complete and validate the auction calculations. LCH will notify auction participants of the outcome (whether or not they have won any share in the auction and, if relevant, the price paid) within 30 minutes of the auction closing.

BIDDING LOGISTICS
For each auction, LCH will show the full size (but not the direction) of the position being auctioned and will ask for two-way tradeable quotes from the auction participants.

The quotes provided will represent the levels at which auction participants are willing to enter into a Fed Funds vs. SOFR basis swap with LCH in the specified size, maturity and direction, and are quoted in terms of basis points spread on the SOFR leg of the trade.

Bids will be submitted via the LCH auction platform. Auction participants will access the auction platform via a web portal that displays a schedule of auctions for the day. During the auction window, members may use the portal to submit, change or withdraw their bids. This platform has been developed and tested externally for use in auction processes. There will be an additional test with auction participants in advance of the event via at least one ‘dress rehearsal exercise’.

*Bids must be kept separate in order to preserve the integrity of pricing for individual swaps. This is important as costs will later be allocated to client accounts based on their share of each individual tenor.*
Auction participants will be permitted to provide prices in two formats: an ‘order book’, or an ‘all or nothing’ price. Auction participants may supply quotes in one or both formats, as below. The minimum requirement is to bid for 10% of each auction swap.

**Order Book**

<table>
<thead>
<tr>
<th>Proportion</th>
<th>Bid</th>
<th>Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10%</td>
<td>X bp</td>
<td>X bp</td>
</tr>
<tr>
<td>10-25%</td>
<td>X bp</td>
<td>X bp</td>
</tr>
<tr>
<td>25-50%</td>
<td>X bp</td>
<td>X bp</td>
</tr>
<tr>
<td>50-75%</td>
<td>X bp</td>
<td>X bp</td>
</tr>
<tr>
<td>75-100%</td>
<td>X bp</td>
<td>X bp</td>
</tr>
</tbody>
</table>

**All Or Nothing**

<table>
<thead>
<tr>
<th>Proportion</th>
<th>Bid</th>
<th>Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% Only</td>
<td>X bp</td>
<td></td>
</tr>
</tbody>
</table>

In the order book approach, auction participants provide differentiated pricing for a defined proportion of the compensating swap being offered. With the all or nothing bid, an auction participant shows a price which is valid if and only if they are allocated the full size. The rationale for this type of quote is that auction participants may prefer to take the swap knowing that they own the full size and therefore may be prepared to offer better pricing if this condition is met, resulting in a better outcome for the opting out clients.

**Determining the Auction Winner(s)**

Initially, all bids in the order book format will be aggregated and arranged in descending order (or offers in ascending order, depending on the direction of the swap being auctioned). LCH will work down this list until enough bids have been accumulated to cover the full size of the auction. The last bid (or offer) is then the market clearing price, i.e. the best price at which there are enough partial bids to cover the full auction size in aggregate.

The market clearing price from the order book bids is then compared with the best all or nothing bid. If there is a better all or nothing bid, that bidder will be the sole auction winner. Otherwise, the order book bidders will be declared the winners and the auction swap will be allocated to them. Note that all winners will be allocated their swap using the same market clearing price, which will be the same or lower than the price they bid (or higher than their offer). This feature is in the interests of fairness to all bidders and to encourage competitive bidding: there is no ‘winner’s curse’ for individual high bidders.

Note that the swaps themselves will be ‘at market’, i.e. the rates used will be the auction mid price, not the market clearing price paid by the auction winners (see next section for more detail).

**Allocation of Swaps to the Auction Winners**

All bidders who bid higher than the market clearing price will be allocated the full share that they bid for. Bidders who bid the market clearing price will be allocated a share of the remainder in proportion to the size of bid they made at that level.

Auction participants will be notified within 30 minutes of the auction close whether they have won a share of the auction portfolio and (if relevant) the size of the allocation and the price paid.

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*If two or more auction participants submit the same best price, the submission with the earliest time stamp will be taken. In the event that the best all or nothing bid is the same as the market clearing price, then the all or nothing case will take precedence, this minimises the number of swaps needing to be booked.*
The Auction Mid Price

Calculating the Auction Mid Price

One of the important features of the auction is to generate robust prices from which to derive the cash compensation. To ensure the quality of this information, the bids will go through a cleaning process, described below.

For each auction participant, take the highest bid and the lowest offer. The bid must be lower than the offer for individual participants — the auction platform will block any bids that do not meet this condition. The highest bid (and lowest offer) may be an order book bid or an all or nothing bid.

Any crossing bids, i.e. individual participant bids that are higher than another participant’s offer (and vice versa), will be excluded.6

The auction mid price will be the average of the highest quarter of bids and lowest quarter of offers from the quotes remaining. The number of bids in this calculation will be rounded up to the nearest whole number, e.g. if there are five bids left after removing the crossing bids, the average of the best two will be used for the auction mid calculation.

Use of Auction Mids in End-of-Day Pricing

The auction mid prices will be used to construct the LCH end-of-day SOFR curve on the day of the auction. The auction will produce the SOFR-Fed Funds spreads at 2Y, 5Y, 10Y, 20Y, and 30Y, which will be applied to the regular Fed Funds curve (consensus market level sourced from broker quotes) to create the SOFR curve. For points between these pillars, the spreads will be calculated using linear interpolation. For points beyond 30Y, the 30Y spread will be extrapolated out flat. For the short end of the SOFR curve including the fixing, the regular market data capture process for SOFR will apply, i.e. SOFR quotes will be taken from the market directly.

These curves will be the official SwapClear close of business curves for the day. They will be used to calculate all cash compensation amounts for members and clients, irrespective of whether they opt out of the compensating swaps. For opting out clients, the auction mid also serves as a reference for calculating the auction proceeds, as described in the next section.

At all other times the usual SwapClear processes will apply to mark closing curves and call and pay variation margin, i.e. using consensus market levels based on broker sources.

Auction Mid Example

Removal of Crossing Bids

In this example, the bid from Bank 5 is higher than the offer from Bank 4. Both data points would therefore be removed from the auction mid calculation.

Selecting Best Bids and Offers

With five quotes remaining, the number of quotes selected is two (one quarter of five, rounded up).

Calculating the Auction Mid

The average of the best bids and best offers (two bids at 10bp and two offers at 12bp) gives the auction mid of 11bp.

*Note that crossing bids are not excluded from the auction winner calculations. It is possible for crossed bids to win a share, or all, of the auction portfolio.
05. Auction Proceeds

CALCULATING THE AUCTION PROCEEDS

Auction winners will be provided with their compensating swaps at market with reference to the auction mid as the market level. This means that the fix spread on the SOFR leg of their trade will be equal to the auction mid price for the relevant tenor.

The difference between the auction mid price (in basis point terms) and the price agreed with the auction winner(s) market clearing price (the best bid or combination of best bids, also in basis point terms) multiplied by the size of the auction position (in dv01 terms) can therefore be thought of as the auction proceeds. If the market clearing price is lower than the auction mid, this results in the need for a cash payment to the auction winner from the opting out client accounts.7

ALLOCATING TO INDIVIDUAL ACCOUNTS

For each individual auction, the proceeds are allocated to client accounts in proportion to the notional size of compensating swap that they have opted out of (irrespective of long/short):

\[
\text{ClientAllocation}_i = \frac{\text{ClientNotional}_i}{\sum \text{OptOut}_i \times \text{TotalNotional}} \times \text{Auction Proceeds}
\]

AUCTION PROCEEDS CAP AND PARTIAL FILL SCENARIO

In order to prevent the opting out client accounts from incurring unquantifiable costs in the auction process, LCH plans to cap the auction proceeds at a predetermined number of basis points. If the auction fails to produce sufficient bids to cover the entire auction size within this level, this will result in a partial or no fill scenario. If there are no bids within the auction proceeds cap, all clients will receive their full allocation of compensating swaps.

In the partial fill scenario, each opting out account will be allocated both cash and swaps. The cash represents their share of the auction proceeds payable to the successful bidders that were within the agreed range. The swaps will represent their share of the compensating swap notional for which there were insufficient bids (bids outside the range or no bids at all). Both calculations will be performed as a percentage of notional, as per the auction proceeds calculations above.

If clients subsequently require an unwind of their remaining compensating swaps positions, it will be their own responsibility to achieve this in the open market with the help of their clearing broker (as the intermediating counterparty). We are in dialogue with the clearing brokers regarding their roles and responsibilities in this process. Note that unwinding the compensating swaps in the open market will clearly be an option for any clients who may prefer not to put their compensating swaps into the auction process.

LCH does not plan to hold any further rounds of LCH-organised auctions after the initial scheduled round, even in the partial or no fill scenarios. LCH will confirm the level of the auction proceeds cap closer to the time that client elections need to be made.

06. Post-auction Processing

CREATING THE COMPENSATING SWAPS

The compensating swaps assigned to the auction winners will be booked over the weekend following the auction and cleared at the opening of the SwapClear service on Monday, 19th October 2020.

The auction winner(s) will receive a two-swap package, with both trades executed at market, using curves derived from the auction mids as described above.

PROCESSING THE AUCTION PROCEEDS

From an operational perspective only, the individual payments between the auction winner(s) and the relevant opting out client accounts will be facilitated using fees attached to a $1 notional short-dated Fed Funds swap (the same mechanism as will be used to facilitate the cash compensation). These trades will also be booked over the weekend and cleared at the opening of the SwapClear service on Monday, 19th October 2020. The cash payments will settle on Tuesday, 20th October.

TRADE REPOSITORY REPORTING

Auction winners will need to report their winning trades in accordance with their local regulations for off-facility swap transactions. All cleared swap transactions associated with this process will be subject to the usual reporting requirements for cleared swaps. SwapClear will report all transactions to the trade repository after the close of business on the day of clearing, i.e. Monday, 19th October. All such reporting will be anonymous, i.e. individual counterparties will not be identifiable.

Note that the rates used for the compensating swaps will be the auction mid prices. The market clearing price, i.e. the price paid by auction winners, should not be visible in the trade repositories.

AUCTION BID REPORTING

The full schedule of bids will be reported on a confidential basis to the relevant supervisory authorities, i.e. CFTC and the Bank of England.

7Note that it is possible (for example where an all or nothing bid crosses other offers) for the winning auction bid to be higher than the auction mid price. In this case a payment is due from the auction winner to the opting out client accounts.
07. Further Information

RESOURCES
Further information is available at:

LCH Website: https://www.lch.com/resources/rules-and-regulations/regulatory-responses/benchmark-reform/usd-market

LCH Portal: https://clearingservices.lchclearnet.com/portal/group/lch/swappclear

CONTACT US
For any other queries please discuss with your regular SwapClear representative or you can email:

SwapClear Sales and Relationship Management: LCHGlobal.SRM@lch.com