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

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The contents of this paper are for informational purposes only. The legally binding terms of the auction process and LCH Limited’s transition to SOFR discounting, and which is described herein, are set out in the rulebook of LCH Limited and any ancillary materials published pursuant thereto. Clearing Members and their clients should not rely on anything stated in this document and LCH Limited expressly disclaims, to the extent permitted by law, any liability in connection with this document and its contents. Clearing Members and their clients should take their own legal and other advice regarding the transition to SOFR discounting and ancillary matters connected therewith. The LCH rulebooks are publicly available at www.lch.com. Further information is also available at: https://www.lch.com/risk-management/risk-management-ltd/fd-risk-notices/lchs-transition-fed-funds-sofr-discounting-its.

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Executive Summary

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 Friday 16th October 2020.

As part of the conversion process, LCH plans to provide ‘risk compensation’ in the form of Fed Funds versus 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. All swaps that are opted-out 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.²

This version of the document (published in July 2020) has been updated from the original version (April 2020) to address further feedback received regarding the design of the auction, including from the CFTC’s MRAC (Market Risk Advisory Committee)’ ‘Tabletop Exercise’. The main updates consist of refinements to the bidding process (one-way bidding and a separate mid-setting auction) and the process for communicating the indicative auction portfolio and results of the auction to the market. Further detail has also been included on contingency planning and on how the auction proceeds caps and maximum cost allocation for clients (now called the ‘gross client cap’) will be set.

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.

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.³ 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 offsetting 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 clearing 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 Friday 16th October 2020. LCH will not accept any backloads or portfolio transfers during 15th-16th October. All trades subject to 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, CLP and COP interest rates. The risk compensation results are calculated on a fully netted basis.

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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, gross client cap and partial fill scenario;

06. Post-auction events
   Trade repository reporting; creating the compensating swaps; processing the auction proceeds; auction bid reporting;

07. Contingency planning
   Factors determining go/no-go decisions; technology failure impacting auctions; discounting transition playbook;

08. Further information
   Where to find other resources; contact details.

†Price Alignment Interest / Price Alignment Amount.
²For detail please see disclaimer note on cover sheet.
³Equally LCH could look at this calculation with reference to Fed Funds risk, but the calculation with respect to SOFR is more straightforward this way due to the relatively much smaller number of existing SOFR trades in the clearing service.
COMPENSATING SWAP TRADE DETAILS

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

01. Firstly, a Fed Funds OIS in which the floating leg will reference the Floating Rate Option “USD-Federal Funds-H.15-OIS-COMPOUND”, payable annually on an ACT/360 basis, versus an annual fixed rate leg payable on the same basis.

02. Secondly, a SOFR OIS in which the floating 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.

04. The annual fixed rate on the Fed Funds OIS will be the SwapClear closing price for ‘at market’ Fed Funds swaps at the close of business on 16th October (the annual fixed rate on the SOFR leg is then this rate minus the market spread for SOFR/Fed Funds swaps determined from the auction mid); see Section 4 for details.

Notionals will be rounded to discrete quantities using the rounding convention below. All computed notional 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>

Opt-out decisions are communicated by clearing brokers using the LCH Portal.

02. Client Opt-outs

COMMUNICATING OPT-OUT DECISIONS

Opt-out decisions must be communicated to LCH by clearing brokers no later than Friday 4th September 2020 using the LCH Portal. Clients may view the elections made on their behalf directly in the LCH Portal. Please contact SwapClear.ClientServices@lch.com for further information on accessing the LCH Portal.

Opt-out decisions are made at the clearing 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. Any accounts for which LCH does not receive an election by 4th September will receive the compensating swaps.

LCH will attempt to close out all opted-out compensating swaps by running an auction 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).
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 who have been contacted by LCH.

Auction participants are expected to be US primary dealers with the required operational experience and connectivity, and to be subject to the relevant supervisory oversight. Clients wishing to provide liquidity into the auction should contact a bank which can intermediate. Other dealers wishing to participate as auction bidders should contact LCH by emailing SwapClearRisk@lch.com prior to Wednesday 15th July 2020.

All auction participants will be expected to demonstrate connectivity to LCH’s auction platform which is based on the existing LCH Portal.

The list of auction participants is expected to be finalized and published by Friday 31st July 2020.

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 trades4), though for logistical reasons LCH may decide to run multiple auctions at the same time, depending on the composition of the overall auction portfolio.

The precise timing and ordering of individual tenor auctions will be discussed with the group of auction participants in advance. We also expect to discuss feedback on the auction logistics and any testing exercises with this group.

LCH expects that each auction will have a bidding window of approximately 10 minutes. Each participant 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 selection of the winning bids. LCH will notify all auction participants when each auction closes and will aim to inform the auction winner(s) of their percentage share and the price paid within 20 minutes of the auction closing.

4 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.
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). Matching bids will be treated based on the time received by LCH, such that the bid received first will be given precedence over later bids. 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 the swap using the same market clearing price paid by the auction winners (see next section for more detail).

ALLOCATION OF SWAPS TO THE AUCTION WINNERS

All successful bidders except the lowest bidder will be allocated the full share that they bid for. The lowest bidder may be allocated a smaller share if the remainder of the position (after the higher bids are accounted for) is smaller than the size of their bid.

The auction winner(s) will be notified within 20 minutes of each individual auction close of any share of the auction portfolio they have won and the price paid. Other market participants (including the other auction participants) will be notified of the overall outcomes at the end of the day, after the market has closed (see Section 6 for details).

All winners will be allocated their swap using the same market clearing price.
Auction Mid Example

REMOVAL OF CROSSING BIDS
In this example, the bid from Bank 5 is higher than the offer from Bank 4. Banks 4 and 5 would then be required to enter into a Fed Funds versus SOFR basis swaps. The spread on this trade will be 10.5bp. Both data points would then be removed from subsequent stages of the auction mid calculation.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Best Bid</th>
<th>Best Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank1</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Bank2</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Bank3</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Bank4</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Bank5</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Bank6</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Best</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

SELECTING BEST BIDS AND OFFERS
With five quotes remaining, the number of quotes selected is two (one quarter of five, rounded up).

<table>
<thead>
<tr>
<th>Crossed</th>
<th>Bid</th>
<th>Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removed</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Best</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Worst</td>
<td>8</td>
<td>14</td>
</tr>
</tbody>
</table>

CALCULATING THE AUCTION MID
The average of the best bids and best offers (two bids at 10bp and two offers at 12bp), meaning the auction mid is 11bp.
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 fixed 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 winner(s) tenor (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.6

ALLOCATING TO INDIVIDUAL ACCOUNTS

For each individual tenor 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):

\[
\text{ClientAllocation}_i = \frac{-\text{AuctionProceeds}}{\sum_{\text{OptOut}} |\text{ClientNotional}_i|} \sum_{\text{OptOut}} |\text{TotalNotional}| \]

AUCTION PROCEEDS CAP, GROSS CLIENT 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 implement a gross client cap to limit the allocation of auction costs to client accounts to a defined number of basis points for each tenor. The auction proceeds cap will then be derived by dividing the gross client cap by the net/gross ratio of the opted-out client positions, i.e.:

\[
\frac{|\sum_{\text{GrossClientCap}}|}{|\sum_{\text{TotalNotional}}|} = \frac{|\sum_{\text{OptOut}} |\text{ClientNotional}_i|}{|\sum_{\text{OptOut}} |\text{TotalNotional}|} \]

Note that the gross client cap will be lower than (or, in the case of all opted-out clients having the same directional position, equal to) the auction proceeds cap.

If the auction fails to produce sufficient bids to cover the entire auction size within this level, this will result in a partial 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 bidder(s) whose bids 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. Note that the rounding convention described in section 1 is not reapplied in this calculation.

Note that it is possible for the winning auction bid(s) 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.

If clients subsequently require an unwind of their remaining compensating swap 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). 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.

AUCTION PROCEEDS CAP WORKED EXAMPLE

In the following example, 7 clients are assumed to have opted-out with the following notional values for a single tenor:

| Opt-outs Received (notional $m) |
|---|---|
| Shorts | Longs |
| -10.00 | 25.00 |
| -15.00 | 20.00 |
| -5.00 | 15.00 |
| 10.00 | |
| -30.00 | 70.00 |

Net Opt-out = 40.00
Gross Opt-out = 100.00
Net/Gross Ratio = 0.4

The auction process will be used to clear the net amount, with $40m being sold to participants. However, the proceeds from the process will be allocated on a pro-rata basis between the full $100m gross notional. If the gross client cap were set to 5bp, dividing this by the net/gross ratio results in an auction proceed cap of 12.5bp.

**Note:** 6 Note that it is possible for the winning auction bid(s) 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.
SOFR DISCOUNTING – VERSION 2.0

06. Post-auction Processing

CREATING THE COMPENSATING SWAPS
The compensating swaps assigned to the auction winners will be booked after close of business on 16th October and cleared at the opening of the SwapClear service on Monday 19th October 2020. The auction winner(s) will receive a two-swap package per tenor, with both trades executed at market, using curves derived from the auction mids as described above (the Fed Funds rates will be from market quotes, with SOFR-FF basis spreads added with reference to the mid-setting auction results).

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 2020.

TRADE REPOSITORY REPORTING
Auction winners will need to report their winning trades in accordance with their local regulations for off-facility swap transactions.

LCH will publish the gross client cap ranges by 31st July 2020.

AUCTION RESULTS PUBLICATION
LCH plans to publish the auction fill percentages, auction clearing prices and gross/net ratios at the end of the trading day on 16th October 2020, after the market has closed. This information will be required by all opting out clients to independently calculate their expected share of the auction costs and the notional value of any swaps they should expect to see in their accounts on the morning of 19th October.

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.
07. Contingency Planning

FACTORS DETERMINING GO/NO-GO DECISIONS
LCH will need to make the final go/no-go decision on the discounting conversion process and auctions at the beginning of the day on 16th October at the latest. Considerations for making the go/no-go decision will include:

01. whether testing has been completed and any issues uncovered in testing have been remediated;
02. whether key infrastructure partners (e.g. MarkitWire) are ready for the change;
03. whether key personnel are available to execute the changes;
04. whether there are any live technology issues that may impact on LCH’s capabilities (e.g. availability of the auction platform);
05. whether there are any live counterparty risk issues (e.g. a member close to or recently put in default); and
06. whether there are any objections to going ahead from relevant competent authorities or the user community.

TECHNOLOGY FAILURE IMPACTING AUCTIONS
Once the auctions have started on the morning of 16th October, the process cannot be halted or reversed. If LCH is unable to complete one or more of the auctions due to a technology failure, and there is insufficient time left in the day to re-schedule the auction, that auction will be given a fill percentage of 0% and the swaps will be delivered for that tenor (the same as if the auction was run but with no bids within the auction proceeds cap).

Any serious issues will be communicated live to the auction participants (and, if required, to the broader LCH user community), particularly if any change to the schedule of individual auctions is required.

DISCOUNTING TRANSITION PLAYBOOK
LCH has developed a detailed discounting transition playbook to ensure that all the required steps for a successful transition are documented and can be executed seamlessly on the conversion weekend.

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/lchswapclear

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

SwapClear Sales and Relationship Management: lchsales@lseg.com