SOFR Discounting Transition Process For Cleared Swaps

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Price Alignment & Discounting Transition

CME Group has worked with market participants and industry groups to develop a plan for transitioning price alignment and discounting for USD OTC cleared swaps from the daily Effective Federal Funds Rate (EFFR) to SOFR

Scope: Cleared US Dollar interest rate swap products at CME (IRS, OIS, FRAs, Basis, ZCS, Swaptions)

- CME SOFR index swaps are excluded from the transition as they are already using SOFR discounting and price alignment
- CME believes market practitioners should continue to evaluate a future date for transitioning additional IRS currencies that contain a US Dollar-funding component, taking into consideration potential impacts on adjacent FX forward and cross-currency swap markets

Transition Date: Close of Business October 16, 2020

Transition Process: Following the standard EOD cycle using EFFR discounting/PA on Friday, CME will generate a discounting transition report that provides the NPV of all trades under SOFR discounting and corresponding cash adjustment amounts needed to account for the change in discounting rate

Re-Hedging Process:

- By changing the discounting curve, CME effectively moves the discounting risk of all participants from EFFR to SOFR
- To mitigate re-hedging costs CME will book a mandatory series of EFFR/SOFR basis swaps to participants' accounts
- These basis swaps will approximately restore participants back to their original discounting risk profile at the portfolio level, and will be booked at closing curve levels ($0 NPV)

Auction: On Monday October 19th, CME will facilitate an auction for participants looking for an efficient way to unwind their basis swaps

Variation Margin & Cash Adjustment

SOFR Discounting Transition

Variation Margin and Cash Adjustment

Transition Cash Flow Example

	Date	Current NPV	Prior NPV	VM	Adjustment	Total Cash
1	T – 1 *(Thursday)*	$100 (EFFR)				
2	T *(Friday)*	**$125 (EFFR)**	$100 (EFFR)	$25		$25
Processing Options:						
A	T + 1 *(Monday)*	$140 (SOFR)	**$125 (EFFR Friday)**	$15	-$1	$14
B	T + 1 *(Monday)*	$140 (SOFR)	**$126 (SOFR)**	$14		$14

The purpose of generating the IRS Discounting Transition Report is to:

- Isolate the impacts of the discounting transition for each USD IRS trade cleared at CME
- Provide participants operational flexibility in processing this transition on Monday via either:
  - ***Option A***, referencing the cash adjustment amount and prior-day EFFR NPV
  - ***Option B***, referencing the prior-day SOFR NPV, consistent with Monday's trade register

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Variation Margin and Cash Adjustment

IRS Discounting Transition Report

- Shows revised NPVs under the new discounting methodology and the cash adjustment at the trade level for each position account
- Produced as part of the Special EOD Cycle
  - Publication targeted for 8 pm ET on the Transition Date
- CSV report delivered to firm and client sFTP folders
  - All parties receiving Trade Registers today will receive this report
- FCMs and Customers can find sample reports on CME's Intra-Links site

Column Header	Description	Sample Value	Type
Value Date	Business Date	10/16/2020	Date
Position Account ID	Position Account	3TTNN7	VARCHAR(8)
Cleared Trade ID	CME Trade ID	6355844	Integer
Platform ID	SEF/Platform ID	7897868G9H	VARCHAR(255)
Client ID	Client ID	1423523IS	VARCHAR(255)
REG_TRADE_ID	USI	CCCIRS6355844	VARCHAR(255)
Firm ID	3 digit clearing firm ID	998	VARCHAR(3)
ORIGIN	HOUS or CUST	CUST	VARCHAR(4)
PRODUCT_TYPE	type of swap	OIS	VARCHAR(5)
Currency	3 digit currency code	USD	VARCHAR(3)
NPV_NEW_DISC	NPV under SOFR discounting	2,266.34	Float
NPV_PRIOR_DISC	NPV under EFFR discounting	2,244.28	Float
NPV_ADJ_NEW_DISC	ADJ NPV under SOFR discounting	2,266.34	Float
NPV_ADJ_PRIOR_DISC	ADJ NPV under EFFR discounting	2,244.28	Float
NPV_ADJ_DIFF	New ADJ NPV minus Prior ADJ NPV	22.06	Float
FX_RATE	FX Rate use to convert non-deliverable currencies' NPV differences to the adjustment amount. Equal to 1 for USD	1.000000	Float
OFFSET_ADJ_AMT	Cash adjustment amount Prior ADJ NPV minus new ADJ NPV	-22.06	Float

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Variation Margin and Cash Adjustment

Curve Construction

The below demonstrates the SOFR curves construction used for computing the cash compensation:

- The short end of the SOFR curve is constructed using monthly and quarterly listed SOFR futures contracts. These products are the most liquid futures in the marketplace.
- Convexity adjustment is applied to SOFR futures to better reflect the differential of interest rate risk between OTC and exchange traded instruments.
- Fed Funds-SOFR Basis swaps are used for the remainder of the curve as they are the most liquid OTC product.
- Quotes taken at 3:00 p.m. ET.

Forward rates will be held constant for the transition process

	Tenor	Instruments
Forecasting and DiscountingCurve Inputs	1M	CME Monthly SOFR Futures (SR1)
	3M-2Y	CME Monthly SOFR Futures (SR3)
	3Y,4Y,5Y,7Y,10Y,12Y,15Y,20Y,25Y,30Y, 40Y, 50Y	Fed Funds-SOFR Basis Swap

Draft proposal intended for soliciting further participant feedback

Re-Hedging Process

SOFR Discounting Transition

Discounting Re-Hedging Process

Maintaining Original Discounting Risk Exposures with Mandatory Basis Swaps

The Goal of the ARRC's Discounting Transition is to Gradually Expose Participants to SOFR

($MM DV01)	Pre-Transition	Transitioning w/o Re-hedging	Basis Swaps	Transitioning w/ Re-hedging
Outright ICE LIBOR Risk	**$20MM**	$20MM	-	**$20MM**
EFFR Discounting Risk	**$1MM**	$0	$1MM	**$1MM**
SOFR Discounting Risk	**$0**	$1MM	($1MM)	**$0**

For illustration purposes only
Delta ladder computed based on zero-rate bump

Transitioning to SOFR discounting will effectively move the discounting risk of all CME-cleared participant portfolios from EFFR to SOFR at closing curve levels on October 16, 2020

To mitigate both the re-hedging costs associated with this transition and the sensitivity of valuations to closing curve marks on that day, CME will book a series of EFFR/SOFR basis swaps to participants' accounts

Through these basis swaps, CME's Re-hedging mechanism restores participants back to their approximate EFFR discounting exposures

- If the basis swaps are held, participants gain incremental exposure to SOFR as new risk is cleared and as the dynamics of the legacy portfolio change after the transition
- Alternatively, by unwinding the resulting basis swaps via auction or directly sourcing liquidity, participants immediately transition their discounting risk from EFFR to SOFR

Discounting Re-Hedging Process

Basis Swap Details

- Swap Tenors: 2Y, 5Y, 10Y, 15Y, 20Y, 30Y

- Participants can choose to have these swaps booked as either CME cleared:
  - Float-versus-float basis swaps, or
  - Pairs of fixed-versus-float synthetic basis swaps

- Basis Swaps will be processed after the close on October 16th with a cleared date of October 19th
  - Swaps booked at a $0 NPV
  - No variation or initial margin will be calculated for these swaps on transition date
  - Basis swaps: Breakeven spread is included on the SOFR leg
  - Synthetic basis swaps: Difference in par rates will reflect the breakeven spread

Discounting Re-hedging Process

Basis Swap Characteristics

- ***Index***: USD-SOFR-COMPOUND vs USD-Federal Funds-H.15-OIS-COMPOUND
- ***Start Date***: 10/21/2020 ***Maturity Date***: + {2yr, 5yr, 10yr, 15yr, 20yr, 30yr}
- ***Roll convention***: 21 (both legs)
- ***Cal period Adj Frequency***: 3M (both legs)
- ***Cal period Adj Calendar***: USNY (both legs)
- ***Payment Frequency***: 3M (both legs)
- ***Payment Offset***: 2D (both legs)
- ***Payment Related to***: End period (both legs)
- ***Payment Calendar***: USNY (both legs)
- ***Spread***: On SOFR leg
- ***Comp Method***: Spread Exclusive (both legs)
- ***Day Count***: ACT/360 (both legs)
- ***Fixing Date Cal***: SOFR – USGS; EFFR - USNY
- ***Floating Index Tenor:*** 1D
- ***Fixing Date Offset:*** 0D
- ***Fixing Date type:*** Business
- ***Fixing Date Business date convention***: Preceding (both legs)

Discounting Re-hedging Process

Trade-Level Report for Discounting Risk

- Available on SOFR Transition Date
- Attributes SOFR discounting risk impacts back to individual trades, helping participants allocate risk between entities sharing the same position account
- Produced as part of the Friday transition process
- CSV report delivered to firm and client sFTP folders
    - All parties receiving Trade Registers will receive this report

Sample report:

Value Date	Trade ID	Curve Name	2 Year	5 Year	10 Year	15 Year
10/16/2020	1446246	USD_SOFR_1D	-157.0307	442.3291	2.7073	-5.9383
10/16/2020	1447678	USD_SOFR_1D	-357.9837	-188.2520	99.8234	806.2125
10/16/2020	1442453	USD_SOFR_1D	59.7710	64.9625	225.4575	165.3493
10/16/2020	1444939	USD_SOFR_1D	-259.9575	19.7858	8.5534	19377.8389
10/16/2020	1441641	USD_SOFR_1D	1.0911	3.1523	5.8781	9.1668
10/16/2020	1445732	USD_SOFR_1D	-28596.9878	11165.1008	-102124.1556	13373.9478

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Auction Mechanism

SOFR Discounting Transition

Discounting Re-Hedging Process

Overview

- Re-hedging exercise is mandatory for all participants at CME
- Basis Swap Tenors: 2Y, 5Y, 10Y, 15Y, 20Y, 30Y

Client Elections

Election:	1. Choose how re-hedging swaps are booked	2. Whether to liquidate swaps in the auction
Default:	Float v. Float Basis Swap	Not to participate in the auction
Alternative:	Pairs of Fixed v. Float Synthetic Basis Swaps	Participate in the auction
Process	*FCMs facilitate clients' selection*	*FCMs facilitate clients' selection &* *Clients sign CME agreement*

Legal Agreement Details - CME SOFR Auction Customer Agreement

- Client consents that results of the auction are binding
- All re-hedging swaps received for the position account are submitted to the auction (no partials)
- Maximum loss limit based on a percentage of gross discounting exposure in DV01

Maximum Loss Limit

- Defined as the maximum dollar amount that each client could incur as a result of the auction
- The limit will be set based on prevailing liquidity prior to the auction legal agreement being made available
- If the cost of auctioning the net risk, when allocated back to participants’ portfolios, exceeds the loss limit, then the auction will not be executed

Basis Swap Auction Process

Potential Auction Benefits

1. Positions netting across all participating clients is expected to result in lower cost of execution, as demonstrated below:

Gross DV01: $5M
Market Bid/Ask: 1.0bp

Net DV01: $2M
Realized Bid/Ask: 0.4bp
Realized Savings: 60%

Customer	DV01	Cost Based on Individual Liquidation	Cost Using The Auction	$ Saving
Customer A	($500,000)	($500,000)	($200,000)	$300,000
Customer B	($1,000,000)	($1,000,000)	($400,000)	$600,000
Customer C	$1,500,000	($1,500,000)	($600,000)	$900,000
Customer D	$2,000,000	($2,000,000)	($800,000)	$1,200,000
Total	**$2,000,000**	**($5,000,000)**	**($2,000,000)**	**$3,000,000**

2. A sizeable pool of large and active SOFR/Fed Funds basis dealers combined with an optimal auction setup

Basis Swap Auction Process

Approach Overview

Timing: Monday, October 19th, CME will open the auction window between 9-10am ET

- Auction will be held over a short period of time (approximately 30 minutes)

Eligible Bidders: Auction participants will be invited by CME

- May include CME IRS members and active participants in the SOFR/Fed Funds market
- All participants will be subject to NDA

Design: Single voluntary auction, inclusive of all 6 tenor points

- Allows dealers to consider offsetting risk when providing prices
- CME will be asking for a 2-way price to protect participating clients if the auction is not executed

Auction Type: Determined by CME based on the size of the portfolio being auctioned

- Winner-takes-all: The best price wins the portfolio (Smaller portfolio)
- Dutch-style**:** Execution price is determined based on the bid filling the last clearing size of the portfolio (Larger Portfolio)

Basis Swap Auction Process

Dutch Auction Example

Process:

1. Portfolio divided into equally proportioned “vertical slices” across all six tenor points, these “slices” represent the minimum portfolio bidding size
2. Each bidder submits bid (stated in terms of $ bid/ask) at either the minimum bidding size, or its multiples
3. The auction price is determined based on the last clearing size of the portfolio, all winning bidders get filled at that price

Example: Auction portfolio with net $2M DV01, shown on slide 21, divided into four equal slices (25% of portfolio):

Bidder	Submission	Allocation	Premium Received
1	**$375,000**	$500k DV01 “Slice”	$500,000
2	**$450,000**	$500k DV01 “Slice”	$500,000
6	**$475,000**	$500k DV01 “Slice”	$500,000
4	**$500,000**	$500k DV01 “Slice”	$500,000
3	**$550,000**	N/A	-
5	**$625,000**	N/A	-

Included Bid | **Excluded Bid** | **Auction Clearing Price**

Final auction cost will be:

$500,000 x 4 Slices = **$2,000,000**

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Basis Swap Auction Process

Auction Results and Communication

Immediately after the auction window closes, CME will determine whether or not the auction is executed based on whether the cost per customer does not exceed universal loss threshold

- Auction participants will be notified within minutes whether or not the auction is successful
- Participating clients will be notified shortly thereafter

If auction is executed, CME will allocate the auction cost to individual clients (based on DV01) and book offsetting trades.

Cost Participation % Share is calculated as a ratio of a client's gross DV01 to the entire portfolio gross DV01.

Customer	Gross DV01	Cost Participation % Share
Customer A	($500,000)	10%
Customer B	($1,000,000)	20%
Customer C	$1,500,000	30%
Customer D	$2,000,000	40%
Total	**$5,000,000**	**100%**

Net DV01: $2M
Bid/Ask: 1.0bp
Cost: ($2,000,000)

$ Cost
($200,000)
($400,000)
($600,000)
($800,000)
($2,000,000)

If auction is not executed, CME will notify all participating clients immediately after the auction's end so that they can seek alternate means of risk mitigation

Basis Swap Auction Process

Auction Risks and Considerations

- If there is no, or limited, position netting, i.e. all participating clients are in the same direction, this may materially diminish the auction benefits and increase the cost of the auction due to the large concentrated risk being auctioned off at the same time vs bilateral trading which may be spread over longer period of time

- A large move in the SOFR/Fed funds basis price from Friday night, October 16th to Monday morning, October 19th may jeopardize CME's ability to execute an auction as the resultant mark-to-market may exceed the previously communicated loss threshold

- By participating in the auction, you agree to sell your SOFR/Fed Funds basis swaps according to following:
  - **If the auctioned portfolio generates a loss (expected case)**: The cost would be no greater than the Maximum Loss Level, as communicated by CME
  - **If the auctioned portfolio generates a gain**: The gain would be allocated consistent with the earlier participation share methodology

- Clients with very small exposures may get a better price transacting on a bilateral basis

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Testing & Readiness

SOFR Discounting Transition

Available Analysis – SOFR Discounting Transition

CME can provide indicative impacts from the discounting transition for existing cleared portfolios based on data for a pre-selected date:

1. Change in NPV on a trade level (Cash Adjustment)

2. Discounting Risk Sensitivities by Tenor – Portfolio and/or trade level

3. Resulting Basis Swaps from Re-hedging Process

4. Historical descriptive statistics of the EFFR/SOFR basis

CME plans to periodically refresh data used to conduct such analysis and, beginning on September 28th, will provide the Discounting Transition Report in a production environment for testing

To receive this information, please send an email with the CME position account ID to: CMEOTCAnalysis@cmegroup.com

Client Readiness Checklist

Operational process to account for the change in discounting rate

- ❑ Determine whether to update prior NPVs or recognize a cash adjustment
- ❑ Decide how to reconcile the above choice

Develop a strategy for handling basis swaps for SOFR Transition

- ❑ Ability to process SOFR & EFFR OIS, SOFR vs EFFR basis swaps and SOFR discounting
- ❑ Identify whether there is a need to allocate basis swap risk between entities utilizing the same position account
- ❑ Ensure internal systems can capture trades created by the CCP
- ❑ Elections: basis swaps vs fixed vs. float swap pairs, auction participation

Preparing for the transition

- ❑ Develop understanding of the magnitude of the cash adjustment
- ❑ Gain familiarity with discounting risk sensitivities and corresponding basis swap notional amounts for SOFR Transition
- ❑ Setup to trade and clear SOFR/€STR discounted instruments as well as SOFR-indexed instruments
- ❑ Engage with FCMs ahead of the transition to ensure all elections and operational setups are in place

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