Quotation and Pricing Guide

CME FX Link is the first ever anonymous, automated central liquidity pool for efficiently managing a wide range of FX swap, forward, and basis risk exposures.

CME FX Link is a CME Globex basis spread between FX futures and over-the-counter ("OTC") spot FX, traded as a differential between CME FX futures and OTC spot FX. The spreads result in the simultaneous execution of FX futures cleared by CME and OTC spot FX subject to OTC documentation and credit relationships.

In this white paper, we describe the quotation and pricing conventions of CME FX Link – the first ever electronic central limit order book for trading spreads between OTC FX spot and CME FX futures.

This document provides a description of how CME FX Link spreads are priced and traded on CME Globex and will cover the following topics:

- Spread quotation and pricing

- Tick sizes determination for each currency pair

- OTC spot FX rate and notional calculations

FX Futures and OTC FX Quoting Conventions

The OTC market generally, but not exclusively, quotes currencies with a base currency that has a higher purchasing power relative to the second currency (e.g., with USD/JPY, the U.S. Dollar has a higher purchasing power than the Japanese Yen). The second currency is commonly referred to the quote or term currency, which is calculated by multiplying the base currency ("CCY") amount by price. Price level fluctuations directly affect the quote currency amount, which means that the futures contract will tick in the quote currency amount.

In contrast, all major ("non-cross") FX futures contracts tick in U.S. Dollars, such that the base currency may not have more purchasing power than the second currency, resulting in quoting conventions that could differ between the futures and OTC markets. Where this difference occurs, futures market quoting conventions can be harmonized with the OTC market by inverting the currency pair (dividing 1 by the rate) and flipping the currency sides, but that changes the shape of the instrument's price curve, from linear ($f(x) = rate$) to asymptotic ($f(x) = 1/rate$).

Currently, four futures currency pairs that are available for trading via CME FX Link spreads (CAD/USD, CHF/USD, JPY/USD, and MXN/USD) are quoted inversely to the OTC market. Given these dynamics and market quoting conventions, such currency pairs will need to be inverted before calculating, quoting, and trading the spread differential on CME Globex.

CME FX Link Spread Quotations

The CME FX link spread is traded on CME Globex as the differential between the futures and spot prices in OTC terms, which is also equivalent to the relevant forwards points for the futures contract.

EUR/USD (NON-INVERTED)

SPREAD PRICE	FUTURES PRICE	SPOT PRICE
0.000005 =	1.12955 −	1.129545

CAD/USD (INVERTED)

SPREAD PRICE	1/FUTURES PRICE	SPOT PRICE
0.00001 =	1.33360053 (1/0.74985) −	1.333590

CME FX Link Spread Construction

For a non-inverted currency pair:

- The buyer of the spread buys CME FX futures and sells OTC spot FX; and

- The seller sells CME FX futures and buys OTC spot FX.

For an inverted currency pair:

- The buyer of the spread sells* CME FX futures and sells OTC spot FX; and

- The seller buys* CME FX futures and buys OTC spot FX.

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*   The spread construction for an inverted currency pair is different because when a market participant sells a futures contract that is quoted inversely to the OTC market, the execution is equivalent to buying the currency pair in OTC terms.

CME Group

CME FX Link Tick Sizes

CURRENCY PAIR	SIZE OF OUTRIGHT FUTURE	MINIMUM PRICE INCREMENT ON OUTRIGHT FUTURE	US DOLLAR VALUE OF MINIMUM PRICE INCREMENT ON OUTRIGHT FUTURE	MINIMUM PRICE INCREMENT ON FX LINK SPREAD	USD DOLLAR VALUE OF MINIMUM PRICE INCREMENT ON FX LINK SPREAD
AUD/USD	AUD100,000	0.00005	$5.00	0.00001	$1.0000
EUR/USD	EUR125,000	0.00005	$6.25	0.000005	$0.6250
GBP/USD	GBP62,500	0.0001	$6.25	0.00001	$0.6250
NZD/USD	NZD100,000	0.00005	$5.00	0.00001	$1.0000
USD/CAD	CAD100,000	0.00005	$5.00	0.00001	$0.6159**
USD/CHF	CHF125,000	0.00005	$6.25	0.00001	$1.4827**
USD/JPY	JPY12,500,000	0.0000005	$6.25	0.001	$0.9493**
USD/MXN	MXN500,000	0.00001	$5.00	0.0005	$0.5695**

Spread tick sizes, are subject to revision and recalibration as the market changes, based on the CME's discretion within the established CME Globex communication service level agreement.

CME Globex Fills

The CME FX Link is traded as a differential on CME Globex. Once an order is matched, CME Globex will return three filled transactions for the spread, the futures leg, and the spot leg.

Spot Leg Price Calculation

The spot leg of the spread will be calculated by anchoring off the last CME Globex futures price, and subtracting the traded spread.

EUR/USD (NON-INVERTED)

SPOT PRICE (ASSIGNED)	FUTURES PRICE	SPREAD PRICE
1.129545 =	1.12955 −	0.000005

In the case of the inverted currencies, the futures price is inverted prior to subtracting the traded spread.

CAD/USD (INVERTED)

SPOT PRICE (ASSIGNED)	1/FUTURES PRICE	SPREAD PRICE
1.333590 =	1.333600053 (1/0.74985) −	0.00001

Spot Leg Rounding

In the case of non-inverted currency pairs, the spot leg will be rounded to the same precision of the spread tick. If the currency pair is inverted, the spot leg will be rounded to one decimal place beyond granularity of the spread, to avoid rounding impact to the tick value of the traded spread differential.

The below table describes the minimum price increment that will determine the spot rate precision and rounding.

CURRENCY PAIR	MINIMUM PRICE INCREMENT
AUD/USD	0.00001 (0.1 pip)
EUR/USD	0.000005 (0.05 pip)
GBP/USD	0.00001 (0.1 pip)
NZD/USD	0.00001 (0.1 pip)
USD/CAD	0.000001 (0.01 pip)
USD/CHF	0.000001 (0.01 pip)
USD/JPY	0.0001 (0.01 pip)
USD/MXN	0.00001 (0.1 pip)

** The FX Link Spread is quoted in OTC terms for USD/CAD, USD/CHF, USD/JPY, and USD/MXN, while the outright future is quoted inversely to OTC convention. USD values of the FX Link Spread minimum price increment were calculated using March 2022 contract month settlements on March 4, 2022. The formula to compute the USD value of the FX Link Spread minimum price increment where the outright future is quoted inversely to OTC convention: Outright Futures Notional * FX Link Minimum Price Increment * Outright Futures Price * Outright Futures Price. The USD value of the FX Link minimum price increment will fluctuate with the price of the outright futures contract.

Notional Calculations

The base and quote notional for each spot transaction will be calculated and assigned for each transaction.

For each spot currency pair, the non-U.S. Dollar notional per spread is fixed and equivalent to the futures notional, as defined in the CME rulebook.

For the non-inverted currencies, the quote amount is calculated by multiplying the futures base amount by the spot price.

EUR/USD (NON-INVERTED)

BASE NOTIONAL	SPOT RATE	QUOTE NOTIONAL
125,000.00 EUR x	1.12954 =	141,192.50 USD

With inverted currency pairs, the quote notional in divided by the spot rate to determine the base notional.

CAD/USD (INVERTED)

QUOTE NOTIONAL	SPOT RATE	BASE NOTIONAL
100,000.00 CAD ÷	1.333590 =	74,985.57 USD

All notional values are rounded to the nearest penny.

End-to-End Example for Non-Inverted Currency Pair: EUR/USD Spot FX vs. April FX Futures Expiry

The following example is from the perspective of a market participant buying the CME FX Link spread on CME Globex.

STEP	DESCRIPTION	NOTES
1. MARKET PRICES	• Spot Price (EUR/USD): 1.1260 • Futures Price (EUR/USD): 1.12955 • Differential (Futures – Spot): 0.00355	Prevailing market prices for each leg will drive a participant's view of the CME FX Link basis differential and resulting orders to trade the basis on CME Globex.
2. QUOTING ON CME GLOBEX	<table><tr><td>QTY.</td><td>BID</td><td>OFFER</td><td>QTY.</td></tr><tr><td>50</td><td>0.00355</td><td>0.00356</td><td>65</td></tr></table> • 1 Spread = 125,000 EUR per Leg • Minimum Order Quantity = 5	CME Globex quotes for trading CME FX Link are expressed as the applicable differential with spread quantities expressed as the number of spreads (notional quantity of each spread leg is equal to the base currency notional of the FX futures leg).
3. SPREAD MATCH	Assume an aggressing order to buy 5 spreads @ 0.00356 resulting in a match on CME Globex for 5 spreads @ 0.00356.	Aggressor is buying 5 futures (125,000 EUR notional per contract) and selling (125,000 EUR x 5) in FX spot.
4. CME GLOBEX FILL MESSAGES	CME Globex fill message contains 3 price values: • Spread Price: 0.00356 • Futures Price: 1.12955 • Spot Price: 1.12599	User receives 3 fill messages containing the spread, futures leg, and spot leg prices.
5. FUTURES LEG PRICE AND QUANTITY	• Futures Leg Price = Last CME Globex Price • Last CME Globex Price = 1.12955 • Buy 5 Spreads = Buy 5 EUR FX Futures *(Notional Calculations: Base = 125,000 EUR x 5 Spreads = Long 625,000 EUR, Quote = 625,000 EUR x 1.12955 = Short 705,968.75 USD)*	Pricing and quantity messaging for the Futures and Spot legs are available via iLink, CME STP, Traiana, IHS Markit and RTN.
6. OTC SPOT LEG PRICE	• Spot Price = Futures Leg Price – Traded Spread • Spot Price = 1.12955 – 0.00356 = 1.12599	Pricing and quantity messaging for the Futures and Spot legs are available via iLink, CME STP, Traiana, IHS Markit and RTN.
7. OTC SPOT NOTIONAL	• Base = 125,000 EUR x 5 Spreads = Short 625,000 EUR • Quote = 625,000 EUR x 1.12599 = Long 703,743.75 USD	Pricing and quantity messaging for the Futures and Spot legs are available via iLink, CME STP, Traiana, IHS Markit and RTN.

End-to-End Example for Inverted Currency Pair: USD/JPY Spot FX vs. September FX Future Expiry

The following example is from the perspective of a market participant buying the CME FX Link spread on CME Globex.

STEP	DESCRIPTION	NOTES
1. MARKET PRICES	• Spot Price (USD/JPY): 108.7629 • Futures Price (JPY/USD): 0.0092215 • Differential (1/Futures − Spot): -0.3207	Prevailing market prices for each leg will drive a participant's view of the CME FX Link basis differential and resulting orders to trade the basis on CME Globex.
2. QUOTING ON CME GLOBEX	<table><tr><th>QTY.</th><th>BID</th><th>OFFER</th><th>QTY.</th></tr><tr><td>30</td><td>-0.321</td><td>-0.320</td><td>25</td></tr></table> • 1 Spread: 12,500,000.00 JPY per Leg • Minimum Spread Contract Quantity = 5	CME Globex quotes for trading CME FX Link are expressed as the applicable differential with spread quantities expressed as the number of spreads (notional quantity of each spread leg is equal to the base currency notional of the FX futures leg).
3. SPREAD MATCH	Assume an aggressing order to buy 5 spreads @ -0.320 resulting in a match on CME Globex for 5 spreads @ -0.320.	Aggressor is selling 5 futures (12,500,000.00 JPY notional per contract) and buying (12,500,000.00 JPY x 5) in FX spot.
4. CME GLOBEX FILL MESSAGES	CME Globex fill message contains 3 price values: • Spread Price: -0.320 • Futures Price: 0.0092215 • Spot Price: -108.7622	User receives 3 fill messages containing the spread, futures leg, and spot leg prices.
5. FUTURES LEG PRICE AND QUANTITY	• Futures Leg Price = Last CME Globex Price • Last CME Globex Price = 0.0092215 • Buy 5 spreads = Sell 5 JPY FX Futures *(Notional Calculations: Base = 12,500,000 JPY x 5 Spreads = Short 62,500,000 JPY, Quote = Long 62,500,000 JPY x 0.0092215 = Long 576,343.75 USD)*	Pricing and quantity messaging for the Futures and Spot legs are available via iLink, CME STP, Traiana, IHS Markit and RTN.
6. OTC SPOT LEG PRICE	• Spot Price = 1/Futures Leg Price − Traded Spread • Spot Price: 1/0.0092215 - [-0.320] = 108.7622	Pricing and quantity messaging for the Futures and Spot legs are available via iLink, CME STP, Traiana, IHS Markit and RTN.
7. OTC SPOT NOTIONAL	• Base = 62,500,000 JPY/108.7622 = Short 574,648.18 USD • Quote = 12,500,000 JPY x 5 Spreads = Long 62,500,000 JPY	Pricing and quantity messaging for the Futures and Spot legs are available via iLink, CME STP, Traiana, IHS Markit and RTN.

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