



# CME FX Link

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QUOTATION AND PRICING GUIDE

 CME Group

# CME FX Link: One CME Globex Spread, Connecting OTC FX and FX Futures Markets

CME FX Link is a CME Globex basis spread between FX Futures and OTC Spot FX, traded as differential between CME FX futures and OTC Spot FX. The spreads result in simultaneous execution of FX futures cleared by CME, and OTC Spot FX subject to OTC documentation and credit relationships.

This document provides a description of how CME FX Link is priced and traded on CME Globex, which 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 US dollar has a higher purchasing power than Yen). The second currency is commonly referred to the quote or term currency, which is calculated by multiplying the Base Currency (“CCY”) Amount \* Price. Price level fluctuations directly affect the quote currency amount, which means that the contract will tick in the quote currency amount.

In contrast, all major (non-cross) FX future contracts tick in USD, 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 ( $f(x) = \text{rate}$ ) to asymptotic ( $f(x) = 1/\text{rate}$ ).

For the initial launch, three futures currency pairs that will be available for trading via CME FX Link spreads (MXN/USD, CAD/USD, JPY/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

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

### EUR/USD (Non-Inverted)

Spread Price	Futures Price	Spot Price
0.00001 =	1.20355 -	1.20354

For inverted currency pairs, the futures value is expressed as 1 divided by the futures price, such that the differential is calculated in OTC terms.

### CAD/USD (Inverted)

Spread Price	1/ Futures Price	Spot Price
0.00001 =	1.317696666 (1 / 0.7589) -	1.317687

## 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.

\* 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 FX Link Tick Sizes

FX Spot Basis spread ticks are approximated to reflect a fixed percentage (~1/10 as of launch) of the outright futures' tick value, considering full tick increments, and not the current minimum price increment which may be a half tick for certain currency pairs. If the futures quoting convention matches the OTC market, the spread tick's USD value will equal exactly 1/10 the outright futures' tick value, while inverted currency pairs will be approximated at close to 1/10 futures' outright tick value.

The tick increment for inverted currency pairs is an approximation of 1/10 the outright tick value because the spot leg of the instrument is calculated by dividing one by the applicable futures price (  $1 / \text{Price}$  ) before the spread price is subtracted. The function (  $1 / \text{Price}$  ) is non-linear, which will cause the spot leg quote amount to change at a variable rate for each tick movement of the futures price, which moves at a linear rate. As a result, as FX price levels change, CME will on an as-needed basis re-evaluate the tick sizes of the inverted currency pairs, and maintain a tick increment which most closely approximates the USD equivalent of 1/10th a tick in the outright (or then prevailing target USD spread tick value), based on the current outright futures level.

The below table illustrates that the spread value in USD varies from the 1/10th of one full tick of an outright futures for the three inverted currency pairs (USD/MXN, USD/CAD, USD/JPY).

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

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. The fill price of the OTC Spot FX leg will initially be shown in the fill message as equal to the CME FX Link spread price (reflecting the differential from the assigned FX futures leg price that the OTC Spot FX fill price will ultimately take), while the actual OTC Spot FX leg fill price and full transaction details can be consumed via CME STP.

CCY Pair	Spot FX Spread Tick Size	1/10th Futures Tick USD Value	CME FX Link Spread Value in USD *
AUD/USD	0.00001	\$ 1.00	\$ 1.00
EUR/USD	0.00001	\$ 1.25	\$ 1.25
GBP/USD	0.00001	\$ 0.625	\$ 0.625
USD/CAD	0.00001	\$ 1.00	\$ 0.6657
USD/JPY	0.001	\$ 1.25	\$ 1.0479
USD/MXN	0.0005	\$ 0.50	\$ 0.7752

\*Calculated using futures price levels as of September 19, 2017.

## 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
1.20354 =	1.20355 -	0.00001

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
1.317687 =	1.317696666 (1 / 0.7589) -	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 Pairing	Minimum Price Increment
AUD/USD	0.00001 (0.1 pip)
EUR/USD	0.00001 (0.1 pip)
GBP/USD	0.00001 (0.1 pip)
USD/CAD	0.000001 (0.01 pip)
USD/JPY	0.0001 (0.01 pip)
USD/MXN	0.00001 (0.1 pip)

## 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-USD notional per spread is fixed and equivalent to the futures notional, as defined in CME's 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	1.20354 =	150,442.50 USD

With the inverted currency pairs, the quote notional of the spot transaction is set to the futures notional, and divided by the spot rate to resolve the base notional.

### CAD/USD (Inverted)

Quote Notional	Spot Rate	Base Notional
100,000.00 CAD ÷	1.228114 =	81,425.67 USD

All notional values are rounded to the nearest penny.

## Example (non-inverted pair): EUR/USD Spot FX vs. November 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								
<b>1. Market Prices</b>	<ul style="list-style-type: none"> <li>Spot Price (EUR/USD): 1.1792</li> <li>Futures Price (EUR/USD): 1.18275</li> <li>Differential (Future - Spot): 0.00355</li> </ul>	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.								
<b>2. Quoting on CME Globex</b>	<table border="1"> <thead> <tr> <th>Quantity</th> <th>Bid</th> <th>Offer</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>0.00355</td> <td>0.00356</td> <td>65</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>1 spread = 125,000 EUR per leg</li> <li>Minimum Order Quantity = 5</li> </ul>	Quantity	Bid	Offer	Quantity	50	0.00355	0.00356	65	CME Globex quotes for trading of CME FX Link expressed as applicable differential with spread quantities expressed as number of spreads (notional quantity of each spread leg is equal to the base currency notional of the FX futures leg).
Quantity	Bid	Offer	Quantity							
50	0.00355	0.00356	65							
<b>3. Spread Match</b>	Assume an aggressing order to buy 5 spreads @ 0.00356 results 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.								
<b>4. CME Globex Fill Messages</b>	CME Globex fill message contains 3 price values: <ul style="list-style-type: none"> <li>Spread Price: 0.00356</li> <li>Futures Price: 1.18275</li> <li>*Spot Price: 0.00356</li> </ul>	User receives 3 fill messages containing the spread, future leg and spot leg. * The spot leg fill price is only available on STP and MQ messages, and will be reflected as the traded spread differential to the futures leg price on the fill message.								
<b>5. Futures Leg Price &amp; Quantity</b>	<ul style="list-style-type: none"> <li>Futures leg price = Last CME Globex Price</li> <li>Last CME Globex Price = 1.18275</li> <li>Buy 5 spreads = Buy 5 EUR FX Futures</li> </ul> (Notional Equivalent: Base = 125,000 EUR * 5 spreads = Long 625,000 EUR, Quote = 625,000 EUR * 1.18275 = Short 739,218.75 USD)	Consumed via Globex fill message, CME STP or via trading firm FCM.								
<b>6. OTC Spot Leg Price</b>	<ul style="list-style-type: none"> <li>Spot Price = Future Leg Price-Traded Spread</li> <li>Spot Price = 1.18275 - 0.00356 = 1.17919</li> </ul>									
<b>7. OTC Spot Notional</b>	<ul style="list-style-type: none"> <li>Base Notional = 125,000 EUR * 5 spreads = Short 625,000 EUR</li> <li>Quote = 625,000 EUR * 1.17919 = Long 736,993.75 USD</li> </ul>	Consumed via CME STP or via PB for trading firms. PBs and central FXPB consume via Traiana or CME MQ.								

## End-to End-Example (inverted pair): USD/JPY Spot FX vs. November 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								
<b>1. Market Prices</b>	<ul style="list-style-type: none"> <li>Spot Price (USD/JPY): 112.19</li> <li>Futures Price (JPY/USD): 0.008939</li> <li>Differential (1/Future - Spot): -0.3207</li> </ul>	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.								
<b>2. Quoting on CME Globex</b>	<table border="1"> <thead> <tr> <th>Quantity</th> <th>Bid</th> <th>Offer</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>30</td> <td>-0.321</td> <td>-0.320</td> <td>25</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>1 Spread: 12,500,000.00 JPY per leg</li> <li>Minimum Order Quantity: 5</li> </ul>	Quantity	Bid	Offer	Quantity	30	-0.321	-0.320	25	CME Globex quotes for trading of CME FX Link expressed as applicable differential with spread quantities expressed as number of spreads (notional quantity of each spread leg is equal to the base currency notional of the FX futures leg).
Quantity	Bid	Offer	Quantity							
30	-0.321	-0.320	25							
<b>3. Spread Match</b>	Assume an aggressing order to buy 5 spreads @ -0.320 results 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.								
<b>4. CME Globex Fill Messages</b>	CME Globex fill message contains 3 price values: <ul style="list-style-type: none"> <li>Spread Price: -0.320</li> <li>Future Price: 0.008939</li> <li>*Spot Price: -0.320</li> </ul>	User receives 3 fill messages containing the spread, future leg and spot leg. * The spot leg fill price is only available on STP and MQ messages, and will be reflected as the traded spread differential to the futures leg price on the fill message.								
<b>5. Futures Leg Price &amp; Quantity</b>	<ul style="list-style-type: none"> <li>Futures leg price = Last CME Globex Price</li> <li>Last CME Globex Price = 0.008939</li> <li>Buy 5 spreads = Sell 5 JPY FX Futures</li> </ul> (Notional Calculations: Base = 62,500,000.00 * 5 spreads = Short 312,500,000 JPY, Quote = Long 312,500,000 JPY * 0.008939 = 2,793,437.50 USD)	Consumed via Globex fill message, CME STP or via trading firm FCM.								
<b>6. OTC Spot Leg Price</b>	<ul style="list-style-type: none"> <li>Spot Price = 1 / Future Leg Price – Traded Spread</li> <li>Spot Price: <math>1/0.008939 - 0.320 = 112.1893</math></li> </ul>									
<b>7. OTC Spot Notional</b>	<ul style="list-style-type: none"> <li>Base = 62,500,000.00 JPY / 112.1893 = Short 557,094.13 USD</li> <li>Quote = 12,500,000.00 JPY * 5 spreads = Long 62,500,000.00 JPY</li> </ul>	Consumed via CME STP or via PB for trading firms. PBs and central FXPB consume via Traiana or CME MQ.								

**For more information, please visit [cmegroup.com/fxlink](https://cmegroup.com/fxlink)  
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