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Bitcoin Futures: A Closer Look At CME's Contract Design

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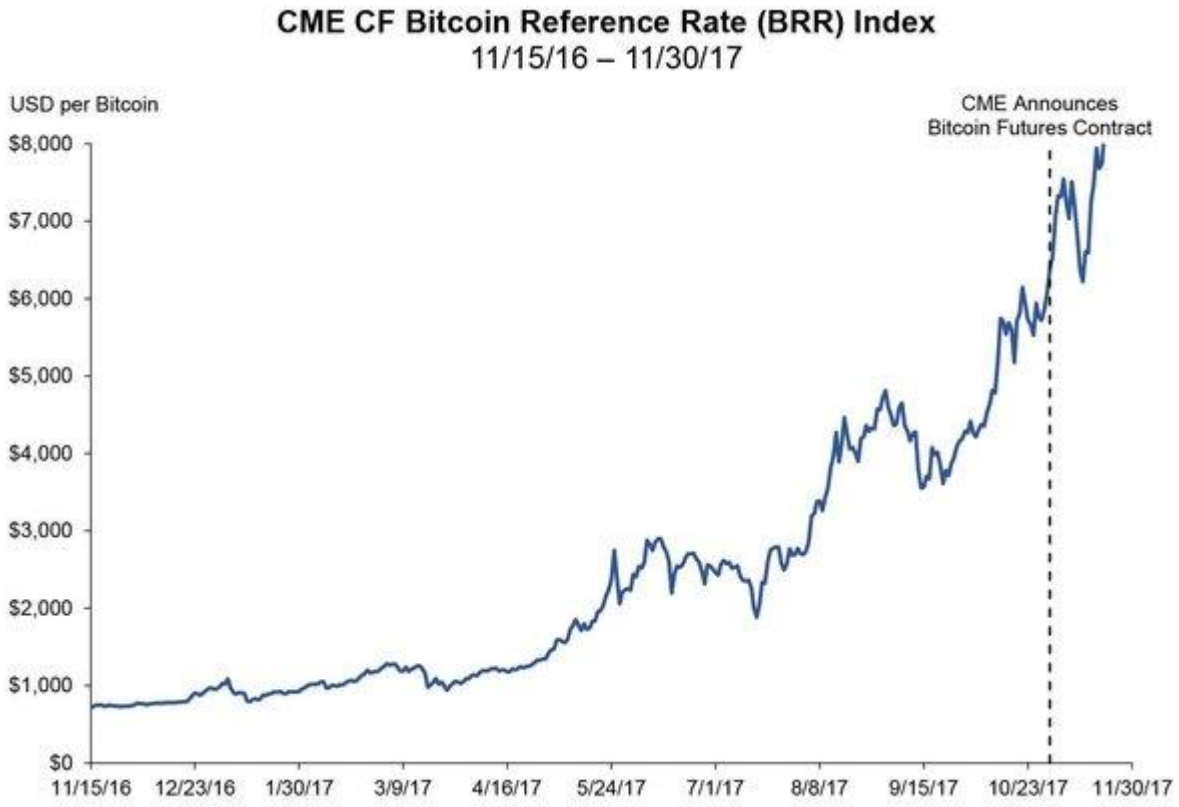
The first regulated exchange-traded bitcoin products have started trading on the CME Group and the Chicago Board Options Exchange in the form of futures contracts. These are the first financial products that allow investors to hedge or speculate on bitcoin prices without actually transacting in the cryptocurrency. The success or failure of the futures contracts will serve as a litmus test for additional exchange-traded products based on bitcoin. In particular, it may determine if an exchange-traded fund product can be approved by the U.S. Securities and Exchange Commission for trading on the securities exchanges (e.g., Nasdaq and NYSE).

One of the main requirements for futures contract design is identifying a robust, representative underlying commodity or product that the futures contract will be priced against. In this case, while the contracts are called “bitcoin” futures, there is no centralized price or exchange for bitcoins. The CME and CBOE chose different methods for calculating the underlying price for their futures contracts. The CME created an index of bitcoin prices from numerous decentralized bitcoin exchanges to serve as the underlying price. The CBOE chose to reference an end-of-day auction rate published by the single bitcoin exchange Gemini. This article focuses on the design of the CME bitcoin futures contract.

CME’s Bitcoin Reference Rate Index

In November 2016, the CME began publishing its daily bitcoin index, called the Bitcoin Reference Rate (BRR), which is now the underlying price for the CME bitcoin futures contract. The CME partnered with Crypto Facilities Ltd. (CF) to facilitate the calculation and publication of the BRR.

The CME sought to create a Bitcoin price index that would have limited susceptibility to temporary swings in prices and outlier prices. The BRR uses a one-hour calculation time period and a median price calculation rather than a simple or weighted average across the time period.



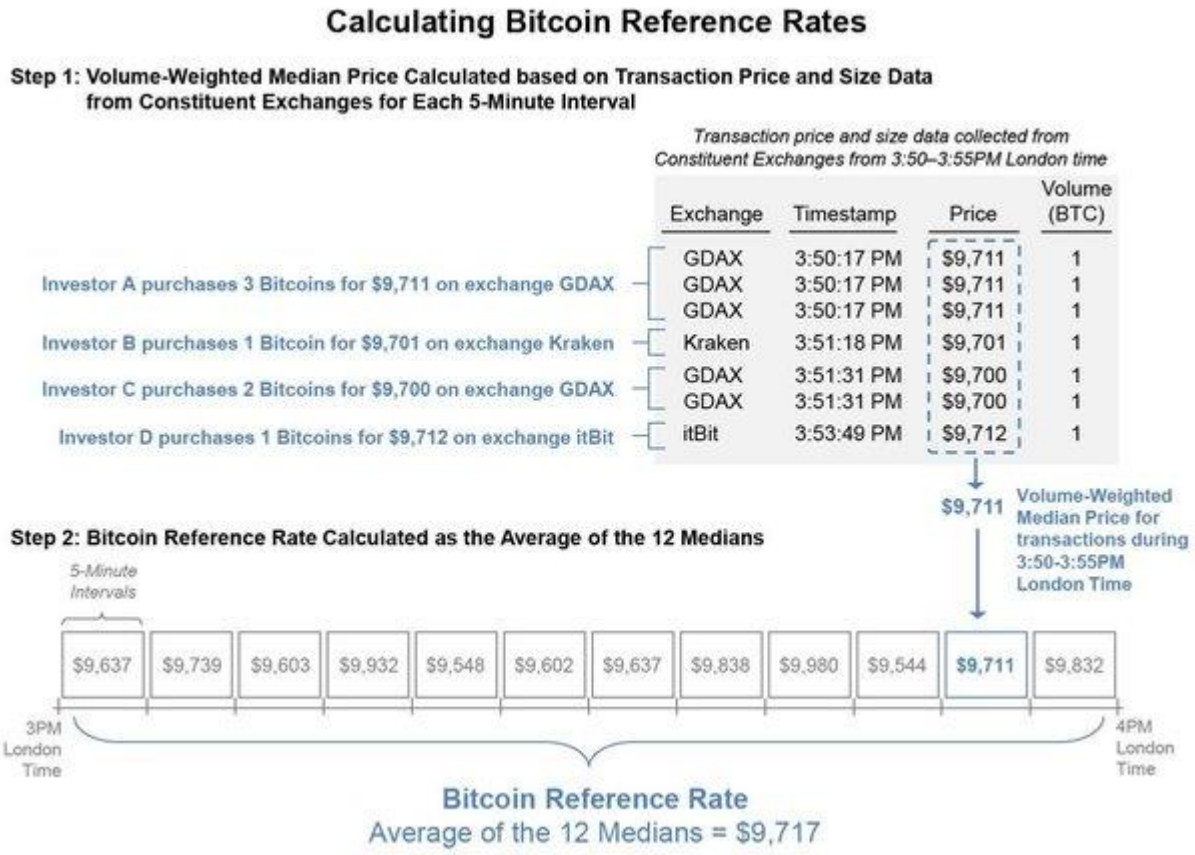
Constituent Exchanges

For purposes of calculating the BRR, the CME aggregates trade flows of multiple bitcoin exchanges across the world, called constituent exchanges. The CME originally started aggregating trades from six exchanges: Bitstamp (Luxembourg), GDAX (San Francisco), itBit (New York), Kraken (San Francisco), Bitfinex (Hong Kong) and OKcoin (Hong Kong). Within a year, both Bitfinex and OKcoin were removed from the CME's constituent exchanges aggregated trade flow "due to suspension of USD withdrawals and later deposits."[1]

The CME provides guidance on how constituent exchanges are selected. It requires that the "venue's bitcoin vs. U.S. Dollar spot trading volume contribute[s] at least 3% to the total bitcoin vs. U.S. Dollar spot trading volume of all other Constituent Exchanges during each of the last two consecutive calendar quarters."[2] The CME guidance also includes broad requirements that the exchanges deliver transparent and reliable data, maintain fair and transparent market conditions to "impede illegal, unfair or manipulative trading practices," not place undue barriers to entry, and comply with applicable law, among others.[3]

The BRR uses the constituent exchanges trade flow to calculate a once-per-day reference rate in U.S. dollar per bitcoin. Between 3 p.m. and 4 p.m. London time, the bitcoin transaction price and volume data are collected and separated into 12 equal time partitions of five minutes each. The volume-weighted median trade price is calculated for each five-minute interval. The 12 medians from each of the five-minute intervals are then averaged to determine the published BRR. Using a median for each of the five-minute intervals makes the index less susceptible to outlier transactions and temporary swings in price.

The example below shows the calculation of the volume-weighted median price in the 11th partition from bitcoin transactions on the four constituent exchanges. The resulting 11th partition price of $9,711 is one of the 12 partition volume-weighted medians that are averaged to yield the published BRR of $9,717 per bitcoin.



CME Bitcoin Futures Contract

After tracking the BRR data for a year and fine-tuning the methodology, the CME announced on Oct. 31, 2017, that a bitcoin futures contract would be listed on the exchange by the end of 2017. In December 2017, the U.S. Commodity Futures Trading Commission approved the proposed futures contract after self-certification by the CME.

Contract Unit

Each futures contract represents five bitcoins measured by U.S. dollar per bitcoin. For example, if a bitcoin is priced at $9,000, then a futures contract is priced at five times $9,000, or $45,000. The minimum price fluctuation is $5 per bitcoin, or $25 per contract.

Settlement at Contract Expiration

Futures contracts are typically settled at expiration through either (1) physical delivery of the underlying commodity, or (2) financial cash settlement relative to a benchmark price. The CME bitcoin futures contract is a cash-settled futures contract that settles relative to the BRR if held until maturity.

Price Fluctuations

The CME is applying similar price fluctuation limits to the bitcoin futures contract as it does to equity index-based futures products. When prices move 7, 13 or 20 percent above or below the prior day's settlement, trading will enter a two-minute monitoring period followed by either a continuation of trading at the next expanded price limit, or the contract will revert to a preopen market state. Trading at more than 20 percent over or under the previous day's settlement is not permitted. For example, if the contract settles at $9,000 on the prior day, trading will not be allowed outside the range of $7,200 to $10,800.

Position Limits and Accountability Levels

Bitcoin positions in the nearest-to-expiry futures contract (spot month) are limited to 1,000 contracts per participant (e.g., 1,000 futures contracts have a value of $45 million if bitcoin trades at $9,000). Position limits for nonspot month contracts combined are 5,000 contracts per participant (e.g., 5,000 futures contracts have a value of $225 million if bitcoin trades at $9,000). In comparison, the corn futures contract spot month position limit is 600 contracts and positions for nonspot months combined are limited to 33,000 contracts (e.g., the value of 600 contracts is $10.8 million and the value of 33,000 contracts is $594 million if corn prices are $3.60 per bushel).

Clearing

The CME bitcoin futures will be cleared through CME Clearport and CME Direct. The clearing procedure is similar to other CME-listed futures contracts.

Margin Posting

The initial margin requirement for CME bitcoin futures traders is 47 percent and the maintenance margin is 43 percent. These margins are roughly 10 times larger than the amount needed for trading corn futures. The large margins are commensurate with the higher volatility associated with bitcoin prices.

Conclusion

Investors have a desire to both speculate and hedge risk in bitcoin. In response, the CME created a bitcoin futures contract even though the U.S. regulatory infrastructure has not developed a uniform treatment of bitcoin. As Adam White, the general manager of GDAX, a constituent exchange, states, "the IRS says it's property, the SEC said now some digital currency is a security, and FinCEN says digital currency is a 'money-like instrument.'"[4]

The CME bitcoin futures contract puts in place a structure that may provide some stability to the volatile bitcoin market. If the bitcoin futures contract succeeds, other financial instruments, such as bitcoin ETFs, may be approved for trading by regulatory authorities.

About the Authors

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1. [illegible]

2. "BRR and BRTI Constituent Exchanges Criteria," CME Group, Dec. 14, 2016, http://www.cmegroup.com/education/brr-brti-constituent-exchanges-criteria.html.

3. Ibid.

4. Rob Urban and Benjamin Bain, "Bitcoin Heads to Wall Street Whether Regulators Are Ready or Not," Bloomberg News, Dec. 1, 2017, https://www.bloomberg.com/news/articles/2017-12-01/bitcoin-futures-to-start-trading-as-regulators-rush-to-catch-up.