

CME Bitcoin Futures

The Basics

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Agenda

- I. Cryptocurrencies and Digital Assets
- II. CME Bitcoin Futures and the CME CF Bitcoin Reference Rate (BRR)
- III. Trading Examples
- IV. Additional Resources

Bitcoin Overview

Bitcoin is a peer-to-peer electronic cash system or "cryptocurrency" that doesn't rely on one central monetary authority



What is Bitcoin?

- In 2008 a software developer called Satoshi Nakamoto proposed the concept of Bitcoin as an electronic payment system based on mathematical proof.
- The idea was to produce a currency independent of any central authority, transferable electronically, with very low transaction fees.
- Bitcoin is a form of digital currency, created and held electronically. No one controls it. Bitcoins aren't printed, like dollars or euros – they're produced by people, and businesses, running computers all around the world, using software that solves mathematical problems.
- Bitcoin is also unique in that it has a fixed supply of 21 million coins.

Cryptocurrencies

What are cryptocurrencies?

- There are currently over 1461 different cryptocurrencies
- Popular examples include: Bitcoin, Ethereum, Ripple, and Litecoin
- Bitcoin is a cryptocurrency and world wide payment system
- It was the first decentralized digital currency.
- The network is a peer to peer and transactions take place between users directly through the use of cryptography, without an intermediary.
- These transactions are verified by network nodes (miners) and recorded in an immutable ledger known as the blockchain
- Bitcoins are created as a reward for the cryptographic process known as mining
- As of 2015 bitcoin is used by over 100,000 merchants and payments (Visa, Mastercard and Discover cards are accepted at approximately 42 million merchants).
- There are between 3 and 6 million unique users that have a cryptocurrency wallet.
- ***Bitcoin futures offer some huge advantages.....***

Cryptocurrencies

What are the benefits of cryptocurrencies?

- **Efficiency:** Cryptocurrencies make it easier to transfer funds between two parties in a transaction
- **Security:** Fund transfers are facilitated through the use of public and private keys for security purposes
- **Cost Savings:** fund transfers are done with minimal processing fees, allowing users to avoid the steep fees charged by most banks
- **Accessibility:** Cryptocurrency requires no bank or line of credit to make or receive payments electronically

Bitcoin Essentials

How do you obtain bitcoin?

- There are multiple ways for an individual to obtain bitcoin.
- It can be purchased on an exchange using traditional payment methods such as a credit card.
- It can be transferred to you from another person or entity.
- You can earn bitcoin as a miner.

How do you store Bitcoin?

- Before taking possession of bitcoin, an individual must have a bitcoin wallet.
- Secure bitcoin wallets can be downloaded and set up onto a computer, smartphone or other mobile device.
- Each bitcoin wallet stores an individual's private key which verifies the wallet owner and the balance of bitcoin that is associated with that wallet.

Why is there interest in Bitcoin?

- Individuals and entities can use bitcoin as a payment method for goods or services. There are a growing number of retailers who currently accept bitcoin.
- Bitcoin can also be used as an investment. It can be 'physically' owned or used as a tradable instrument.
- It can be bought or sold in exchange for a fiat currency such as the U.S. dollar. Bitcoin premiums vary across currencies creating arbitrage opportunities.
- Bitcoin is the most liquid of all cryptocurrencies

Where do cryptocurrencies like bitcoin come from...

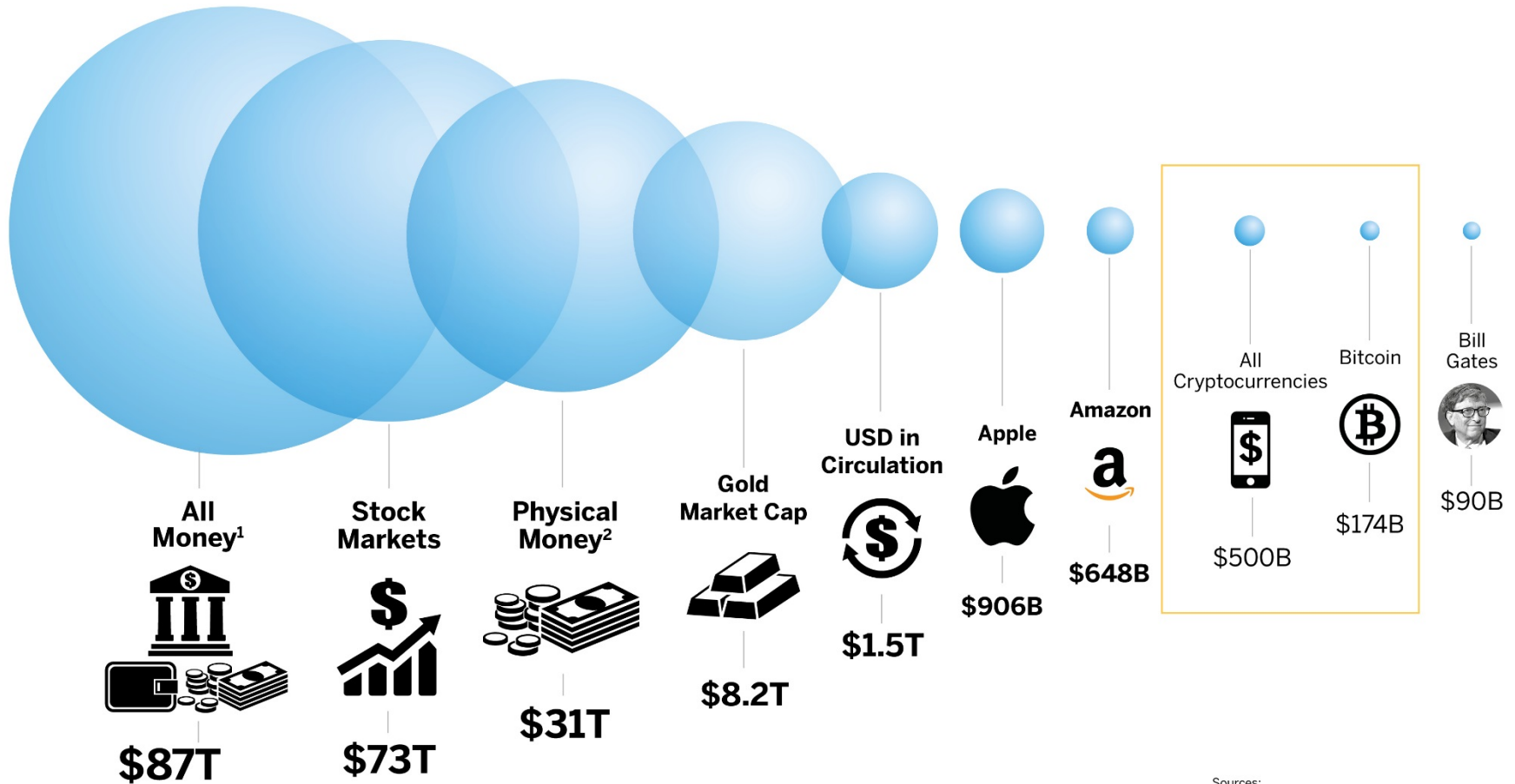


Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshi@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

Comparing Market Caps













1 All Money = money in any form including bank or other deposits as well as notes and coins.

2 Physical Money = money in forms that can be used as a medium of exchange, generally notes, coins and certain balances held by banks.

Sources:
howmuch.net/articles/worlds-money-in-perspective
coinmarketcap.com
forbes.com
federalreserve.gov
cia.gov

Top Ten Cryptocurrencies by Market Cap

#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Ct
1	 Bitcoin	\$177,193,424,578	\$10,533.70	\$9,857,350,000	16,821,575 BTC	
2	 Ethereum	\$93,308,897,094	\$960.35	\$3,642,270,000	97,161,749 ETH	
3	 Ripple	\$50,614,239,648	\$1.31	\$2,682,200,000	38,739,142,811 XRP *	
4	 Bitcoin Cash	\$26,404,055,114	\$1,559.84	\$630,015,000	16,927,413 BCH	
5	 Cardano	\$13,966,238,795	\$0.538674	\$388,643,000	25,927,070,538 ADA *	
6	 Litecoin	\$9,479,745,995	\$172.72	\$481,938,000	54,884,733 LTC	
7	 Stellar	\$8,349,366,375	\$0.467283	\$270,136,000	17,867,900,983 XLM *	
8	 NEM	\$8,214,092,999	\$0.912677	\$69,437,300	8,999,999,999 XEM *	
9	 EOS	\$7,730,274,886	\$12.42	\$1,690,710,000	622,646,022 EOS *	
10	 NEO	\$7,540,065,000	\$116.00	\$263,059,000	65,000,000 NEO *	

- There are 1461 cryptocurrencies across many exchanges
- The total cryptocurrency market cap is currently more than \$500B – Bitcoin represents ~36% of that figure

Source: CoinMarketCap, as of December 11, 2017

Top Ten Bitcoin Exchanges by BTC/USD Volume

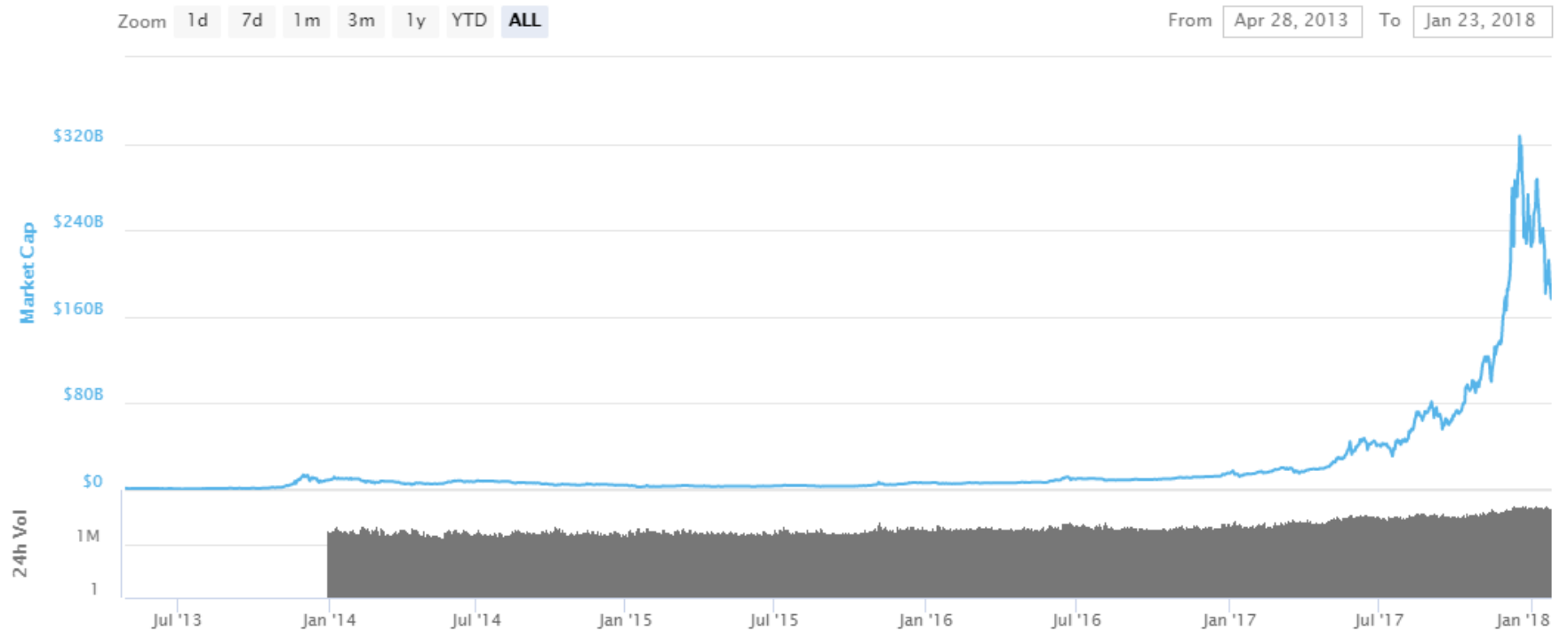
Source	Pair [▲]	Volume (24h)	Price
Bitfinex	BTC/USD	\$1,240,660,000	\$16,824.00
● GDAX	BTC/USD	\$628,092,000	\$16,916.90
BTCC	BTC/USD	\$342,250,000	\$18,500.00
● Bitstamp	BTC/USD	\$263,686,000	\$16,390.90
LakeBTC	BTC/USD	\$172,654,000	\$16,914.90
Gemini	BTC/USD	\$169,389,000	\$16,830.90
● Kraken	BTC/USD	\$70,440,700	\$16,639.40
● itBit	BTC/USD	\$51,579,900	\$16,849.80
CEX.IO	BTC/USD	\$47,587,800	\$17,409.20
CoinsBank	BTC/USD	\$29,874,600	\$16,341.10

● Denotes CME CF Bitcoin pricing product constituent exchange

Source: CoinMarketCap, as of December 11, 2017

Bitcoin Price History, Apr. 2013 – January 23, 2018

Bitcoin Charts



Source: CoinMarketCap, as of January 23, 2018

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CME CF Bitcoin Reference Rate (BRR)

The BRR aggregates the trade flow of major bitcoin spot exchanges during a specific calculation window into a once-a-day reference rate of the U.S. dollar price of bitcoin. Calculation rules are geared toward a maximum of transparency and real-time replicability in underlying spot markets. CME Group and Crypto Facilities Ltd. designed the BRR around the IOSCO Principles for Financial Benchmarks.

The CME CF Bitcoin Reference Rate (“BRR”) is a daily reference rate of the U.S. Dollar price of one bitcoin as of 4:00 p.m. London time and published shortly thereafter. It is representative of the bitcoin trading activity on Constituent Exchanges and is geared towards resilience and replicability.

Name	CME CF Bitcoin Reference Rate
CME Ticker Symbol	BRR
Administrator	Crypto Facilities Ltd
Calculation Agent	Crypto Facilities Ltd
Description	U.S. dollar price of one bitcoin as of 4:00 p.m. London time
Calculation Methodology	Aggregation of trade executions occurring on constituent exchanges between 3:00 p.m. and 4:00 p.m. London time
Dissemination Time	Once per day, every day of the year including weekends and holidays, between 4:00 p.m. and 4:30 p.m. London time
Dissemination Precision	0.01 U.S. dollars

CME Bitcoin Futures

Based on the CME Crypto Facilities Bitcoin Reference Rate (BRR)

Bitcoin Futures

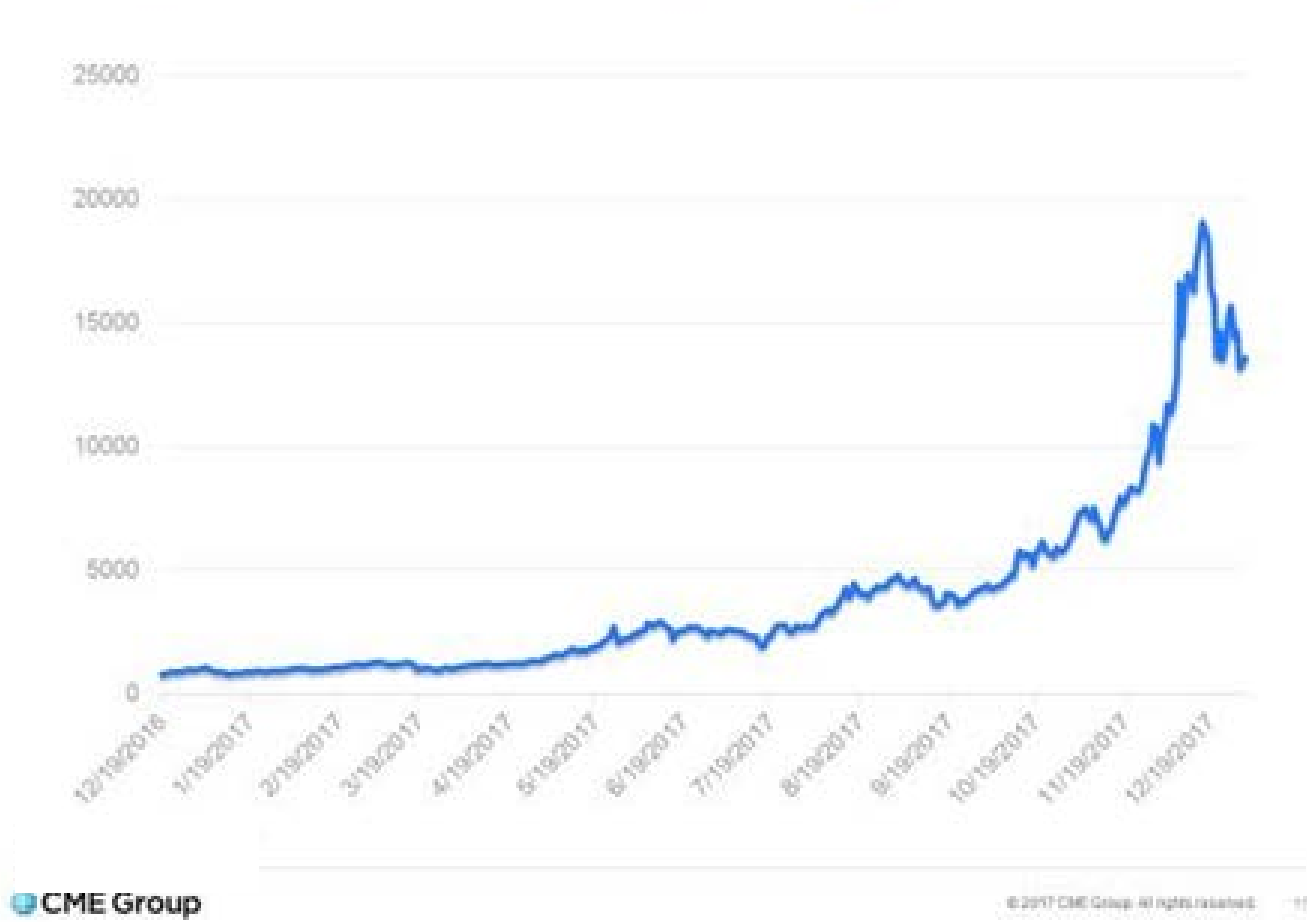
- CME Group will launch bitcoin futures on December 18th (begins Sunday evening the 17th)
- The new contract will be cash-settled, based on the CME CF Bitcoin Reference Rate (BRR). Bitcoin futures will be listed on and subject to the rules of CME.

CME CF Bitcoin Reference Rate (BRR)

- Launched in November 2016 in partnership with Crypto Facilities – experts in digital assets
- The BRR is a once-a-day reference rate of the U.S. dollar price of bitcoin
- Represents the aggregate trade flow of major bitcoin spot exchanges during a specific calculation window
- Is fully transparent in accordance with market best practices and IOSCO principles
- Calculation ensures tradability and replicability in the underlying spot markets
- Methodology is designed to be robust and resistant to manipulation
- Is governed through an independent oversight committee of industry experts
- Has rigorous criteria for the inclusion of constituent exchanges (currently 6 approved with 4 contributing)
- The current constituent exchanges include: GDAX, Kraken, itBit, and Bitstamp

Bitcoin Reference Rate - Year Ending 1/1/18

Bitcoin Reference Rate as of January 1st 2018



CME Bitcoin Futures

Contract Specifications

Contract Unit	5 bitcoin, as defined by the CME CF Bitcoin Reference Rate (BRR)
Minimum Price Fluctuation	Outright: \$5.00 per bitcoin = \$25.00 per contract Calendar Spread: \$1.00 per bitcoin = \$5.00 per contract
Trading Hours	CME Globex and CME ClearPort: 5:00 p.m. – 4:00 p.m. CT Sunday – Friday
Product Code	Outright: BTC
Listing Cycle	Nearest 2 months in the March Quarterly cycle (Mar, Jun, Sep, Dec) plus the nearest 2 “serial” months not in the March Quarterly cycle.
Termination of Trading	Last Day of Trading is the last Friday of contract month. Trading in expiring futures terminates at 4:00 p.m. London time on Last Day of Trading.
Position Limits	Spot Position Limits are set at 1,000 contracts. A position accountability level of 5,000 contracts will be applied to positions in single months outside the spot month and in all months combined.
Block Minimum	5 contracts
Price Limits	Price limits for a given Business Day are made by reference to the most recent Bitcoin Futures settlement price, settled at 4:00 p.m. London time each Business Day. Special price fluctuation limits equal to 7% above and below prior settlement price and 13% above and below prior settlement price and a price limit of 20% above or below the previous settlement price. Trading will not be permitted outside the 20% above and below prior settlement price.
Settlement	Cash settled by reference to Final Settlement Price, equal to the CME CF Bitcoin Reference Rate (BRR) on Last Day of Trading.

Bitcoin Futures Price Limits

Bitcoin futures will be subject to daily price fluctuation limits of 7%, 13% and 20%. These limits apply to both upside and downside price changes relative to the prior day's Bitcoin futures settlement price.

Please note that the first two price limits, +/- 7% and +/- 13%, are soft limits. If, at the end of the two-minute period, the contract comes off that limit, then trading will continue without a halt at the expanded price limits of +/- 13% and +/- 20%, respectively.

Conversely, if the contract is still at the limit at the end of the monitoring period, then there will be a two-minute trading halt where the contract will enter into “a pre-open” market state. During the pre-open market state, trade matching does not occur but orders can be entered, modified or cancelled. After the two-minute halt, the contract will resume trading at the expanded price limits of +/- 13% and +/- 20%, respectively.

The +/- 20% limit is a hard limit. (exception on final settlement day)

Bitcoin Quotation: as of 1/22/18 at 6 pm

Month	Open	High	Low	Last	Change	Settle	Estimated Volume	Prior Day Open Interest
JAN 18	11300.0	11830.0	9955.	10280.0B	-1005.	10355.0	1,137	560
FEB 18	11360.0	11840.0B	10085.0A	10315.0B	-1040.	10390.0	347	613
MAR 18	11420.0	11905.0B	10120.0A	10350.0B	-1060.	10425.0	94	331
JUN 18	10600.0	10600.0	10530.0A	10570.0B	-1060.	10560.0	1	27
Total							1,579	1,531

Last Updated: Monday, 22 Jan 2018 06:00 PM

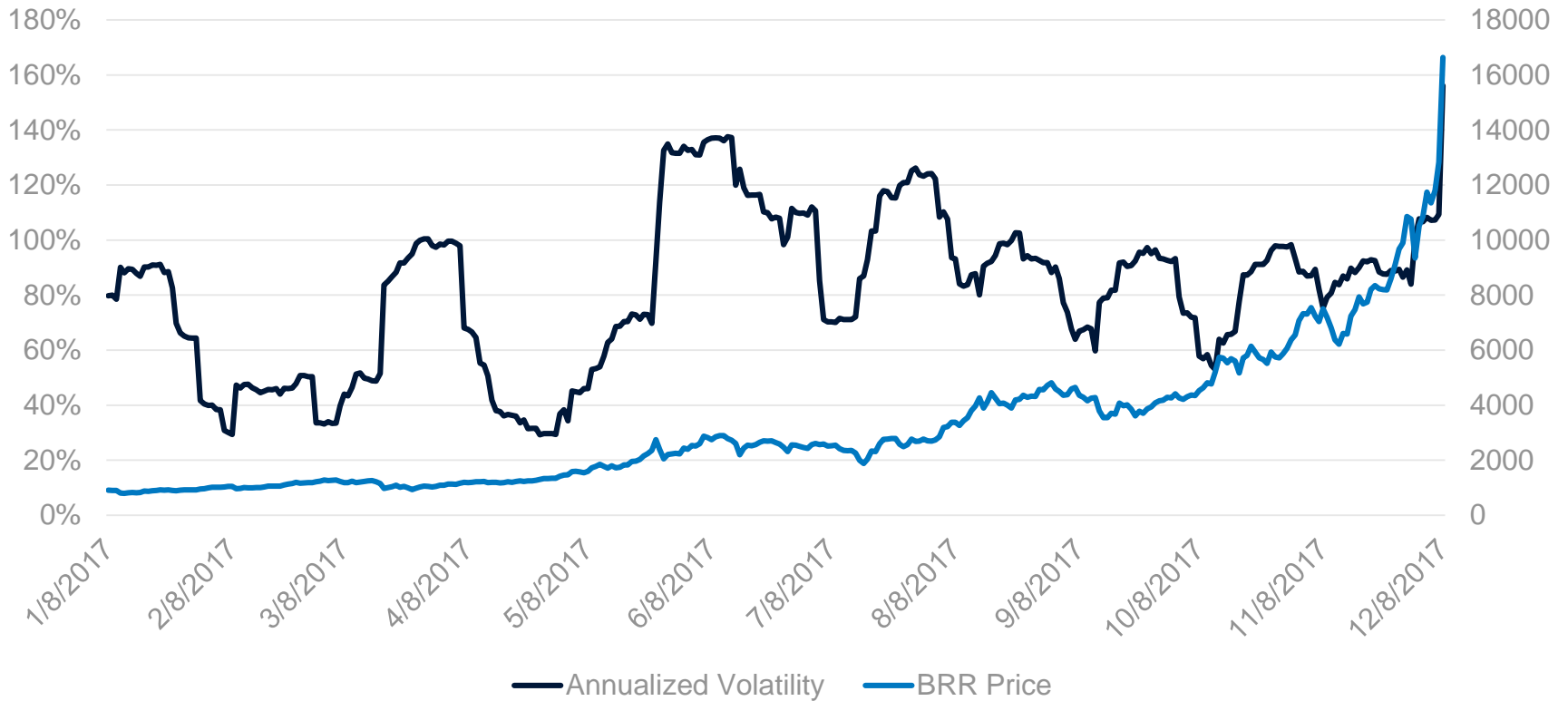
[? About This Report](#)

Bitcoin Volatility (30/100 day historical vols)



Bitcoin Volatility

Bitcoin (BRR) Volatility



Bitcoin Volatility Compared with other futures....

Futures contract	Current implied Volatility
Crude Oil	16.60%
Corn	15.70%
Soybeans	11.46%
E-mini S&P 500	8.70%
Gold futures	8.21%
Bitcoin	Over 100% (historical vol)

Bitcoin Expected Daily Moves at a Given Volatility

With Bitcoin at \$15,000

Annualized Volatility	Converted to Daily Volatility	1 sigma	2 sigma	3 sigma
120	7.5	1125	2250	3375
100	6.3	938	1875	2813
80	5.0	750	1500	2250
60	3.8	563	1125	1688
40	2.5	375	750	1125
20	1.3	188	373	563

CME Group Provides Extensive Risk Management Tools

Available risk management tools to be considered for use in Bitcoin futures contract

Price Limits (previously mentioned)

- +/- 7, 13 and 20 percent.
- 7 and 13 percent limits are “soft limits”
- 20 percent is hard limit except at final expiration

Position Limits

- Spot Position Limits are set at 1,000 contracts.
- A position accountability level of 5,000 contracts will be applied to positions in single months outside the spot month and in all months combined.
- The reportable level will be 25 contracts.
- Block minimum = 5 contracts

Performance bond margins set in line with volatility and contract notional value

- 47% initial. 43% maintenance subject to change (as of December 12, 2017)

In Line Credit Controls (ICC)

- Pre-trade position control enforced at the account/product level. Calculation is done prior to orders reaching the matching engine.
- Access can be granted to risk managers at both the legal clearing entity and the account ownership level. This allows them to set limits on accounts registered to each individual.
- Risk managers can see account activity in real-time through dashboards and email alerting systems, similar to those already in place in Globex Credit Controls and Account Manager

Globex Credit Controls

- Allows risk manager to set pre-execution credit control limits for futures and options on Globex

Risk Management Interface

- Allows clearing firms to programmatically block/unblock order entry and cancel working orders at the account level via API or UI

The CME Clearing House and Risk Mitigation

With tremendous volatility (mostly upside volatility at this point), some investors are curious about risk mitigation.

In a sentence, the CME clearing house, in conjunction with its clearing member firms, is well equipped to handle risk. For over 150 years, CME Group has been assessing and mitigating the risks associated with financial markets including:

- Swiss FX volatility of 2013
- BREXIT vote in 2016
- U.S. Elections in November 2016

CME Group also has the power to assess additional margin and change margins at a moment's notice.

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Bitcoin Futures Trade Example: A Miner's Hedge

Hypothetical Example: For Illustration Only

With the bitcoin reference rate trading at \$16,000, a “miner” with significant holdings in the cryptocurrency wishes to protect some of his holdings from a price decline while allowing more upside from his remaining bitcoin holdings.

- Strategy: Sell Bitcoin futures as a hedge against decline
- Sell short 5 January Bitcoin futures (BTCF18) at \$16,000

Remember: CME Bitcoin futures track the CME CF Bitcoin Reference Rate

- At \$16,000, each bitcoin futures has a notional value of \$80,000.
- The performance bond margin, subject to change, will be approximately 47% of the notional value or \$37,600.

Bitcoin Futures Trade Example: A Miner's Hedge

Hypothetical Example: For Illustration Only

On December 27th, 2017

Sell short 5 January bitcoin futures (BTCF18) at \$16,000

By February 11th, bitcoin futures dropped from \$16,000 to \$14,800.

P/L on hedge strategy:

Sold BTCF18 at 16,000

Currently trading at 14,800

p/l = \$1,200

p/l USD = \$1,200 x 5 bitcoin per contract x 5 contracts

= \$30,000

Bitcoin Futures Trade Example: A Miner's Hedge

Hypothetical Example: For Illustration Only

Sold BTCF18	at 16,000
Currently trading	at 14,800
p/l	= \$1,200
p/l USD	= \$1,200 x 5 bitcoin per contract x 5 contracts
	= \$30,000

The \$30,000 gain from his hedge will offset the losses on the bitcoin in his portfolio.

Remember each \$5.00 change equals	\$25.00 per contract
Each \$10 change in bitcoin futures equals	\$50.00
Each \$100 change in bitcoin futures equals	\$500.00
Each \$1000 change in bitcoin futures equals	\$5,000.00

The futures contract will settle to the bitcoin reference rate on the last day of trading of the contract's expiration month

Bitcoin Futures Trade Example

The Benefits of Using Futures

Hypothetical Example: For Illustration Only

A trader feels that bitcoins significant rally will continue. He decides to go long via bitcoin futures.

On December 20, BTC (bitcoin futures) are trading at \$15,000

The trader goes long 1 BTCF18 (Bitcoin futures expiring in Jan 2018)

Price: = \$15,000

Notional value: \$15,000 x 5 bitcoin = \$75,000

Margin: 47% (subject to change) = \$35,250

Exchange minimum margin may change at any time including intraday changes in margin if volatility warrants such a change.

FCM margin requirement may actually be higher than CME Group margin but never lower.

Bitcoin Futures Trade Example

The Benefits of Using Futures

Hypothetical Example: For Illustration Only

A trader feels that bitcoin's significant rally will continue. He decides to go long via bitcoin futures.

On December 28, BTCF18 (bitcoin futures) are trading at \$16,200

P/L

Dec 28 price of BTCF18 = \$16,200

Purchase price of BTCF18 = \$15,000

Profit on trade = \$1,200 per bitcoin

Contract is 5 bitcoin = \$6,000 profit on trade so far

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Bitcoin Futures Trade Example

The Benefits of Using Futures

Hypothetical Example: For Illustration Only

On the last day of trading of the contract month the trader still has position.

Holding until final settlement results in cash settlement procedure.

Bitcoin futures settle to the Bitcoin Reference rate (BRR) on last day of trading

BRR final settlement	= \$17,210
Purchase price of BTCF18	= \$15,000
Final Profit on trade	= \$2,210 per bitcoin
Contract is 5 bitcoin	= \$11,050 total profit

CME Group Bitcoin Futures vs. Bitcoin Spot Market

	Bitcoin Futures	Bitcoin on Spot Market
Wallet requirement	No	Yes
Capital efficiencies (leverage)	Yes	No
Regulated Market	Yes	Somewhat
Tax efficiencies	Yes	No
Clearinghouse risk mitigation	Yes	No
Underlying Exchange Business Experience	178 years	3-6 years depending on exchange
Ability to go short	Easy	Not as easy

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Resources

Bitcoin Futures Resources

www.cmegroup.com/bitcoinfutures

[FAQs](#)

CME CF Bitcoin Reference Rate Resources

www.cmegroup.com/bitcoin

[BRR Methodology](#)

[FAQs](#)

Educational Modules

[What is Bitcoin?](#)

[Introduction to Bitcoin Reference Rate](#)

[What are Bitcoin Futures?](#)