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Volatility: Bitcoin vs Other Assets



Apple (AAPL)



Amazon (AMZN)



Bank of America (BAC)



Bitcoin (BTC)

VS



Ethereum (ETH)



S&P500 (GSPC)



General Electric (GE)



SPDR Gold (GLD)



SPDR S&P500 (SPY)



Tesla (TSLA)



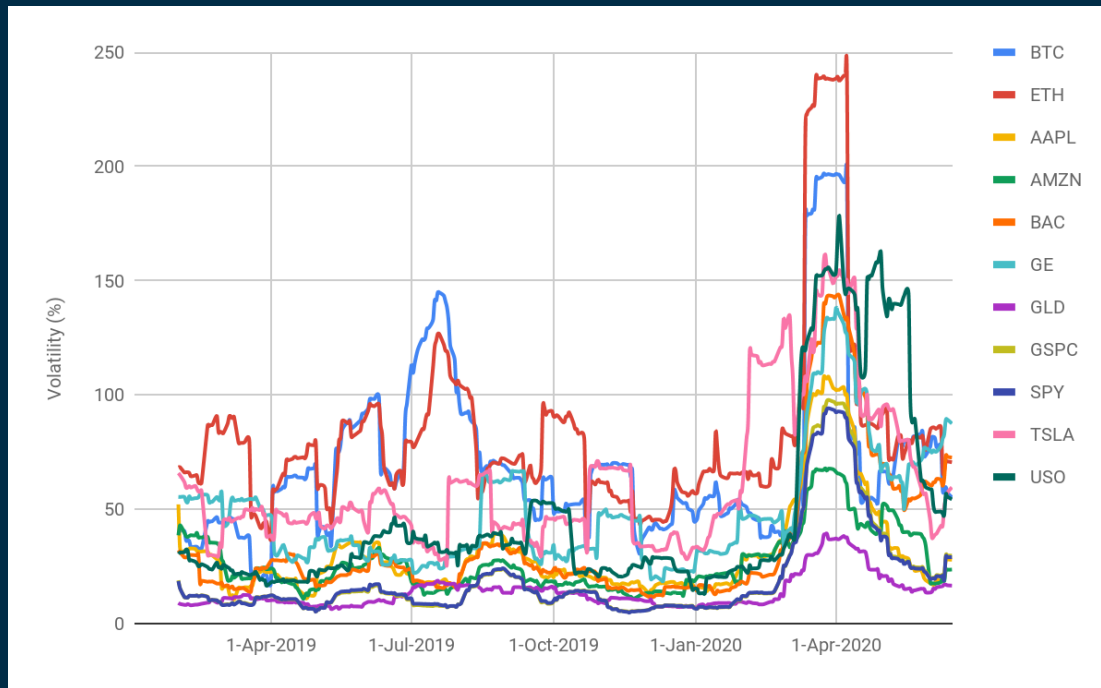
Crude Oil (USO)

Bitcoin Volatility

- We have observed how Bitcoin is on average more volatile than some notable large cap US stocks, although there are some stocks that have a similar, and at times greater, volatility, including many small cap US stocks.
- Bitcoin's current volatility and market structure, when combined with extremely high leverage (50 -100x) offered by marketplaces outside the purview of US regulators, can create conditions for sharp price movements unrelated to market fundamentals.
- As Bitcoin and its market structure mature, and come under greater oversight, participants and exchanges will benefit from the experience of traditional markets and asset classes to reduce market structure rooted volatility.
- Enabling responsible, regulated, professionally run trading venues to bring the benefits of robust and reliable infrastructure, surveillance programs, and secure and sound operations to market will help strengthen market structure and present the market with a competitive alternative to riskier, less mature, and less stringently regulated products and platforms.

Historical Volatility (January 2019 - June 2020)

1-Month Annualized Volatility of Log Returns



Source: Yahoo Finance.

Volatility Calculation: standard deviation($\log(\text{price at } t) - \log(\text{price at } t-1)$) with a rolling window of 20 days, annualized by 252 trading days

- Bitcoin and Ethereum are on average more volatile than traditional stocks.
- Nonetheless, some stocks experience periods where their volatility is *substantially higher* than Bitcoin/Ethereum volatility.
- On 29% of the reviewed days Tesla's volatility was higher than Bitcoin's volatility.
- In fact, through February 2020, Tesla's volatility was more than double Bitcoin's volatility.
- Other stocks like GE or BAC have also had periods of higher volatility compared to Bitcoin.
- Gold's volatility is much lower than Bitcoin's volatility, overall.
- Crude Oil volatility has been above Bitcoin on several occasions. Particularly, during April-May of 2020, Crude Oil volatility was 2.5x higher than Bitcoin volatility.

COVID-19 Impact on volatility

1-Month Annualized Volatility of Log Returns (Jan 2019 - Jun 2020)

	BTC	ETH	AAPL	AMZN	BAC	GE	GLD	GSPC	SPY	TSLA	USO
Jan2019 - Feb2020	65.50%	75.15%	27.64%	24.01%	24.08%	40.87%	12.10%	13.75%	13.83%	58.78%	31.03%
Mar2020 - Jun2020	116.73%	141.64%	63.36%	46.39%	93.77%	94.73%	24.81%	58.13%	56.25%	103.80%	126.04%

Source: Yahoo Finance.

Volatility Calculation: standard deviation($\log(\text{price at } t) - \log(\text{price at } t-1)$) with a rolling window of 20 days, annualized by 252 trading days

- Since the COVID-19 spread to the US and triggered significant market sell-offs, sample stocks' volatility has gone up on average 265% with respect to previous levels, while Bitcoin volatility has gone up 178% and Ethereum volatility has gone up 188%.
- Although Bitcoin and Ethereum volatility are on average the highest volatilities in both periods, there are certain stocks, particularly Tesla and General Electric, whose volatility is very close to that of the two digital assets'.
- Gold doubled its average volatility after the pandemic broke out, but it's still the least volatile asset among all the analyzed assets.
- Crude Oil experienced a period of higher volatility during the months April-May 2020, increasing its volatility by 400% compared to the volatility levels from 2019.

Bitcoin March 2020 Crash - BitMEX Liquidations



Source: Coin Metrics

¹ <https://blog.bitmex.com/how-we-are-responding-to-last-weeks-ddos-attacks>

- Between 9am UTC on March 12th and 6am UTC on March 13th, Bitcoin's price fell from \$7,300 to \$3,900.
- During that period \$1.1B worth of contracts were liquidated in the BitMEX platform.
- This automated liquidation resulted in selling pressure in the market, which exacerbated the BTC price drop.
- BitMEX reportedly suffered a DDOS attack¹ at ~2am, lasting ~45 minutes on March 13th, which caused their liquidation engine to stop the liquidation for a period of time, thus, alleviating the selling pressure from the market.
- During this period of time, BTC prices rose by ~23%.

Historical Volatility (Jan 2019 - June 2020)

1-Month Correlation of Log Returns



Source: Yahoo Finance

Correlation Calculation: $\text{pearson correlation}(\log(\text{price at } t) - \log(\text{price at } t-1))$ with a rolling window of 20 days

- The correlation between BTC-USD and ETH-USD is consistently high, and has been particularly high during the COVID-19 outbreak, with correlations close to 1.
- There is low correlation between BTC-USD and SPY or GLD.
- Correlation increased during the March '20 volatility to 0.4-0.6 but has since reverted to lower levels.
- The correlation between BTC-USD or ETH-USD with stocks or gold, is not consistent.

COVID-19 Impact on Correlation

Correlation of Log Returns (Jan 2019 - Feb 2020)

	BTC	ETH	GLD	SPY
BTC	100.0%	80.7%	-8.7%	21.4%
ETH	80.7%	100.0%	0.0%	12.5%
GLD	-8.7%	0.0%	100.0%	-23.2%
SPY	21.4%	12.5%	-23.2%	100.0%

Source: Yahoo Finance

Correlation Calculation: $\text{pearson correlation}(\log(\text{price at } t) - \log(\text{price at } t-1))$ with a rolling window of 20 days

Correlation of Log Returns (Mar 2020 - Jun 2020)

	BTC	ETH	GLD	SPY
BTC	100.0%	96.0%	53.5%	32.2%
ETH	96.0%	100.0%	60.2%	27.7%
GLD	53.5%	60.2%	100.0%	17.5%
SPY	32.2%	27.7%	17.5%	100.0%

Source: Yahoo Finance

Correlation Calculation: $\text{pearson correlation}(\log(\text{price at } t) - \log(\text{price at } t-1))$ with a rolling window of 20 days

- The pandemic outbreak has increased correlation across all pairs.
- It's worth noting the correlation between ETH and Gold, which was 0 for the previous year, and during the pandemic it rose to 60%.
- High correlation is already subsiding and returning to pre-pandemic levels.
- This data suggests that under normal market conditions ETH and BTC are not correlated with the stock market nor Gold, but that under extreme market conditions the correlation rises significantly and can remain high for a period of time. When the market conditions start to settle, correlation declines and normal levels are once more achieved.

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