



# Bitwise Asset Management

Analysis of Real Bitcoin Trade Volume

March 19, 2019



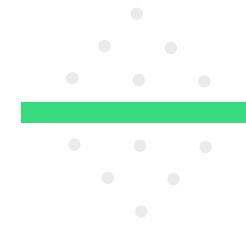
# The Real Bitcoin Market

## KEY FINDINGS

The real market for bitcoin is significantly smaller, more orderly, and more regulated than is commonly understood.

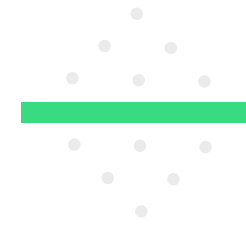


# What *Makes* Bitcoin Unique?



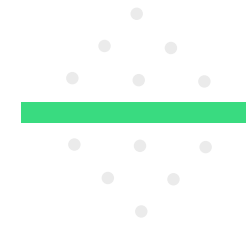
**Bitcoin is a globally fungible commodity with low transaction costs, near-zero transportation costs and low-to-zero storage costs.**





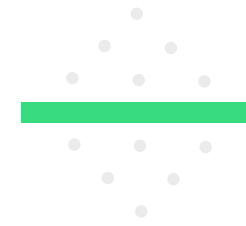
Bitcoin is a **globally fungible** commodity with low transaction costs, near-zero transportation costs and low-to-zero storage costs.

A bitcoin is the same everywhere in the world.



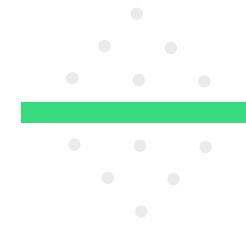
Bitcoin is a globally fungible commodity with **low transaction costs**, near-zero transportation costs and low-to-zero storage costs.

On leading exchanges, bitcoin commonly trades with a \$0.01 spread on an approximately \$4,000 handle with significant volume.



Bitcoin is a globally fungible commodity with low transaction costs, **near-zero transportation costs** and low-to-zero storage costs.

Unlike physical commodities, there is virtually no cost to transport bitcoin anywhere in the world.



Bitcoin is a globally fungible commodity with low transaction costs, near-zero transportation costs  
**and low-to-zero storage costs.**

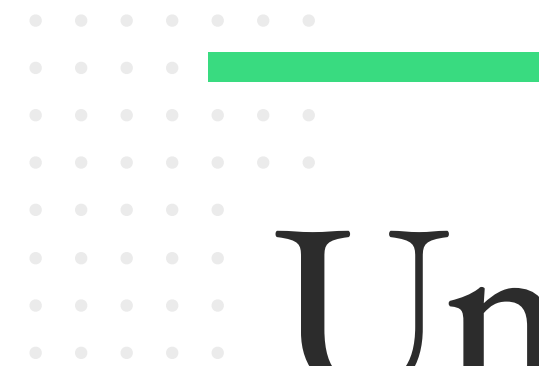
Bitcoin can be safely custodied with established third-party custodians at a cost that ranges from 0% to 1.5% per year.



# What does that mean?

As a result, you would expect the bitcoin market to **be uniquely orderly and efficient, with tight spreads and nearly perfect arbitrage.**

Bitcoin fits the textbook definition of an arbitrable good to a degree unmatched in history, which would suggest a uniquely efficient market.



# Unfortunately, Public Perception *And* Data Suggest Exactly The Opposite

Bitcoin Markets							
		Pair: All		Category: Spot		Fee Type: All	
						USD	
#	Source	Pair	Volume (24h)	Price	Volume (%)	Category	Fee Type
2	CoinBene	BTC/USDT	\$258,399	\$3,562.29	3.05%	Spot	Percentage
3	Binance	BTC/USDT	\$232,019	\$3,562.28	2.74%	Spot	Percentage
4	OKEEx	BTC/USDT	\$217,034,50	\$3,562.28	2.56%	Spot	Percentage
5	OEX	ETH/BTC	\$163,006,485	\$3,562.28	1.92%	Spot	Percentage
6	FCoin	BTC/USDT	** \$157,204,555	\$3,562.29	1.86%	Spot	Transaction Mining
7	Coinbit	BTC/KRW	** \$153,973,091	\$3,444.30	1.82%	Spot	Transaction Mining
8	Huobi	BTC/USDT	\$148,604,031	\$3,564.94	1.75%	Spot	Percentage
9	Bitfinex	BTC/USD	\$131,230,813	\$3,654.30	1.55%	Spot	Percentage
10	DigiFinex	BTC/USDT	\$130,519,257	\$3,563.20	1.54%	Spot	Percentage
11	DOBI trade	LTC/BTC	\$118,234,866	\$3,555.20	1.40%	Spot	Percentage
12	DOBI trade	ETH/BTC	\$116,594,281	* \$3,561.98	1.38%	Spot	Percentage
13	Liquid	BTC/JPY	** \$113,659,671	\$3,520.71	1.34%	Spot	No Fees
14	HitBTC	BTC/USDT	\$103,090,002	\$3,649.19	1.22%	Spot	Percentage
15	RightBTC	ETH/BTC	\$95,898,916	\$3,558.53	1.13%	Spot	Percentage
16	IDAX	BTC/USDT	\$87,557,665	\$3,563.79	1.03%	Spot	Percentage
17	DOBI trade	EOS/BTC	\$80,796,400	\$3,558.82	0.95%	Spot	Percentage
18	Fatbtc	BTC/CNY	\$79,055,472	\$3,363.28	0.93%	Spot	Percentage
19	Coinbase Pro	BTC/USD	\$77,266,732	\$3,520.75	0.91%	Spot	Percentage
20	BCEX	BTC/USDT	\$77,080,267	\$3,560.41	0.00%	Spot	Percentage
21	BitForex	BTC/USDT	\$75,204,77	\$3,543.60	0.89%	Spot	Percentage
22	ZB.COM	XRP/BTC	\$73,513,	\$3,543.60	0.87%	Spot	Percentage
23	BCEX	BTC/CKUSD	\$67,946,	\$3,203.60	0.00%	Spot	Percentage
24	OOBTC	BTC/USDT	\$67,923,0	\$3,538.42	0.80%	Spot	Percentage
25	Kraken	BTC/USD	\$64,996,009	\$3,538.42	0.77%	Spot	Percentage
26	Simex	BTC/USD	\$62,126,103	\$3,520.61	0.73%	Spot	Percentage
27	Bitstamp	BTC/USD	\$58,002,667	\$3,519.28	0.68%	Spot	Percentage

Public perception holds that the bitcoin market is in fact uniquely *disorderly* and *inefficient*.

This is a rational response to the information most people have at their disposal.

For example, leading data aggregators show prices on different exchanges separated by hundreds of dollars.



How Can This Be?





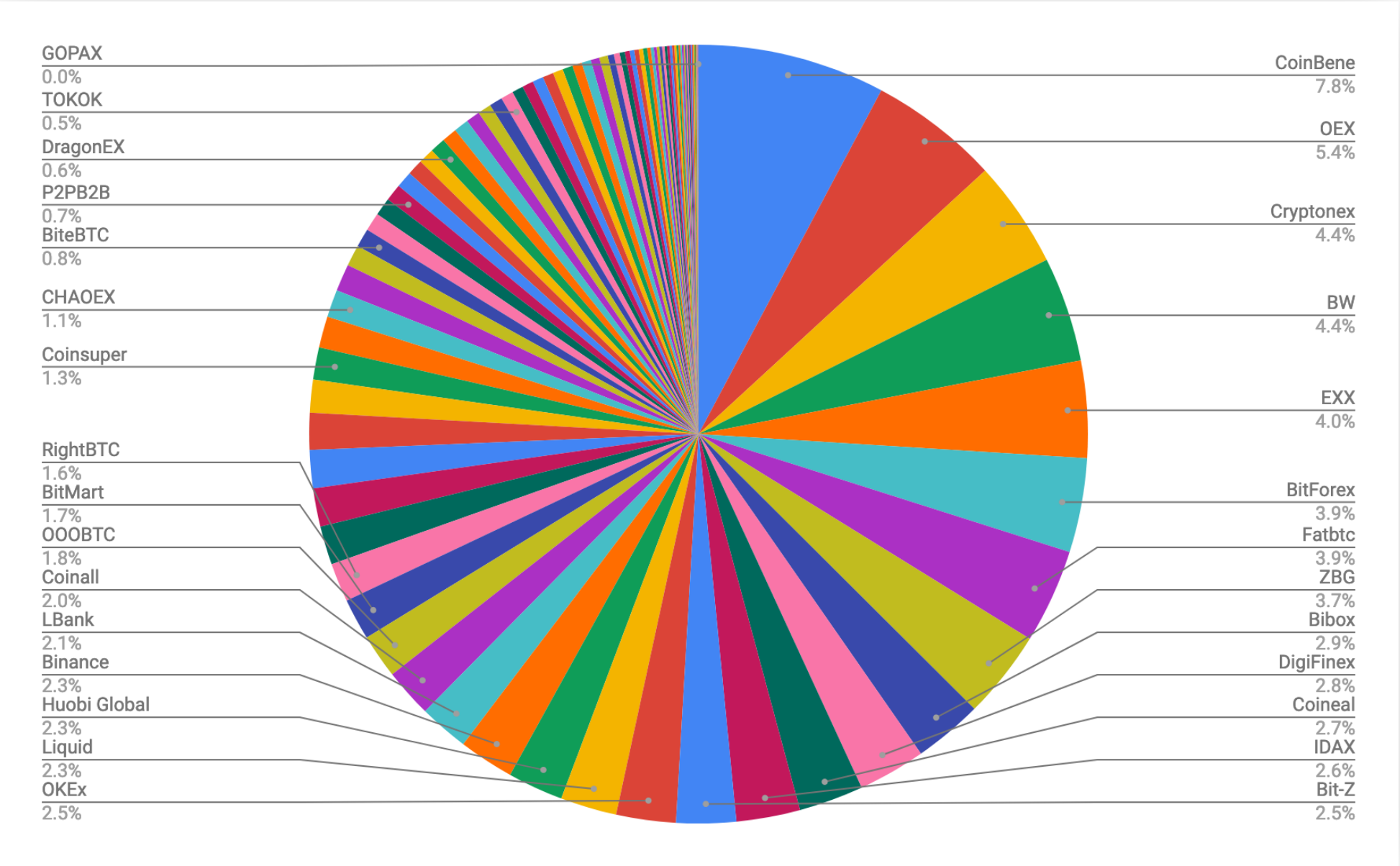
# Top Bitcoin Exchanges by Reported Volume

Reported volume adds to roughly \$6 billion/day\*, but under the hood the exchanges that report the highest volumes are unrecognizable. The vast majority of this reported volume is fake and/or non-economic wash trading.

## CoinMarketCap Top Exchanges

Bitcoin Markets								
#	Source	Pair	Volume (24h)	Price	Volume (%)	Category	Fee Type	Updated
2	CoinBene	BTC/USDT	\$519,473,547	\$3,965.49	3.93%	Spot	Percentage	Recently
3	OEX	BTC/USDT	\$344,465,558	\$3,964.29	2.61%	Spot	Percentage	Recently
4	BW	BTC/USDT	\$287,808,371	\$3,962.83	2.18%	Spot	Percentage	Recently
5	BitForex	BTC/USDT	\$273,338,561	\$3,963.72	2.07%	Spot	Percentage	Recently
6	ZBG	BTC/USDT	**\$235,219,535	\$3,966.05	1.78%	Spot	Transaction Mining	Recently
7	Bibox	BTC/USDT	\$227,182,722	\$3,964.59	1.72%	Spot	Percentage	Recently
8	DigiFinex	BTC/USDT	\$196,151,977	\$3,966.80	1.49%	Spot	Percentage	Recently
9	Coinéal	BTC/USDT	\$189,723,011	\$3,964.75	1.44%	Spot	Percentage	Recently
10	IDAX	BTC/USDT	\$182,114,079	\$3,965.26	1.38%	Spot	Percentage	Recently
11	DigiFinex	LTC/BTC	\$180,772,269	\$3,956.79	1.37%	Spot	Percentage	Recently
12	Coinéal	LTC/BTC	\$177,085,654	\$3,955.72	1.34%	Spot	Percentage	Recently
13	OKEx	BTC/USDT	\$162,231,333	\$3,964.23	1.23%	Spot	Percentage	Recently
14	Bit-Z	BTC/USDT	\$157,452,242	\$3,965.27	1.19%	Spot	Percentage	Recently
15	DOBI Exchange	ETH/BTC	\$157,381,534	\$3,962.00	1.19%	Spot	Percentage	Recently
16	Coinall	BTC/USDT	**\$155,776,905	\$3,964.15	1.18%	Spot	Transaction Mining	Recently
17	Coinall	LTC/BTC	**\$155,406,913	\$3,952.56	1.18%	Spot	Transaction Mining	Recently
18	Bgogo	BTC/USDT	**\$138,951,870	\$3,962.86	1.05%	Spot	Transaction Mining	Recently
19	55 Global Markets	BTC/USDT	\$138,245,374	\$3,965.49	1.05%	Spot	Percentage	Recently
20	EXX	BTC/USDT	**\$133,624,207	\$3,962.95	1.01%	Spot	Transaction Mining	Recently
21	LBank	BTC/USDT	\$132,426,103	\$3,966.80	1.00%	Spot	Percentage	Recently
22	Binance	BTC/USDT	\$131,745,321	\$3,965.22	1.00%	Spot	Percentage	Recently
23	Bibox	ETH/BTC	\$131,590,304	\$3,965.45	1.00%	Spot	Percentage	Recently
24	Liquid	BTC/JPY	**\$131,183,093	\$3,897.30	0.99%	Spot	No Fees	Recently
25	Huobi Global	BTC/USDT	\$122,031,909	\$3,962.97	0.92%	Spot	Percentage	Recently
26	EXX	ETH/BTC	**\$120,000,891	\$3,959.85	0.91%	Spot	Transaction Mining	Recently
27	Binance	ENJ/BTC	\$116,926,318	\$3,928.83	0.89%	Spot	Percentage	Recently
28	OOBTC	BTC/USDT	\$115,245,922	\$3,959.95	0.87%	Spot	Percentage	Recently
29	Simex	BTC/USD	\$113,347,372	\$3,919.23	0.86%	Spot	Percentage	Recently
30	BitMart	BTC/USDT	\$112,926,902	\$3,964.57	0.86%	Spot	Percentage	Recently

## Exchange Breakdown



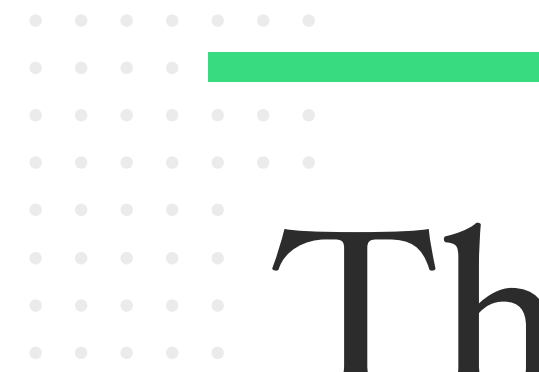
Reported: ~\$6 Billion in Avg. 24hr Daily Volume\*

\* Only counting trading volumes where BTC trades against fiat currencies or stablecoins.

Screenshot: Coinmarketcap on March 9, 2019

Data Source: Coinmarketcap. March 4-8, 2019





# This Data Is Widely Reported ... And Extremely Wrong

This data comes from CoinMarketCap.com, the most widely cited source for bitcoin volume. It is used by every major media outlet in the world (examples shown to the right).

Despite its widespread use, the [CoinMarketCap.com](https://coinmarketcap.com) data is wrong. It includes a large amount of fake and/or non-economic trading volume, thereby giving a fundamentally mistaken impression of the true size and nature of the bitcoin market.

We will demonstrate in multiple different ways that approximately 95% of this volume is fake and/or non-economic in nature, and that the real market for bitcoin is significantly smaller, more orderly, and more regulated than commonly understood.

*"Binance, currently the largest online exchange by volume, according to research site [coinmarketcap.com](https://coinmarketcap.com)..."*

**THE WALL STREET JOURNAL.** August 5, 2018

*"According to data from the website [coinmarketcap.com](https://coinmarketcap.com)..."*

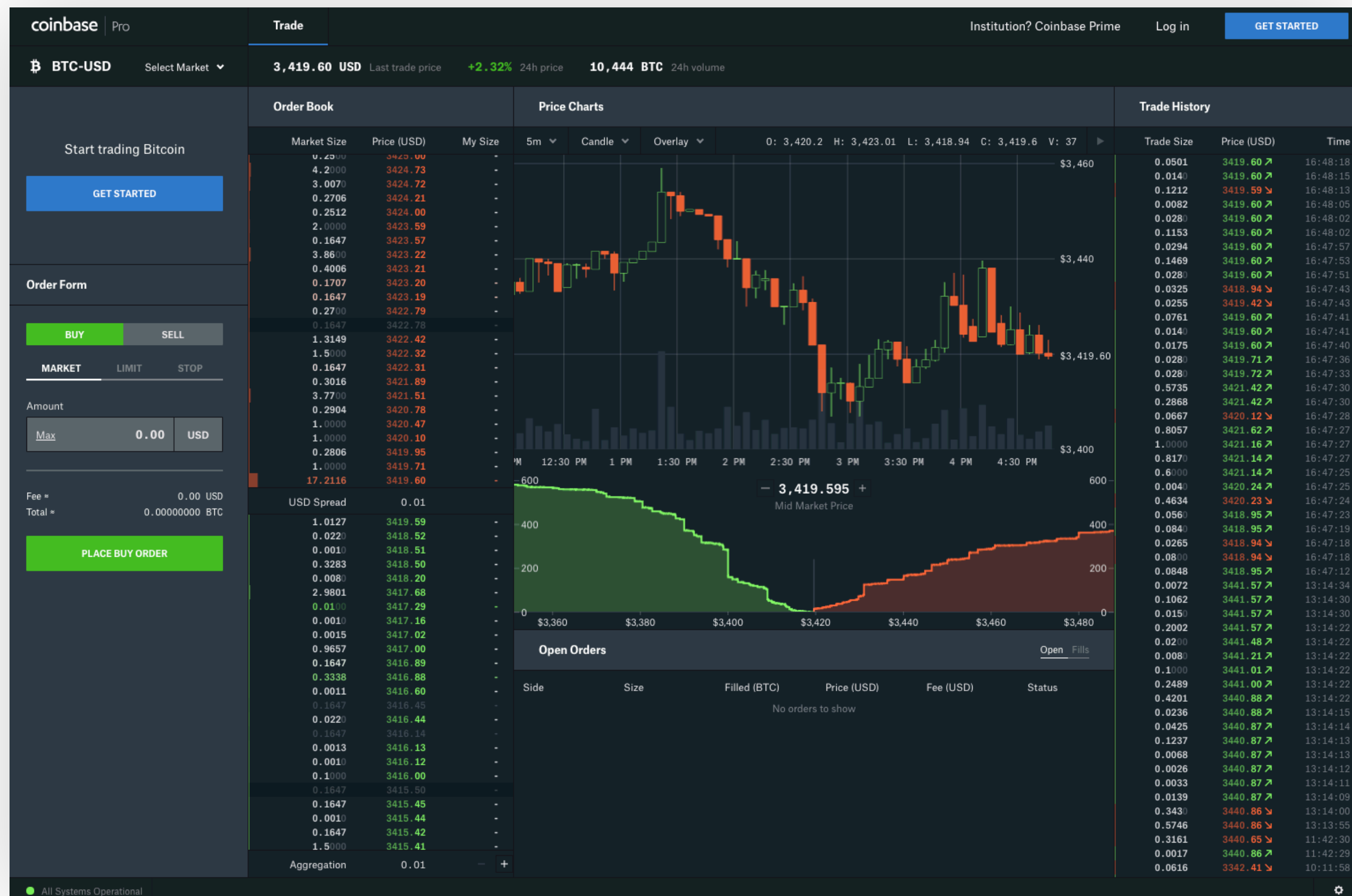
**The New York Times** August 20, 2018

*"Digital coins are collectively valued at \$140 billion, according to [coinmarketcap.com](https://coinmarketcap.com)..."*

**BARRON'S** November 23, 2018



# What Do Real Exchanges Look Like?



## Coinbase Pro (\$27M\*)

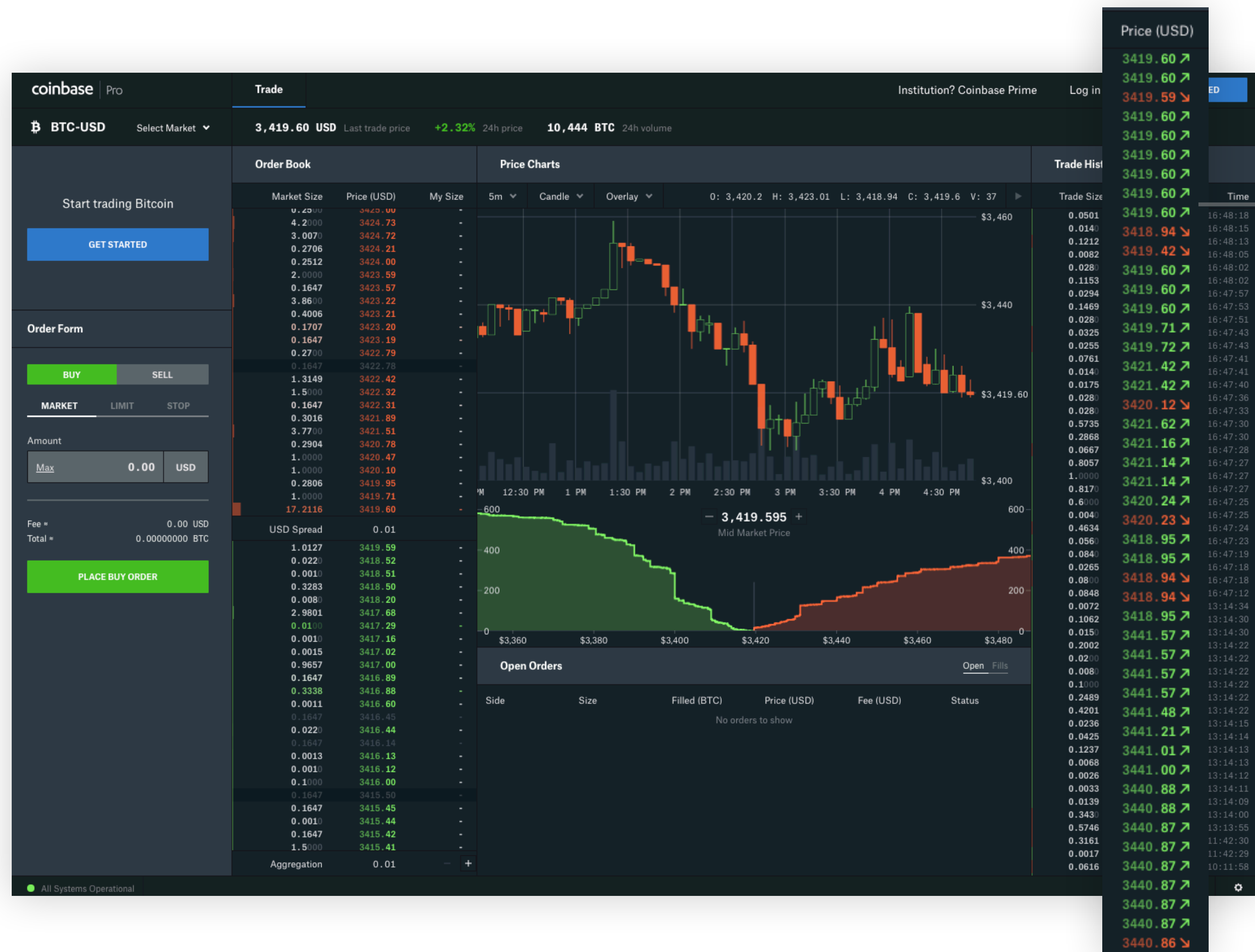
Coinbase is a San Francisco-based firm that has raised \$546 million\* in venture capital. It does about \$27 million in daily bitcoin volume. The firm has a BitLicense from the New York State Department of Financial Services, and is generally well-known in the community.

On the left is a screenshot of its trading interface.

\* Average Daily Volume. Data Source: Kaiko. March 4-8, 2019 . Funding estimate is from Crunchbase.



# What Do Real Exchanges Look Like?

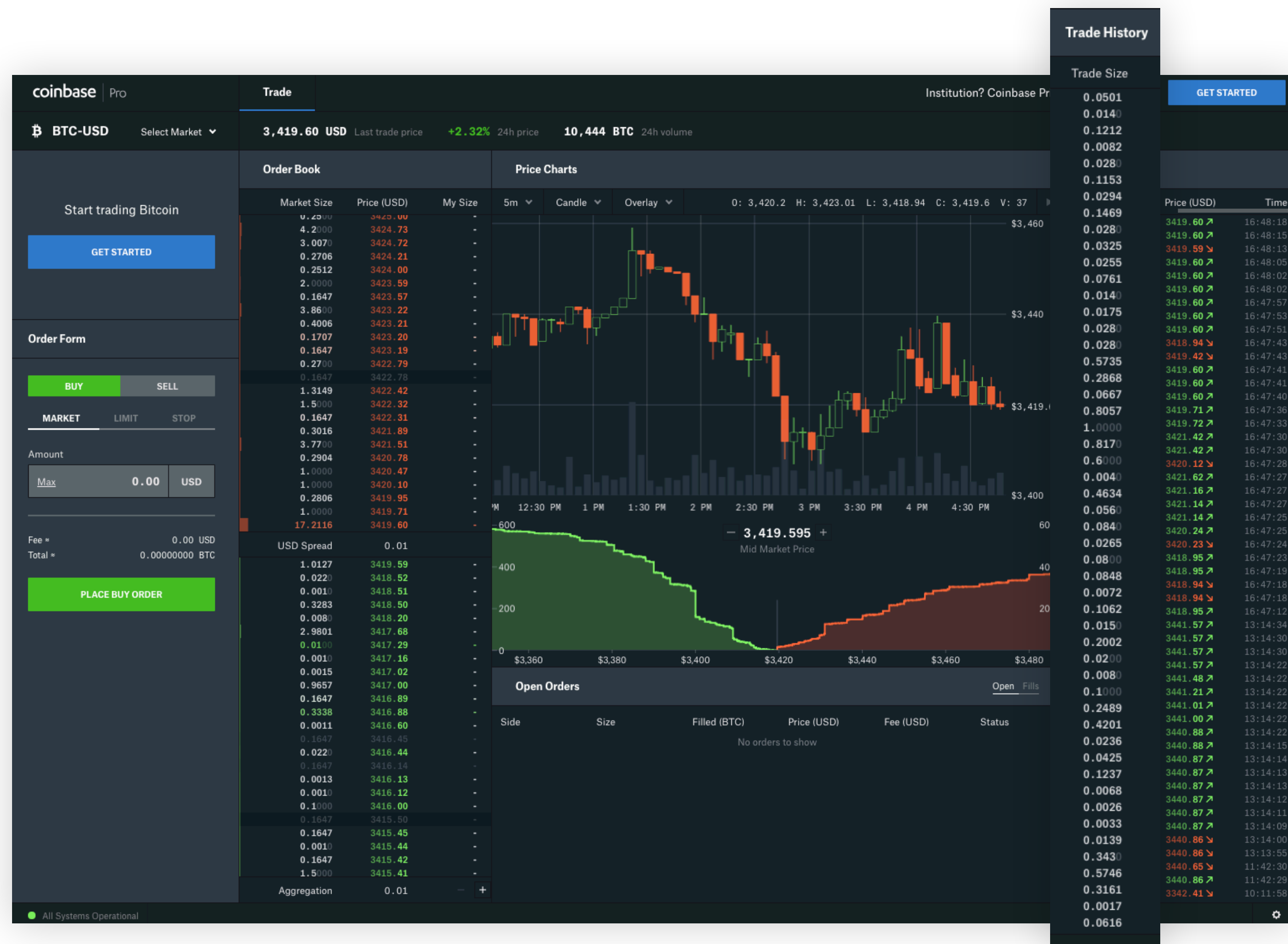


This column captures the trade history on Coinbase Pro. Green trades reflect buy orders that lifted the offer, while red trades reflect sell orders that hit the bid.

Notice that the mix of red and green trades is unequal and streaky. In this case, there was more buying activity (green) than selling activity (red). If you took this screenshot at a different time, the reverse could easily have been true.



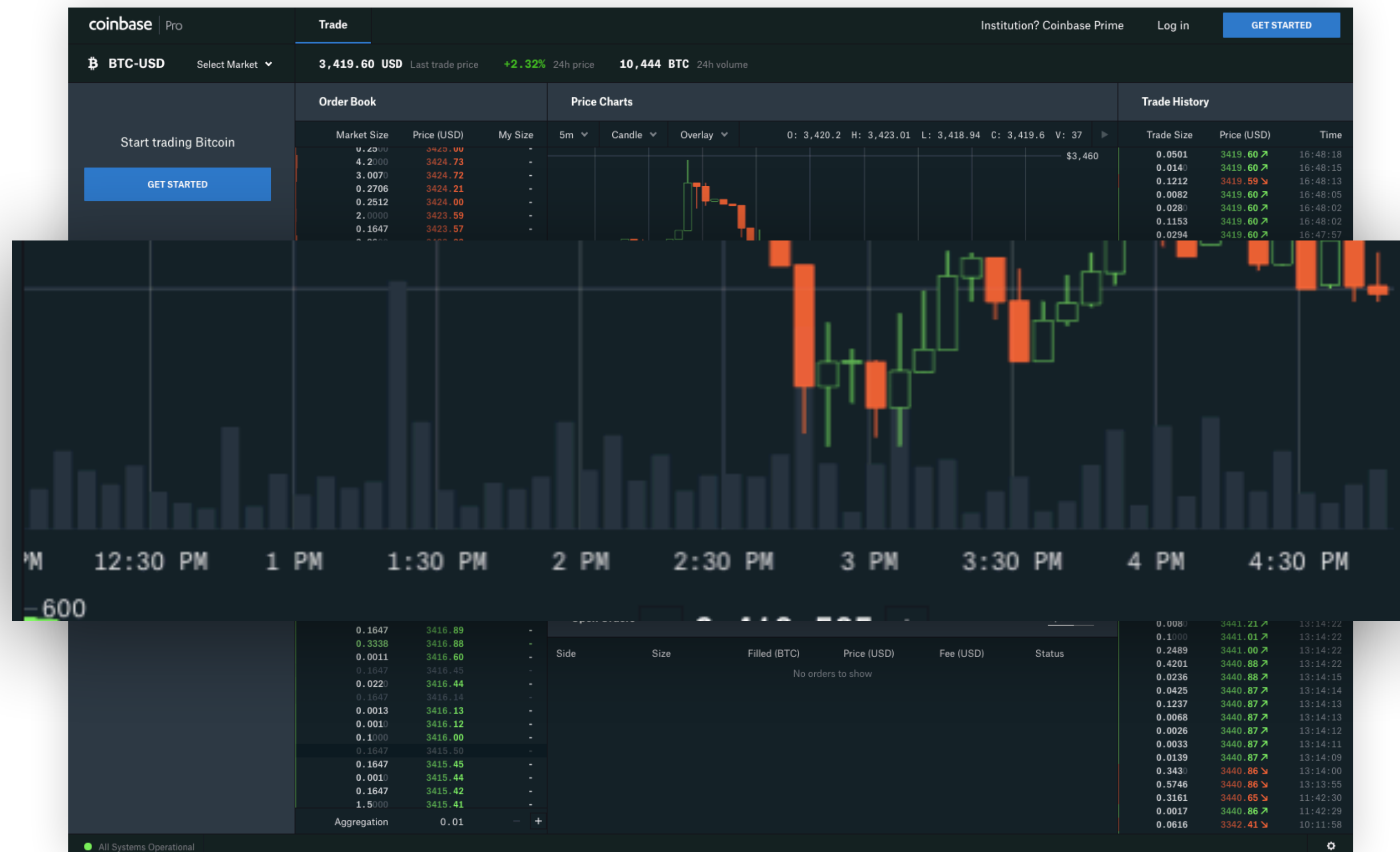
# What Do Real Exchanges Look Like?



This column captures trade sizes. Notice that they vary over time, from 0.0017 bitcoin to 1.00 bitcoin. You'll also see a greater-than-random number of round trade sizes: 1.00 bitcoin, 0.60 bitcoin, 0.10 bitcoin, etc. This is natural behavior: People are more likely to trade 1 bitcoin than 0.821 bitcoin.



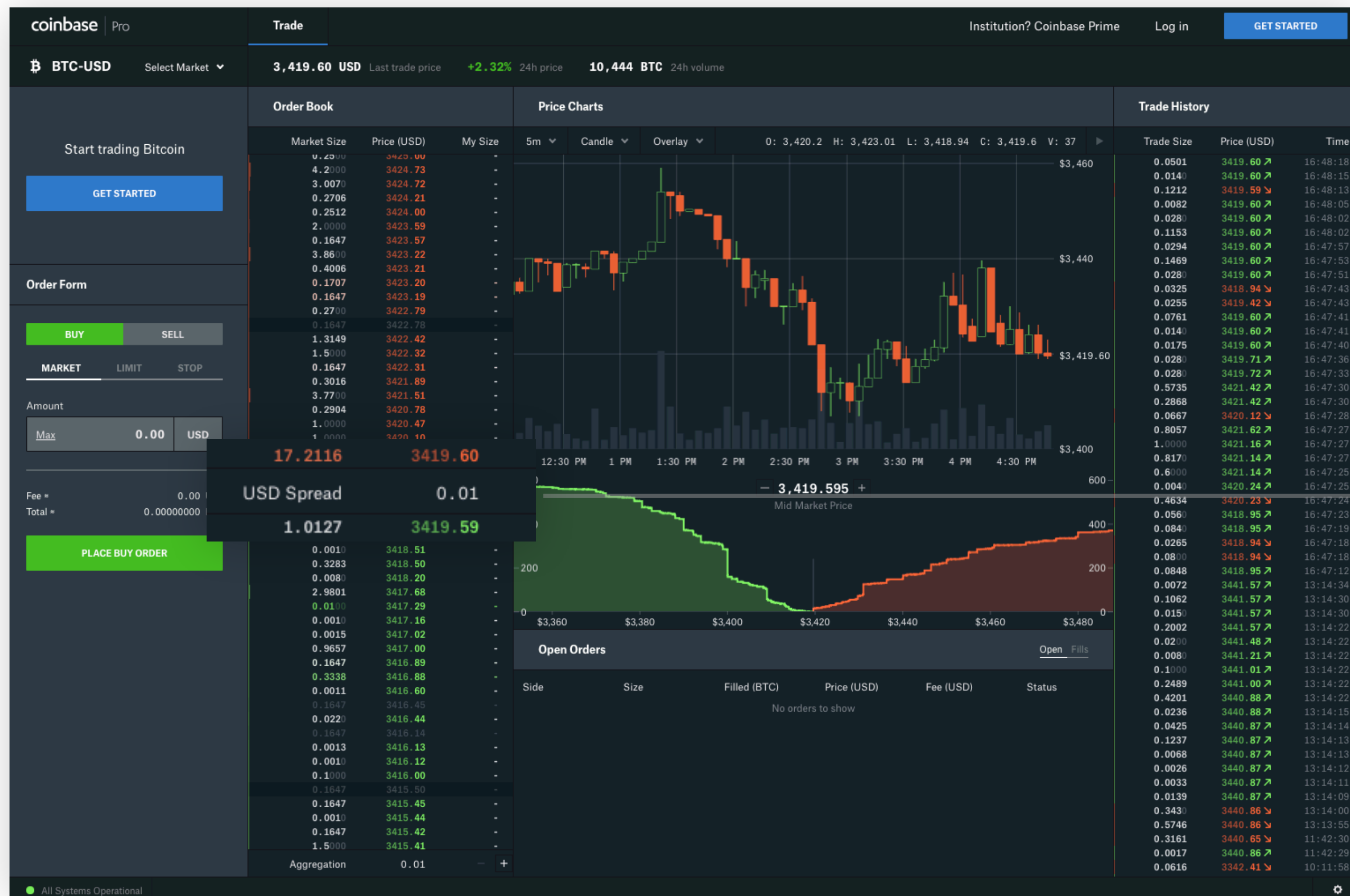
# What Do Real Exchanges Look Like?



Each of these grey “candles” represents the amount of bitcoin traded on Coinbase Pro in a 5-minute period. Notice that the size of these candles changes over time: Some 5-minute periods have more volume than others, as you would expect.



# What Do Real Exchanges Look Like?



This is the spread. It's \$0.01. At the time this screenshot was taken, bitcoin was trading at \$3,419. That means bitcoin was trading at a 0.0003% spread, making it amongst the tightest quoted spreads of any financial instrument in the world.





# What Do Suspicious Exchanges Look Like?



## EXAMPLE 1: TRADE PRINTING BETWEEN BID AND ASK

### CoinBene (\$480M\*)

CoinBene is reported to be the largest bitcoin exchange in the world, with \$480m in daily volume (18x Coinbase Pro). Essentially all of its trades print inside the prevailing bid and ask.

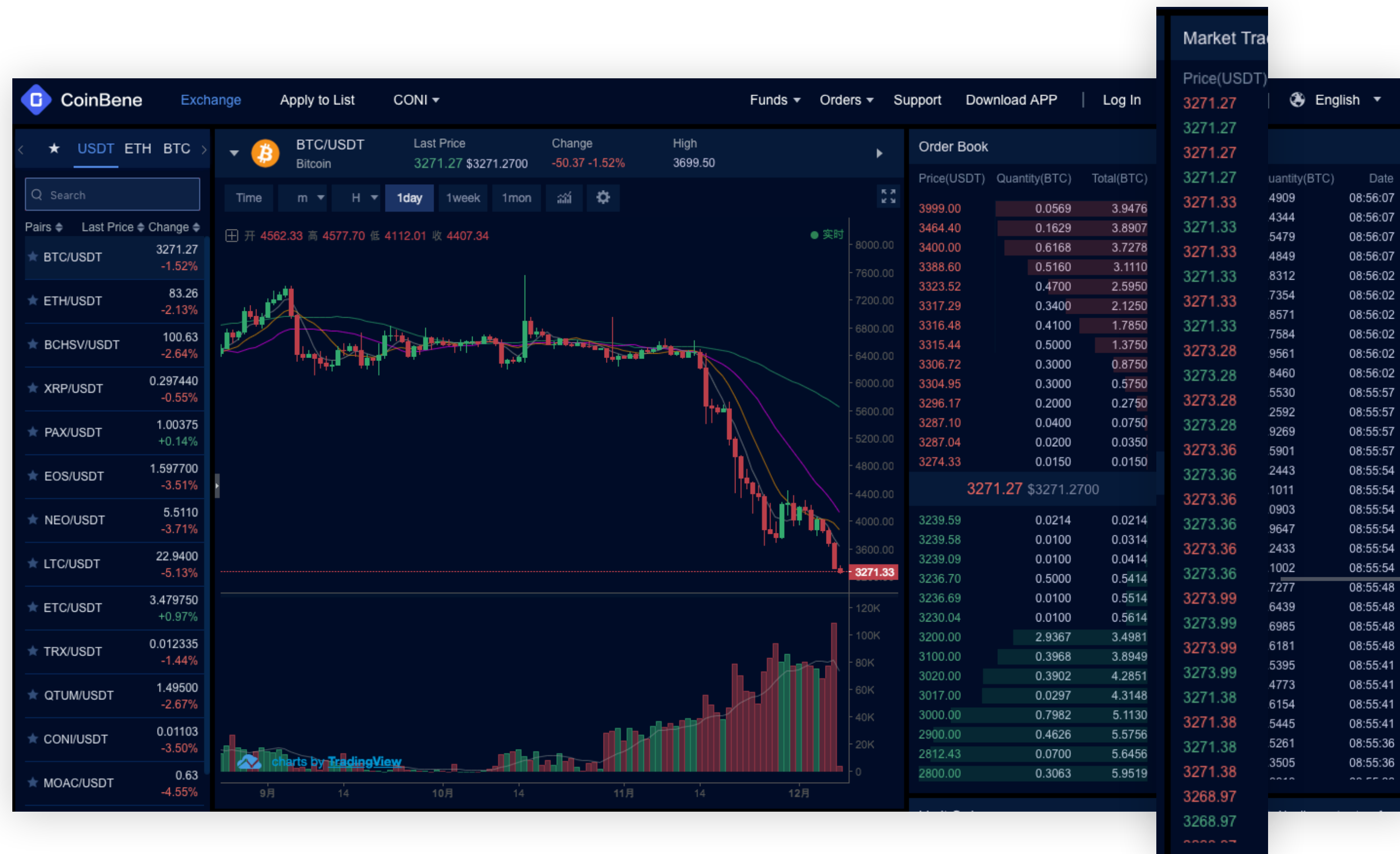
\* Average Daily Volume. Data Source: CoinMarketCap. March 4-8, 2019

Screenshot: CoinBene on December 12, 2018

Note: CoinBene's exact mechanism of printing fake trades between the bid and ask has changed since this part of the presentation was initially developed in December 2018. The example is still illustrative. We will examine CoinBene's current trading patterns later in the presentation.



# What Do Suspicious Exchanges Look Like?



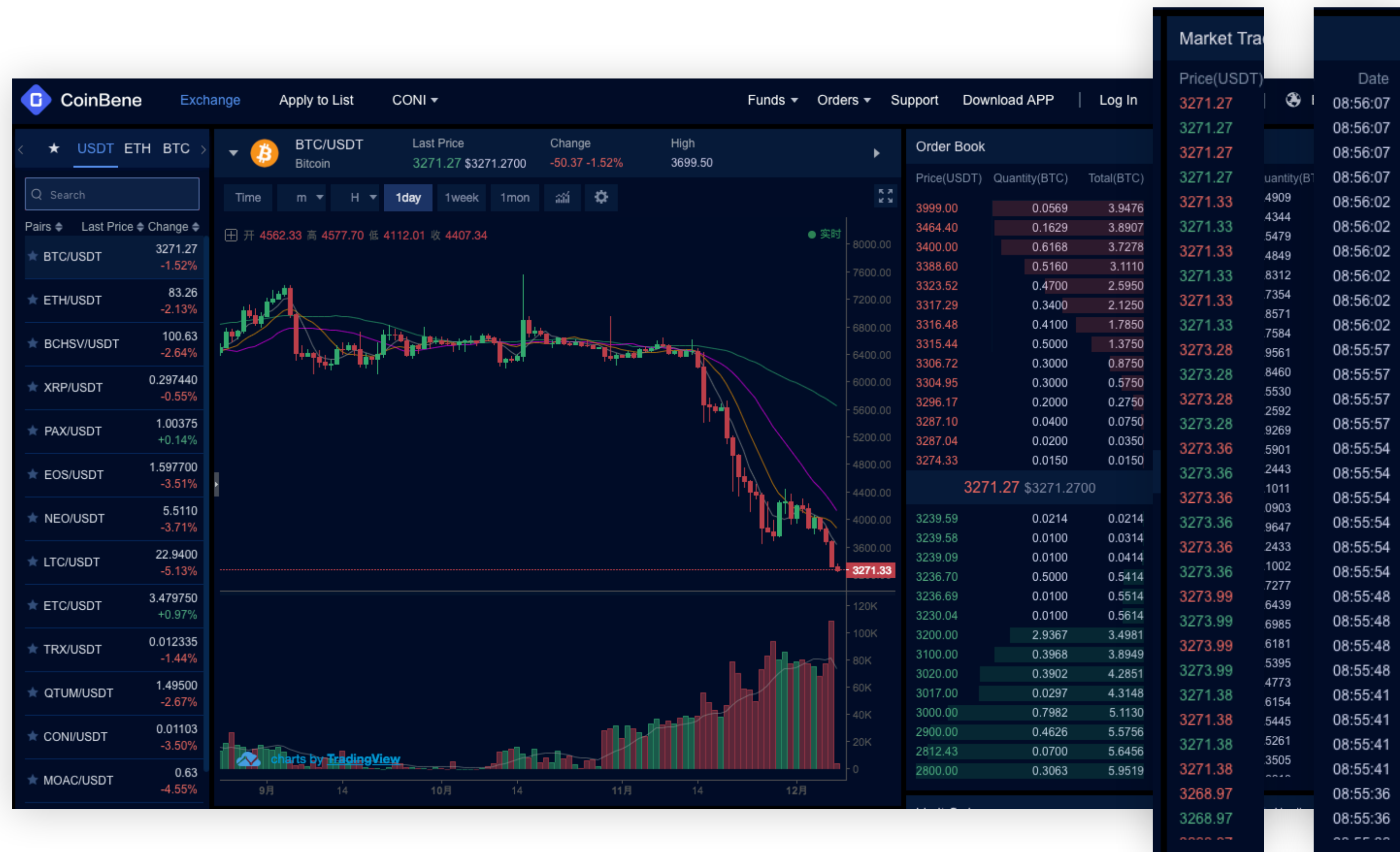
## EXAMPLE 1: TRADE PRINTING BETWEEN BID AND ASK

This column captures trades. Notice the perfectly alternating pattern of green and red trades. Compare this to Coinbase Pro, where we saw a more random distribution of buying and selling activity.

It's highly unlikely that there is a perfect, even distribution of economic buy and sell orders.



# What Do Suspicious Exchanges Look Like?

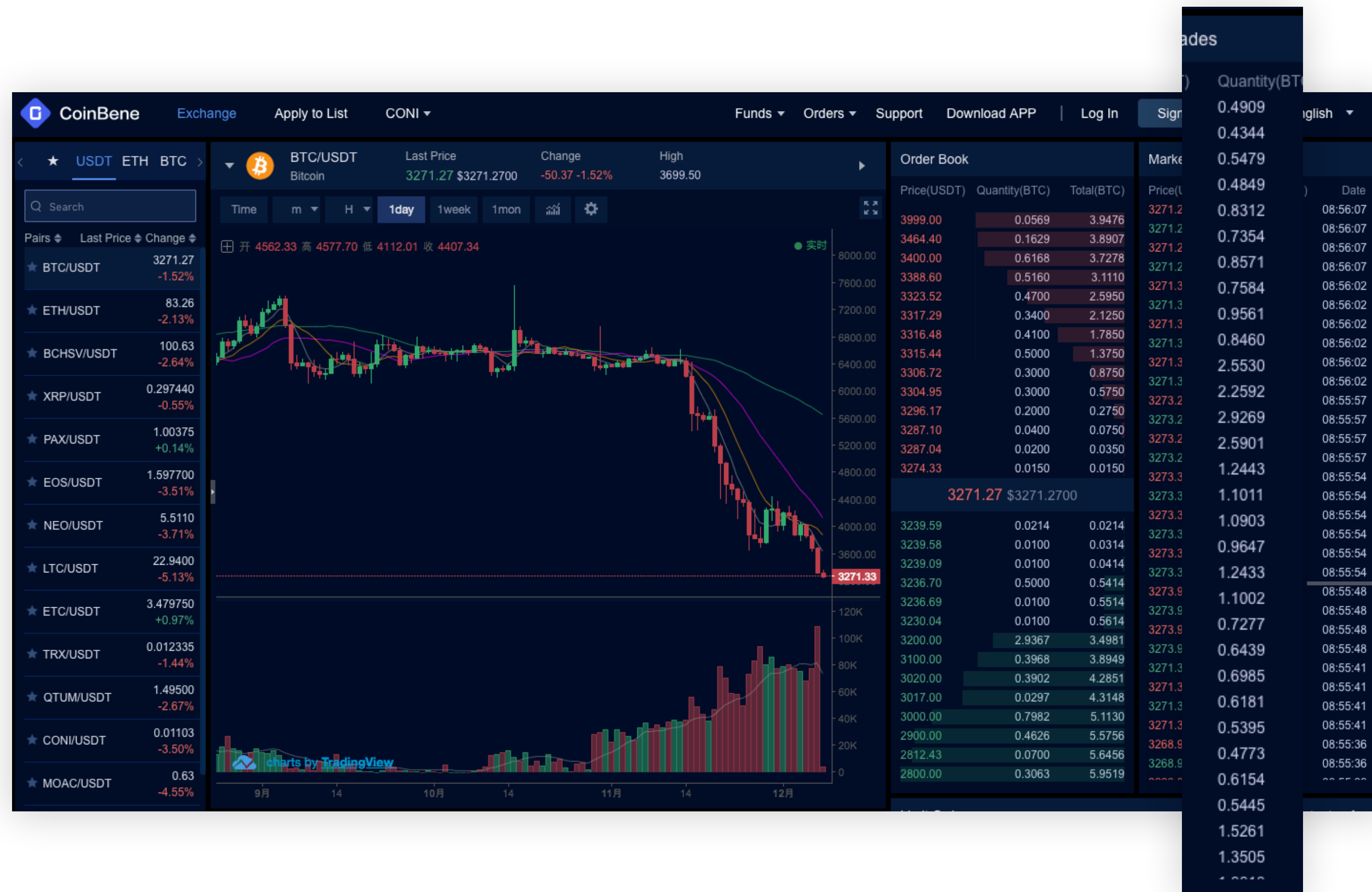


## EXAMPLE 1: TRADE PRINTING BETWEEN BID AND ASK

This column shows the “timestamp” for each trade. Combine it with the “trades” column and you’ll see that trades on CoinBene come in pairs, and each pair has one buy (green) and one offsetting sell (red).

The size of these trades are always roughly equal in size (as shown in the middle column), allowing them to nearly offset one-another over time.

# What Do Suspicious Exchanges Look Like?



## EXAMPLE 1: TRADE PRINTING BETWEEN BID AND ASK

The distribution of trade sizes is also very different than Coinbase Pro.

For starters, there are no very small trades—the smallest trade shown is 0.43 bitcoin, or roughly \$1,400. Coinbase Pro had trades as small as \$5.

Also, there are no “round number” trades, despite the obvious behavioral reasons for their existence.





# What Do Suspicious Exchanges Look Like?



## EXAMPLE 1:

### TRADE PRINTING BETWEEN BID AND ASK

At the time of this screenshot, the best offer to buy bitcoin on CoinBene was \$3,239.59, while the best offer to sell was \$3,274.33. This means the “spread” was \$34.74. That compares to \$0.01 on Coinbase Pro.

It is surprising that an exchange claiming 18x more volume than Coinbase Pro would have a spread that is 3400x larger.

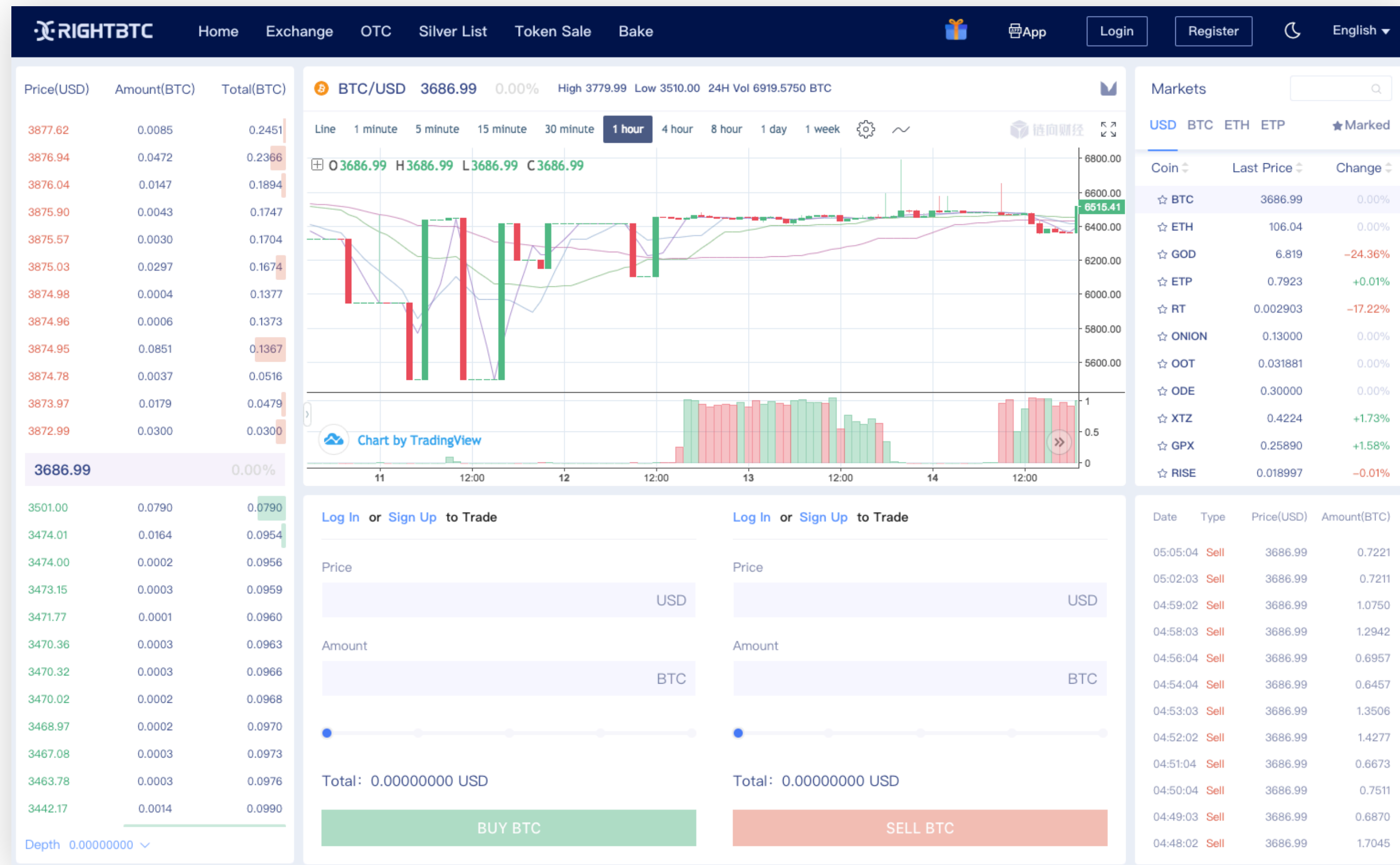


# CoinBene's Real-World Footprint Is Also Suspiciously Smaller Than Coinbase's

	CoinBene	Coinbase
Number of Twitter Followers	10K	1M
Number of Google Search Results	1.25M	26M
Web Traffic by SimilarWeb	Ranked 90,701 among websites globally based on an estimated 617,475 monthly web visitors	Ranked 1,917 among websites globally based on an estimated 25,045,634 monthly web visitors
Venture Funding Raised	Unreported	\$546M over seven years
Number of Employees on LinkedIn	42, most appear to be part-time	852



# What Do Suspicious Exchanges Look Like?



**EXAMPLE 2:**  
**MULTIPLE HOURS (AND DAYS) WITH ZERO VOLUME**

## RightBTC (\$100M\*)

RightBTC claims to have roughly 4x the volume of Coinbase Pro. However, it shows multiple hours (and days) with zero volume. These gaps are not correlated with business hours, volatility, up time or other factors. The two likely explanations are fake volume and/or trade mining.

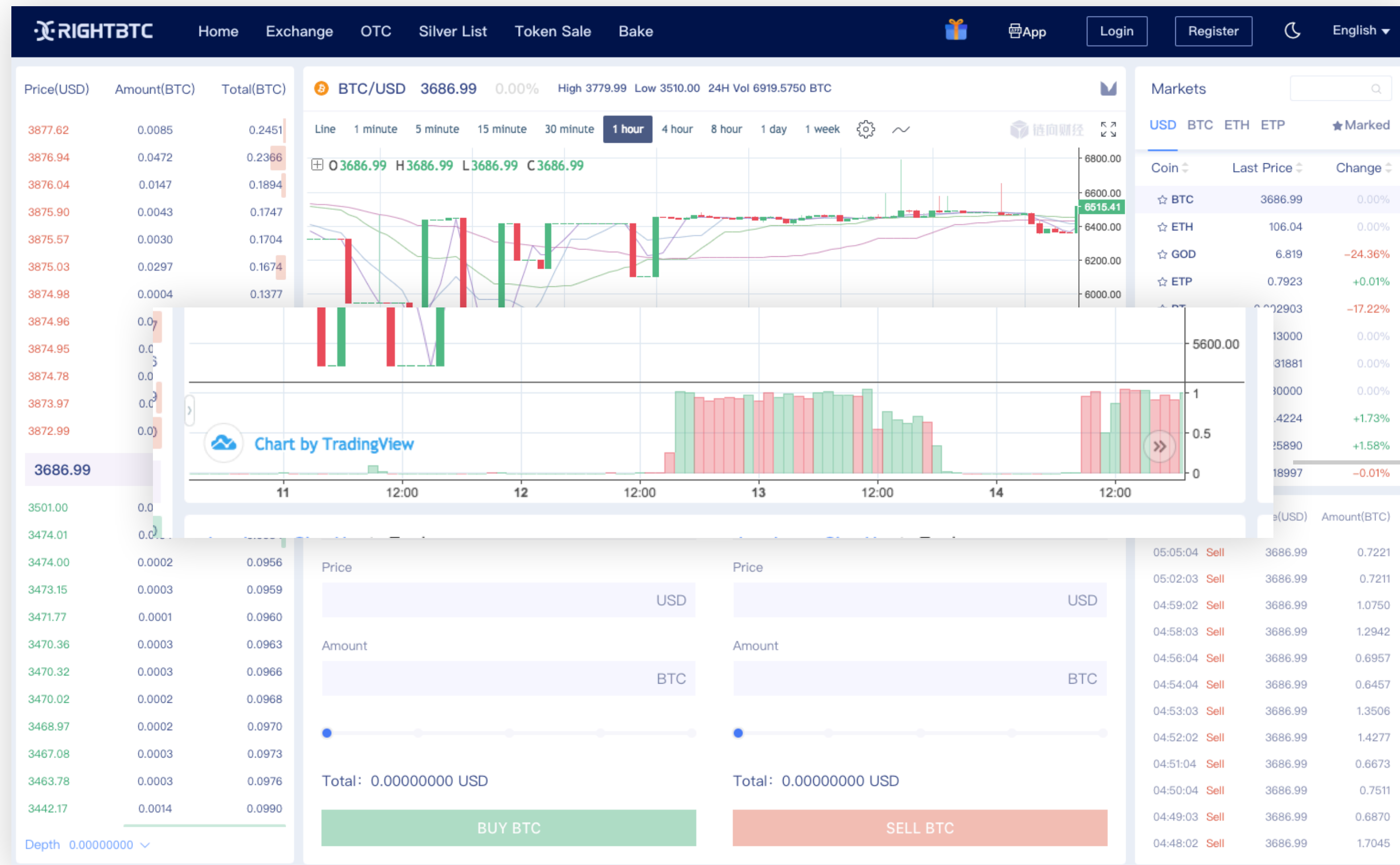
\* Average Daily Volume. Data Source: CoinMarketCap. March 4-8, 2019

Screenshot: RightBTC on December 8, 2018





# What Do Suspicious Exchanges Look Like?

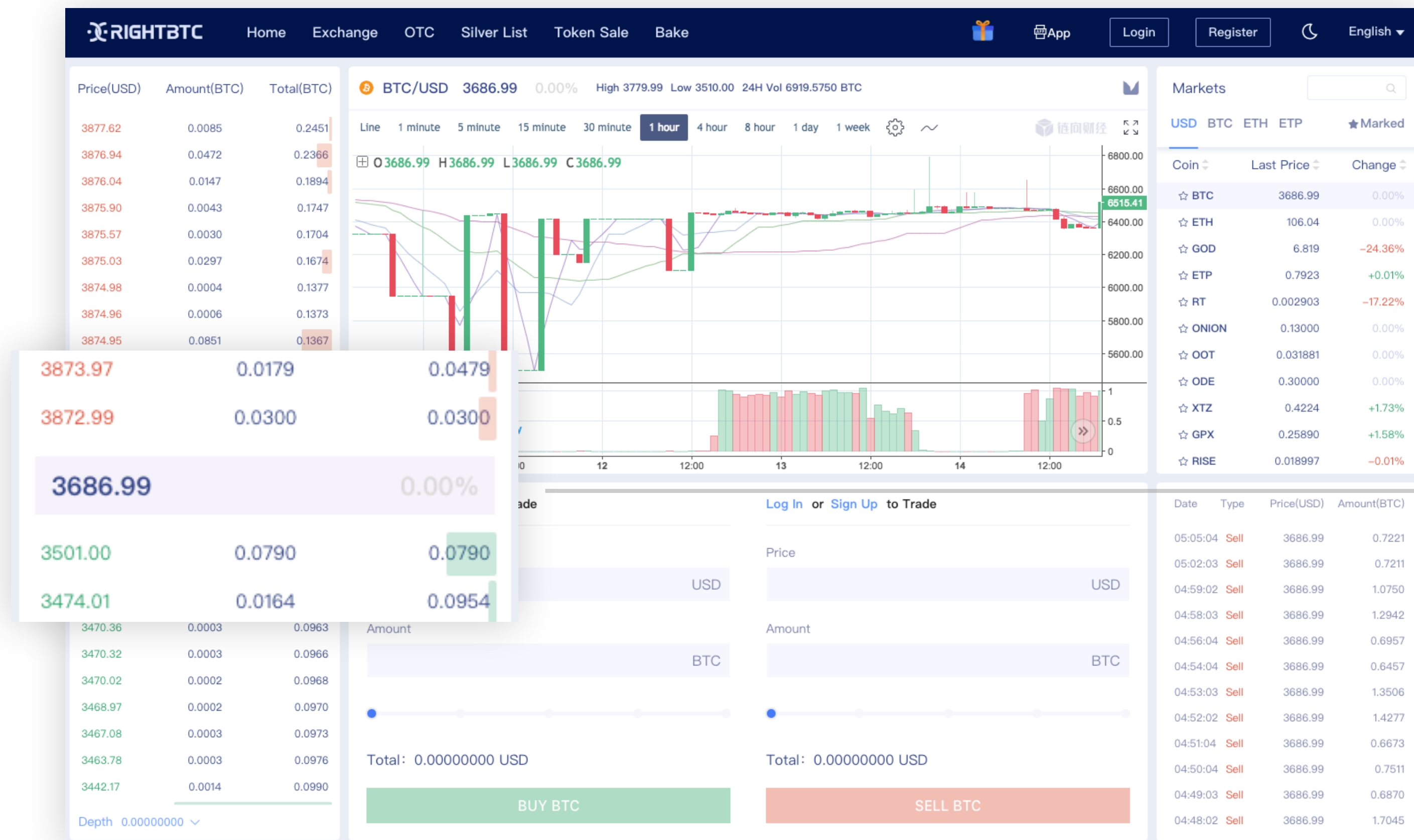


## EXAMPLE 2: MULTIPLE HOURS (AND DAYS) WITH ZERO VOLUME

Each “candle” represents the amount of volume on RightBTC during a one-hour period. Notice that there are large gaps (stretching for days in some cases) where no volume occurs.



# What Do Suspicious Exchanges Look Like?



## EXAMPLE 2: MULTIPLE HOURS (AND DAYS) WITH ZERO VOLUME

RightBTC's displayed spread here is \$371.99.  
That compares to \$0.01 for Coinbase Pro.

This is ridiculous, especially considering it  
claims to have significantly more volume than  
Coinbase Pro.

# What Do Suspicious Exchanges Look Like?



## EXAMPLE 3: MONOTONIC TRADING VOLUME

### CHAOEX (\$70M\*)

CHAOEX claims to have \$70 million in daily bitcoin volume, more than 2x the volume of Coinbase Pro. However, that volume is mostly monotonic: Roughly an identical amount gets printed every hour of every day. This volume pattern is insensitive to price movements, news, waking hours, weekends, or other real-world factors.



# What Do Suspicious Exchanges Look Like?



Each of these bars reflects one hour's volume.

It is highly unlikely that real trading volume would remain this consistent every hour of the day for nearly three consecutive days.

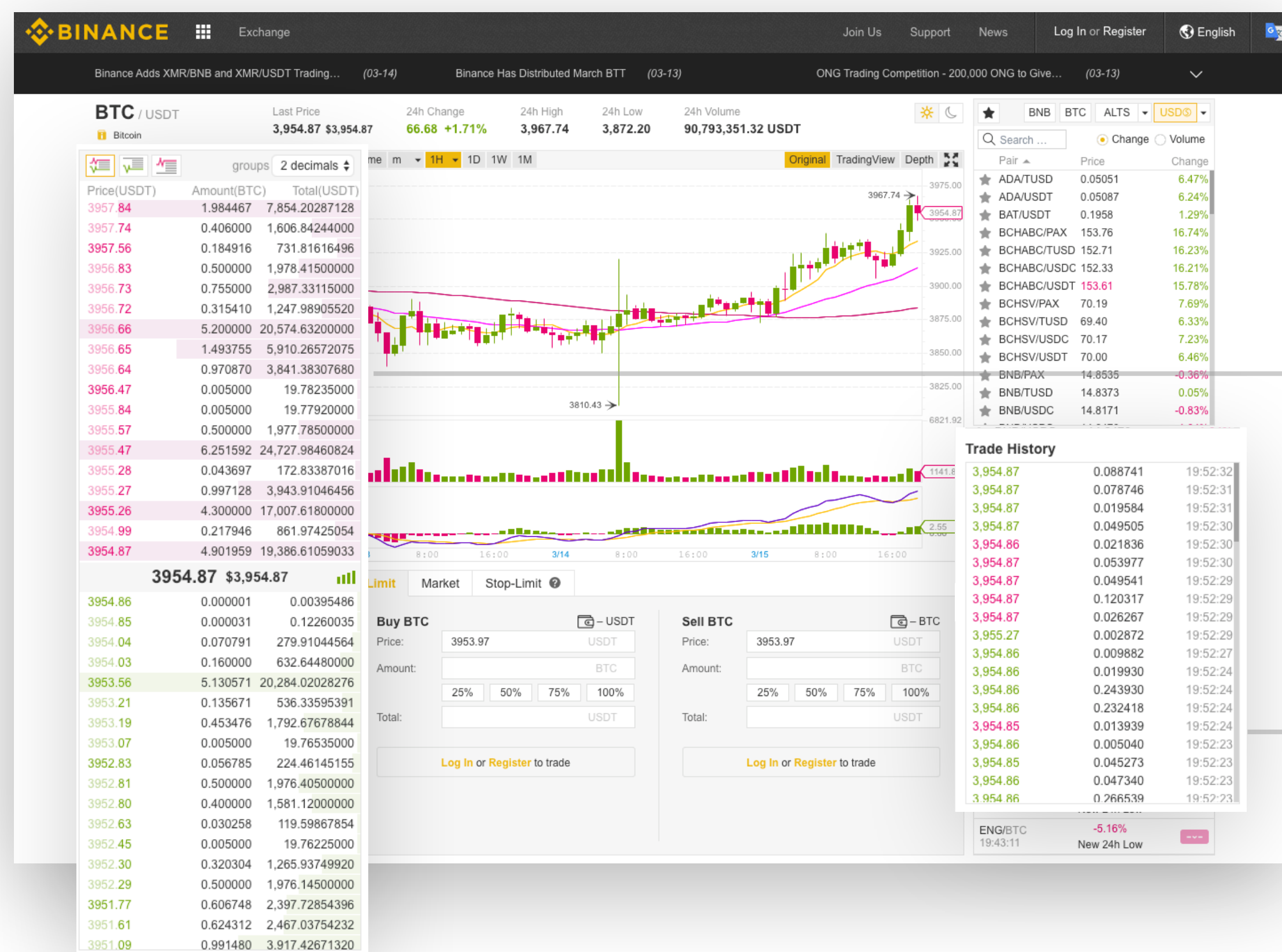


Not All Fake Exchanges Are Easy To Spot.  
You Need More Data To Dive Deeper.

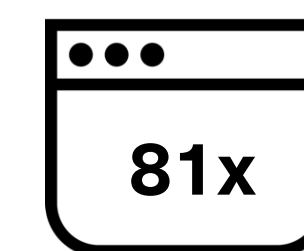


# We've collected data from 81 exchanges\*

We needed a universal method of collecting data across any exchange. So we built infrastructure to programmatically read data off the screen. We read the order book and recent trades four times a second.



Order Book



Order Books

Trades

Trade History

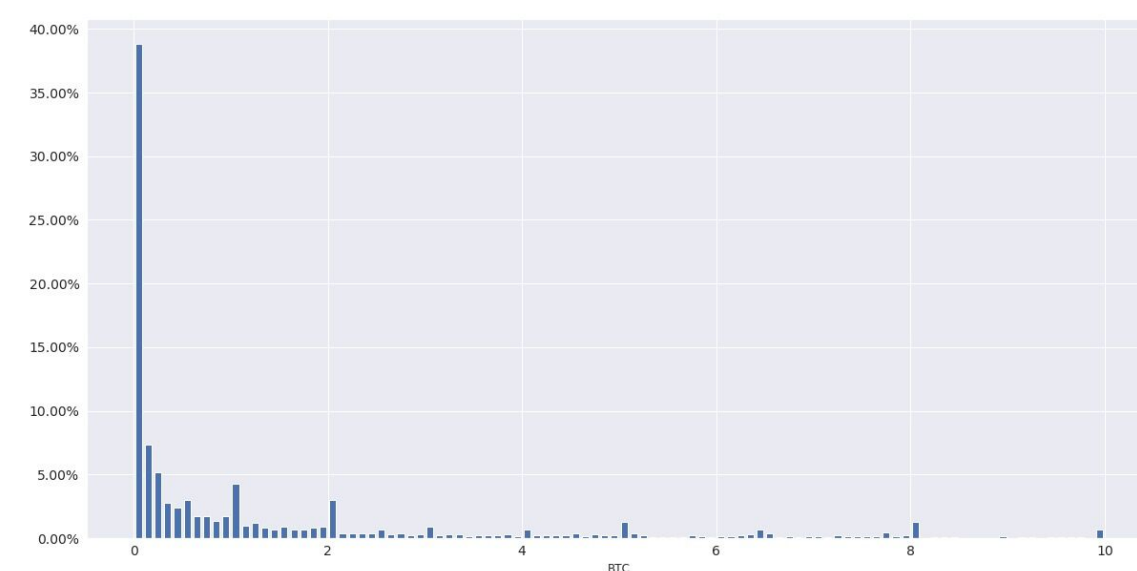
\* Practically every relevant exchange. We started from the top of the reported bitcoin volume list on the bitcoin markets page on CoinMarketCap on December 5, 2018 and worked our way down to the bottom, stopping at exchanges with less than \$1 million in daily volume.



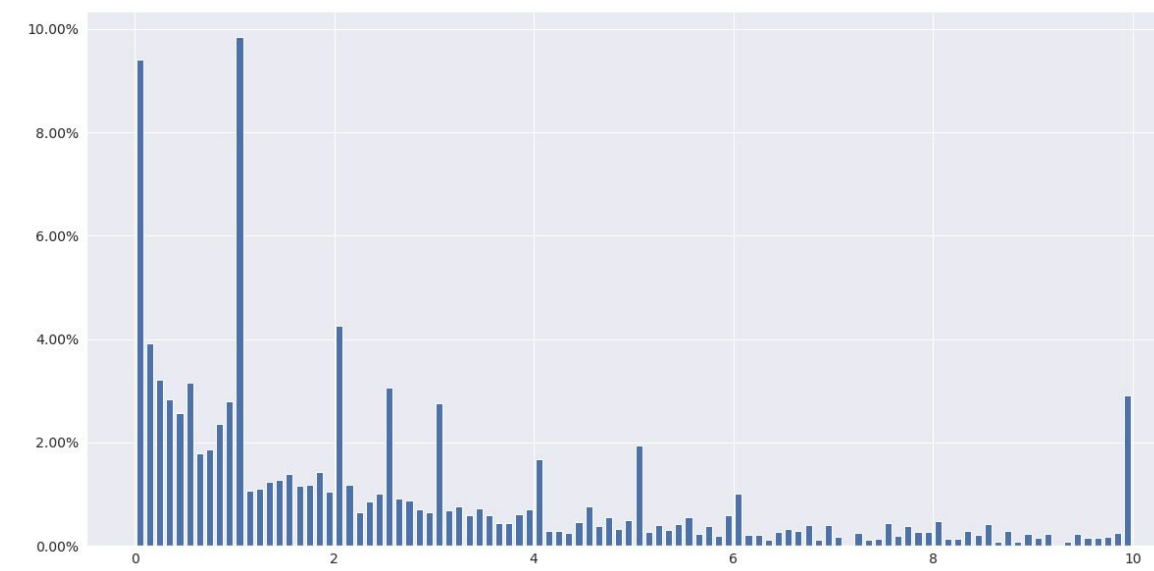
# Trade Size Histograms For Well-Known Exchanges

## Show Natural Patterns

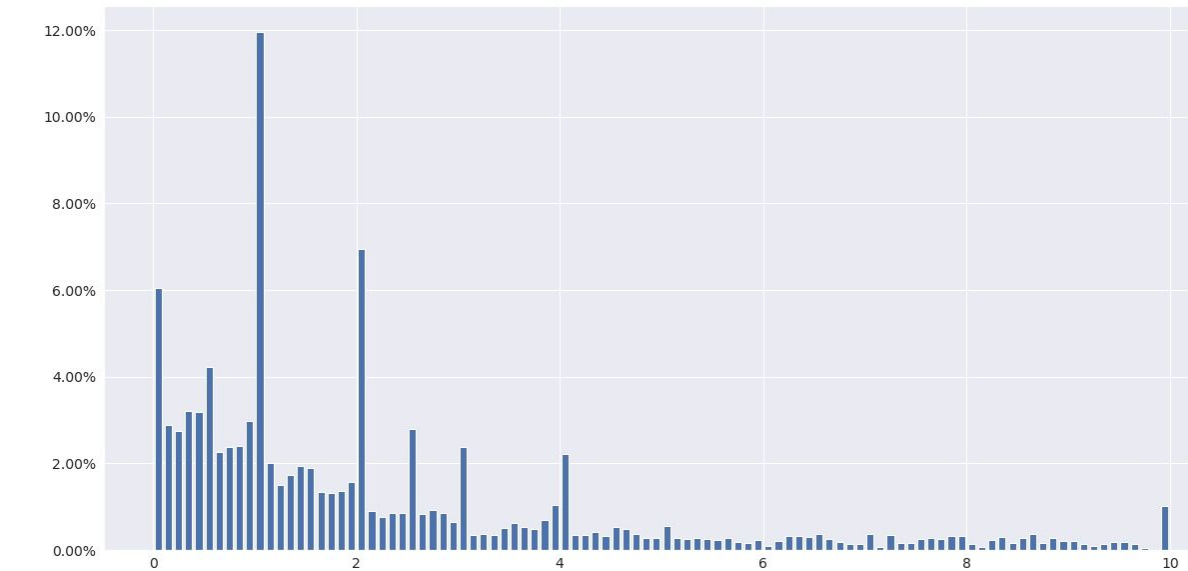
These histograms show the percentage of volume that is captured within each trade size bucket (0-0.1 BTC, 0.1-0.2 BTC, etc). They reveal consistent, intuitive patterns: Percentage weight in each bucket declines as trade size increases, and there are noticeable peaks at whole bitcoin sizes (1, 2, 3, etc). X-axis is from 0 to 10 BTC.



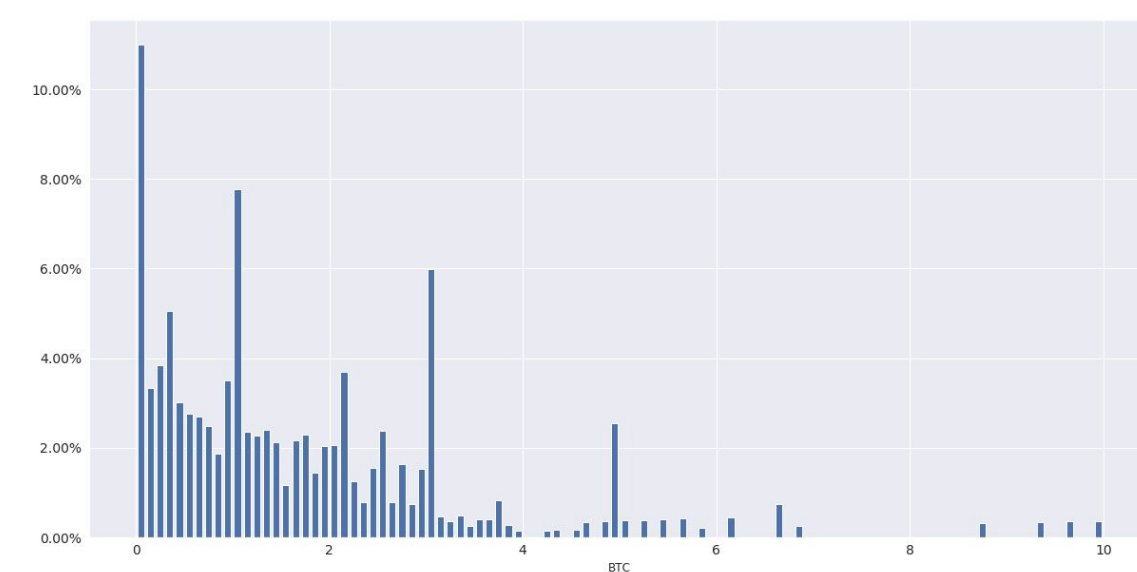
Coinbase (\$27M\*)



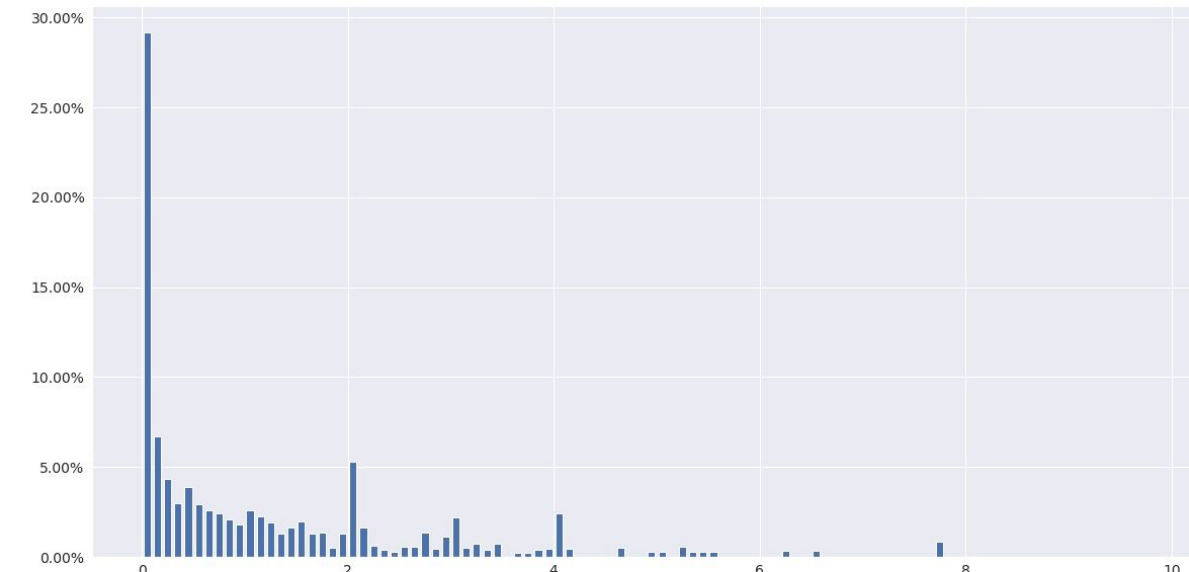
Kraken (\$31M\*)



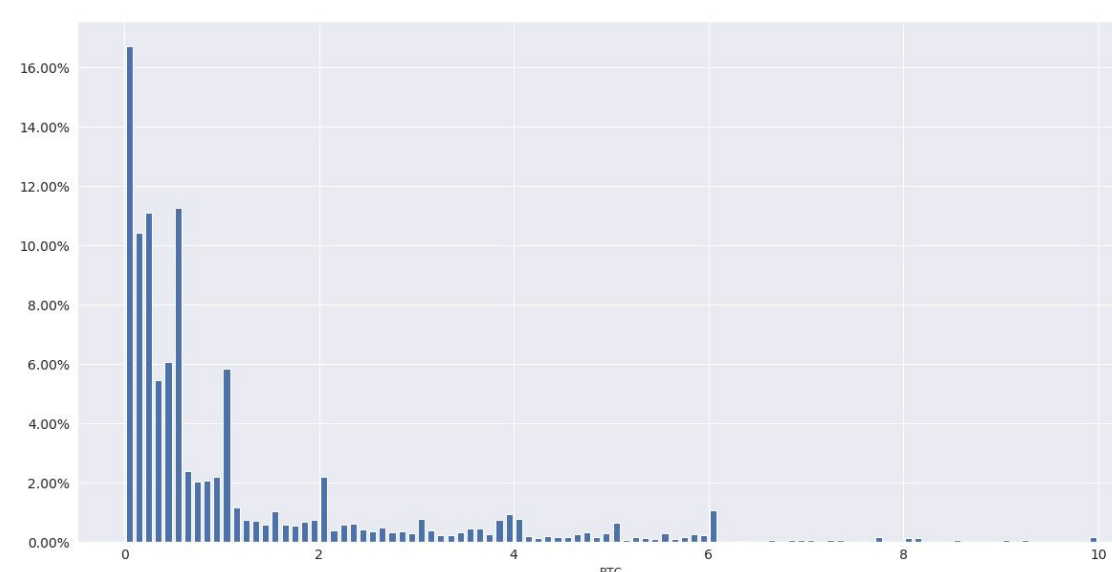
Bitstamp (\$31M\*)



Bittrex (\$5M\*)



Poloniex (\$1.4M\*)



bitFlyer (\$13M\*)

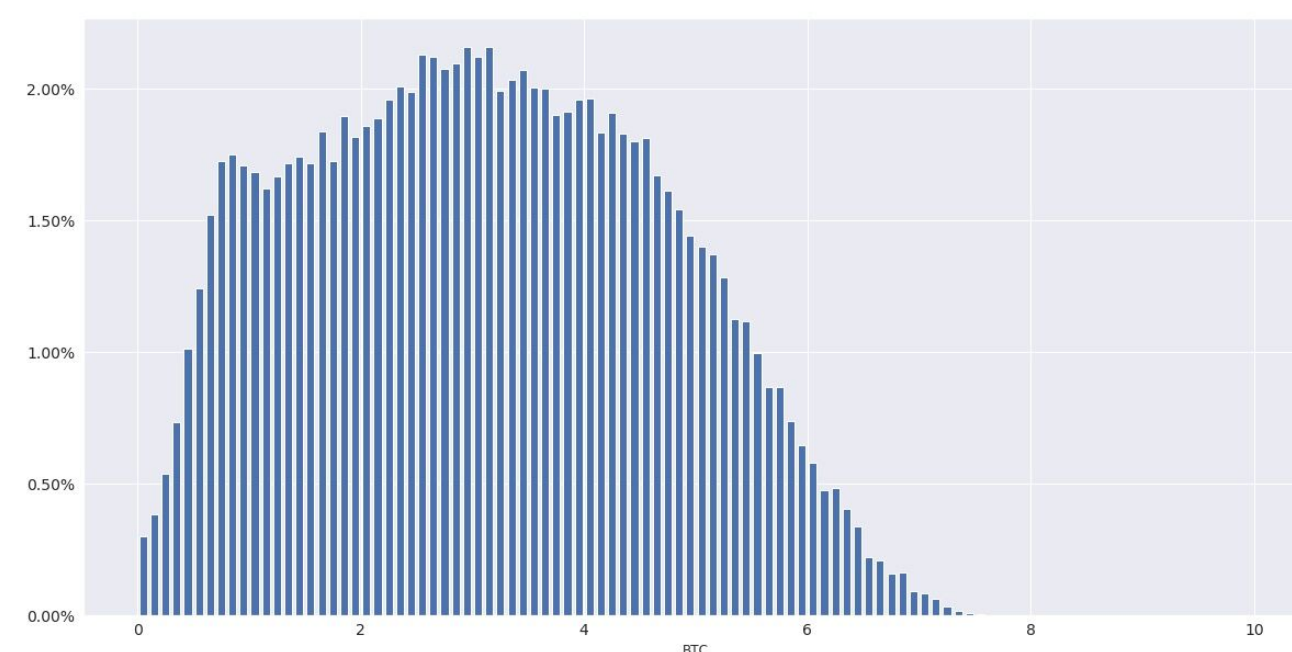
\*Average Daily Volume. Source: Kaiko. March 4-8, 2019.  
Graph Source: Bitwise. March 4-8, 2019.



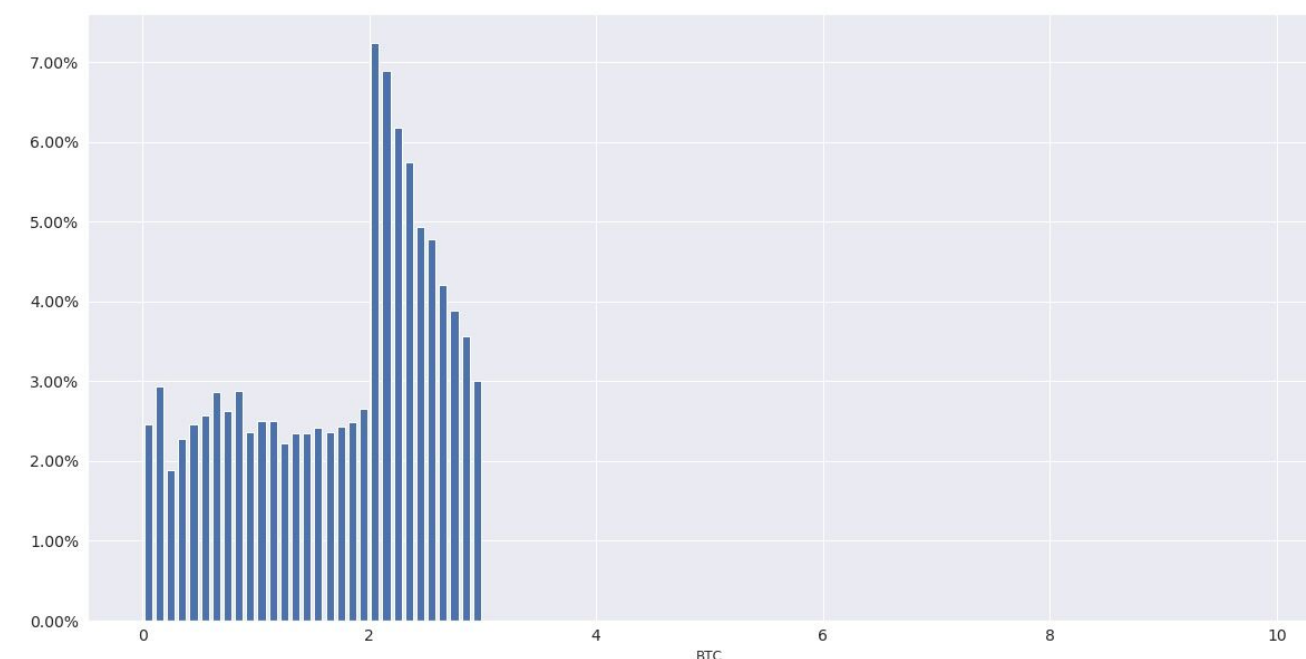


# Trade Size Histograms For Suspect Exchanges

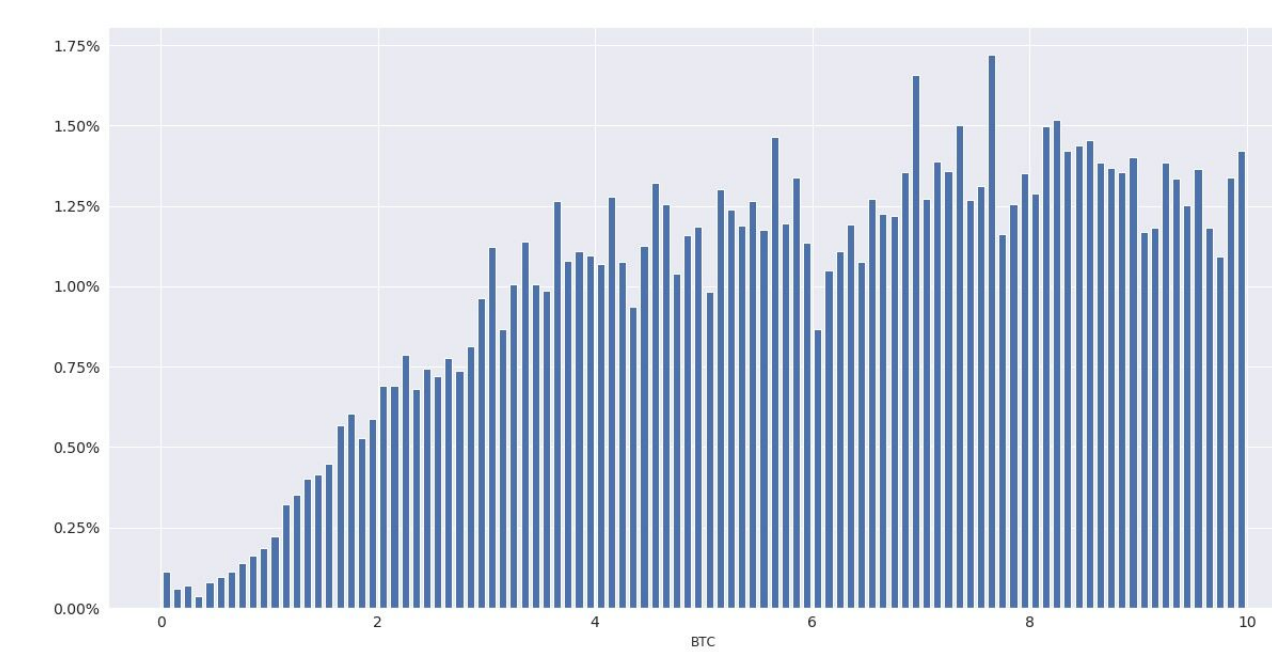
Trade Size Histograms for exchanges with suspicious volume look completely different, and showcase patterns that are both idiosyncratic and highly suspicious.



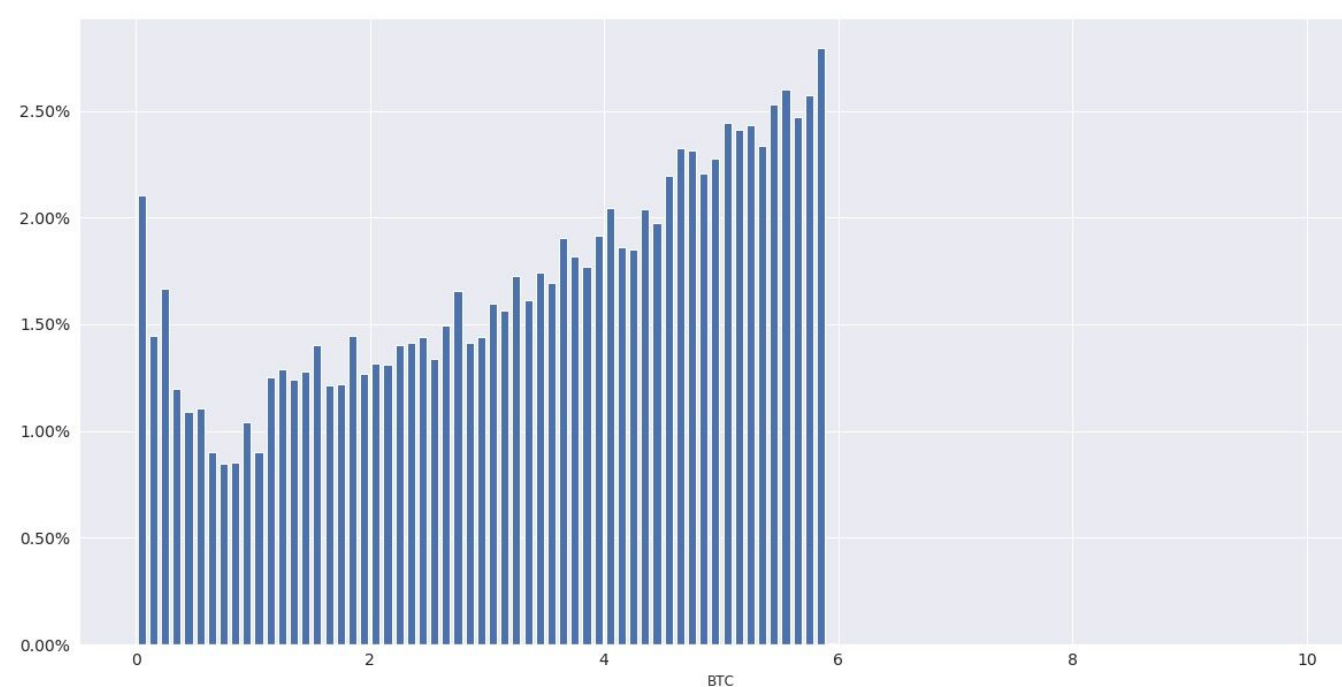
CoinBene (\$480M\*)



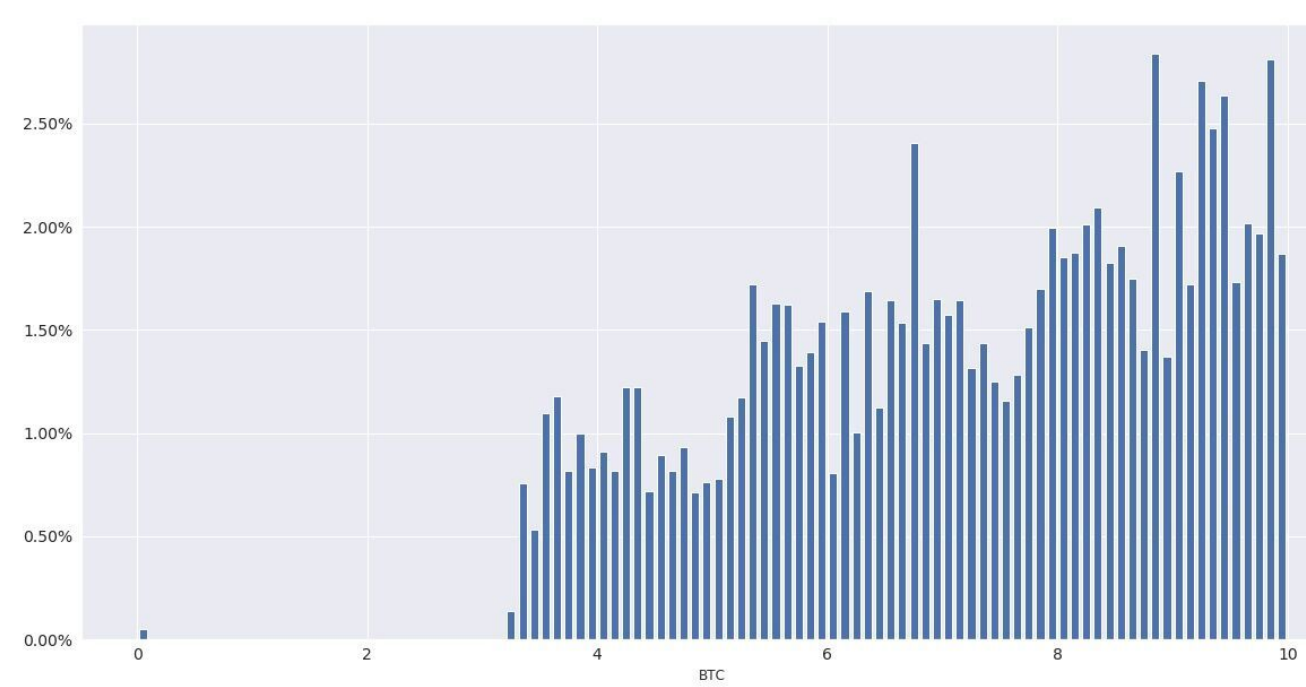
IDAX (\$163M\*)



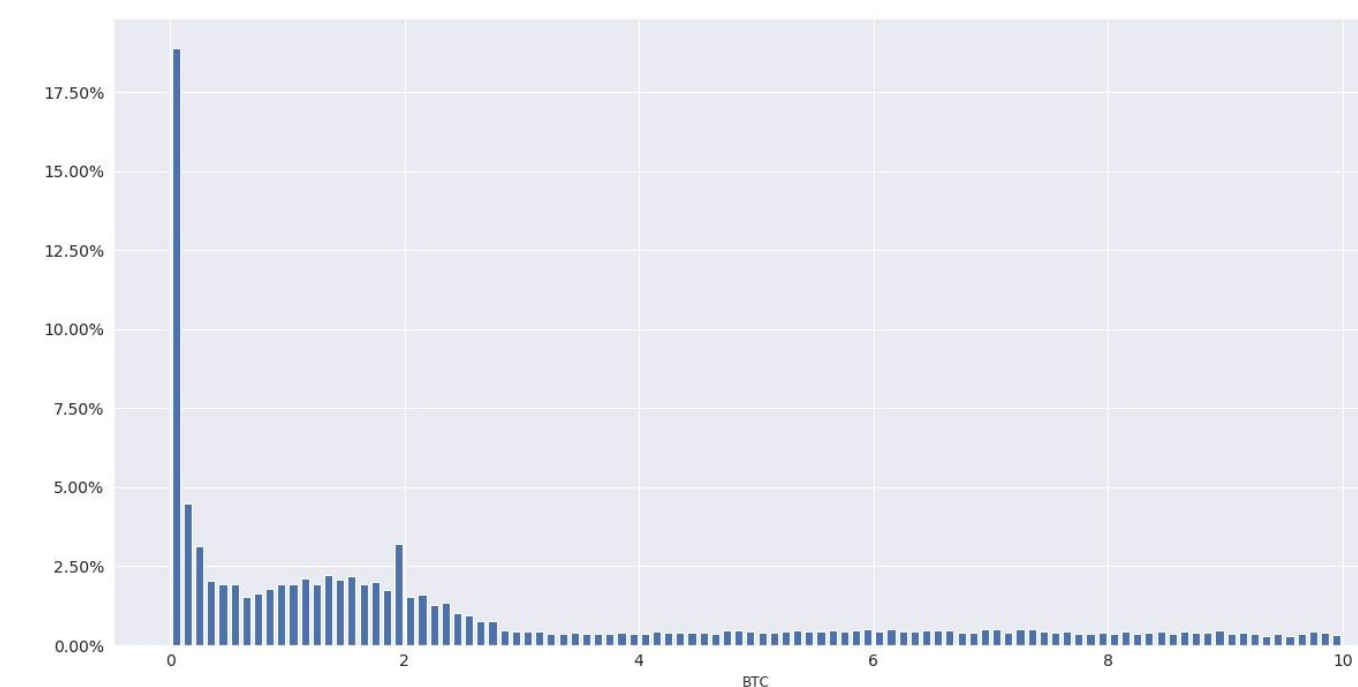
LBank (\$127M\*)



BitForex (\$241M\*)



Exrates (\$35M\*)

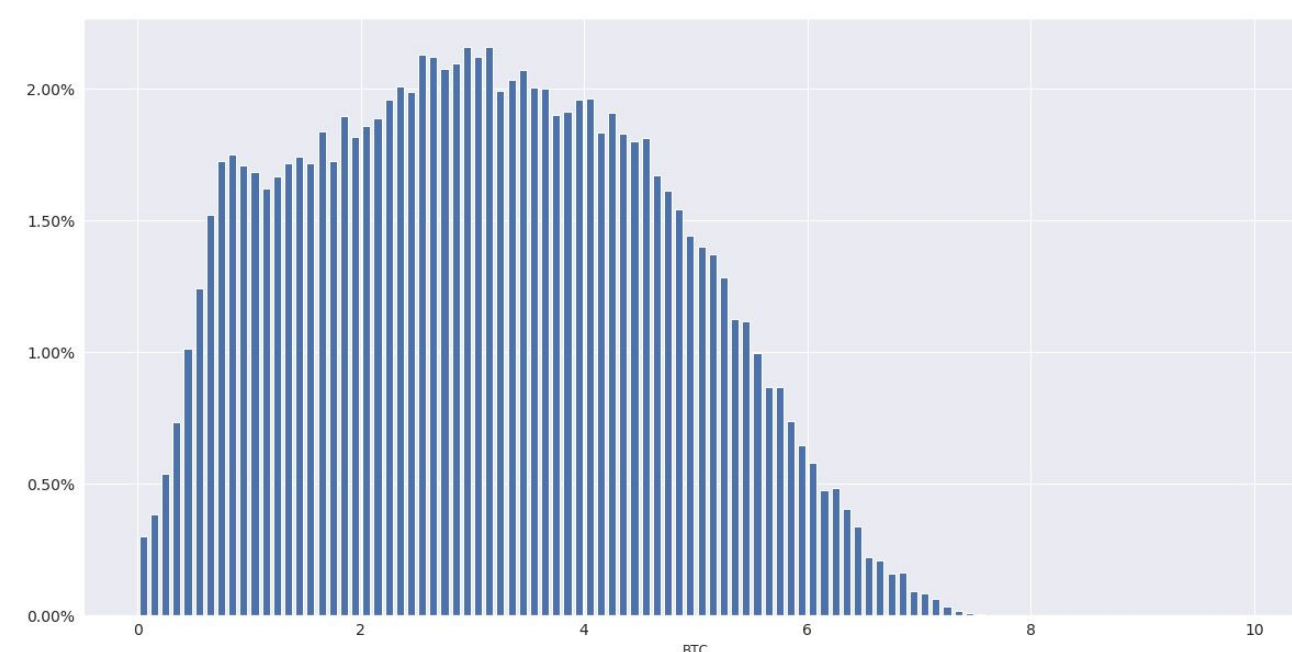


OKEx (\$152M\*)



# Trade Size Histograms For Suspect Exchanges

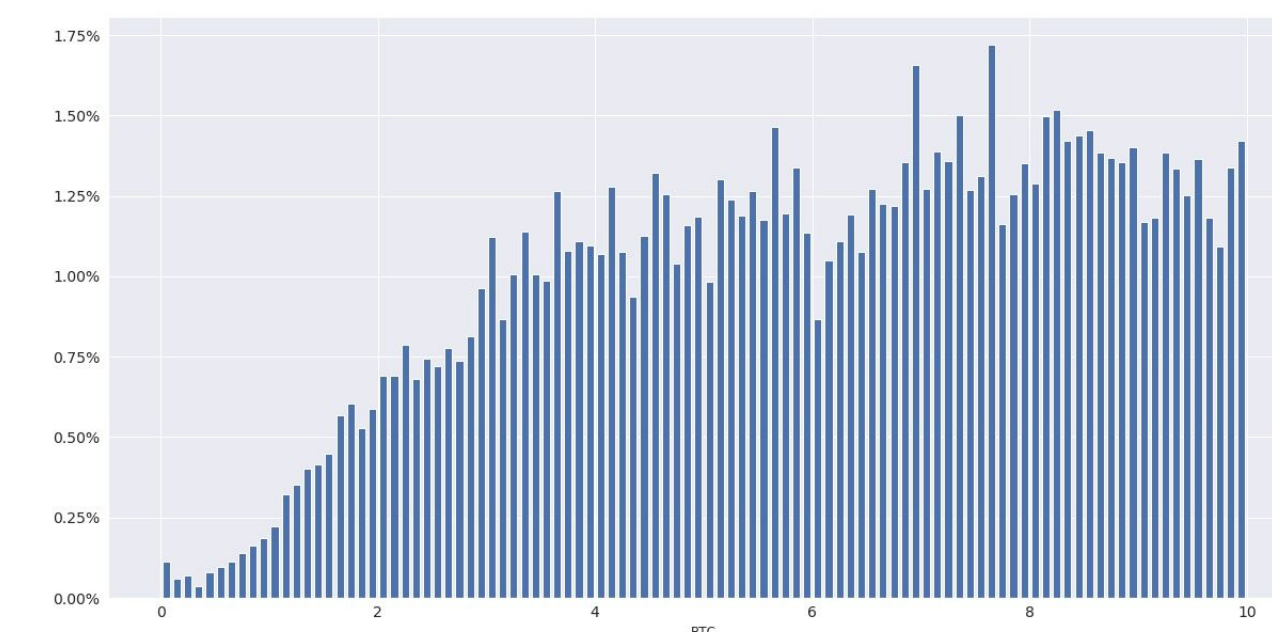
Trade Size Histograms for exchanges with suspicious volume look completely different, and showcase patterns that are both idiosyncratic and highly suspicious.



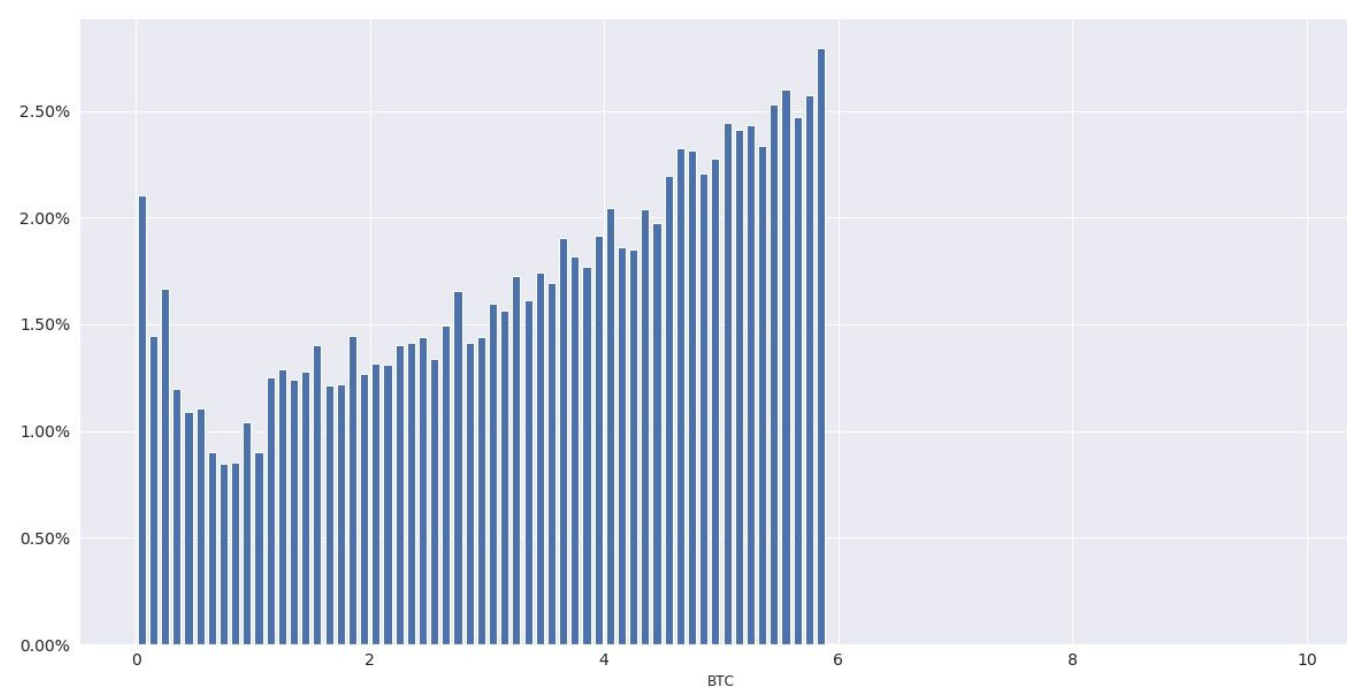
CoinBene (\$480M\*)

For example, CoinBene's histogram shows an odd bell curve-like distribution.

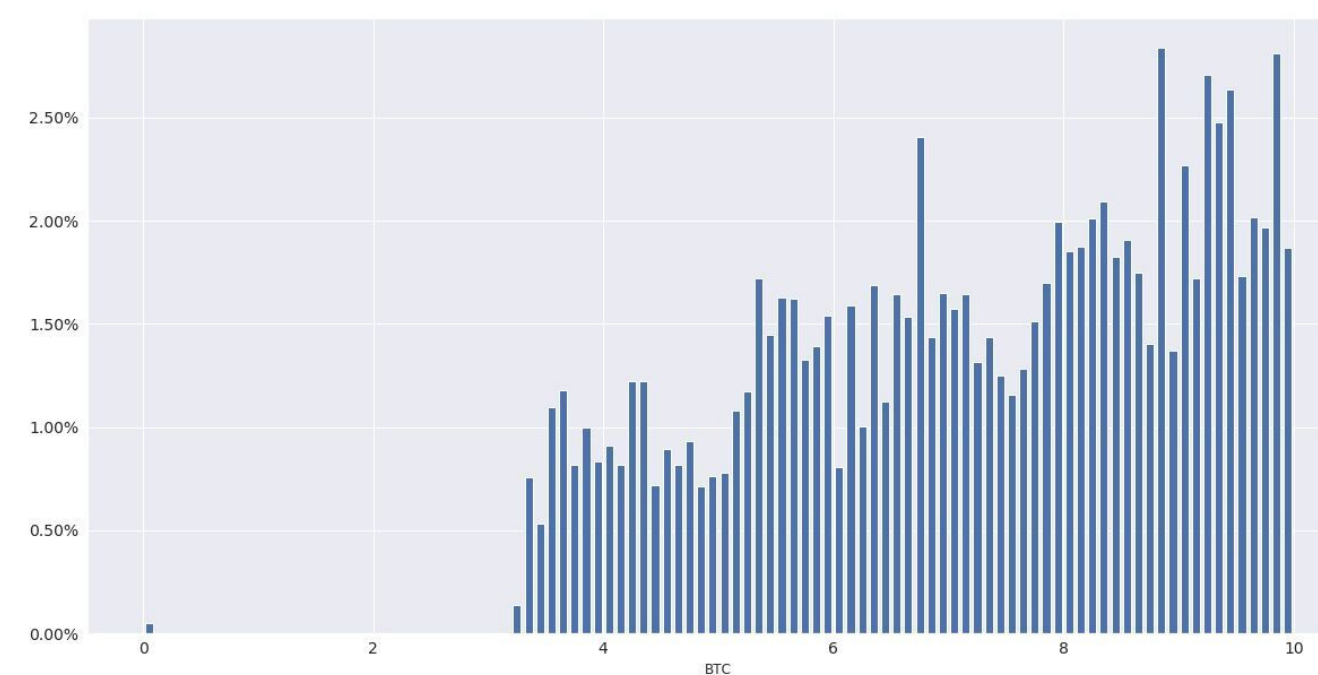
It also has no peaks at whole bitcoin quantities.



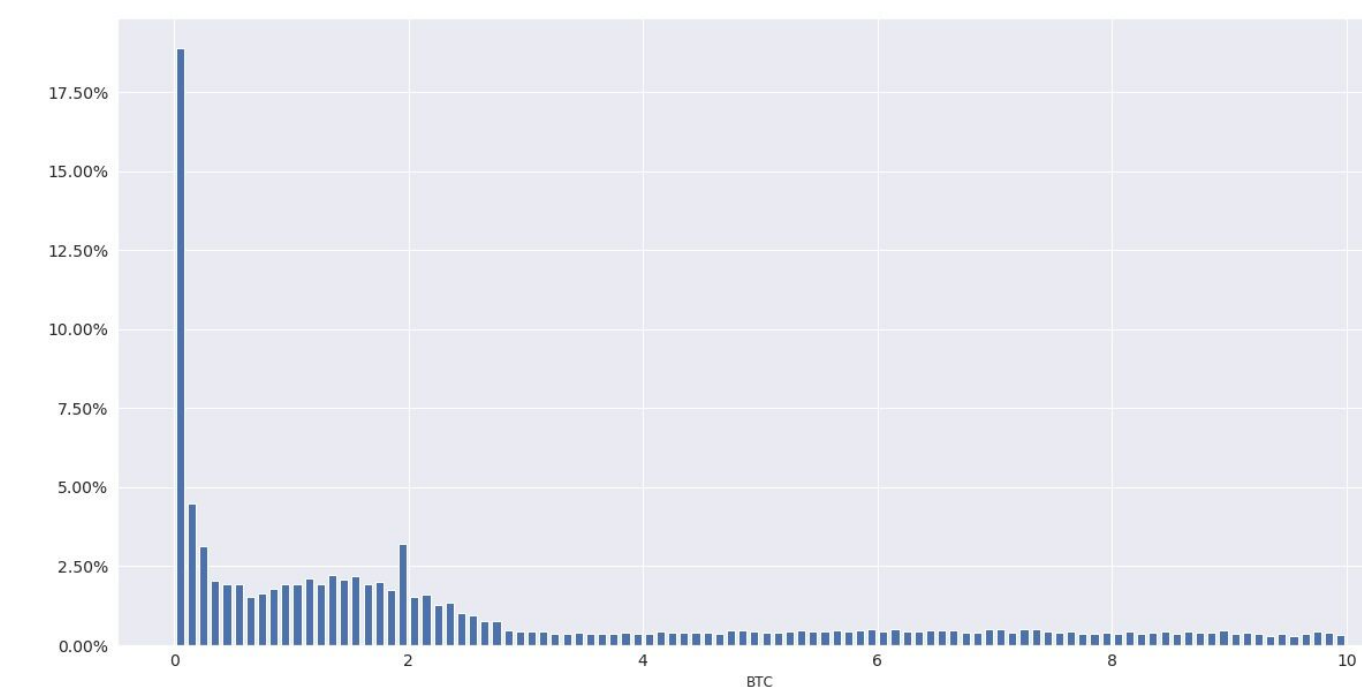
LBank (\$127M\*)



BitForex (\$241M\*)



Exrates (\$35M\*)

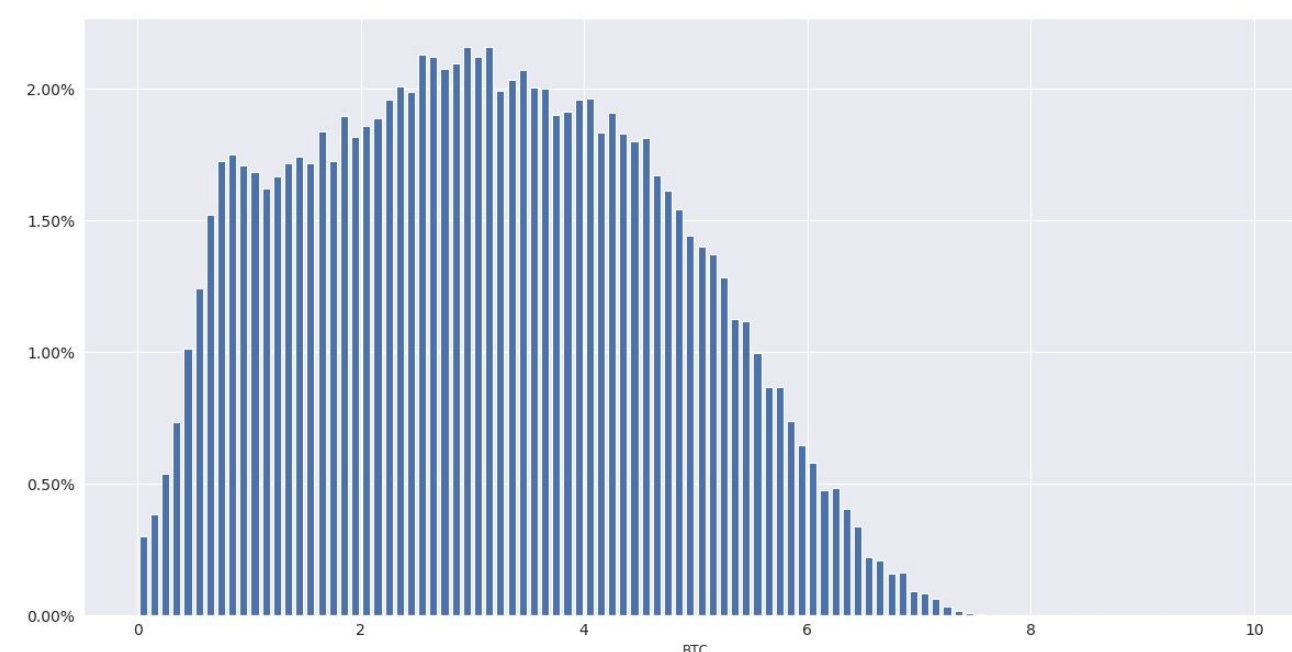


OKEx (\$152M\*)



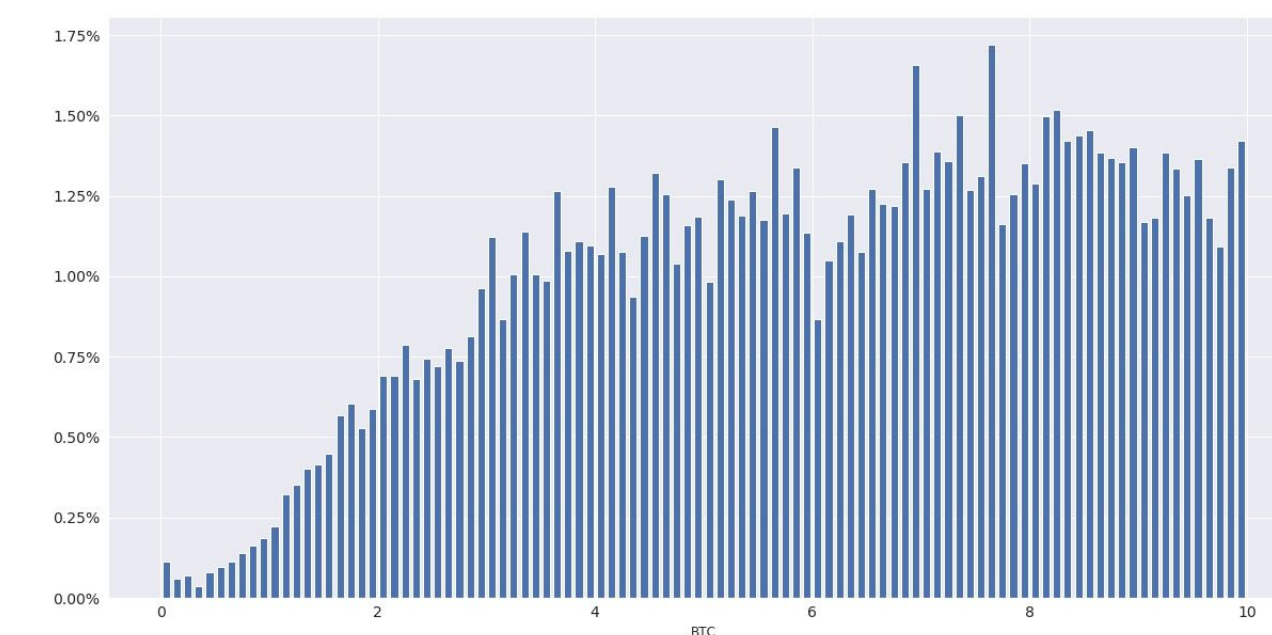
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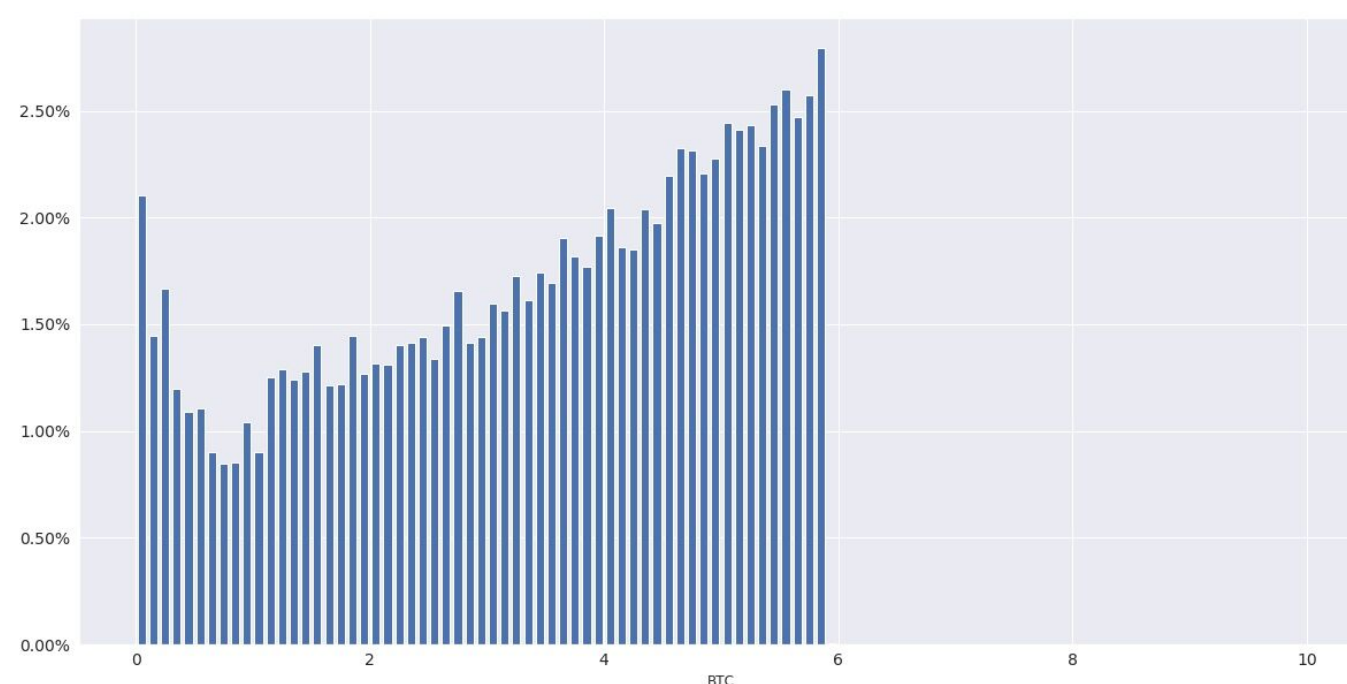


CoinBene (\$480M\*)

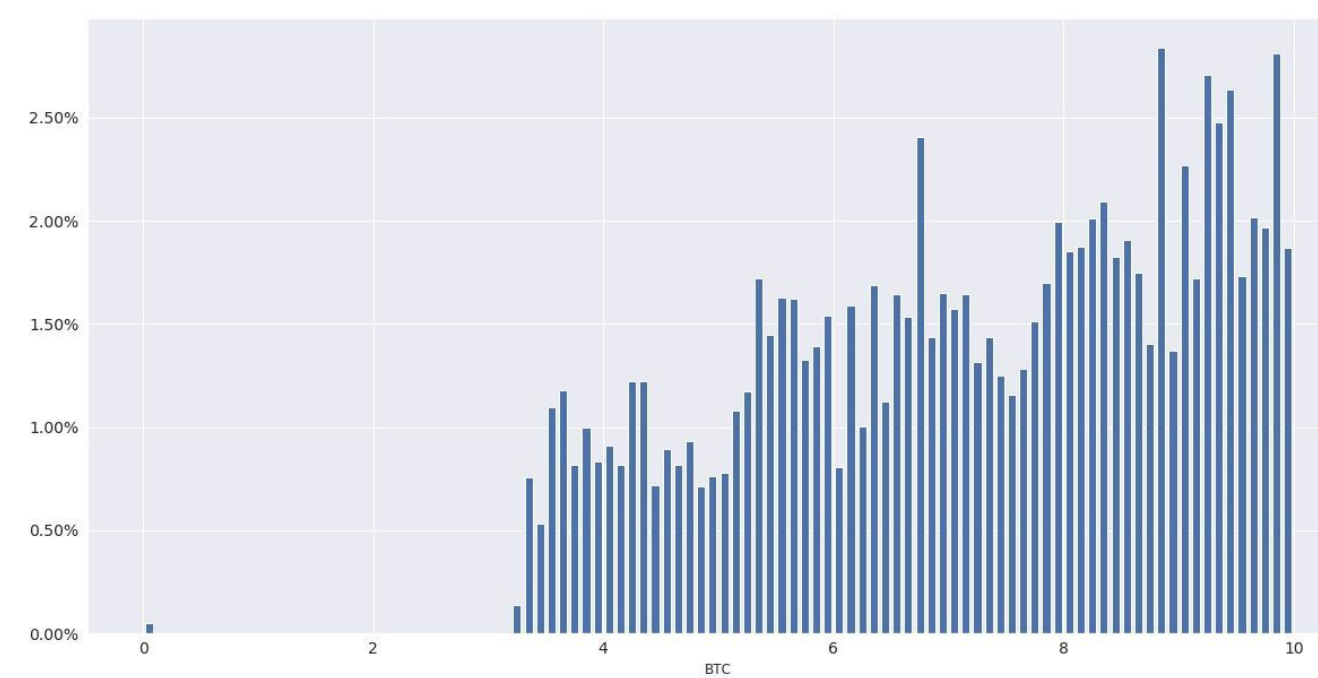
LBank shows increasing volume percentage for larger trade sizes. It reverses the decaying trend from all the well-known exchanges.



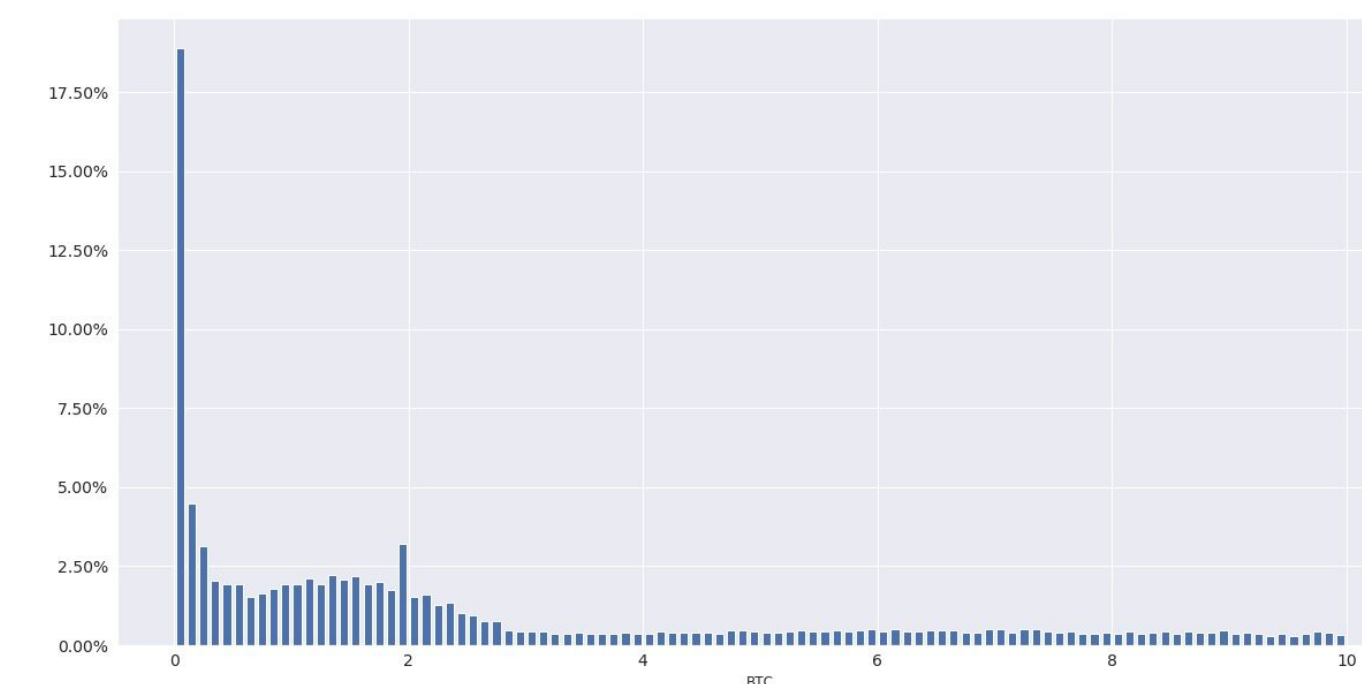
LBank (\$127M\*)



BitForex (\$241M\*)



Exrates (\$35M\*)



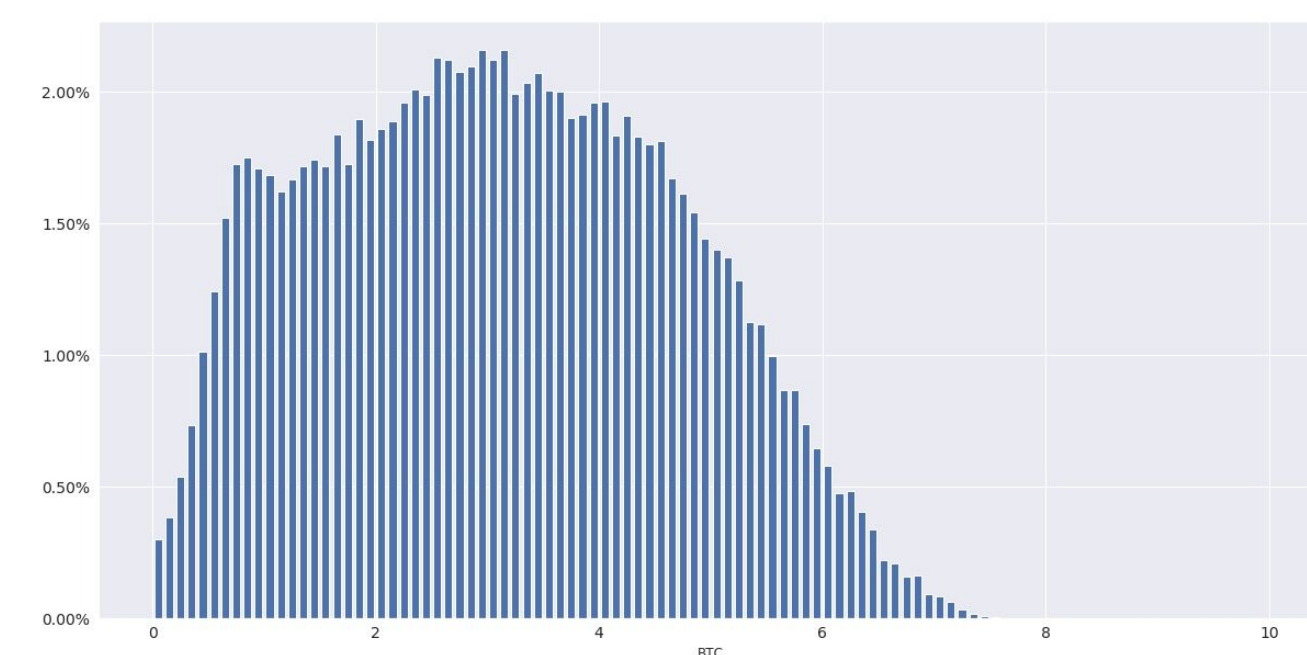
OKEx (\$152M\*)



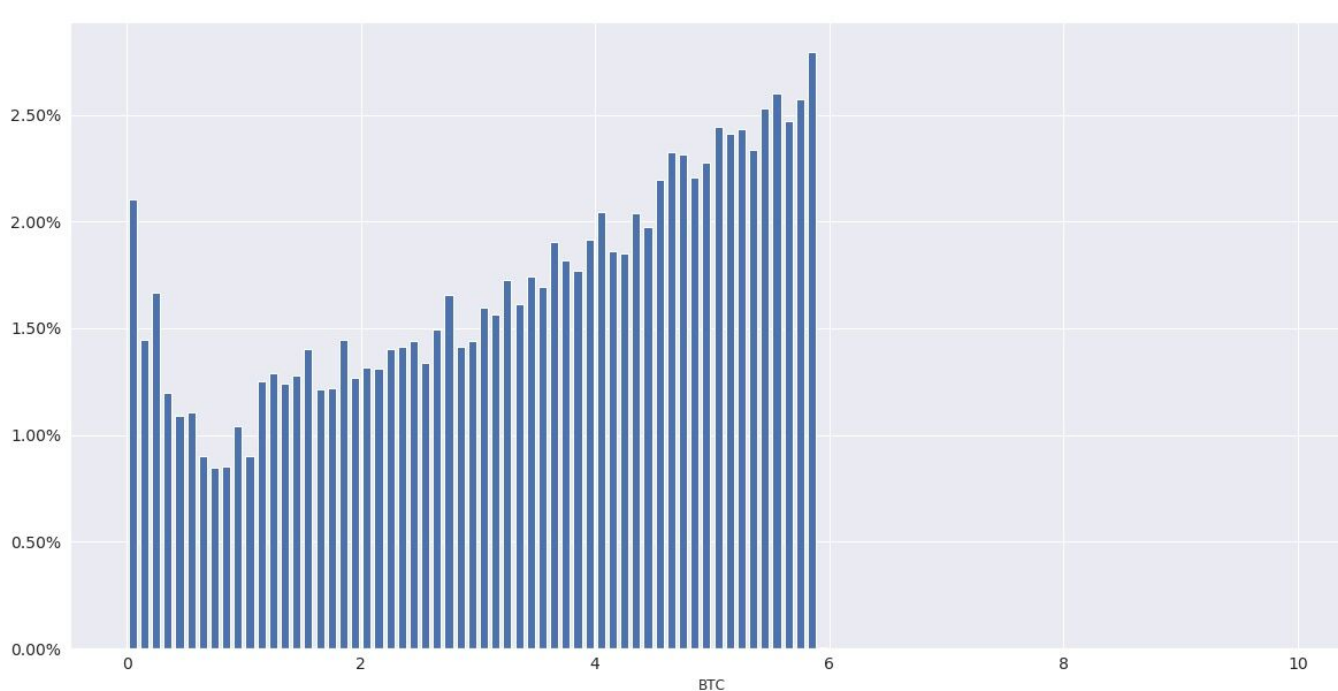


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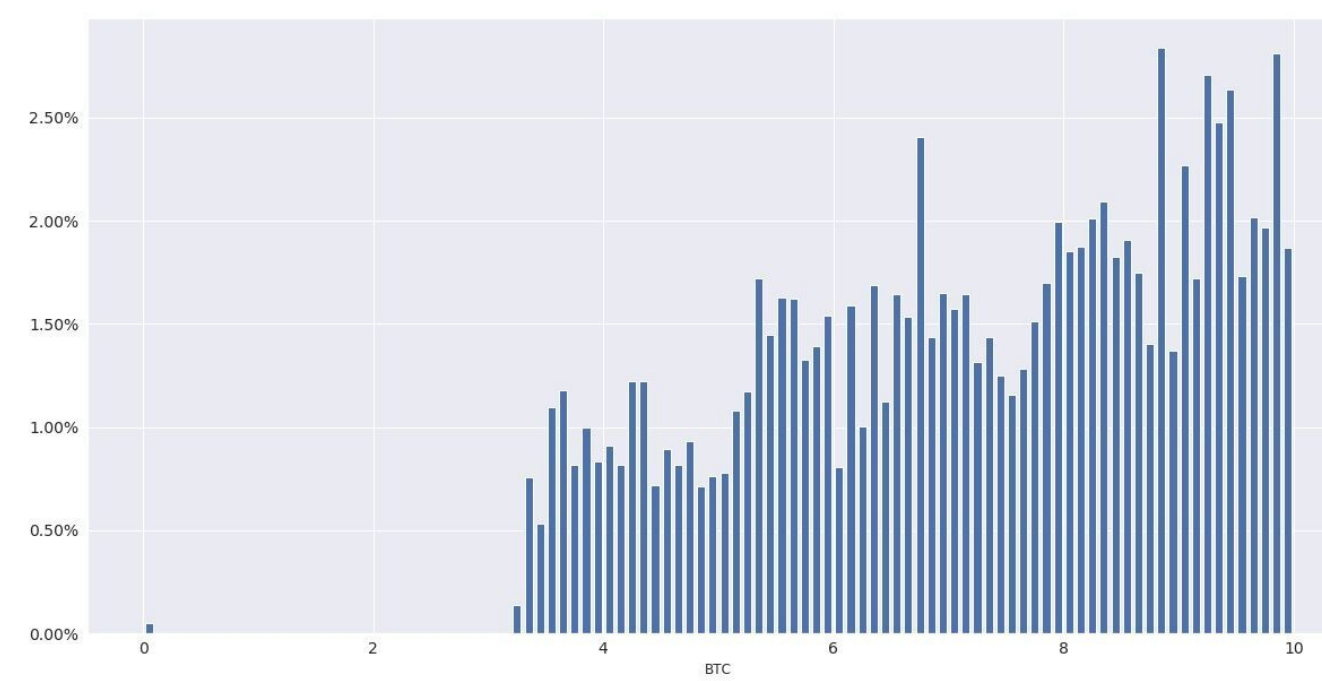


CoinBene (\$480M\*)

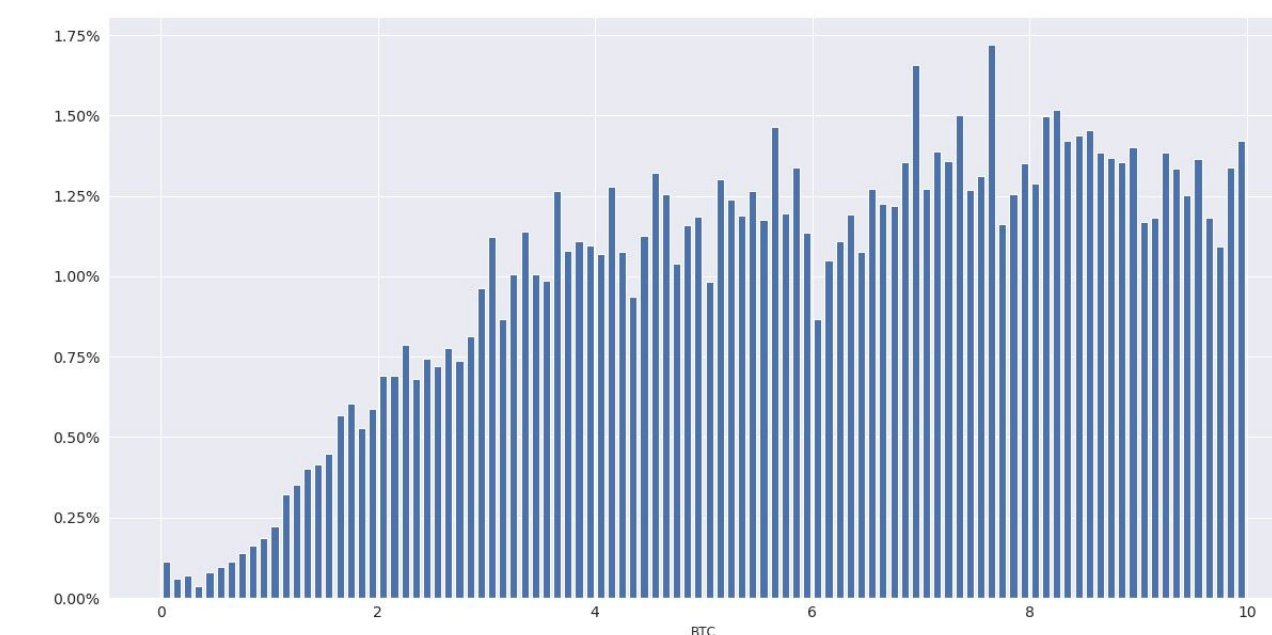


BitForex (\$241M\*)

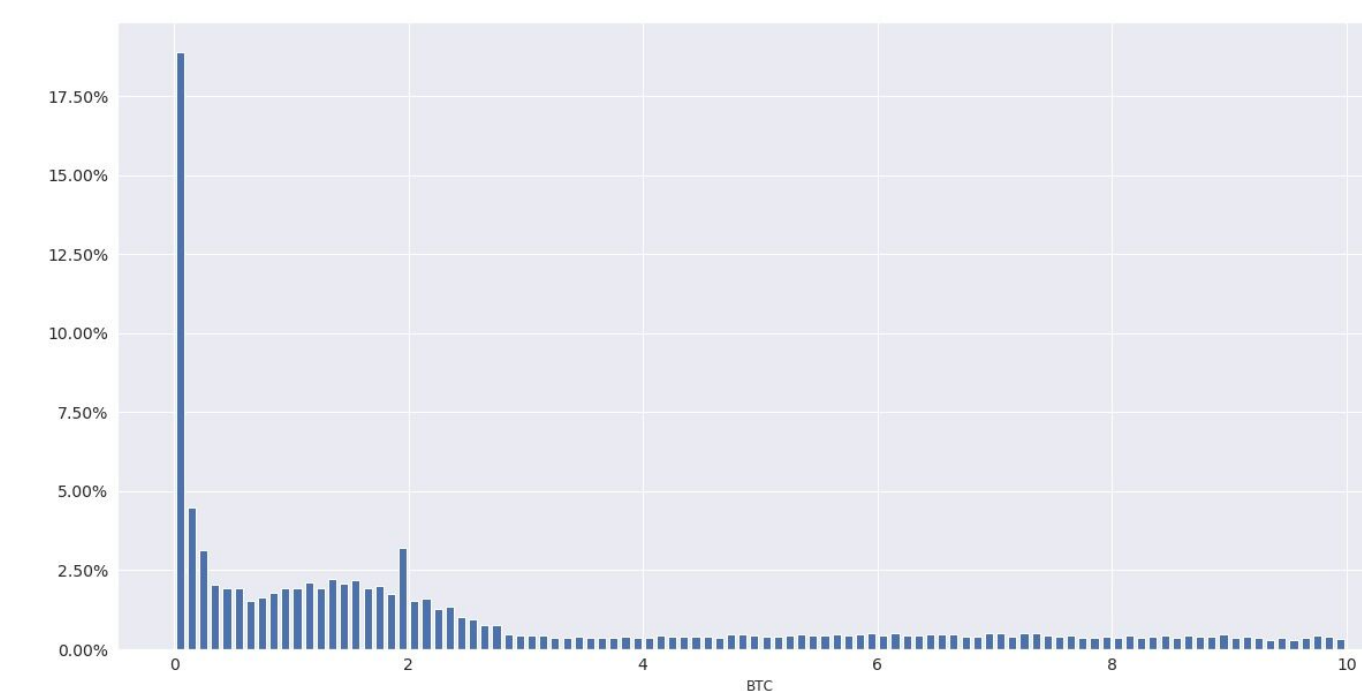
BitForex has an inexplicable cliff of trade volume percentage right before 6 bitcoin trade sizes.



Exrates (\$35M\*)



LBank (\$127M\*)



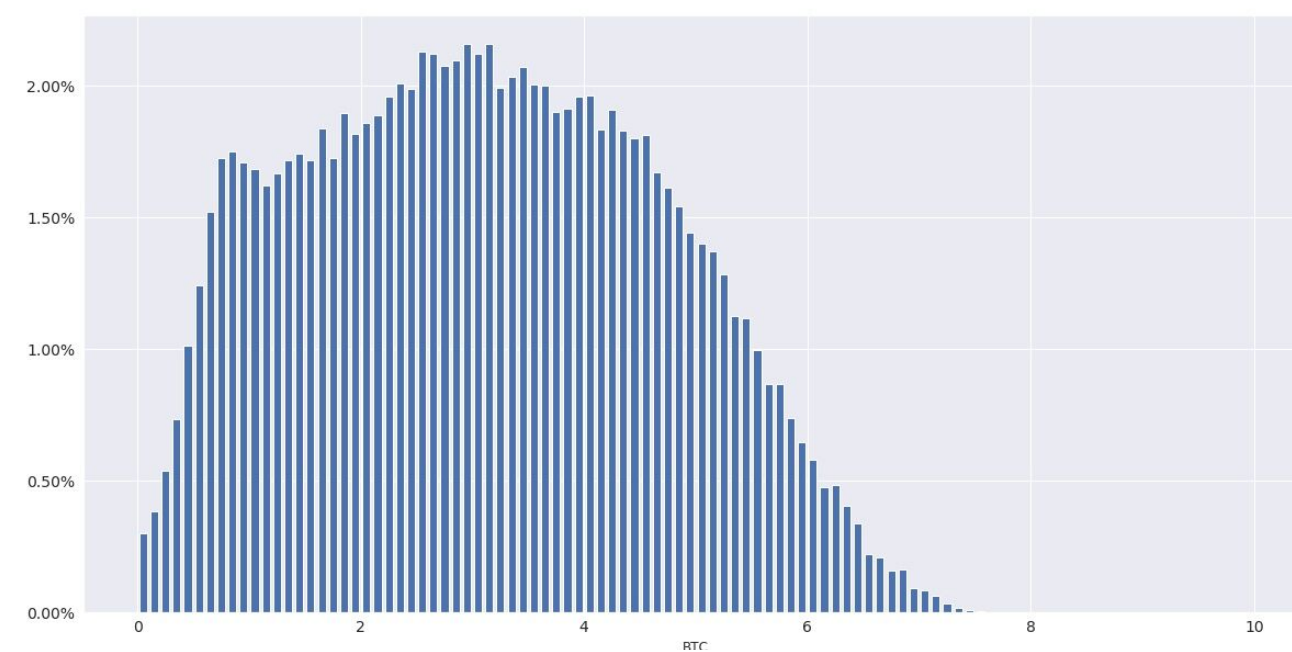
OKEx (\$152M\*)





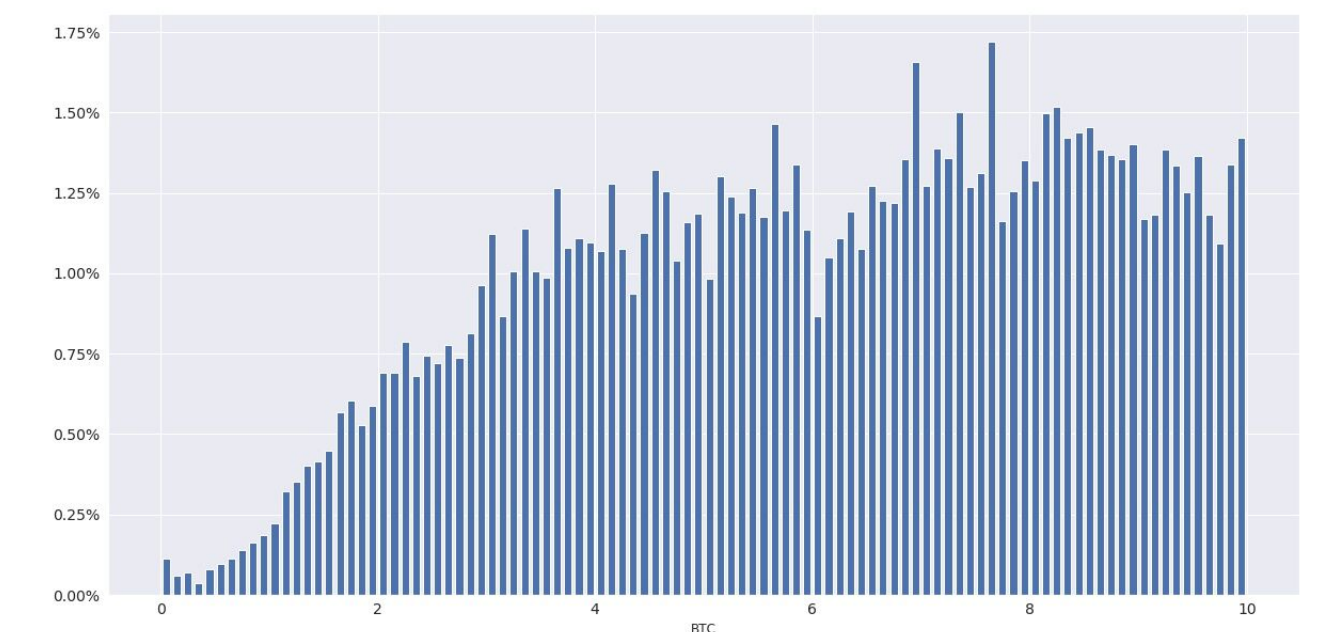
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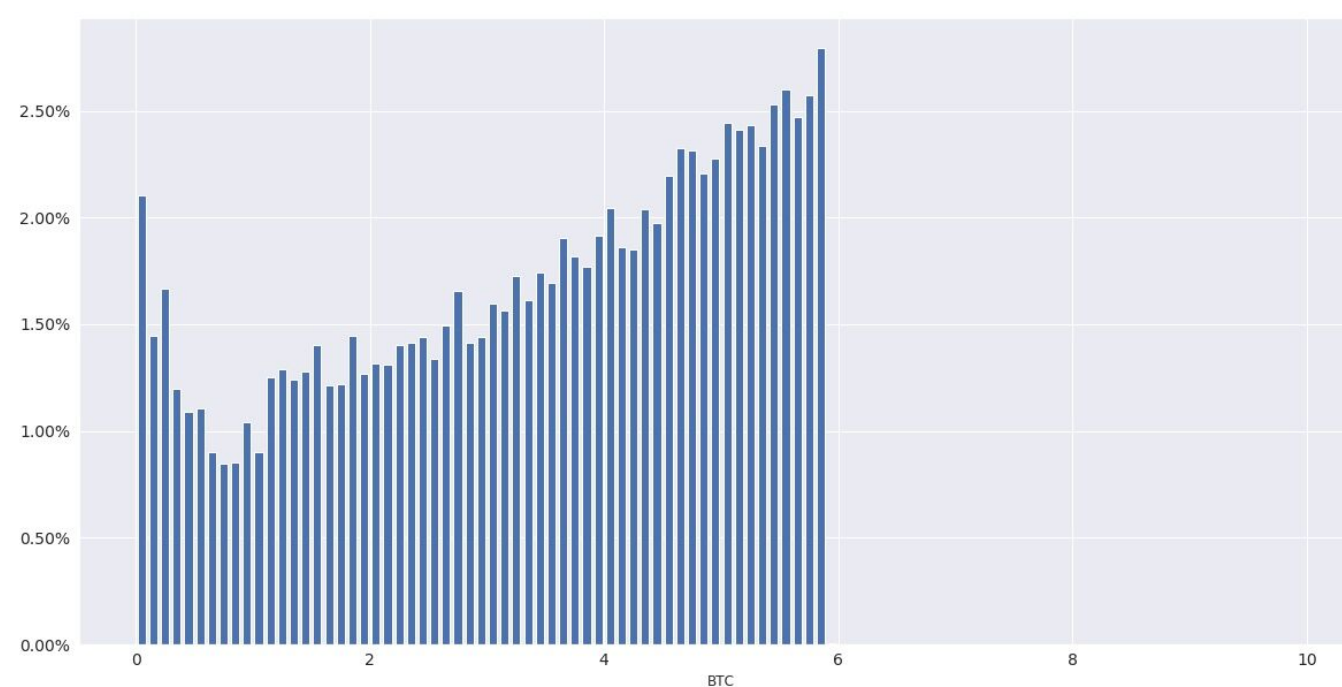


CoinBene (\$480M\*)

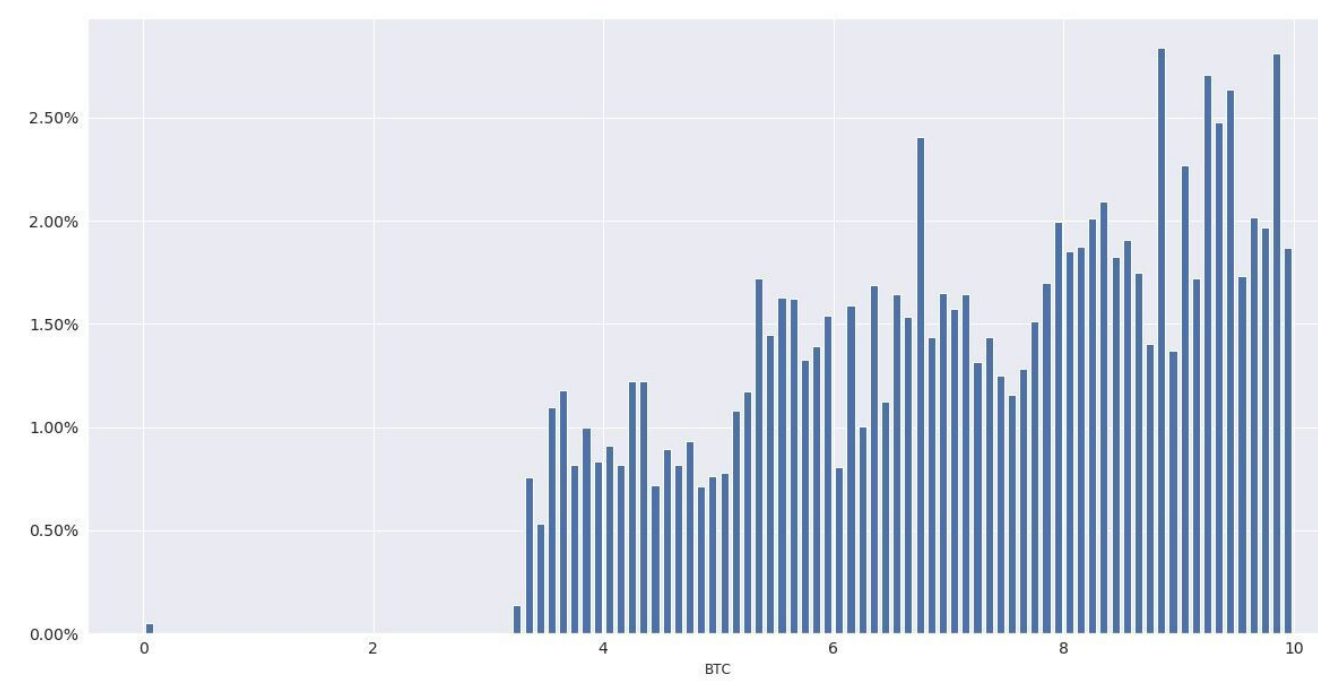
Exrates has substantially no trades smaller than 3 bitcoin.



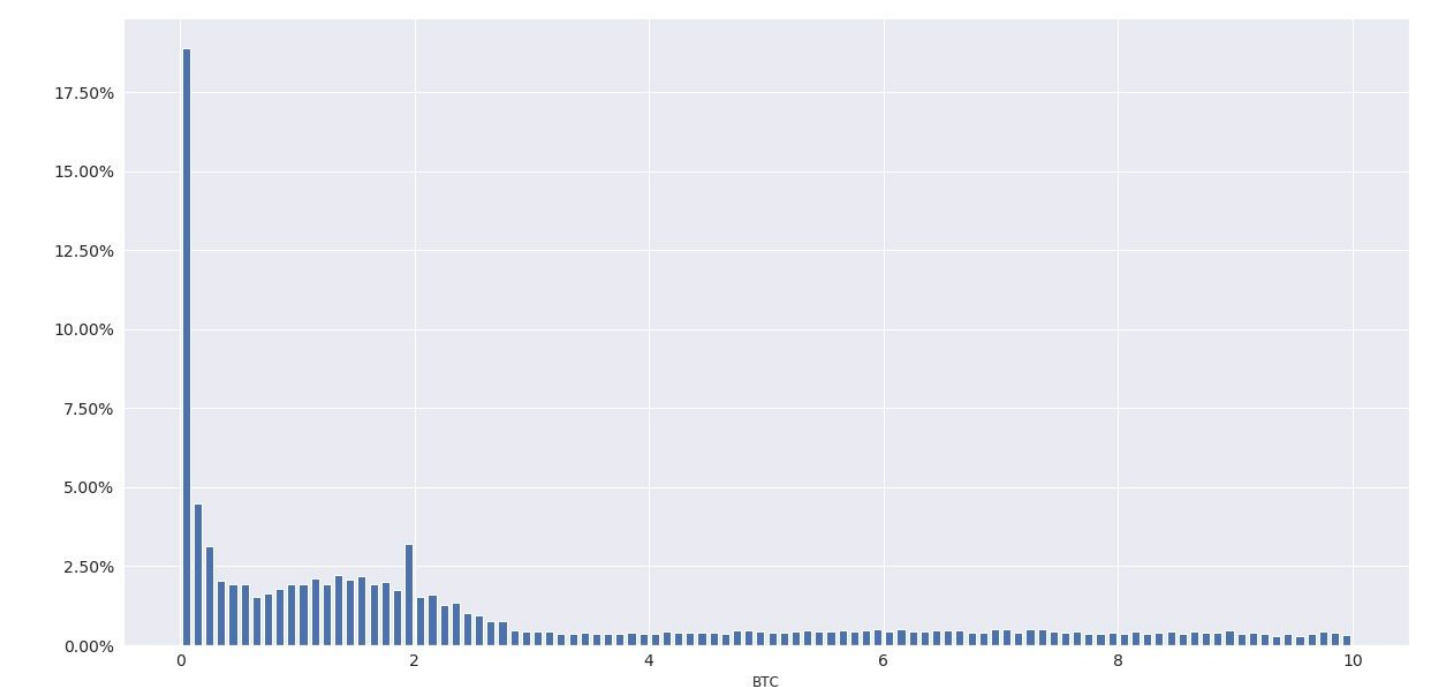
LBank (\$127M\*)



BitForex (\$241M\*)



Exrates (\$35M\*)

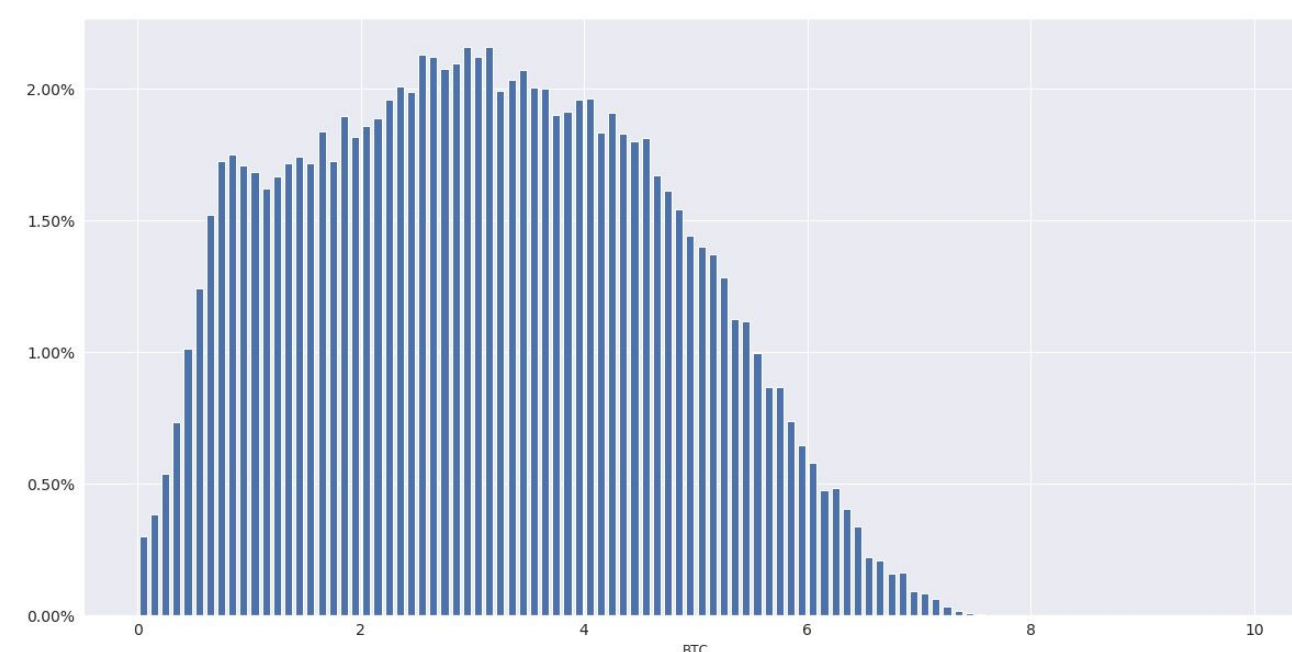


OKEx (\$152M\*)



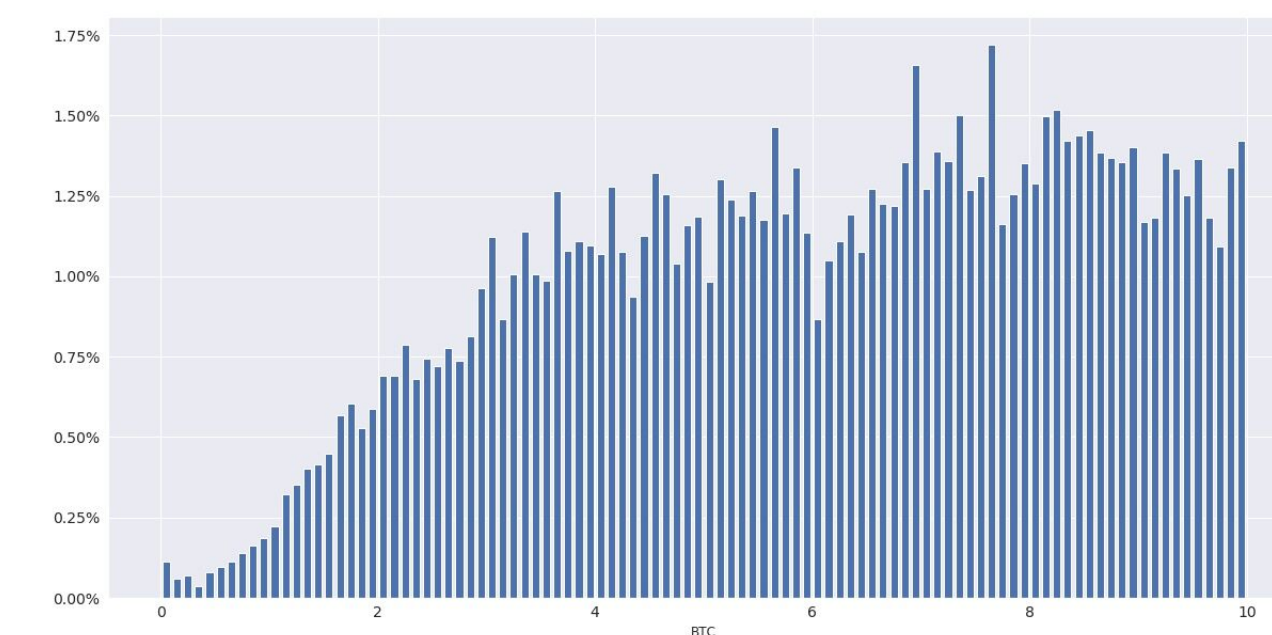
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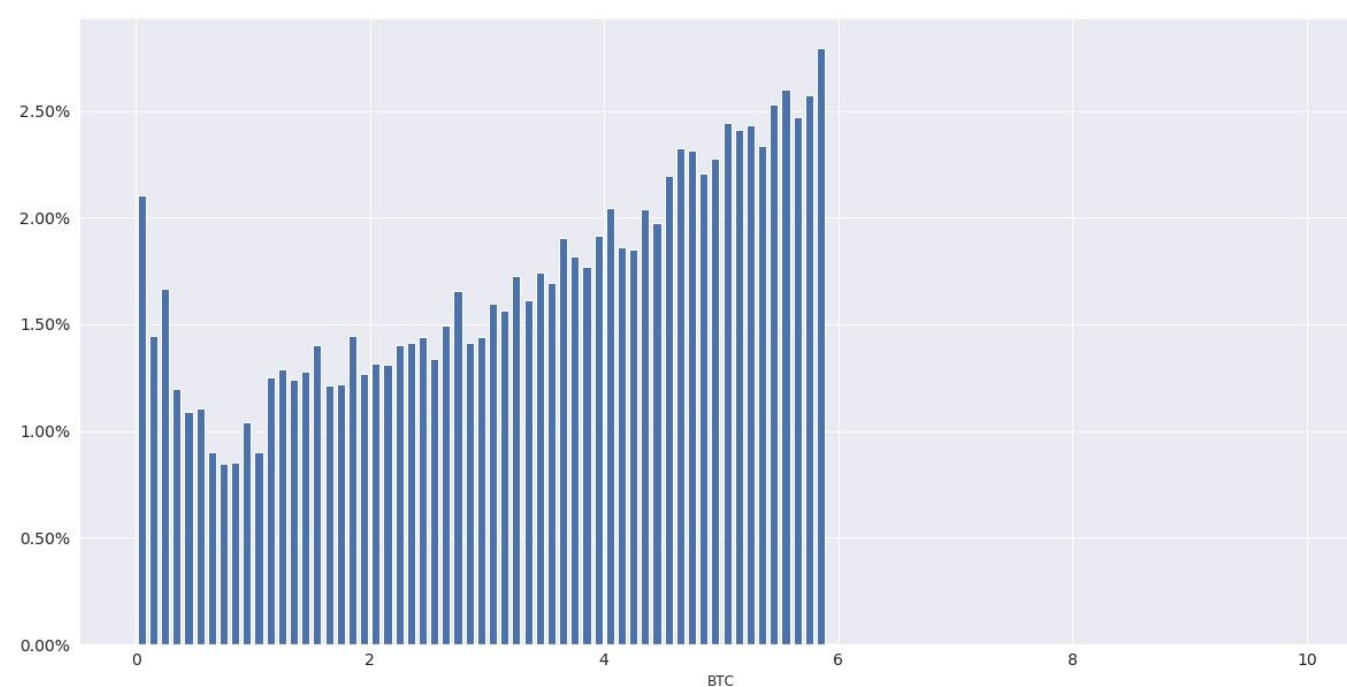


CoinBene (\$480M\*)

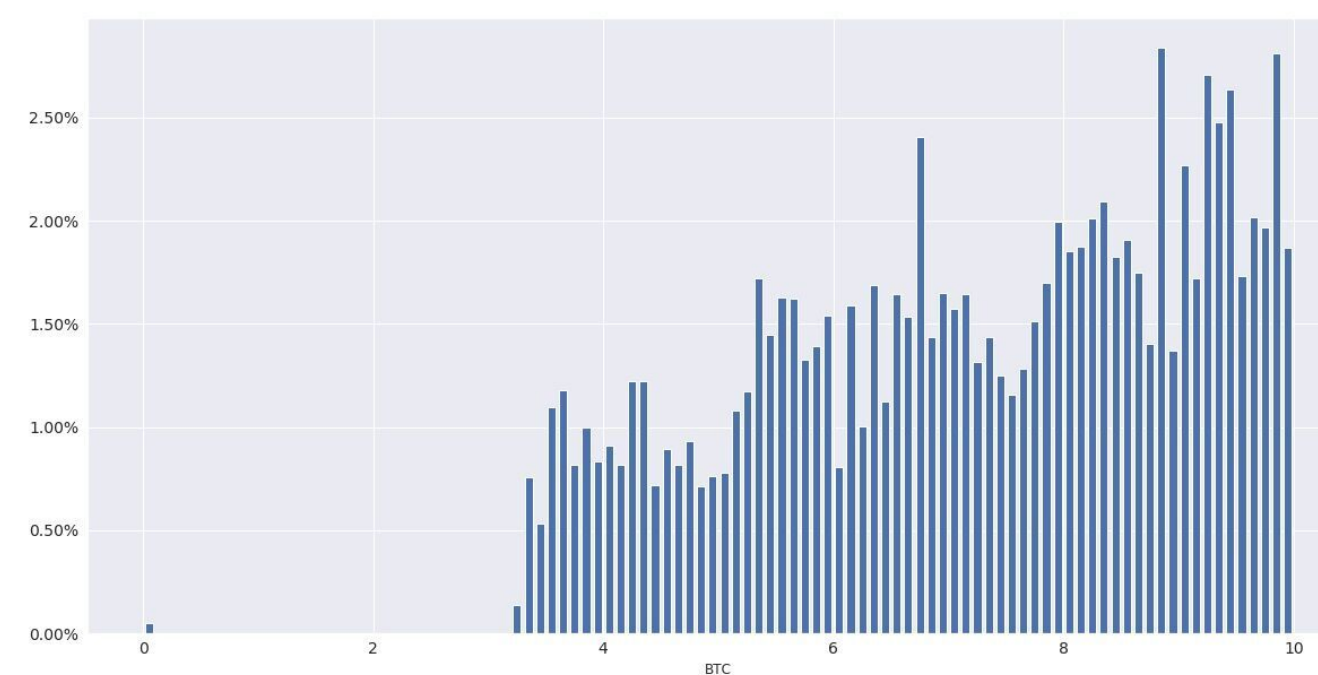
OKEx's warning sign is the “flat-line” volume percentage trend after 3 bitcoin, which shows no signs of stopping even at 10 bitcoin.



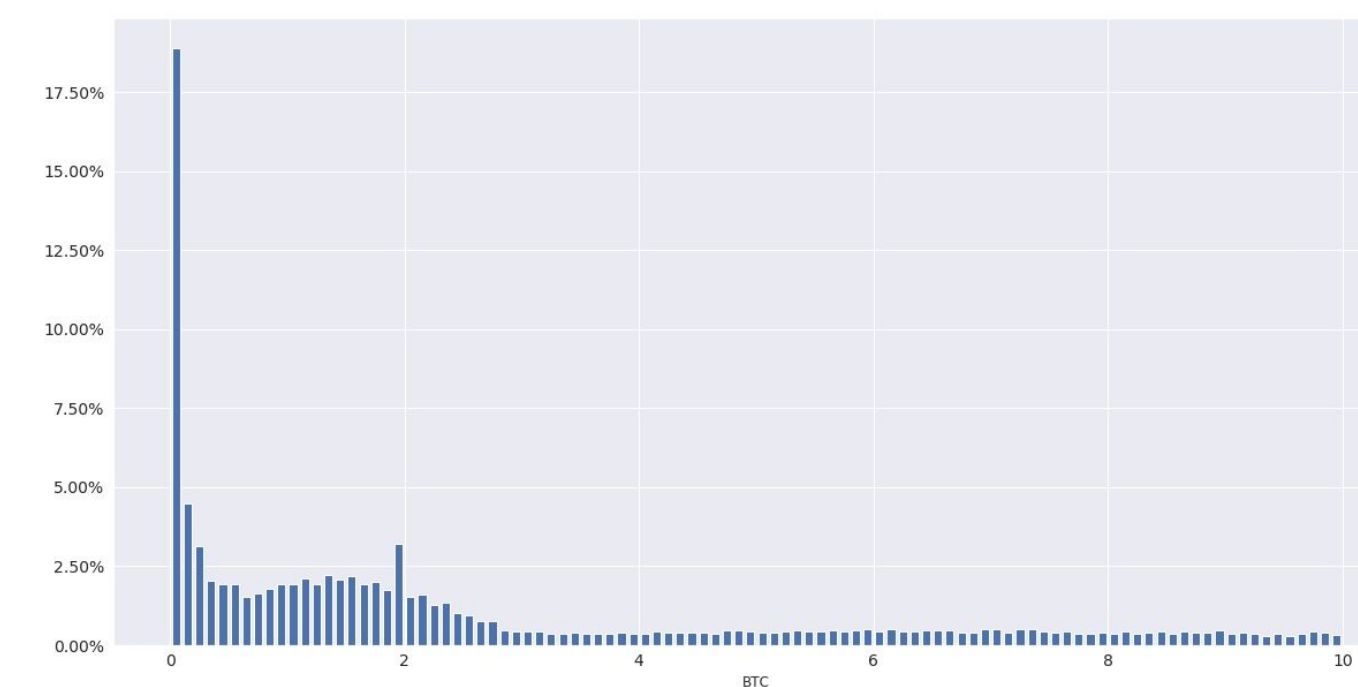
LBank (\$127M\*)



BitForex (\$241M\*)



Exrates (\$35M\*)

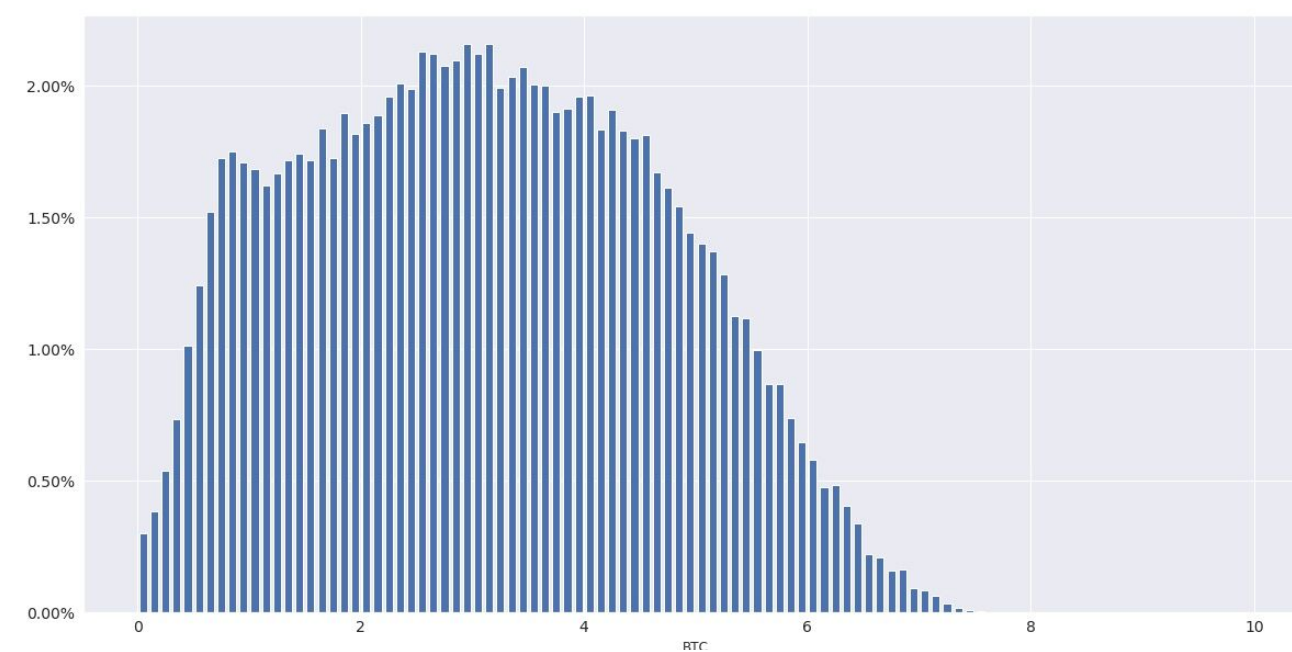


OKEx (\$152M\*)

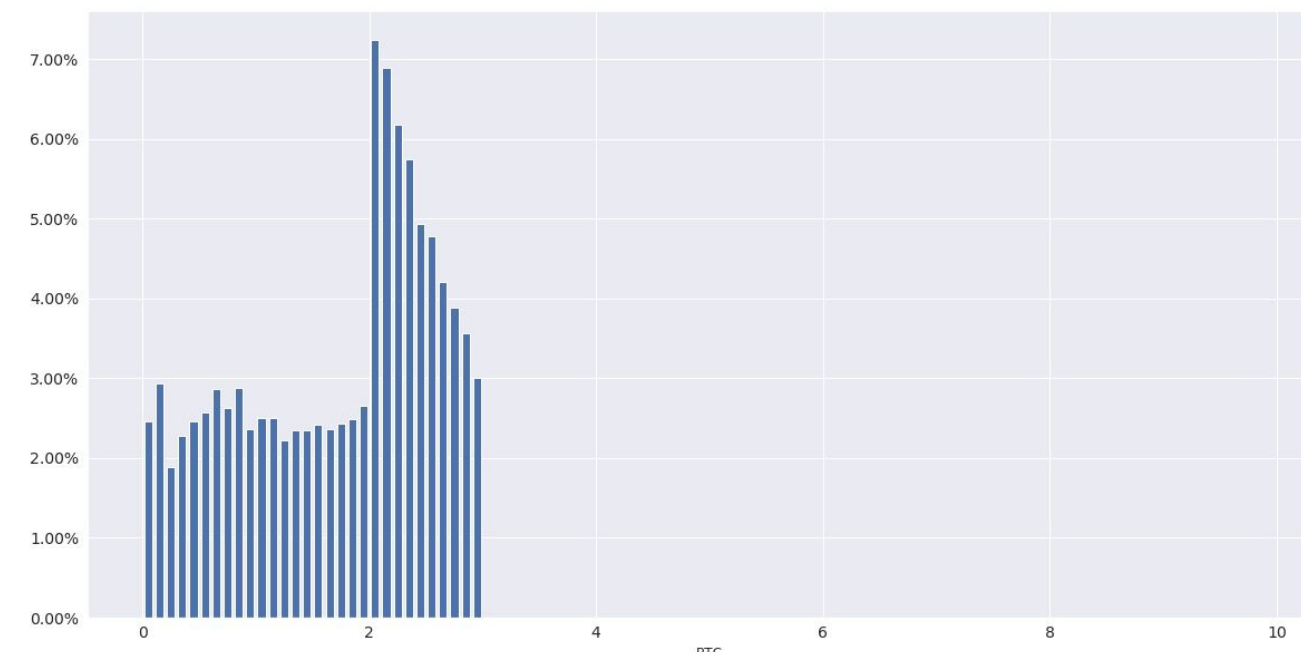


# Trade Size Histograms For Suspect Exchanges

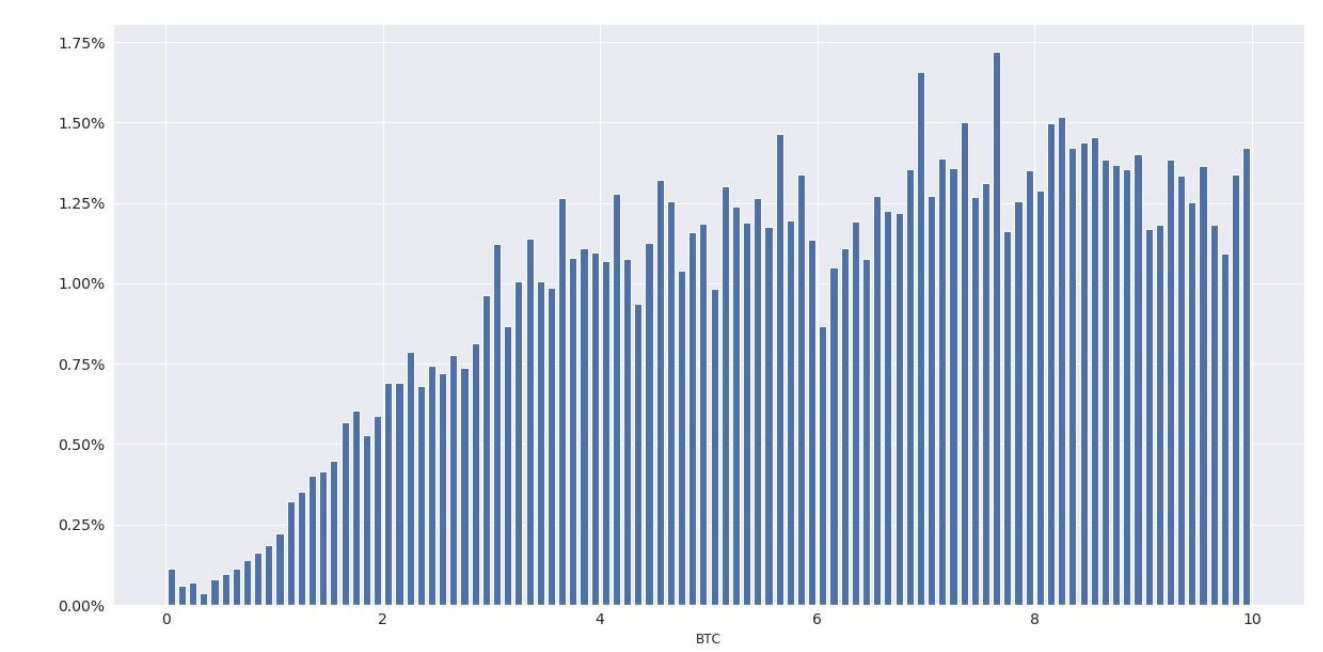
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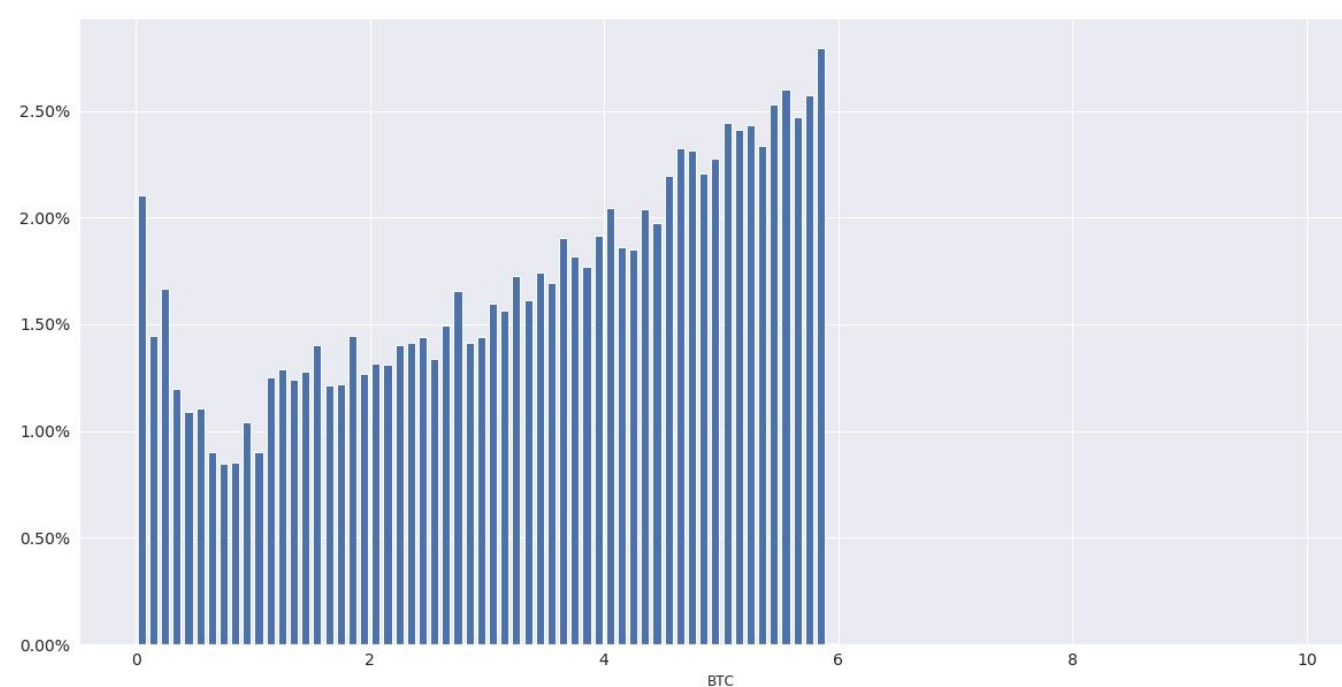
CoinBene (\$480M\*)



IDAX (\$163M\*)

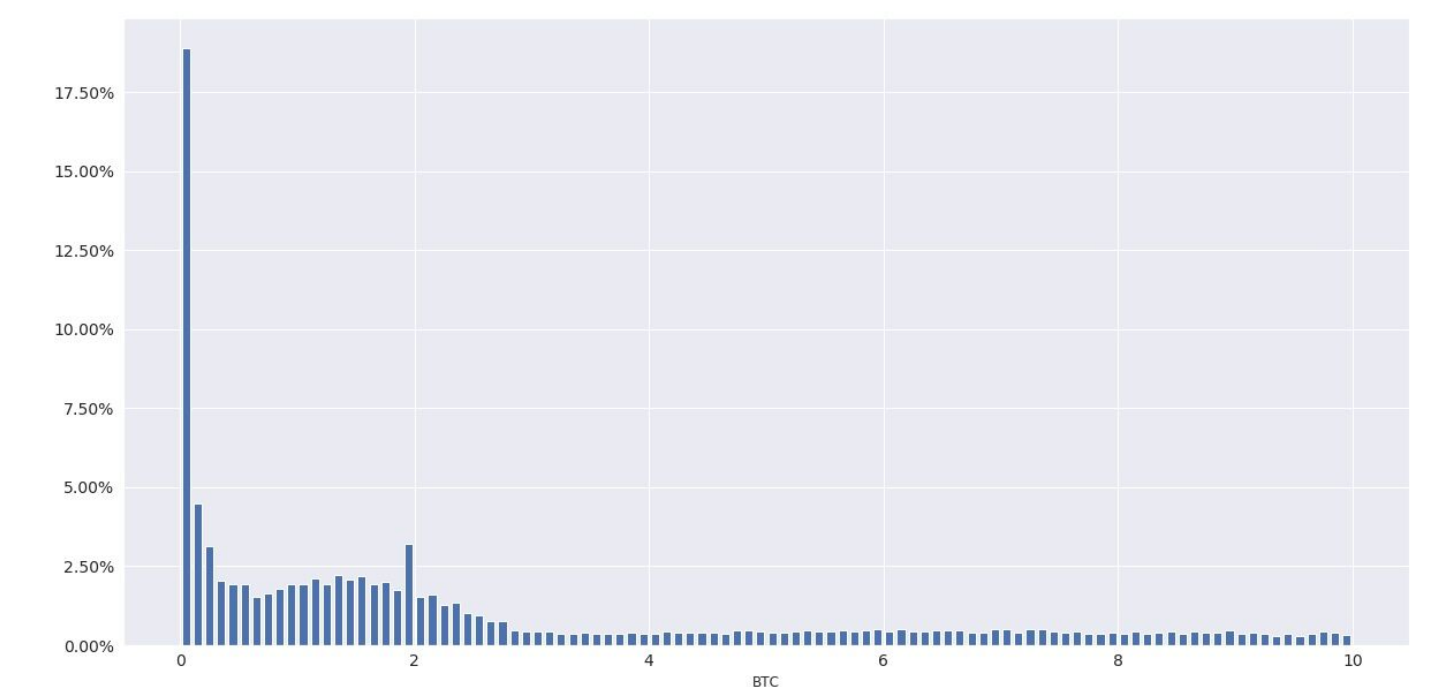


LBank (\$127M\*)



BitForex (\$241M\*)

IDAX's histogram appears to have multiple artificial trade distribution patterns overlapped.

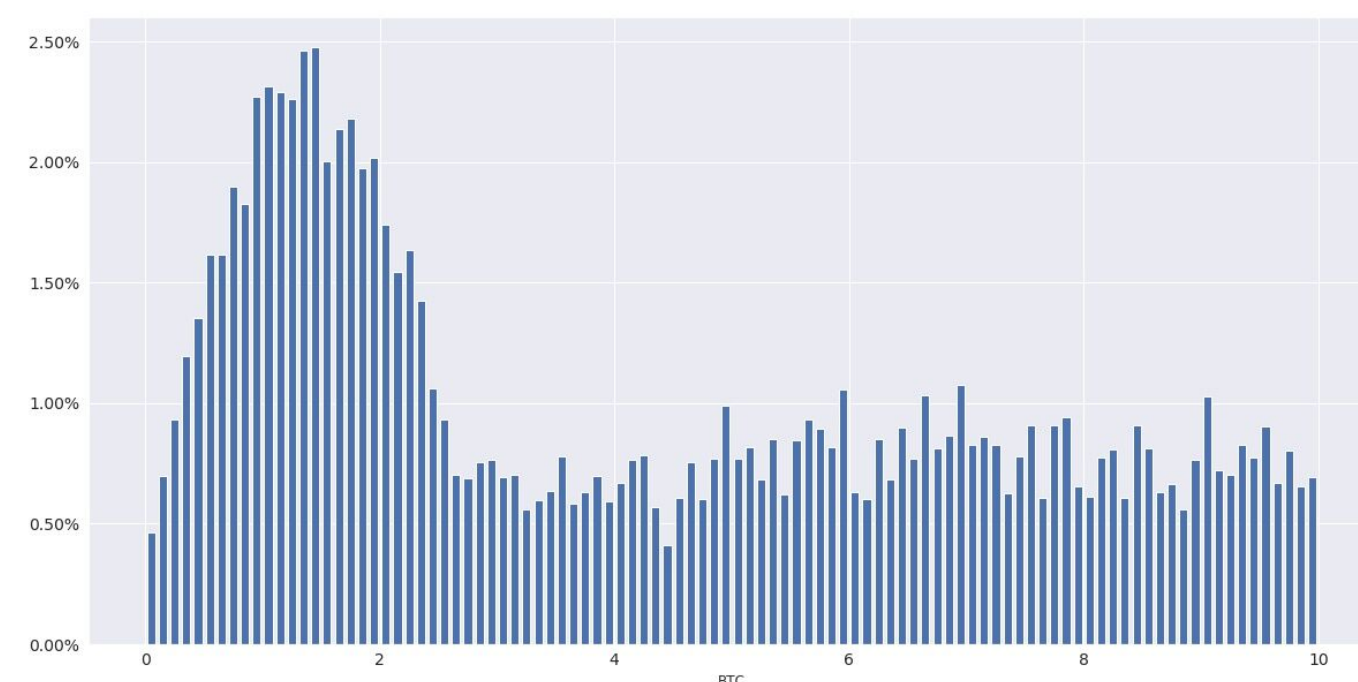




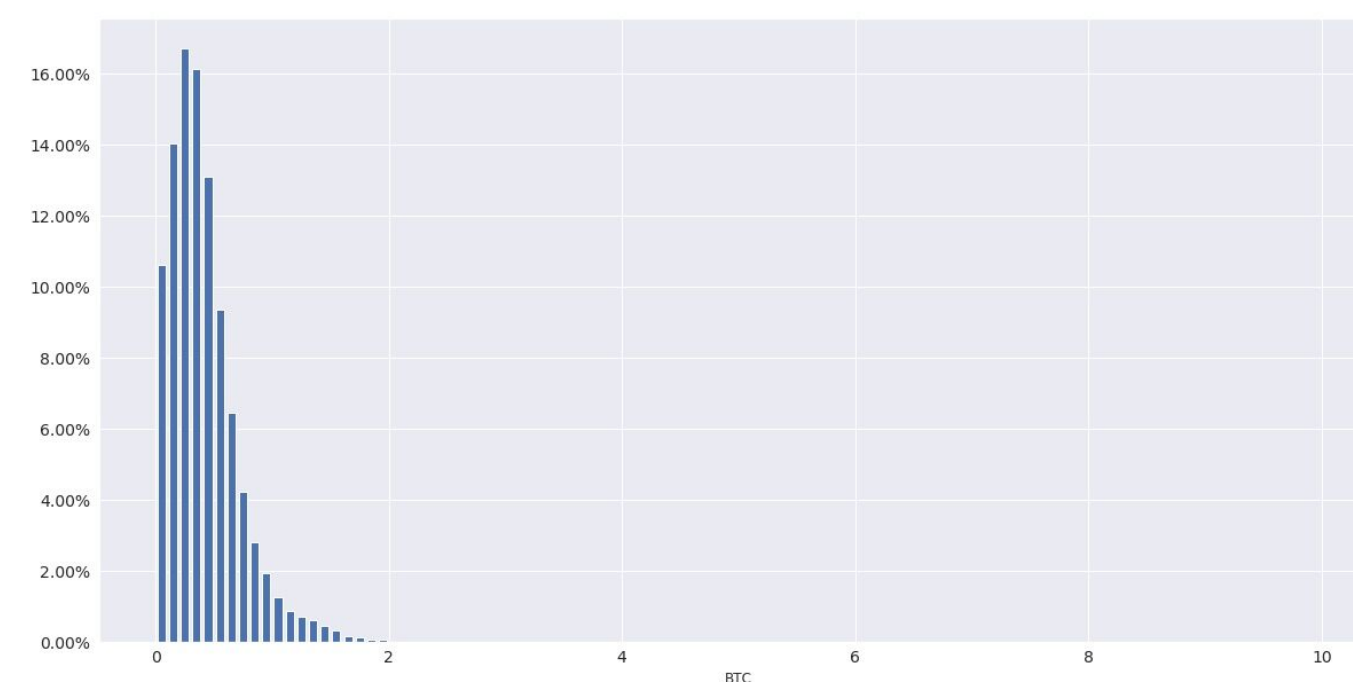


# More Trade Size Histograms For Suspect Exchanges

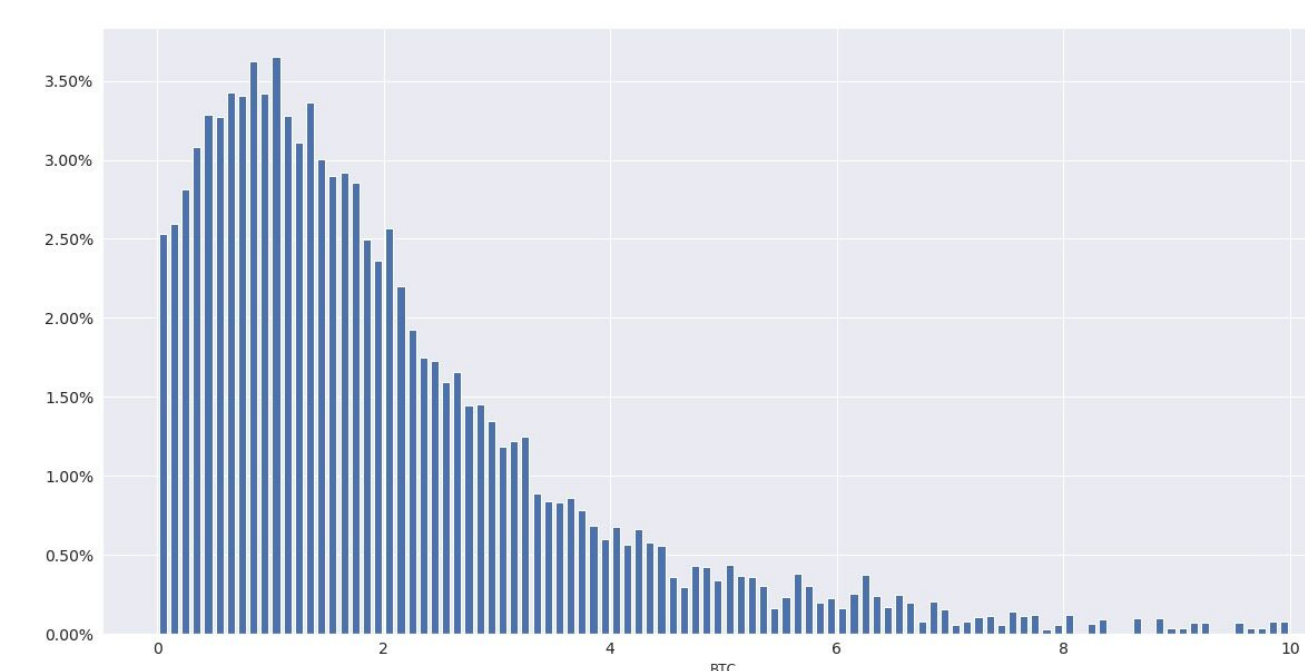
Trade Size Histograms for exchanges with suspicious volume look completely different, and showcase patterns that are both idiosyncratic and highly suspicious.



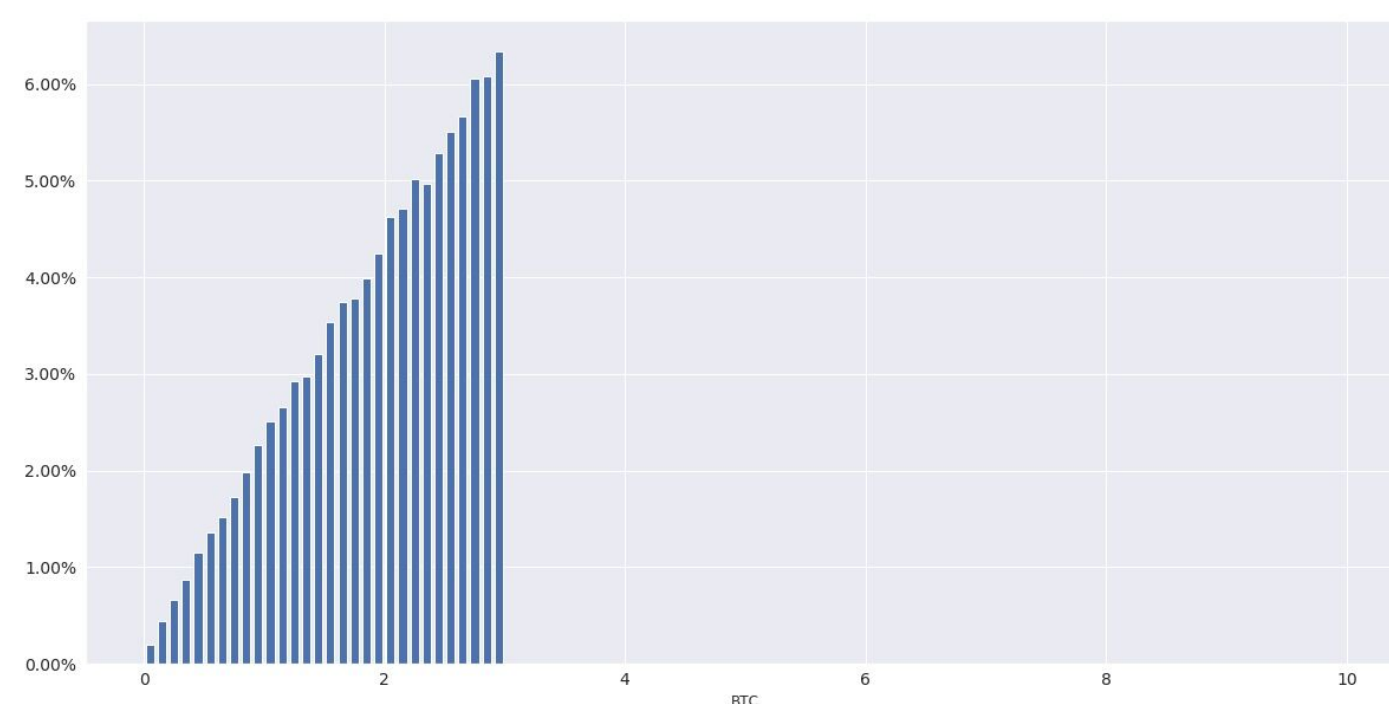
BitMart (\$106M\*)



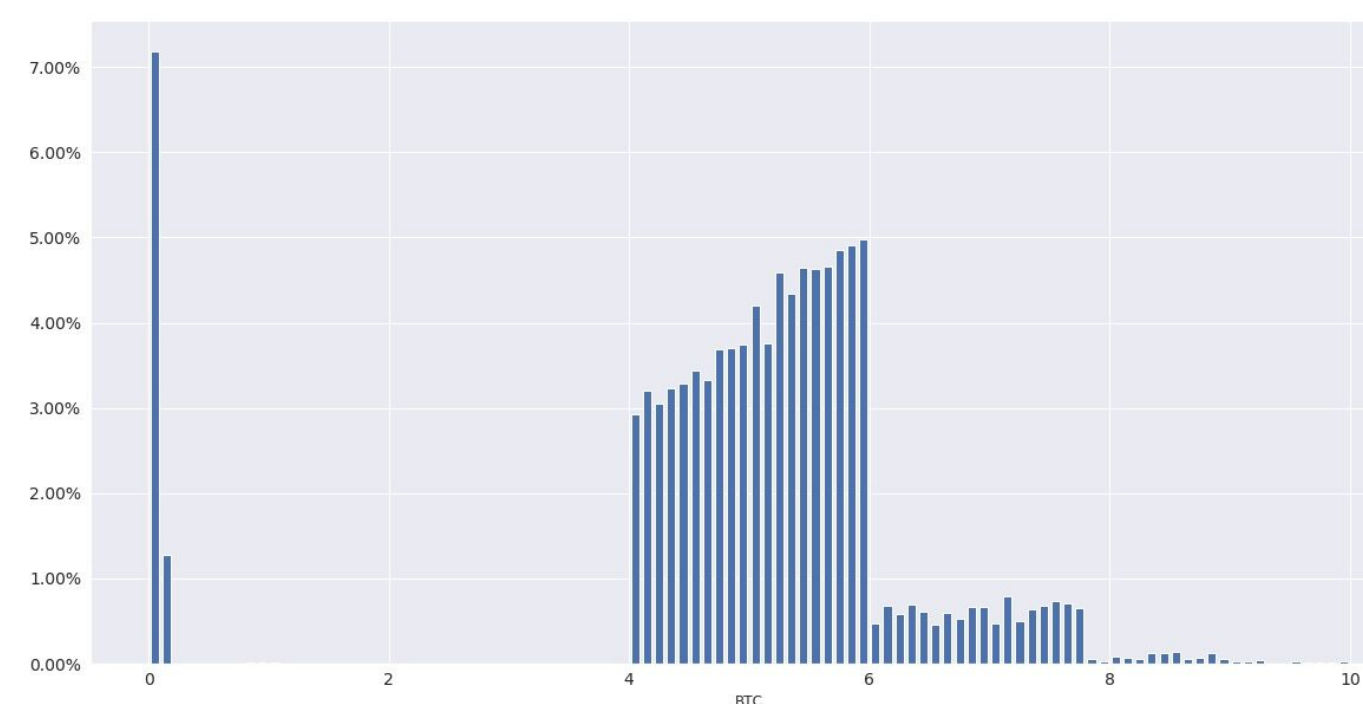
ZBG (\$225M\*)



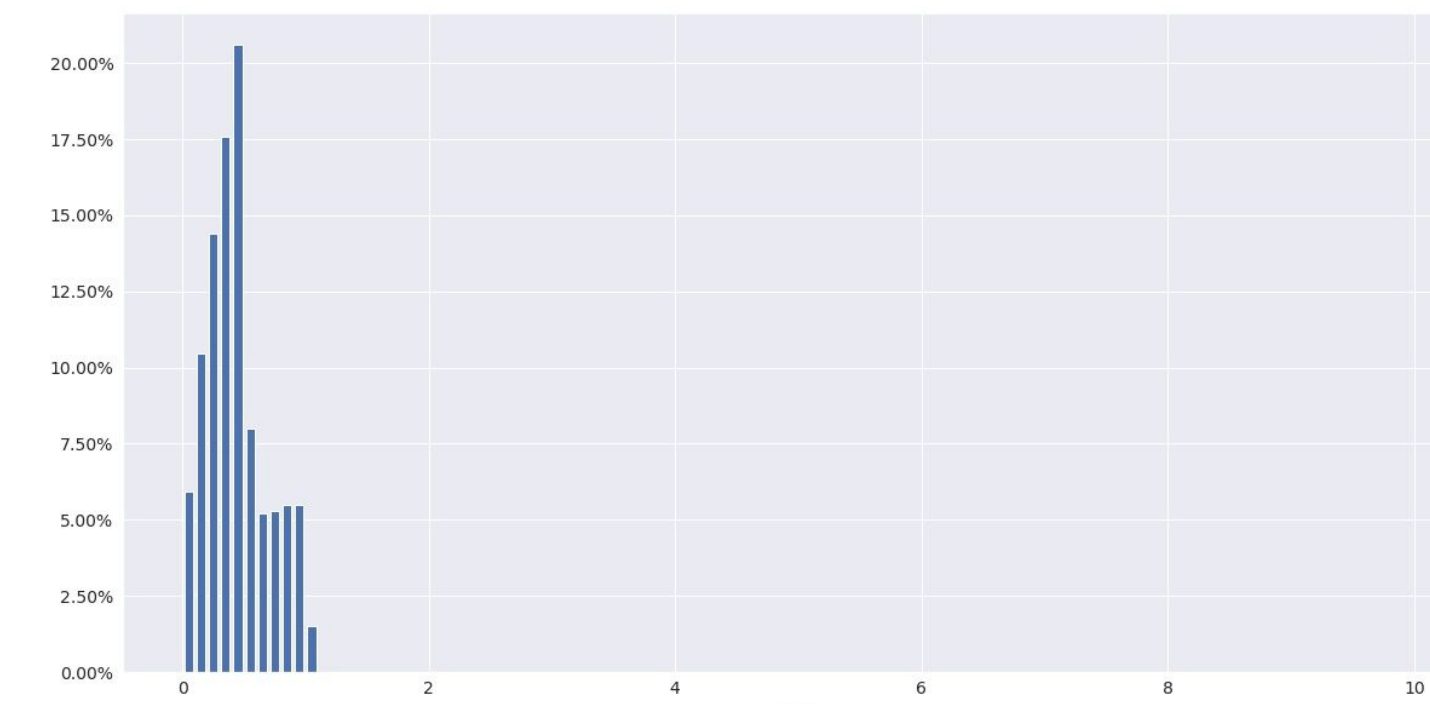
CoinTiger (\$97M\*)



SIMEX (\$97M\*)



Coinsuper (\$82M\*)

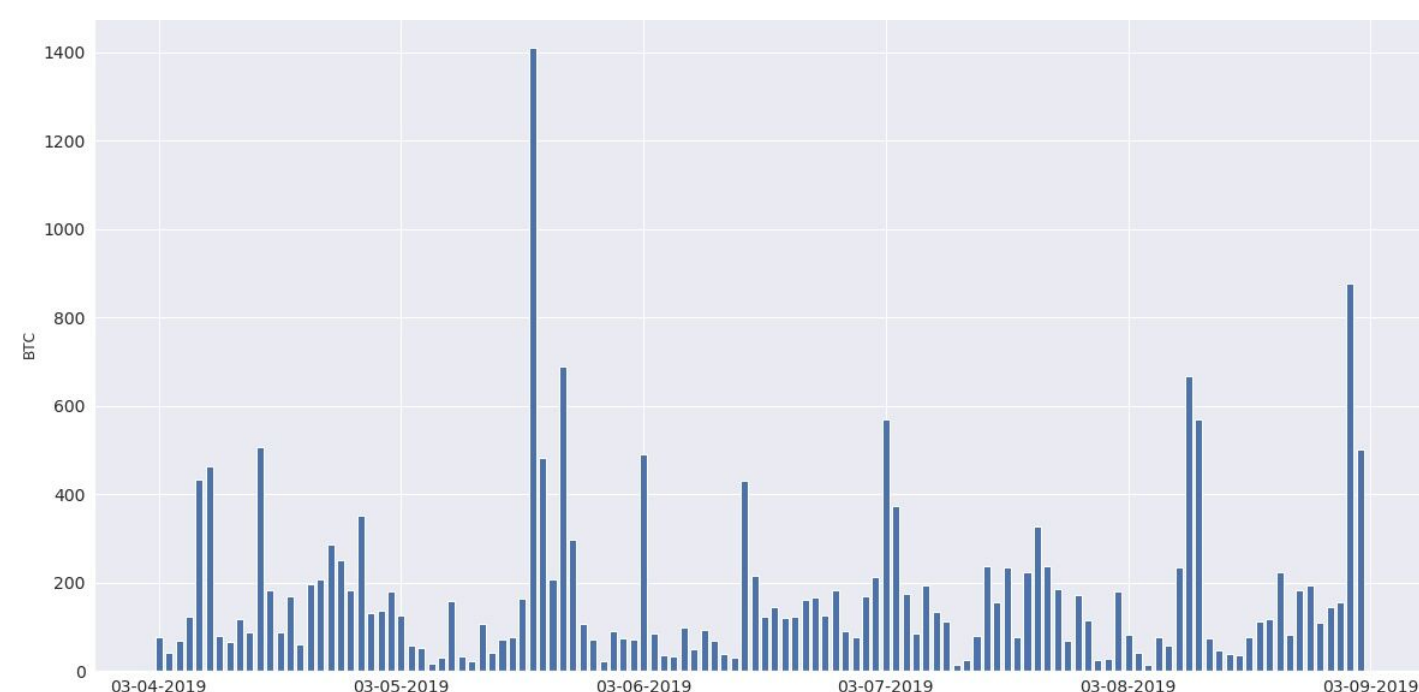


Bit-Z (\$152M\*)

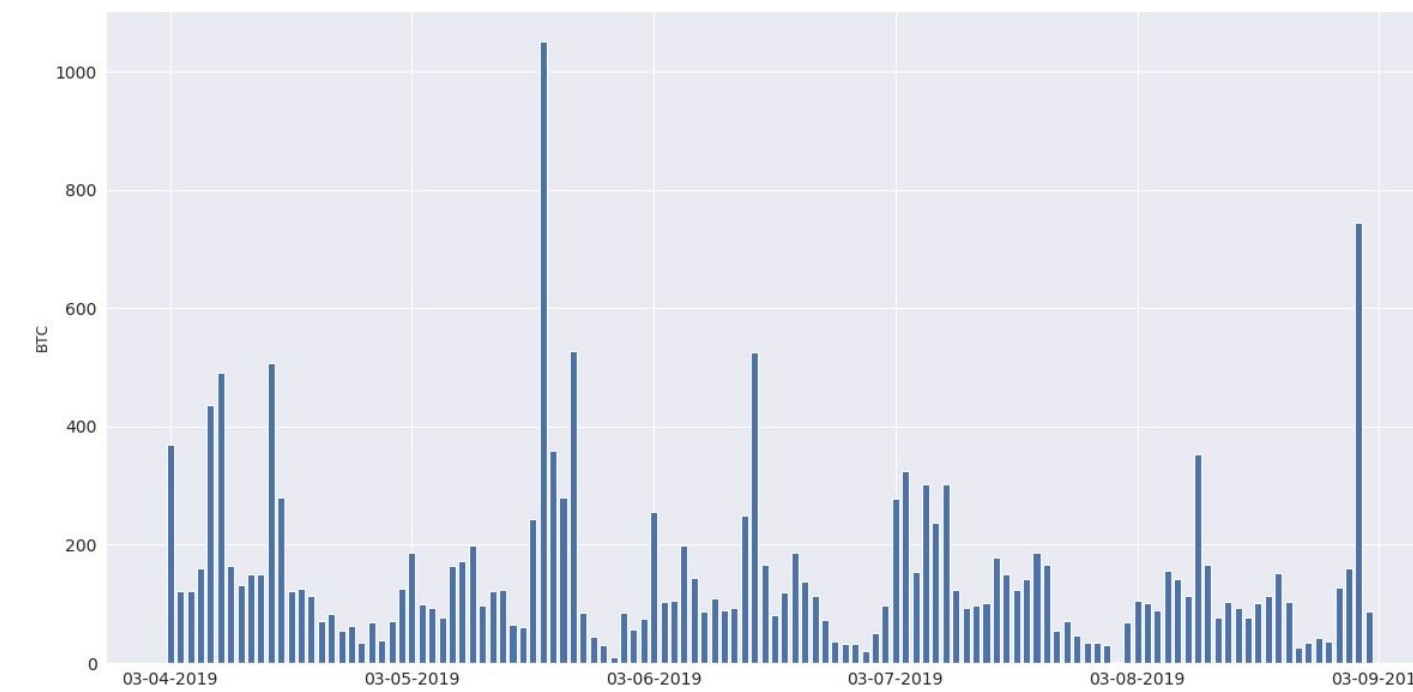


# Volume Spike Alignment Provides Another Vector Of Analysis

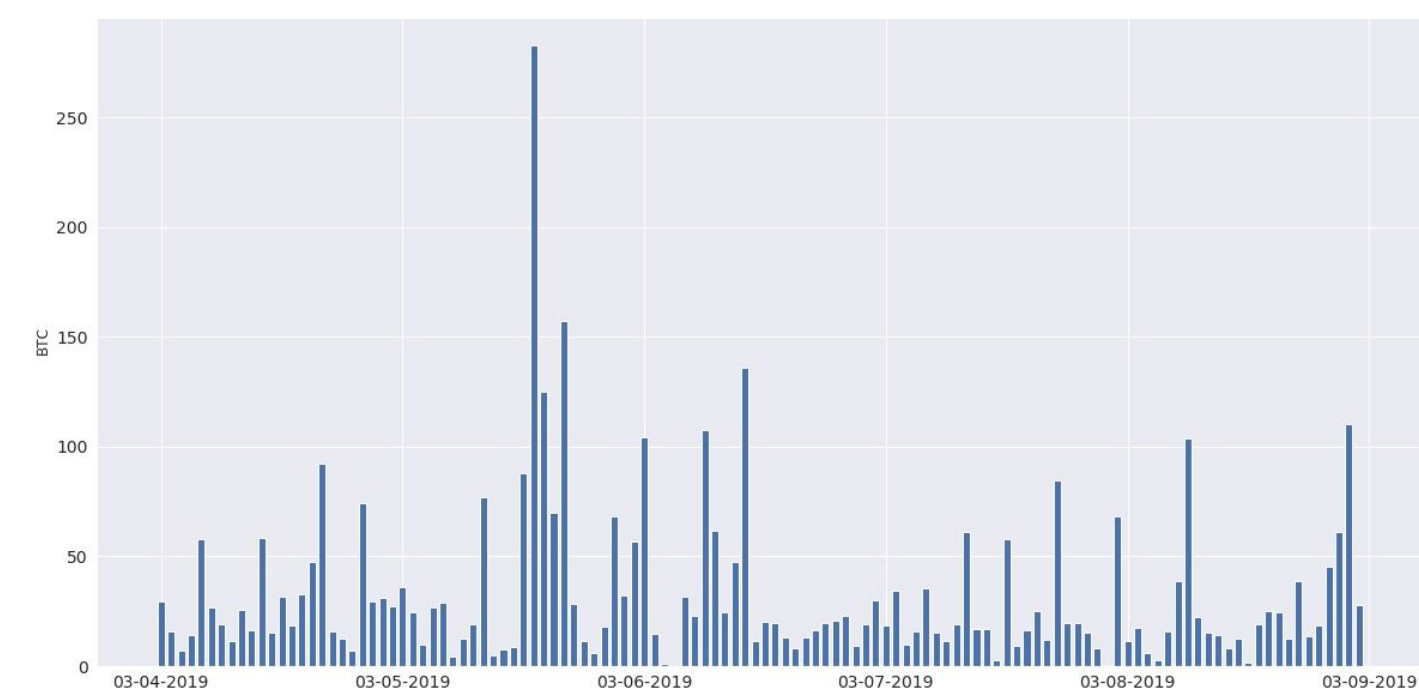
In a globally integrated market like bitcoin, you would expect exchange volume to rise and fall at the same time across all exchanges. It does for well-known exchanges. Notably, volume spikes align at literally the same hour for each of the exchanges below.



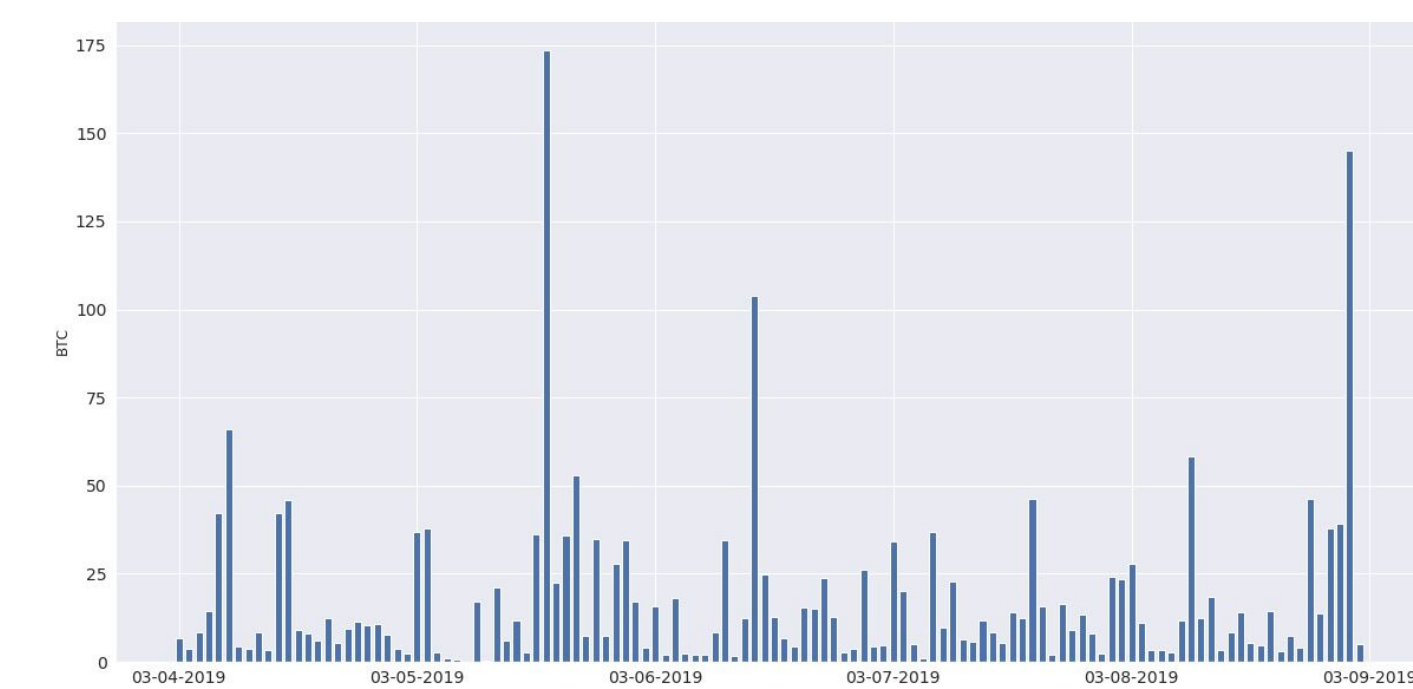
Kraken (\$31M\*)



bitFlyer (\$13M\*)



Bittrex (\$5M\*)

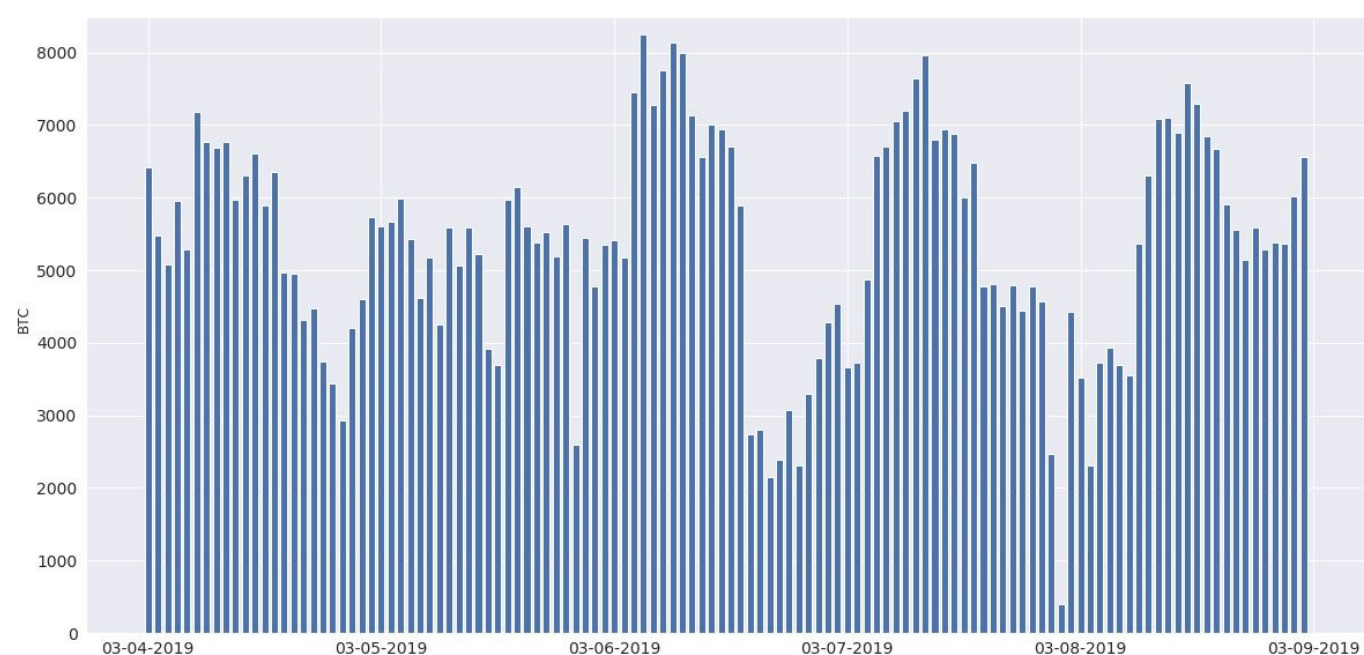


Poloniex (\$1.4M\*)

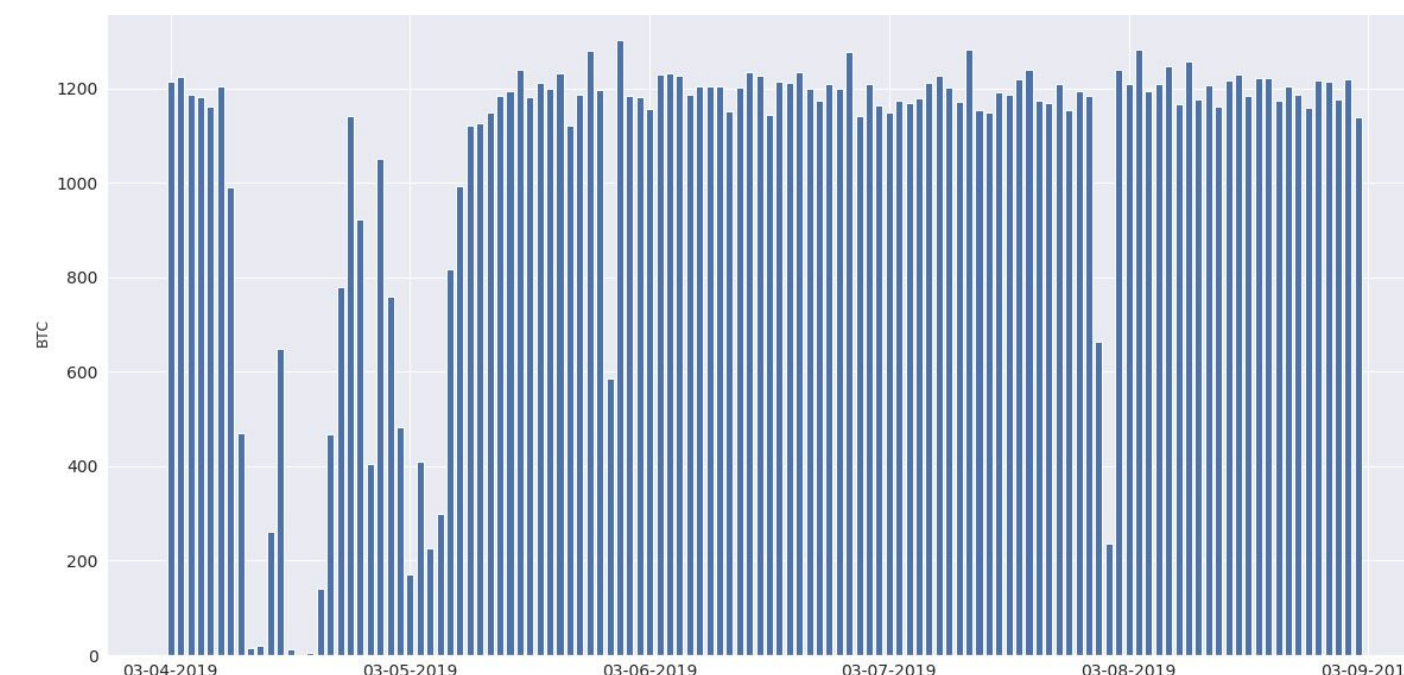


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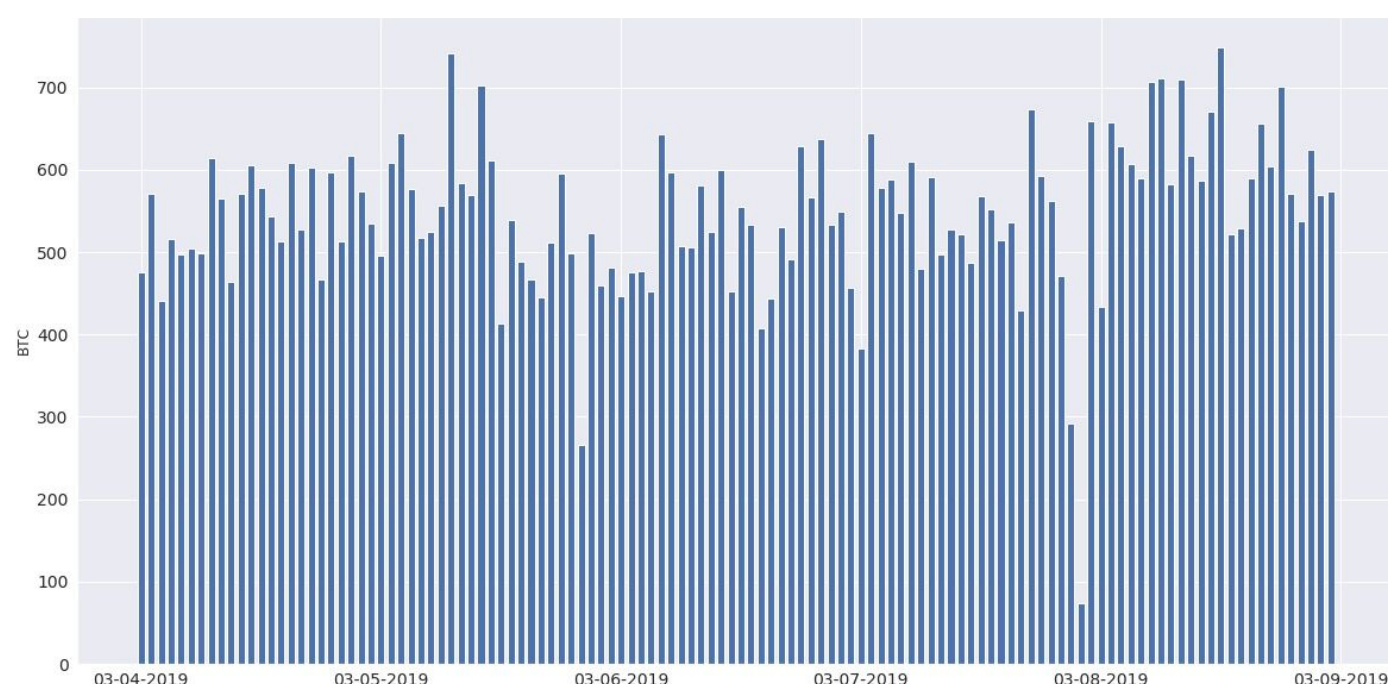
Many other exchanges, however, fail this test, showing disconnected and/or random patterns. Some of them maintain constant volumes over time while others rise and fall at different times than any other market.



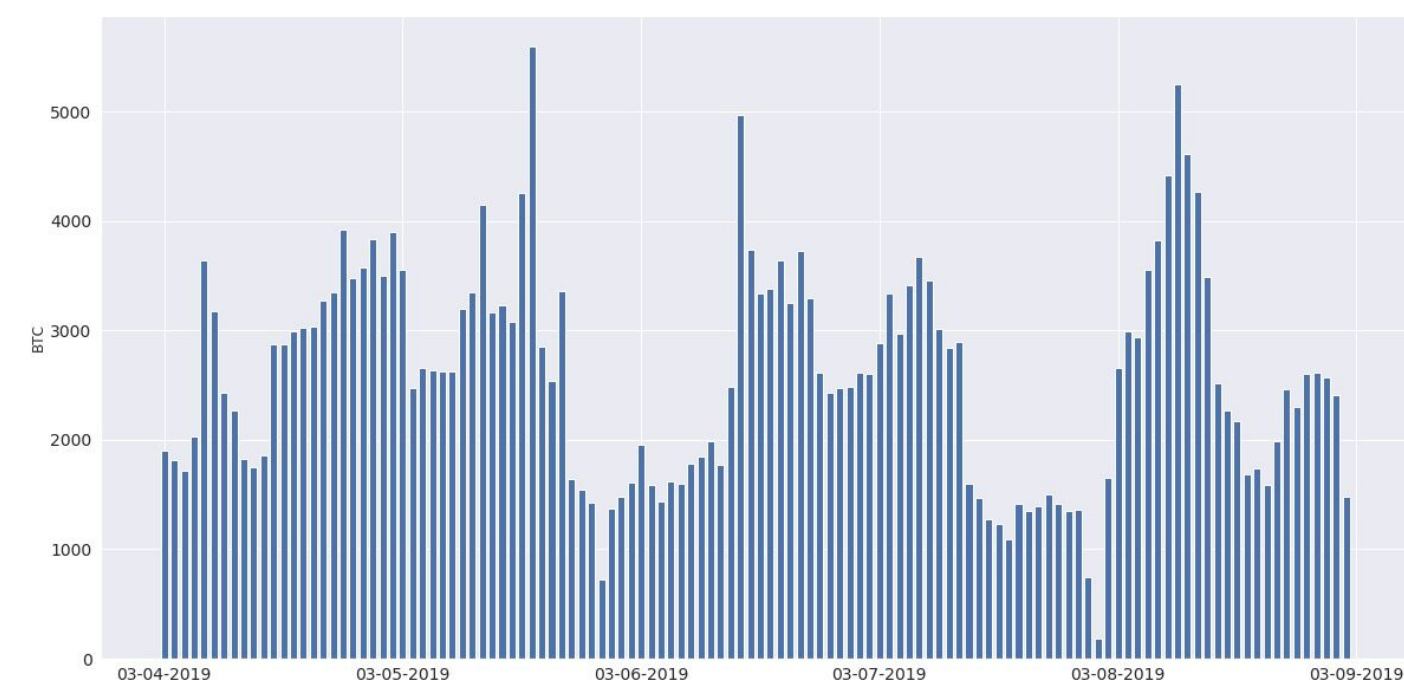
CoinBene (\$480M\*)



Simex (\$97M\*)



BitMart (\$106M\*)



BitForex (\$241M\*)

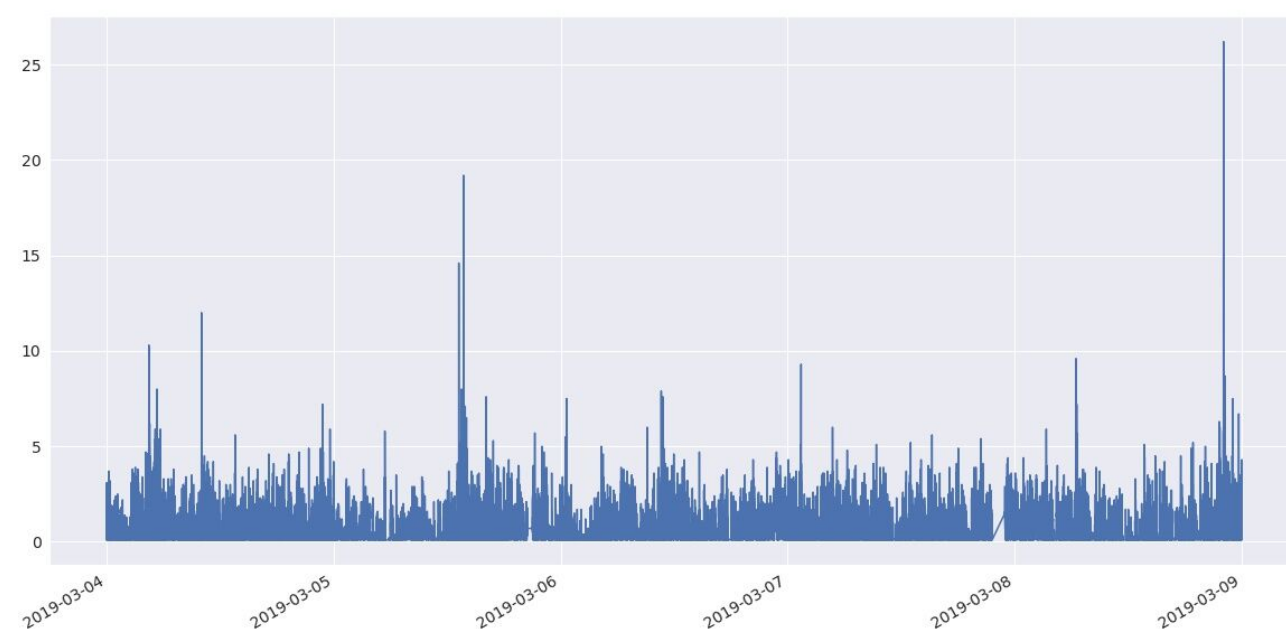
\*Average Daily Volume. Source: CoinMarketCap. March 4-8, 2019.  
Graph Source: Bitwise. March 4-8, 2019.



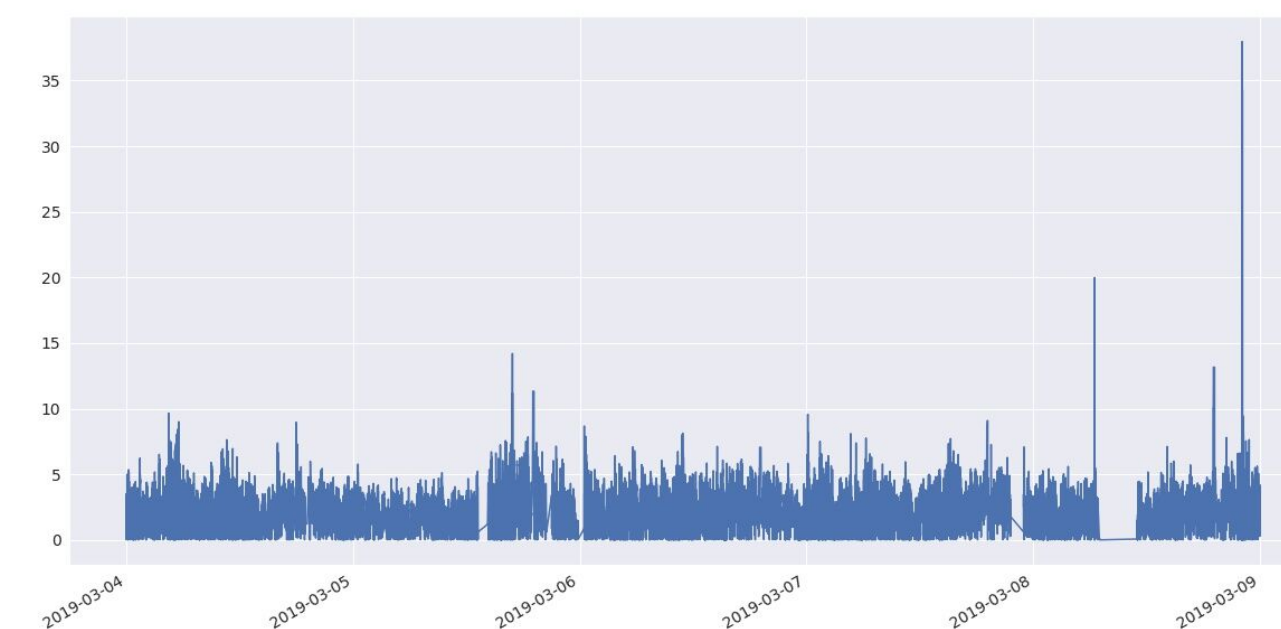


# Spread Patterning Analysis Provides A Third Vector Of Analysis

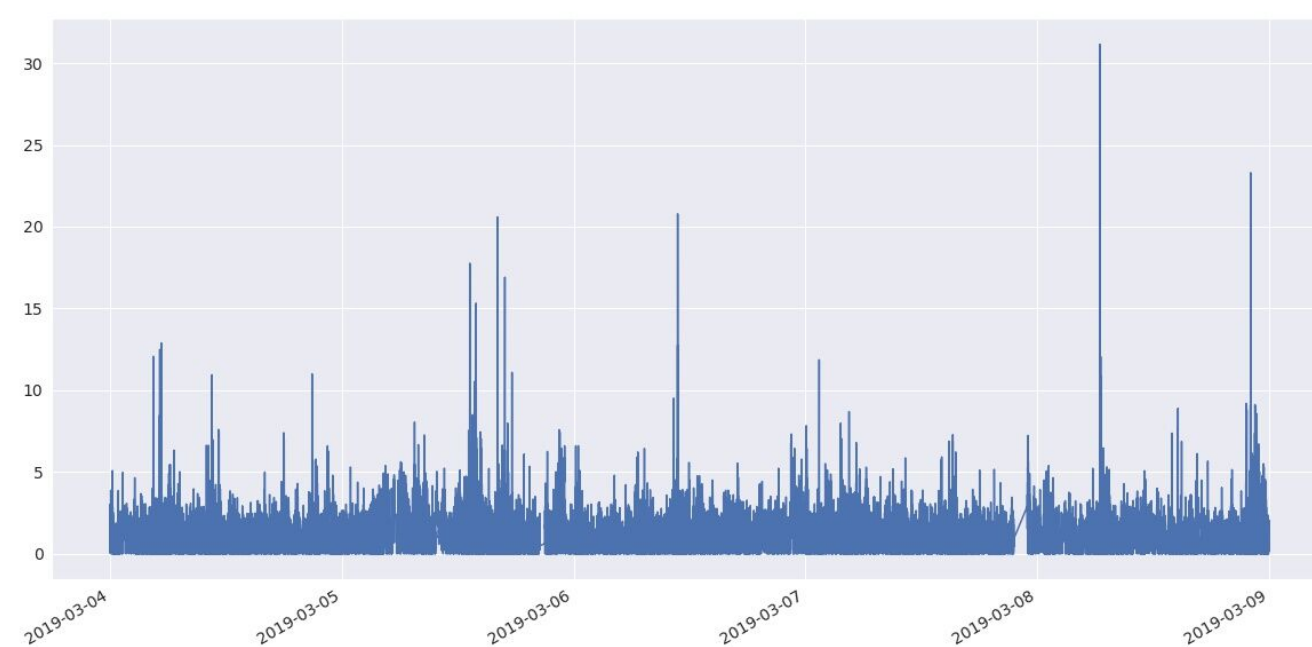
Spreads on well-known exchanges show a consistent pattern, anchoring on zero with random variability, and then spiking periodically to reflect momentary surge in volatility and change of the order book.



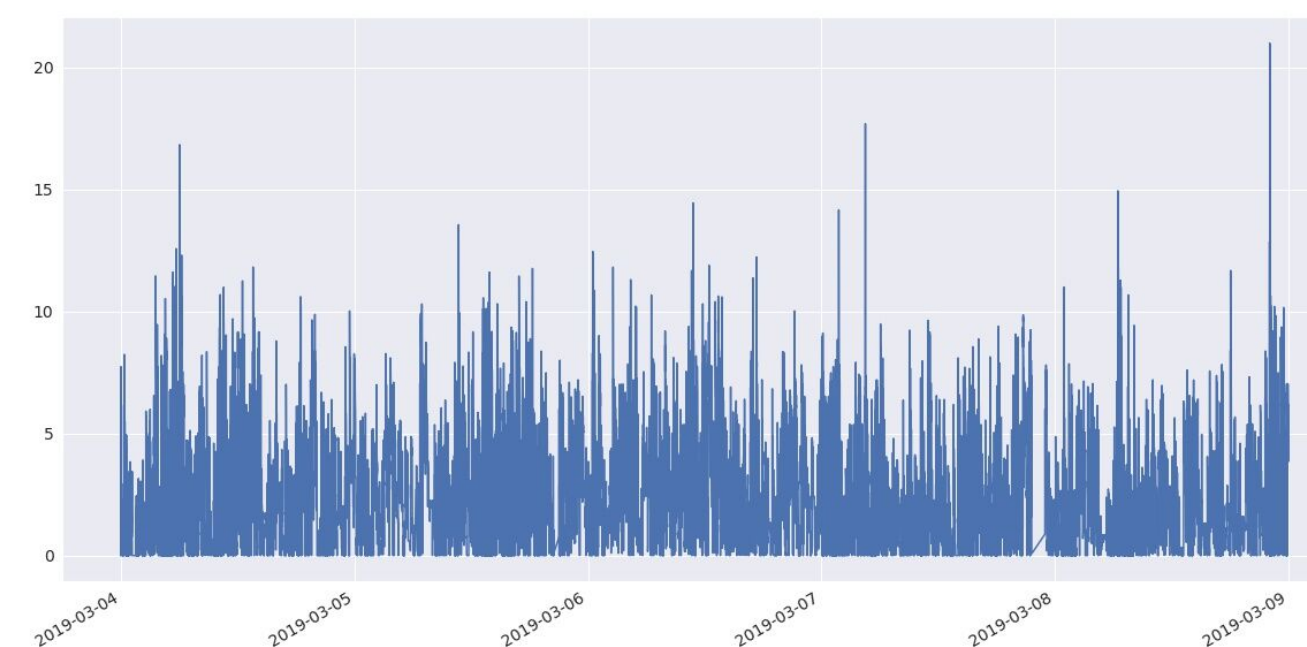
Kraken (\$31M\*)



bitFlyer (\$13M\*)



Bitstamp (\$31M\*)



Poloniex (\$1.4M\*)



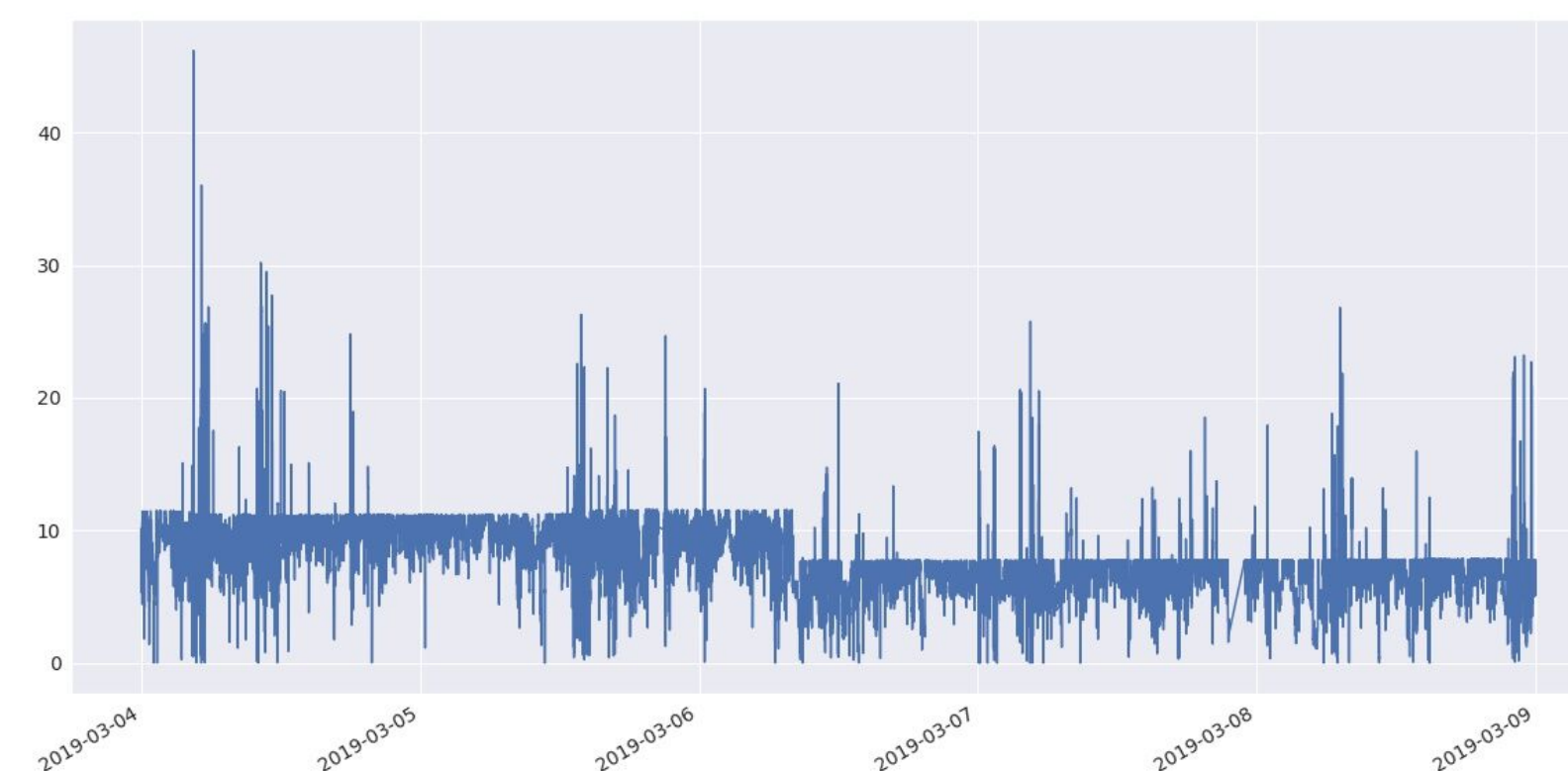
# Spread Patterning Analysis Provides A Third Vector Of Analysis

Spreads on suspicious exchanges exhibit a variety of anomalous patterns, including central tendencies that hover around an unusual fixed amount, or spreads that stay fixed for extended periods.

LBank's spread fluctuates over time, but reverts to a central tendency of about \$10, while claiming roughly 5x Coinbase's daily volume. There is no economic explanation for this high spread anchor if LBank is a real, competitive marketplace.



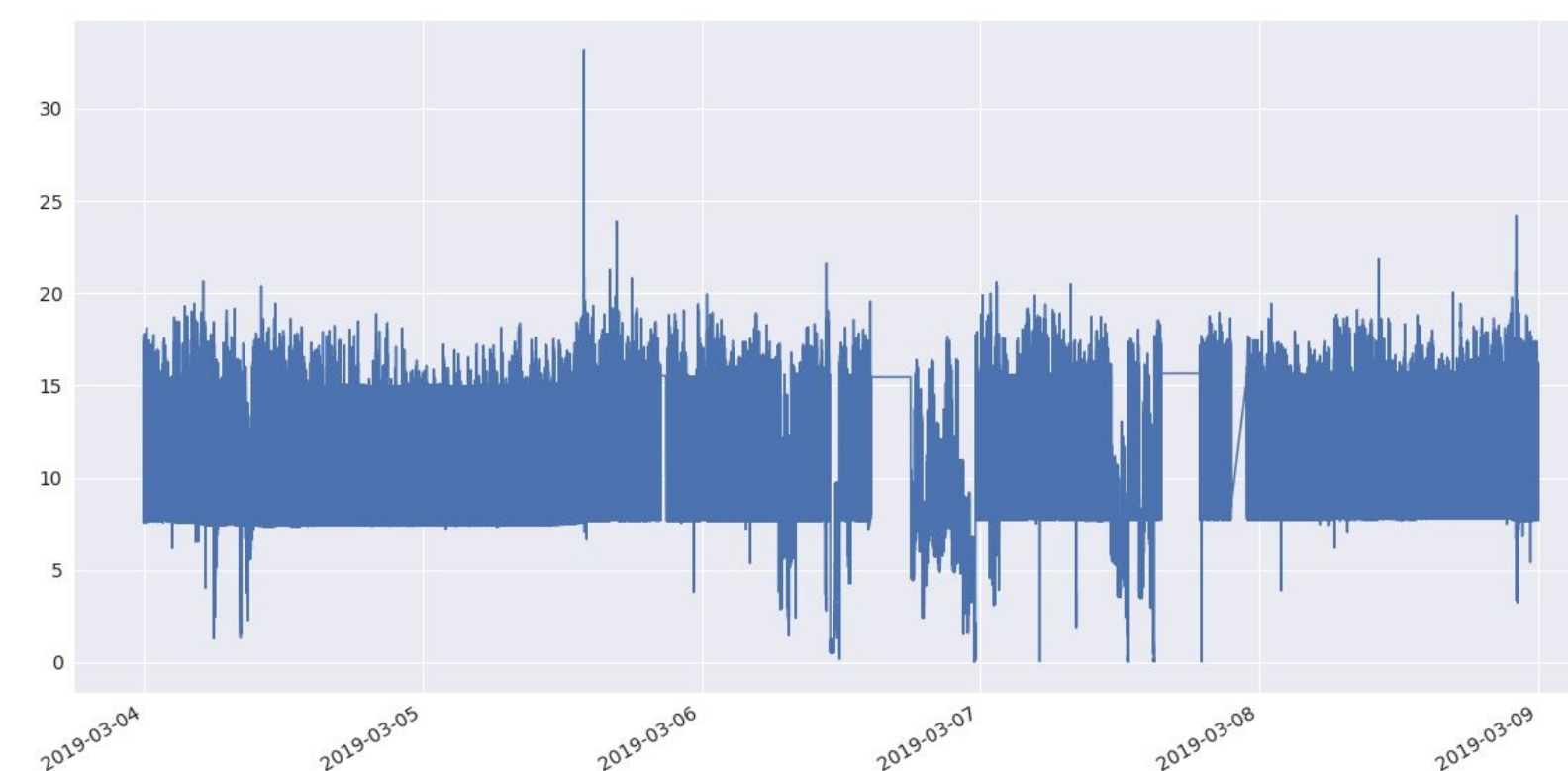
**LBank  
(\$127M\*)**



IDCM's spreads fluctuate between \$8 and \$15, almost exclusively. There is no reason an exchange with more daily volume than Coinbase would refuse to drop below a \$8 spread almost entirely.



**IDCM  
(\$45M\*)**



\*Average Daily Volume. Source: CoinMarketCap. March 4-8, 2019.  
Graph Source: Bitwise. March 4-8, 2019.

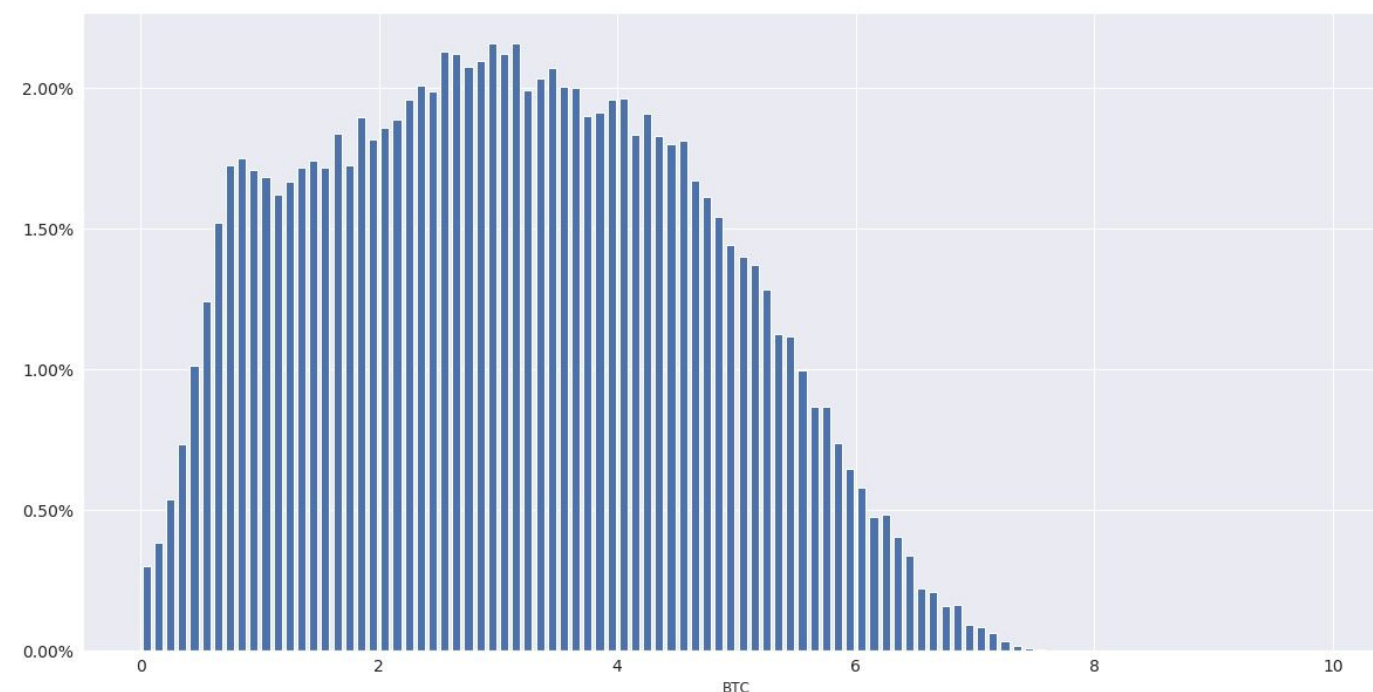




# Applying All Three Analyses: CoinBene

Now that we know three ways we can spot exchanges with fake volume, let's look at a few of the top exchanges holistically. CoinBene claims the highest ADV (\$480M) of any bitcoin spot exchange.

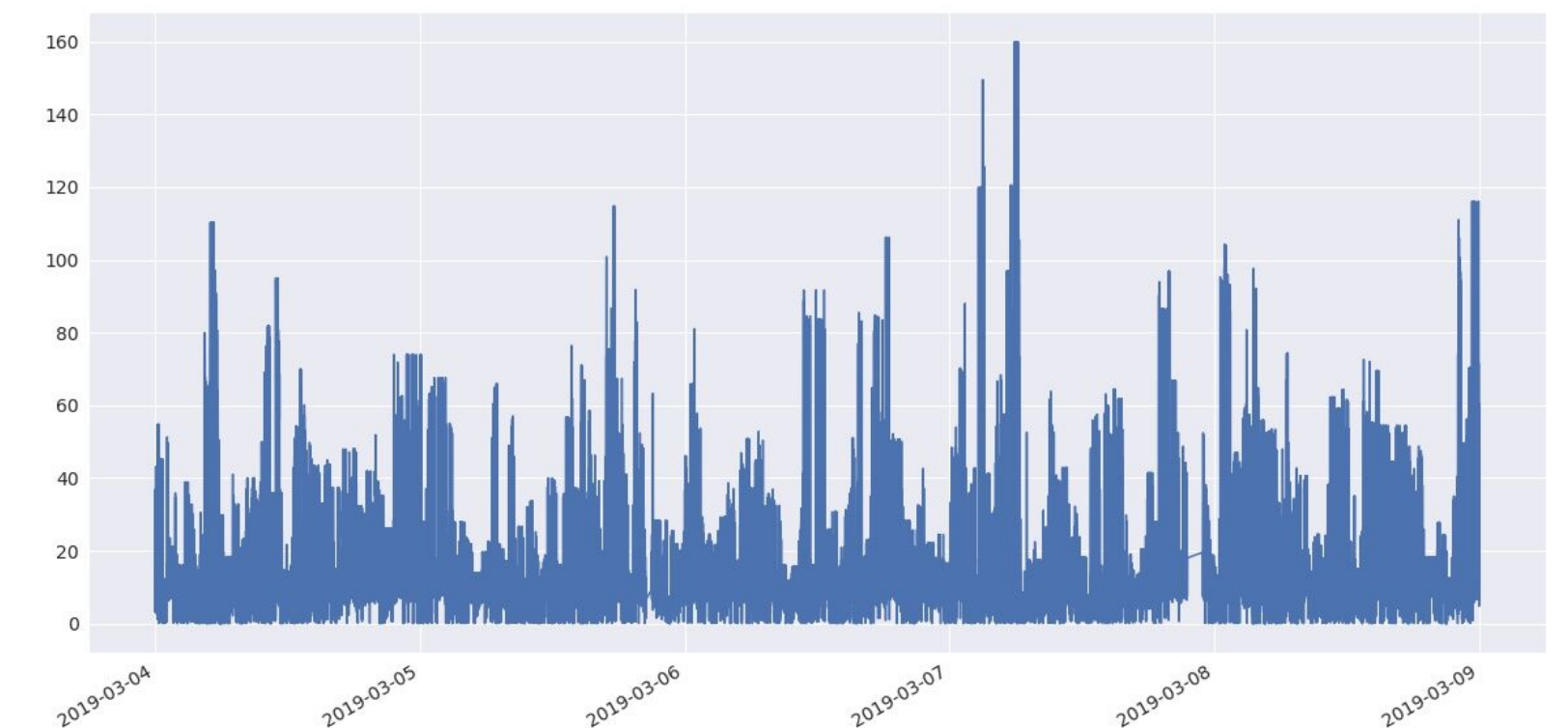
Trade Size Histogram shows an odd bell curve-like distribution. It also has no peaks at whole bitcoin quantities.



There aren't any notable volume spikes and the peaks do not align with any other market. Hourly volume also rarely falls meaningfully close to zero, unlike the pattern exhibited by well-known exchanges.



CoinBene's average and peak spreads are unreasonably high, upwards of \$100. This is only plausible in a thin market, which contradicts CoinBene's claim of high volume.



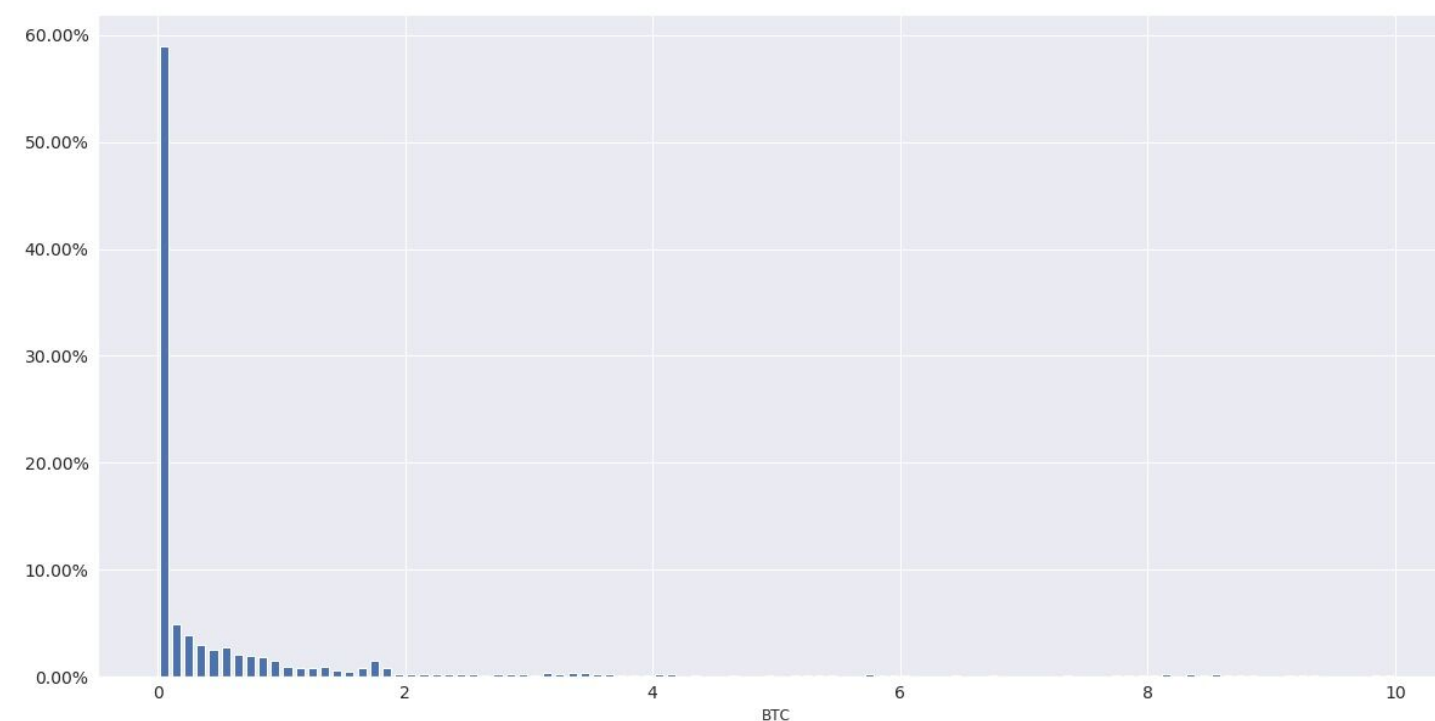
CoinBene fails all three data analyses. We believe its volume is fabricated.



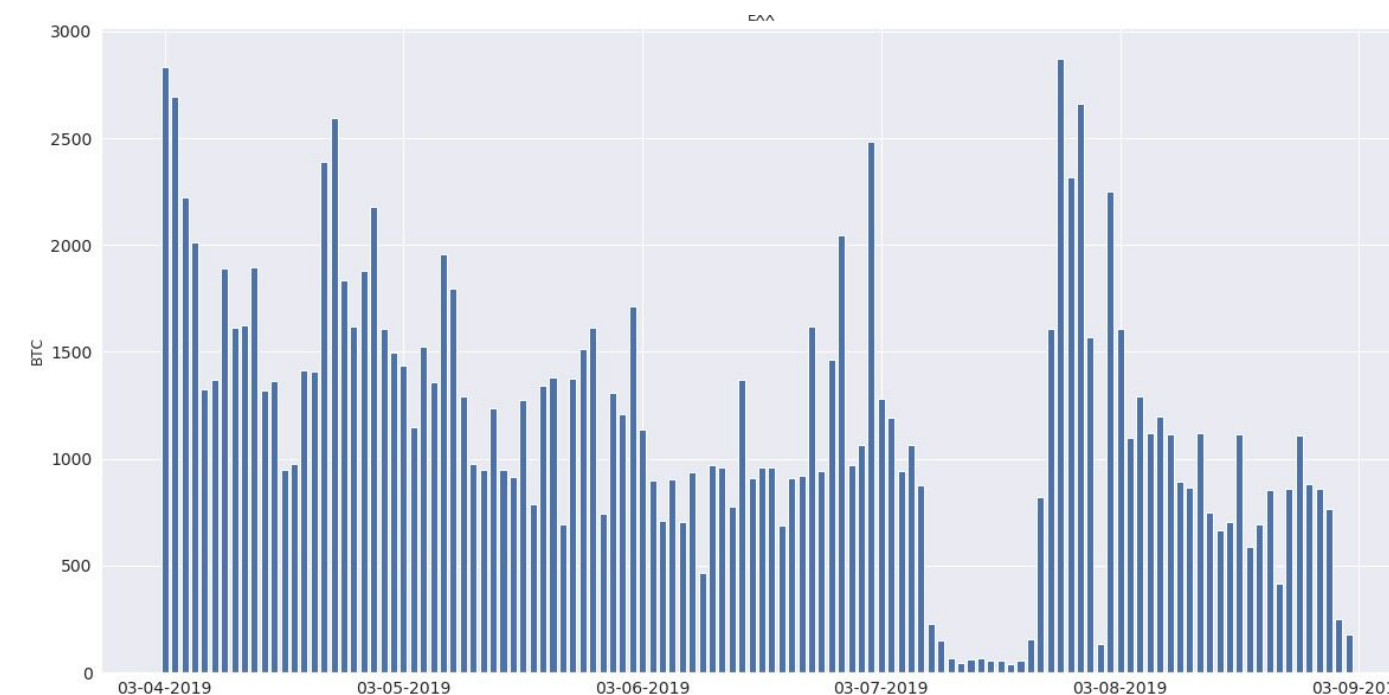
# Applying All Three Analyses: EXX

Let's look at another exchange. EXX has a reported ADV of \$247M.

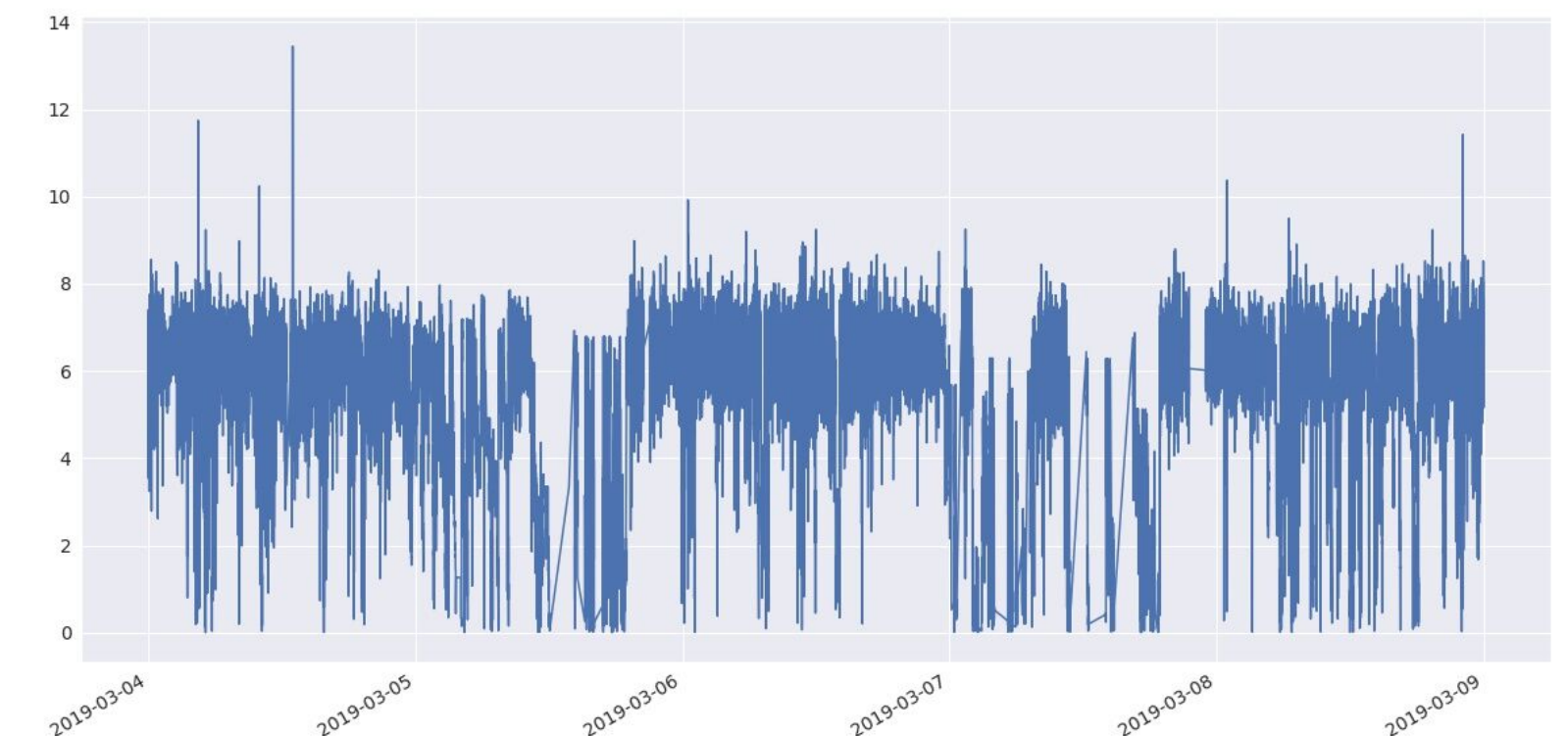
Trade Size Histogram shows highly concentrated volume on 0-0.1 BTC (over 50%) and does not show any spikes of volume on round numbers.



Volume spikes do not align with any other market. There's also an odd U-shaped valley of volume mid-week.



EXX's spread converges to around \$6, never goes above \$12, and rarely goes to \$0. For an exchange with such high volume, this seems unlikely unless the market is truly very thin.



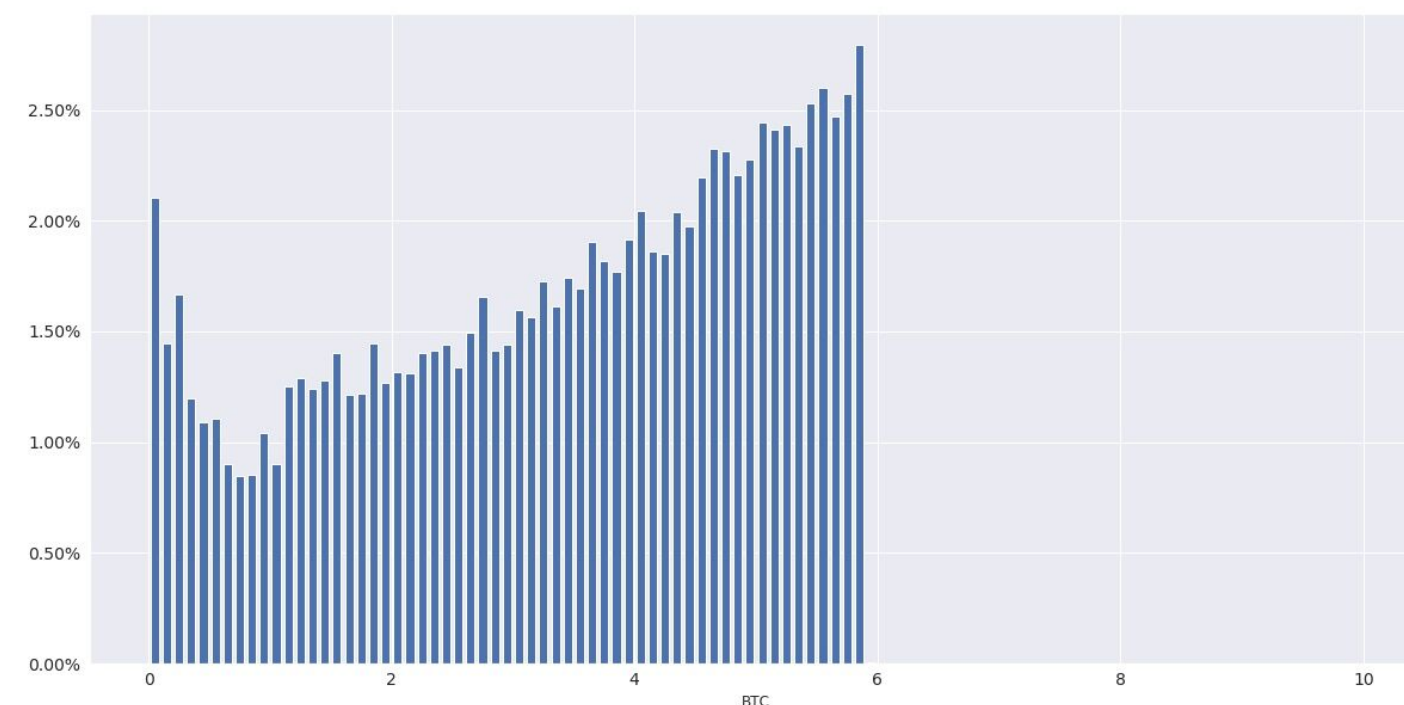
EXX, another of the top exchanges by ADV, again fails all three data analyses. We believe its volume is fabricated.



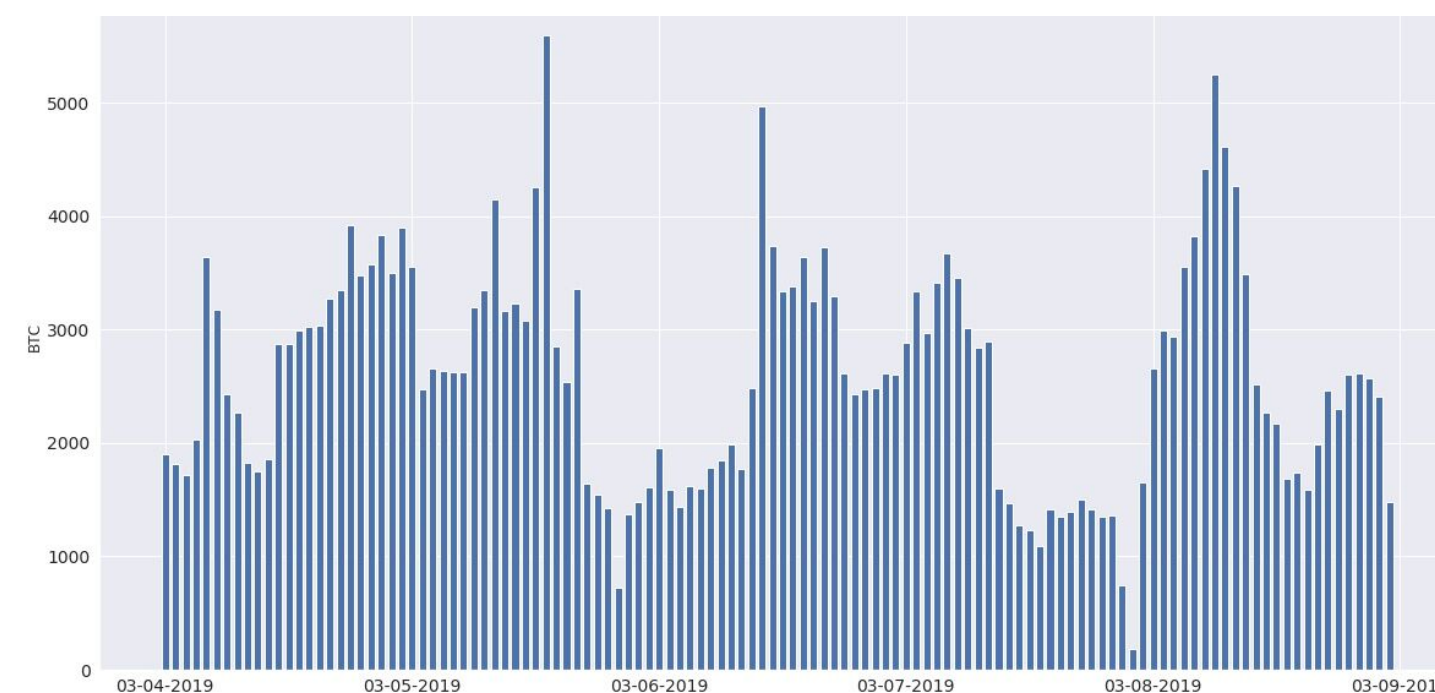
# Applying All Three Analyses: BitForex

Let's look at one last exchange. BitForex has an ADV of \$241 M.

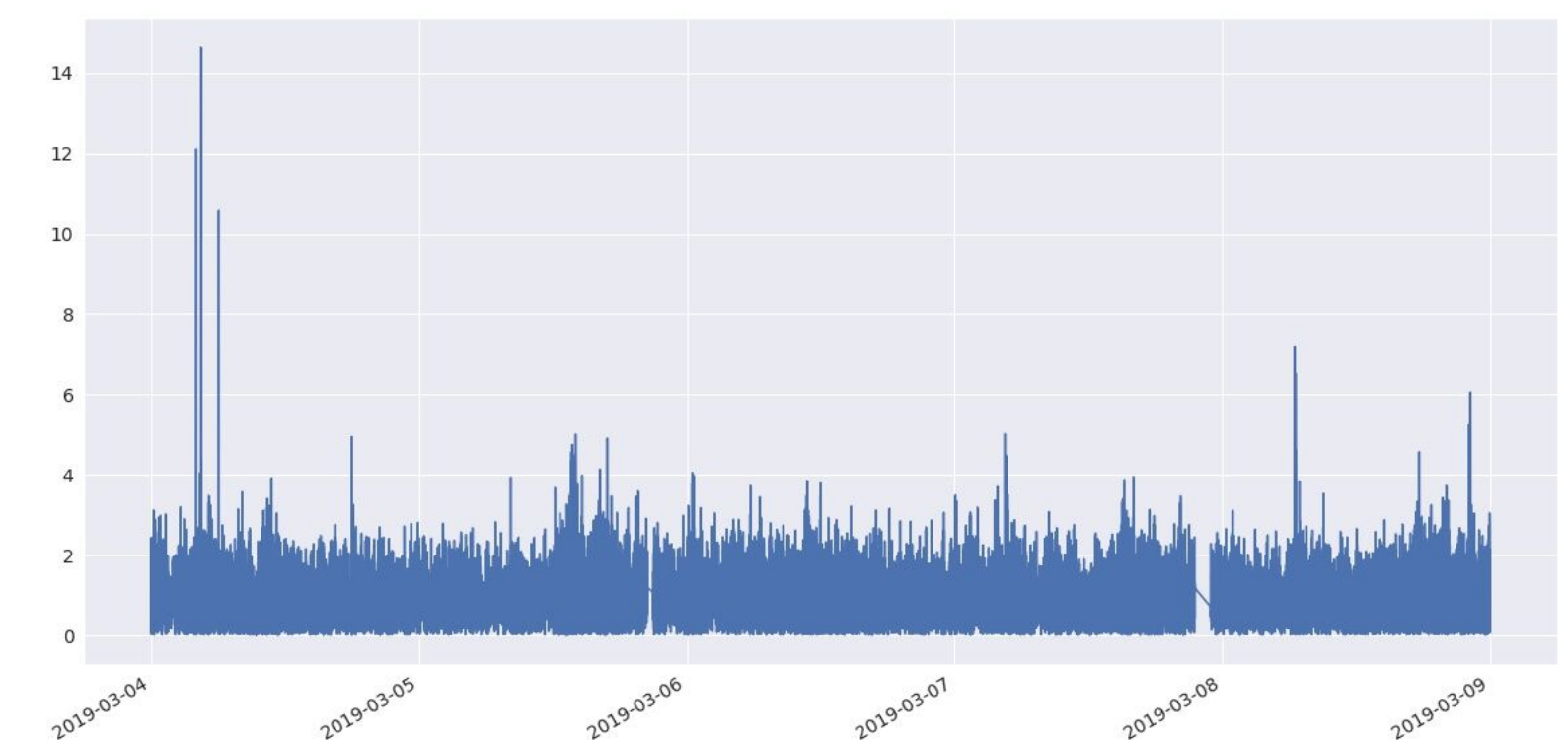
The Trade Size Histogram rises as the quantity of bitcoin traded increases. It then drops abruptly right before 6 bitcoin.



Similar to previous suspicious exchanges, BitForex does not have true spikes—only peaks—and the peaks do not align with any other market.



Spreads on BitForex vary fairly reasonably. They are low and return to 0 or close to 0. There isn't an obvious reason to question the spread variability.



BitForex, the fifth largest exchange by reported ADV, fails two of the three data analyses. We believe the volume is fabricated.



Across the Board, We Find Exchanges That  
Fail One or More of These Tests.





# Why Would Exchanges Exaggerate Volume?

Volume inflation is familiar to any self-reported league table (dark pools, etc.). But in crypto, the incentive to inflate volume is pernicious and strong: Exchanges that appear at the top of the lists used by leading media organizations can attract listing fees (often millions of dollars) from ICOs and alt coins.

## Where Would You Look To Trade Or List?

Bitcoin Markets							
#	Source	Pair	Volume (24h)	Price	Volume (%)	Category	Fee Type
2	CoinBene	BTC/USDT	\$467,208,679	\$3,921.38	4.20%	Spot	Percentage
3	OEX	BTC/USDT	\$338,963,056	\$3,918.61	3.04%	Spot	Percentage
4	ZBG	BTC/USDT	** \$297,351,258	\$3,920.97	2.67%	Spot	Transaction Mining
5	LATOKEN	BTC/USDT	\$217,113,110	\$3,919.06	1.95%	Spot	Percentage
6	Bit-Z	BTC/USDT	\$216,706,122	\$3,919.50	1.95%	Spot	Percentage
7	EXX	EOS/BTC	** \$213,017,106	\$3,917.34	1.91%	Spot	Transaction Mining
8	BW	BTC/USDT	\$211,374,368	\$3,920.87	1.90%	Spot	Percentage
9	BitForex	BTC/USDT	\$192,865,161	\$3,919.81	1.73%	Spot	Percentage
10	Fatbtc	ETH/BTC	\$175,074,499	\$3,888.79	1.57%	Spot	Percentage
11	IDAX	BTC/USDT	\$161,821,898	\$3,919.42	1.45%	Spot	Percentage
12	Coineal	BTC/USDT	\$160,918,017	\$3,917.04	1.45%	Spot	Percentage
13	Bit-Z	EOS/BTC	\$160,122,401	\$3,917.00	1.44%	Spot	Percentage
14	EXX	ETH/BTC	** \$147,235,620	\$3,917.86	1.32%	Spot	Transaction Mining
15	Coineal	LTC/BTC	\$146,154,530	\$3,920.59	1.31%	Spot	Percentage
16	Bgogo	BTC/USDT	** \$139,758,555	\$3,920.14	1.26%	Spot	Transaction Mining
17	Bibox	BTC/USDT	\$128,083,628	\$3,920.29	1.15%	Spot	Percentage
18	Bibox	ETH/BTC	\$127,890,585	\$3,918.69	1.15%	Spot	Percentage
19	BitMart	BTC/USDT	\$121,097,174	\$3,920.18	1.09%	Spot	Percentage
20	EXX	BTC/USDT	** \$115,834,963	\$3,920.07	1.04%	Spot	Transaction Mining
21	OOOBTC	BTC/USDT	\$115,746,868	\$3,918.35	1.04%	Spot	Percentage
22	LBank	BTC/USDT	\$112,741,811	\$3,918.14	1.01%	Spot	Percentage
23	Simex	BTC/USD	\$111,884,970	\$3,853.34	1.00%	Spot	Percentage
24	Coinsuper	BTC/USD	\$108,142,962	\$3,866.45	0.97%	Spot	Percentage
25	Cryptonex	BTC/USD	\$103,162,613	\$3,950.61	0.93%	Spot	Percentage
26	Huobi Global	BTC/USDT	\$102,362,565	\$3,920.07	0.92%	Spot	Percentage
27	HitBTC	BTC/USDT	\$99,136,564	\$3,922.03	0.89%	Spot	Percentage

*“Cryptocurrency Exchanges Are Making Millions from Just Listing Coins”*

- Bitcoin.com, March 12, 2018

*“The market price to list a crypto token on an exchange is \$1 million for a reasonably regarded token, to \$3 million for an opportunity to get quick liquidity.”*

- Autonomous Next, April 3, 2018

Screenshot Source: [CoinMarketCap.com](https://www.coinmarketcap.com), March 9., 2019  
Bitcoin.com: “Cryptocurrency Exchanges Are Making Millions From Just Listing Coins,” March 12, 2018  
Autonomous Next: “CRYPTO: Token and Coin Exchange Listing Fees,” April 3, 2018.



# Only Ten Exchanges Have Actual Volume

Just 10 of the 81 top exchanges are revealed to have actual volume\*\*



\$110M\*



\$38M\*



\$31M\*



\$31M\*



\$27M\*



\$14M\*



\$8M\*



\$6M\*



\$5M\*



\$1.4M\*

\* Average Daily Volume. Data Source: Kaiko. March 4-8, 2019

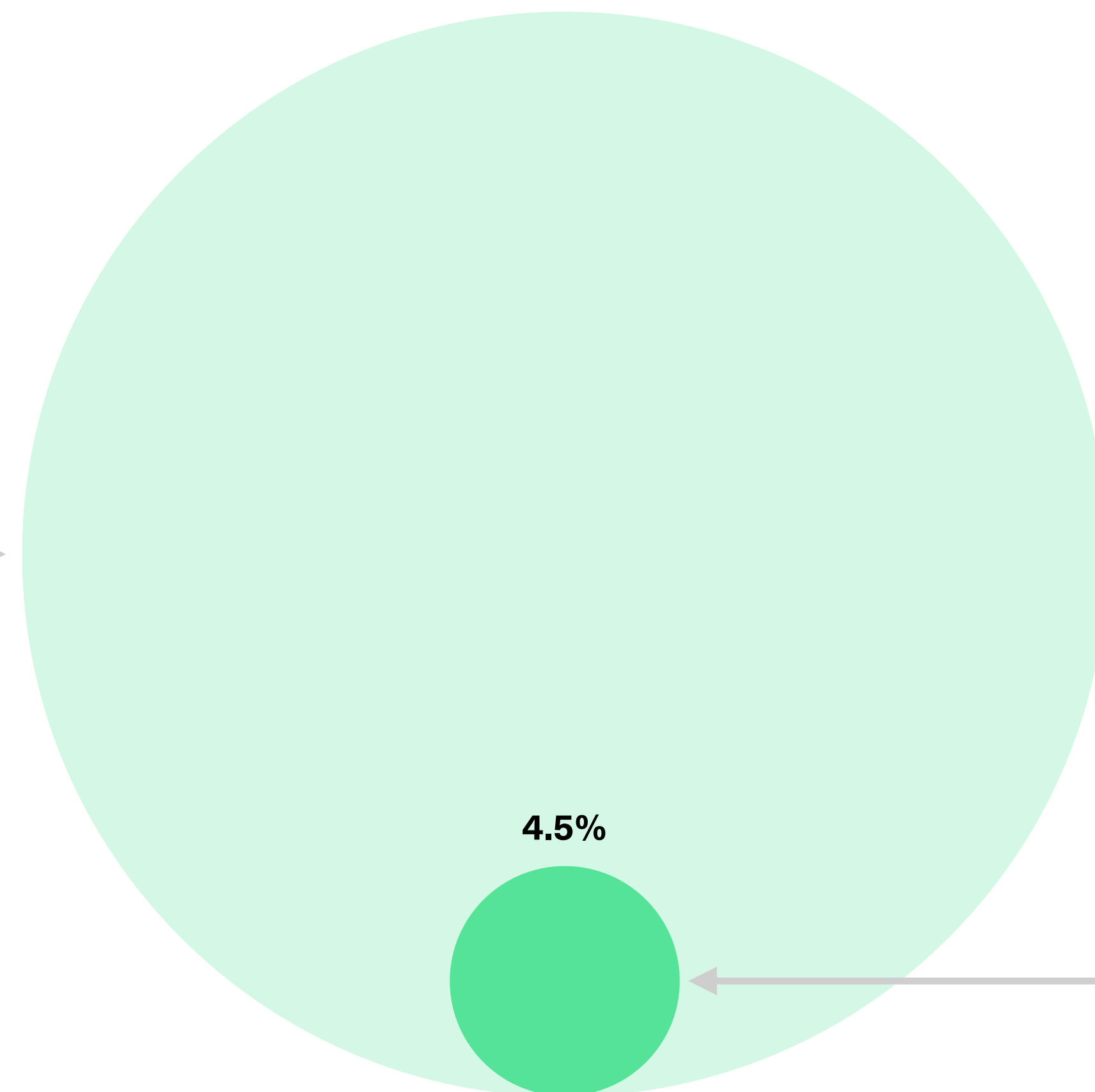
\*\* Korean exchanges were excluded from this analysis because they are an isolated market that trades at different prices due to capital restrictions. One other exchange we examined—CEX.IO—passed our tests and appears to be reporting real volume, but it was too small (less than \$1M ADV) to include in this group.



# Total Volume Is Considerably Less Than Reported

**Reported Volume: ~\$6B**

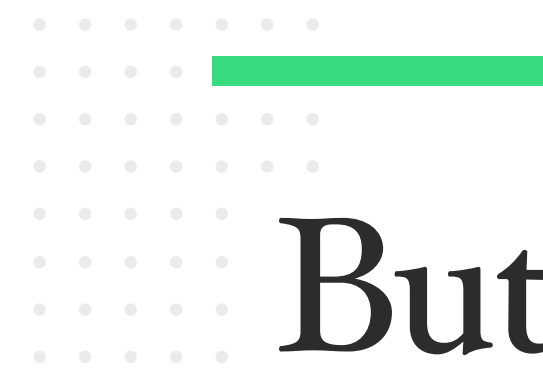
Source: Coinmarketcap. March 4-8, 2019.



**Actual Volume: \$273M**

Source: Kaiko. March 4-8, 2019.





# But It Is Healthy Given Bitcoin's Market Cap

Considering its market capitalization, Bitcoin's actual trade volume is reasonable when compared to analogs like gold. In fact, the counterfactual—imagining that the reported volume (\$6B) is entirely real—would be concerning, as it would imply that 8.6% of all bitcoin was changing hands every day.

	Market Cap	Spot Volume	Daily Turnover
Gold	~\$6.7T*	\$37B**	0.55%
Bitcoin	~\$70B	\$270M	0.39%

\* Estimate of the value of all existing gold from [Golden Eagle Coins](#), March 16, 2019 (assumes spot price of \$1,302.13)

\*\* Gold spot volume from [Marketwatch](#), Nov 20, 2018.





# The SEC Has Indicated That Bitcoin’s Absolute Trade Volume Is Not A Concern

The “Overdahl Letter,” submitted as a comment letter regarding the Winklevoss Bitcoin Trust application, argued that the SEC has approved ETFs in the past with underlying holdings that had lower average daily volume (ADV) than the amount of bitcoin trading each day on the proposed pricing exchange for the trust (the Gemini exchange, which had \$4.2M ADV at the time). The SEC’s responded that Gemini’s ADV in the “absolute sense” was not an issue.

ETF Ticker	Name	Underlying Type	Average Underlying \$ADV (\$MM)
NGE	Global X MSCI Nigeria ETF	INTL	0.2
ICOL	iShares MSCI Colombia Capped ETF	INTL	2.3
PAK	Global X MSCI Pakistan ETF	INTL	2.4
VNM	VanEck Vectors Vietnam ETF	INTL	2.8
XMPT	VanEck Vectors CEF Municipal Income ETF	CEF	3.0
PCEF	PowerShares CEF Income Composite Portfolio	CEF	3.1
QAT	iShares MSCI Qatar Capped ETF	INTL	3.3
EPHE	iShares MSCI Philippines ETF	INTL	3.4
GREK	Global X MSCI Greece ETF	INTL	3.6
PZI	PowerShares Zacks Micro Cap Portfolio	SM CAP	3.7
GXG	Global X MSCI Colombia ETF	INTL	3.7
YYY	Yield Shares High Income ETF	CEF	3.9
ENZL	iShares MSCI New Zealand Capped ETF	INTL	4.1

**SEC’s response:** *“The issue here is not that the Gemini Exchange has low trading volume in an absolute sense but, rather, that the Trust would value its holdings using the Gemini Auction price, even though there is no basis in the record to find that the Gemini Auction represents a significant portion of the worldwide bitcoin trading.”*

Source: Comment letter (“Overdahl Letter”) submitted to the SEC by James A. Overdahl of the Delta Strategy Group on May 12, 2017, in reference to Bats BZX Exchange’s Proposed Rule Change to List and Trade Shares Issued by the Winklevoss Bitcoin Trust (File No. SR-BatsBZX-2016-30).

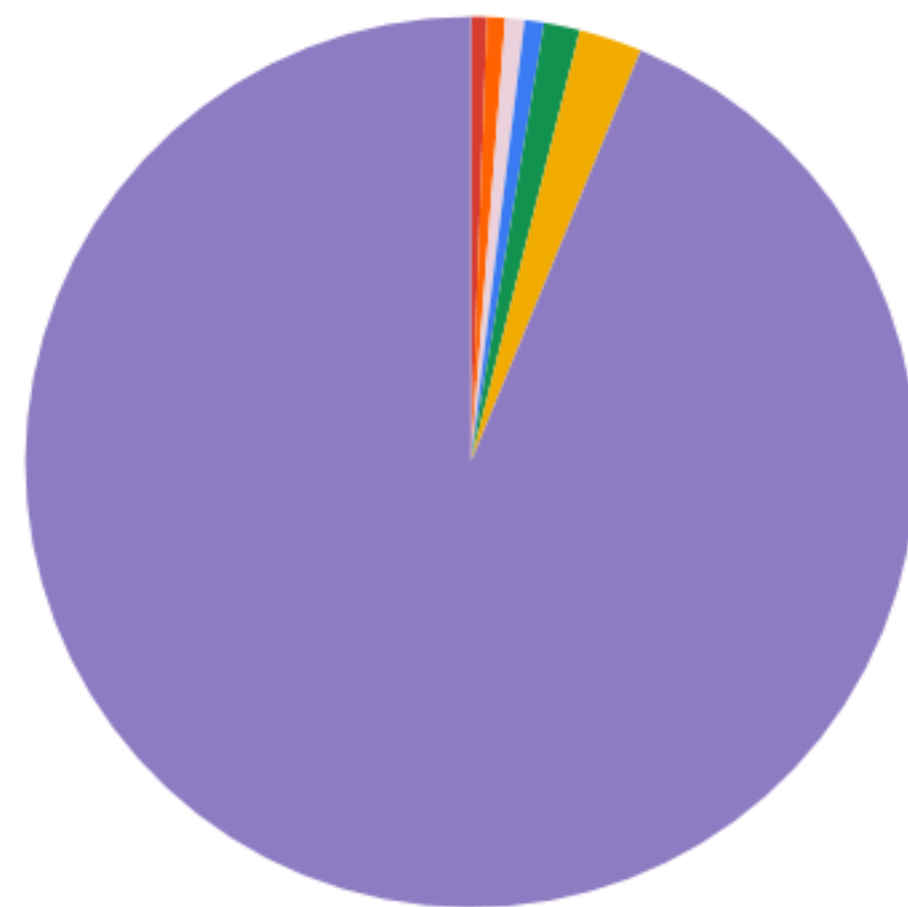


# Volume Is More U.S. Focused Than Is Widely Perceived

Nearly 30% of spot bitcoin volume takes place on U.S.-domiciled exchanges, compared to just 1% of reported volume.

**Reported Exchange Volume By Domicile**

- UK: 0.58%
- Taiwan: 0.66%
- Korea: 0.70%
- Japan: 0.70%
- US: 1.30%
- Malta: 2.29%
- Unclear: 93.77%

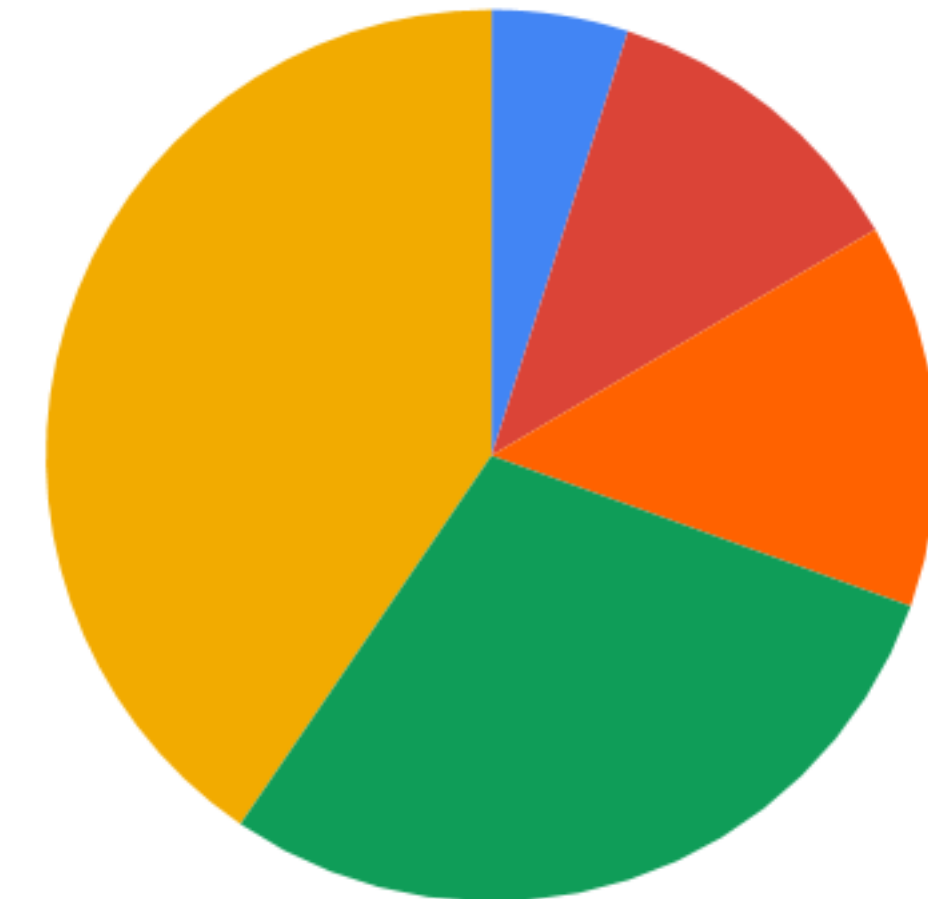


US: 1%

Source: Coinmarketcap. March 4-8, 2019.

**Actual Exchange Volume By Domicile**

- Japan: 4.96%
- UK: 11.58%
- Taiwan: 13.94%
- US: 29.05%
- Malta: 40.47%



US: 29%

Source: Kaiko. March 4-8, 2019.



# The Futures Market Is Significant

Together, the CME bitcoin futures volume (\$85M) and the CBOE bitcoin futures volume (\$6M) represent nearly as much ADV as the largest bitcoin spot market Binance (\$110M).

## \$110M

**Largest Spot Exchange** (Binance)

Source: Kaiko. March 4-8, 2019.

## \$91M

**Bitcoin Futures** (CME & CBOE)

Sources: Chicago Mercantile Exchange, Chicago Board Options Exchange. March 4-8, 2019

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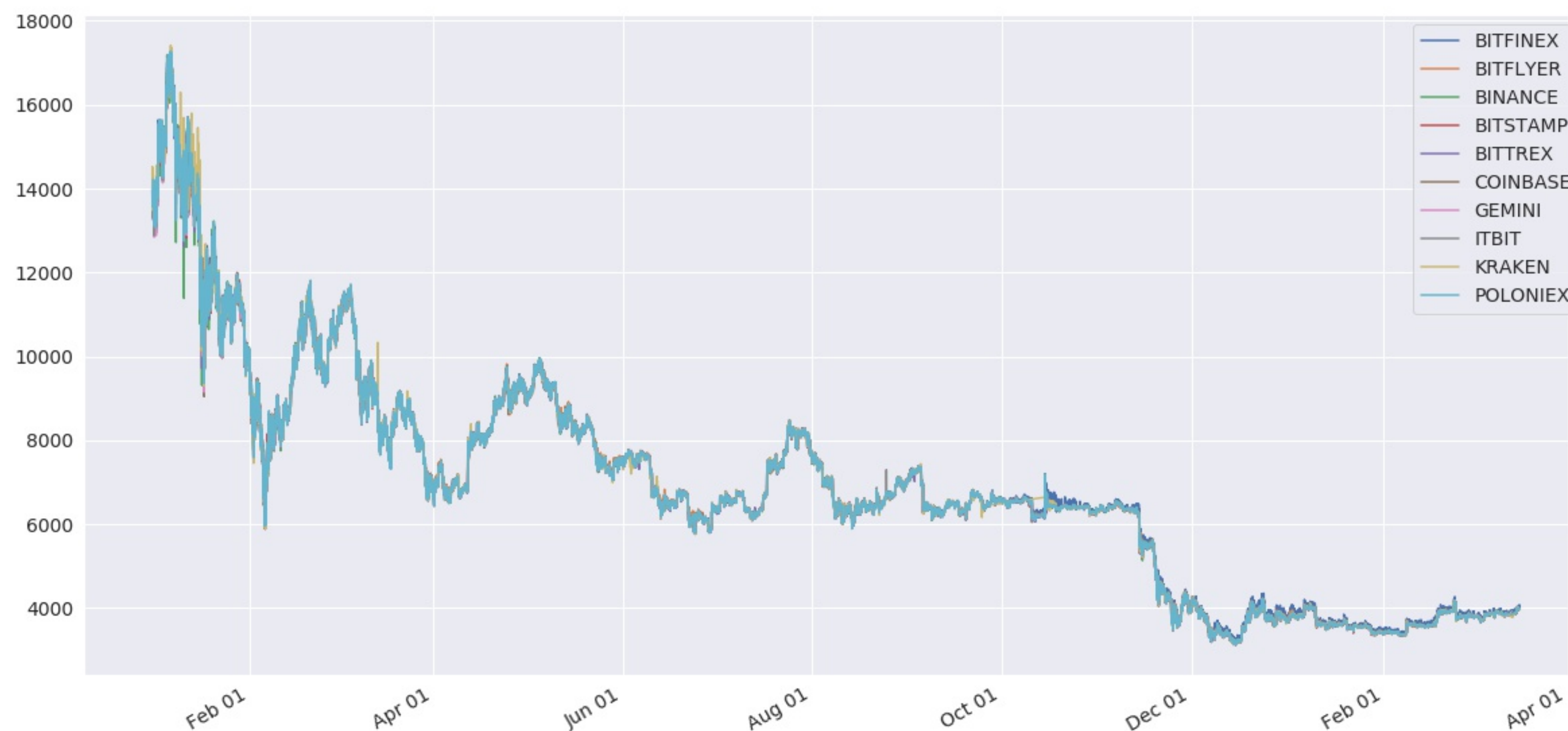
The Bitcoin Market Is More Orderly and  
Efficient Than Is Commonly Understood.





# The 10 Exchanges Trade Extremely Tightly

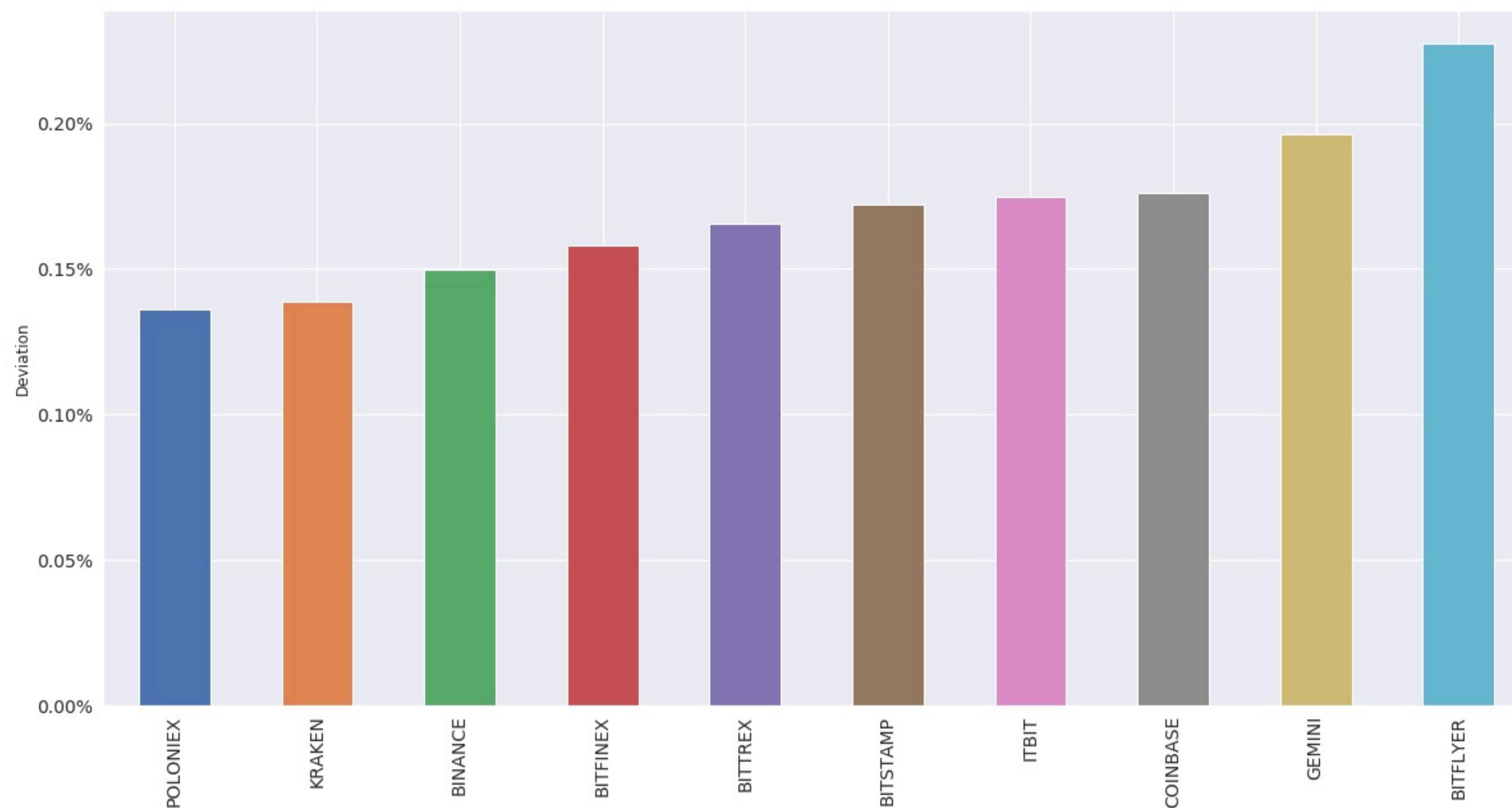
The 10 exchanges trade as a uniform, highly connected market. They form a singular price.





# The 10 Exchanges Trade Extremely Tightly

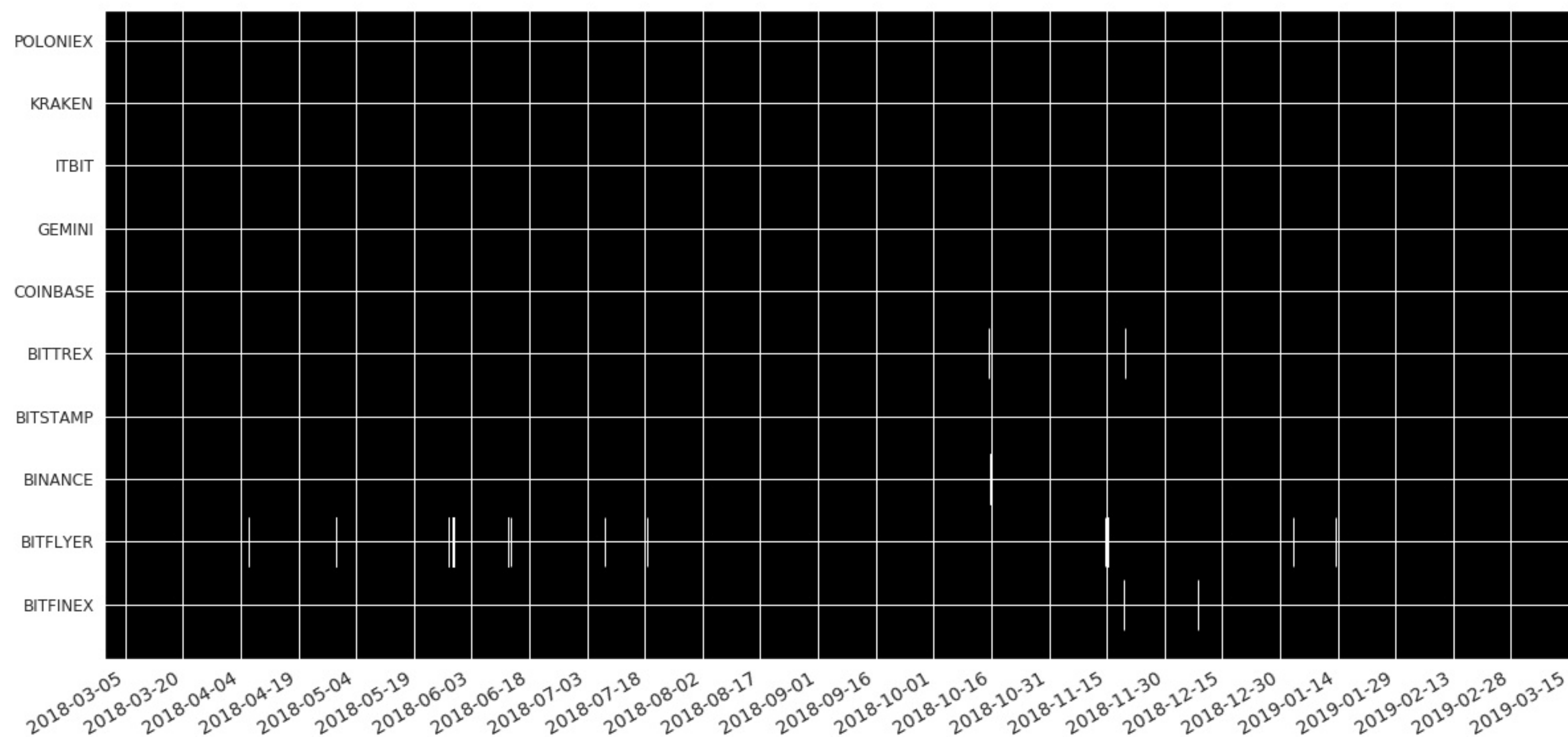
Average deviations from the aggregate price for the ten exchanges is well within the expected arbitrage band when you account for exchange-level fees (~30 basis points), volatility and hedging costs. Arbitrage is operating well.





# Sustained Deviations Are Extremely Rare

Sustained deviations (defined as deviations  $>1\%$  that last more than 100 seconds) appear as single white lines on the graph below. The graph demonstrates that the ten exchanges trade at a single unified price.





# There Is A Common Institutional Understanding Of The True Nature Of The Actual Market

- While mainstream media sites carry the higher “reported volume” data, industry participants broadly know the truth.
- For example, every regulated crypto product that has launched — whether in the U.S. or Europe — has drawn prices either entirely from or, in the case of XBT Provider, almost entirely from a subset of the 10 exchanges highlighted in this presentation as “real.”\*



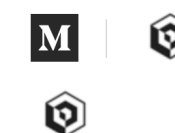
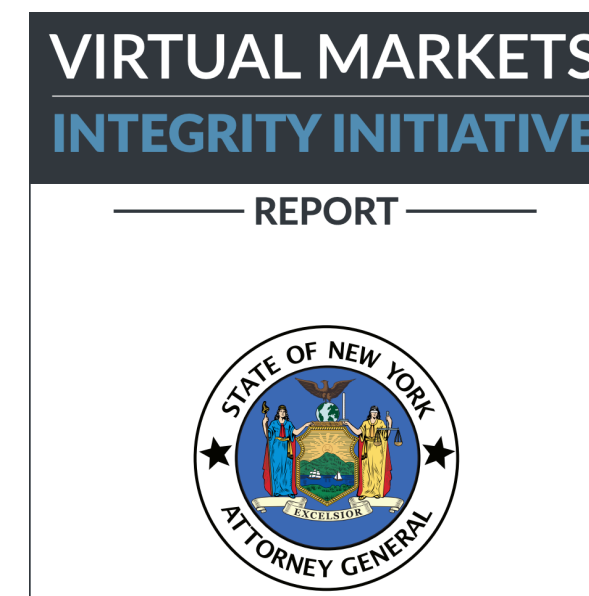
\* XBT Provider has a unique pricing methodology that draws from a portion of six named exchanges. Five of those six named exchanges are part of the ten exchanges. The sixth, OKCoin, is not.





# There Is A Common Institutional Understanding Of The True Nature Of The Real Market

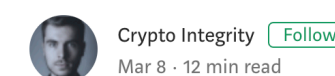
- Other entities that have investigated the question of non-economic and/or fake volume have arrived at similar conclusions as Bitwise.
- When the New York Attorney General (NYAG) reached out to exchanges as part of its Virtual Markets Integrity Initiative, the 10 real exchanges highlighted in this report dominated the list of 13 exchanges that the NYAG reached out to.
- The Blockchain Transparency Institute has investigated non-economic and/or fake volume at length, and has identified 56 exchanges it suspects of having fake volume. None of those exchanges are among the ten exchanges.
- Others media-level investigations into the space have arrived at similar conclusions.



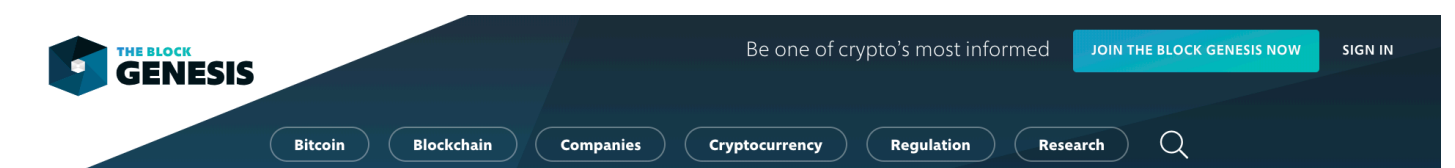
Follow

## Fake volumes in cryptocurrency markets — February report

Mechanics of wash trading behind the scenes



Mar 8 · 12 min read



### QUICK TAKE

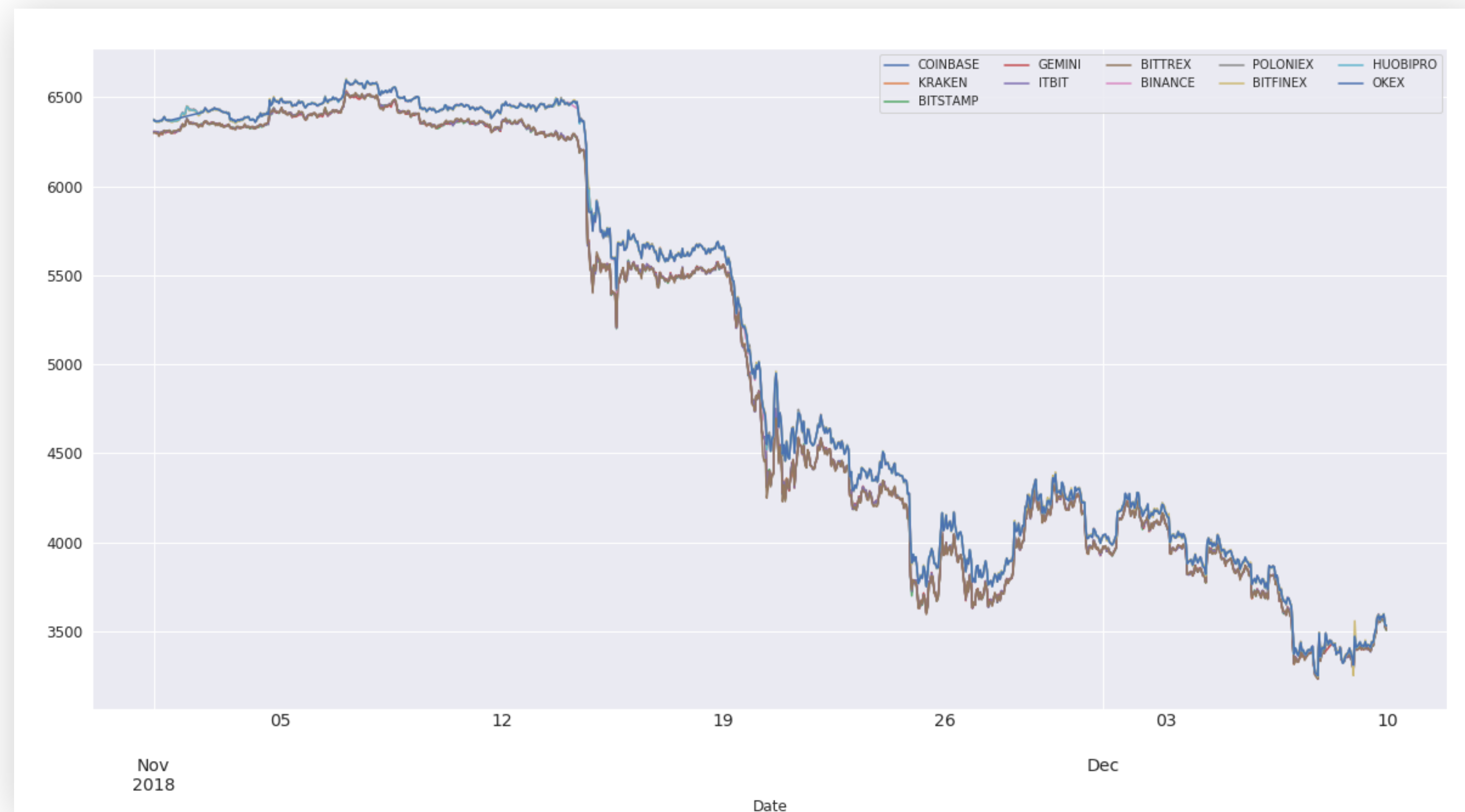
- Volume on exchanges is a good indicator of the health of the space, but faking volume skews the numbers
- By only tracking the volume of exchanges known to not fake the majority of volume, we get a good proxy for volume of the whole sector

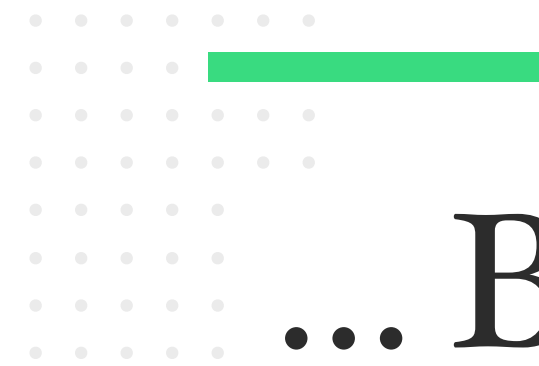
Sources: 1) State of New York Attorney General, "Virtual Markets Integrity Initiative Report," September 18, 2018; 2) [Blockchain Transparency Institute Exchange Advisory List](#); 3) Crypto Integrity on Medium, "Fake Volume In Cryptocurrency Markets - February report," March 8, 2019; 4) TheBlockCrypto, "Analysis of Crypto Traded Volumes Indicates A Bleak Trend: Down 80% Across The Market," March 11, 2018.



# Common Misconception: USD and Tether (USDT) Markets Appear To Trade At Different Prices...

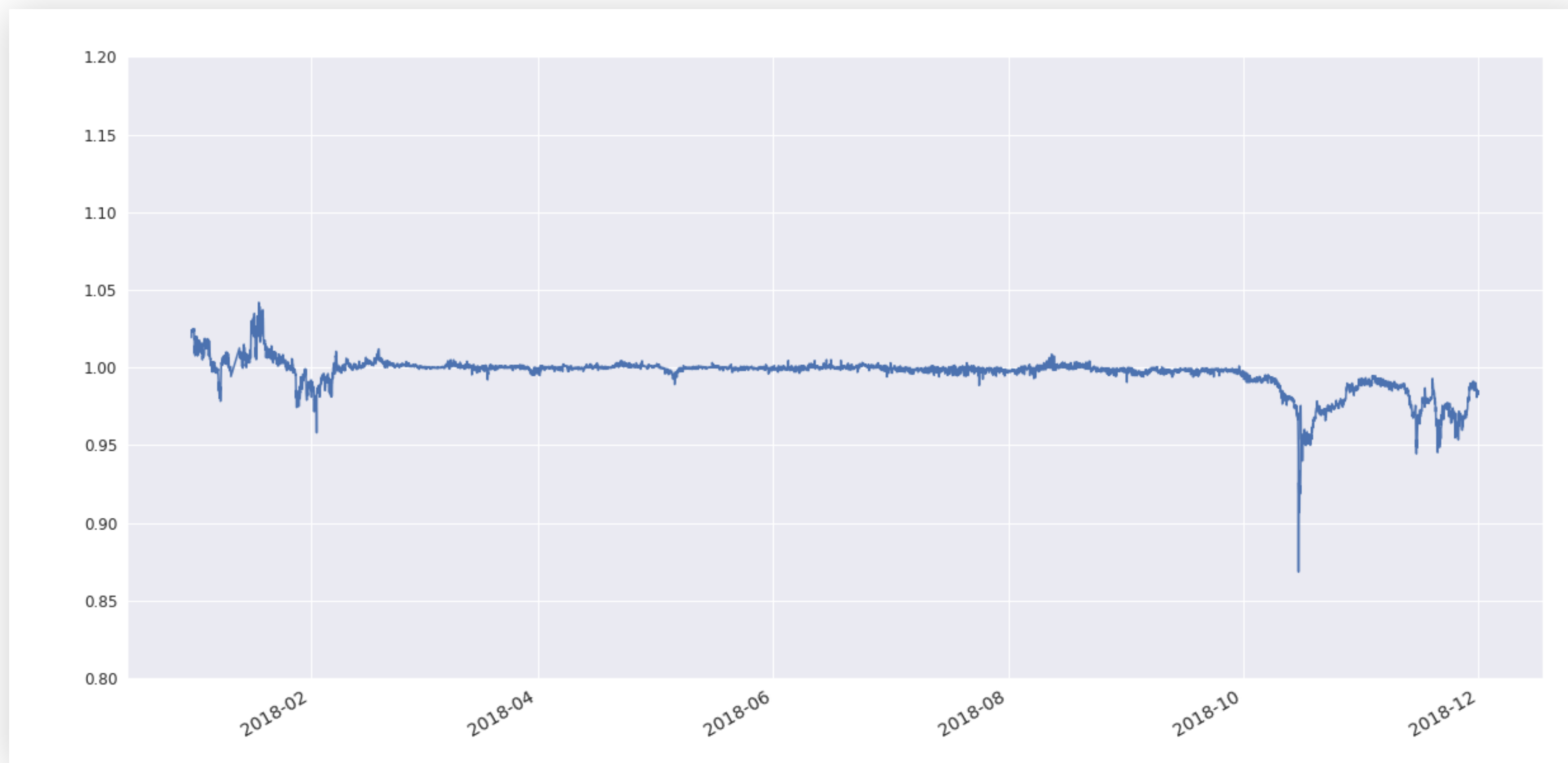
Markets that trade BTC paired against the stablecoin Tether (USDT) appear to trade at a persistent premium to BTC-USD markets. You see these apparent dislocations on popular public web sites like CoinMarketCap, which often show highly variable prices.

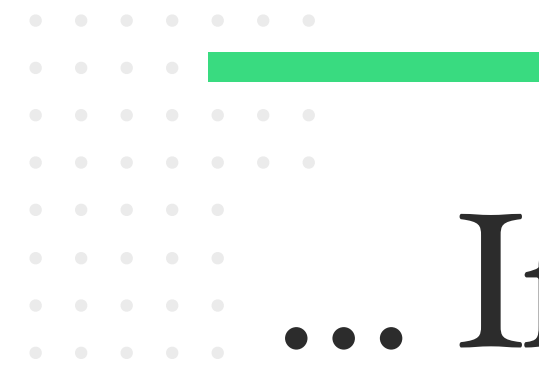




## ... But Tether Trades At A Variable Price ...

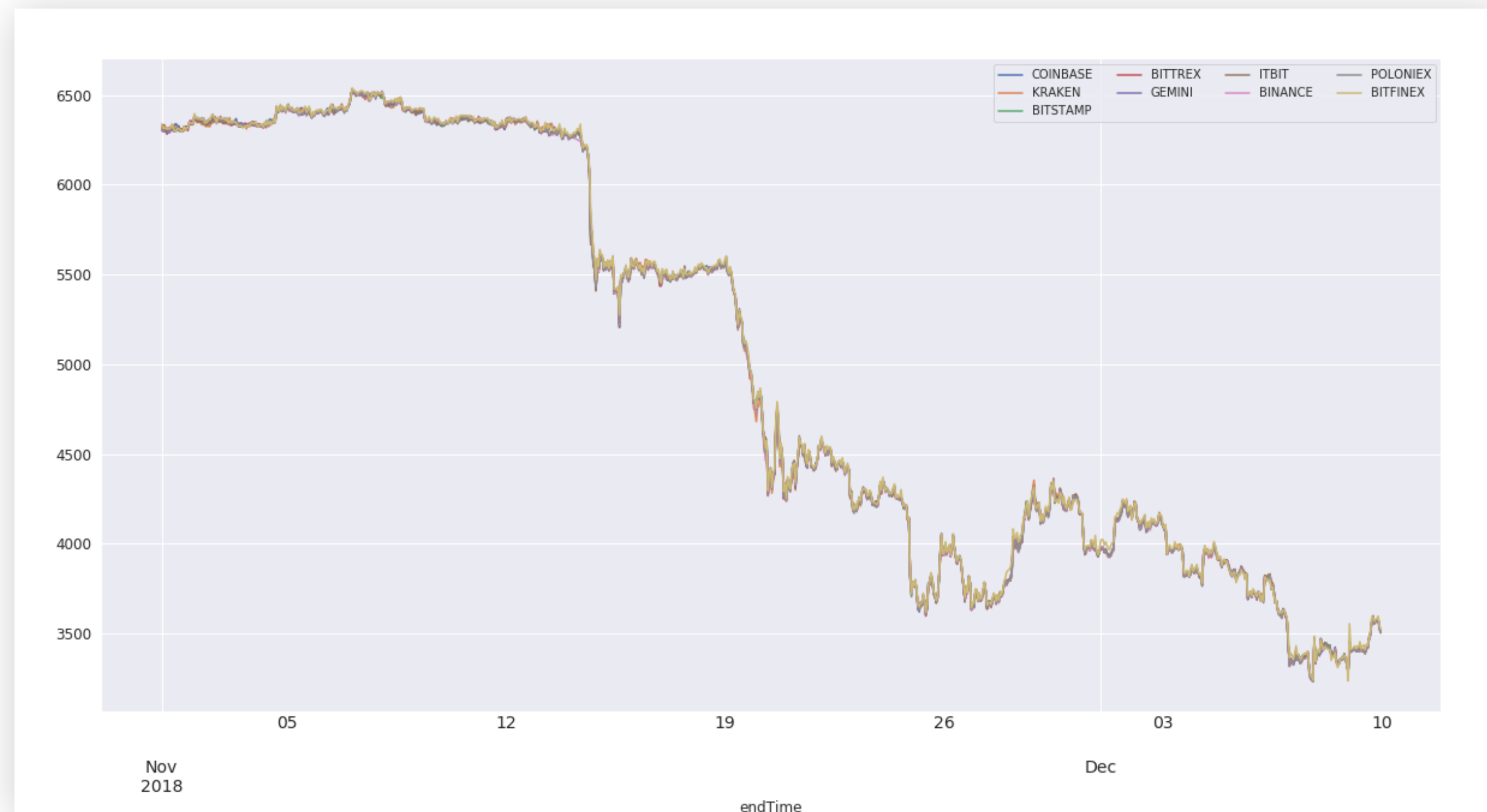
USDT is a stable coin that is designed to trade at a stable price of \$1. But in practice, its price varies (sometimes significantly). The globally integrated bitcoin market incorporates this into its prices.





# ... If You Adjust for USDT Price Fluctuations They Trade In Line

If you treat Tether for what it really is — a currency that fluctuates against the value of the U.S. dollar — prices for BTC/USD and BTC/USDT pairs line up exactly.





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The Bitcoin Market Is More Regulated and  
Surveilled Than Is Commonly Understood.

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**We acknowledge that we're using the term "regulated" loosely here. We are not implying that bitcoin spot exchanges are "regulated markets" or that they are on an equal legal status with national securities exchanges or futures exchanges, but rather that the 10 bitcoin spot exchanges highlighted earlier interface with other forms of regulation.**



# FinCEN Has Required Crypto Exchanges To Register As Money Services Businesses (MSB) Since 2013

FinCEN's responsibility is to safeguard the financial system from being abused by criminals and terrorists, with a focus on combating money laundering. It refers to cryptocurrencies as "virtual currency."



## Department of the Treasury Financial Crimes Enforcement Network

### Guidance

**FIN-2013-G001**

**Issued:** March 18, 2013

**Subject:** Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencies

**Clarification:** *"[A] exchanger is an MSB under FinCEN's regulations, specifically, a money transmitter, unless a limitation to or exemption from the definition applies to the person."*

**Definition:** *"An exchanger is a person engaged as a business in the exchange of virtual currency for real currency, funds, or other virtual currency."\**

\* Source: <https://www.fincen.gov/sites/default/files/shared/FIN-2013-G001.pdf> March 18, 2013.



# MSBs Have A Long List Of Obligations

- Identifying people with ownership stakes or controlling roles in the MSB.
- Establishing a formal Anti-Money Laundering (AML) policy in place with documentation, training, independent review, and a named compliance officer.
- Having strict customer identification and verification policies and procedures.
- Filing Suspicious Activity Reports (SARs) for suspicious customer transactions.
- Filing Currency Transaction Reports (CTRs) for cash-in or cash-out transactions greater than \$10,000.
- Maintaining a five-year record of currency exchanges greater than \$1,000 and money transfers greater than \$3,000.





# A BitLicense Is Needed For Exchanges Doing Business in New York

To operate in New York, virtual currency businesses must register with the New York State Department of Financial Services (NYSDFS) and receive a BitLicense, which enforces strict operating standards. Five of the ten spot bitcoin exchanges are registered with NYSDFS and hold a BitLicense.



coinbase

 GEMINI

POLONIEX

 bitFlyer

itBit



# The BitLicense Has An Even Longer List Of Obligations

- Submission of audited financial statements including income statements, statement of assets/liabilities, insurance, and banking.
- Capitalization requirements set at NYDFS's discretion.
- Full reserves of custodian assets — selling / encumbering prohibited.
- Fingerprints and photographs of employees with access to customer funds.
- Qualified Chief Information Security Officer and annual penetration testing / audits.
- Documented business continuity and disaster recovery plan, independently tested annually.
- Independent exam by NYFDS.



# Regulatory Status Of the 10 Exchanges

Exchange	MSB	BitLicense
Binance		
Bitfinex	X	
bitFlyer	X	X
Bitstamp	X	
Bittrex	X	
Coinbase Pro	X	X
Gemini	X	X
itBit	X	X
Kraken	X	
Poloniex	X	X

Nine out of the ten exchanges—every exchange besides Binance—is registered as a Money Services Business with FinCEN.

The BitLicense is more optional because it's enforced by a NY state regulator and certain exchanges have decided not to do business in NY due to the operational and compliance burden. Still, five out of ten exchanges have BitLicenses.

Most of these exchanges have raised significant venture capital or been acquired by large, established companies. They have significant public profiles, well-known senior executives, and large offices in major metropolitan areas.



# Sophisticated Market Surveillance Tools And Protocols Are Emerging At The 10 Exchanges

Exchange	Market Surveillance Tools	Since
Binance	N/A	N/A
Bitfinex	Irisium Market Surveillance	Mar 13, 2018
bitFlyer	N/A	N/A
Bitstamp	Irisium Market Surveillance	Nov 28, 2018
Bittrex	N/A	N/A
Coinbase Pro	Internal, "Coinbase Trade Surveillance Program" led by Peter Elkins, former head of market surveillance at NYSE	July 4, 2018
Gemini	Nasdaq SMARTS	April 25, 2018
itBit	N/A	N/A
Kraken	N/A	N/A
Poloniex	NICE Actimize	Feb 27, 2019

Five out of the ten exchanges—Binance, Bitstamp, Coinbase Pro, Gemini, and Poloniex—have formal market surveillance tools in place that help detect market manipulations such as spoofing and wash trading through the real-time and historical analysis of trades, order books, and other market information.





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