

Investigating Cryptoasset Cycles

A look at changes in cryptoasset correlations based on market structure

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Binance Research - April 11th 2019

KEY TAKEAWAYS

- **Price co-movement** of cryptoassets is quite high; the nascency of the cryptoasset market and the weak pricing ability of its participants has likely contributed to this phenomenon.
- **An estimated 7% of the cryptoassets are held by institutional investors**, which is almost one-thirteenth of the institutional holdings proportion for the U.S. stock market.
- Higher turnover rates for cryptoassets (**five times higher** than that of the U.S. stock market) indicate that participants in the crypto asset industry could be more active or reactionary than in traditional markets.
- However, the “UTXO/Realized Cap” metric suggests that **crypto-investors tend to "HODL" as prices drop**, only becoming more active when prices recover.
- Extreme internal correlation among coins is often accompanied by a price “inflection point”.
- Having emerged from a period of the highest internal correlations in crypto history, the data may support the notion that **the cryptomarket has already bottomed out**.

In a previous [report](#), we used a cross-sectional method to analyze the internal correlations of the cryptoasset market to observe the cyclical patterns of various assets. We found that low internal correlations between some cryptoassets are often due to three main reasons:

- **Idiosyncratic factors**, such as project-specific news & catalysts, may influence the strength of correlations among cryptoassets.
- **“Binance Effect”**: digital assets listed on Binance often have higher correlations among themselves; conversely, assets not listed on Binance may have lower correlations.
- **Consensus Mechanisms**: a cryptoasset’s consensus mechanism could have an impact on its correlation with the returns of other cryptoassets (i.e., returns of PoW coins exhibited higher correlations amongst themselves than with non-PoW coins.)

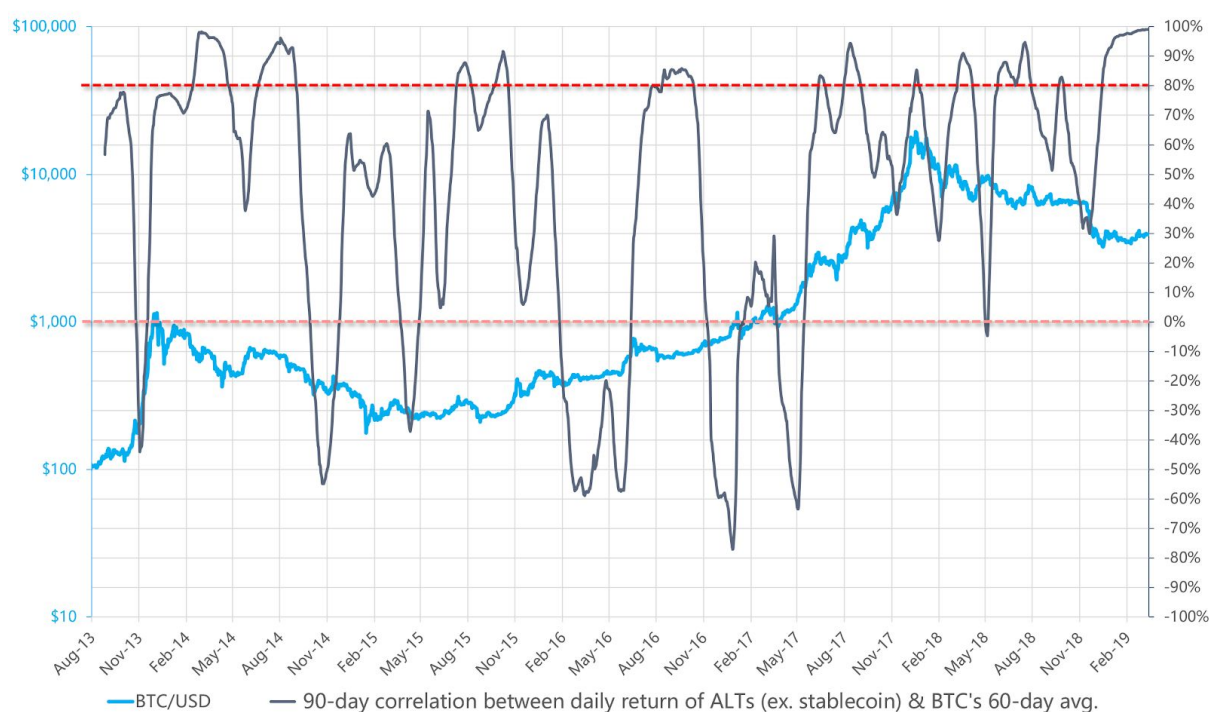
However, the overall correlation observed across the cryptoasset market has increased, which may be due to the steady decrease over the course of 2018 in the market's reliance on Bitcoin-denominated trading pairs, and the corresponding rise of stablecoin volume in all cryptoasset markets¹. In this report, we will further discuss the cyclicity of correlations among cryptoassets and the effects of market structure on this cyclicity.

1. Market Turning Points and Cyclical Movements in Correlations

Correlations between the USD price of cryptoassets are constantly fluctuating due to a variety of factors - one of the most important factors is **market irrationality**, which has an effect similar to a "herding effect"² or co-movement phenomenon.

The below chart displays the average correlation, in USD prices, amongst all Altcoins (excluding the top 10 stablecoins). The data shows that whenever correlations between these coins reach a specific positive upper bound of [0.8 to 1.0], the trend of Bitcoin against USD tends to reverse, or at least halts the previous price action.

Chart 1 - Correlation between the smoothed market cap of Bitcoin and Altcoins (excluding stablecoins)



Sources: Binance Research, Coinmarketcap

Table 1 below captures the duration and maximum correlation during each period where positive correlations between altcoins and Bitcoin surpassed the 0.8 mark.

¹ <https://info.binance.com/en/research/marketresearch/crypto-correlations.html>

² https://www.investopedia.com/university/behavioral_finance/behavioral8.asp

The cumulative duration of these periods totaled 513 days, or **more than one-quarter of the entire sample range** from 13 February 2014 to 14 March 2019, indicating that the crypto market is prone to show extreme correlations.

This total duration of time above the 0.8 threshold was almost 1.3 times the amount of time during which the metric dipped into negative territory (only 381 days).

Table 1 - Historical crypto-correlation periods over 0.8 (Data from 2013/8/26 to 2019/3/14)

Start Date	End Date	Length (Days)	Max Correlation	End of market trend ensues ³ ?
2018-12-15	-	<u>90</u>	<u>0.991</u>	Y
2018-09-21	2018-09-30	10	0.830	N
2018-05-26	2018-07-29	65	0.947	Y
2018-03-08	2018-04-06	30	0.911	Y
2017-12-15	2017-12-23	9	0.854	Y
2017-07-31	2017-09-01	33	0.944	Y
2017-06-12	2017-06-24	13	0.834	Y
2016-08-12	2016-10-12	62	0.859	Y
2016-07-25	2016-07-27	3	0.801	Y
2015-09-22	2015-10-18	27	0.917	Y
2015-07-11	2015-08-07	28	0.879	Y
2014-06-21	2014-09-01	73	0.961	Y
2014-02-13	2014-04-23	70	0.982	Y
Average		39	0.901	

On average, these “0.8+ correlation periods” lasted for durations of about 39 days, with an average maximum correlation of 0.901. The most recent “peak correlation period” lasted 90 days until March 14, **the longest such period in crypto-history.**

Within this period, the composite altcoin correlation with Bitcoin also hit an all-time high (13 Mar 2018). That coincided with Bitcoin's fall from the \$6,000 range to the \$3,000 range. This high correlation suggests that market sentiment has already found a local maximum during that period, and **a trend reversal may possibly ensue.**

Such a price movement pattern, to some extent, may reflect both the irrational behavior of market participants and some inherent traits of a young market.

³ If the trend of the two subsequent weeks after the peak period is different than that of the peak period.

However, given the short history of the crypto market, it may be premature to say that there is a causal relationship between peaks in correlation and market reversals, or if it's actually a herding effect during the market reversals themselves. We will continue to observe the development of this phenomenon, but believe that it could be a valuable sentiment indicator.

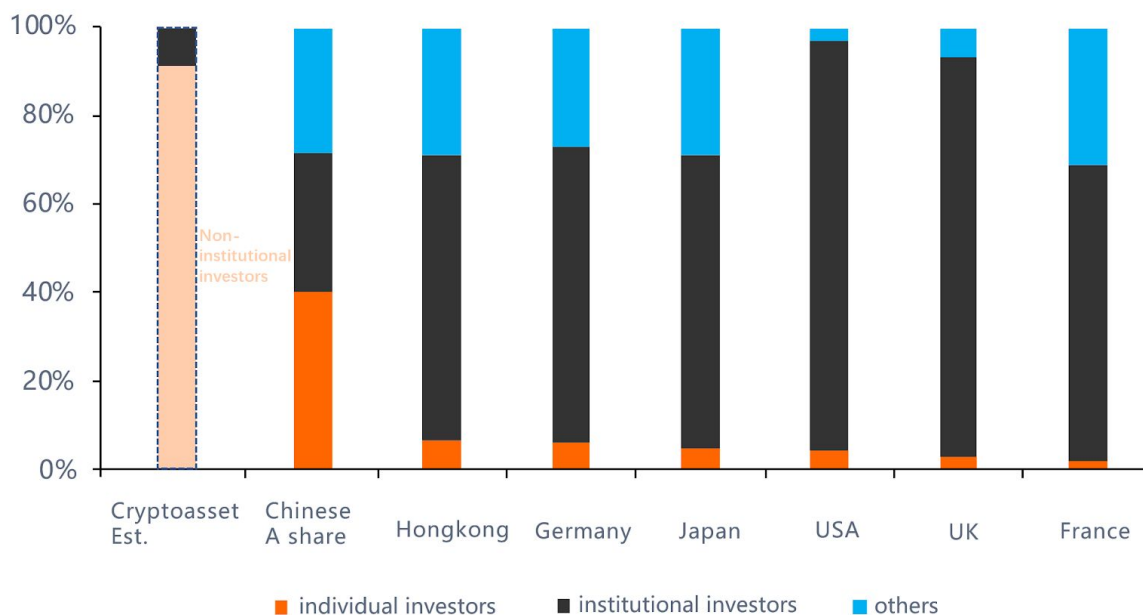
2. Irrational Cognition: Are Crypto Market Correlations Prone To Extremes?

2.1 High proportion of retail investors

The cryptomarket's frequent periods of extreme correlation are inseparable from the market's highly retail-driven participation.

From data collected by cryptofundresearch.com, around 700 crypto funds operate in the cryptomarket today⁴, representing a total of just under \$10 billion in assets as of January 2019. With a conservative assumption that they all hold solely Bitcoin, this would **account for an upper bound of only 14%** of the total market value of Bitcoin; If Altcoins are included in the assumption of their holdings, (given that BTC dominance percentage is around 50% as of time of writing according to Coinmarketcap), the "institutional proportion" overall **could be less than 7% for the cryptoasset market**.

Chart 2 - Investor structure comparison: crypto (estimated) vs. stock markets



Sources: Binance Research, Cryptofundresearch.com, Bloomberg

Others include nonprofit holders like central banks or governments.

⁴ <https://cryptofundresearch.com/cryptocurrency-funds-overview-infographic/>

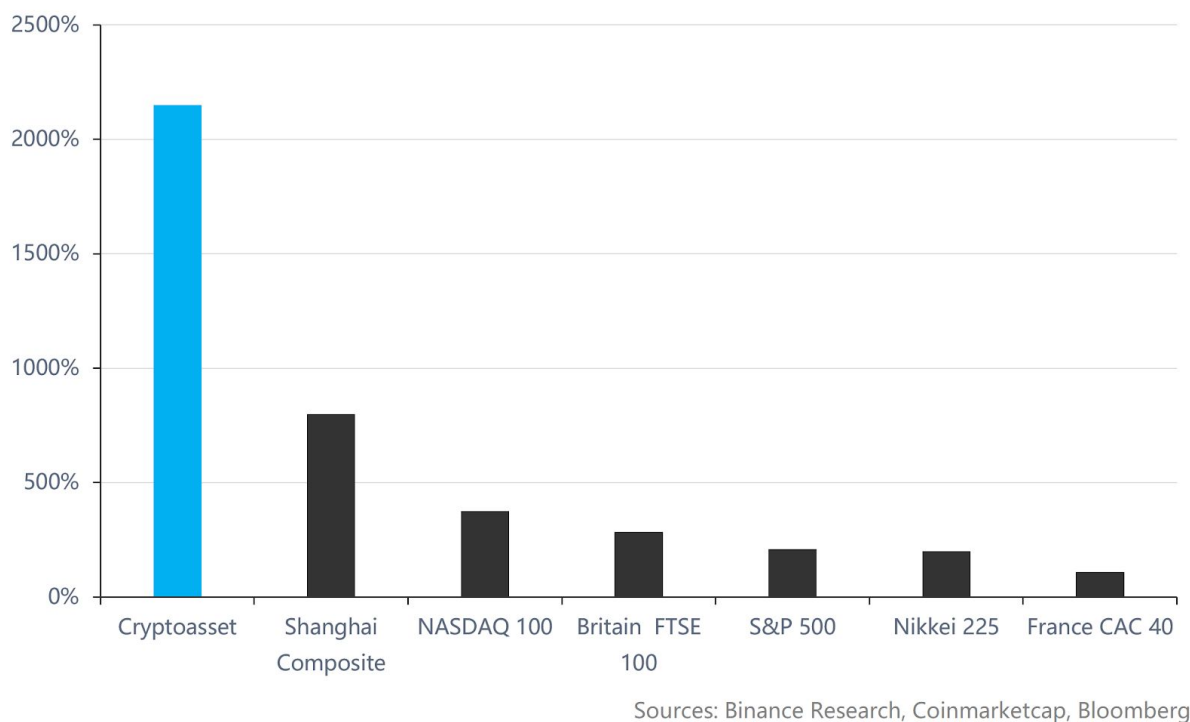
Meanwhile, crypto’s estimated 7% institutional participation rate **represents only one-thirteenth of that for the U.S. stock market.**

Among the main traditional equity markets, only the structure of the Chinese stock market is somewhat similar to the cryptoasset market—in 2017, retail investors accounted for more than 99.8% of the Chinese stock market by number of accounts, more than 40% by market value, and more than 80% by trading volume⁵.

In addition to having an unusually high percentage of retail investors, the cryptoasset market and the Chinese stock market both have extremely high turnover rates.

Chart 3 below illustrates the phenomenon that **markets with fewer professional investors tend to have a higher turnover rate** (defined as annual trading volume divided by total outstanding shares).

Chart 3 - 2018 Annual turnover rate comparison: crypto vs. stock markets



Annual turnover rate within the cryptoasset market⁶ stands at **2150% over 2018, which is 6 times that of the US stock market and 3 times that of the Chinese stock market,**

⁵ See the *SHANGHAI STOCK EXCHANGE STATISTICS ANNUAL 2018* page 529 & 531 http://www.sse.com.cn/aboutus/publication/yearly/documents/c/tjnj_2018.pdf

⁶ It is based on “adjusted volume” and circulating market capitalization from coinmarketcap.com.

indicating that crypto investors are perhaps **more easily moved**⁷ by news and information, holding positions for a shorter time.

Generally speaking, non-professional investors are prone to becoming overconfident or overly pessimistic in reacting to market trends, leading to higher potential transaction volume, more volatile prices, as reported in numerous studies⁸.

However, it is certainly too early to draw the same conclusions about crypto investors. In fact, it may be that crypto investors are **more active and attentive to new market developments**, and more **hands-on with participation** in the governance, community development, and general progress of the coins and tokens they invest in. In other words, they have a **material impact on the success of the crypto networks they participate in** and are incentivized to make their voice heard, even if it is simply through price action.

2.2 HODLing - another feature of the crypto investors

In the face of market downtrends, unlike many momentum-driven institutional investors, most investors in the cryptoasset market may prefer to “HODL” through a prolonged decline in prices, but quickly become active when prices recover to near previous highs.

This behavior can be observed through the metric of “realized cap”, which was introduced by Antoine Le Calvez and Nic Carter⁹ in 2018 and is also referred to as the “UTXO market cap” of a cryptoasset.

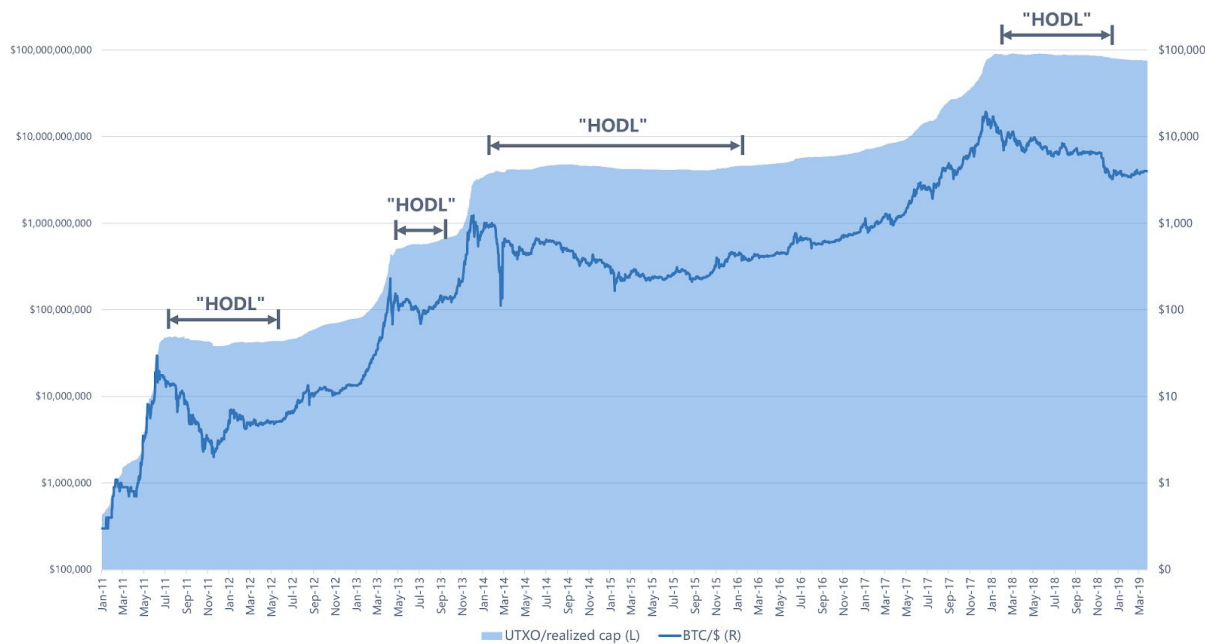
This metric is resistant to downward movements in the market capitalization of Bitcoin, as it is a measure **based on the summation of the last on-chain movement market price** across the Bitcoin network. Thus, rather than marking all of the coin’s available supply to the current spot price, it only marks down coins that are transacted at the spot price from when their most recent transaction occurs.

⁷ An analysis from [Obryan \(2018\)](#) found that consensus was evident across investors as the prices started to rise. In other words, the herding behavior is quite common in cryptomarket.

⁸ Kent and David (2015) provided a summary in [Overconfident Investors, Predictable Returns, and Excessive Trading](#)

⁹ <https://coinmetrics.io/realized-capitalization/>

Chart 4 - "UTXO market cap" and the spot price of Bitcoin



Sources: Binance Research, Coinmetrics.io

Chart 4 shows that crypto investors **tended to HODL in bear markets**, leading to only moderate changes in UTXO cap during these periods¹⁰. If individuals were to transact with Bitcoin at the lower USD value prices at the same pace as pre-bear-market, the decline of **UTXO cap would be steeper**. It is also worth noting that after a significant bear period, the measure does not quickly pick up, at least until the underlying price approaches its previous peak¹¹.

For example, from early 2014 to early 2015, the price of Bitcoin fell by 75%, while **UTXO cap actually rose by 15%**; in the most recent bear period from the beginning of 2018 through November 2018, the price of Bitcoin fell nearly 70%, while UTXO cap only fell 5%.

This echoes the findings of Calderón (2018), who utilized the CSAD model¹² to demonstrate that crypto investors tend to display greater “herding” effects in a bull market, and are more inclined to HODL when overall yields fall in a bearish market

Additionally, the effects of the price movements of leading coins such as Bitcoin or Ethereum also carry through the rest of the market¹³, as many Altcoins are only available to be traded against other crypto-denominated pairs, leading to the tendency for cryptoassets to form singular, unified trends:

¹⁰ In some cases, UTXO's market value even rose as the price fell, possibly because investors who entered earlier at a very low price chose to leave, while those who joined later at a high price were reluctant to sell at a loss.

¹¹ As many others, the algorithm isn't perfect, such as when exchanges moving their wallets, can cause a significant amount of market value to be calculated at the new price without any real trading taking place.

¹² Identify herding behavior by testing whether the cross-sectional absolute deviations of individual coin returns and the return of a market portfolio keep linear relationship: <https://arxiv.org/pdf/1806.11348>

¹³ Also see [our report](#) about the impact of the rise of stablecoins on the correlation of the cryptoassets

- **Extreme market optimism often drives up the price of all cryptoassets**, including the ones with no clear utility or value. This often leads to the formation of a bubble;
- **Extreme market pessimism often sends the price of all cryptoassets into a tailspin**, including the ones with clear utility or value. This often leads to market over-adjustment.

Essentially, high correlation among cryptoassets can be summed up by an **“if you can’t beat ‘em, join ‘em” mentality**; during a unilateral trend (late bull or early bear phase), **excess returns denominated in USD would become harder to capture, so it becomes easier for market participants to just ride the market waves.**

However, the effects of “herding behavior” always depend on the specific situation. If the initial information is correct, "herding effects" will cause information to be reflected in the price more quickly. For example, in the 2017 ICO boom, many investors were aware of the potential of cryptoasset financing through the creation ERC-20 tokens, and consequently, investors quickly piled into Ethereum, which illustrates the herding effect that quickly spread through the market and vaulted Ethereum to the second place market cap position behind Bitcoin¹⁴.

Whereas the traditional equities market is both **mature, with high institutional presence**, and **sophisticated - with a wide range of derivatives products** across many developed countries (e.g. United States, Japan, Germany), the **cryptoasset market** - which is less than 10 years old - has faced several issues over its young lifetime, such as:

- **Incomplete system and regulations:** The absence of a compulsory information disclosure mechanism adhered to by market participants, a lack of popular market trading instruments (e.g. lack of physically settled futures contracts), and insufficient investor protection measures all reduce enthusiasm of professional investors.
- **Asymmetric information:** The blockchain industry is highly complex, with a relatively high barrier of entry for new participants. This is coupled with the lack of professional, fast and reliable media outlets, resulting in slow information transmission and the rampant spreading of fake news.
- **Limited arbitrage channel:** Inherent limitation of transfer speed/cost of some mainstream coins, regulatory restrictions of many countries, as well as the temporary lack of sufficient derivatives and an in-depth market, there are not enough arbitrageurs, resulted in the asset prices may stay in an unreasonable range for a longer period. However recent reports suggest that cross-exchange arbitrage opportunities decreased over 2018, leading to greater price efficiency.

¹⁴ Joe Liebkind. Investopedia. [How Did Ethereum’s Price Perform In 2017?](#)

Due to the above, the effects of a quick-to-react market participant becomes even more pronounced, making accurate pricing of individual cryptoasset even more difficult. Hence, “irrational behavior” or herding effects should not just be blamed on inexperienced market participants, but should also be attributed to market infrastructure and maturity, However, especially after 2018, we continue to see various traditional research institutions, regulatory bodies, and media outlets paying more attention to the blockchain industry, in addition to a wave of crypto-native coverage and research being built and grown each and every day.

The quickly maturing industry has already attracted new funds and support from governmental and traditional capital sources, and looks to continue to do so with each additional step of regulatory clarity, improved data and news reliability, and reduced usability friction, leading to more efficient price discovery in the market as a whole.

Please see tables 2 and 3 below for a recap of the progress of the space over the last few quarters. With the rollout of many mature financial products covering the industry and a clearer regulatory framework worldwide, the crypto market may be **maturing faster than ever.**

Table 2 - Cryptoasset product participated by traditional institutions and regulatory progress in the past 3 quarters

Date	Event
2018.5.9	Bloomberg Launched its first cryptocurrency benchmark index
2018.6.28	South Korea reveals new crypto regulatory framework and guidelines pertaining to AML and KYC requirements for crypto exchanges
2018.7.31	CryptoCompare provide order book and trade data on 50 cryptocurrencies for Thomson Reuters' financial desktop platform Eikon
2018.9.10	First bitcoin mutual fund launches in Canada
2018.11.1	Hong Kong issues new rules to regulate cryptocurrency funds and exchanges
2018.11.16	Switzerland's principal stock exchange SIX lists World's first multi-crypto ETP amidst market collapse
2019.2.12	First U.S. pension funds invest in crypto venture capital (Morgan Creek)
2019.2.25	Samsung include a cryptocurrency wallet in its latest flagship Galaxy S10 phones
2018.2.27	Russian president Putin orders the government to adopt regulations for the digital assets industry by July 2019
2019.2.26	SIX (Swiss stock exchange) lists its first physically backed Bitcoin ETP (Ethereum ETP was announced a week after)
2019.3.20	Two CoinMarketCap crypto indices launch on Nasdaq, Bloomberg, Reuters
2019.4.4	Highest volume ever on CME Bitcoin Futures (USD546m in one day)

Table 3 - The status of cryptoasset regulations around the world

	Are crypto exchanges banned, regulated or do they operate in a gray area?	Are ICOs banned, regulated or do they operate in a gray area?	Are crypto payments banned?	Are conversions from virtual currencies to fiat currencies banned?	Is there any planned legislation to increase crypto regulation?
Japan	Regulated	Gray	×	×	√
Hong Kong	Gray	Gray	×	×	√
Singapore	Gray	Gray	×	×	√
Phillippines	Regulated	Gray	×	×	√
Thailand	Regulated	Gray	×	×	√
India	Gray	Gray	×	×	√
S. Korea	Gray	Banned	×	×	√
Indonesia	Gray	Gray	√	√	√
China	Banned	Banned	√	√	√
Australia	Gray	Gray	×	×	√
U.S.	Gray	Regulated	×	×	×
Canada	Gray	Regulated	×	×	×
Brazil	Gray	Gray	×	×	×
U.K.	Gray	Gray	×	×	×
France	Gray	Gray	×	×	√
Germany	Gray	Gray	×	×	×
Switzerland	Regulated	Regulated	×	×	√
Russia	Gray	Gray	×	×	√
Nigeria	Gray	Gray	×	×	√
South Africa	Gray	Gray	×	×	√
Zimbabwe	Gray	Gray	√	×	×
Kenya	Gray	Gray	×	×	×

Note: data compiled by [Bloomberg](#), released in March 26, 2019, updated by Binance Research in March 29, 2019.

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