THE BLOCK GENESIS

Latest Research & Analysis

October 2019

The Block Genesis consists of the most in-depth, timely and impactful pieces, giving you an informational edge over the entire digital asset industry. The Block Genesis is the first and last word on the world of digital assets, cryptocurrencies, and blockchain.

Unlocked by

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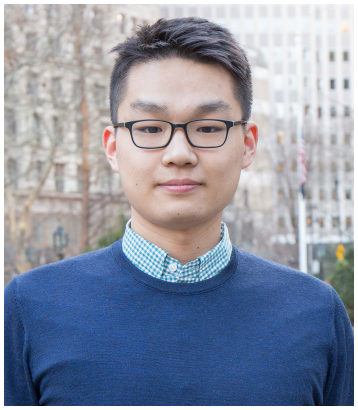

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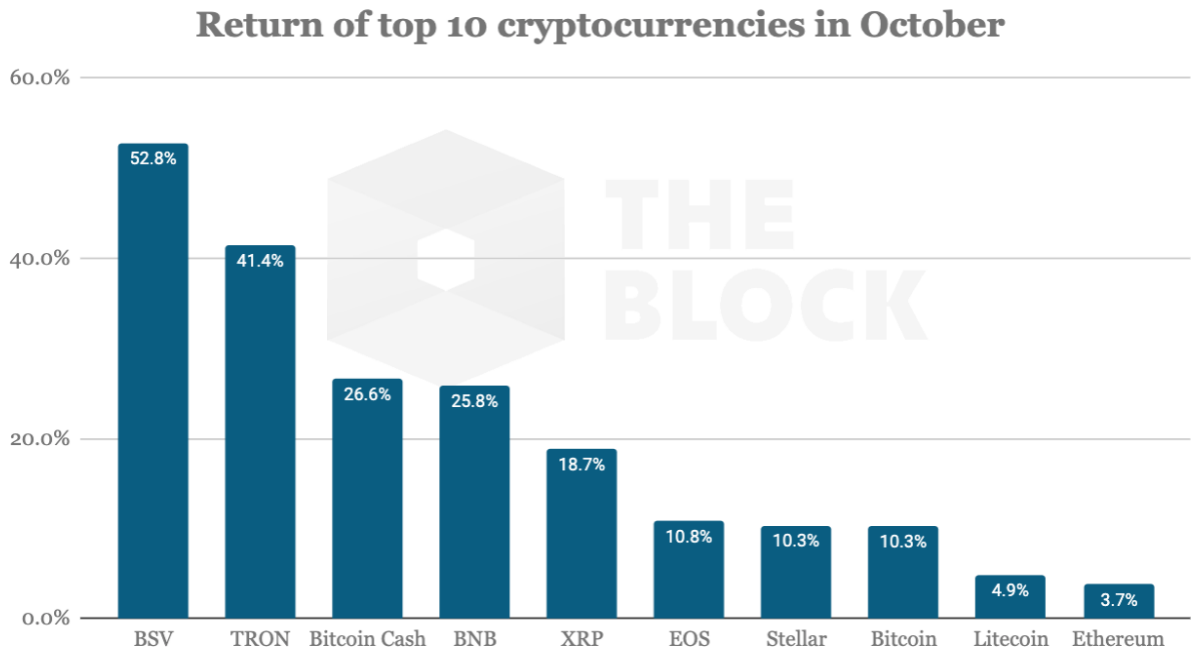
Market Outlook Insights

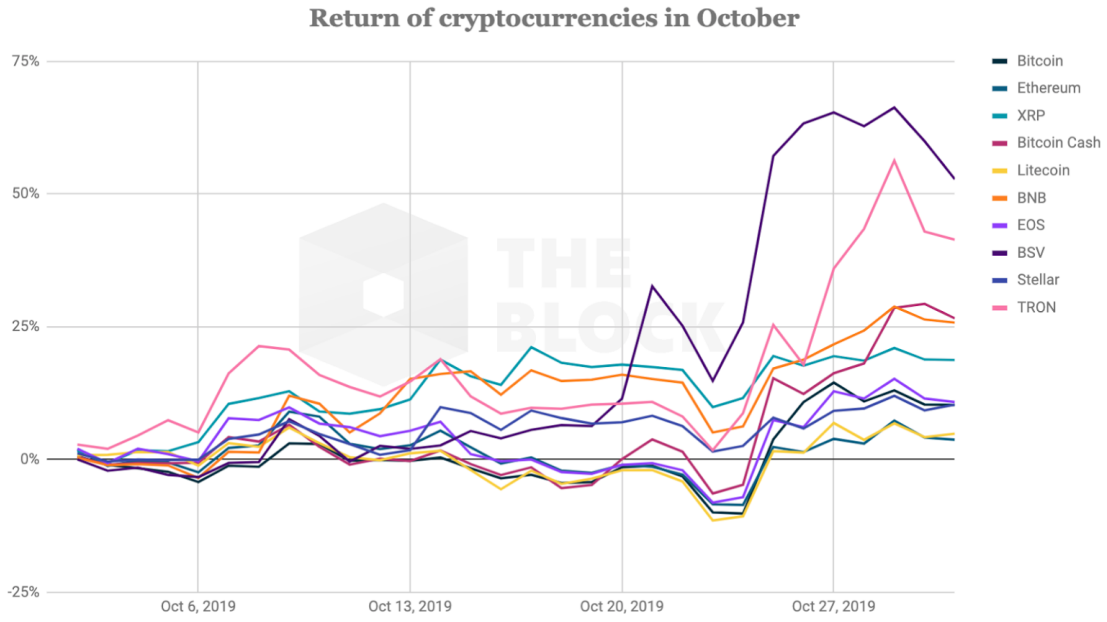
October, 2019

Prices and volatility

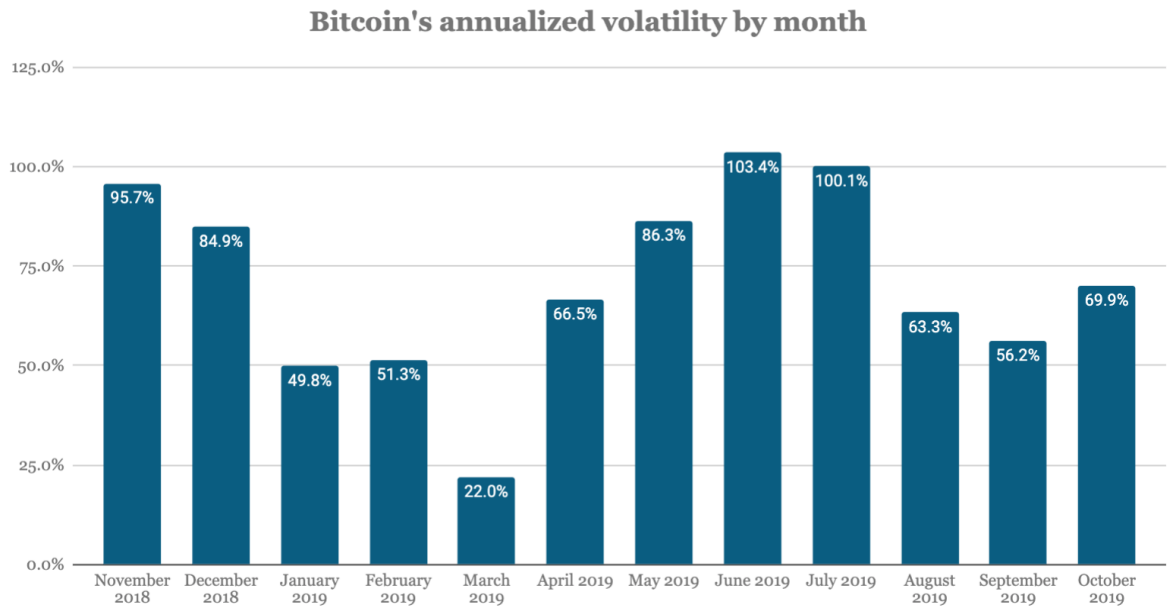
In October, bitcoin's (BTC) price grew by more than 10% adding roughly $16 billion to market capitalization. Ether (ETH) saw the slowest performance of top 10 cryptocurrencies; growing by only about 4% in October. Smaller cap cryptocurrencies performed the best - led by BSV (52.8%), TRON (41.4%) and Bitcoin Cash (26.6%).



Majority of the price gains were recorded on Oct. 25 when the price of BTC grew by 14.5% and price of ETH by 11.3%. Oct. 25 was the second-best performing day in the last year, after Apr. 2 when price of BTC skyrocketed by 16%.

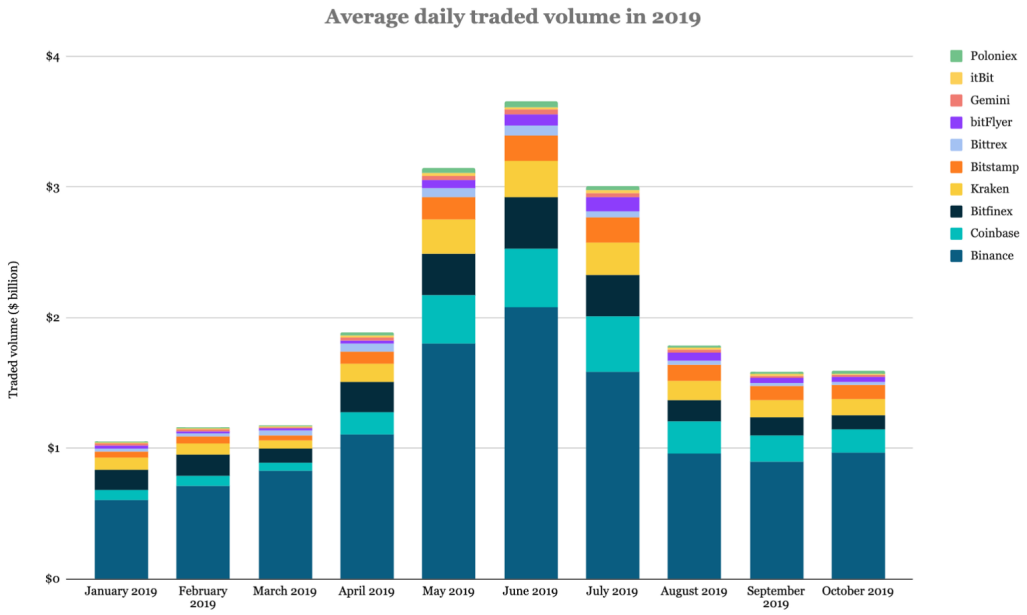


Bitcoin has the reputation of a highly volatile asset. In October, annualized volatility of BTC was 69.9%, which is slightly more than in August and September. Overall, volatility was still significantly lower than in May, June and July.

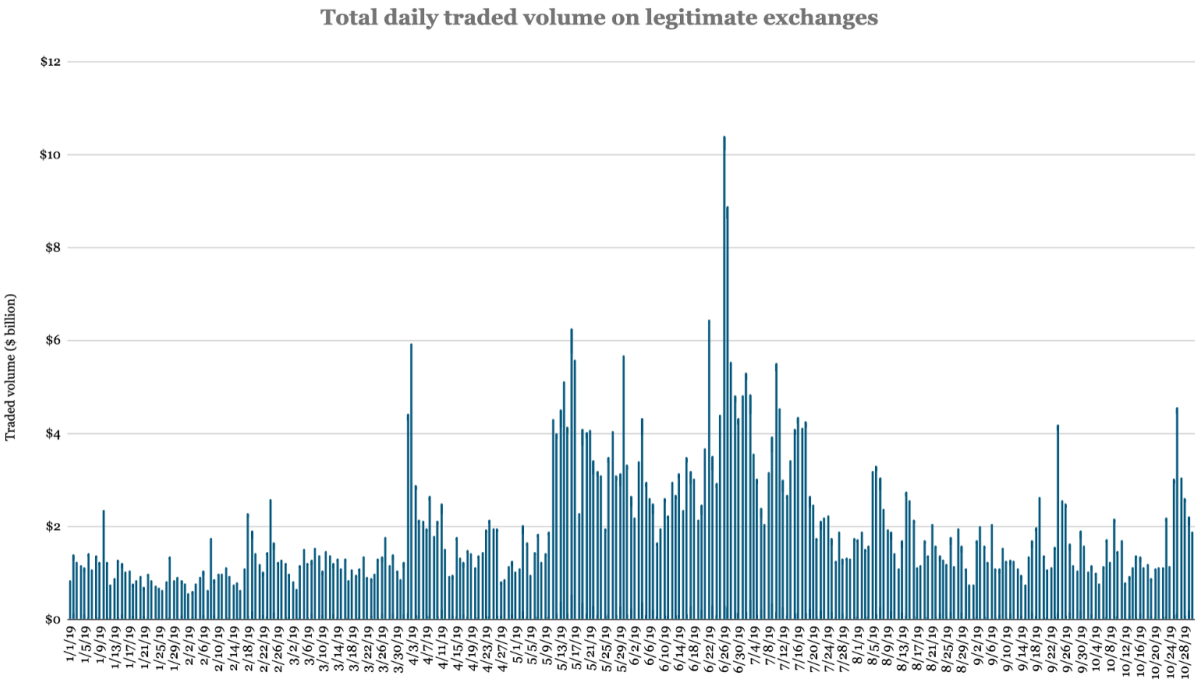


Traded volume and exchanges

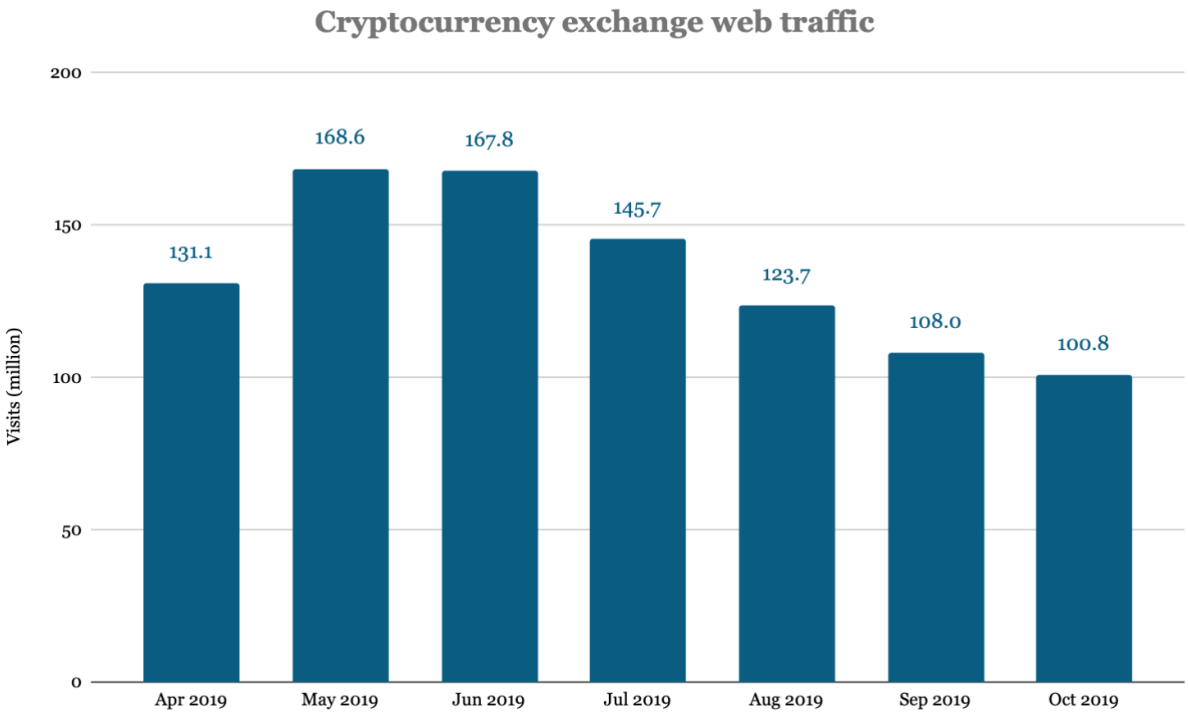
Cryptocurrency traded volumes in October stayed around the same as September amid an increase in market volatility. The average daily trading volume on legitimate exchanges was about $1.60 billion in October, slightly higher than $1.59 billion in September but still down 56% from $3.66 billion in June.



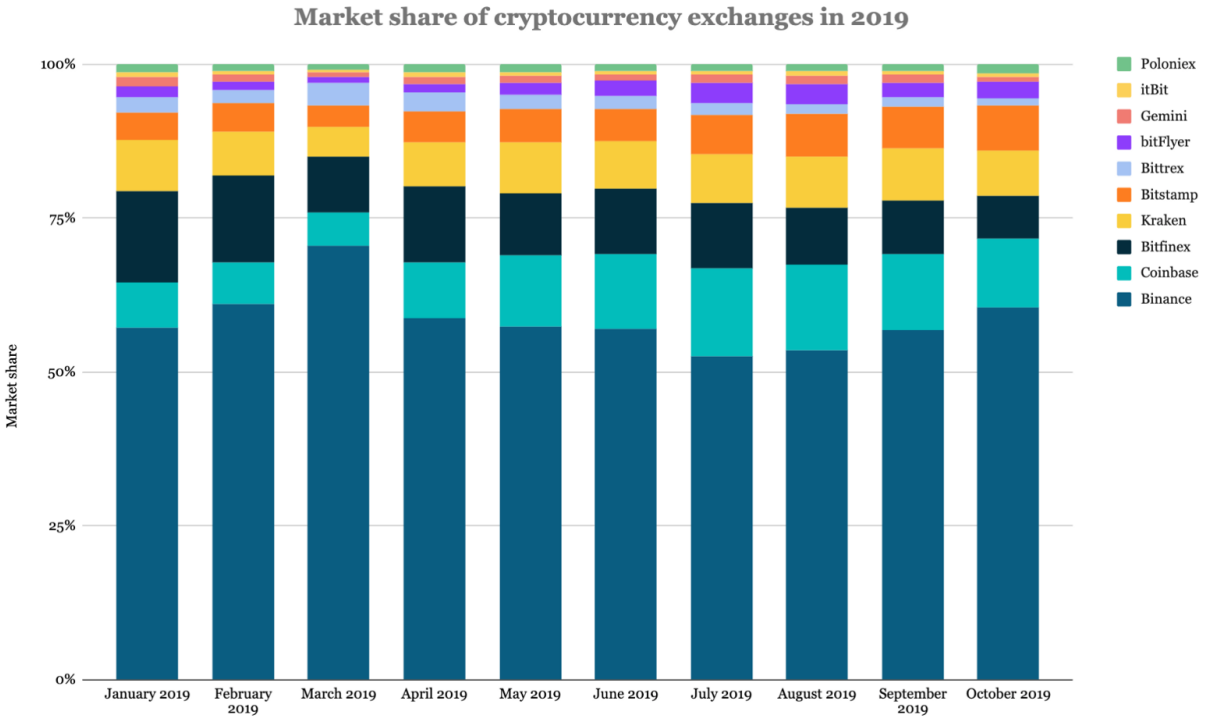
Bitcoin's volatility skyrocketed towards the end of the month, which drove trading volumes. On Oct. 23, bitcoin's price briefly dropped to about $7,500 within minutes, reaching a five-month low. Two days later, the price increased by more than 30% in one day and touched $10,000. The daily traded volume of $4.57 billion on Oct. 26 reached a three-month high. Such volume has not been seen since July 10.



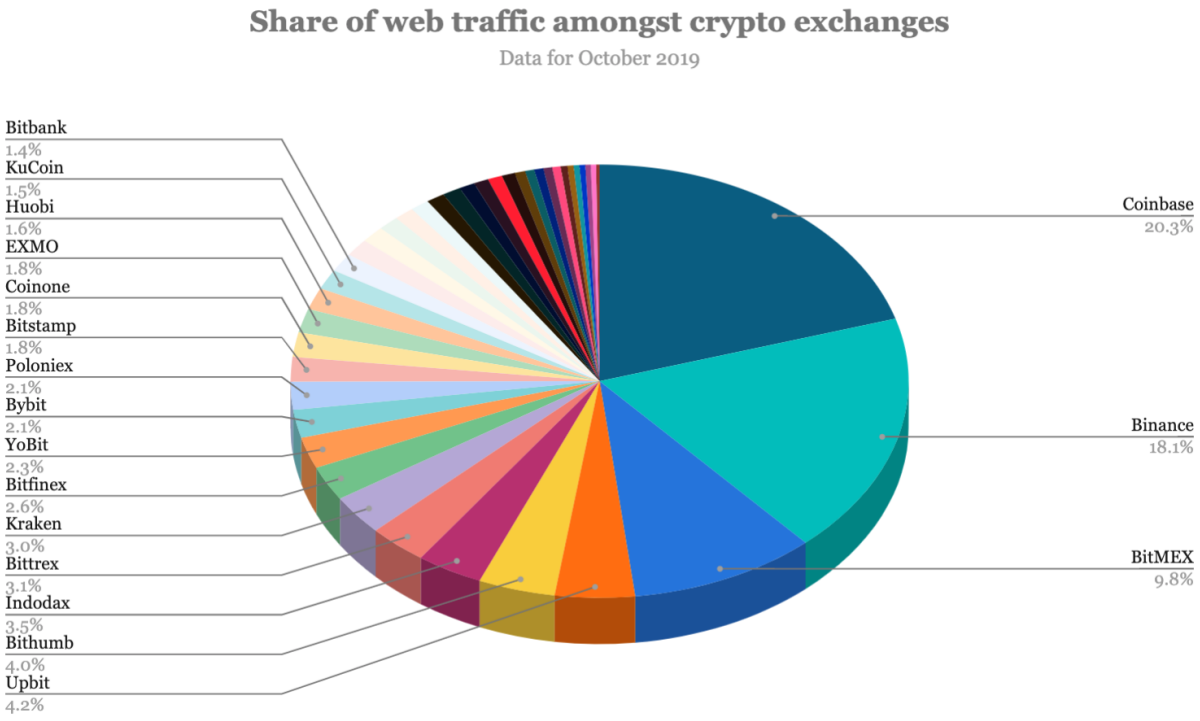
According to the data from SimilarWeb compiled by The Block, cryptocurrency exchanges recorded a total of 100.8 million website visits in October, which is 40% less than just four months ago. The dropping traffic indicates that retail interest in cryptocurrencies is down on a global scale after growing until June.



As for market share, Binance continues to dominate. In October, Binance captured more than 60% of the legitimate traded volume; its highest market share since March. Coinbase captured about 11% of the volume, followed by Kraken (7.4%), Bitstamp (7.2%), Bitfinex (7.1%), and bitFlyer (2.7%). The remaining exchanges all captured less than 2% of the total volume.

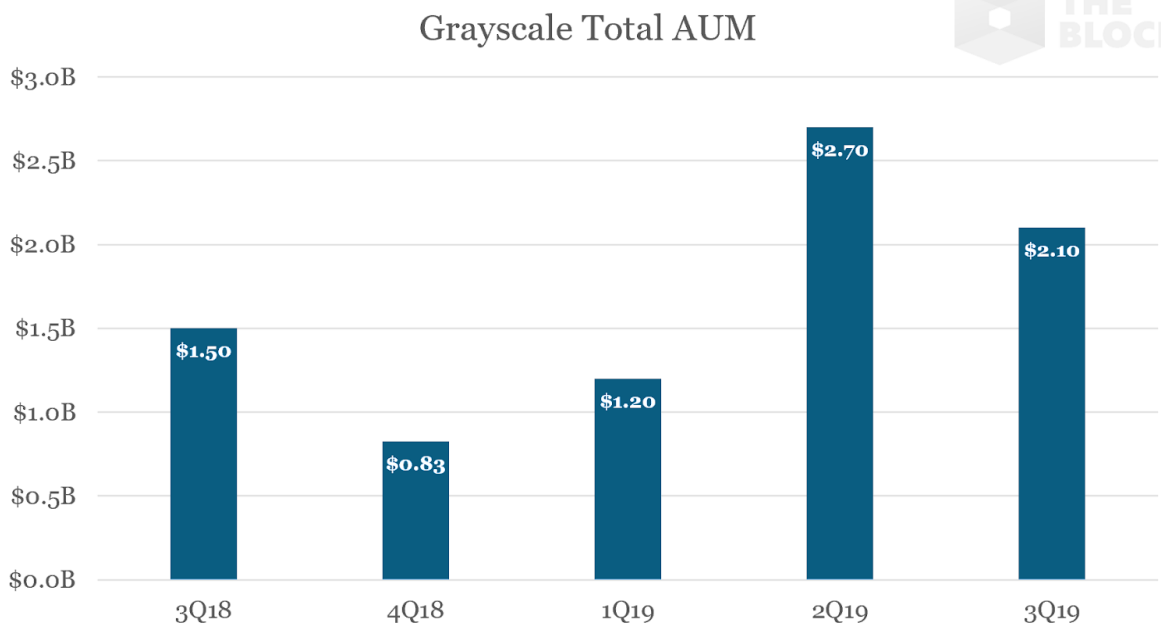


Coinbase had the largest number of estimated visitors in October with about 20.5 million; followed by Binance with 23.7 million and BitMEX with 9.9 million. Coinbase, Binance, BitMEX drew nearly 50% of the total traffic.

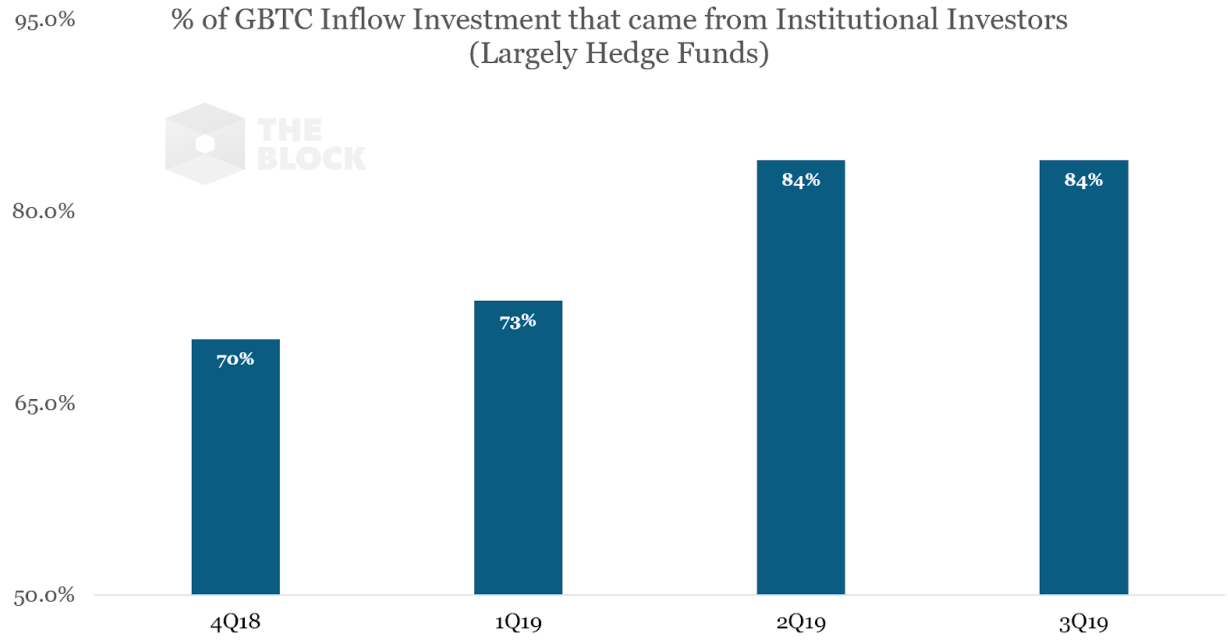


Institutional demand and derivatives

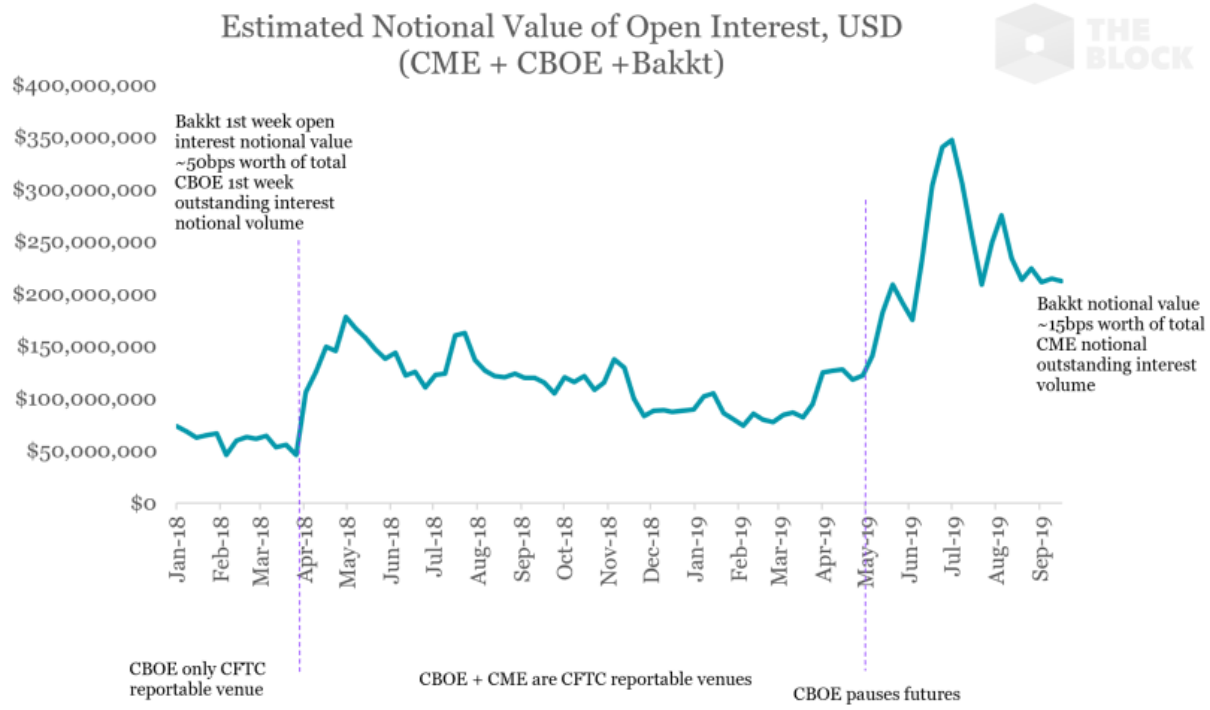
In the third quarter, Grayscale saw record quarterly inflows across investment products (total inflows were ~$260 million for the quarter), of which more than $170 million flowed into its bitcoin trust product, up ~170% Y/Y and Q/Q. Grayscale also saw record flows into its Ethereum trust product at an estimated 25% mix of total flows, or ~$63 million worth.



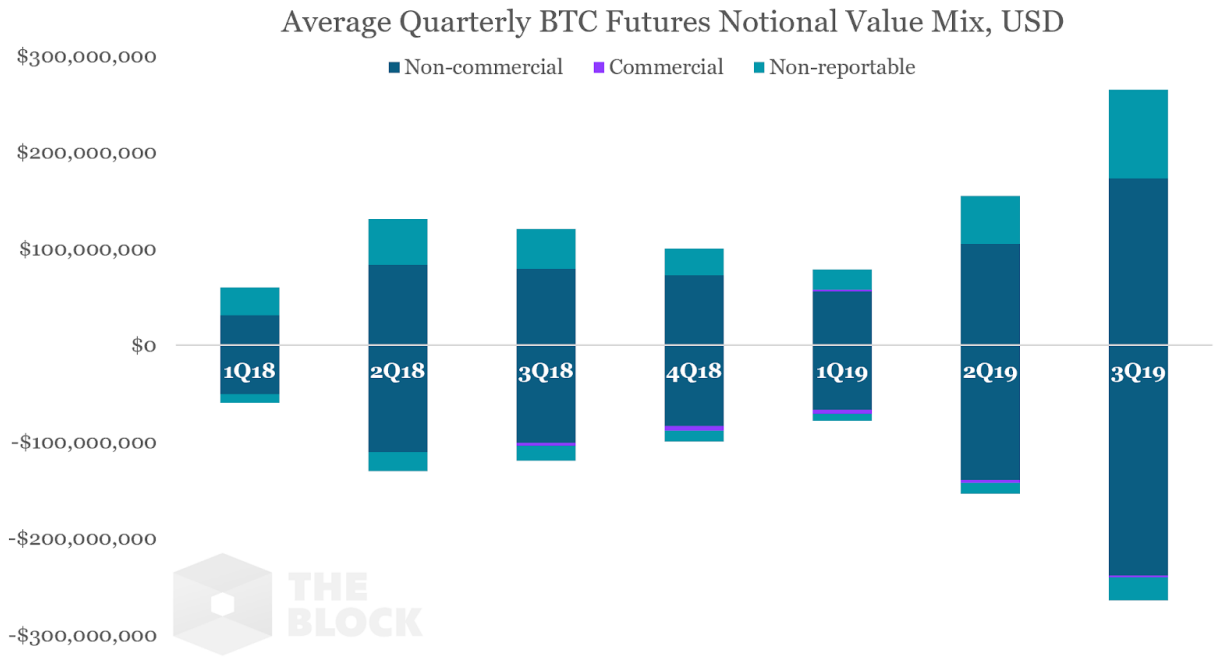
Institutional investors continue to compose the bulk of purchasers for these products, as the percent of total flow of investment for the quarter from institutional investors (largely hedge funds) now sits at 84%, up 14% since the end of 2018.



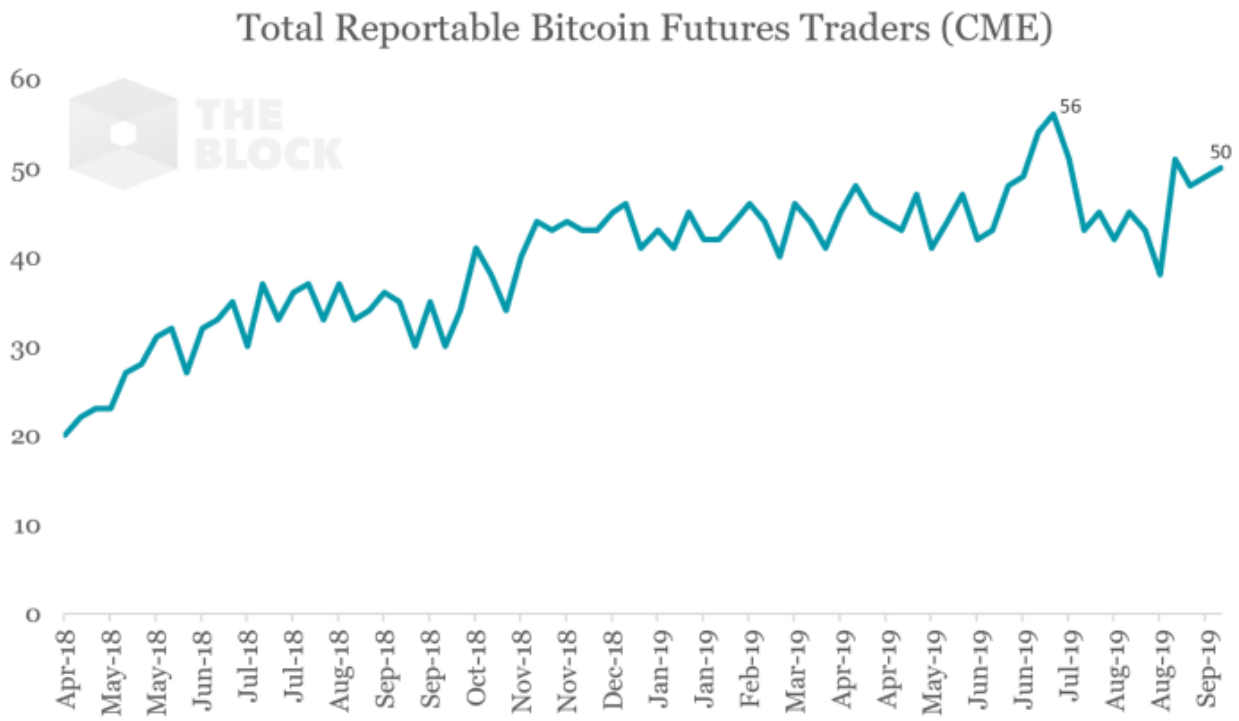
While 3Q saw a peak in total volumes and notional value of open interest on bitcoin futures outstanding in July (when bitcoin spiked to over $13,800 intra-day), notional values have come back down to where the quarter started (~$212 million). On average, however, the quarter saw ~$272 million worth of estimated outstanding notional value, up 65% since 2Q averages, and +150% on the year.



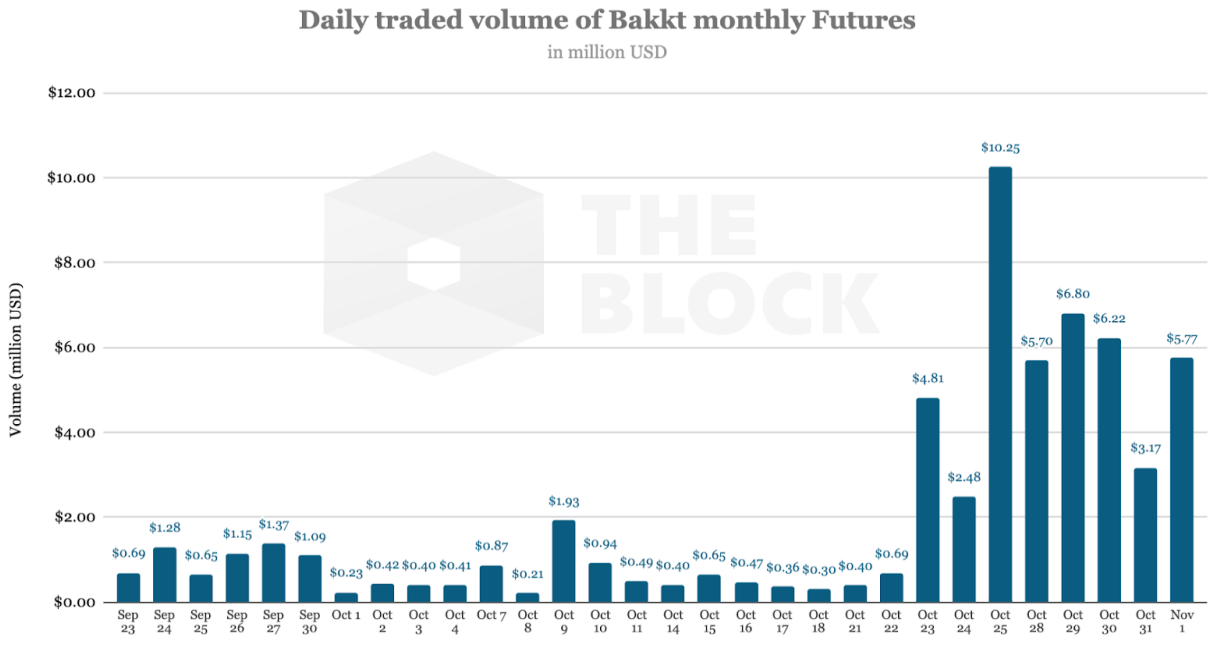
Who's driving these outsized volumes? At a high-level, speculators and smaller non-reportable traders (non-commercial traders make up >75% most quarters). Those that get classified as "commercial" traders, usually those that use futures for hedging purposes (typically on a commodity input cost), have continued to make up an immaterial portion of the total mix.



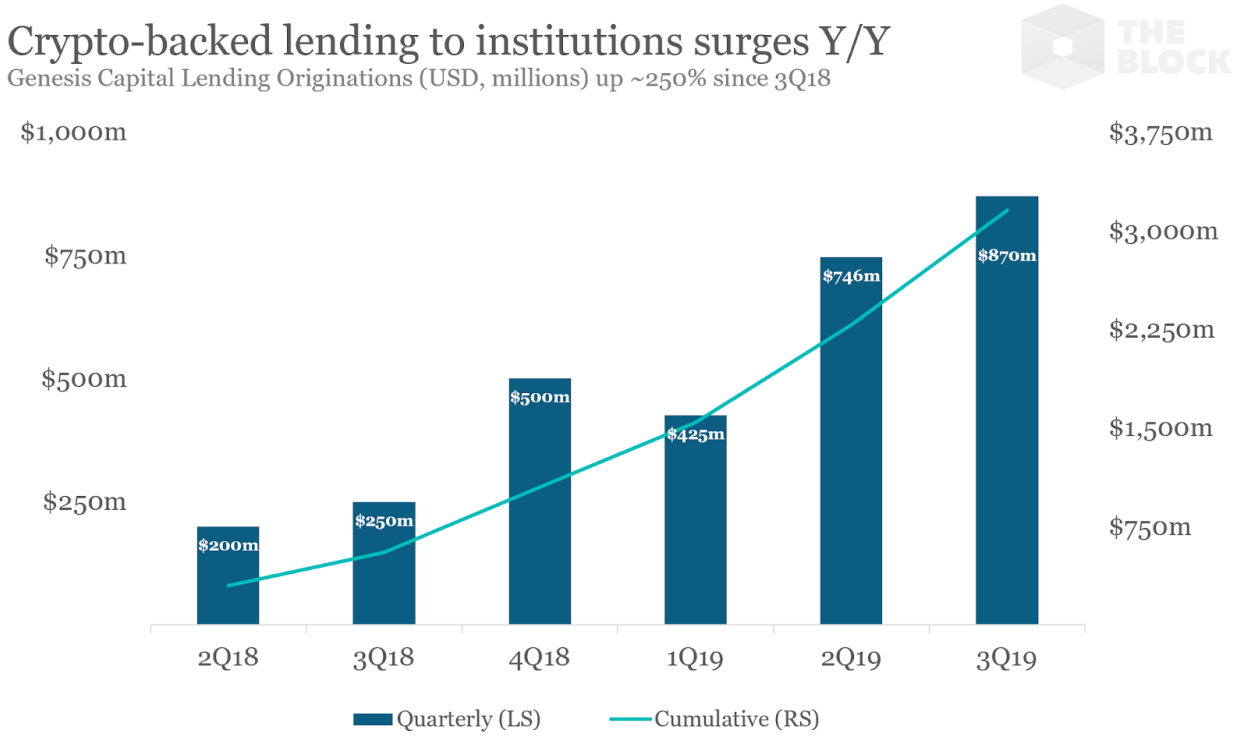
Interesting to note that the total reportable CFTC bitcoin futures traders (those trading more than 25 BTC or five contracts, ~$250,000 in notional value this quarter) still sits at about 50 total traders.



Following its underwhelming inception in late September, Bakkt recently witnessed a significant (and sustained) increase in the trading volume of its physically-settled monthly bitcoin futures, hitting around $10.25 million on Oct. 25. The average daily traded volume of Bakkt monthly futures has been $5.65 million in the last 8 trading days. The average was only $0.7 million for all the days prior to Oct. 23.

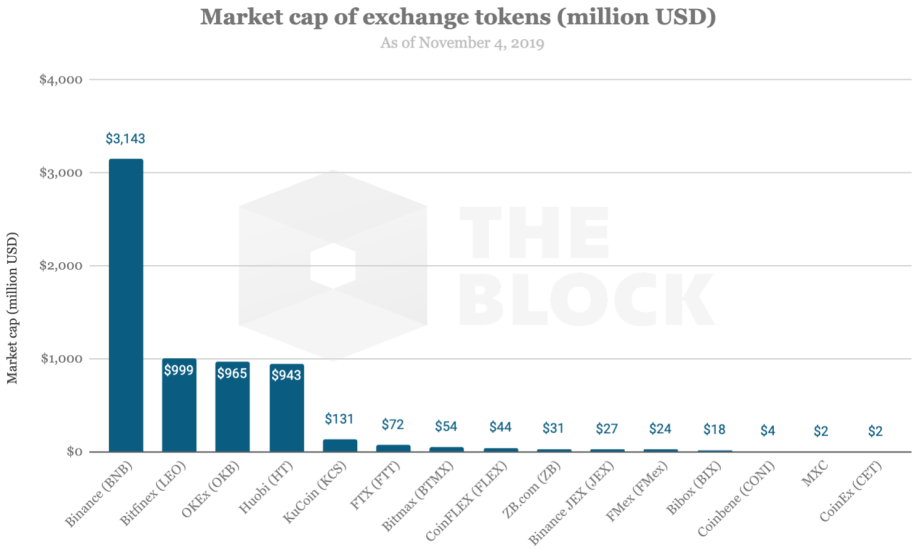


Demand for crypto-backed loans also appears to be increasing, according to a report by Genesis Capital, the lending arm of institutional over-the-counter cryptocurrency trading firm Genesis Global Trading. Loan origination growth hit a new record in Q3; adding $870 million worth in new crypto loan originations, bringing its total originations to $3.1 billion since launching the business in March 2018.



Exchange tokens

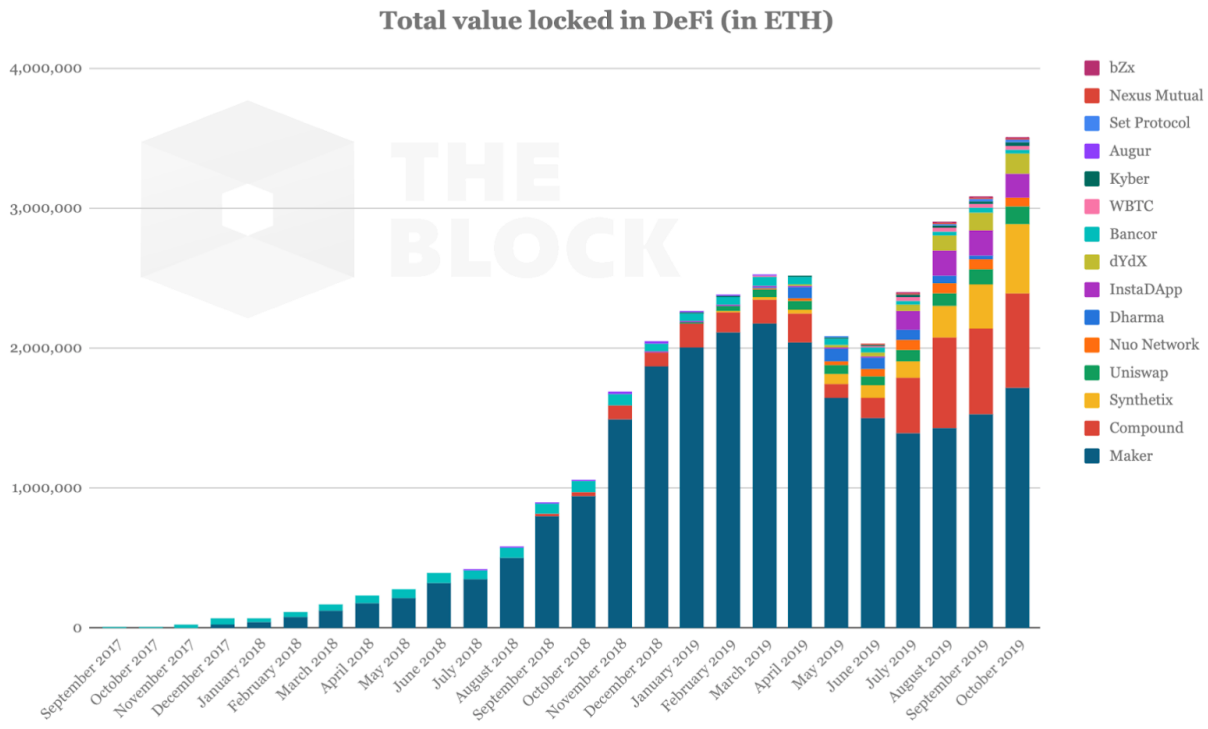
Binance's BNB is the largest exchange token, by far, with a market cap of $3.14 billion. It is more than three times larger than the trailing exchange tokens by Bitfinex, OKEx and Huobi.



Only five exchanges have a token with a market cap of more than $100 million—Binance, Bitfinex, OKEx, Huobi and KuCoin. BNB is currently 48.7% of the total exchange token market cap; trailed by Bitfinex (15.5%), OKEx (14.9%), Huobi (14.6%), KuCoin (2.0%) and FTX (1.1%). The total market cap of exchange tokens is currently $6.46 billion.

Decentralized Finance

The recent months in Decentralized Finance have largely been defined by the maturation and increasing sophistication of market structure.



In May, MakerDAO's stakeholders had raised the system's Stability Fee to 19.5% in an attempt to quell supply glut and return Dai to its U.S. dollar soft peg. Today, the Stability Fee sits at 5.5% while outstanding Dai supply is at all-time highs. This optimistic dynamic is largely the result of increased market maker confidence in the peg maintenance mechanisms: there is now increasing willingness to set tighter spreads, buying up any discounted Dai in expectation of an imminent return to the

peg. Ceteris paribus, the introduction of the Dai Savings Rate under Multi Collateral Dai—an in-built savings rate for Dai holders paid for by lenders—will result in further interest rate depreciation as more supply is taken off the market.

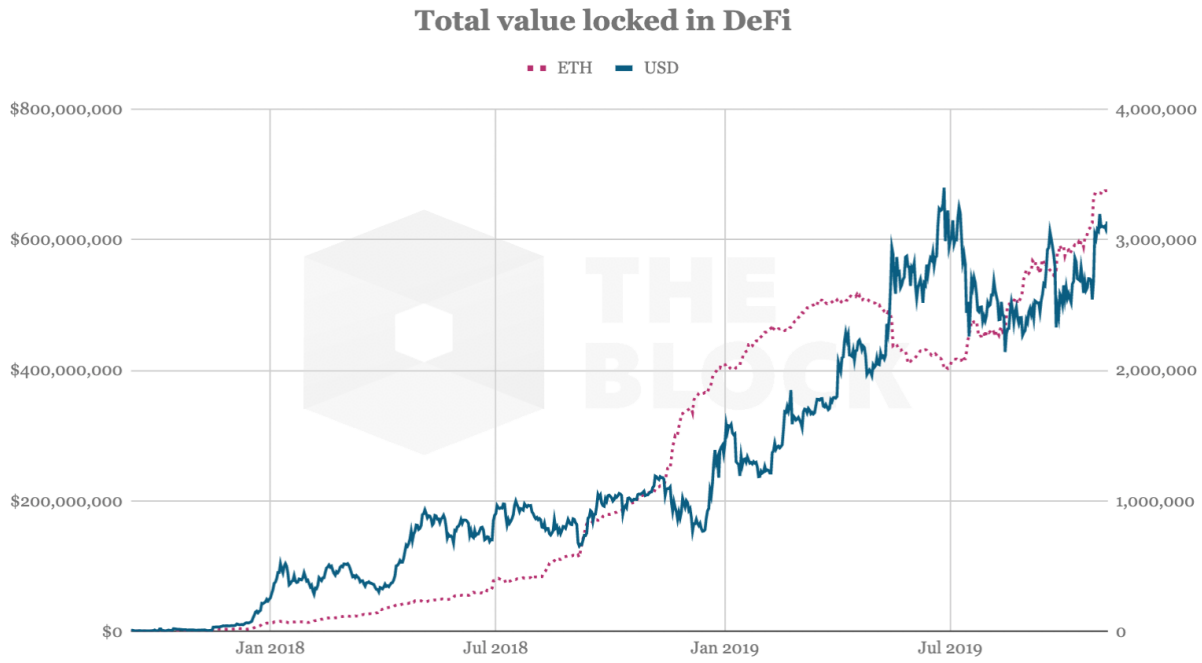
This lowering of the Stability Fee has had a dramatic effect on secondary lending markets. From May to November, secondary lending platforms saw considerable stablecoin inflows as risk-averse speculators sought to take advantage of double-digit yields while multiple venture-backed consumer-facing lending applications—Linen, Outlet Finance, Gossamer—launched to take advantage of this low-risk, high-return aberration. Since then, yields have fallen considerably, potentially threatening near-medium term future lending liquidity growth and adoption of these neo-saving account alternatives. Margin trading exchange, dYdX, now dominates with respect to originations, aided by the seamless user experience of opening leveraged positions.

Meanwhile, exotic lending-related products continue to proliferate: Paradigm's Dan Robinson published a specification for zero-coupon bonds, providing a path to fixed interest rates and an on-chain yield curve, while multiple Ethereum hackathon entrants have built beta applications for interest rate swaps and futures.

The 'decentralized exchange' landscape has also undergone significant change, with volume increasingly directed through aggregation platforms like 1inch and Totle, which push orders across a variety of venues according to best execution. This poses some risk to those working on the protocol side as their liquidity becomes increasingly commoditized: maintaining control over the end-user seems somewhat essential to long-term monetization strategies. dYdX's decision to roll out its own native markets and relinquish support for 0x-based venues is illustrative of this changing dynamic.

Uniswap, the Automated Market Maker exchange protocol, now has some competition in the imminent Balancer, a generalized version AMM offering. However, Uniswap's impending transition to v2, which will support ERC20-ERC20 liquidity pools alongside an on-chain price oracle, may help to shore up its success. Further, Uniswap's willingness to experiment with Layer 2 infrastructure like Optimistic Rollup, which provides instant finality, higher throughput, and lower gas costs, may help it maintain its current lead.

The future of DeFi looks increasingly bright. Both entrepreneurs and investors continue to embrace the notion that non-custodial, non-centralized financial products and financial services have near-term product-market fit and perfectly illustrate the value proposition that blockchain technology provides. Questions around paths to profitability linger, although most teams currently prioritize growth over earnings as they wait for the regulatory landscape to adapt to this disruptive paradigm.



The Block Research Team

Macro

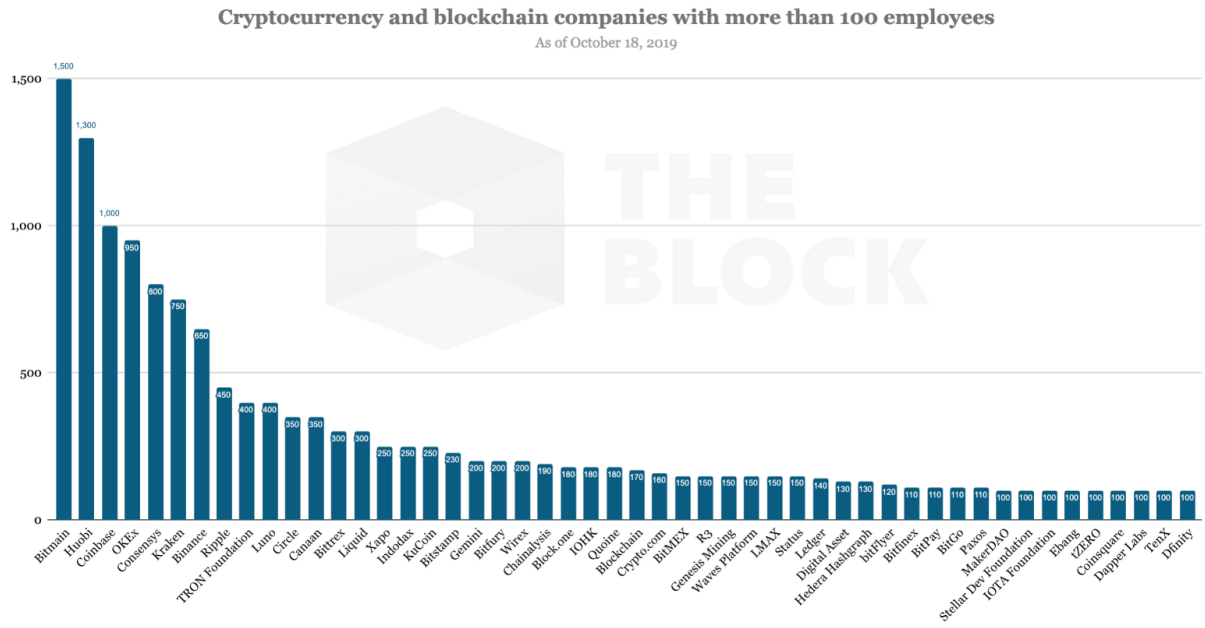
Research: 42% of blockchain industry employees work for exchanges

October 23, 2019

Quick Take

- The Block has analyzed 158 companies exclusively involved in blockchain and cryptocurrencies
- At least 50 companies in the blockchain industry currently employ more than 100 people
- The largest is Bitmain with 1,500 employees, followed by Huobi (~1,300), Coinbase (~1,000) and OKEx (~950)
- More than 42% of all people in the blockchain industry work for cryptocurrency exchanges, another 10% for mining hardware manufacturers

Despite its cyclical tendencies, the blockchain industry continues to grow. There are now 11 companies worth more than $1 billion, according to Hurun's inaugural list of unicorns. According to The Block's research, at least 50 companies in the blockchain industry currently employ more than 100 people.



Source: The Block

The largest company, by the number of employees, is ASIC producer Bitmain, with about 1,500. Bitmain is followed by three exchanges—Huobi (~1,300), Coinbase (~1,000) and OKEx (~950).

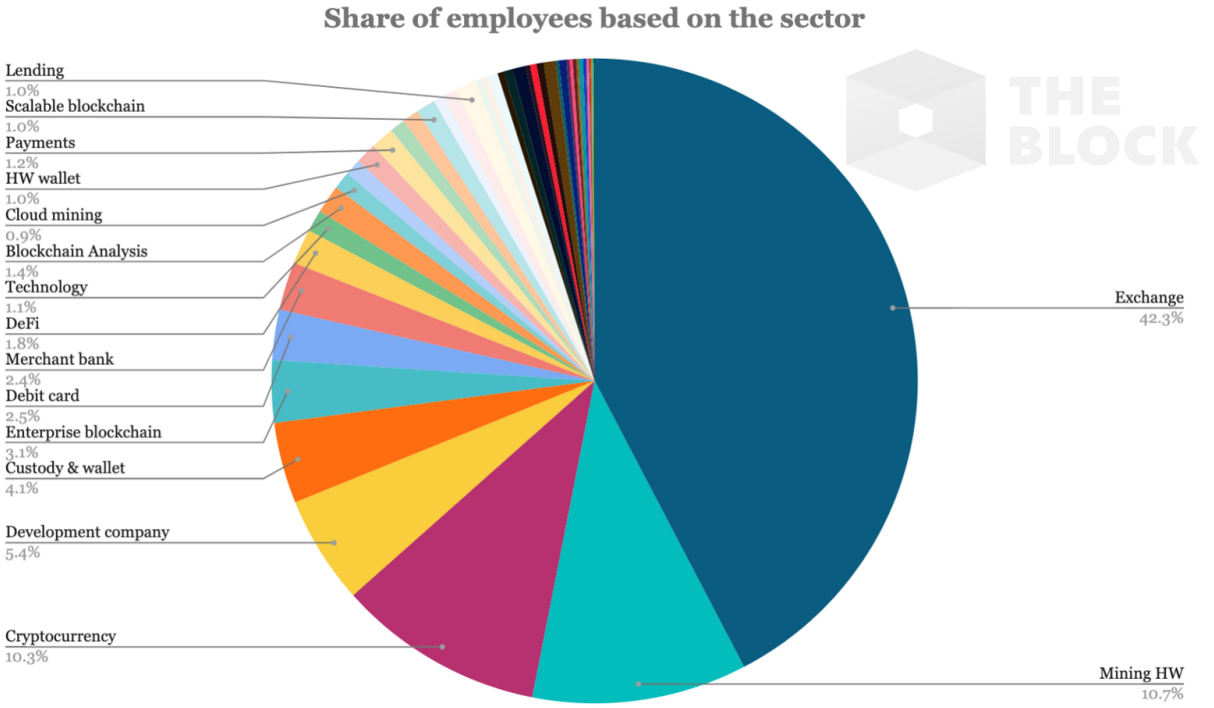
Company	Employees
Bitmain	1,500
Huobi	1,300
Coinbase	1,000
OKEx	950
Consensys	800
Kraken	750
Binance	650
Ripple	450
TRON Foundation	400
Luno	400

Source: The Block

The Block has analyzed 158 companies exclusively involved in blockchain and cryptocurrencies. It's likely that a few companies are missing from this sample, but the most significant companies are included. These 158 companies employ a total of 18,200 people.

More than 42% of all people in the blockchain industry work for cryptocurrency exchanges. About 7,700 people combined work for 30 different exchanges. The second-largest sector by number of employees is mining hardware production, in which Bitmain, Canaan and Ebang combined employ nearly 11% of blockchain industry workers. This means more than half of the people in the space are working for either exchanges or ASIC hardware manufacturers.

Another 10% are working for foundations that govern different cryptocurrencies. Ripple, TRON, Block.one and IOHK appear to be the largest employers in this sector.



Source: The Block

Perhaps not surprisingly, the three sectors that employ the most people are also the only ones that have been historically profitable. Cryptocurrency exchanges generate revenues from trading fees, ASIC manufacturing companies from selling their hardware and cryptocurrency foundations from selling their coins. The vast majority of companies in other sectors are still in the bootstrapping phase.

The cryptocurrency and blockchain space will start maturing when profitable companies start coming out of other non-infrastructural sectors. One such promising sector could be cryptocurrency and stablecoin lending.

The data on the number of employees was collected by speaking to the companies. Some companies (Bitmain, Huobi and some others) refused to disclose. The numbers for companies that refused to disclose were collected through multiple secondary sources. These numbers might not be exact but they are the best estimate and should be indicative of the real number.

What's at stake? A comparison of the value in validators that offer staking for Cosmos and Tezos

October 17, 2019

Quick Take

- Some staking services initially began as being secluded to a specific blockchain, as newer networks have popped up, many of these services have diversified and now offer staking services for numerous blockchains.
- The staking service Staked.fish currently has $34,520,615 delegating to its Cosmos validator compared to $3,378,613 to Tezos, approximately a difference of 922%
- Polychain Labs has an influential presence on both networks with the second-largest validator on Cosmos and largest validator on Tezos when excluding the foundation bakers

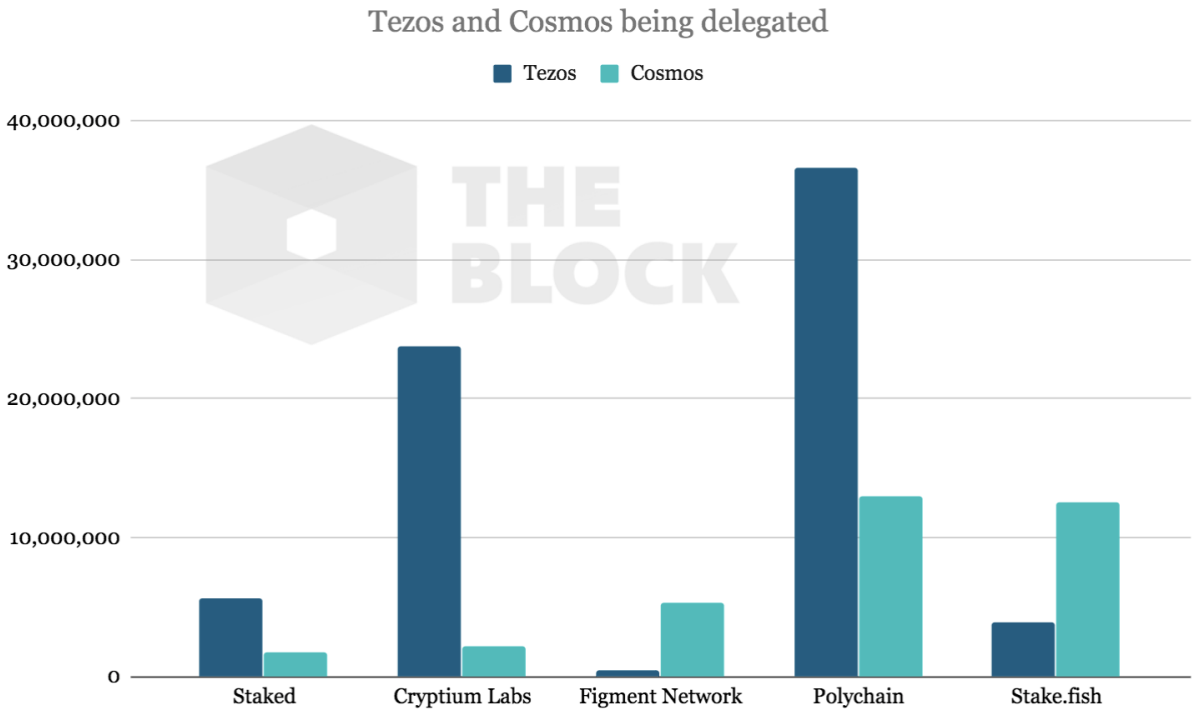
As Proof-of-Stake (POS) networks continue to grow in popularity, businesses have begun launching services to cater to these networks. These services allow participants, who lack either the required number of tokens or the technical skills, to become validators, as part of a pool, that participates in the consensus of POS networks and gains their block rewards.

While some services started with focuses on a specific blockchain, as newer networks have popped up, many of these services have diversified and now offer staking services for numerous different blockchains.

We will consider five validators that offer these services for multiple networks, and more specifically, for Cosmos and Tezos. The validators we will be discussing include Staked, Cryptium Labs, Figment Network, Polychain Labs, and Stake.fish. We will also

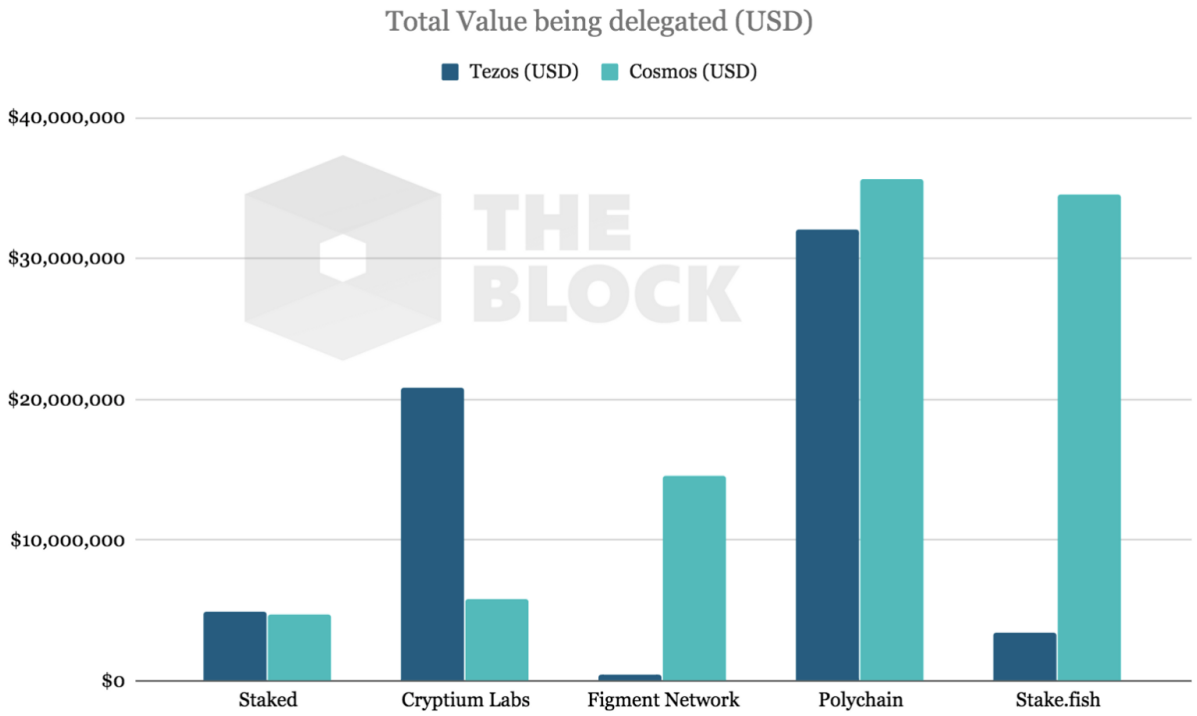
analyze how much value is being managed in each of these Cosmos and Tezos validators.

Units



In terms of units, Staked has about 232% more Tezos (XTZ) than Cosmos (ATOM). Cryptium Labs has approximately 1021% more Tezos delegated with its validator than Cosmos. Figment network is on the opposite spectrum, where it is the ninth largest validator on the Cosmos network with about 1082% more Cosmos staking with its validator than Tezos. Polychain now has two validators on the Tezos, with the majority of the value being on one— for our research we've combined both validators. Polychain has approximately 183% more Tezos delegated than Cosmos. Stake.fish has around 224% more Cosmos delegated to its services than Tezos.

Value (USD)

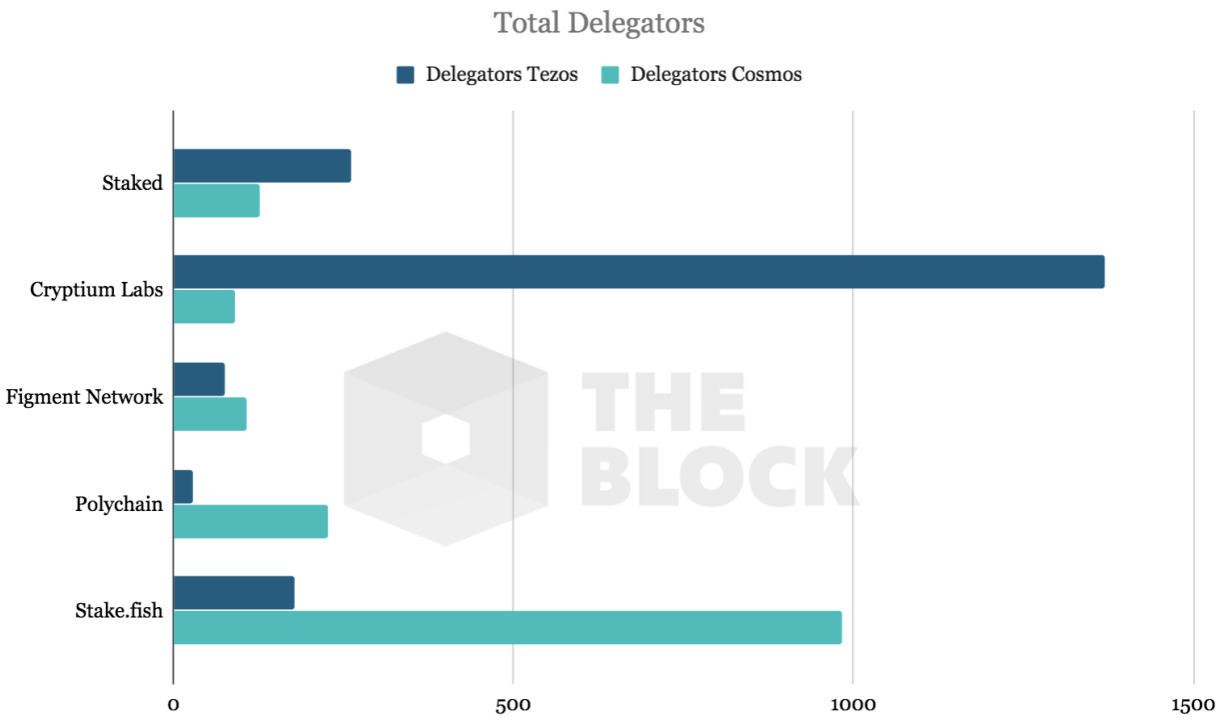


An operator may have way less or more of Cosmos or Tezos when measured by its units, but this does not reveal enough relative to the value stored there. Currently, the per-unit price of Cosmos ($2.76) is approximately 215% higher than Tezos ($0.88).

Staked provides an excellent example of why looking at units alone is deceiving. Staked has much more Tezos than Cosmos delegated on a per-unit basis, but when measured in USD, the service has nearly the same amount of capital parked in its validators.

Cryptium Labs has approximately 256% more capital in its Tezos validator than Cosmos. Figment Network has drastically more capital in its Cosmos service, with $14,502,755 compared to just $389,657, or about 3,622% more. Polychain, like Staked, has similar capital in each of validators, where it has $35,647,738 being delegated on Cosmos compared to $32,041,907 on Tezos, about an 11% difference. Staked.fish has approximately 922% more capital delegated on its Cosmos validator, with $34,520,615 compared to $3,378,613.

Delegators



Delegates tell us how many unique addresses are assigning their funds with these validators. We do note, however, that a high percentage of these addresses hold a non-significant amount of funds, which inflates the numbers.
Staked has similar capital in each of its Cosmos and Tezos validators, however, it has approximately 107% more delegators delegating funds with its Tezos validator. Staked.fish has 804 more delegates, or about 449% more on Cosmos than on Tezos. Whereas Cryptium Labs has 1,278 more delegates on Tezos, or about 1,404% more. The higher amount of delegates on Cosmos for Stake.fish and higher amount of delegates on Tezos for Cryptium Labs partially explains why they have much higher capital on one validator over another.

While Polychain has approximately 11% more capital in its Cosmos validator, it has 686% more Cosmos delegates.

Voting Power

Voting power amongst Validators					
	Staked	Cryptium Labs	Figment Network	Polychain	Stake.fish
Cosmos	0.93%	1.17%	2.91%	7.16%	6.93%
Tezos	0.96%	4.07%	0.08%	6.25%	0.66%

Voting power reveals how much influence each validator has when it comes to the governance of the network.

Staked has almost identical voting power across both networks, where it has 0.93% with Cosmos and 0.96% with Tezos. Polychain has significant influences on both networks. The firm is the second-largest validator on Cosmos at 7.16% and is the largest validator on Tezos outside of the foundation bakers at 6.25%. While Stake.fish doesn't have a significant presence with its Tezos validator, it is currently the third-largest validator on the Cosmos network, where 6.93% of all atoms (the native token of the Cosmos network) that are staking are delegated to Stake.fish.

Conclusion

Most staking services or validators now offer their services for numerous blockchains. While this is true, some still provide the majority of their services toward one blockchain. Stake.fish may provide support for Tezos, but as things currently stand, it has about 922% more capital delegated to its Cosmos validator. The opposite can be said for other validators such as for Polychain Labs, where it has pretty equal value and a substantial amount of voting power on both networks.

A look at which institutional investors hold Grayscale trust products

October 23, 2019

Quick Take

- Total AUM for Grayscale products still sits above $2 billion, but came down 22% since last month. AUM is up 40% Y/Y across investment products
- According to 13F filings, we found that 1.3% of Grayscale Bitcoin Trust assets (private placement) come from institutional investors with more than $100m in AUM in the U.S. The other 98.3% come from unknown clients under the $100m watermark, or not subject to 13F filings (note 53% of Q3 inflows came from offshore investors)
- Finally, we found zero institutions with more than $100m in AUM in the U.S. that have owned the Ethereum trust product since inception, also noting that offshore investors aren't applicable to 13F filings

Behind The Scoop offers Genesis subscribers a summary of what we learned from our podcast guests, and profiles research to further the discussion beyond the latest episode.

On this episode of The Scoop, Michael Sonnenshein talks about the largest Q3 that Grayscale has experienced in its six-year history, the increased participation of institutions in the space and the transference of traditional wealth that will be occurring over the next couple of decades -- a transference that will undoubtedly expand the scope and usage of digital currencies.

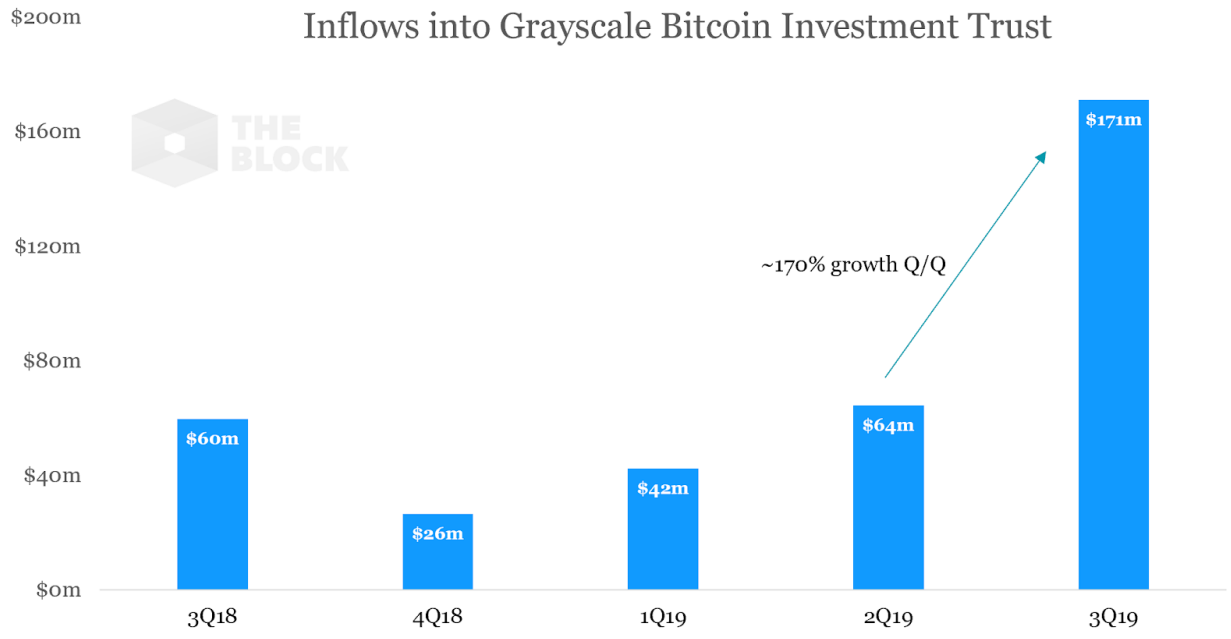
Interview Summary

Whether it's you guys or other folks in the press, you're always asking us, where are the institutions? And why aren't the institutions coming into digital currencies yet? And I would argue that they've been not only showing up to Grayscale, but they've actually been showing up in droves.

MICHAEL SONNENSHEIN

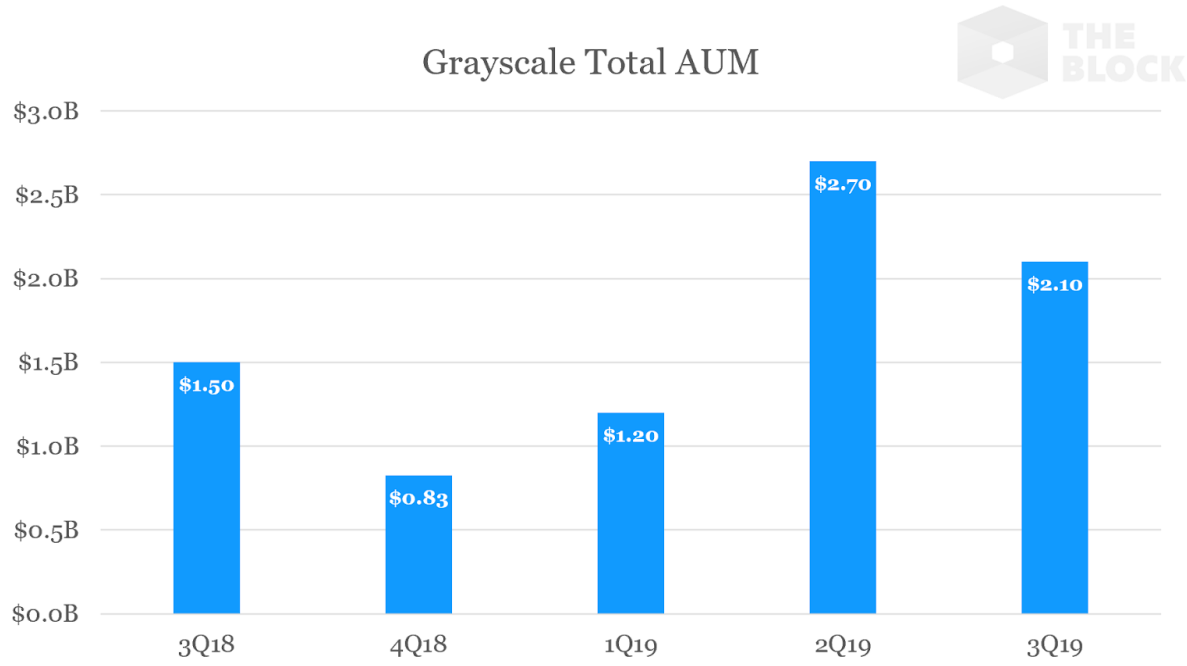
Grayscale released its 3Q19 Investment Report last week, highlighting fund flows, investor mix, and total AUM across its Bitcoin investment trust product, and other asset trust products (Ethereum, Ethereum Classic, Z-cash, etc.).

In the third quarter, Grayscale saw record quarterly inflows across investment products (total inflows were ~$260 million for the quarter), of which more than $170 million flowed into its bitcoin trust product, up ~170% Y/Y and Q/Q. Grayscale also saw record flows into its Ethereum trust product at an estimated 25% mix of total flows, or ~$63 million worth.

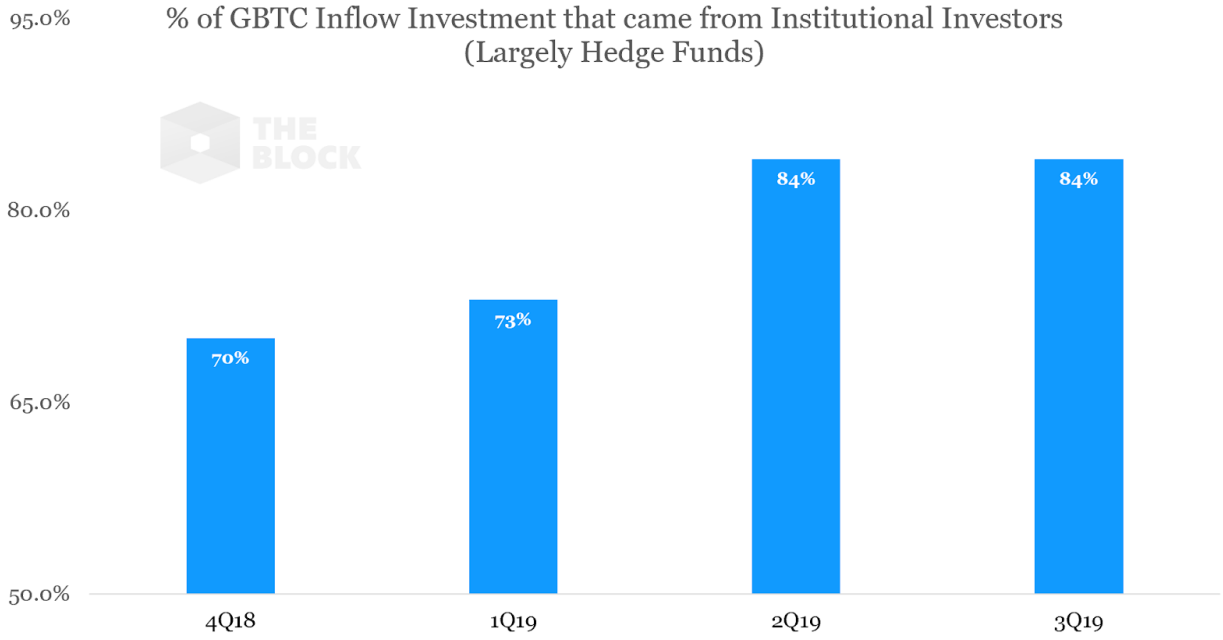


Source: Grayscale Q3 Digital Asset Investment Report

Total AUM for Grayscale products still sits above $2 billion, but came down 22% since last month. AUM is up 40% Y/Y across investment products.



Institutional investors continue to compose the bulk of purchasers for these products, as the percent of total flow of investment for the quarter from institutional investors (largely hedge funds) now sits at 84%, up 14% since the end of 2018.



So the secret -- or the not-so-secret -- sauce at Grayscale is the fact that we have packaged digital currency exposure into a security so if you're a hedge fund, if you're a high net worth investor you can buy into any one of our private placements any day of the week. We have 10 different funds and that lets you do something that feels very familiar to any of the other investments you make. It's a security with a CUSIP and has audited financial statements and produces tax documents. It's what investors want to see.

--MICHAEL SONNENSHEIN

On The Scoop, Sonnenshein downplayed competitive impact from new competing products out in the market potentially taking future share from GBTC. Because Grayscale's trust product is subject to a one-year hold period, Bakkt's physically settled future or CME Group's Bitcoin futures, may lead to more expensive hedging costs than just holding GBTC for a full-year because of the need to roll over future contracts month to month throughout the year.

While Sonnenshein noted the prevalence of GBTC's premium to NAV (net asset value), he believes the premium is further evidence of the dislocation in the market driven by greater demand for the only available security available in the U.S. to let investors gain exposure to Bitcoin "right alongside any of the other assets they may own in their brokerage or retirement accounts." He also acknowledged that an ETF is really more of a matter of when, not so much a matter of if.

Who are the "institutional investors"?

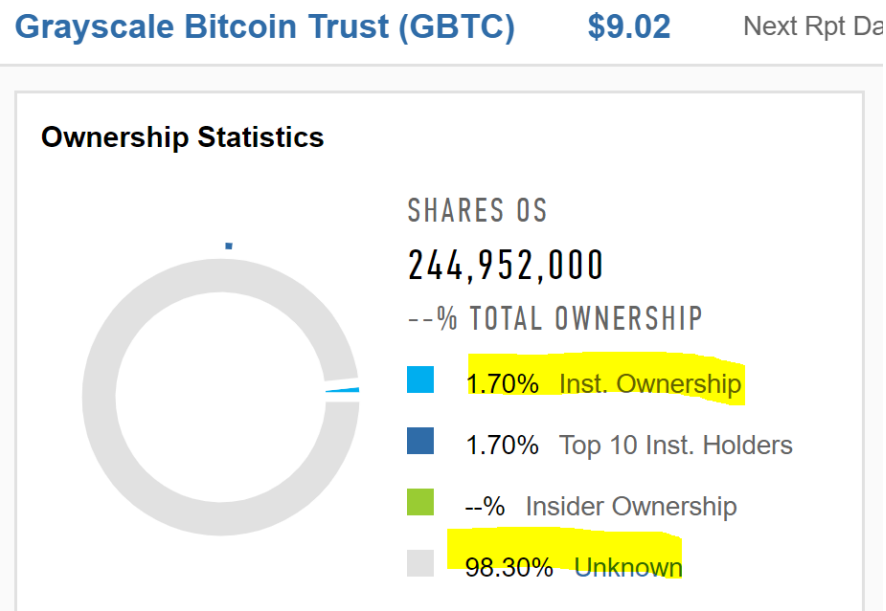
So the picture that I'm hopefully painting for you is one of that the investor that's coming to us is usually not that like startup fund that just got their funding and is trying to swing for the fences early on and building their track record. And it's important to take that away because it's showing compelling data that institutions who have been through all kinds of cycles are really excited about this asset class

--MICHAEL SONNENSHEIN

When asked about the typical profile of the institutional investors contributing the 84% of inflows into the products, Sonnenshein was quick to note that they actually aren't crypto hedge funds, or funds that can handle their own digital asset exposure. He did, however, note that these funds were indeed global macro funds, individual tech investors, arb and momentum funds, "really the whole gamut." Sonnenshein also said that the institutions Grayscale is interacting with are "getting larger in terms of AUM, and operating track record," and can be as large as $10-15 billion in AUM.

We took a look at Grayscale's largest institutional holders, and confirmed that there are indeed a number of funds that are anywhere from $5-10 billion in AUM that are "clients" of the Bitcoin investment trust product, however at a much smaller allocation size into the trust product than we would have originally expected.

In fact, according to 13F filings, we found that 1.3% of Grayscale Bitcoin Trust assets come from institutional investors with more than $100m in AUM in the U.S. The other 98.3% come from unknown clients (or clients outside the U.S.), that don't have to report holding because they are under the $100m AUM mark (or don't have to file 13F because they are outside the U.S.). Considering more than 50% of inflows in Q3 came from offshore accounts, there could be larger non-U.S. based institutions that hold the bitcoin trust product.



This value represents the difference between shares held by Institutions & Insiders and shares outstanding.

- Individual investors who have not crossed a disclosure threshold
- Mutual funds not covered due to non-disclosure laws e.g. Cayman Islands
- Institutional investors in US managing less than $100 million and do not file 13F
- Institutional investors outside the US who disregard 13F requirements or manage less than $100 million

Within the U.S., of the 1.3% top largest institutions that hold the product, only Horizon Kinetics Asset Management and ARK Investment Management hold any material portion of the bitcoin trust securities in their portfolios (Horizon holds ~$21 million worth of bitcoin trust securities, and ARK holds $15 million worth).

Top 15 Institutions / Top 5 Insiders/Stakeholders

Rank	Type	%OS	Position (000)	Pos Chg (000) [Recent]	Mkt Val (MM)	% Port	Activism	Report Date	Source
-	**Total**	**1.70**	**4,172**	**-2,165**	**38**	-	-	-	-
-	Institutions	1.70	4,172	-2,165	38	-	-	-	-
1	Horizon Kinetics Asset Management LLC	0.96	2,359	-18	21	0.63	Very Low	06/30/2019	Sum of Funds
2	ARK Investment Management LLC	0.70	1,705	-2,205	15	0.47	Very Low	06/30/2019	13F Form
3	Purpose Investments, Inc.	0.02	45	45	0	0.05	Very Low	07/31/2019	Sum of Funds
4	Boston Private Wealth LLC	0.01	20	-9	0	0.01	Very Low	06/30/2019	13F Form
5	Edge Wealth Management LLC	0.01	19	14	0	0.04	Very Low	09/30/2019	13F Form
6	Rothschild Investment Corp.	0.00	12	0	0	0.01	Very Low	09/30/2019	13F Form
7	FNY Capital Management LP	0.00	4	4	0	0.02	Low	06/30/2019	13F Form
8	Davis-Rea Ltd.	0.00	2	2	0	0.01	Very Low	06/30/2019	Sum of Funds
9	Horrell Capital Management, Inc.	0.00	2	0	0	0.01	Very Low	09/30/2019	13F Form
10	Heritage Wealth Advisors LLC	0.00	1	0	0	0.00	Very Low	06/30/2019	13F Form
11	Lake Point Wealth Management LLC	0.00	1	0	0	0.01	Very Low	06/30/2019	13F Form
12	IFP Advisors, Inc.	0.00	1	1	0	0.00	Very Low	03/31/2019	13F Form
13	AlphaMark Advisors LLC	0.00	1	0	0	0.00	Very Low	06/30/2019	13F Form
14	Front Row Advisors LLC	0.00	1	0	0	0.00	Very Low	06/30/2019	13F Form
15	WealthStone Family Office LLC	0.00	0	0	0	0.00	Very Low	06/30/2019	13F Form

Source: FactSet

The current ~$15 million position by ARK is about 1% of the value of the ARK Web x.0 ETF it sits within, (and not a top 20 holding), and is actually the lowest total value it's been since late January. The investment manager recently sold ~$22 million worth of Grayscale bitcoin trust shares towards the end of June. FactSet estimates that ARK has lost ~8% historically on holding and rebalancing into the product since 2015, which appears largely in part to holding 8x as many shares at the 2017 market top as they hold today.

Ark Investment Management Llc (F404353)

Historical Position in Grayscale Bitcoin Trust

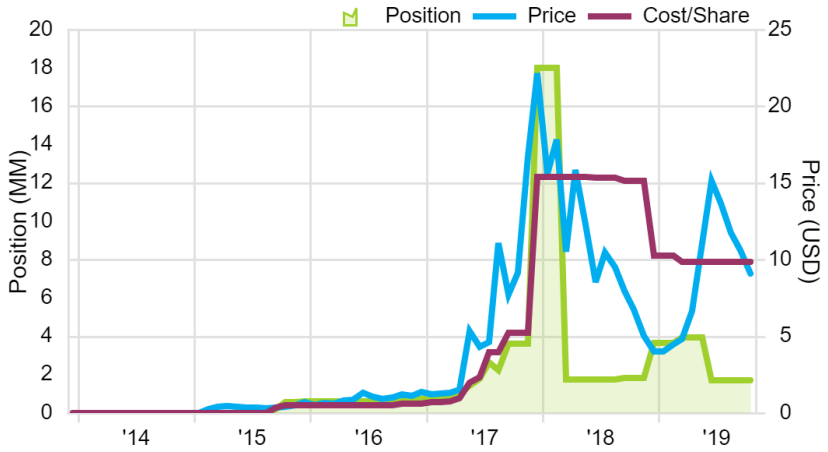
Date	Pos (000)	Pos Chg (000) [1M]	%OS	Cost/Share	Mkt Val (MM)
10/22/2019	1,705	0	0.70	9.85	15.46
09/30/2019	1,705	0	0.70	9.85	18.05
08/30/2019	1,705	0	0.74	9.85	19.98
07/31/2019	1,705	0	0.74	9.85	23.25
06/28/2019	1,705	-2,205	0.74	9.85	25.79
05/31/2019	3,909	0	2.22	9.85	43.24
04/30/2019	3,909	0	2.22	9.85	25.84
03/29/2019	3,909	271	2.22	9.85	18.69
02/28/2019	3,639	0	2.07	10.24	16.23
01/31/2019	3,639	0	2.07	10.24	14.52
12/31/2018	3,639	1,832	2.07	10.24	14.43
11/30/2018	1,807	0	1.03	15.13	9.02

Source: FactSet

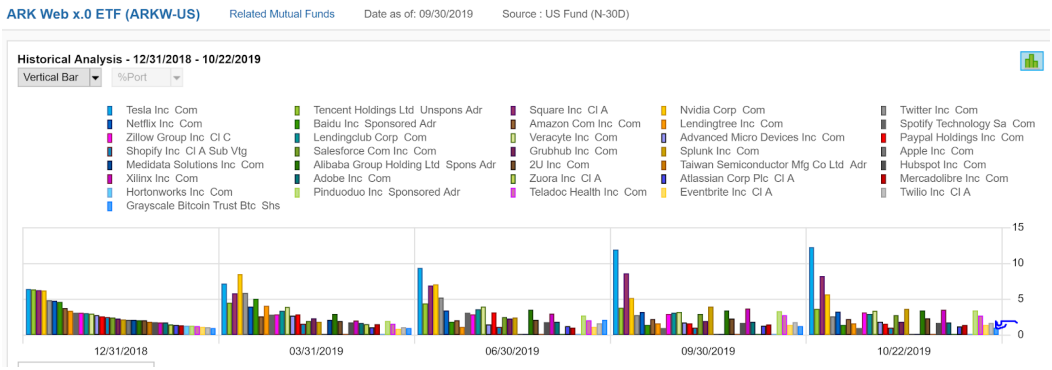
History | MF Detail | History Table

Historical Position in Grayscale Bitcoin Trust (GBTC-US)

Cost/Share	Curr. Price	Estimated Return	Last Pos Chg
$9.85	**$9.07**	**-7.90%**	**-2,204,931** 06/28/2019

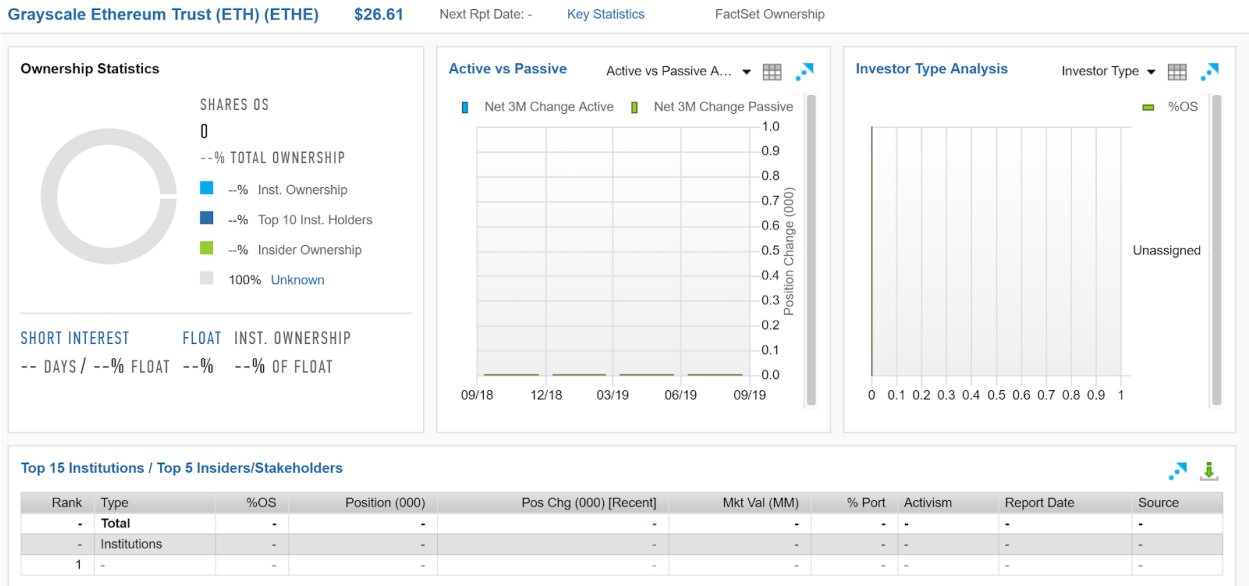


Source: FactSet



Source: FactSet

Finally, we found zero institutions with more than $100m in AUM in the U.S. that have owned the Etheruem trust product since inception.



Despite a recent 40% decline, exchange tokens are still up about 200% in 2019

October 11, 2019

Quick Take

- Even though there has been a 43% decline in the last four months, the market cap of exchange tokens has still grown by 255% since the beginning of the year
- Binance's BNB is the largest exchange token by far, with a market cap of $2.7 billion – nearly three times larger than the trailing LEO
- There appears to be a clear correlation between the market cap of exchange tokens and trading volume
- Exchange tokens seem to be effective at providing exposure to the growth of volume on the underlying exchange

Even though there has been a 43% decline in the last four months, the market cap of exchange tokens has still grown by 255% since the beginning of the year. Exchange tokens appear to be effective at providing exposure to the growth of volume on the underlying exchange.

Virtually all Asian exchanges have issued their own tokens that give holders certain advantages. Exchanges based in the U.S. and Europe have so far avoided the Asian trend; perhaps over concerns regulators would consider the exchange tokens securities.

The most common use-case of exchange tokens is a discount on transaction fees on the exchange. The utility of the tokens varies widely by the exchange though. Some other use-cases include:

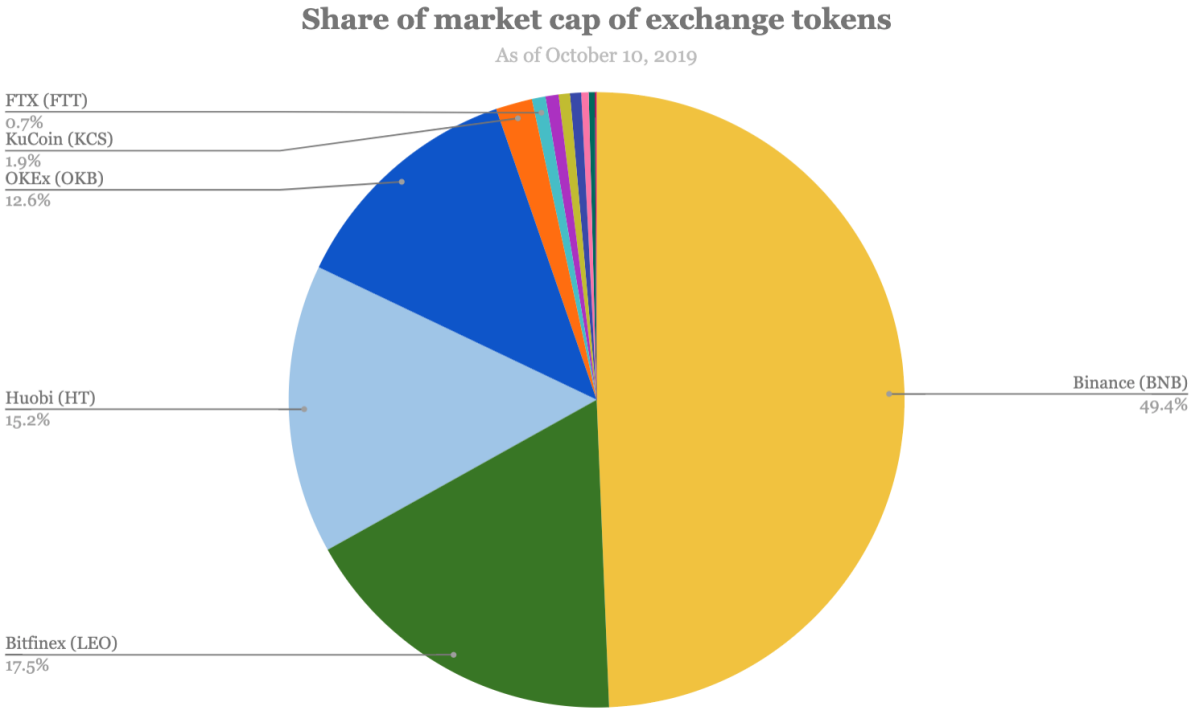
- Ability to participate in Initial Exchange Offerings (IEOs)
- Gas to participate in a decentralized exchange (DEX)

- Governance—voting rights on which token will be listed

Some exchanges also destroy their tokens on a regular basis depending on how much profit or revenue the exchange brings in. However, the majority of exchange tokens, including BNB, do not offer a claim on the exchange's cash flow because simply burning tokens (created at zero cost) from the treasury does not offer the same benefits as a stock buyback. This is slightly different for exchange tokens, such as Bitfinex's LEO, which market buy before the burns.

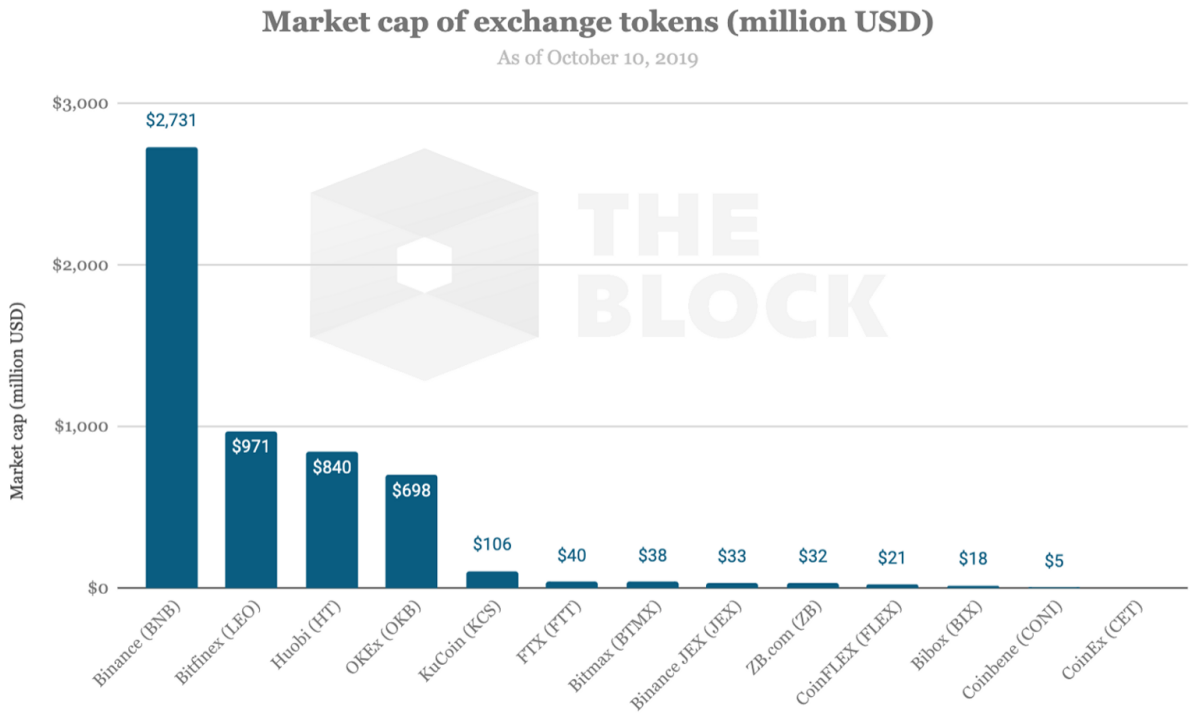
Exchange tokens' value is driven mostly by speculation, but also by the assumption that the demand will increase when more people want to actually utilize the token.

There are currently at least 13 exchanges that have their own exchange tokens—Binance, Bitfinex, Huobi, OKEx, KuCoin, FTX, BitMax, Binance JEX, ZB, CoinFLEX, Bibox, CoinBene, and CoinEX. Together, they have a market cap of nearly $5.5 billion; nearly 4% of Bitcoin's market cap.



Source: CoinGecko, The Block

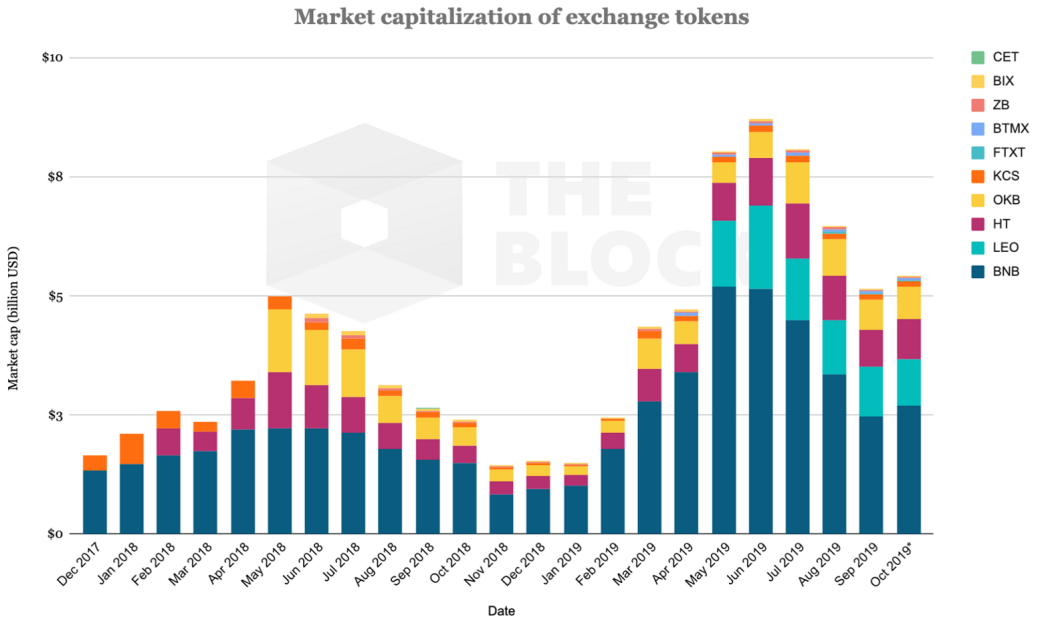
Binance's BNB is the largest exchange token, by far, with a market cap of $2.7 billion. It is nearly three times larger than the trailing LEO, more than three times larger than Huobi's HT and nearly four times larger than OKEx's OKB. Only five exchanges have a token with a market cap of more than $100 million—Binance, Bitfinex, Huobi, OKEx, and KuCoin.



Source: CoinGecko, CoinMarketCap, The Block

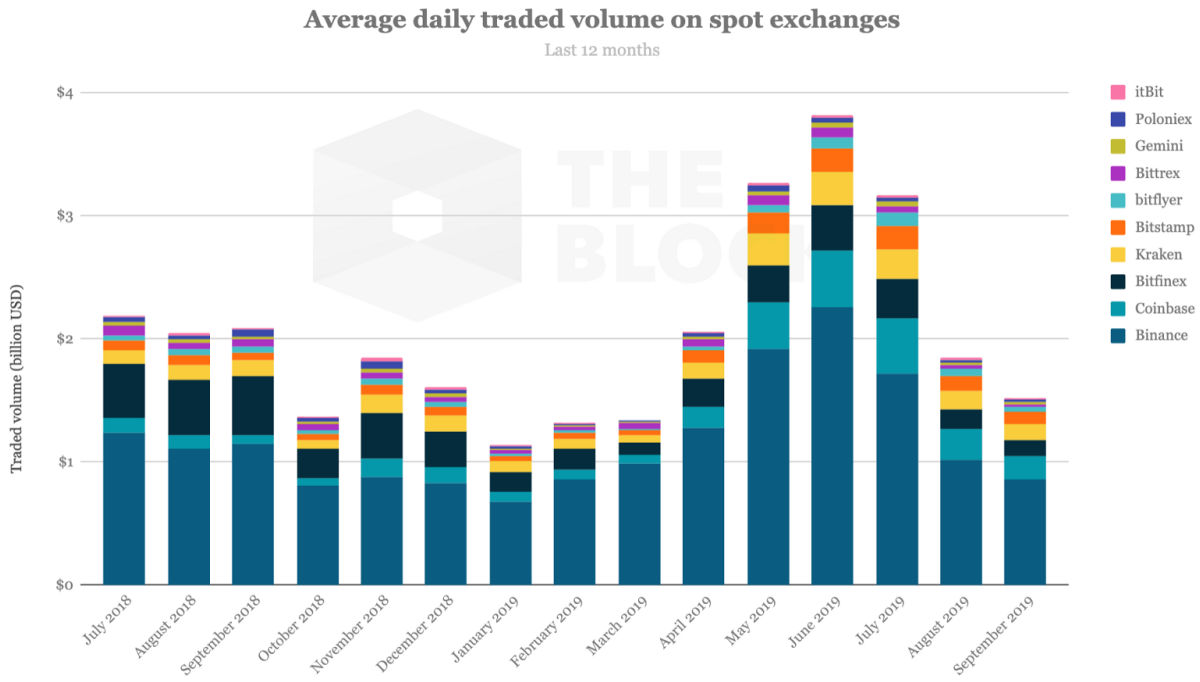
Even though there has been a 43% decline since June, the market cap of exchange tokens has still grown by 255% since the beginning of the year. It's important to caveat, though, that the second-largest exchange token, LEO, launched in May and instantly added a billion USD in market cap. The price of the largest exchange token, BNB, is up by 182% in 2019. Huobi's HT is up 217% while OKEx's OKB is up 239%.

Source: CoinGecko, CoinMarketCap, The Block



Source: CoinGecko, CoinMarketCap, The Block

There is a clear correlation between the market cap of exchange tokens and trading volume as seen in the chart below. It's possible that since trading fees are the dominant source of revenue for the vast majority of exchanges, when the volumes decrease, exchanges earn less revenue and the market reflects that on the price of exchange tokens. Another possible explanation is that since nearly all cryptocurrencies fall in price when the traded volume drops, exchange tokens are just manifesting the same trend since their prices correlate with other cryptocurrencies.



Source: CryptoCompare, The Block

While some jurisdictions would clearly consider the majority of exchange tokens securities, they remain one of the only tokens that deliver users actual utility. Even though there is often no claim on the exchange's cash flows, exchange tokens seem to be effective at providing exposure to the growth of volume on the underlying exchange.

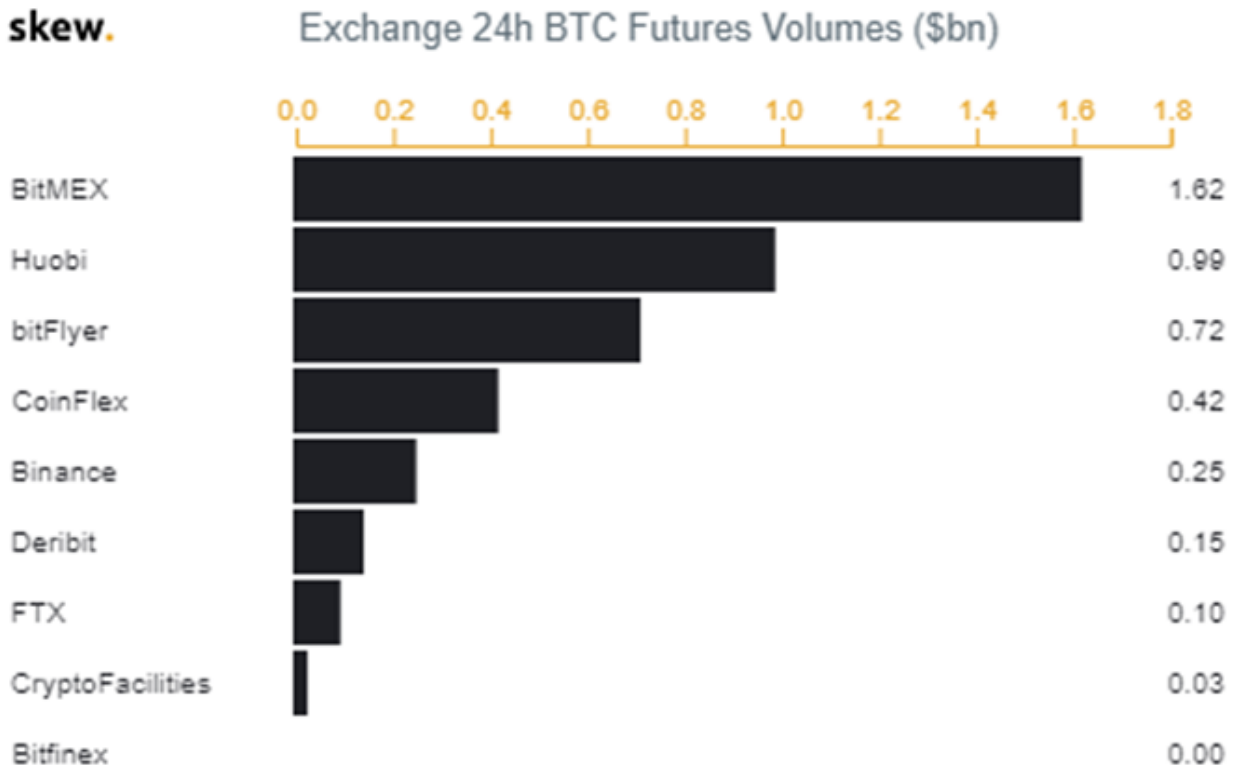
A look at BitMEX futures volume

October 3, 2019

Quick Take

- BitMEX, the market leader in bitcoin futures, has so far experienced a 14% increase in average monthly perpetual contract volumes this year
- However, perpetual contract volumes have declined 44% since June, a similar trend seen in the spot markets
- BitMEX's XBTUSD open interest declined from $1 billion last month to nearly $770 million, mostly due to the $600 million in liquidations that occurred last Tuesday
- Despite that occurrence, total liquidations in 3Q19 were still 8% lower than 2Q19

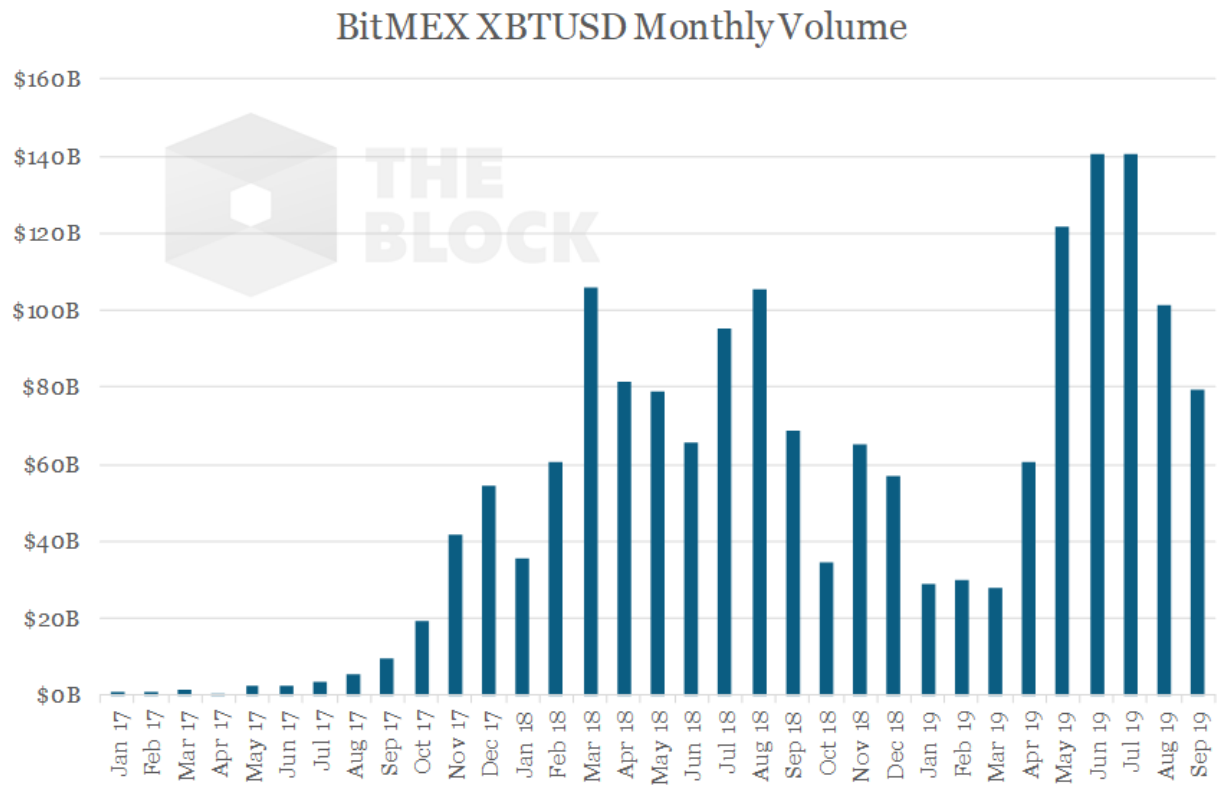
Although Bakkt launched its bitcoin derivatives trading platform last week, its current volume falls well below its competitors. BitMEX has been the market leader with self-reported futures volume generally averaging well above $2 billion per day.



Source: skew

According to skew, BitMEX had the largest bitcoin futures volume within the past 24 hours ($1.6 billion) followed by Huobi ($1 billion) and bitFlyer ($0.7 billion).

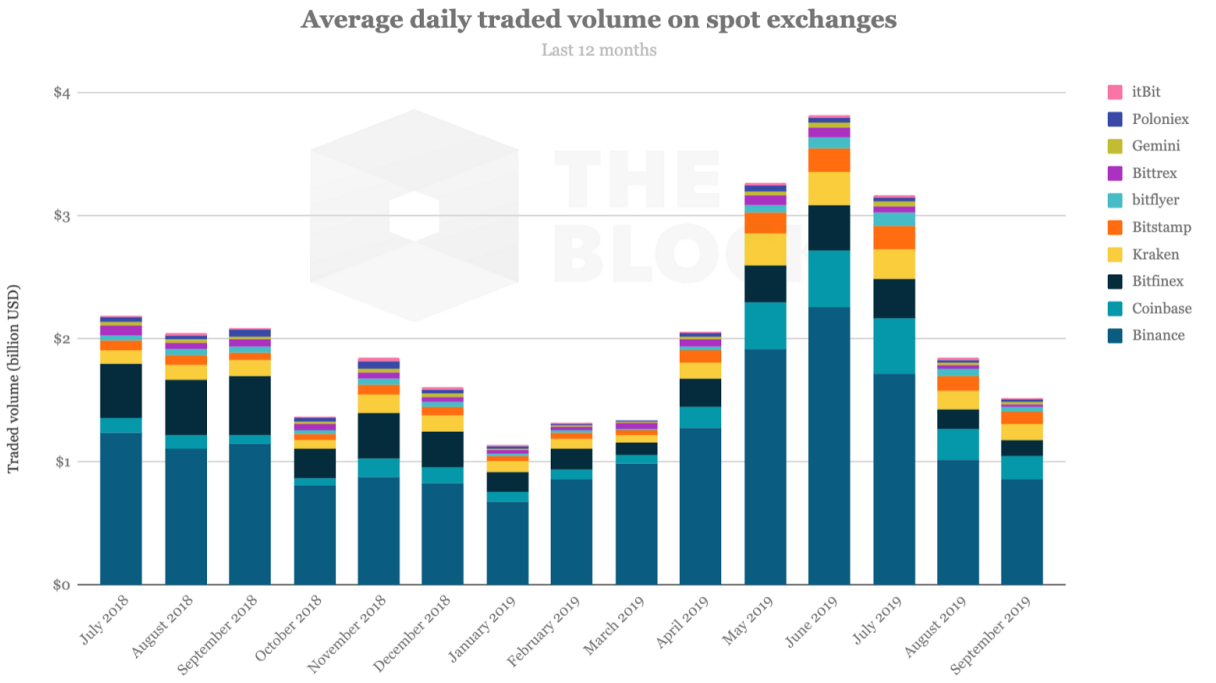
Among BitMEX's futures products, bitcoin perpetual contracts (XBTUSD) have been the most popular. Within the last 24 hours, BitMEX reported XBTUSD volume of $1.5 billion while futures contracts expiring Dec. 27, 2019 (XBTZ19) and March 27, 2020 (XBTH20) had volumes of only $38 million and $13 million respectively.



Source: BitMEX, The Block

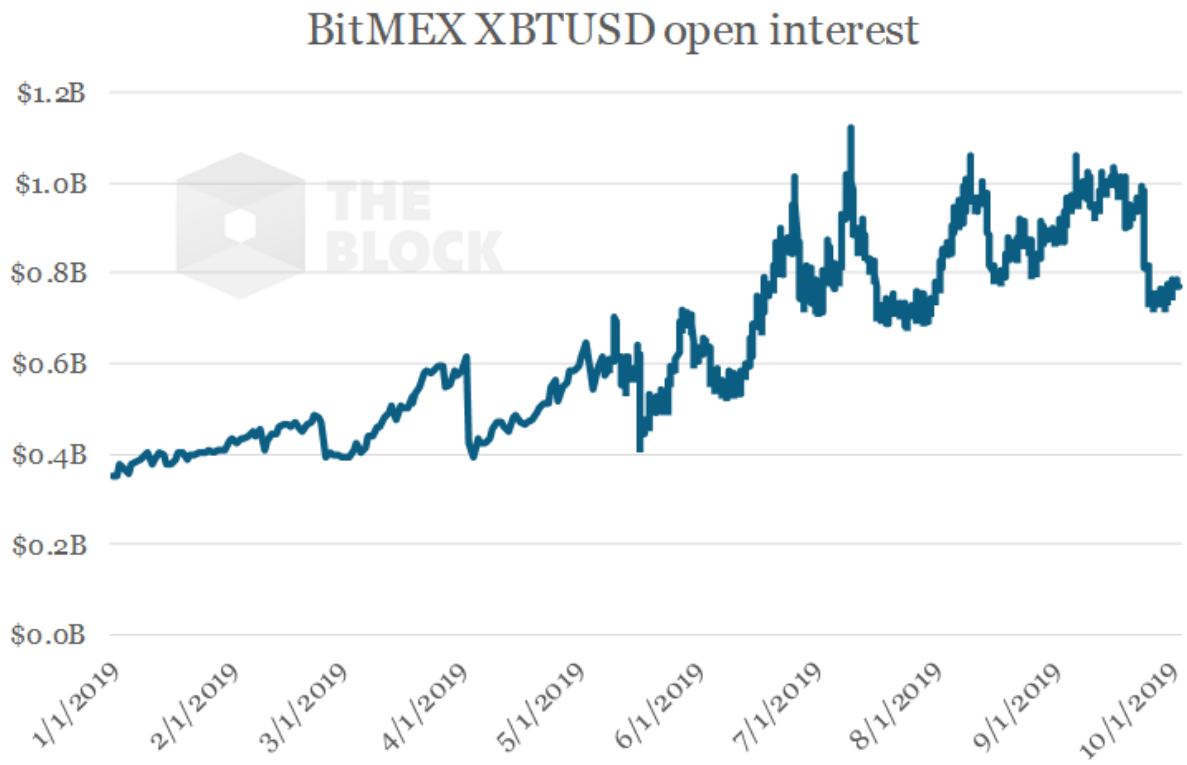
In comparison to last year, BitMEX's perpetual contracts appear to have gained more popularity. The average XBTUSD monthly volume this year has been $81 billion, a 14% increase from 2018's average monthly volume of $71 billion.

For the past few months, however, futures trading activity has been on the decline. XBTUSD volume for September came in at $79 billion, which was 22% below that of August and 44% below that of June.



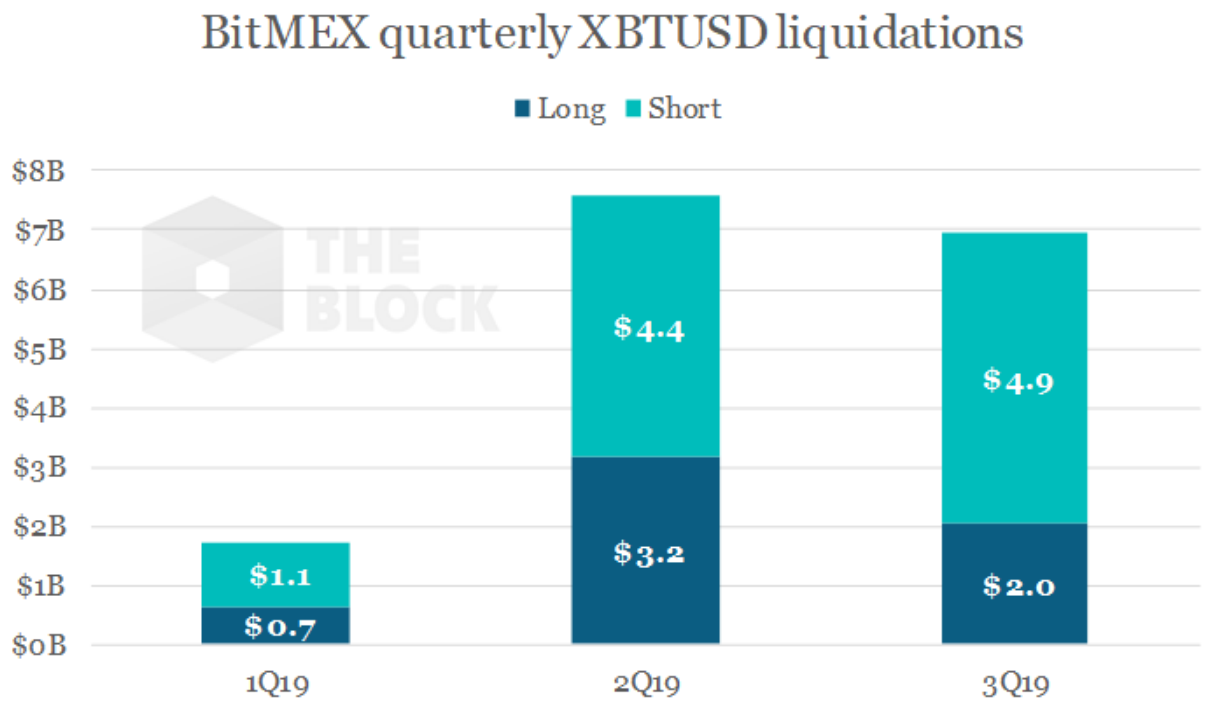
Source: The Block, CoinGecko, CryptoCompare

Spot markets have shown a similar pattern of monthly declines since June as shown above with the average daily volume per month. September's average daily volume of $1.51 billion was down 18% from August and down 60% since June.



Source: datastudio, The Block

For a few weeks, BitMEX's XBTUSD open interest had fluttered around $1 billion. However, open interest quickly fell to slightly below $0.8 billion following last Tuesday's 12% BTC price drop.



Source: skew, The Block

This was caused by the $6.9 billion in liquidations during the quarter ($600 million of which occurred last Tuesday), which was somewhat offset by the opening of new contracts. Although the amount of short positions liquidated increased quarter-over-quarter, the total amount of liquidations had decreased from $7.6 billion to $6.9 billion.

Stablecoin 2019 market summary

October 28, 2019

Quick Take

- The Block provides a 2019 market summary for stablecoins
- We analyzed trading volumes, exchange market share, and stability
- In our analysis of six stablecoins, we found that from the beginning of 2019 to date, USDC deviated the least from $1 and DAI deviated the most
- USDT maintained a daily stablecoin trading volume share of ~88% for the year

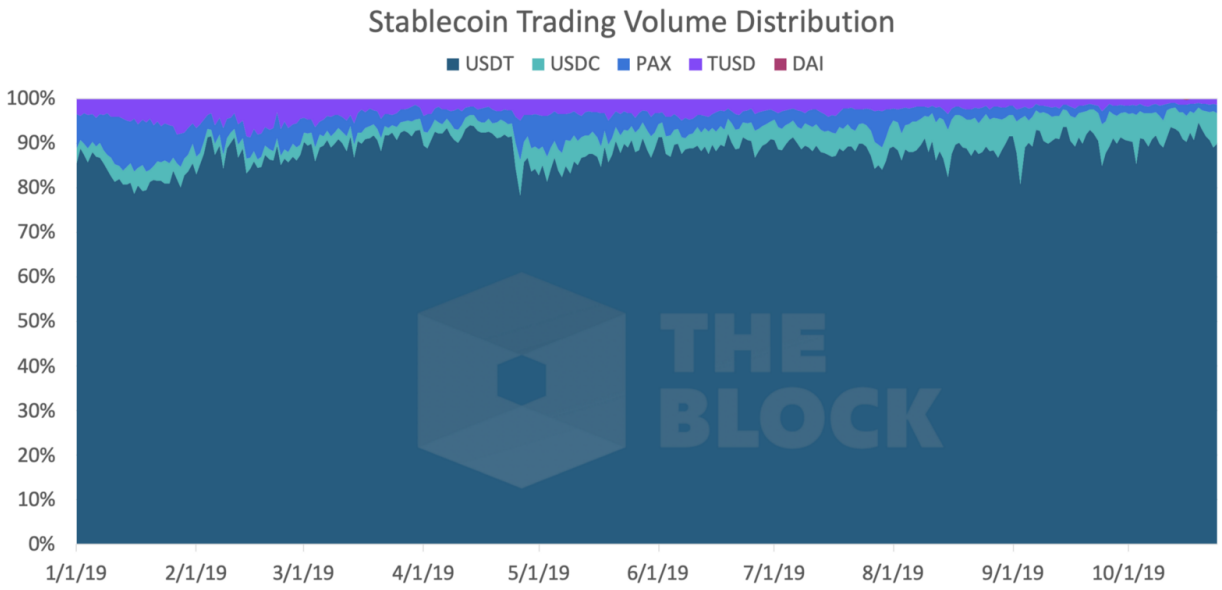
2018 was widely cited as the year of the stablecoin, with many prominent firms launching their own projects to take market share from dominant and controversial market leader Tether. A year on, these new projects have begun to take shape in the cryptocurrency ecosystem.

While some projects have failed to take off, others have experienced significant growth since their launch. In this piece, The Block will provide a market summary of stablecoins and their current standing in the cryptocurrency market.

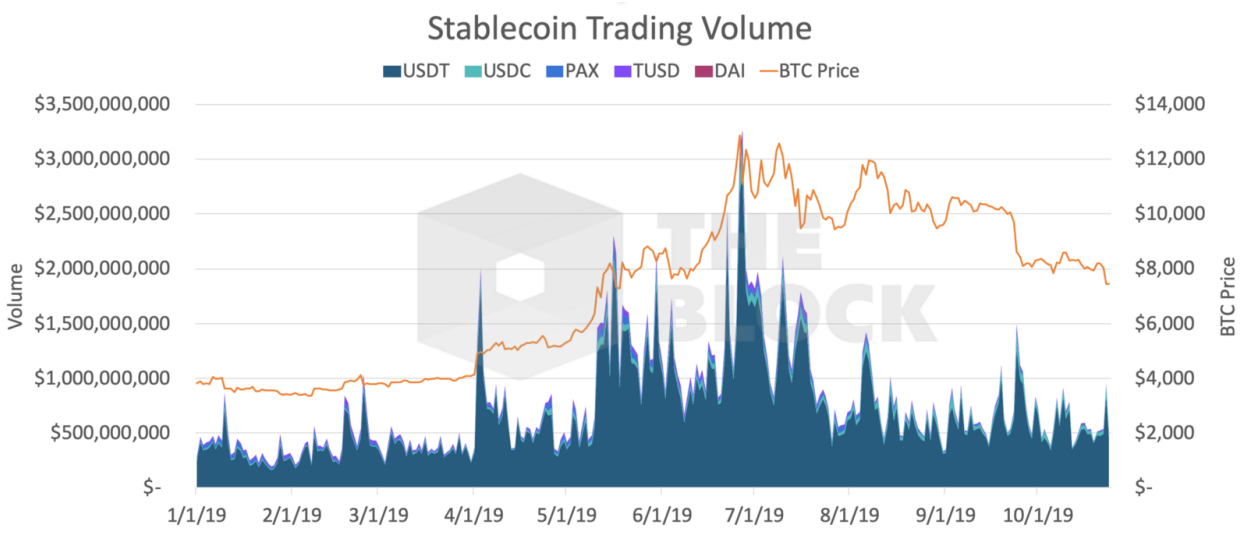
Our piece will be primarily based on six stablecoins: USDT, USDC, PAX, TUSD, GUSD, and DAI. We will also only be using data from exchanges cited in Bitwise's volume report.

Trading Volume

Despite the influx of stablecoin competitors, USDT still maintained its trading volume dominance. Since the beginning of 2019, USDT has kept an average trading volume dominance of approximately 88%. The closest competitor in volume share is USDC with ~4.40%.

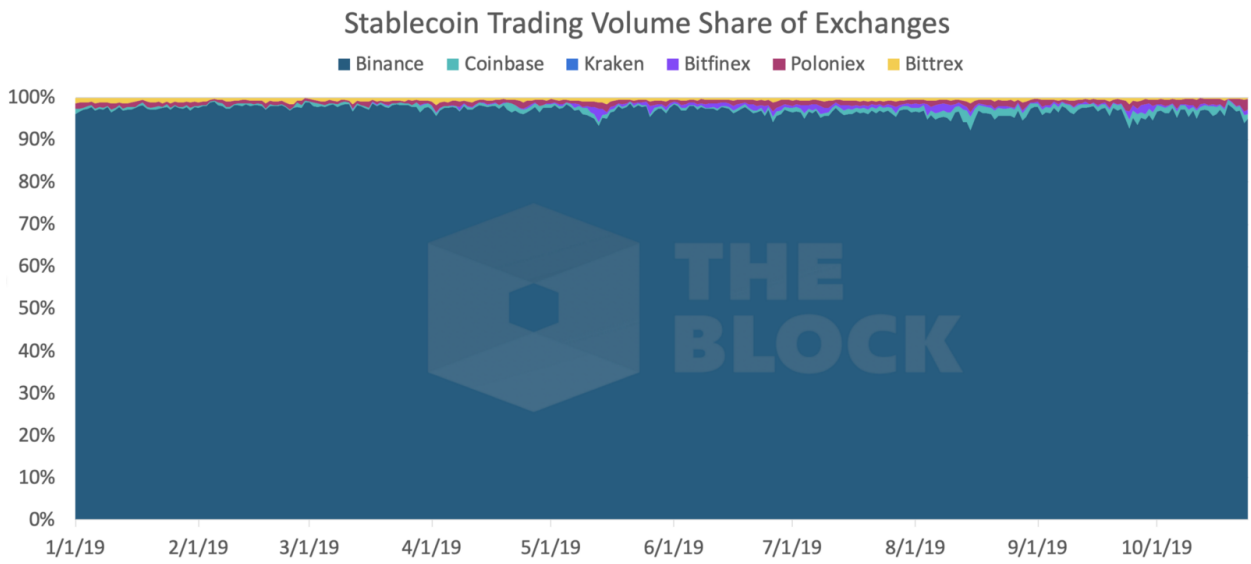


The average daily stablecoin trading volume from the beginning of 2019 to date is approximately $767 million. Trading volumes hit their peak in late June, coinciding with the yearly high of the price of bitcoin. June 26 and June 27 both experienced over $3 billion in total stablecoin trading volume.



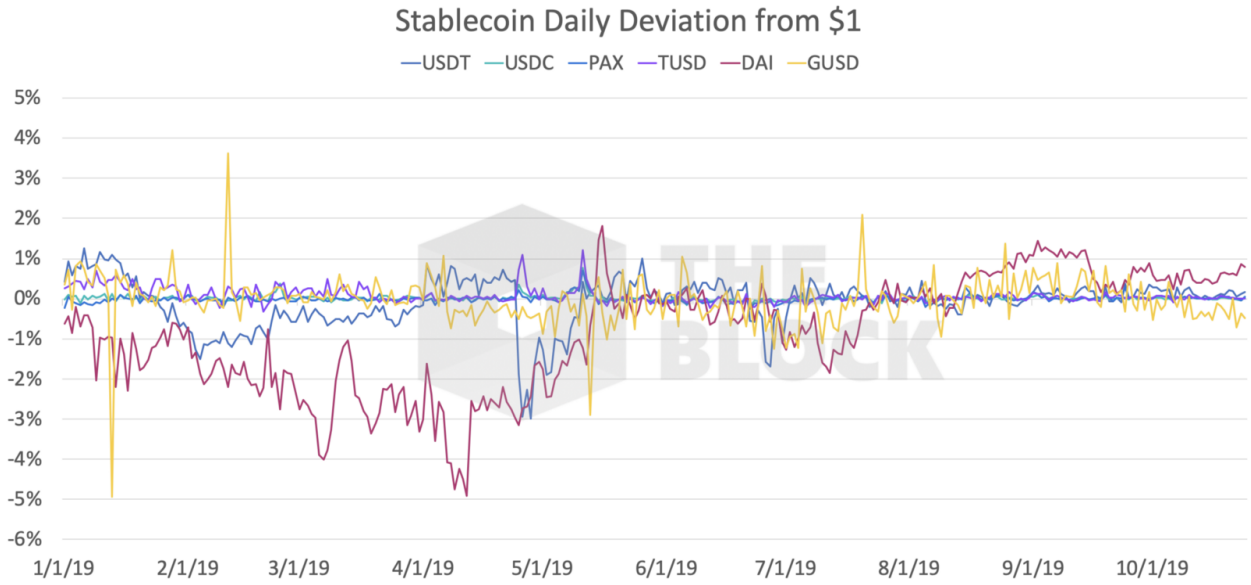
Of the 10 exchanges in Bitwise trading volume report, six supported trading pairs for the stablecoins we analyzed in this piece. They are Binance, Coinbase, Kraken, Bitfinex, Poloniex, and Bittrex. Of these six, five supported USDT, with Coinbase being the lone holdout. None of the exchanges we analyzed had trading pair support for GUSD. Not even Gemini, the firm behind the stablecoin.[1]

The exchange with the largest share of stablecoin trading volume is Binance. The exchange maintained a daily average share of 97% of total stablecoin volume.

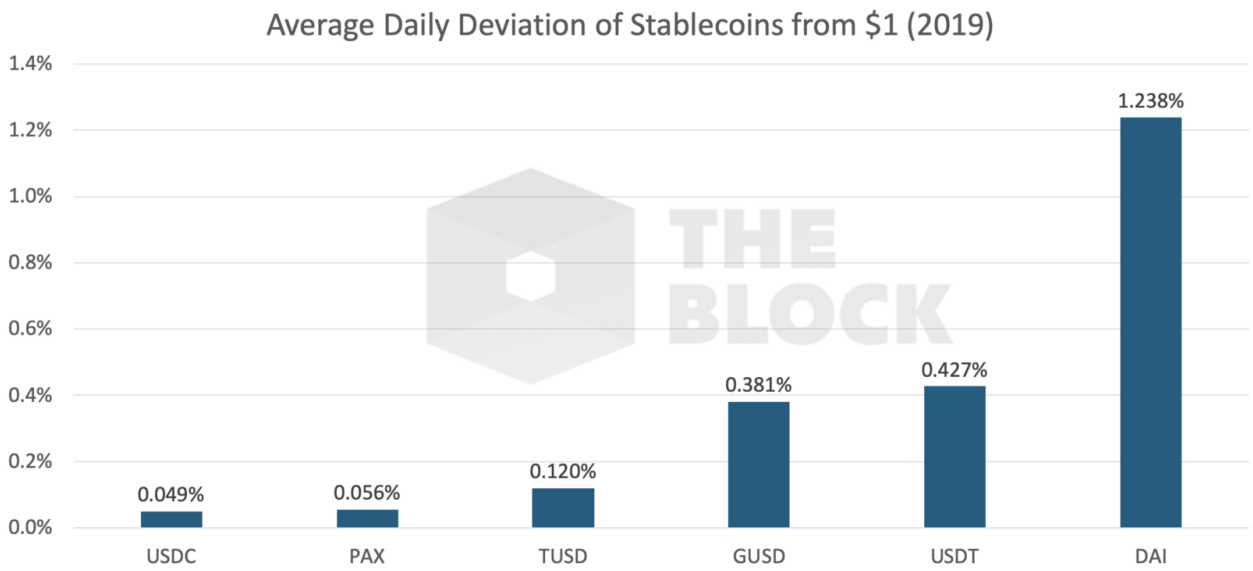


Stability

Stablecoins should, by design, maintain price parity with the U.S. dollar. However, as we've previously analyzed, that is often not the case. In the chart below, we show the daily deviation of stablecoins from $1 in 2019.



To better visualize these deviations, we took the absolute value of the daily deviations and averaged them in the chart below.



From this chart, we see that USDC deviated the least from $1, and DAI deviated the most. In our previous piece analyzing stablecoin stability, USDT was the stablecoin that deviated the least using data from 2018 to March 2019. Since that report, Bitfinex and Tether have found themselves in the middle of a legal battle with the N.Y. Attorney General and the alleged theft of $850 million of its funds from its payment processor Crypto Capital. These two events could have contributed to the increased instability of USDT.

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[1] Gemini does support GUSD deposits, however, the exchange automatically converts it to USD for its USD trading pairs.

An analysis of cryptocurrency exchanges

October 14, 2019

Quick Take

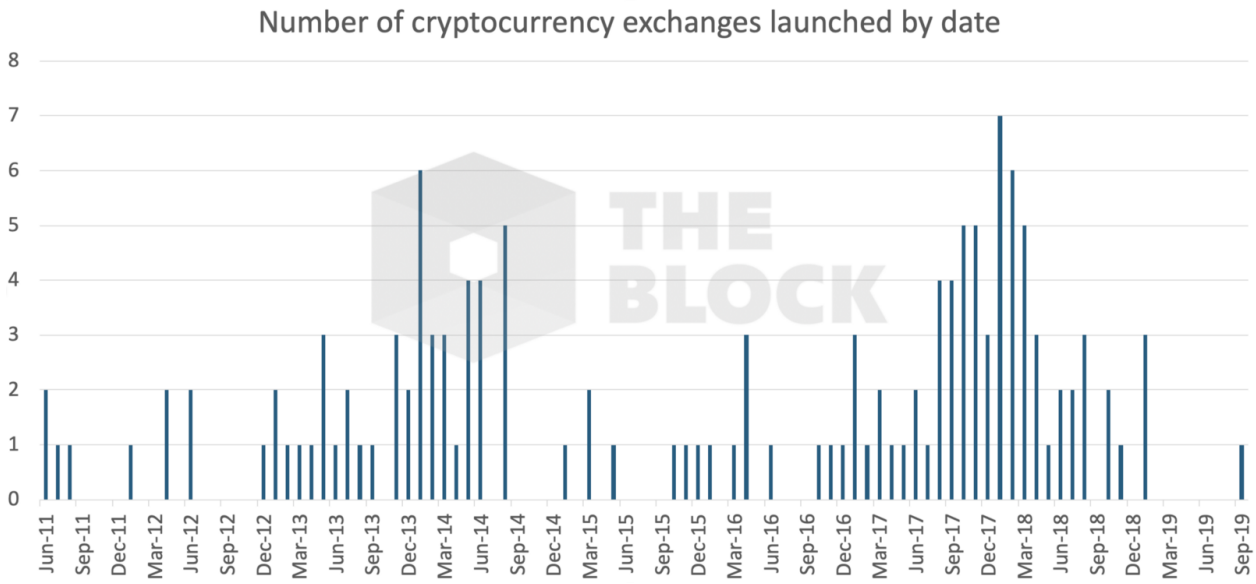
- The Block has aggregated and filtered data from 159 cryptocurrency exchanges to examine trends in the business vertical
- We found that 49% of active cryptocurrency exchanges were launched after 2016
- The three countries that have launched the most exchanges were the U.K., China, and the U.S.

There's a common belief in emerging industries experiencing enormous growth that it is better to be the person selling the shovels and pickaxes than being the person mining the gold. During the California Gold Rush, the picks and shovels salesman was Samuel Brannan, who, quite literally, sold pickaxes and shovels to gold miners.

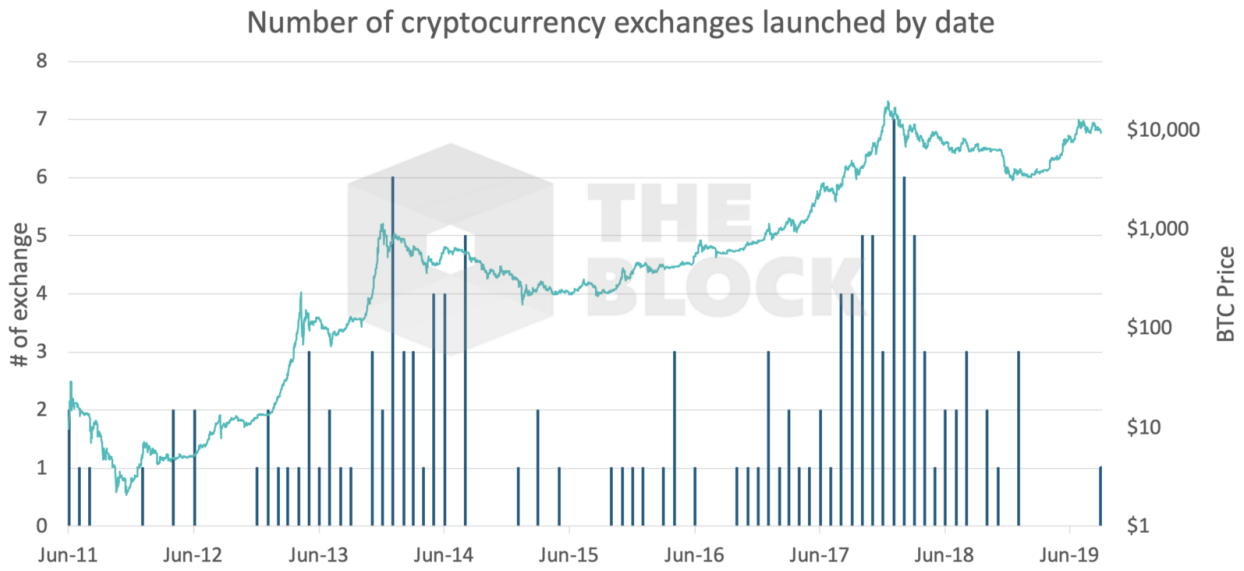
The picks and shovels salesmen in the cryptocurrency industries are the mining hardware manufacturers, offering businessmen the chance to strike rich on mining cryptocurrencies and cryptocurrency exchanges offering investors the opportunity to own a claim on assets prospectively powering the multi-billion dollar decentralized economy.

With leading cryptocurrency exchanges generating hundreds of millions of dollars in profits, it comes as no surprise that we've seen hundreds of cryptocurrency exchanges spring up since the creation of Bitcoin. In this piece, we analyze the cryptocurrency exchange landscape and examine when these exchanges launched and where they are based. For our data set, we leveraged the aggregated exchange list from CryptoCompare as well as listing data from CoinMarketCap and Nomics. We also filtered our list for active centralized exchanges, which resulted in a set of 159 exchanges, 138 of which we have launch date data for.

Below, we charted out the number of exchanges launched from 2011 to 2019.

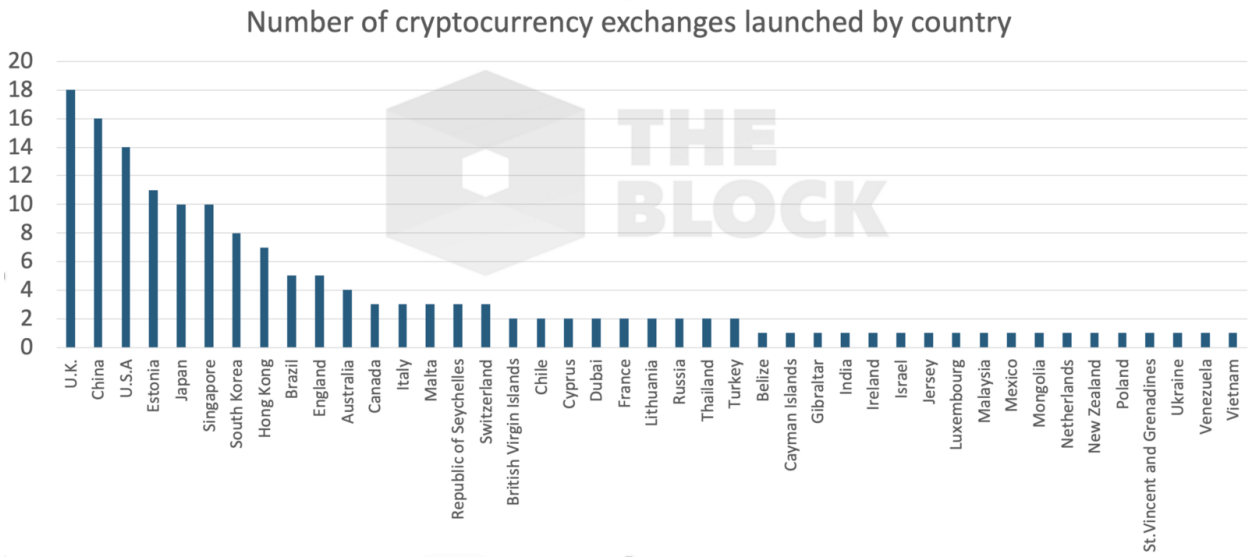


We can see some exchange growth in late 2013 and late 2017, coinciding with two large bitcoin price rallies. We plotted the price of bitcoin over this period to better visualize this growth.



Of the 138 exchanges examined, over 49% of them launched after 2016.

The Block also analyzed the geographic distribution of these exchanges. We plotted the countries where these exchanges are headquartered below.



The most popular countries to launch cryptocurrency exchanges are the United Kingdom, followed by China, and the United States. China is an interesting outlier here as the country has publicly banned exchanges from serving its citizens. Of the 159 exchanges we examined, 30% are headquartered in the U.K., China, or the U.S.

We do note that the data behind exchange launch dates and headquarters can be misreported either by the data aggregators or by the exchanges itself. However, The Block's process of manual filtering and updating of these data points increases the accuracy of the data we used for this piece. For future pieces, we hope to aggregate larger data sets to find clearer trends in the cryptocurrency exchange landscape.

Recession fears and schadenfreude: Breaking down Fundstrat's positive outlook for the S&P and Bitcoin

October 8, 2019

Quick Take

- We highlight some of Fundstrat's recent research surrounding its call for the S&P 500 to make new highs by March; with bitcoin following as a risk-on asset

Behind The Scoop offers Genesis subscribers a summary of what we learned from our podcast guests, and profiles research to further the discussion beyond the latest episode.

Tom Lee, former chief equity strategist at JPMorgan, made headlines during the bitcoin boom of 2017 with his calls that the cryptocurrency would soar to its price target of $25,000. Fast forward to today; Lee isn't making any more price targets on bitcoin, but he still makes calls on the market -- leading Fundstrat, a market research shop covering both equities and crypto. On this episode of The Scoop*, Lee shared his thoughts on how the research business has evolved over the last two decades, why he doesn't think bitcoin is a macro-hedge, and the largest roadblocks keeping big investors out of the market.*

Interview Summary - Fundstrat's positive year end S&P 500 and bitcoin thesis

Lee joined The Scoop to discuss a number of topics ranging from the evolution of research business models, to his thesis that the S&P will mark new highs by March, and why that's a positive for bitcoin.

Known for an illustrious career as both a Chief Equity Strategist at JPMorgan, as well as a ranked Telecommunication senior analyst, Lee has spent more than 20 years crafting what he describes as a "evidence-based" fundamental research approach across asset classes.

Often polarizing within crypto circles for his prior lofty bitcoin price predictions, the one thing that's hard to disagree on is Lee and Fundstrat's ability to deliver a differentiated in-house insights to markets, including crypto. In a space dominated with tribalism, group-think, and those with the largest microphones likely talking their own book, the originality and objectivity of the Fundstrat's work is a breath of fresh air for crypto fundamental research.

This Behind The Scoop will walk through Tom Lee's positive year-end outlook for the S&P 500, and why he believes an all-time high for the S&P 500 spells good news for bitcoin. A lot of the data that follows originated from a presentation Lee gave for Interactive Brokers in early September, as well as a recent interview with CNBC.

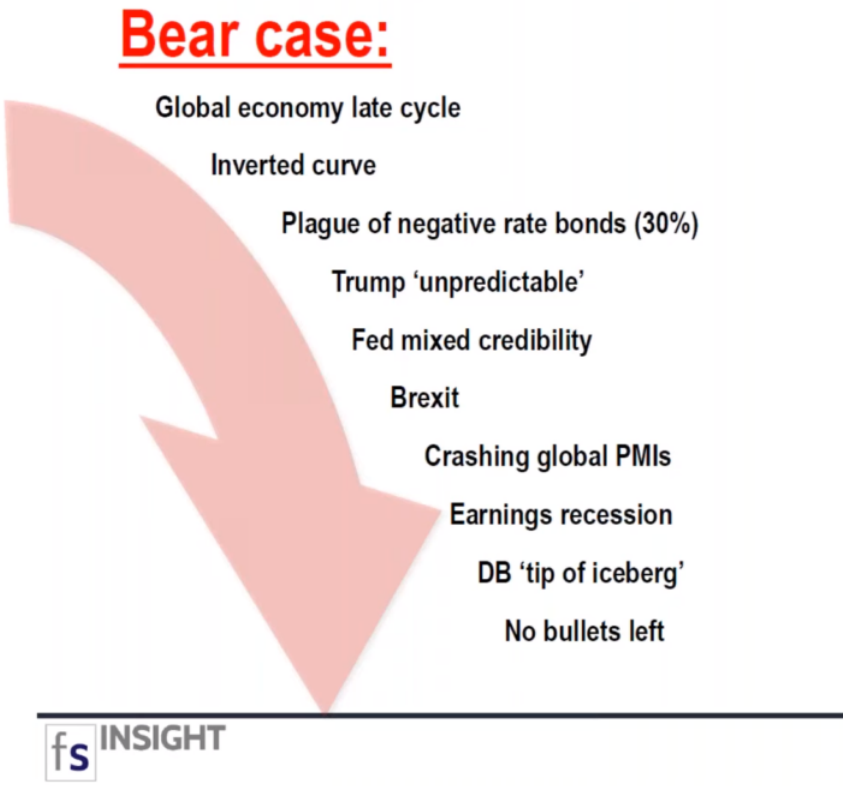
Understanding the Macro

"So in other words if you look at the performance of an active managers portfolio probably 70% of that performance is explained by a top down decision either related to monetary policy, positioning around a regime change, responding to some cyclical indicator. It means that macro is still one of the, despite people sort of not believing that, it still mostly explains how the stock market moves."

~Tom Lee

It's hard not to go a week and hear growing concerns over economic data that has started to trickle out across the globe, whether that's trade-wars, global growth

slowdowns, inverted yield curves on sovereign debt, Brexit, contractions in global manufacturing data, mixed central bank credibility, etc. The list goes on:



Source: Fundstrat

In a presentation for Interactive Brokers, Lee laid out his three biggest negatives for the broader macro picture that he sees at the moment:

1. ISM Data - Weak PMI (Purchasing Managers Index)

   PMI's are an index of economic trends within manufacturing, based on a monthly survey of supply chain managers across 19 industries. According to Investopedia, the index and its components can be used as a leading indicator of overall economic activity, with a value > 50 indicating manufacturing expansion, and < 50 implying manufacturing contraction.
   In 2019, PMIs have begun to trend towards contraction in several large developed economies across the globe. In the U.S., PMI's dropped below 50 for

both August and September, a sign that the U.S manufacturing sector is currently contracting.

While many have pointed to the weak September PMI numbers as yet another warning sign for a "looming recession," interestingly Fundstrat made a call in late 2018 that PMIs would indeed drop below 50 and bottom by Fall of 2019. So far they have nailed that call.

PMIs WEAK: PMIs around the world are very weak

	Composite PMI	Source	8/18	9/18	10/18	11/18	12/18	1/19	2/19	3/19	4/19	5/19	6/19	7/19	8/19
	Global	Markit	53.4	52.8	53.0	53.1	52.7	52.1	52.6	52.8	52.2	51.2	51.2	51.7	
	Developed Markets	Markit	54.0	53.3	53.6	53.3	52.7	52.3	52.9	52.7	52.0	51.1	51.3	51.7	
	Emerging Markets	Markit	51.8	51.6	51.3	52.6	52.5	51.6	51.7	52.9	52.4	51.3	50.9	51.5	
"Diffusion"	Total		85%	85%	81%	70%	63%	63%	74%	67%	81%	67%	59%	70%	53%
(% above 50)	Developed		92%	83%	83%	83%	83%	67%	75%	83%	83%	83%	75%	92%	83%
	Emerging		86%	100%	86%	43%	43%	57%	57%	43%	71%	57%	43%	43%	20%
	Commodity		75%	75%	75%	75%	75%	63%	88%	75%	88%	63%	50%	63%	50%
	USA	ISM	59.0	60.7	59.7	60.2	57.6	56.7	59.1	56.0	55.2	56.4	54.7	53.4	
	Canada*	Markit	56.9	53.9	52.7	53.5	51.4	49.6	51.4	50.5	50.6	52.0	52.1	52.0	49.5
	Eurozone	Markit	54.5	54.1	53.1	52.7	51.1	51.0	51.9	51.6	51.5	51.8	52.2	51.5	51.8
	Germany	Markit	55.6	55.0	53.4	52.3	51.6	52.1	52.8	51.4	52.2	52.6	52.6	50.9	51.4
	France	Markit	54.9	54.0	54.1	54.2	48.7	48.2	50.4	48.9	50.1	51.2	52.7	51.9	52.7
	Italy	Markit	51.7	52.4	49.3	49.3	50.0	48.8	49.6	51.5	49.5	49.9	50.1	51.0	
	Spain	Markit	53.0	52.5	53.7	53.9	53.4	54.5	53.5	55.4	52.9	52.1	52.1	51.7	
	UK	Markit	54.2	54.1	52.1	50.8	51.4	50.3	51.5	50.0	50.9	50.9	49.7	50.7	
	Japan	Markit	52.0	50.7	52.5	52.4	52.0	50.9	50.7	50.4	50.8	50.7	50.8	50.6	51.7
	Australia*	Australian Ind.	55.9	57.1	54.7	50.8	50.0	52.5	54.0	51.0	54.8	52.7	49.4	51.3	53.1
	Singapore	Markit	51.1	49.6	52.6	53.8	52.7	50.1	49.8	51.8	53.3	52.1	50.6	51.0	
	Hong Kong	Markit	48.5	47.9	48.6	47.1	48	48.2	48.4	48	48.4	46.9	47.9	43.8	
	Mexico*	Markit	50.7	51.7	50.7	49.7	49.7	50.9	52.6	49.8	50.1	50.0	49.2	49.8	49.0
	China	Markit	52.0	52.1	50.5	51.9	52.2	50.9	50.7	52.9	52.7	51.5	50.6	50.9	
	Taiwan*	Markit	53.0	50.8	48.7	48.4	47.7	47.5	46.3	49.0	48.2	48.4	45.5	48.1	47.9
	South Korea*	Markit	49.9	51.3	51.0	48.6	49.8	48.3	47.2	48.8	50.2	48.4	47.5	47.3	49.0
	Vietnam*	Markit	53.7	51.5	53.9	56.5	53.8	51.9	51.2	51.9	52.5	52.0	52.5	52.6	51.4
	Poland*	Markit	51.4	50.5	50.4	49.5	47.6	48.2	47.6	48.7	49.0	48.8	48.4	47.4	48.8
	India	Markit	51.9	51.6	53.0	54.5	53.6	53.6	53.8	52.7	51.7	51.7	50.8	53.9	

Source: Fundstrat

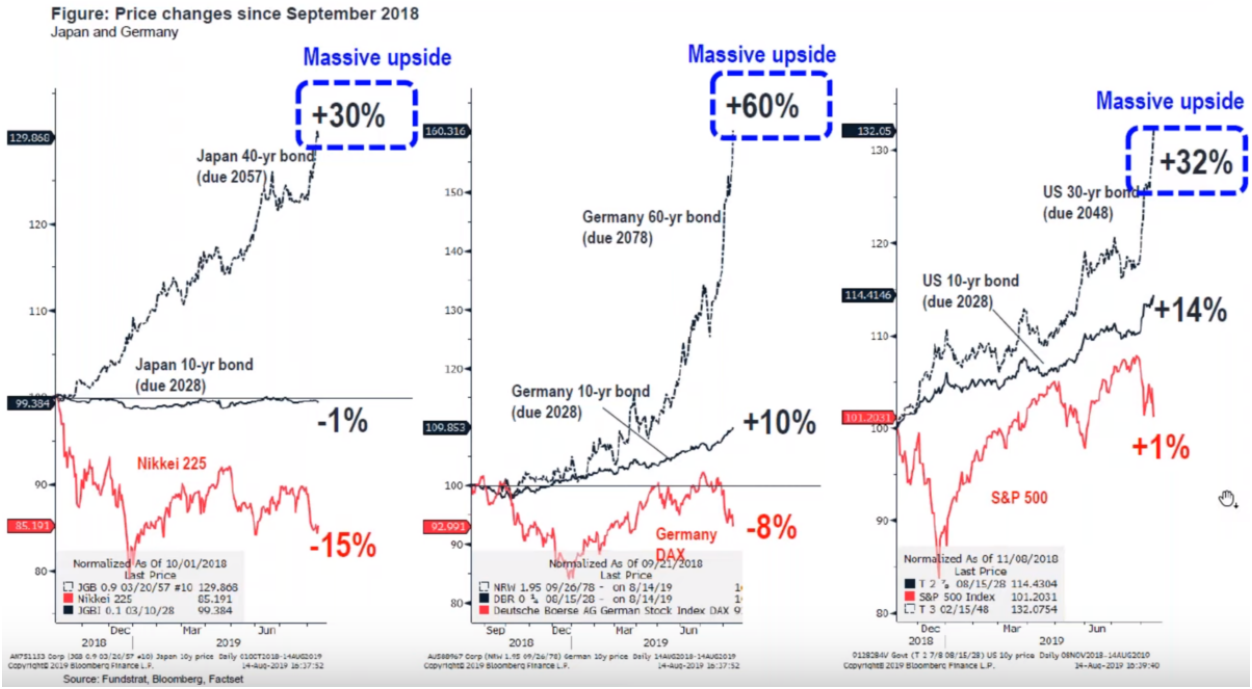
MANUFACTURING AT A GLANCE
SEPTEMBER 2019

Index	Series Index Sep	Series Index Aug	Percentage Point Change	Direction	Rate of Change	Trend* (Months)
PMI®	47.8	49.1	-1.3	Contracting	Faster	2
New Orders	47.3	47.2	+0.1	Contracting	Slower	2
Production	47.3	49.5	-2.2	Contracting	Faster	2
Employment	46.3	47.4	-1.1	Contracting	Faster	2
Supplier Deliveries	51.1	51.4	-0.3	Slowing	Slower	43
Inventories	46.9	49.9	-3.0	Contracting	Faster	4
Customers' Inventories	45.5	44.9	+0.6	Too Low	Slower	36
Prices	49.7	46.0	+3.7	Decreasing	Slower	4
Backlog of Orders	45.1	46.3	-1.2	Contracting	Faster	5
New Export Orders	41.0	43.3	-2.3	Contracting	Faster	3
Imports	48.1	46.0	+2.1	Contracting	Slower	3
OVERALL ECONOMY				Growing	Slower	125
Manufacturing Sector				Contracting	Faster	2

Source: ISM September Report

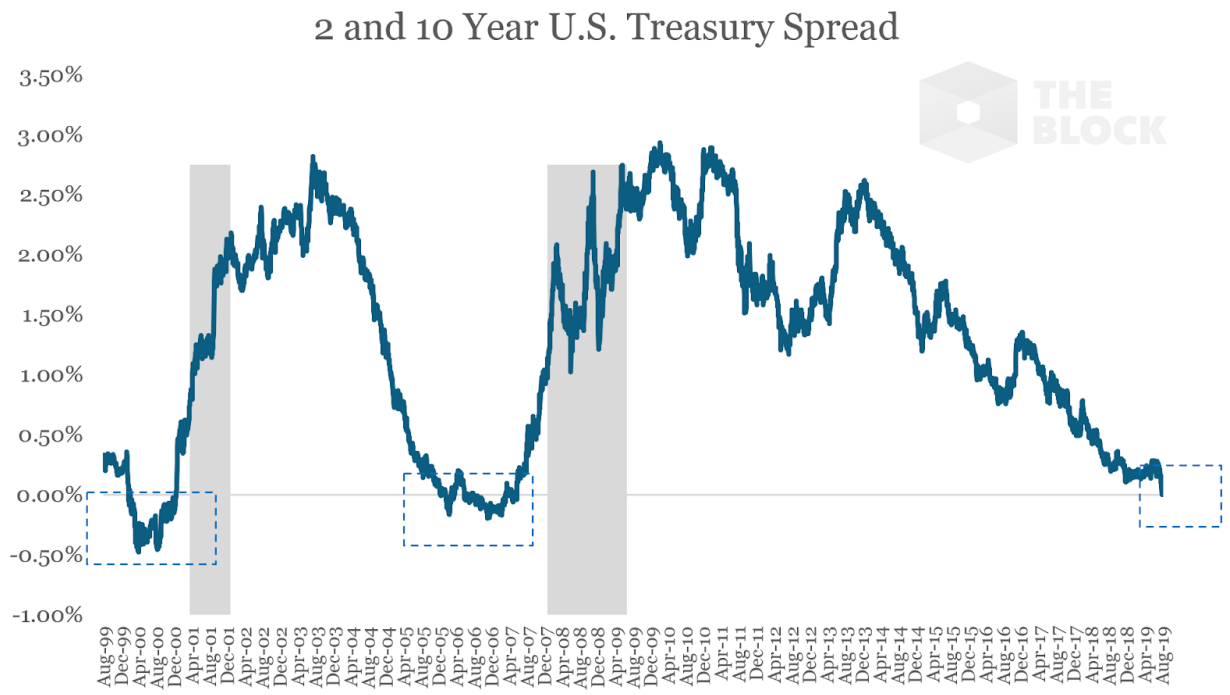
2. According to Deutsche Bank Economist, Torsten Slok, ~30% of the world's debt is now on negative yields

The total market value of debt that is associated to a negative yield is nearing all time highs (set in 2016), driven by economies such as Japan, and most of Europe (including Germany). With yields continuing to slide across the globe, several long duration sovereign bonds such as the Japan 40-yr bond, Germany 60-yr bond, and US 30-yr bond, have seen more than 30% upside this year in bond value accretion. Lee believes these massive bond outperformances have driven more of a self-fulfilling prophecy of lower rates as investors have overcrowded into these products — pushing rates down even further.



Source: Fundstrat

3. Yield curve inversion on 2 and 10 year U.S. treasuries

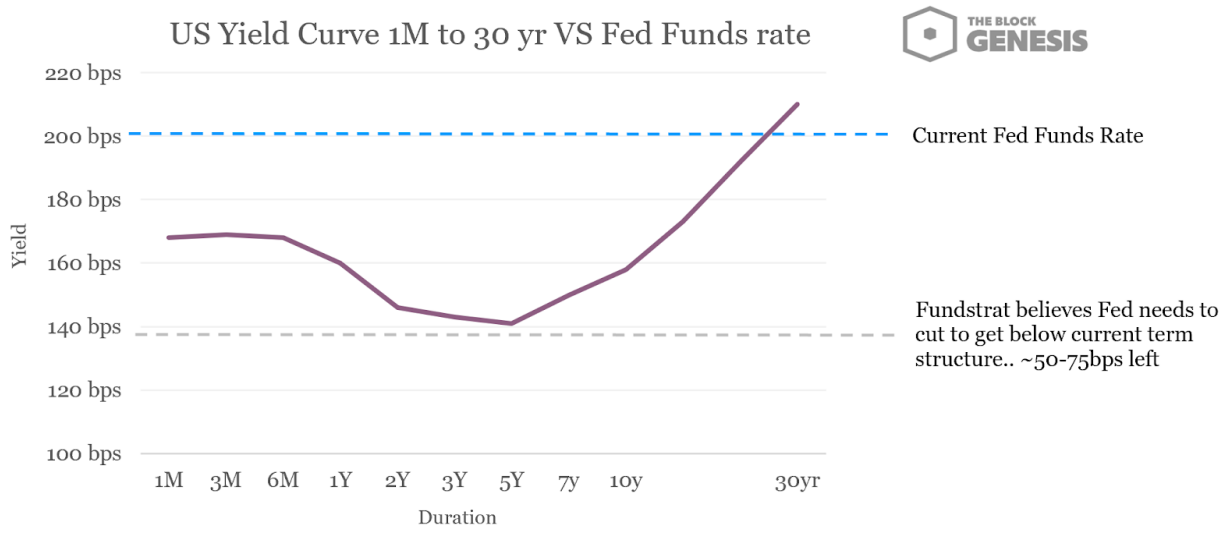


Source: The Block, FactSet

When the 2 and 10 Year U.S Treasury Yield Curve inverted in August — one of the most watched indicators used to point to a looming recession — and the 30-year Treasury bond yield fell below 2% for the first time ever, many in the media began to warn a recession is likely on the horizon. Even the ABC morning television program *Good Morning America* ran a segment on yield curve inversions and what it means for markets the following day it occurred (imagine that!), according to Lee on The Scoop.

While Lee shares a view that the global demand for U.S treasuries during a risk-off environment (August) helped flatten the curve, similar to the opinion Deutsche Bank Chief U.S. Economist Matthew Luzzetti gave in an interview with The Block, Lee believes the term structure (rates and different durations) of the yield curve is "screaming policy error by the Fed."

Looking at the current Fed funds rate (current rate set at 2.00%), every U.S. government bond outside of the 30-year is at a rate below the fed funds rate — a fact Lee says has really never happened before. Fundstrat believes this implies the bond market is telling the Fed it needs to push the Fed funds rate below the yield curve, implying another 50-75bps worth of cuts from today's 2.00%.



Source: The Block, FactSet

"What has always time and again killed the equity markets, it's not the Fed but it's policy error because inflation got too strong. And as you guys know there's like no inflation in the world anywhere. I don't think you have to worry about that being a root cause. And the second has actually been external shocks, it could be a commodity spike. It could be war. It could be a tariff related shock."

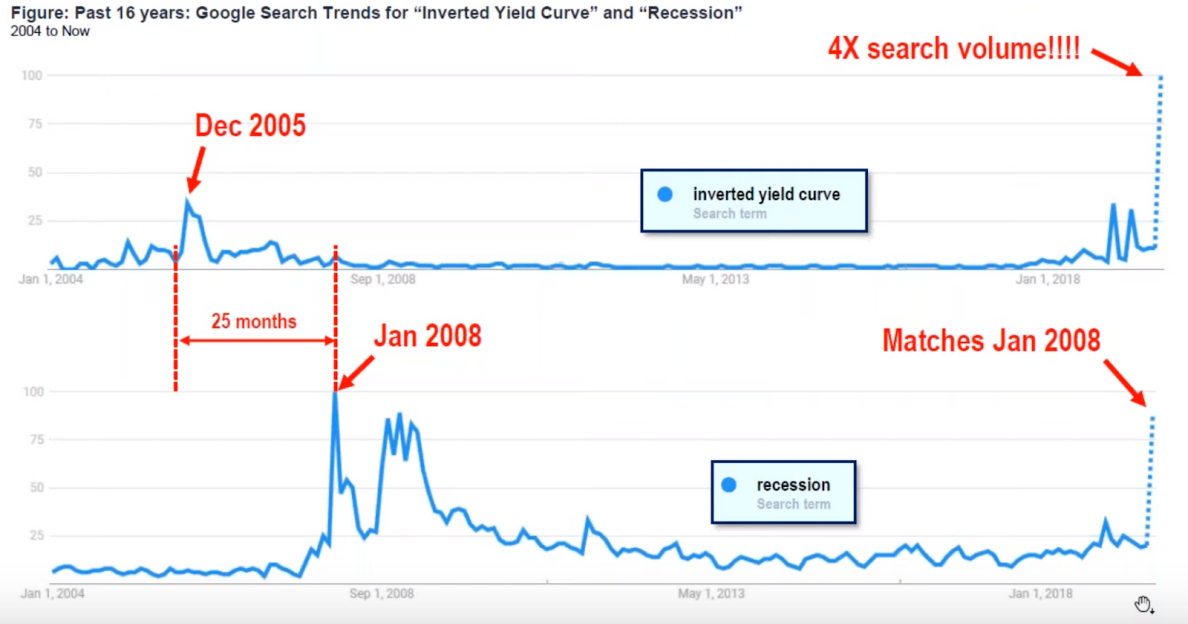
~TOM LEE

Negative worries aside, Fundstrat is bullish the S&P 500 will make new highs by March

1. Overblown fears driving consensus view of recession -- leads people rooting for it

Lee ultimately believes the three biggest negatives within the macro picture are already fully-priced into the market, given how wide the narrative of yield curve inversion and recession worries have spread (Good Morning America proxy). Looking at Google Search volume trends, Fundstrat found that searches for "Inverted Yield Curve" in August were almost 4x the former peak total set in December 2005. More interesting, the total volume of Google searches for "Recession" this August actually matched the level set in January 2008, even though the later came 25 months after the spike in "Inverted Yield Curve" searches.

In Lee's opinion, these patterns indicate that August had hit full recession mania, and suggests that if the inverted curve is a false positive, or even still on its typical 12-25 month lag-time until recession, that the market has over-discounted the risks today.



Source: Fundstrat, Google Trends

Furthermore, Lee believes too many people stand to benefit from recession fears, and have turned to actually rooting for it, including the consensus view within bitcoin circles that weaker economic data, large debt loads, and Fed accommodating policy is favorable for bitcoin.

Given some of the obvious beneficiaries of a US recession: investors that are positioned accordingly (shorts, bond holders, gold investors, bitcoin?), Democrats wanting "Trump's economy and market" to implode, and China (trade war), Lee suggests that it's the $2 trillion un-allocated dry powder within private equity that suggests "a lot of people want a recession not because they think we're due, but because they want to take advantage of it."

Figure: Beneficiaries of a US recession or rising economic gloom
Per Fundstrat

1.	**Short Sellers**	Obvious
2.	**Democratic Candidates**	Economy is THE swing factor.
3.	**Trump Haters**	Obvious
4.	**Bond Holders**	Falling rates = massive upside to bond price
5.	**China**	A recession forces Trump to capitulate.
6.	**Media**	turmoil sells Ads baby!!!
7.	**Europe**	Misery loves company + Schadenfreude
8.	**Private Equity**	$2 trillion of dry powder
9.	**Federal Reserve???**	To Be Determined

Source: Fundstrat

2. Why Lee is bullish on rate cuts

Fundstrat believes the timing of rate cuts, in relation to what part of the cycle the economy is in, determines the likely outcome for market performance. Looking at historical cuts since 1970, the five times the Fed cut while the U.S. economy was already in recession saw four out of five observations return

negative three-month, six-month, nine-month, and one-year forward returns. This is a sharp contrast to the six observations of the Fed cutting while the economy was still in expansion (what we currently are in), which has seen a 100% of observations return positive three-month, six-month, nine-month, and one-year forward returns (at an average +16.5% 12 months from the cut).

Fed cut + recession:
July '74, April '80, June '81, Jan '01 and Sept '07

	% return (avg)	Win-ratio
3M	-8.0%	20%
6M	-4.1	20
9M	-4.6	20
12M	-0.9	40

Fed cut + Expansion:
Jan '71, Oct '84, Oct '87, July '89, July '95, Sept '98

	% return (avg)	Win-ratio
3M	9.7%	100%
6M	13.5	100
9M	15.7	100
12M	16.5	100

Source: Fundstrat

3. Historic equity declines in a single day, followed by outperformance one month, three months and six months forward

Lee believes it's bullish that the Fed is cutting rates while the economy is still expanding (even if manufacturing is contracting with weak PMI), and people are overly discounting the likelihood of a recession near-term, but it's the historical performance following the largest one-day declines in the S&P 500 that suggest to him that the next 12 months could see a significant move higher in the S&P. In fact, looking at the 24 observations of days since 2009 that had more than a 3% drawdown in the S&P, average returns six months out from the drawdown were ~15%. The last 3% drawdown occurred in the first week of August.

Figure: Equity declines of 3% and VIX term structure

Since 2009

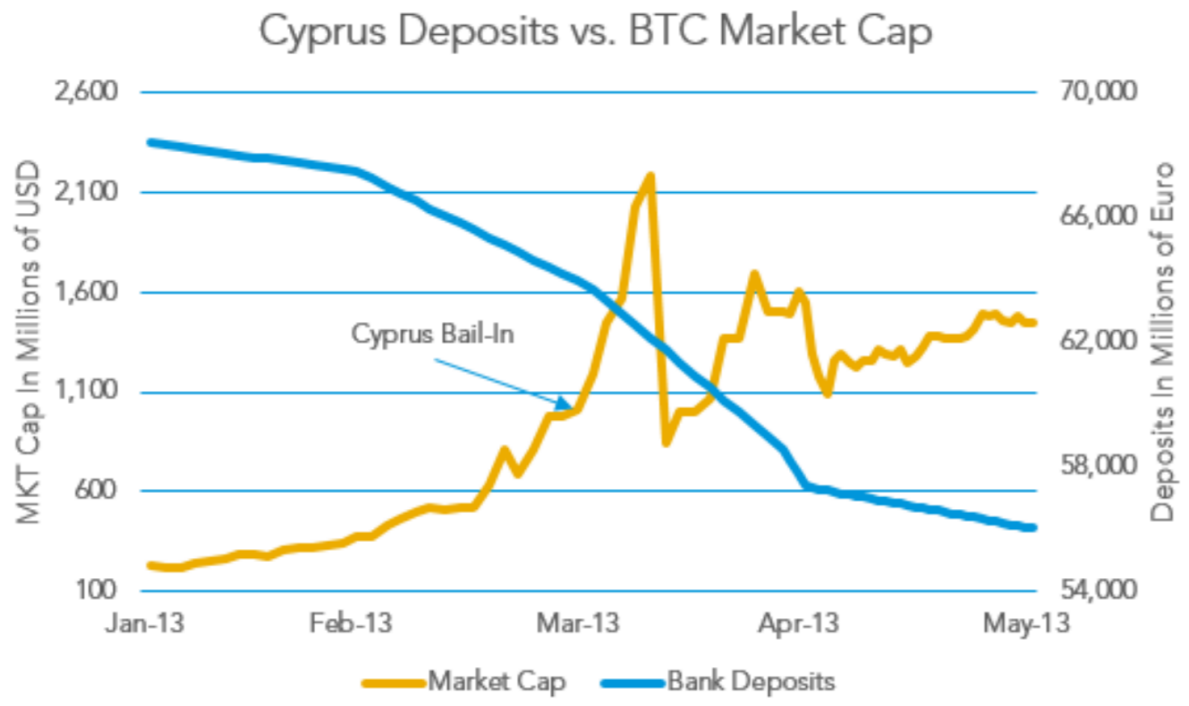
		S&P Level	1 Day Change	1 Month forward return	3 Months forward return	6 Months forward return
1	3/5/2009	682.55	(4.3%)	23.4%	38.1%	47.0%
2	3/30/2009	787.53	(3.5%)	10.9%	17.7%	35.0%
3	4/20/2009	832.39	(4.3%)	8.5%	14.3%	31.9%
4	6/22/2009	893.04	(3.1%)	6.8%	19.2%	24.7%
5	2/4/2010	1063.11	(3.1%)	7.1%	6.1%	5.9%
6	5/6/2010	1128.15	(3.2%)	(5.6%)	(0.2%)	8.2%
7	5/20/2010	1071.59	(3.9%)	4.3%	0.4%	11.7%
8	6/4/2010	1064.88	(3.4%)	(4.0%)	3.7%	15.0%
9	6/29/2010	1041.24	(3.1%)	5.8%	10.2%	20.9%
10	8/4/2011	1200.07	(4.8%)	(2.2%)	5.1%	10.5%
11	8/8/2011	1119.46	(6.7%)	7.1%	12.7%	20.1%
12	8/10/2011	1120.76	(4.4%)	3.0%	9.7%	20.5%
13	8/18/2011	1140.65	(4.5%)	6.6%	6.6%	19.1%
14	9/22/2011	1129.56	(3.2%)	9.6%	11.0%	23.3%
15	11/9/2011	1229.10	(3.7%)	2.1%	9.8%	10.2%
16	8/21/2015	1970.89	(3.2%)	(0.7%)	6.0%	(2.7%)
17	8/24/2015	1893.21	(3.9%)	2.4%	10.2%	2.8%
18	6/24/2016	2037.41	(3.6%)	6.8%	6.2%	11.1%
19	2/5/2018	2648.94	(4.1%)	2.9%	0.9%	7.6%
20	2/8/2018	2581.00	(3.8%)	8.0%	5.5%	10.6%
21	10/10/2018	2785.68	(3.3%)	(0.2%)	(7.2%)	3.7%
22	10/24/2018	2656.10	(3.1%)	(0.9%)	(0.7%)	10.2%
23	12/4/2018	2700.06	(3.2%)	(9.3%)	3.3%	3.8%
24	8/5/2019	2844.74	(3.0%)			
	Average		(3.8%)	4.0%	8.2%	15.3%
	Median		(3.5%)	4.3%	6.2%	11.1%
	Win Ratio			69.6%	87.0%	95.7%

Source: Fundstrat

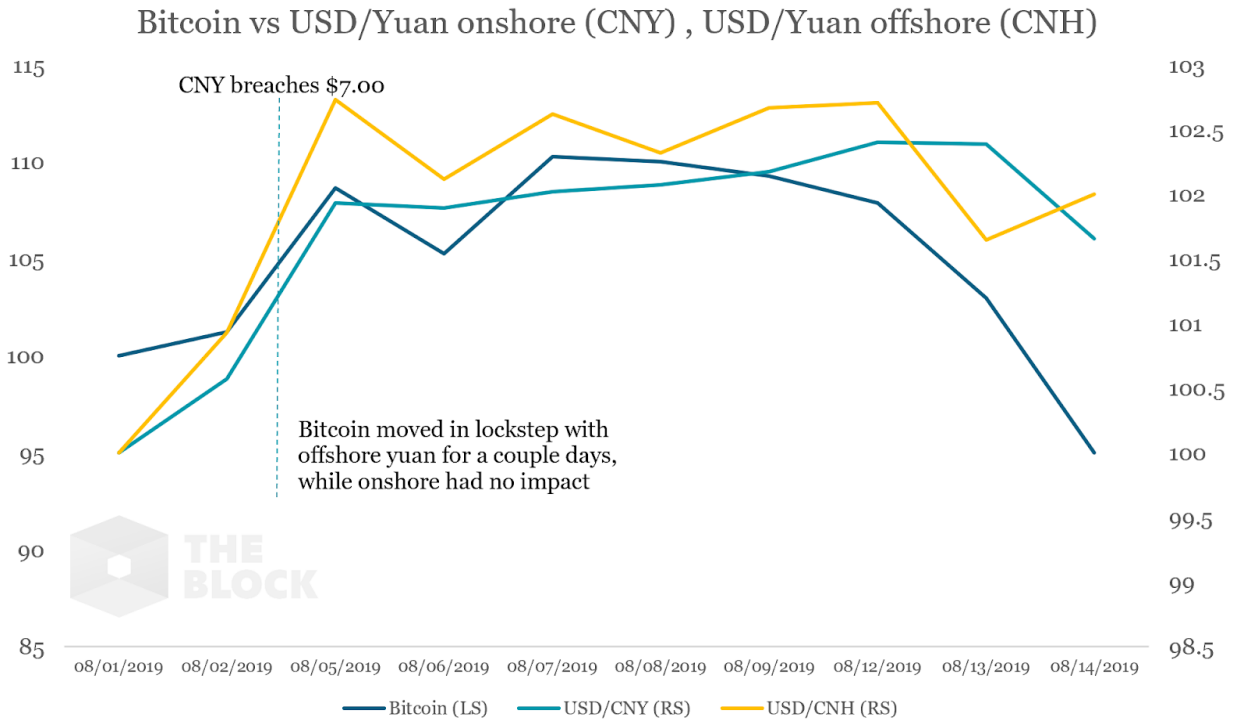
How does this relate to bitcoin?

On a CNBC interview a couple of weeks back, Lee laid out his contrarian thesis for why he believes bitcoin will act as a risk-on asset, and not as a hedge on equity market turmoil; predicting that the S&P 500 would make new highs by March, and bitcoin would soon follow.

Lee acknowledged that bitcoin has appeared to respond to specific crises (such as the Cyprus banking crisis which saw two bank bailouts and a loss of confidence with the Central Bank of Cyprus — leading to more than 35% of central bank deposits fleeing the system, amidst a +300% rise in the price of bitcoin during that time in 2013), and the relationship between daily bitcoin price returns and the Yuan devaluation in the first week of August.



Source: Susquehanna Financial Group - David Ryzhik, Central Bank of Cyprus



Source: The Block, FactSet

However, Lee also noted that mechanically, bitcoin may work even better in a risk-on world. If one were to assume bitcoin acts as a "macro hedge," then Lee suggests you would expect bitcoin's price to do best when the S&P 500 has a bad year. Historically, that just hasn't been the case. In fact, the S&P 500's best four years this decade coincide with bitcoin's best years as well. So far 2019 is no exception, with the S&P up ~20% on the year, with bitcoin up ~120% (vs last year's ~75% drawdown).

	BTC Annual Return	S&P500 Annual Return
2012	187%	13%
2013	5,286%	30%
2014	-57%	11%
2015	38%	-1%
2016	123%	10%
2017	1,337%	19%
2018	-74%	-6%
2019*	113%	18%

Source: The Block, FactSet, Coinmetrics

Conclusion

"I think crypto is really more like a hive mind community. There really isn't a centralized Mr. bitcoin spokesperson and there's no bitcoin company yet. And they're not publishing KPIs or talking to the trading desk. So it's a very different business and I think because of that it actually makes traditional institutions really leery of trying to enter the market because it's hard for them to believe that they can come in with an edge."

~Tom Lee

Even with all the "scary macro" that has surfaced over the past couple months, the market is still only ~2% off all time-highs. Since late July, it's been a pause, and wait and see approach, or what Tom Lee describes as "trend-less macro."

Lee believes in a world without trend, bitcoin won't see new highs. His firm is betting the next big catalyst for bitcoin will come from a decisive breakout in equities, and once that happens, bitcoin will resume its course as a full-on risk asset.

Source: The Block, FactSet

I think those people that do take the risk are gonna be really rewarded. I think the 1% could end up being 100% by just pure price appreciation. It does mean that anyone allocating 1% to crypto has to realize it's a hyper volatile asset that could, in that path from 1 to 100 could go to .1% of their net worth as well. And so I think that's really the important part of investor education or hodler education.

~TOM LEE

Project Deep Dives

Balancer: N Dimensional Automated Market Maker

October 4, 2019

Quick Take

- The Balancer system is composed of numerous liquidity pools, public and private, which can support up to 'n' assets and is not constrained by a uniform numeraire
- Although Balancer has yet to formally launch, the concept of a generalized Automated Market Makers has excited many observers in the ecosystem
- The ability to replace Uniswap's base numeraire — Ether — with an asset less exposed to impermanent loss is in itself an exciting development

Late 2018 and early 2019 has largely been defined by the development and maturation of Open Finance market structure. Exchange infrastructure continues to proliferate, with users offered various architectures including continuous order books via 0x, batched auctions via DutchX, and Automated Market Makers (AMM) via Uniswap. Other developments of note include synthetic stablecoin, Dai, which serves as the dominant medium of exchange, and money markets, such as Compound.

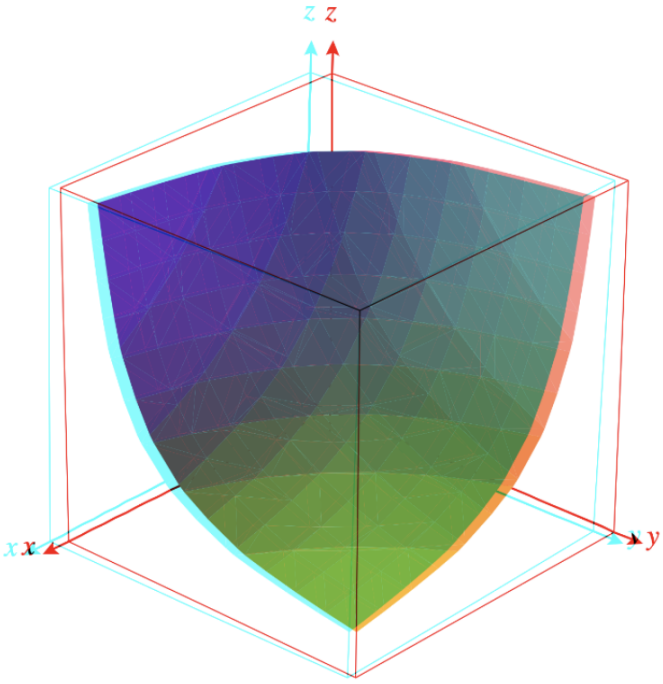
The innately interoperable nature of these protocols has now inspired more complex experimentation. Recent developments include: Uniswapex, an extension to Uniswap permitting users to execute limit orders through the AMM model; margin exchange venues like dYdX, and debt instruments—certificates of deposits and zero-coupon bonds.

Balancer

While Balancer, presented as a non-custodial portfolio manager, falls under this second category, in practice it serves as a base layer primitive, and is likely to see considerable second-order experimentation. Founded by Fernando Martinelli, serial

entrepreneur and previously of management consulting giant Bain & Co., and Nikolai Musheigan, co-founder of MakerDAO, Balancer, in simplistic terms, is a generalized implementation of Uniswap's AMM model. Currently advised by Block.Science's Michael Zargham, Ocean Protocol's Trent McConaghy, and Blockchain Chief Legal Officer Marco Santori, Balancer's version one, dubbed 'Bronze', is expected to launch before the end of the year.

Balancer can be described as an 'n-dimensional AMM'. Like Uniswap, the Balancer system is composed of numerous liquidity pools: however, each pool can support up to 'n' assets and, unlike Uniswap, is not constrained by a uniform numeraire—in Uniswap's case, each liquidity pool is required to have 50% of its value in Ether. Rather than producing a single asymptotic price curve, Balancer liquidity pool's produce a multi-dimensional constant value surface, as illustrated below.



This multi-asset construction allows Balancer liquidity pools to replicate an index fund structure, with customizable weights assigned to particular assets. However, Balancer offers two important advantages over traditional Exchange Traded Funds, beyond the obvious self-custody property.

The first advantage is the absence of consistent management fees. According to the Wall Street Journal, the average ETF charges 0.44% in annual management fees, although explicit fees continue to compress as index providers instead seek revenue from lending the underlying securities. By contrast, Balancer liquidity pools charge no explicit user fees beyond the gas costs required to deposit and withdraw assets.

The second advantage of Balancer is that liquidity providers serve as passive market makers, earning trading fees in return for allowing speculators to trade against their assets. By trading against these assets, these speculators are concurrently serving as index rebalancers, ensuring that the pre-set asset distributions remain constant in the face of single asset appreciation or depreciation. Traditional ETFs, by contrast, commonly use 'heartbeat' trades, a controversial practice enabled by 1969 Nixon-era legislation, to rebalance portfolios. Heartbeat trades essentially allow ETFs to defer capital gains tax events by paying out a certain appreciated stock:

"Say an ETF needs to get rid of a stock that went up. Selling it would trigger a taxable gain that would ultimately be paid by fund investors. But handing the stock off to a broker who's making a withdrawal achieves the same goal, tax-free."

The Heartbeat strategy should not be considered a means of avoiding tax: rather, ETF investors are simply deferring tax payments, whereas mutual fund investors pay on an annual basis. However, deferring tax payment does benefit from the time value of money and inflation: a dollar today is worth more than a dollar tomorrow. This advantage has led many finance executives to believe that the loophole will eventually be shuttered, to the ultimate loss of ETF investors.

'Value'

A generalized AMM model capable of supporting 'n' tokens simultaneously was initially suggested by Gnosis' Alan Lu in his 2017 blog post, *Building a Decentralized Exchange in Ethereum*, although Balanncer's approach differs in regarding some key elements.

As described in the whitepaper, the fundamental principle underlying the Balancer liquidity pools' functions is a surface defined by a constraining value function—V—to a constant. This constant is a function of the pool's weights and balances. V is

somewhat equivalent to the constant product (k) in Uniswap, which is a multiple of x and y.

ETH Purchased	Cost per ETH	Total Cost in DAI	Premium	New ETH Liqudity	New DAI Liqudity	Constant Product
				x	y	k
0	100.00	-	0	1000.00	100000.00	100000000.00
1	100.10	100.10	0.10%	999.00	100100.10	100000000.00
2	100.20	200.40	0.20%	998.00	100200.40	100000000.00
5	100.50	502.51	0.50%	995.00	100502.51	100000000.00
10	101.01	1010.10	1.01%	990.00	101010.10	100000000.00
25	102.56	2564.10	2.56%	975.00	102564.10	100000000.00
50	105.26	5263.16	5.26%	950.00	105263.16	100000000.00
100	111.11	11111.11	11.11%	900.00	111111.11	100000000.00
200	125.00	25000.00	25.00%	800.00	125000.00	100000000.00
500	200.00	100000.00	100.00%	500.00	200000.00	100000000.00
800	500.00	400000.00	400.00%	200.00	500000.00	100000000.00
999	100000.00	99900000.00	99900.00%	1.00	100000000.00	100000000.00
1000	Infinity	Infinity	Infinity	Infinity	0.00	100000000.00

Example of Uniswap constant product model

The Balancer Value function serves as an extension of this constant product model, allowing for multiple assets and weightings: no matter what trade takes place, the share of value of each token in the pool remains constant. As an equation, Value (V) is defined as follows:

$$V = \prod_t B_t^{W_t}$$

Stated otherwise, Value = Token A balance^Token A weight * Token B balance^Token B weight...*Token N balance^Token N weight.

The following table illustrates a Balance liquidity pool composed of Ether (ETH), Maker (MKR), and Dai (DAI), with weightings of 50%, 25%, and 25%, respectively. For the sake of simplicity, accumulated fees from trading have been omitted.

ETH Purchased	New ETH Liquidity	New DAI Liquidity	New MKR Liqudity	Value Constant
	a (50%)	*b (25%)*	*c (25%)*	*v (100%)*
0	100	5000	10	149.5348781
1	99	5101.520253	10	149.5348781
2	98	5206.164098	10	149.5348781
5	95	5540.166205	10	149.5348781
10	90	6172.839506	10	149.5348781
25	75	8888.888889	10	149.5348781
50	50	20000	10	149.5348781
99	1	50000000	10	149.5348781
100	0	Inifinity	10	149.5348781

ETH Price (DAI)	MKR Price (DAI)	Dai Price (DAI)
100.00	500.00	1
103.06	510.15	1
106.25	520.62	1
116.64	554.02	1
137.17	617.28	1
237.04	888.89	1
800.00	2000.00	1
100000000.00	5000000.00	1
Infinity	Infinity	1

As Ether is purchased in exchange for Dai, the price per Ether increases asymptotically. Although the MKR balance remains constant, its price in terms of Dai similarly increases exponentially in order to maintain set weightings. The spot price of any asset can be calculated as Token A Balance/Token A Weight over Token B Balance/Token B Weight.

The table below illustrates an identically composed liquidity pool, yet this time showing the effects of Maker purchases in exchange for Ether.

MKR Purchased	New ETH Liquidity	New DAI Liquidity	New MKR Liqudity	Value Constant
	a (50%)	*b (25%)*	*c (25%)*	*v (100%)*
0	100	5000	10	149.5348781
1	105.4092553	5000	9	149.5348781
2	111.8033988	5000	8	149.5348781
2.5	115.4700538	5000	7.5	149.5348781
5	141.4213562	5000	5	149.5348781
7.5	199.9999999	5000	2.5	149.5348781
9	316.2277659	5000	1	149.5348781
10	Infinity	5000	0	149.5348781

ETH Price (DAI)	MKR Price (DAI)	Dai Price (DAI)
100.00	500.00	1
94.87	555.56	1
89.44	625.00	1
86.60	666.67	1
70.71	1000.00	1
50.00	2000.00	1
31.62	5000.00	1
Infinity	Infinity	1

The following tables show the effects of various different trades on the balance and prices of the pool's assets. The first table shows the initial pool construction. The

second table shows the effect of a 1 Ether purchase in exchange for Dai. The third table shows the effect of a subsequent 1 Maker sale in exchange for Ether. The final table shows the effect of a 10 Ether sale in exchange for Dai.

New ETH Liquidity	New DAI Liquidity	New MKR Liqudity	Value Constant
a (50%)	*b (25%)*	*c (25%)*	*v (100%)*
100	5000	10	149.5348781

ETH Price (DAI)	MKR Price (DAI)	Dai Price (DAI)
100.00	500.00	1.00

New ETH Liquidity	New DAI Liquidity	New MKR Liqudity	Value Constant
a (50%)	*b (25%)*	*c (25%)*	*v (100%)*
99	5101.52025	10	149.5348781

ETH Price (DAI)	MKR Price (DAI)	Dai Price (DAI)
103.06	510.15	1.00

New ETH Liquidity	New DAI Liquidity	New MKR Liqudity	Value Constant
a (50%)	*b (25%)*	*c (25%)*	*v (100%)*
94.39279634	5101.52025	11	149.5348781

ETH Price (DAI)	MKR Price (DAI)	Dai Price (DAI)
108.09	463.77	1.00

New ETH Liquidity	New DAI Liquidity	New MKR Liqudity	Value Constant
a (50%)	*b (25%)*	*c (25%)*	*v (100%)*
104.3927963	4170.962227	11	149.5348781

ETH Price (DAI)	MKR Price (DAI)	Dai Price (DAI)
79.91	379.18	1.00

Balancer In Practice:

Balancer offers two distinct types of liquidity pools: public and private.

The owner of a private pool is the only entity that may contribute liquidity and update pool parameters—assets, weights, pool trading fees. A private pool may be more appropriate for sophisticated liquidity providers that want the ability to update their indexes and trading fees at short notice. Theoretically, this owner could be a DAO, with the power to update pool parameters proportional to voting power within the DAO.

A public pool has its parameters set and fixed upon creation. Any entity can provide liquidity, receiving pool shares pro-rata according to the value of liquidity provisioned. A withdrawal fee, expected to settle around 0.1%, will be levied on liquidity providers, with 10% of the withdrawal fee directed to the Balancer team. This withdrawal fee

should serve to incentivize longer-term liquidity provision, although will likely not be large enough to punish those needing short term liquidity.

While the ability to set arbitrary trading fees does theoretically set the stage for a competitive fee market, one might expect an equilibrium percentage fee to emerge over time. The initial free market does provide some utility, however, in that using market forces helps to avoid setting arbitrary, potentially sub-optimal parameters.

As with Uniswap's pools, liquidity providers are potentially subject to 'impermanent loss', a phenomenon used to describe loss relative to a standard hold strategy resulting from asset volatility. Uniswap's 'impermanent loss' structure is illustrated below.

Starting Value	End Value	Price Change	Impermanent Loss
$100	$10	90%	-42.50%
$100	$20	80%	-25.46%
$100	$25	75%	-20.00%
$100	$33	67%	-13.62%
$100	$50	50%	-5.72%
$100	$75	25%	-1.03%
$100	$100	0%	0.00%
$100	$125	25%	-0.62%
$100	$150	50%	-2.02%
$100	$175	75%	-3.79%
$100	$200	100%	-5.72%
$100	$300	200%	-13.40%
$100	$400	300%	-20.00%
$100	$500	400%	-25.46%
$100	$750	650%	-35.56%
$100	$1,000	900%	-42.50%

Consequently, Balancer's index funds may be more appropriate for certain low-volatility assets: a basket of equally weighted stablecoins (Dai, USDC, USDT, TUSD) or yield tokens (yDai, yETH, yMKR), the latter with bounded impermanent loss, are two promising possibilities. A tailored synthetic equities portfolio combined of,

say, the top five largest public corporations across China, Germany, the United States and Brazil could also be appropriate, assuming that trading fees net more revenue than impermanent loss.

An important feature of the Balancer product is its custom smart order routing (SOR) system, which provides traders with unified quotes sourced across the system's various liquidity pools. The SOR system can also be customized around certain parameters, including maximum slippage and fees. A prototype has been built, although may not be released alongside the Bronze implementation. The computational complexity of the SOR, which has to account for the impact of orders on pool weightings, has required the Balancer team to construct the system off-chain: the team hopes to implement it on-chain by the Gold version, which would permit for contract fillable liquidity. This is to say that other protocol contracts will be able to interoperate with Balancer's liquidity pools to execute any trade directly on-chain. This SOR system could feasibly be extended to lending protocols in order to provide borrowers and lenders optimized rates.

An interesting bi-product of the Balancer Value function is the emergence of 'negative spreads'—prices that outcompete market rates. Depending on pool fees, liquidity, and gas costs, it may not be profitable for arbitrageurs to collect spreads at all times. This leads to a multitude of distinct prices between pools at any given time, and the possibility of better average prices for both buyers and sellers at any given time.

Although Balancer has yet to formally launch, the concept of a generalized AMM has excited many observers in the Open Finance ecosystem. The ability to replace Uniswap's base numeraire—Ether—with an asset less exposed to impermanent loss is in itself an exciting development. Further, advanced trading strategies, currently offered by Set Protocol, can also be replicated, with the added advantage that liquidity providers are less exposed to front running and benefit themselves from rebalancing: a recent rebalance for the Ether 20 Day Simple Moving Average set saw slippage of 1.13%.

Balancer's Fernando Martinelli has suggested that his project and Uniswap can co-exist, although considering the similarities and desired end goals—liquidity aggregation—this seems doubtful. However, Balancer's success is by no means

guaranteed: Uniswap has a significant head start in that it has been operating in the wild for close to 12 months, has accumulated almost unrivaled goodwill within the Ethereum community, and, given the open-source nature of these programs, can always adjust their design to account for Balancer's innovations. Indeed, the imminent Uniswap v2 is expected to permit customizability around pool numeraires.

BitDEX: A decentralized exchange for perpetual swaps

October 21, 2019

Quick Take

- Financial services platform UMA has released a specification regarding a decentralized protocol for perpetual swaps, BitDEX
- BitDEX presents a way to provide highly leveraged exposure to any target asset in a non-custodial, permissionless fashion

Universal Market Access (UMA) is a platform for financial product innovation on Ethereum. The project is comprised of two intersectional products: a synthetic token issuance platform and an oracle mechanism.

Recently, the UMA team published a paper, *BitDEX: Building a Decentralized BitMEX using Priceless Financial Contracts*, outlining a specification for a bi-lateral Contract for Difference (CFD) architecture like that employed by BitMEX's perpetual swap product.

Why DEX

BitDEX brings several incremental advantages versus centralized counterparts like BitMEX.

In theory, BitDEX's 'decentralized' structure helps avoid both financial and non-financial costs. Traditional centralized exchange operators provide some or all of the following services: aggregating liquidity via hosted order books; custodying margin; trade clearing; liquidations; and settling. Trading fees — explicit financial costs — are levied to compensate for overheads required to operate these services.

Non-financial costs include collection of personal data and the ability to arbitrarily restrict access — indeed BitMEX has barred access to U.S.-based customers. Non-financial costs include asymmetric information between user and operator, which can be leveraged to countertrade and trigger liquidation points.

The decentralized architecture proposed by UMA for BitDEX removes the many of these implicit costs: the collection of personal data, the ability to selectively admit or deny certain demographics. However, as long as Ethereum struggles with scaling constraints, a decentralized implementation of BitMEX will necessarily be unable to compete on latency and liquidations. Additionally, the public nature of the Ethereum blockchain means that order data will be widely available for analysis, potentially opening up squeeze opportunities from enterprising third parties.

Perpetual swaps

A perpetual swap is a financial instrument invented by Hong Kong-based cryptocurrency derivatives exchange, BitMEX. At present, the BitMEX Bitcoin perpetual swap market is the most liquid Bitcoin product on the market, with over $2.3 billion of volume in the past 24 hours. In practice, a perpetual swap is an auto-rolling futures contract with an eight-hour expiry. The auto-rolling nature allows speculators – both long and short – to gain the equivalent of spot exposure without actually owning the underlying.

Perpetual swaps have several advantages of traditional, distinct maturity futures. One problem plaguing the traditional futures market is fragmented liquidity and front-running before expiry. Fragmented liquidity occurs due to speculators closing exposure to one maturity and opening exposure for a latter maturity. As for front running: because there is little demand to purchase futures close to expiry, market makers can wipe out the buy-side of the order book, forcing those with open positions to sell at a discount. While manual rolling is common in institutional futures markets, it provides a suboptimal retail user experience. This is especially relevant for on-chain products where user notification infrastructure is still lacking.

Additionally, perpetual swaps present an efficient way to gain leveraged exposure without supporting a distinct lending market. For traditional margin (using Bitcoin as an example) a long position will have to borrow some assets, usually dollars, which

they then proceed to sell for Bitcoin. Likewise, a short speculator will have to source Bitcoin, which they then proceed to sell for dollars. Perpetual swaps, on the other hand, allow speculators to place margin in the base asset itself, baking leverage directly into the contracts.

BitDEX protocol

BitDEX is designed to function as follows:

Each market is represented by a single smart contract, which defines the rules of engagement. The contract custodies all counterparties' margin and publicly displays the net deposits of each counterparty. The contract can be easily verified to ensure that all long and short counterparties are accounted for and there is no residual risk left against the contract: as with any CFD, counterparties always trade against each other.

Unlike existing margin exchanges, BitDEX does not rely on a price feed to ensure overcollateralization — rather, counterparties are responsible for monitoring their counterparties' positions, incentivized by potential rewards in scenarios where they identify a negative equity position. UMA describes these particular products as 'priceless financial contracts.'

The rules of engagement assert the Net Present Value function and margin requirement that all counterparties agree to use and can be checked against during a dispute process. Margin calls — the process whereby an operator notifies a trader that additional margin must be deposited to avoid liquidation — are replaced by "pull" requests initiated by counterparties to the contract to deposit additional margin or withdraw excess margin. Counterparties are free to deposit and withdraw margin from BitDEX, although withdrawals are subject to a probation period.

Alice and Bob trade on 10x leverage

Imagine that Alice wants to go 'long' 10,000 contracts, with each contract priced at $1. With Bitcoin trading at $10,000, this amounts to 1 BTC worth of exposure. First she must find a counterparty. A funding rate, similar to that used by BitMEX, could be

introduced to ensure there remains balanced supply on both sides of the order book. As it happens, in our imaginary universe Bob wants to go 'short' 10,000 contracts. They are matched after agreeing to a mutually agreeable price.

This matching process is coordinated outside of the BitDEX protocol. Once complete, both Alice and Bob deposit their margin into the BitDEX market. In order to ensure that Alice and Bob are safely margined, BitDEX uses existing counterparties' deposits to infer whether Alice and Bob's initial deposits are acceptable. Assuming Alice and Bob's initial deposit amounts each meet or exceed the collateralization of other existing long/short positions, their positions will not be disputed and can be maintained in the contract.

This mutually agreeable price is used to calculate the current NPV function and margin requirements. For Bitcoin, BitDEX NPV Function has initially been set as Price - 10,000, while minimum margin requirement is 10% * Price. This permits a maximum leverage of 10x.

With Bitcoin at $10,000, both Bob and Alice must post a minimum of $1,000 margin for $10,000 worth of contracts. If they each post $1,000, they are in 10x leveraged.

Let's imagine that the price of Bitcoin moves down to $9,500. At this point, Bob has an unrealized profit, or Net Present Value, of $500, while Alice has an unrealized loss of $500 — they have swapped the difference between price and 10,000. At this point Alice is undercollateralized: $500 of her initial $1,000 margin is owed to Bob, leaving her with just $500, or 5.26% margin. If Alice does not top her margin an additional $450 – taking her back to the 10% margin requirement ($950) – her long contracts will be liquidated.

Conversely, let's imagine that the price of Bitcoin moves up from $10,000 to $11,500. This time, the price has moved against Bob. If Bob wants to maintain his position he will have to post $1,150 of margin and an additional $1,150 deposit to cover the NPV. As Bob already posted $1,000 of margin when he entered the position, this comes to $1,300 of additional margin. If Bob fails to post this margin before a counterparty initiates dispute proceedings, he will be liquidated.

Dispute

Priceless financial contracts require some dispute mechanism in the event that a market participant believes their counterparty is undercollateralized.

At any time, any long BitDEX counterparty can dispute any short counterparty (and vice versa). The only requirement is that the two parties have offsetting risk: that is to say, they must have the same volume of open exposure.

To initiate a dispute, a counterparty (the disputer) calls the dispute function on another counterparty they believe to be undercollateralized. This immediately terminates the trade for both counterparties, placing both sides in a liminal state as they await the results of an oracle. Using an oracle of choice – whether UMA's very own Data Verification Mechanism or a more lightweight implementation like a weighted rolling average Uniswap market price – the BitDEX contract calculates how much margin should be returned to the two parties at termination. If the dispute was accurate – i.e. one position was undercollateralized – the disputer is paid the NPV plus a penalty paid by the disputed counterparty. If the dispute was inaccurate, the disputer is paid the NPV less a penalty.

The penalty mechanism ensures that counterparties are correctly incentivized to dispute in the case of undercollateralization while sufficiently penalized for griefing activity. The presence of a dispute penalty should help to ensure that most counterparties remain sufficiently overcollateralized.

Implementation

In its current form, BitDEX is merely a draft specification: the UMA team has no intention to build out the protocol themselves, although the team has suggested that they will support any developer or group of developers working towards a production-ready version.

In isolation, BitDEX contracts are rather limited in the utility they can provide. As with the 0x exchange protocol, BitDEX requires third party 'relayers', or consumer facing interfaces. These interfaces will serve as access points to the underlying protocol,

while also providing features like order books and order matching engines. Relayer operators could also feasibly provide guaranteed liquidation services to their customers at a lower penalty than that enforced by the protocol using extra-protocol rebates.

An analysis of Libra Association members and their history of blockchain involvement

October 31, 2019

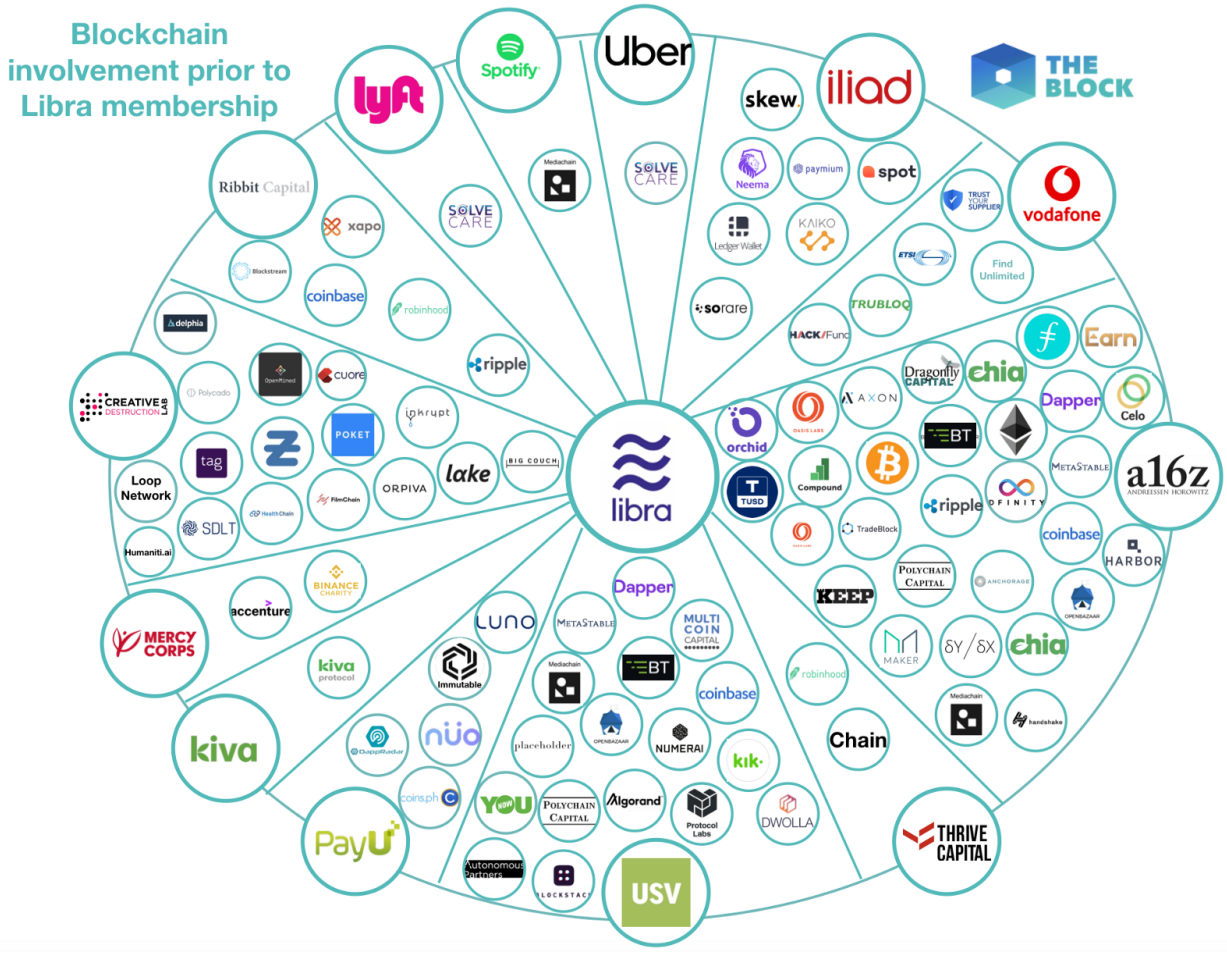
Quick Take

- Many of the remaining Libra Association members are well-known entities, such as Lyft, Spotify and Vodafone. What is not as known are which if any blockchain projects or companies these firms have been involved with prior to their membership in the Libra Association
- Broken down by sector, VCs that are part of the Libra Association have had the most ties with the blockchain industry, accounting for about 58% of all involvement
- The Block has mapped out a total of 89 projects or companies that 13 members of the Libra Association have been involved with

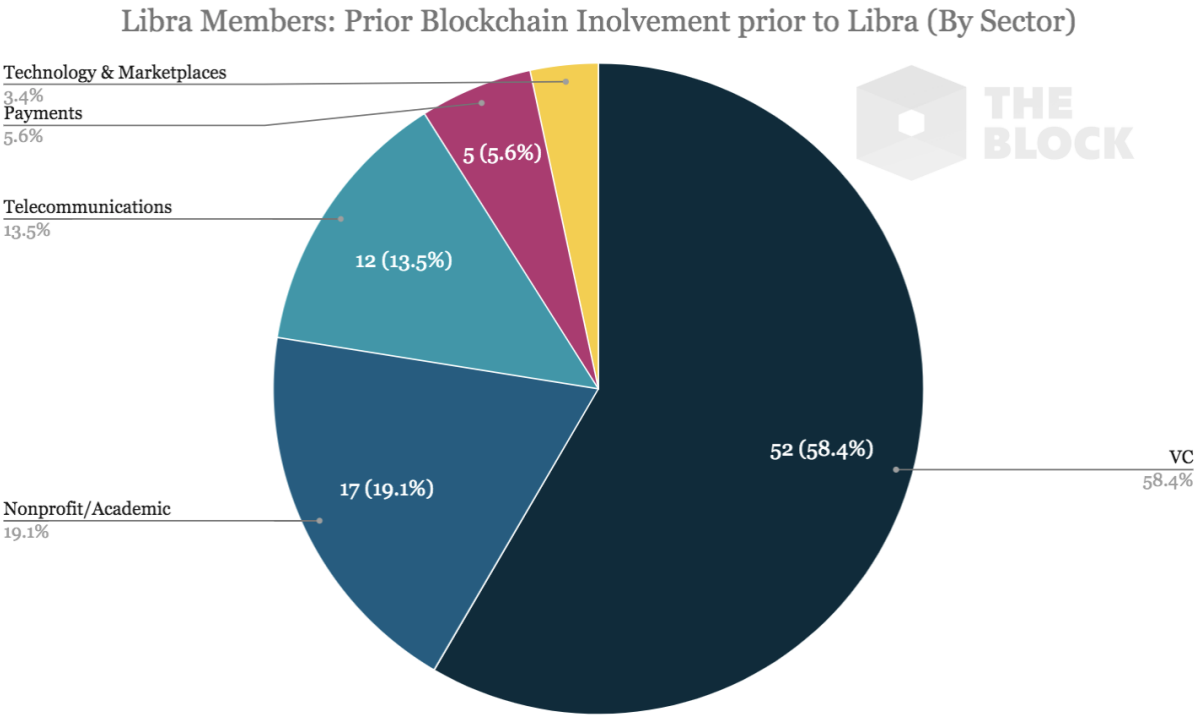
Facebook's Libra project has been making noise in the news and in the halls of Congress, with CEO Mark Zuckerberg facing a grilling from lawmakers last week. Libra, which these days is being touted more as a payment platform than a currency, is slated to be governed by a diverse range of businesses, nonprofits, and academic institutions that together would make up the Libra Association.

Originally, the Association had 28 founding members, but as controversy and regulatory concerns have grown, a quarter of the founding members have dropped out, with 21 members remaining. The companies that have abandoned the association include Visa, Stripe, Ebay, PayPal, Mastercard, Booking Holdings, and Mercado Pago.

Many of the remaining members are well-known entities, such as Lyft, Spotify, Vodafone, etc. What is not as known, are the blockchain projects or companies these entities have been involved with, if any, prior to their membership to Libra. For the purposes of this research, we have focused on the members that are not primarily blockchain companies, yet have engaged in efforts exploring what the technology can do for their businesses. The Block has mapped out a total 89 projects or companies that 13 members of the Libra Association have been involved with.



Breakdown of involvement by Sector



Andreessen Horowitz

Polychain Capital is a hedge fund based in the San Fransisco Bay Area focused on blockchain assets

Dragonfly Capital Partners is a cryptoasset venture fund based in San Francisco and Beijing

MetaStable Capital is a hedge fund based out of San Fransisco that invests directly into cryptocurrencies

Blocktower Capital is an investment firm, applying professional trading, investing and portfolio management to cryptoassets

Compound is an open-source protocol for money markets on Ethereum through which users can borrow and lend cryptocurrencies

dYdX is an open-source protocol for decentralized financial derivatives and margin trading

MakerDao is a smart contract platform that issues CDPs (collateral debt positions) which help stabilize the value of the associated decentralized stablecoin (Dai)

Celo is a mobile-focused platform for digital payments

Ripple is a cross-border payment platform

Anchorage is a crypto custody solutions provider

Axoni develops enterprise blockchain solutions

TradeBlock develops enterprise tools for blockchain assets

Bitcoin is a peer-to-peer payment settlement network

Chia is an energy friendly peer-to-peer currency

Harbor is a security token platform

TrustToken is an asset tokenization platform

Ethereum is a decentralized platform that runs smart contracts and decentralized applications

DFINITY is a decentralized computing platform

Keep is a privacy solution for public blockchains

Orchid Labs provides a suite of open source tools and cryptographic protocols including an open marketplace for bandwidth and a VPN client for all major operating systems

Oasis Labs is a privacy-first, high-performance cloud computing platform

Coinbase is a cryptocurrency wallet and exchange platform

Dapper Labs develops blockchain-based games and non-fungible assets

Filecoin is a cryptocurrency and a decentralized storage network

OpenBazaar is a decentralized e-commerce platform

Earn (acquired in 2018) enables users to earn bitcoin by completing tasks

Mediachain (acquired in 2017) is a blockchain data solution for connecting applications to media and information

Handshake a decentralized protocol for an alternative Domain Name System

Union Square Ventures

Polychain Capital is a hedge fund based in the San Fransisco Bay Area focused on blockchain assets

Numerai is an AI-run hedge fund that crowdsources investment data to make trades

Multicoin Capital is a thesis-driven crypto fund based Austin that invests in tokens and blockchain technology

MetaStable Capital is a hedge fund based out of San Fransisco that invests directly into cryptocurrencies

Placeholder is a venture capital firm that invests in blockchain related companies

Blocktower Capital is an investment firm applying professional trading, investing and portfolio management to cryptoassets

Coinbase is a cryptocurrency wallet and exchange platform

Dapper Labs develops blockchain-based games and non-fungible assets

OB1 develops OpenBazaar a decentralized e-commerce platform

Mediachain (acquired in 2017) is a blockchain data solution for connecting applications to media and information

Algorand is a scalable, secure and decentralized digital currency and transactions platform

Dwolla provides an online payment system and mobile payments network accessible via an open API

Kik is a mobile messaging platform developing Kin, a digital currency

YouNow is a live-streaming platform developing Props, a decentralized mobile video ecosystem

Protocol Labs is a research lab for network protocols

Blockstack is a decentralized computing network, app development support, and identity system

PayU (whose parent Naspers has invested in numerous blockchain projects)

Nuo Bank is a lending platform. PayU India's chief executive officer Amrish Rau and managing director Jitendra Gupta have personally invested

Dapp Radar is a data provider for decentralized applications

Immutable is a blockchain gaming studio most famously known for Gods Unchained

Coins.ph is a mobile platform for Filipinos to buy and sell cryptocurrencies

Luno is a wallet provider wheres users can buy and sell cryptocurrencies

Lyft

Solve.care is a blockchain platform for healthcare that has partnered with Lyft

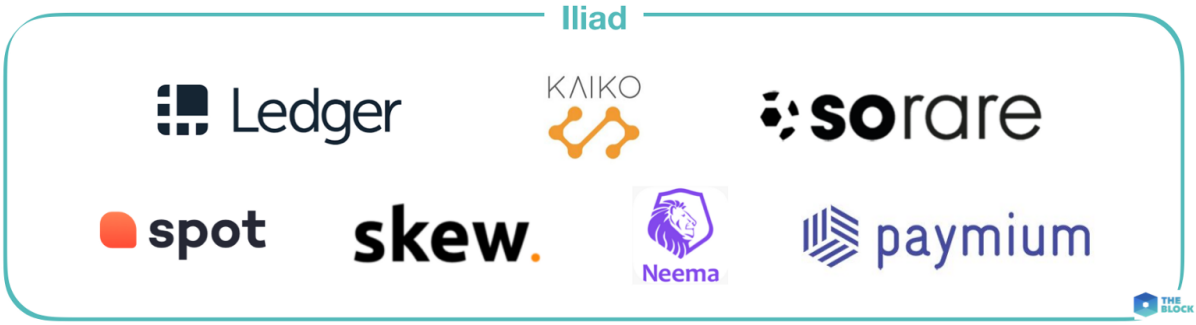
Uber

Solve.care is a blockchain platform for healthcare that has partnered with Uber

Spotify

Mediachain is a blockchain platform for media and information that was acquired by Spotify

Iliad (Iliad's Founder Xavier Niel has invested across numerous blockchain companies through his venture capital arm Kima Ventures)



Ledger Wallet is a hardware wallet provider for cryptocurrencies

Kaiko is a data provider for digital assets

Sorare uses NFTs (Non-fungible tokens) for a blockchain card game

Spot is a mobile application where users can buy, sell, and manage cryptocurrencies

Neema is a payments platform

Paymium is an European Bitcoin Exchange

Skew is a data analytics provider for Bitcoin and Ethereum derivatives

Vodafone

Trust Your Supplier (TYS) is a supply-chain blockchain platform where Vodafone is a participant in the project

Hack Fund is a blockchain venture fund that Vodafone has partnered with

Find Unlimited was a promotion created by Vodafone where users were able to collect Non-fungible-tokens (NFTs)

ISG PDL is an Industry Specification Group on Permissioned Distributed Ledger that Vodafone has become a member in

Ribbit Capital

Coinbase is a cryptocurrency wallet and exchange platform

Blockstream is focused on Bitcoin and blockchain development. Through its block explorer, users can view data on Bitcoin's blockchain

Robinhood is an investment application where users can purchases stocks and cryptocurrencies

Xapo offers custodial services for crypto assets with its cold storage vault

Ripple is a cross-border payment platform

Thrive Capital

Chain was a Bitcoin company acquired by Lightyear that was exited by Thrive Capital in September 2018

Robinhood is an investment applications where users can purchase stocks and cryptocurrencies

Creative Destruction Labs

Big Couch created Filmchain, a platform that records, tracks, and settles revenue generated by film, TV, and digital video

CUBIE Ledger is an adaptive-learning solution that creates an immutable record of a user's education

Cuore digitizes and automates the streamlining process of asset issuance and its lifecycle management

Delphia is a marketplace for predictions where users can earn money by sharing their data

Humaniti.ai is a provider of programming assistance for developers

Inkrypt is a decentralized content-hosting platform

Lake Project uses software to invest, manage, and re-balance a user's investment portfolio in digital assets

Loop Network is a search engine that uses a “Proof of Knowledge” staking mechanism to verify information is reliable without a central authority overseeing it

Orpiva is a luxury good retailers that personalizes a user's shopping experience based on their social media influencers

POKET is a mobile app building a registry of data with more than 1 billion merchants across the globe

Polycado is a marketplace that connects non-technical people with software developers

SecureDLT assists enterprises with writing and using smart contracts

Tag Loyalty supports loyalty programs with its software

ZED Network is a platform for money-transfer operators

Kiva

Kiva Protocol is a National Digital Identity Platform created by Kiva(NDIP) that has worked with U.N. agencies in Sierra Leone to create a national identity system

Mercy Corps

Binance Charity is the the philanthropic arm of the Cryptocurrency Exchange Binance. Mercy Corps partnered with Binance Charity to launch a “Humanity First” token. The token is meant to aide refugees from South Sudan to Uganda

Accenture Supply Chain is a circular supply chain platform Mercy Corps has become a partner of the project

Company Deep Dives

Blockstack 2Q19 update: Estimated runway until 'end of 2021 or more' seems unlikely given rapidly growing expenses

October 9, 2019

Quick Take

- Blockstack released 1H19 financials which showed core operating expenses increased by 40% from 2H18 to $10.2 million
- Management believes its $7.5 million in working capital coupled with the $23.2 million raised through its Reg A+ and Reg S offerings will give it runway until “the end of 2021 or more”
- Given management’s expectations of continued expense growth moving forward, their runway estimate seems extremely aggressive
- Future sources of funds will come from either equity/debt financing or additional token sales, with the latter leading to dilution for token holders

Following the completion of Blockstack’s Reg A+ and Reg S offerings, the company recently released its financials for 1H19. Notably, core operating expenses grew by 40% from 2H18 as the company adds new personnel and increases marketing spend. As noted in The Block's last report on Blockstack, CEO Muneeb Ali estimated that the company has enough runway to last until “the end of 2021 or more.” However, it’s uncertain how this will be obtainable given management’s guidance of even higher expenses in the latter half of the year coupled with no real method of generating revenue outside of future token sales.

1H19 financials and guidance

Blockstack PBC Income Statement

	1H18	2H18	1H19
Revenue from token development arrangements	2,039	34,724	-
Operating expenses			
General and administrative	993	2,960	3,035
Research and development	612	892	553
Compensation expense	1,063	3,072	4,954
Advertising and marketing	375	382	1,672
Depreciation and amortization	8	11	26
Core Operating Expenses	3,051	7,317	10,240
Impairment of digital currencies	1,221	7,038	-
Total operating expenses	4,272	14,355	10,240
Income from operations	(2,233)	20,369	(10,240)
Other income			
Gain from vesting of employee tokens	-	-	3,011
Interest income	-	-	149
Other income (expense)	146	35	(2)
Total other income	146	35	3,158
Income (loss) before income taxes	(2,087)	20,404	(7,082)
Income taxes	-	6,637	-
Net income (loss)	**(2,087)**	**13,767**	**(7,082)**
Net loss allocable to non-controlling interest	439	3,494	-
Net loss attributable to Blockstack PBC	**(1,648)**	**17,261**	**(7,082)**

Source: Blockstack PBC, The Block

Currently, Blockstack's revenue is almost entirely generated by the company's token sales which results in lumpy top-line figures. In 1H19, Blockstack did not recognize any revenue. However, revenue for 2H19 will include the $23.2 million raised through the Reg A+ and Reg S offerings as well as any additional token offerings that take

place before the end of the year (assuming the tokens are successfully delivered to investors).

Total expenses declined from $14.4 million in 2H18 to $10.2 million in 1H19. This was primarily due to a $7 million impairment of digital currencies recognized in 2H18. When excluding impairment on digital currencies, however, core operating expenses increased from $7.3 million to $10.2 million (a 40% increase). This was mainly attributed to higher compensation and advertising expenses.

Management noted that they expect expenses to continue to increase through the end of 2H19 primarily as a result of higher general and administrative costs, research and development expenses, and advertising spend as the company hires new personnel and ramps its promotion of the Blockstack network.

Blockstack PBC and Subsidiaries
Consolidated Balance Sheets
($ in thousands)

	June 30, 2019 (Unaudited)	December 31, 2018 (Audited)
Assets		
Current assets		
Cash and cash equivalents	$ 6,870	$ 21,126
Income tax receivable	674	—
Other current assets	278	102
Total current assets	7,822	21,228
Restricted cash	4,436	4,436
Fixed assets, net	90	95
Intangible assets, net	102	60
Digital currencies	2,758	2,758
Restricted digital currencies	2,923	2,923
Investments	806	290
Right-of-use asset, net	1,955	—
Other assets	245	245
Total assets	**$ 21,137**	**$ 32,035**
Liabilities and Stockholders' Equity		
Current liabilities		
Token delivery obligations	$ 526	$ —
Income tax payable	433	6,158
Token obligations to employees and others	458	—
Lease liability - current	344	—
Other current liabilities	1,329	2,214
Total current liabilities	3,090	8,372
Lease liabilities, net of current portion	1,697	—
Total liabilities	**4,787**	**8,372**
Stockholders' equity:		
Series A convertible preferred stock, $0.00001 par value, 4,558,946 shares authorized; 4,558,498 shares issued and outstanding; liquidation preference of $5,519	—	—
Common stock, $0.00001 par value, 16,000,000 shares authorized; 9,131,646 shares issued and outstanding	—	—
Additional paid-in capital	6,956	6,668
Retained earnings	2,036	9,118
Total controlling stockholders' equity	8,992	15,786
Non-controlling interest	7,358	7,877
Total stockholders' equity	16,350	23,663
Total liabilities and stockholders' equity	**$ 21,137**	**$ 32,035**

Source: Blockstack PBC, The Block

Looking at the balance sheet, Blockstack had working capital (current assets less current liabilities) of $4.7 million as of June 30. The company also had $2.8 million in unrestricted cryptocurrencies (BTC and ETH) which it may sell in order to finance its

own activities. In aggregate, Blockstack had liquid assets of $7.5 million as of June 30.

Cash Runway

Following Blockstack's token offerings ending on Sept. 9, Ali estimated that the company had enough runway to last until "the end of 2021 or more."

Ignoring any expenses that may have occurred between June 30 and Sept. 9, Blockstack would have approximately $30.7 million in liquid assets ($7.5 million at end of 1H19 + the $23.2 million raised from the token offerings).

Core operating expenses for 1H19 were $10.2 million. Given management's expectations of rising expenses as it hires additional personnel and increases marketing spend, this would lead to an annual burn rate of over $20 million moving forward (not to mention any potential income taxes).

With $30.7 million in liquid assets and a $20 million-plus burn rate, it seems unlikely its runway lasts until even 2021 unless expenses are cut significantly at some point.

Once capital starts running low, Blockstack will need to raise additional funding. Management stated that its potential sources of funds include equity/debt financing. Another option is further sales of its native token, Stacks (STX). Without counting its long-term treasury of 110 million STX, approximately 300 million tokens remain unallocated, the future use of which is "under the discretion of Blockstack PBC." At $0.30, the unallocated tokens are currently worth approximately $90 million.

Silvergate Bank 3Q19 Update: IPO terms proposed; deposits decline 11%

October 31, 2019

Quick Take

- This week, Silvergate Bank released an updated S-1 filing which included its proposed IPO terms as well as its preliminary financial results for 3Q19
- Silvergate aims to raise $52 million through the sale of 3.7 million shares (~0.8 million offered by the company, ~3.0 million offered by selling shareholders)
- The company expects the offering price of its common stock to be between $13 to $15 per share, implying a market cap of $249 million
- 3Q19 financial results include: 29% sequential increase in net income thanks to a more aggressive asset allocation; 11% decline in cryptocurrency-related deposits

Silvergate Bank, one of the few crypto-friendly banks in the U.S., announced proposed terms for its upcoming Initial Public Offering (IPO) of its Class A common stock earlier this week. Along with this announcement, the company filed an updated S-1 with preliminary financial results for 3Q19. Despite a lower interest rate environment putting a strain on bank profitability, Silvergate managed to obtain a 29% sequential increase in net income to $6.7 million thanks to a more aggressive asset allocation coupled with increased noninterest income from increased SEN-related fees. Deposit growth, however, proved to be a challenge as it crypto-related deposits declined 11% caused by declining balances from cryptocurrency exchanges and crypto funds.

IPO Details

Silvergate aims to raise $52 million through the offering 0f 3.7 million shares of its Class A common stock. This includes 770,000 shares offered by the company as well as 3.0 million shares offered by selling shareholders. Selling shareholders have also

granted the underwriters a 30-day option to purchase up to an additional 561,645 shares of Class A common stock from selling shareholders.

The common stock has been approved for listing on the NYSE under the ticker symbol “SI.” Silvergate estimates the offering price of its common stock to be between $13 and $15 per share. With 17.8 million shares of Class A common stock to be outstanding after its IPO, this would imply a market cap of approximately $249 million assuming an IPO price of $14 a share (the midpoint of the expected price range).

The company expects net proceeds of $7.6 million (after deducting the underwriting discount and estimated offering expenses) which it intends to use to fund organic growth and for general corporate purposes. Silvergate will not receive any proceeds from the sale of stock by selling shareholders. A registration statement has been filed with the SEC but has not yet become effective.

Management's roadshow presentation can be found here.

Competition

Silvergate Competitor Data

Name	Silvergate Bank*	Silicon Valley Bank	Metropolitan Bank	Cross River Bank	Signature Bank
Ticker	SI	SIVB	MCB	Private	SBNY
Market Cap ($B)	$0.25	$11.69	$0.36	NA	$6.60
Total Assets ($B)	$2.1	$68.2	$3.2	$2.0	$49.4
Cryptocurrency-Related Deposits ($B)	$1.3	NA	$0.2	NA	NA
NIM	3.98%	3.34%	3.26%	7.62%	2.67%
P/E LTM	11.0x	10.1x	12.8x	NA	10.8x
P/B LTM	1.1x	2.0x	1.3x	NA	1.4x

Financials as of September 31; market prices as of October 31

**Assumes IPO price of $14 a share and total shares outstanding of 17.8 million*

Source: Silvergate Bank, FactSet, The Block

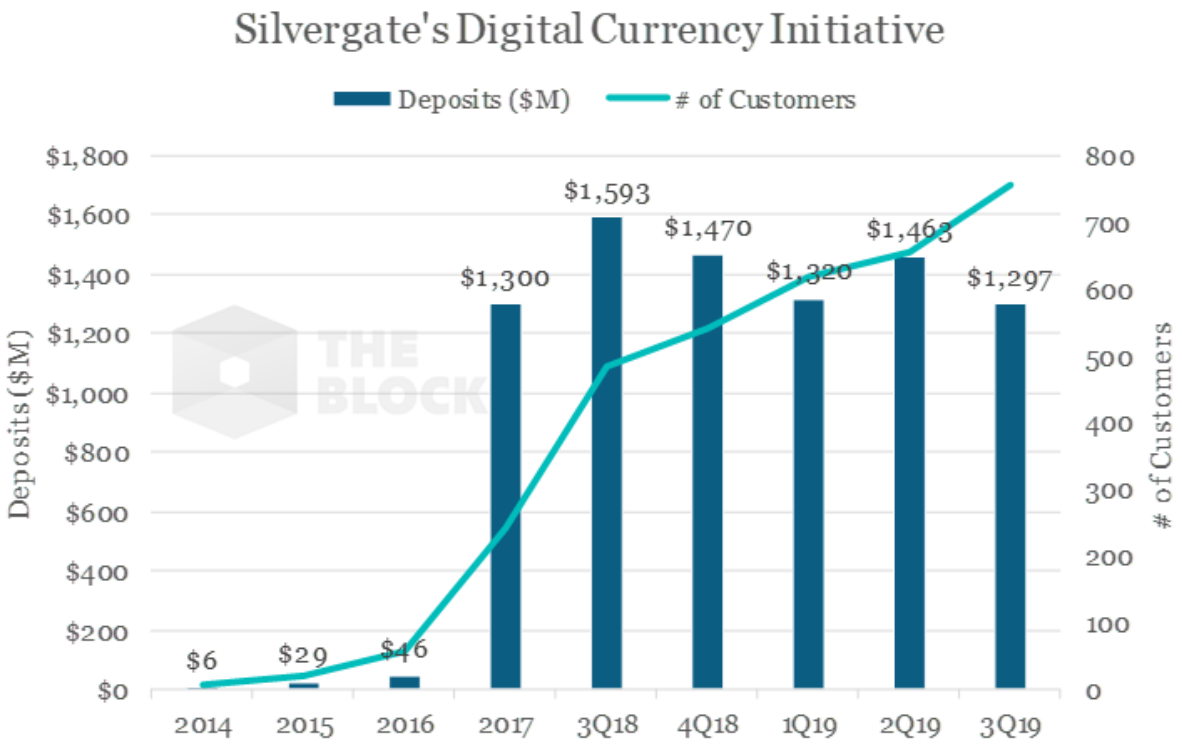
As a result of the added compliance costs and reputation risk associated, very few banks within the U.S. provide banking services for cryptocurrency businesses. Silvergate Bank and Signature Bank stand out as the market leaders within this niche due to their unique product offerings which include their own respective 24/7 payment networks (Silvergate’s SEN and Signature’s Signet).

Since SEN's launch in early 2018, the platform has had cumulative transaction volume of $31.4 billion. Signature Bank doesn't disclose much information on Signet within its filings, but they did claim to have over 100 clients using the platform with daily volume in the millions shortly after its launch in January, according to an article by Forbes.

As of 3Q19, Silvergate had 756 cryptocurrency-related clients with aggregate deposits of $1.3 billion. Signature Bank does not break out information for its digital assets-related clients. However, its management did mention that its Digital Asset Banking Team has made significant deposit growth contributions since its formation in 2018. Metropolitan Commercial Bank, another noteworthy crypto-friendly bank, has seen its digital asset-related deposits decrease significantly since last year likely as a result of Silvergate and Signature Bank's expanding market share. The company stopped reporting its cryptocurrency-related deposits as of 3Q19 (but it was last reported at $213 million in 2Q19).

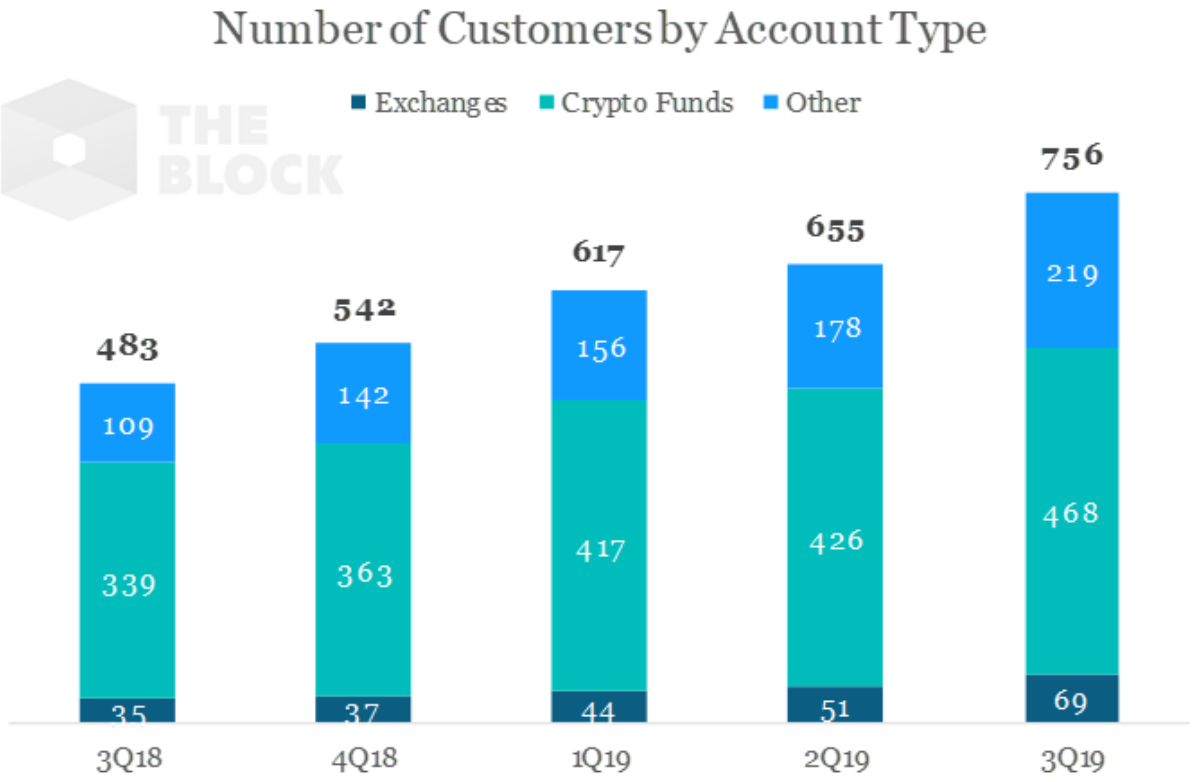
Silvergate's digital asset-related deposits take a hit in 3Q19

As of June 30, $1.5 billion of the bank's $1.9 billion in deposits are from digital asset-related businesses. Due to the difficulties of cryptocurrency businesses to find willing banking partners, Silvergate manages to sustain one of the lowest cost of deposits in the industry (0.18% as of 2Q19 vs 0.72% industry average) with over 97% of its digital asset-related deposits being non-interest bearing.



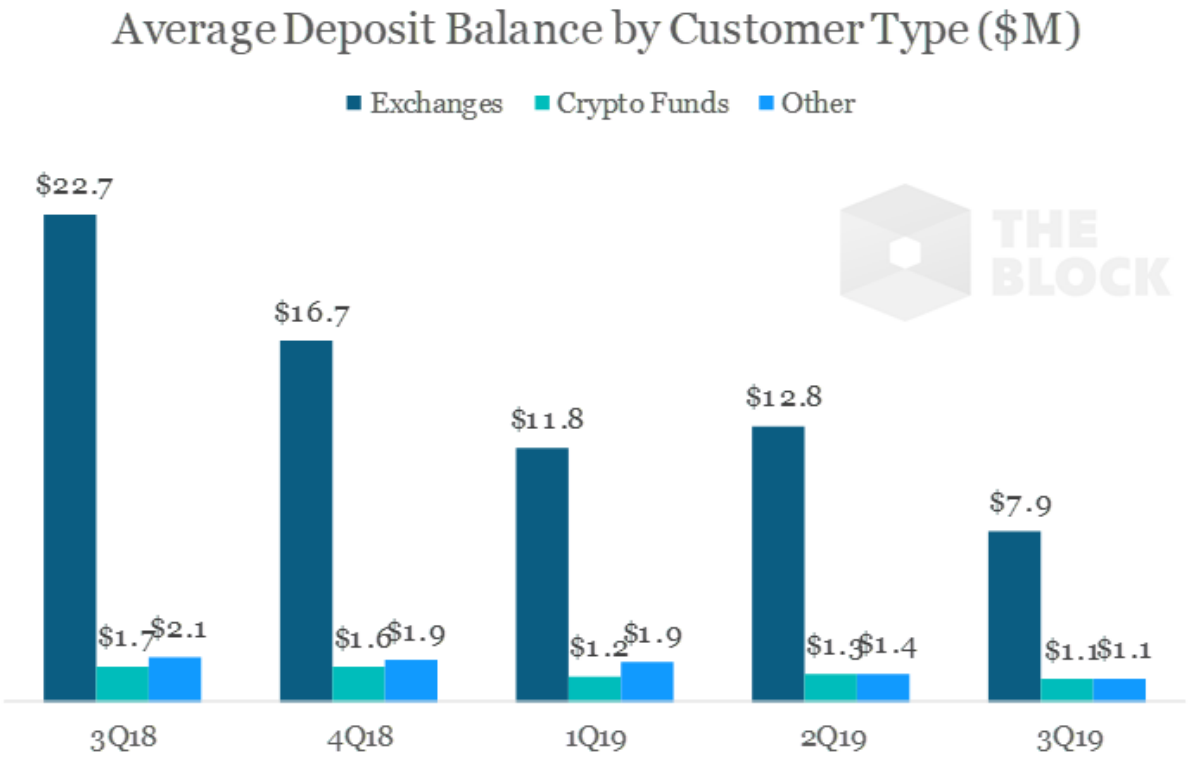
Source: Silvergate Bank, The Block

In 3Q19, Silvergate experienced a significant increase in the number of its digital asset-related clients. Total clients increased by 15% to 756 with notable expansion taking place in all three customer types: exchanges, crypto funds, and other (which includes miners, developers, service providers, etc.)



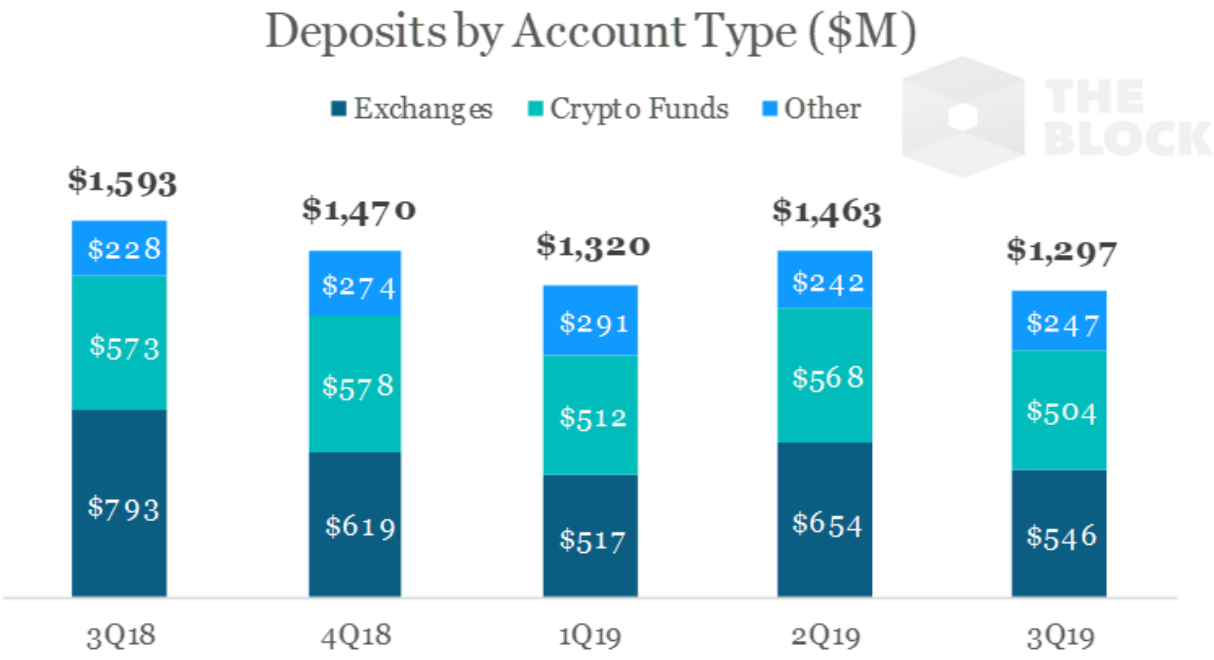
Source: Silvergate Bank, The Block

However, incoming deposits from new accounts was more than offset by a decline from existing deposit balances. Across all three customer categories, the average deposit balance decreased significantly.



Source: Silvergate Bank, The Block

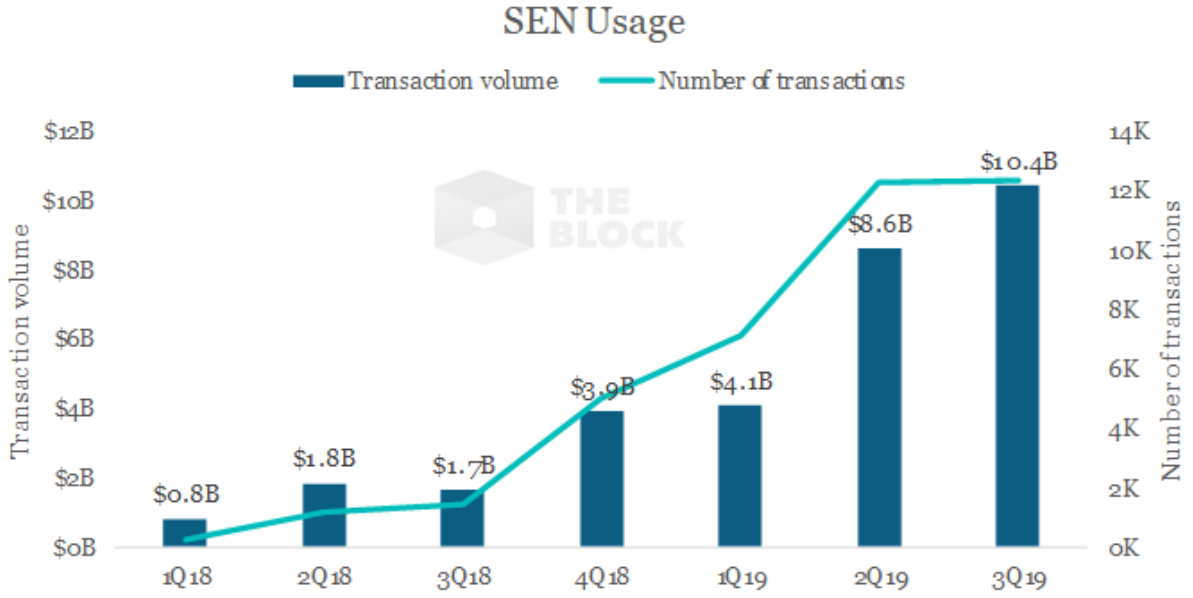
As a result, total cryptocurrency-related deposits declined by $166 million (or 11%) to $1.3 billion in 3Q19. Deposits from exchanges declined by $108 million while deposits from crypto funds declined by $63 million. Given a 25% decline in Bitcoin prices as well as a substantial fall-off in exchange trading volume and blockchain-related funding in 3Q19, this did not come as a surprise.



Source: Silvergate Bank, The Block

SEN utilization continues to grow

Despite deposit growth taking a hit in the quarter, the bank's proprietary payment network, the Silvergate Exchange Network (SEN), continues to grow. The SEN provides 24/7 access to nearly instantaneous USD transfers among the bank's growing digital currency-related client base.



Source: Silvergate Bank, The Block

Since the product's launch in early 2018, the transfer volumes as well as the number of transactions sent on the SEN per quarter have risen dramatically as the platform realizes its network effects. Within 3Q19, approximately 12,300 transfers were made on the platform resulting in total transfer volumes of $10.4 billion (a 21% sequential increase).

Financials

Consolidated Statements of Operations ($000)							
	1Q18	2Q18	3Q18	4Q18	1Q19*	2Q19	3Q19
Net interest income before provision for loan losses	14,741	16,049	17,970	20,863	19,316	17,568	18,443
Provision for loan losses	143	5	-	(1,675)	267	152	20
Net interest income after provision for loan losses	14,598	16,044	17,970	22,538	19,049	17,416	19,301
Noninterest income	1,387	2,001	2,184	1,991	2,362	2,154	2,599
Noninterest expense	11,086	11,843	11,417	13,968	13,486	12,721	12,611
Income before income taxes	4,899	6,202	8,737	10,561	7,925	6,849	9,289
Income tax expense	1,356	1,711	2,458	2,541	2,424	1,693	2,633
Net income	3,543	4,491	6,279	8,020	5,501	5,156	6,656

**1Q19 was adjusted to exclude a $5.5M gain on sale of branch and a $1.6M tax effect*

Source: Silvergate Bank, The Block

Although the bank has not yet released full financial statements for 3Q19, Silvergate did report preliminary results for its main line items. Despite a more challenging rate environment, Silvergate managed to increase its net income by 29% sequentially to

$6.7 million in 3Q19 mostly as a result of a more aggressive asset allocation (as described in our 2Q19 review) which boosted net interest income. Non-interest income has increased since last year thanks to SEN-related fees but still remains a small portion of total revenues (~12%).

Looking ahead, the bank's profitability will be largely tied to the health of the cryptocurrency ecosystem. Assuming major growth within the cryptocurrency industry, Silvergate is well-positioned to capture the upside given its status as a market leader with its unique product offerings. Continued weakness from exchanges and crypto funds, however, will limit the bank's balance sheet growth.

Falling interest rates will continue to be a headwind for the banking industry as a whole, but especially for Silvergate as a result of its high concentration of non-interest bearing deposits. The company has made efforts to sustain its net interest margin by allocating its assets into less liquid but higher-yielding securities. However, this strategy can only go so far given the bank's high liquidity needs as a result of the volatile nature of its cryptocurrency-related deposits.

Earnings stability could be improved by growing noninterest income from SEN-related fees. Complementary services to bolster the SEN's utility will help on this front, including Silvergate's credit product (which is expected to launch in 4Q19) and digital currency custody service (which is currently pending regulatory review).

Major changes to the real-time payment services landscape could be detrimental to Silvergate's competitive advantage with SEN. In August, the Federal Reserve Bank announced that it was developing a payment network called FedNow which would enable all banks to provide 24/7 real-time payment services. The Federal Reserve expects the service to become available by 2023 or 2024.

YouNow 1H19 review: Revenue is up, but there is 'substantial doubt' about the company's solvency

October 11, 2019

Quick Take

- YouNow released 1H19 financials which showed a 74% decrease in operating revenues since 1H17 likely caused by a steep decline in viewership for its namesake live streaming service
- Although the company has tried to taper its expenses, operating losses have eaten through the vast majority of the $21 million raised through the company's SAFT sales of its Props tokens
- Management noted that daily in-app purchases had increased 32% since the integration of Props in July, but it's uncertain how sustainable this growth will be with total visitors down 16% in September
- Given these considerations, the company filings noted "substantial doubt about the Company's ability to continue as a going concern within one year" unless it raised additional capital

On Wednesday, the live streaming company, YouNow, released its financials for 1H19, which showed the company's deteriorating financial condition. Despite raising $21 million from SAFT sales for its Props token back in late 2017, the company now finds itself with only $3.4 million in cash and $2.3 million in cryptocurrencies (BTC and ETH) after a series of consecutive operating losses. The company highlighted a 32% increase in daily in-app purchases following the integration of Props onto its streaming platform in July. However, YouNow will likely need more help than that to dig itself out of the hole it currently finds itself in.

1H19 Financials and Guidance

Income statement

YouNow's Income Statement

	1H18	2H18	1H19
Revenue:			
Digital goods	7,349,158	5,009,449	3,144,909
Advertising and other	1,482	17,243	-
Total revenue	7,350,640	5,026,692	3,144,909
Operating expenses			
Cost of revenue	4,481,166	3,247,694	1,846,678
Research and development	2,696,524	2,818,619	2,718,624
Sales and marketing	1,716,614	1,156,715	985,160
General and administrative	2,494,736	2,693,892	2,499,969
Total operating expenses	11,389,040	9,916,920	8,050,431
Loss from operations	**(4,038,400)**	**(4,890,228)**	**(4,905,522)**
Other income			
Gain from the sale of SAFTs	-	-	16,725,015
Gain from the sale of DPAs	-	-	690,833
Gain from the distribution ofs tokens to advisors	-	-	828,327
Rental income	-	-	80,000
Interest and other	1,509	(1,509)	24,297
Gain on liquidation of digital currencies	154,673	(1,259,865)	-
Total other income	156,182	(1,261,374)	18,348,472
Other expenses:			
Impairment of digital currencies	(1,367,950)	(323,969)	-
Loss on the sale of fixed assets	-	-	(302)
Advisor token expense	-	-	(828,327)
Token offering expense	(508,762)	(1,645,994)	(1,473,474)
Interest expense	(45,270)	37,344	-
Total other expenses	(1,921,982)	(1,932,619)	(2,302,103)
Gain before provision for income taxes	(5,804,200)	(8,084,221)	11,140,847
Provision for income taxes	32,624	(16,259)	56,141
Net income (loss) before noncontrolling interest	(5,836,824)	(8,067,962)	11,084,706
Net loss attrbutable tononcontrolling interest	-	9,610	-
Net loss attrbutable to YouNow Inc.'s stockholders	(5,836,824)	(8,058,352)	11,084,706
Other comprehensive income (loss)			
Foreign currency translation adjustments	-	4,988	-
Comprehensive income (loss)	**(5,836,824)**	**(8,072,950)**	**11,084,706**

Source: YouNow, The Block

YouNow's revenue comes almost entirely from the sales of its in-app (non-crypto) currency, Bars, which users purchase to show appreciation for their favorite content creators on the platform. For the past couple of years, however, the company's virtual good sales have been plummeting. According to YouNow's whitepaper, the company claimed to have virtual good sales of $11.7 million in 1H17. Fast-forward two years later, virtual good sales were only $3.1 million in 1H19 (a 74% decline).

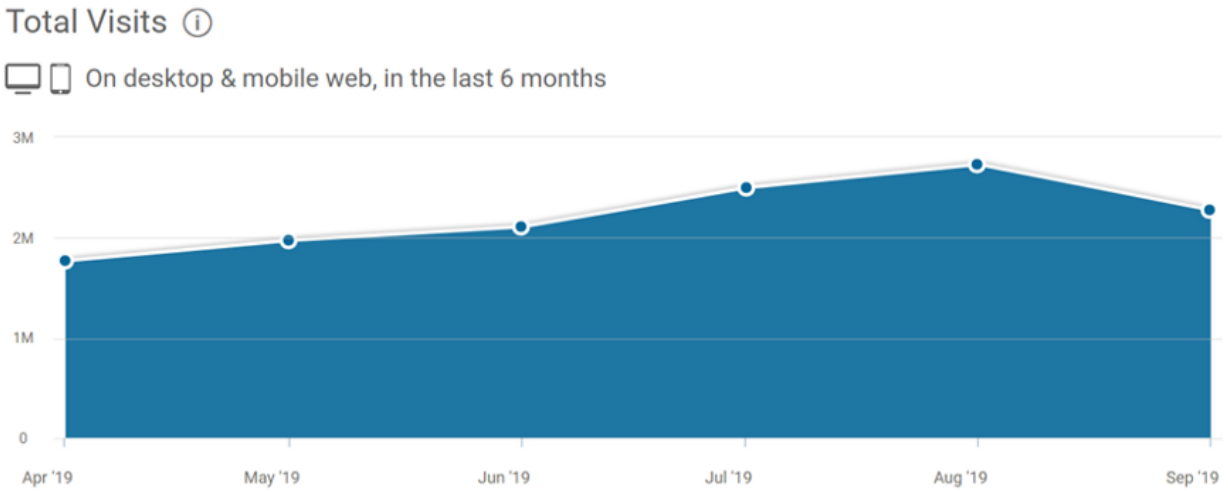
This is mainly attributable to the streaming platform's dwindling user base. According to company filings, YouNow averaged 2.6 million monthly unique users in 2017. By April 2019, monthly unique users had declined to 1.09 million (which was the last updated figure YouNow provided).

Date	Monthly Unique Users (M)
2017*	2.61
2018*	1.80
Sep-18	1.46
Oct-18	1.30
Mar-19	1.03
Apr-19	1.09

Source: YouNow, The Block

In response to declining sales, YouNow management has been cutting back on operating expenses. The company reported 1H19 operating expenses of $8.1 million, a 29% decline year-over-year. However, the expense reductions have not been enough to offset YouNow's rapidly declining virtual goods sales. As a result, the company's losses from operations have been growing larger with its most recent reported loss coming in at $4.9 million in 1H19.

Looking ahead, YouNow management noted how daily virtual goods sales have increased by 32% since YouNow integrated Props onto the streaming platform in July. However, it's uncertain whether this boost in sales is sustainable. According to SimiliarWeb, YouNow experienced a 16% decline in monthly visits in September.



Source: SimiliarWeb, The Block

Management noted that it expects operating expenses to decline even further moving forward, especially in general and administrative costs as well as research and development expenses due to a reduction in personnel.

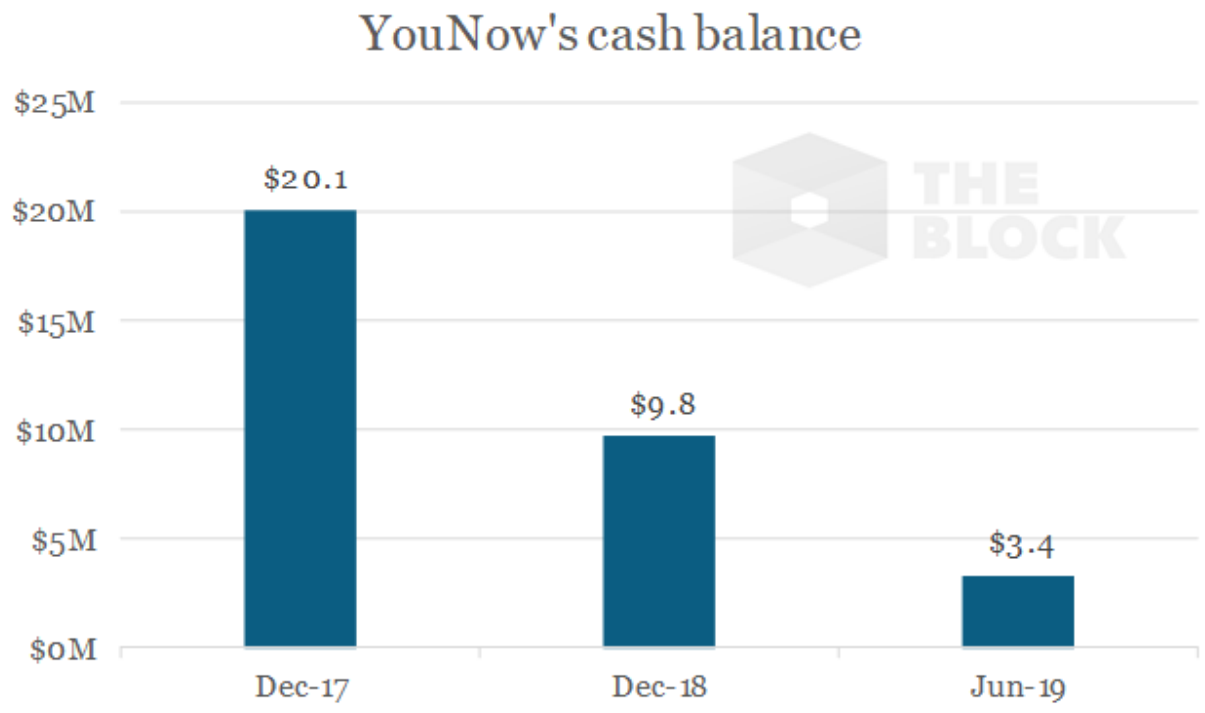
Balance sheet

YOUNOW, INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
AS OF JUNE 30, 2019 (UNAUDITED) AND DECEMBER 31, 2018

	June 30, 2019 Unaudited	December 31, 2018
ASSETS		
Current assets:		
Cash (Note 2)	$ 3,366,737	$ 7,181,920
Accounts receivable, net (Notes 2 and 15)	506,202	527,981
Prepaid expenses and other assets (Note 2)	1,424,758	2,040,733
Total current assets:	5,297,697	9,750,634
Non-current assets:		
Property and equipment, net (Notes 2 and 4)	121,353	153,800
Intangible assets (Notes 2 and 5)	1,992,959	2,150,031
Total non-current assets:	2,114,312	2,303,831
Total assets	$ 7,412,009	$ 12,054,465
LIABILITIES AND STOCKHOLDERS' DEFICIT		
Current liabilities:		
Accounts payable and accrued expenses	$ 3,036,689	$ 2,026,422
Notes payable (Note 8)	—	738,678
Token delivery obligations (Notes 2 and 7)	4,296,321	20,619,136
Deferred rent payable (Note 13)	81,530	81,530
Total current liabilities:	7,414,540	23,465,766
Commitments and contingencies (Notes 2 and 14)		
Stockholders' deficit:		
6% Convertible preferred stock, $0.001 par value - 0 shares and 22,267,532 shares authorized as of June 30, 2019 and December 31, 2018, respectively; 0 and 22,151,167 shares issued and outstanding (Note 9)	—	22,151
Common stock, $0.001 par value - 139,189,499 shares and 34,118,794 shares authorized as of June 30, 2019 and December 31, 2018, respectively; 98,306,607 and 7,285,712 issued; 92,854,286 and 6,044,768 shares outstanding (Note 9)	92,853	6,044
Additional paid in capital	35,449,140	35,189,735
Accumulated other comprehensive income	8,390	8,390
Deficit	(42,733,611)	(42,733,611)
Net income	11,084,707	—
Treasury stock	(3,904,010)	(3,904,010)
Total stockholders' deficit	$ (2,531)	$ (11,411,301)
Total liabilities and shareholders' deficit	$ 7,412,009	$ 12,054,465

Source: YouNow

In late 2017, the company raised $23 million ($20.6 million after refunds) by selling SAFTs, or Simple Agreement for Future Tokens, of its Props tokens. YouNow has been using these funds to finance its operations, but the continued net losses have drained the majority of its cash balance.



Source: YouNow, The Block

YouNow reported having $20.1 million in cash as of December 2017. The company's most recent filings, however, show that its cash balance has dwindled to only $3.4 million as of June. Notably, YouNow also has about $2.3 million in cryptocurrency (BTC and ETH), which the company stated it is willing to sell in order to support its cash needs.

Going concern uncertainty

After incurring $4.9 million losses from operations in 1H19 (which included about $0.5 million in non-cash expenses between stock-based compensation and depreciation), the company is left with only $3.4 million in cash and $2.3 million in cryptocurrency. As a result, the company noted in its most recent filings that this issue "raises substantial doubt about the Company's ability to continue as a going concern within one year after the issuance date of the consolidated financial statements if no additional sources of capital are secured."

Management went on further stating:

"The Company is currently working with various venture capital firms and cryptocurrency funds to secure additional capital through the sale of Props tokens and common stock in order to fund its future operations. However, there can be no assurance that the Company will be successful in achieving its objectives."

As of June, YouNow holds approximately 400 million Props tokens, which represents 67% of the total supply. Using the company's set price of $0.1369 per token, this would value YouNow's holdings at $54.7 million.

Binance recorded its second-best quarter ever, brought $186 million in profit

October 17, 2019

Quick Take

- Binance brought in approximately $186 million in profits in Q3; up 56% from Q2
- Cumulatively, Binance made more than $1 billion in a little over two years of existence
- Based on the growing ratio between profit and spot volume, Binance appears to be diversifying its revenue streams

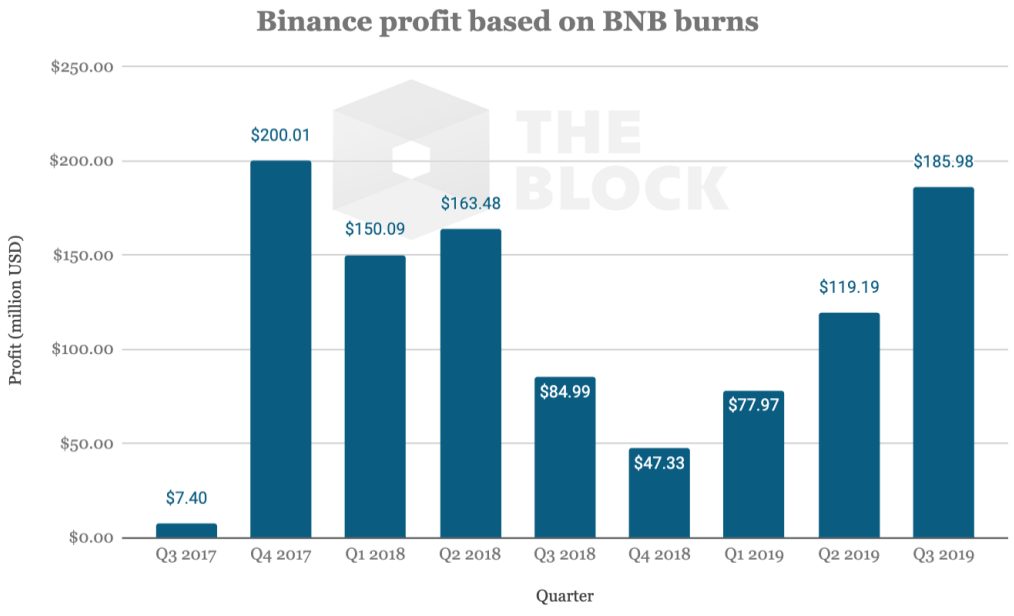
Binance, the largest crypto-to-crypto exchange, has finished its 9th quarterly burn this morning. The exchange took away the equivalent of $37.2 million in BNB from circulation.

While Binance doesn't disclose its financials, it burns 20% of net profits in its exchange token BNB on a quarterly basis. Binance has so far burned ~14.5 million BNB in nine burn events, which represents about 7.3% of the total supply of 200 million.

Quarter	Month	Price (BNB)	Burn (BNB)	Burn ($)	Profit (USD)
Q3 2017	Oct 2017	$1.50	986,000	$1,479,000	$7,395,000
Q4 2017	Jan 2018	$21.96	1,821,586	$40,002,029	$200,010,143
Q1 2018	Apr 2018	$13.52	2,220,314	$30,018,645	$150,093,226
Q2 2018	Jul 2018	$12.93	2,528,767	$32,696,957	$163,484,787
Q3 2018	Oct 2018	$10.34	1,643,986	$16,998,815	$84,994,076
Q4 2018	Jan 2019	$5.83	1,623,818	$9,466,859	$47,334,295
Q1 2019	Apr 2019	$18.79	829,888	$15,593,596	$77,967,978
Q2 2019	Jul 2019	$29.47	808,888	$23,837,929	$119,189,647
Q3 2019	Oct 2019	$18.04	2,061,888	$37,196,460	$185,982,298
Total			**14,525,135**	**$207,290,290**	**$1,036,451,449**

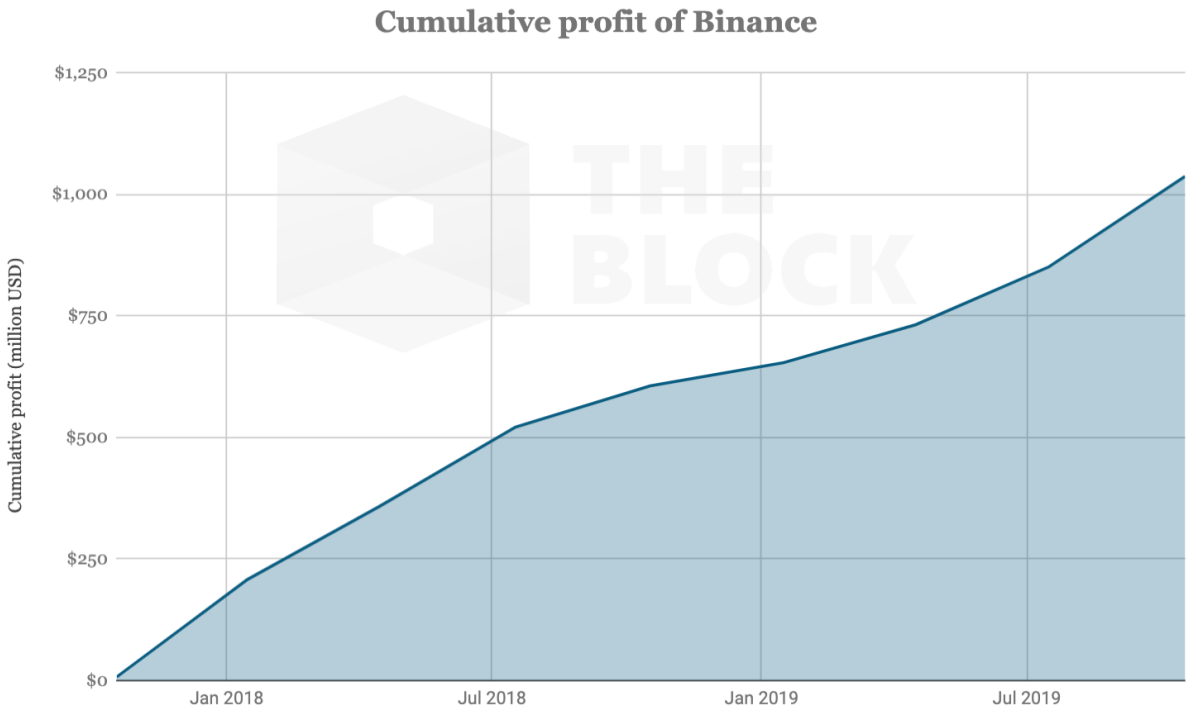
Source: The Block, Binance

In Q3 2019, Binance brought in approximately $186 million in profits; up 56% from $119 million in Q2. In fact, the profit in Q3 was the second-highest in Binance's existence following Q4 2017.



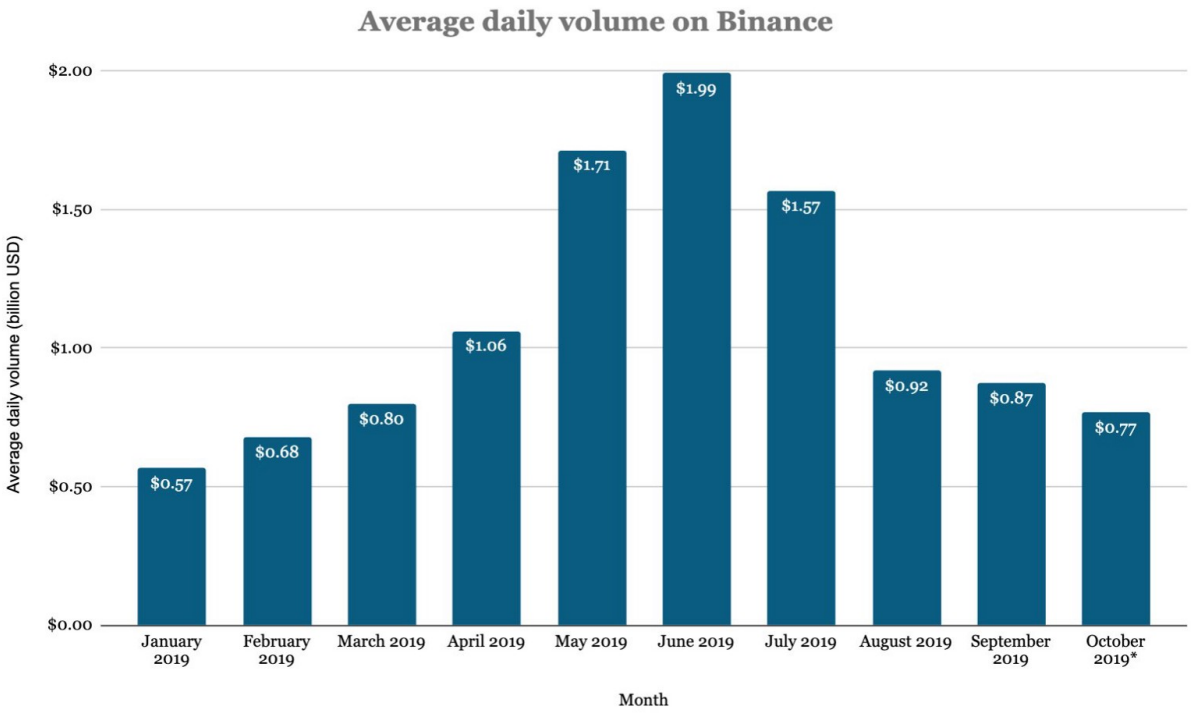
Source: The Block, Binance

In total, Binance has made a profit of more than $1 billion in a little over two years of existence.



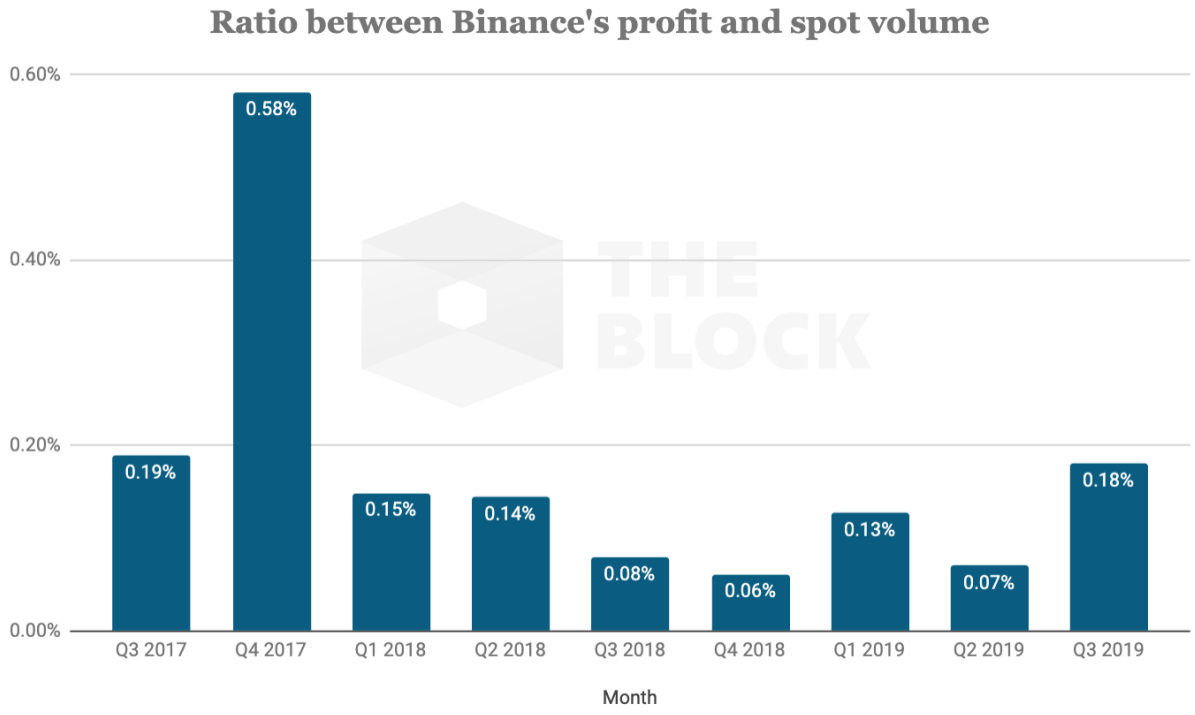
Source: The Block, Binance

Binance's Q3 burn and the profit that it implies is interesting, to say the least, because the traded volume is down across the whole market. Binance's average daily volume in October is nearly three times smaller than in June.



Source: The Block, CryptoCompare

Binance's traded volume in Q3 was $66.2 billion lower than in Q2 while the profit was up by 56%. This implies that the ratio between profit and spot volume has increased significantly in Q3.



Source: The Block, CryptoCompare, Binance

Historically, Binance's revenue has been mainly transactional meaning that it relies on spot trading volume. In Q4 2017, the outlier was likely caused by Binance bringing in a lot of revenue from listing fees. Now that the ratio is increasing again, it seems like Binance appears to be diversifying its revenue streams.

Binance launched three new products that are expected to bring meaningful revenue—futures trading, lending and P2P OTC in China. It could have also theoretically brought revenue from IEOs but that would likely be reflected in Q2 as well.

Nonetheless, Binance appears to be in good financial health despite the market struggling in the last three months. If it continues to diversify its revenue, it could become the first exchange to not be heavily reliant on market cycles.

Analysis of Blockstack's token economics might show why retail investors are down 30%

October 30, 2019

Quick Take

- Since STX started trading on Binance, all Reg A+ and Reg S investors (discounting the voucher holders) are now down more than 30%
- Blockstack says that in order to arrive at $0.30 token valuation, it “has relied on unsolicited preliminary oral indications of interest from its existing investor base”
- STX’s inflation will be 126% in 2020 and 32% in 2021. Bitcoin’s inflation is currently about 3.7% while Ethereum’s is about 4.5%
- Even though retail investors are losing money, since everything was properly disclosed in the filings, they have nothing to complain about

Blockstack, a decentralized computing network project led by Muneeb Ali, announced in early September that it has raised about $23 million from more than 4,500 individuals and entities in a Reg A+ and Reg S token sale approved by the SEC.

Reg A+ allows private companies to raise up to $50 million from non-accredited public investors. Reg S can only be used to sell to investors outside of the U.S.

Blockstack had estimated expenses of $3.5 million to comply with Reg A+ and Reg S requirements, which means that the company netted a total of about $20.2 million. In aggregate, Blockstack sold about 105 million tokens in those offerings; only about 58% of the 180.3 million tokens offered.

The tokens in those offerings were sold for three different prices:

- Reg A+ (available to non-accredited U.S. investors)— $0.30
- Reg S (available to investors outside of the U.S.)—$0.25
- Reg A+ voucher program (available to early community members)—$0.12

Type	Price	Tokens sold (M)	Raised ($M)
Reg A+ general	$0.30	35.6	$10.7
Reg S	$0.25	30.6	$7.6
Reg A+ voucher	$0.12	39.4	$4.7

Source: Blockstack, The Block

Blockstack announced last Wednesday that it has partnered with Binance to list its STX token. Blockstack paid Binance 0.83 million STX upfront (worth approximately $250,000) and agreed to pay Binance the same sum annually "in consideration for the Stacks Token's ongoing and future listing."

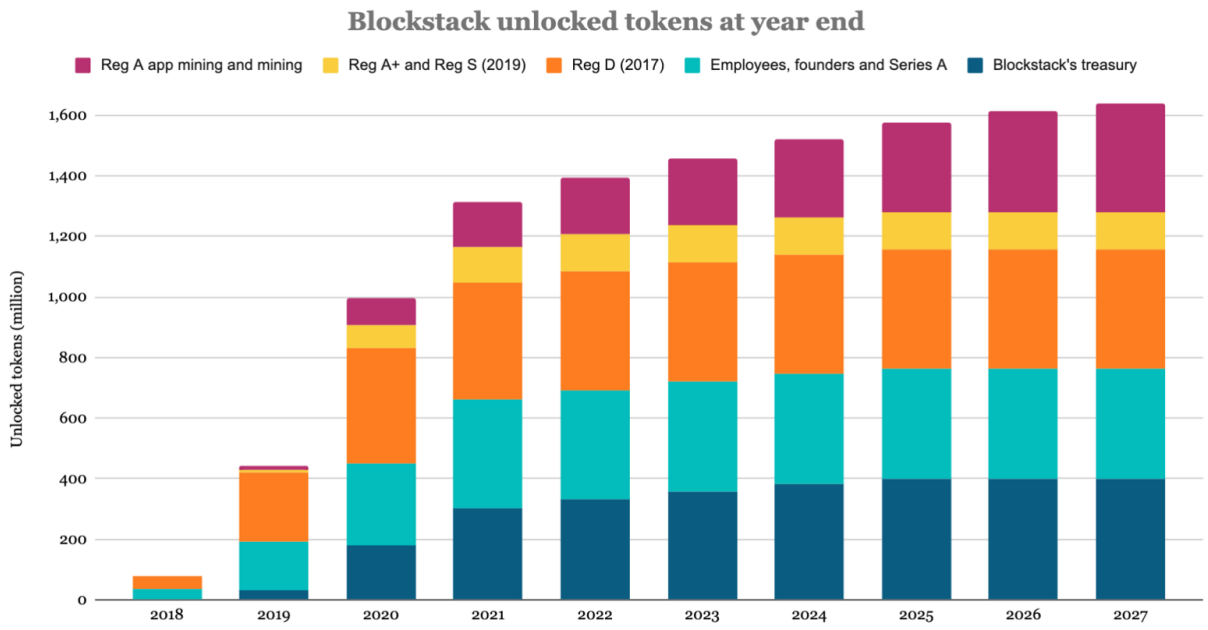
STX was listed on Binance on Friday and started trading at around its Reg A+ price. In the first 24 hours, the price grew by more than 30% to nearly $0.4. Since then, the price has been slowly dipping and now trades at less than $0.20. In terms of USD, STX has lost 50% in the last five days. In terms of BTC, STX lost about 53%.

More importantly, though, all Reg A+ and Reg S investors (discounting the voucher holders) are now losing money. U.S. investors that bought STX for $0.30 in 2019 are now down more than 30% on their STX investment. In other words, if they bought on Binance (even though they technically can't), they would be in a much better spot right now than participating in a regulated token offering.

So why is the price dropping? Why were STX tokens priced at $0.30 in Reg A+? Blockstack says that in order to arrive at $0.30, it "has relied on unsolicited preliminary oral indications of interest from its existing investor base." That's at least

a bit ironic given that this investor base's purchase price was significantly lower than $0.30.

About 386 million STX of its 1.32 billion supply is currently unlocked (~29%). A total of 441 million STX is expected to be unlocked by the end of 2019,— 36% belonging to employees, founders, and Series A investors and 52% belonging to Reg D investors.



Source: Blockstack, The Block

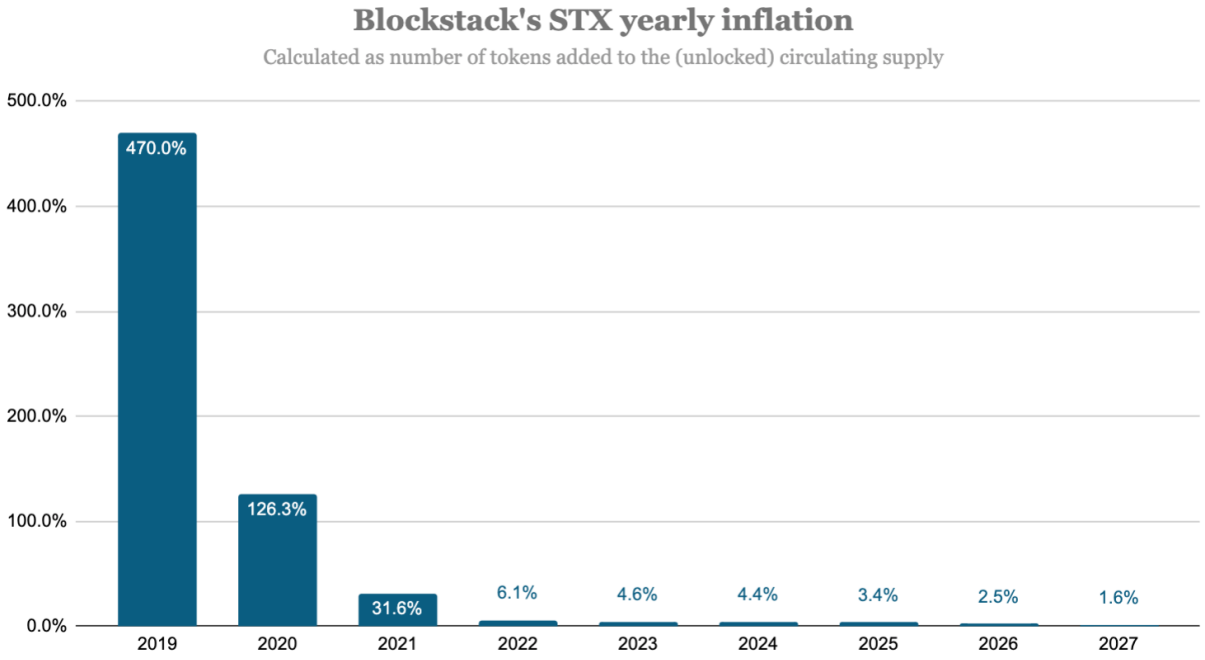
Both Series A investors, as well as Reg D investors, got the tokens for a far lower price than the current price of $0.20. Series A investors who had invested a total of $5.1 million as of late 2016 could purchase tokens at a nominal price. Therefore, they were able to get tokens for less than $0.05 each. Reg D investors purchased the tokens for $0.12 each. Tokens to founders and employees were earned based on merit—similarly to equity.

Date	Type	Price per token	Tokens (M)	Raised ($M)
Late 2016	Series A*	$0.047	108.5	$5.1
October 2017	Founder grants (Shea and Ali)	$0.00012	178.6	$0.02
October 2017	Employee grants	$0.00012	36.3	$0.004
November 2017	Reg D equity	$0.12	218.7	$26.3
December 2017	Reg D SAFT	$0.12	176.4	$21.2
October 2018	Employee grants	$0.0132	38.2	$0.5
September 2019	Reg A+ voucher	$0.12	39.4	$4.7
September 2019	Reg A+ general	$0.30	35.6	$10.7
September 2019	Reg S	$0.25	30.6	$7.6
			Total	**$76.1**

Source: Blockstack, The Block

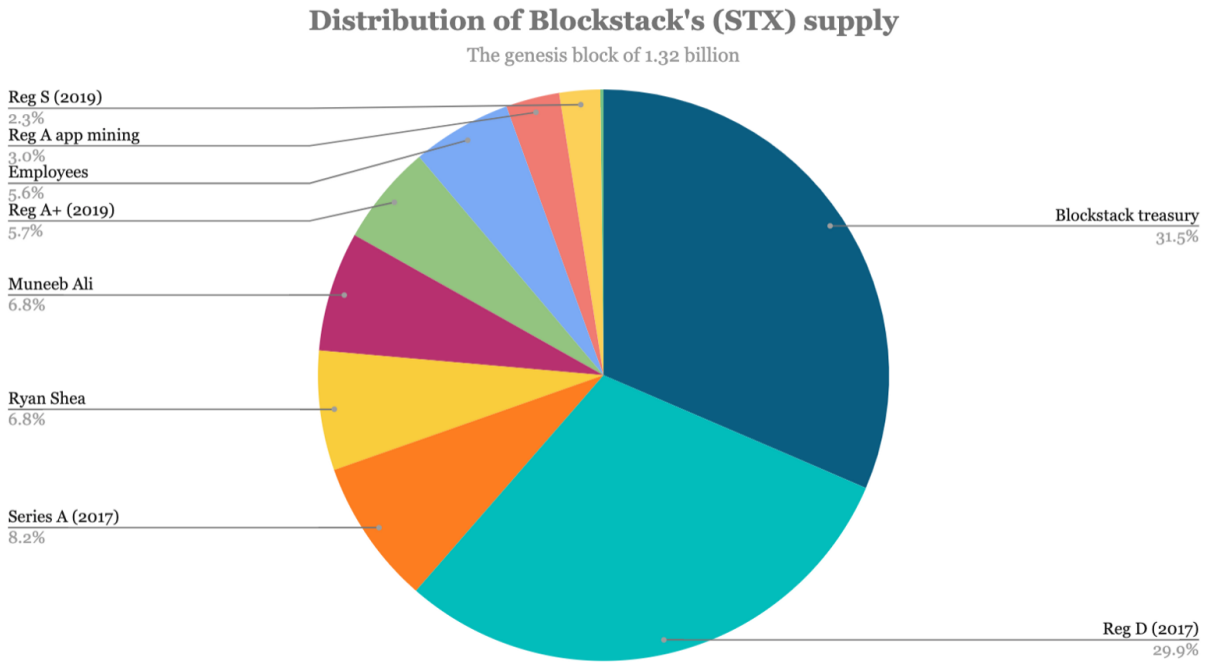
In 2019, STX's inflation, calculated as a yearly increase in the circulating (unlocked) supply, was 470%. Next year, STX's inflation will be 126% and the year after that, it will be 32%. In comparison, Bitcoin's inflation is currently about 3.7% while Ethereum's inflation is about 4.5%.

The majority of the unlocked STX tokens were purchased (or earned) at a price much lower than what STX is currently trading at. Therefore, it's hard to estimate the price floor of STX but the circulating supply will more than double next year.



Source: Blockstack, The Block

It's also important to note that Blockstack still has about 31.5% of the existing supply. Moreover, the founders Muneeb Ali and Ryan Shea own 13.6% of the total supply, which is more than Reg A+ and Reg S combined.



Source: Blockstack, The Block

It turns out that an arbitrarily set price of $0.30 is not working too well for Blockstack's retail investors. But since everything was properly disclosed in the filings, these investors have nothing to complain about. All of this information was transparently disclosed.

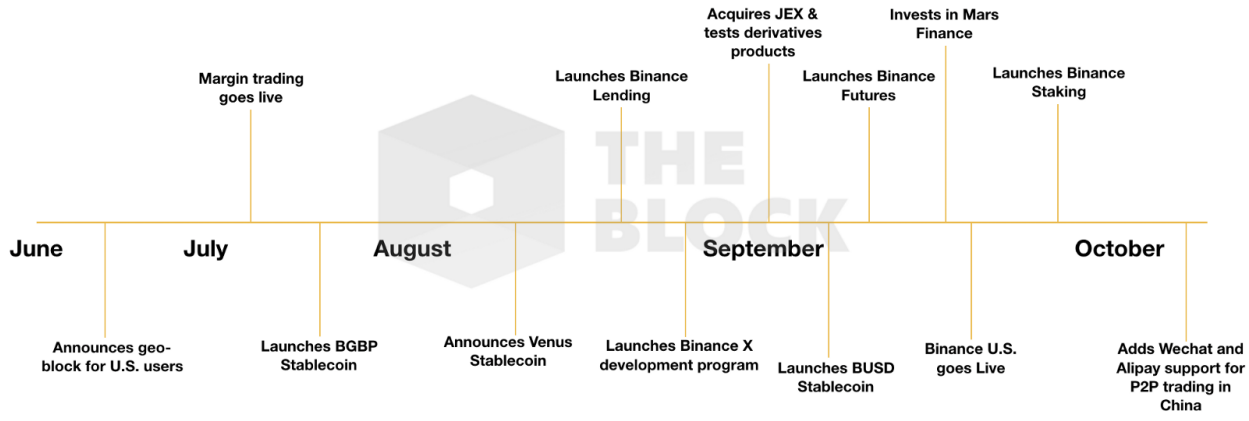
Binance's new products start gaining traction

October 24, 2019

Quick Take

- Binance recently launched two key offerings – Binance US and Binance Futures
- Traded volume on Binance US has grown significantly relative to the rest of the market
- Binance Futures' relative volume, when compared to its competitor BitMEX, grew from about 10% in late September to about 30% in late October

Binance has been busy. The most popular crypto-to-crypto exchange has made more than 20 announcements of new offerings and strategic developments during the second half of the year.



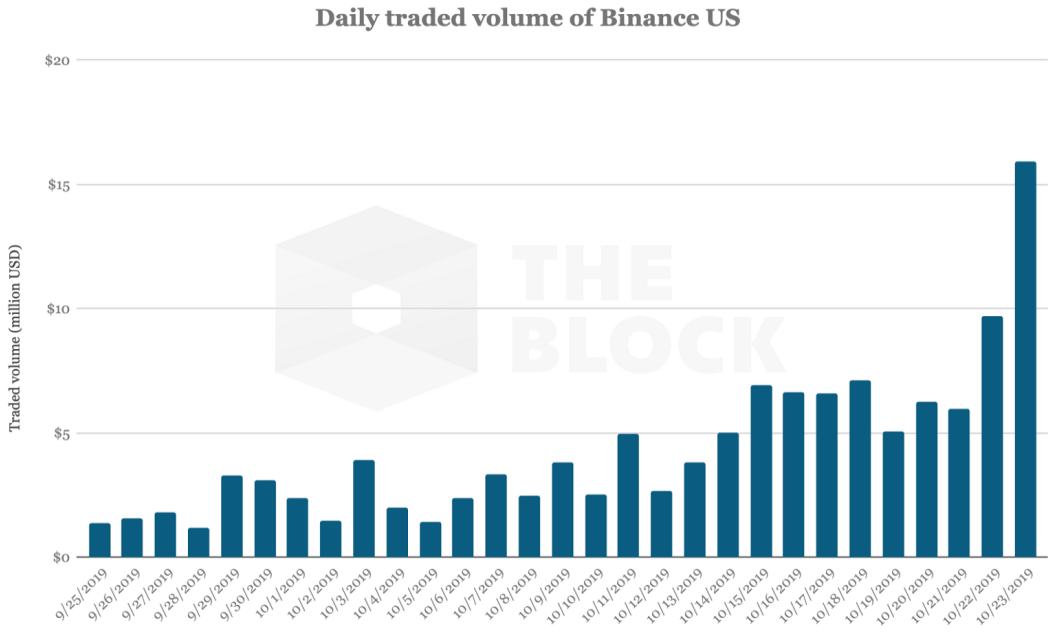
Source: The Block, Binance

Most notably, Binance introduced two key offerings that could each bring in a significant amount of revenue:

- Binance US (a competitor to Coinbase, Kraken, and others)
- Binance Futures (a competitor to BitMEX)

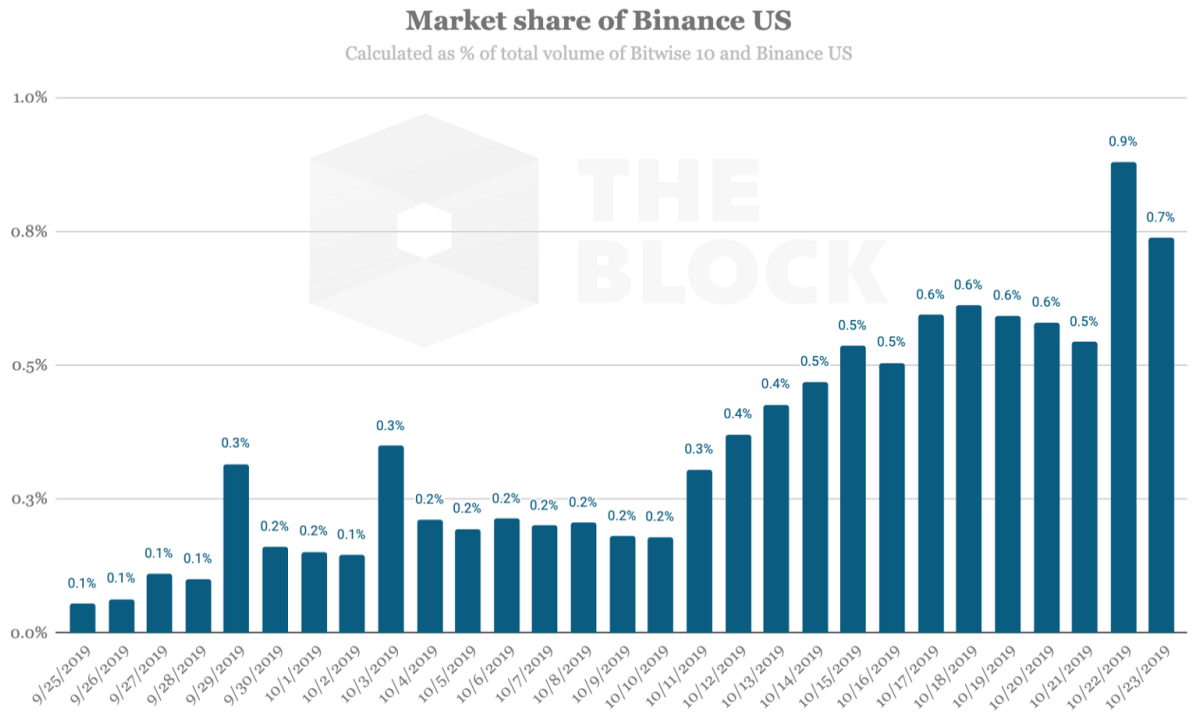
Binance announced in early June that it would start blocking U.S. users due to compliance concerns. However, soon after, the exchange assured the public that it would launch Binance US in partnership with a little-known firm called BAM Trading Services.

Binance US, led by ex-Ripple executive Catherine Coley, officially opened trading on Sept. 23. The exchange now lists 19 different coins and has no trading fees until Nov. 1. While it certainly had a slow start, recording less than $3 million of volume (on average) for the first three trading weeks, volume has recently seen aggressive growth.



Source: The Block, CoinGecko, CoinAPI

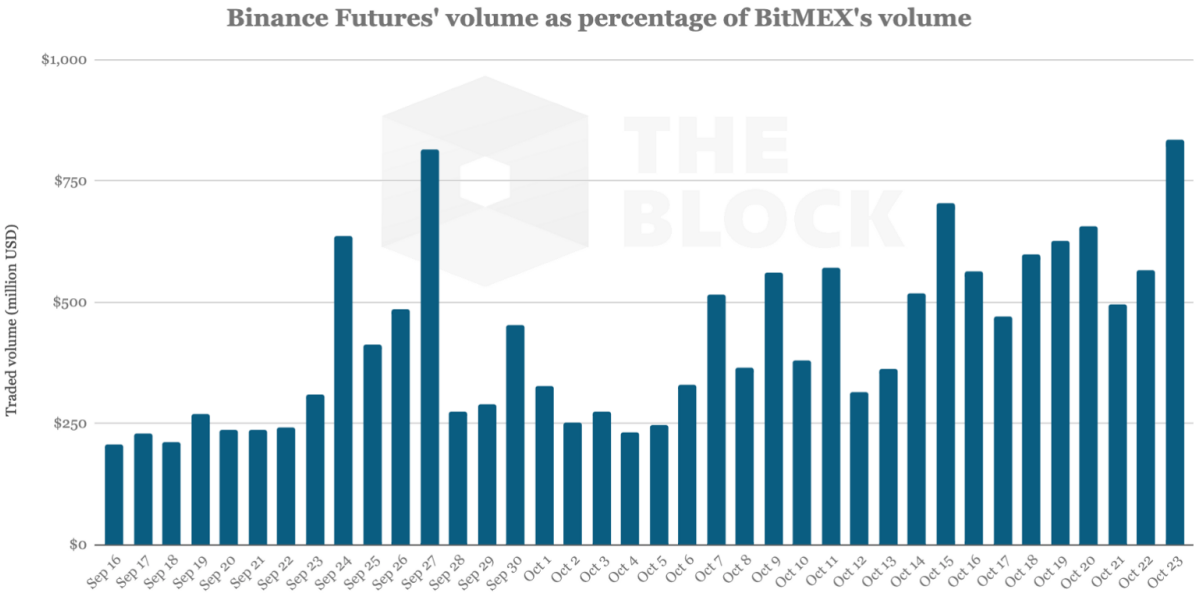
Absolute volumes don't tell the whole story though. If we look at Binance US' volume relative to the total volume of Bitwise's list of 10 exchanges with "actual volume," we can see that Binance US' market share has been growing quite significantly in the last two weeks. On Oct. 22, Binance US recorded higher traded volume than both itBit and Gemini.



Source: The Block, CoinGecko, CoinAPI

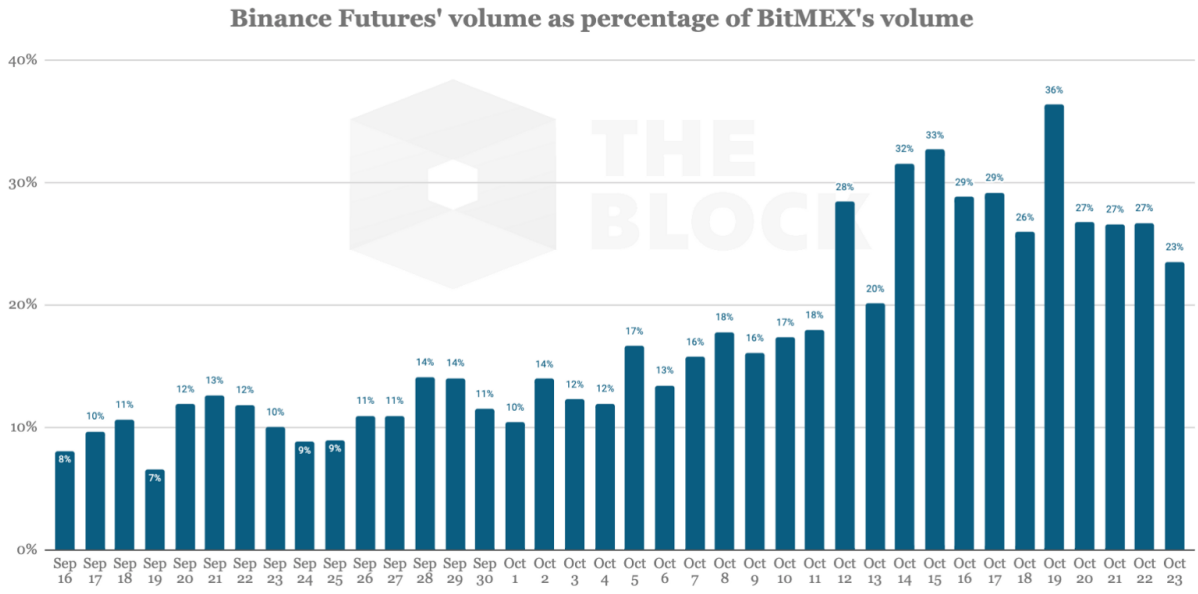
Binance Futures

Binance Futures' platform has also seen similar growth. Last week, the platform increased leverage to as high as 125 times, up from 20 times it allowed earlier. Yesterday, the traded volume of its only contract (BTC/USDT) surpassed $830 million. But then again, absolute numbers are not exactly indicative of the growth.



Source: The Block, CoinGecko, CoinAPI

When looking at volumes relative to its biggest competitor BitMEX, Binance Futures grew from about 10% in late September to about 30% in late October.



Source: The Block, CoinGecko, CoinAPI

Overall, even though it's still early, both Binance US and Binance Futures have seen significant growth over the last few weeks. Binance has access to the largest retail customer base, and is marketing its new products well. Combined with low fees across the board, expect Binance to take more market share in the coming months.

Mapping out Coinbase

October 23, 2019

Quick Take

- Coinbase, the cryptocurrency exchange, has grown into one of the most valuable fin-tech companies in the U.S.
- The Block has estimated that the firm is the third-largest employer in the blockchain industry
- While the exchange has experienced an exodus of senior employees, this has led to an opportunity for new leaders to emerge

Cryptocurrency exchange Coinbase was founded in 2012 by Brian Armstrong and Fred Ehrsam. The firm has grown into not only one of the largest in the blockchain industry but also into one of the most valuable fintech companies in the U.S. Coinbase serves over 20 million customers across 32 countries, has traded over $150 billion in digital currencies, and was ranked the second-most valuable fin-tech company by Forbes in 2019. Despite the diminishing value across all digital assets in 2018, Bloomberg estimated the company was expected to bring in $1.3 billion for the year.

The Block has estimated the exchange is the third-largest employer in the entire blockchain industry, with approximately 1,000 employees across numerous fields. The firm, which was last valued at $8 billion, has been able to acquire over a dozen smaller blockchain-related firms.

What started out as a simple exchange where users can purchase Bitcoin has grown into a conglomerate that now offers a traditional exchange for retail, a trading platform for professionals, a custodial service for institutional clients, and a venture fund that has invested in at least 42 different startups involved in the blockchain space.

Over the past year, the firm experienced an exodus of senior employees when it decided to position and focus itself on “crypto-native” investors rather than traditional Wall Street firms. The vacancies left from departures have opened the door of opportunity to many employees, as they determine what will be next for the crypto powerhouse.

The Block has mapped out key members of the Coinbase team and their historical roles at past firms leading up to their current position. This is part of an ongoing series exploring and mapping out the organizations in the crypto industry.

Brian Armstrong

Brian Armstrong is Chief Executive Officer and co-founder of Coinbase. He co-founded Coinbase in June 2012. Before that, Armstrong served as a software

engineer for Airbnb. Armstrong also served as CEO for UniversityTutor.com, a tutoring website he founded. Armstrong also had a brief consulting stint with Deloitte and interned with IBM.

Emilie Choi

Emilie Choi is Chief Operating Officer at Coinbase. Prior to be being promoted to COO, Choi joined Coinbase in March 2018 as Vice President of business, data, and international for Coinbase. Before Joining Coinbase in March 2018, Choi also served as Vice President and Head of Corporate Development at LinkedIn. Choi also assisted with corporate development and strategy as a director for Warner Bros. and Yahoo! Inc. as a senior analyst.

Alesia Haas

Alesia Haas is Chief Financial Officer at Coinbase. Prior to joining Coinbase in April 2018, Haas served as the Chief Financial Officer at Oz Management for approximately two years. Haas also served as the Chief Financial Officer at OneWest Bank (now CIT Bank) for three years and Head of Strategy prior to being promoted. Before joining OneWest Bank, Haas held a senior role as a director for Merrill Lynch, a wealth management firm.

Jennifer Jones

Jennifer Jones is Chief Accounting Officer at Coinbase. She joined Coinbase in July 2018. Prior to joining Coinbase, Jones held senior roles at EY and Deloitte as a Senior Manager.

Jeff Horowitz

Jeff Horowitz is Chief Compliance Officer at Coinbase. Prior to joining Coinbase in July 2018, Horowitz was Global Head of Compliance for Pershing LLC. He also served as Chief Compliance Officer and a Managing Director for Pershing. Horowitz also held roles as a Director for Citigroup focused Corporate Investment Banking AML compliance and a Deputy AML Officer at Lehman Brothers.

Philip Martin

Philip Martin is Chief Information Security Officer at Coinbase. He joined Coinbase in April 2016. Prior to joining Coinbase, Martin served as Information Security Lead at the data analytics company Palantir Technologies. Martin also served the United

States Army as a counterintelligence agent for 10 years. In-between his time in the army, Martin also worked as an IT Manager at A9, a subsidiary of Amazon.

Brian Brooks

Brian Brooks is Chief Legal Officer at Coinbase. Prior to joining Coinbase in September 2018, Brooks held a senior role with Fannie Mae as Executive Vice President of General Counsel and Corporate Secretary. Brooks also served as Vice Chairman at OneWest Bank and Managing Partner at O'Melveny & Myers LLP.

Carly Emmer

Carly Emmer is Chief of Staff at Coinbase. Emmer joined Coinbase in August 2017 and served as a Business Operations Associate before being promoted to Chief of Staff. Prior to joining Coinbase, Emmer served as both an Associate and Senior Associate at Bain & Company. Emmer also worked at Google as a Grant Portfolio Strategy Extern and served as Intern for strategy at JPMorgan Chase.

L.J. Brock

L.J. Brock is Chief People Officer at Coinbase. Prior to joining Coinbase in March 2019, he held senior roles with Citadel as Senior Managing Director and Chief People Officer. Brock also held senior roles with Red Hat as a Vice President and Experian as a Director.

Trends

Optimistic Rollup explained

October 25, 2019

Quick Take

- The latest breakthrough in Layer 2 architecture comes in the form of Optimistic Rollup (OR) but for now, OR is merely a proof of concept
- Plasma Group hopes to have their specification formally verified before the contracts are deployed to mainnet
- The introduction of BLS signatures will help scale Optimistic Rollup to an expected 2,000 tx's per second while throughput will scale linearly with Eth 2.0 shards

Scaling is hard

The 'scalability trilemma', in simplistic terms, argues that it is difficult to simultaneously satisfy the following three properties — decentralization, security, scalability — where decentralization refers to users validating the chain with limited resources, scalability refers to being able to process a large number of transactions, and security refers to being able to withstand attacks. Trade-offs must be made, and to date, blockchains like Ethereum and Bitcoin have opted to prioritize decentralization and security over scalability.

Achieving high scalability — measured in transactions processed per second — is ultimately necessary if blockchain networks wish to viably compete against legacy payment rails and financial services, providing an indistinguishable user experience from existing 'Web 2.0' applications.

Naive solutions to scalability include: increasing block size, a route taken by Bitcoin Cash, although this comes at the expense of decentralization, requiring full nodes to increase computational capacity; limiting the number of validators, a route taken by EOS (among other networks), which again trades off on decentralization, opening up the network to cartel attacks, and simply distributing throughput across multiple

networks, as we have seen with the emergence of alternative networks, although this ultimately comes at the expense of security.

More robust solutions include sharding, an avenue pursued by Ethereum among several other networks, and recursive succinct non-interactive argument of knowledge (SNARKs). However, while useful, recursive SNARKs are not a scaling panacea and implementing a sharded blockchain, where the transaction verification process is split across different distinct sets of validators, is a rather large undertaking. While significant progress has been made on the sharded version of Ethereum, dubbed Eth 2.0, it is expected that Phase 2, the point at which smart contracts can be deployed on shards, will only arrive in late 2020 at the earliest.

In the meantime, developers seeking higher throughput for their applications can take advantage of so-called Layer 2 schemes. The basic concept underlying Layer 2 solutions is to move computation, (which is expensive) off-chain, and only use the slower and more expensive Layer 1 chain for validation of final state. Unlike sidechains, Layer 2 solutions derive their security guarantees directly from the mainchain. Some Layer 2 variants include payment channels like Lightning Network, and more generalized versions like state channels.

Definitions:

The latest breakthrough in Layer 2 architecture comes in the form of Optimistic Rollup.

Before we start, it is worth making the distinction between Optimistic Rollup (OR) and the previously introduced Optimistic Virtual Machine (OVM). Although semantic cousins, the two are not interchangeable: OVM is a framework for many Layer 2 solutions — state channels, Plasma etc. OR, meanwhile, is a Layer 2 solution in itself.

Similarly, it is worth defining some terms, which will appear frequently throughout the course of this piece. From the Ethereum Foundation's Sharding FAQ:

History: “an ordered list of all transactions that have taken place since genesis. In a simple model, the present state should be a deterministic function of the genesis state and the history.”

Merkle tree: “a cryptographic hash tree structure that can store a very large amount of data, where authenticating each individual piece of data only takes O(log(n)) space and time. In Ethereum, the transaction set of each block, as well as the state, is kept in a Merkle tree, where the roots of the trees are committed to a block.”

State: “a set of information that represents the "current state" of a system; determining whether or not a transaction is valid, as well as the effect of a transaction, should in the simplest model depend only on state. Examples of state data include the UTXO set in bitcoin, balances + nonces + code + storage in ethereum, and domain name registry entries in Namecoin.”

State Root: “the root hash of the Merkle tree representing the state.”

Optimistic Rollup overview:

Now onto the OR explanation. The high-level overview of OR works as follows:

OR takes inspiration from the ‘shadow chains’ concept introduced by Ethereum founder, Vitalik Buterin, in a 2014 blog post. Block data — transactions and the updated state root — are published on-chain by an ‘aggregator’, with state updates having been computed off-chain. OR departs from Layer 1 in that transactions are not verified by default. Rather, state roots are tentatively accepted as valid — hence optimistic — and are considered finalized after some period of time, e.g. two weeks.

In order to serve as an aggregator, a user must first deposit a bond into the OR smart contract. During a two-week period, any third party can challenge the tentatively accepted block. If a third party can prove that some data in that block was invalid — imagine Alice sending 1 ETH to Bob without having 1 ETH starting balance — the transaction can be reverted and the aggregator that published the block will be penalized through a slashing process. Aggregators that published on top of the invalid block will also have their deposits slashed. This dispute process can take place as

early as the proceeding block, and, assuming no censorship complications at Layer 1, is likely to resolve immediately: indeed, the incentive to dispute should be set sufficiently high to ensure that competing aggregators remain ever-diligent.

This use of fraud proofs is an improvement over the interactive dispute games that give payment and state channels their security assumptions. In the latter, counterparties post signed messages of the latest state back and forth until one counterparty stops posting. This forces security assumptions on users themselves, which proves to be suboptimal user experience, and requires users to be online at all times. By contrast, for OR the validity game requires just a single honest verifier to prove invalidity, which is a one-off event.

The OR contract does not keep track of the full state of the system; rather, it keeps track of the latest 'state root'. Users can calculate the state by processing the data submitted to the chain, which can be found in the blockchain's history. If the block is not challenged over that period, the deposit is returned to the validator and the block is considered finalized.

The lower-level overview of OR works as follows:

A developer, Karl, wishes to deploy an OR contract. They signal to an aggregator using an off-chain transaction that they would like to deploy the contract. The aggregator posts a deposit and agrees to deploy the contract: if they do not fulfill this guarantee then their deposit is slashed.

An OR smart contract is deployed to the Ethereum mainchain. Any user wishing to transact within this OR contract can deposit funds into the OR contract: they will then be credited with funds in the OR chain.

Users then submit transactions. For this example, let's imagine that users simply want to use OR to transfer value at lower cost and at speed. Alice sends Bob 1 ETH. Bob then sends Charlie 0.5 ETH. Charlie then sends 0.25 ETH to David.

The aggregator submits these transactions and the new state root that they have calculated off-chain — i.e. Alice now is debited 1 ETH, Bob is credited 0.5 ETH, Charlie

is credited 0.25 ETH, and David is credited 0.25 ETH — to the OR contract on the Ethereum mainchain in a way that makes the transactions themselves available to all blockchain nodes.

The OR contract calculates a Merkle root — a hash of all the transaction hashes and the latest state root — from the transactions. This Merkle Root is deterministic — that is to say, under some no-hash collision assumptions, there will only be one definitive hash that arises from hashing these individual hashes. This Merkle root is then submitted and stored in the Ethereum mainchain state root.

The individual inputs — the transactions and new contract state root — serve as the input for the contract 'calldata' function, and are thus stored in the blockchain history. However, they are not individually stored in the EVM state itself. It is this act of storing these transactions in the blockchain history rather than the EVM state that makes OR a cheaper, scalable solution.

The scalability improvements offered by OR are capped by the amount of transactions that can be available to all nodes: only so many transactions can be fit into each OR block. That these transactions do not need to be included in the active state makes them computationally cheaper — calldata is 2,000 gas per 32 bytes while storage is 20,000 gas — but they are not free and this is the present bottleneck.

The introduction of BLS signatures — a standard of which is currently being developed by a group coordinated by the Ethereum Foundation — will help boost throughput from an expected 200 transactions per second to 2,000 transactions per second. BLS is a signature aggregation scheme, which collapses individual transaction signatures into a single signature. As signature data comprises the majority of transaction data, collapsing signatures into a single signature leads to significant cost per transaction.

How much does it cost to use OR?

As with any Ethereum smart contract, deployment into the state comes with an associated gas fee. The extent of this fee is determined by the complexity of the

contract. The price paid is dependent on the gas price at any given time, which is subject to demand.

Once the contract has been deployed, an aggregator must be compensated for posting transactions to the Ethereum mainchain.Transactions using OR are not free. The lower bound on fees is the cost of submitting data to the mainchain, which, according to Plasma Group's Ben Jones, is 10-100x lower than a standard Layer 1 transaction. The upcoming Istanbul network upgrade will see these costs fall by 5x. Fees will ultimately depend on demand to transact and a fee market will likely develop, like that witnessed on Layer 1.

Aggregators:

The 10 ETH aggregator bond initially proposed by Plasma Group is also parameterizable, depending on the amount of computation validators have to run: the more computation required to validate the Merkle root — and thus the higher the gas cost — the higher the bond. It is yet to be decided exactly what percentage of the aggregator bond will be passed to the disputer, but it is necessary that at least some percentage — perhaps 10% — is burned in order to prevent malicious aggregators from front-running the dispute process, redeeming their own bond, and lowering the cost of fraud to zero. A similar attack, dubbed Auction Grinding, has been previously highlighted regarding MakerDAO CDP liquidations: this eventually led to the introduction of the liquidation penalty.

OR can support multiple aggregators, although having one privileged aggregator does bring some benefits regarding finality. A single aggregator will have absolute control on transaction ordering and can thus promise the exact state that will result from their transactions. This is especially relevant for applications like Uniswap, where a single transaction can significantly shift the price. Depending on when a user's transaction is submitted, this may result in undesired levels of slippage. Supporting multiple aggregators would weaken this user experience.

Of course, multiple aggregators provide censorship resistance guarantees — a single aggregator could feasibly censor user transactions, refusing to post them to the Ethereum mainchain. Thus, a sensible middle ground entails using a hybrid approach where one privileged aggregator receives priority but any other aggregator can submit

blocks with a small delay. Aggregator front running can be mitigated with extra-protocol guarantees — i.e. the aggregator promises to enforce transaction ordering honestly — with users simply migrating to another OR chain in the event that they detect dishonest behaviour.

Unipig:

One additional advantage of OR versus the various Plasma variants is its generalizability: the state transition function in an OR system can be anything that can be computed within the gas limit of a single block. This includes smart contracts that support applications like Uniswap. Plasma (and its variants), on the other hand, currently struggle with generalization: Plasma's security guarantees largely rely on being able to exit the Plasma chain state back to Layer 1 in the event that the operator is behaving maliciously, but most smart contracts do not have single explicit owners and any user can trigger valid state updates that allow them to block an exit. OR surmounts this data availability issue by requiring aggregators to continuously post the minimal information needed to compute state transitions on the Ethereum main chain.

To demonstrate the power of OR, teams from Plasma Group and Uniswap collaborated to produce Unipig, an OR version of the Uniswap exchange. From an implementation perspective, this involves deploying a Uniswap constant product contract within an Optimistic Rollup contract.

For the Unipig demo, a single aggregator, operated by the Plasma Group, has been used in order to give price updates in real time. Unipig offers a single market — the Unicorn/Pigi pair — with the Plasma Group/Uniswap team providing liquidity themselves. Performance so far has been impressive: over 3,130 individual transactions users have saved 5.0080 Ether, or 0.0016 ETH (roughly $0.272) per transaction, and over 91 hours of transaction waiting time.

For now, OR, and Unipig, are merely proofs of concept. Plasma Group hopes to have their specification formally verified before OR contracts are deployed to mainnet. Plasma Group intends to continue working on developing Plasma, although the throughput advantages that Plasma has to offer over OR are not urgently needed at present. Indeed, because OR throughput scales linearly with the number of shards

available, the arrival of Ethereum 2.0 Phase 1, which brings data availability (rather than state execution), will help OR scale up to an expected 50,000 transactions per second.

Analysis of trading fees across cryptocurrency exchanges

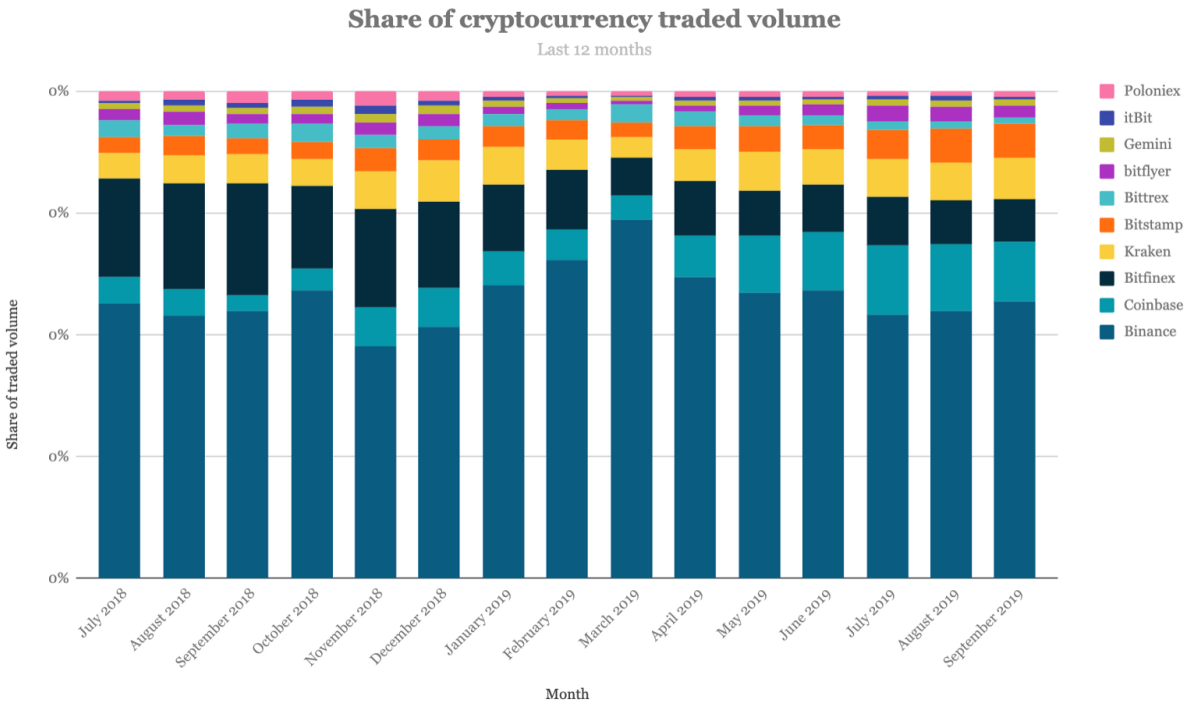
October 2, 2019

Quick Take

- HitBTC, Binance, and KuCoin are the cheapest exchanges for retail traders
- For institutional customers, bitFlyer (Japan/U.S.) and HitBTC seem to be the cheapest exchanges depending on volume
- Gemini and Bitstamp are consistently the most expensive exchanges

The majority of cryptocurrency exchanges' revenues comes from trading fees. As the market continues to be quite saturated, exchanges fiercely compete to capture the largest market share.

If only the exchanges vetted by Bitwise are considered, Binance leads the pack with 56.8% of market share; followed by Coinbase (12.4%), Bitfinex (8.6%), Kraken (8.5%) and Bitstamp (6.9%). The remaining exchanges have less than 3% of market share.



Competing with trading fees is perhaps the easiest way to attract more customers. But there are, of course, other factors such as security, reliability, liquidity, brand awareness, breadth of offered coins, etc.

There are two different types of trading fees charged by exchanges. The key difference is whether an order provides liquidity (maker fees) or removes liquidity (taker fees) from the order book.

Maker fees—paid when a user adds liquidity to the market by either placing a buy or sell limit order (not matched immediately)

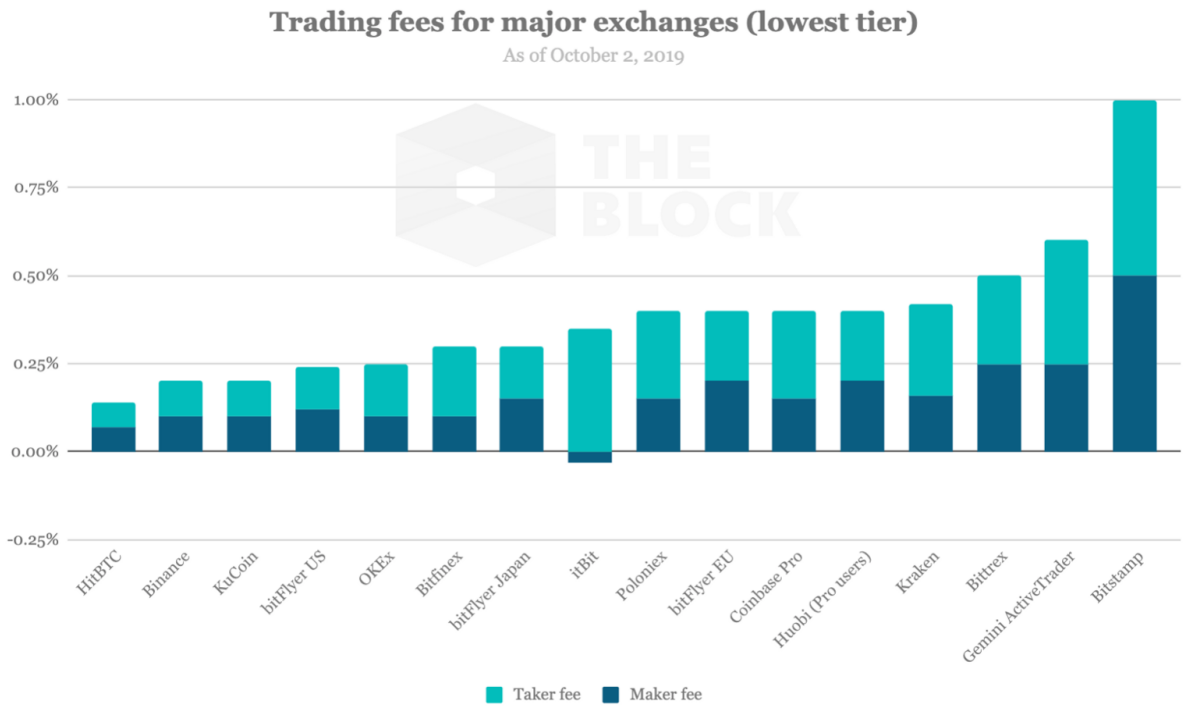
Taker fees—paid when a user removes liquidity from the market by placing any order that fills an existing order

Taker fees are higher (or in some cases the same) than maker fees in order to incentivize placing orders, which people can then buy through market orders. Charging maker-taker fees also disincentives high-frequency trading since immediate order matching comes at a premium.

The Block has looked at the trading fees from 14 established cryptocurrency exchanges—Binance, KuCoin, bitFlyer, OKEx, Poloniex, Bitfinex, HitBTC, itBit, Coinbase Pro, Huobi, Kraken, Bittrex, Bitstamp and Gemini.

All examined exchanges use a tiered system for trading fees based on monthly traded volume. The fees decrease as a participant's monthly traded volume increases. Some Asian exchanges (Binance, KuCoin, OKEx) also require customers to hold a certain amount of their exchange tokens to qualify for higher tiers.

Retail tier



Looking at the lowest tier, which includes the vast majority of retail customers, HitBTC has the lowest combined trading fees; followed by Binance and KuCoin. The cheapest exchange for retail traders with fiat on-ramps is bitFlyer US.

Bitstamp has, by far, the least favorable combined fees for retail customers. itBit is the only exchange in the lowest tier that offers a negative maker fee, which means

traders actually get a rebate by posting liquidity to the order book. The average combined fee of the lowest tier is 0.38% (0.16% maker and 0.22% taker).

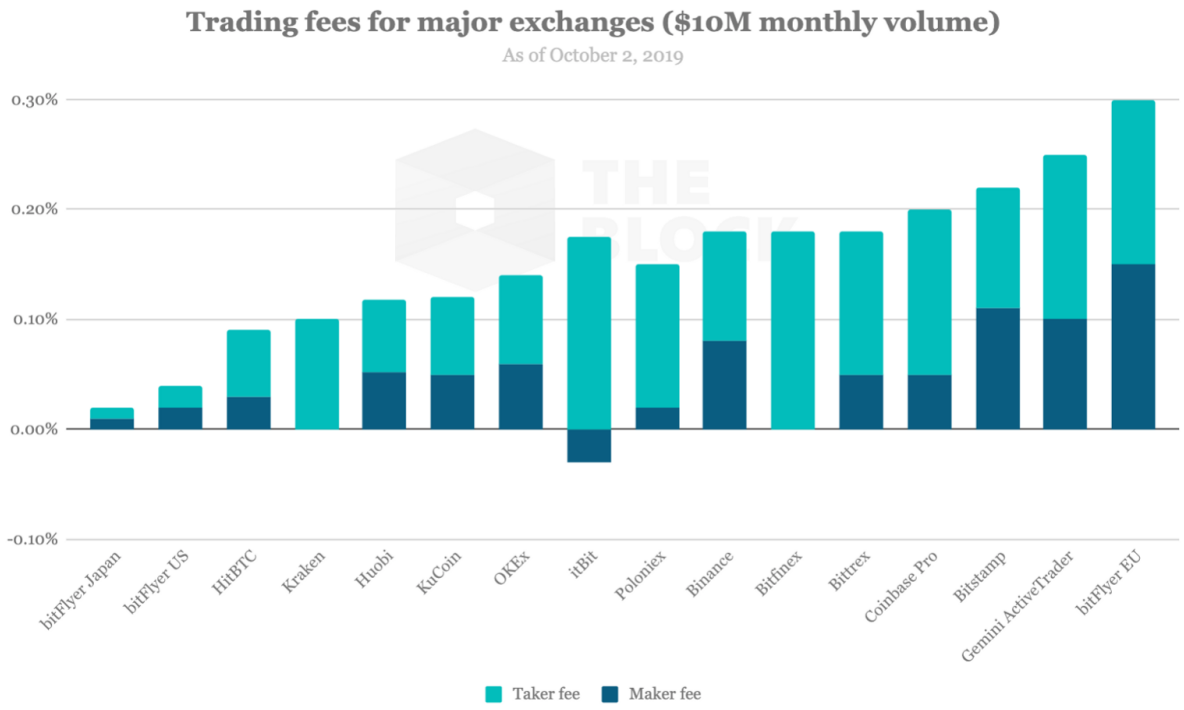
It's important to note that all exchanges have a different upper bound for trading volume, at which there is another, less-expensive tier. The upper boundary is displayed below.

Exchange	Monthly volume
HitBTC	Less than 10 BTC
Binance	Less than 50 BTC
KuCoin	Less than 300 BTC
bitFlyer US	Less than $1 million
OKEx	Less than 1,000 BTC
Bitfinex	Less than $500,000
bitFlyer Japan	Less than 100,000 JPY
itBit	Less than $600,000
Poloniex	Less than $25,000
bitFlyer EU	Less than €1 million
Coinbase Pro	Less than $100,000
Huobi	Less than 1,000 BTC
Kraken	Less than $50,000
Bittrex	Less than $200,000
Gemini ActiveTrader	Less than $500,000
Bitstamp	Less than $10,000

Monthly volume of $10M

Looking at the mid-tier, which I defined as traders that do $10 million of volume monthly, bitFlyer Japan has the lowest combined trading fees; followed by bitFlyer US.

Interestingly, bitFlyer EU has the highest fees for this tier. Kraken and Bitfinex have no maker fees for this tier, while itBit offers a rebate on maker fees. The average combined fee for this tier is 0.15% (0.05% maker and 0.1% taker), which means that it's more than twice as small as the retail tier.

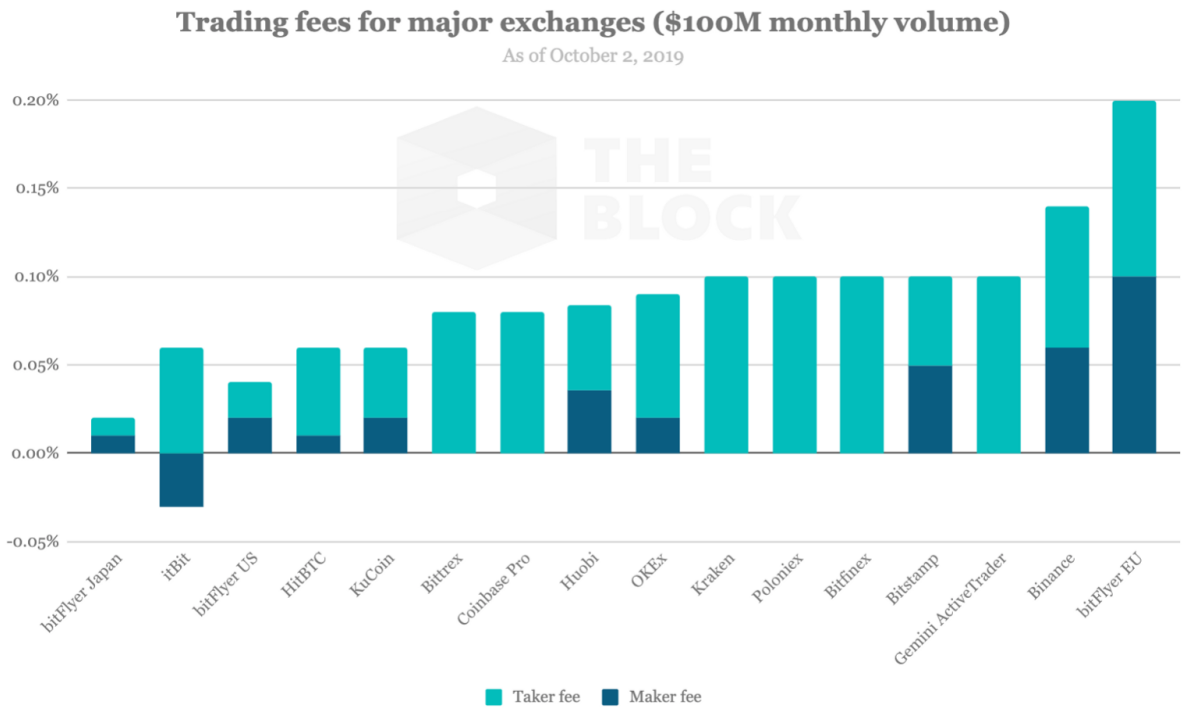


Monthly volume of $100M

Looking at the highest tier, which I defined as traders that do $100 million of volume monthly, bitFlyer Japan has the lowest combined trading fees; followed by itBit and bitFlyer US.

In contract to the retail tier, Binance has the second-highest fees following bitFlyer EU. Bittrex, Coinbase, Kraken, Poloniex, Bitfinex and Gemini have no maker fees for

the largest traders. The average combined fee for this tier is 0.09% (0.02% maker and 0.07% taker).



Summary

While the tier structure varies greatly across different exchanges, it's clear that HitBTC, Binance and KuCoin currently have the lowest trading fees for retail customers while Bitstamp has the highest. For institutional customers, bitFlyer (Japan/U.S.) and HitBTC seem to be the cheapest exchanges depending on volume. Gemini and Bitstamp are consistently the most expensive exchanges.

The summary table can be seen below:

Exchange	Retail		$10M		$100M		Average	
	Maker	Taker	Maker	Taker	Maker	Taker	Maker	Taker
bitFlyer US	0.12%	0.12%	0.02%	0.02%	0.02%	0.02%	0.05%	0.05%
bitFlyer Japan	0.15%	0.15%	0.01%	0.01%	0.01%	0.01%	0.06%	0.06%
HitBTC	0.07%	0.07%	0.03%	0.06%	0.01%	0.05%	0.04%	0.06%
KuCoin	0.10%	0.10%	0.05%	0.07%	0.02%	0.04%	0.06%	0.07%
Binance	0.10%	0.10%	0.08%	0.10%	0.06%	0.08%	0.08%	0.09%
OKEx	0.10%	0.15%	0.06%	0.08%	0.02%	0.07%	0.06%	0.10%
Huobi	0.20%	0.20%	0.05%	0.07%	0.04%	0.05%	0.10%	0.10%
bitFlyer EU	0.20%	0.20%	0.15%	0.15%	0.10%	0.10%	0.15%	0.15%
Bittrex	0.25%	0.25%	0.05%	0.13%	0.00%	0.08%	0.10%	0.15%
Kraken	0.16%	0.26%	0.00%	0.10%	0.00%	0.10%	0.05%	0.15%
Coinbase Pro	0.15%	0.25%	0.05%	0.15%	0.00%	0.08%	0.07%	0.16%
Poloniex	0.15%	0.25%	0.02%	0.13%	0.00%	0.10%	0.06%	0.16%
Bitfinex	0.10%	0.20%	0.00%	0.18%	0.00%	0.10%	0.03%	0.16%
itBit	-0.03%	0.35%	-0.03%	0.18%	-0.03%	0.06%	-0.03%	0.20%
Gemini ActiveTrader	0.25%	0.35%	0.10%	0.15%	0.00%	0.10%	0.12%	0.20%
Bitstamp	0.50%	0.50%	0.11%	0.11%	0.05%	0.05%	0.22%	0.22%

Deposit growth a likely headwind for crypto-friendly banks

October 21, 2019

Quick Take

- Crypto-friendly banks, Silvergate Bank and Signature Bank, experienced strong non-interest bearing deposit growth in 2Q19
- With exchange trading volume and blockchain funding trending lower in 3Q19, this will likely have a negative impact on crypto-related deposit growth moving forward

While falling interest rates are expected negatively impact the banking industries' profitability, crypto-friendly banks will face additional headwinds this year as falling exchange trading volume and blockchain funding will likely hurt deposit growth. Exchange trading volume has been trending lower since June while blockchain funding has dipped as IEO's have begun to fall out of favor. Amongst the banks that accept cryptocurrency-related clients in the U.S., it will be important to keep an eye on Silvergate Bank and Signature Bank (SBNY).

Strong non-interest bearing deposits growth in 2Q19

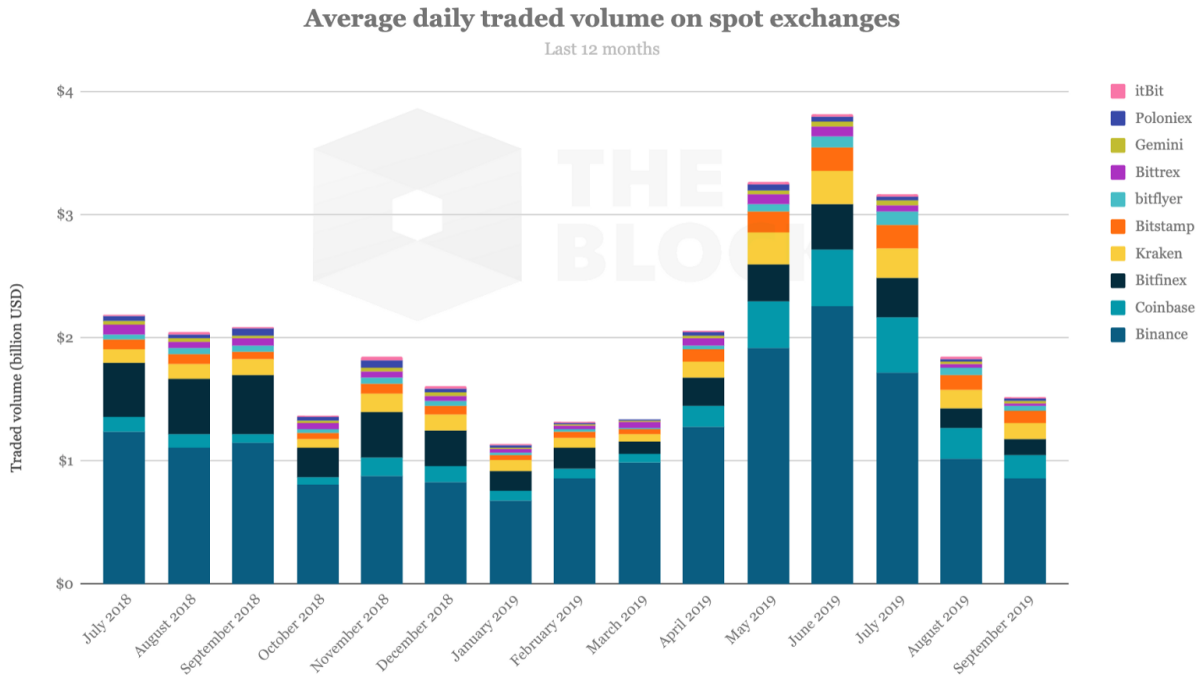
Although providing banking services to cryptocurrency businesses brings additional compliance costs and regulatory risks, the few banks who do decide to take on that challenge are rewarded with cheap deposits from its customer base. Over 97% of Silvergate's $1.5 billion in digital currency-related deposits in non-interest bearing.

Despite a challenging deposit environment for banks, both Silvergate Bank and Signature Bank experienced a notable increase in non-interest bearing deposits in 2Q19. Silvergate's non-interest bearing deposits grew by 6.7% sequentially to $1.5 billion while Signature's grew by 4.7% to $12.3 billion. In its S-1 filing, Silvergate noted how most of its deposit growth came from exchanges during the quarter. Signature Bank does not disclose how much of its deposits are from digital currency-related

clients, but management did call out its blockchain-based payment platform, Signet, and its Digital Banking team for making significant contributions to deposit growth.

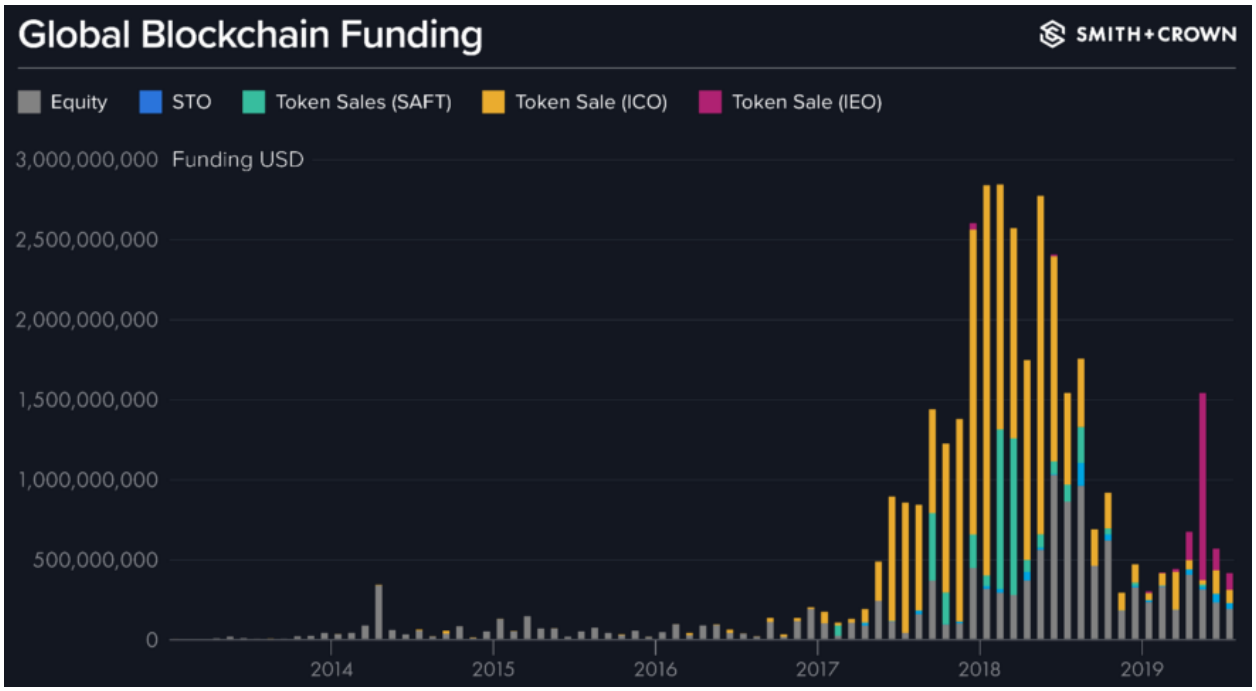
The rest of the year likely won't be as smooth

Exchanges have generally been a major contributor of deposits within the cryptocurrency industry. With trading volume down significantly in 3Q19, it's likely digital asset-related deposit growth will suffer.



Source: CryptoCompare, The Block

Blockchain funding has also notably taken a dip within the past few months as IEOs have fallen out of favor, which should also put a strain on deposit growth.



Source: Smith + Crown

Last Friday, Signature Bank reported 3Q19 earnings. Although its interest-bearing deposit growth was impressive, non-interest bearing deposits fell by 2% sequentially to $12.0 billion. Unlike Silvergate, Signature caters to a more diverse customer base (not just crypto-related). As a result, it's difficult to isolate the effects of any particular industry on deposits. However, if we assume Signature's crypto-related deposits are almost entirely non-interest bearing (as is the case for Silvergate), it seems likely that Signature's crypto-related deposit portfolio underperformed.

Silvergate has not yet released its 3Q19 financials, but I suspect low-cost deposit growth to be a headwind for the company in the near term.

IEOs are dying; nearly 90% have lost more than half of value since their all-time high

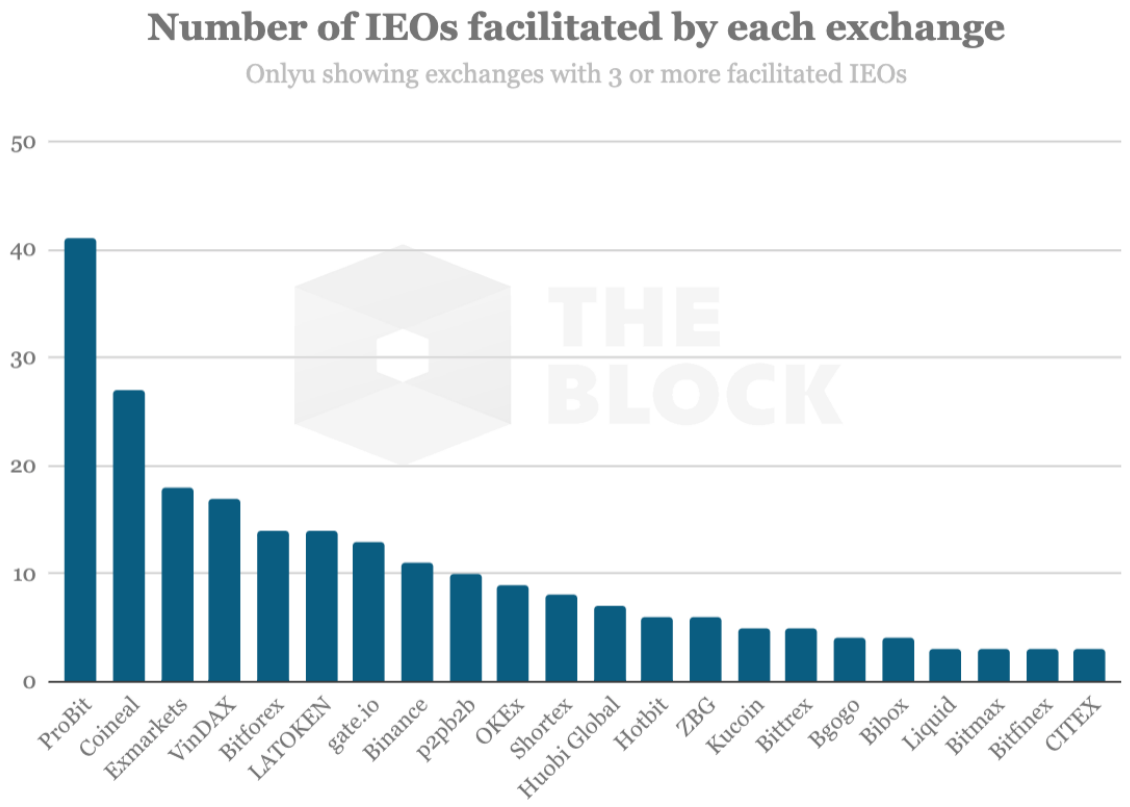
October 16, 2019

Quick Take

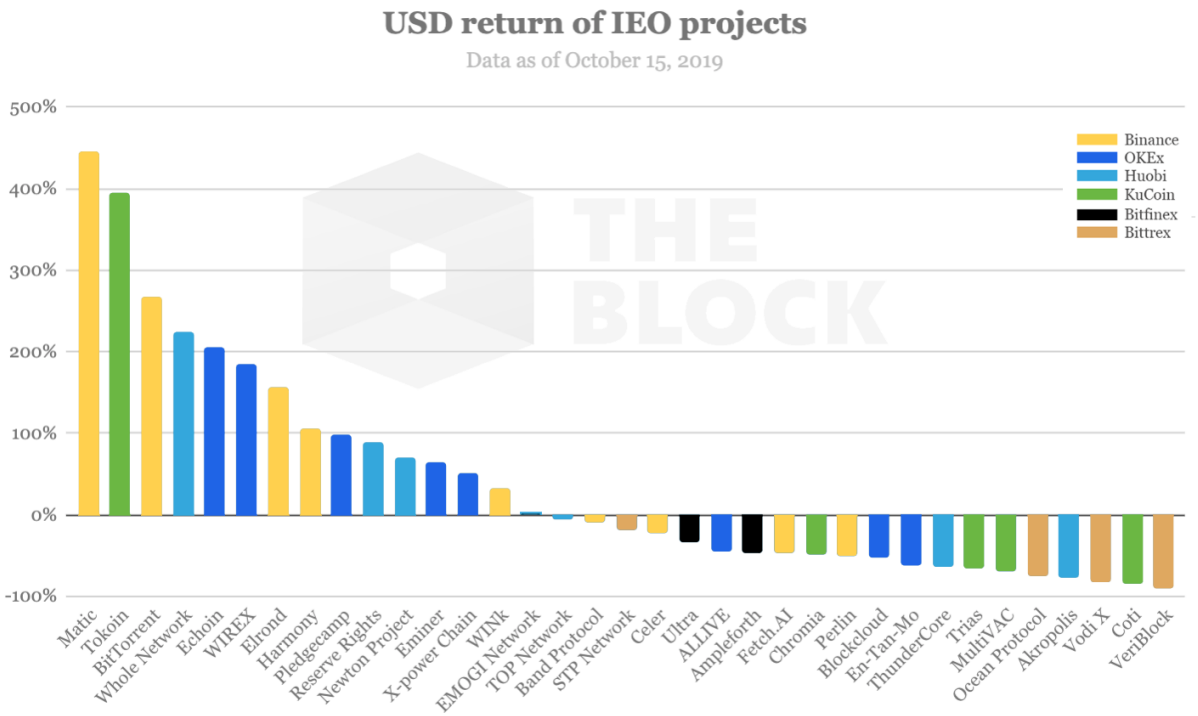
- The legitimate exchanges have had 35 IEOs combined, out of which only 43% have had a positive return in terms of USD; less than half of the projects have outperformed bitcoin
- About 86% of projects have lost 50% of value since their all-time high
- The data shows that Binance has, by far, the highest average USD return across the examined exchanges while Bittrex has, by far, the lowest

Initial Exchange Offerings (IEOs), token fundraising events administered by an exchange, have become a theme of 2019—just as ICOs became a theme of 2017. But data shows IEOs are going to be as shortlived as ICOs. Nearly 60% of IEOs on legitimate exchanges have lost more than 75% of value since their all-time high. While 43% of these IEOs have had a positive return in terms of USD, they don't sustain value over longer periods of time.

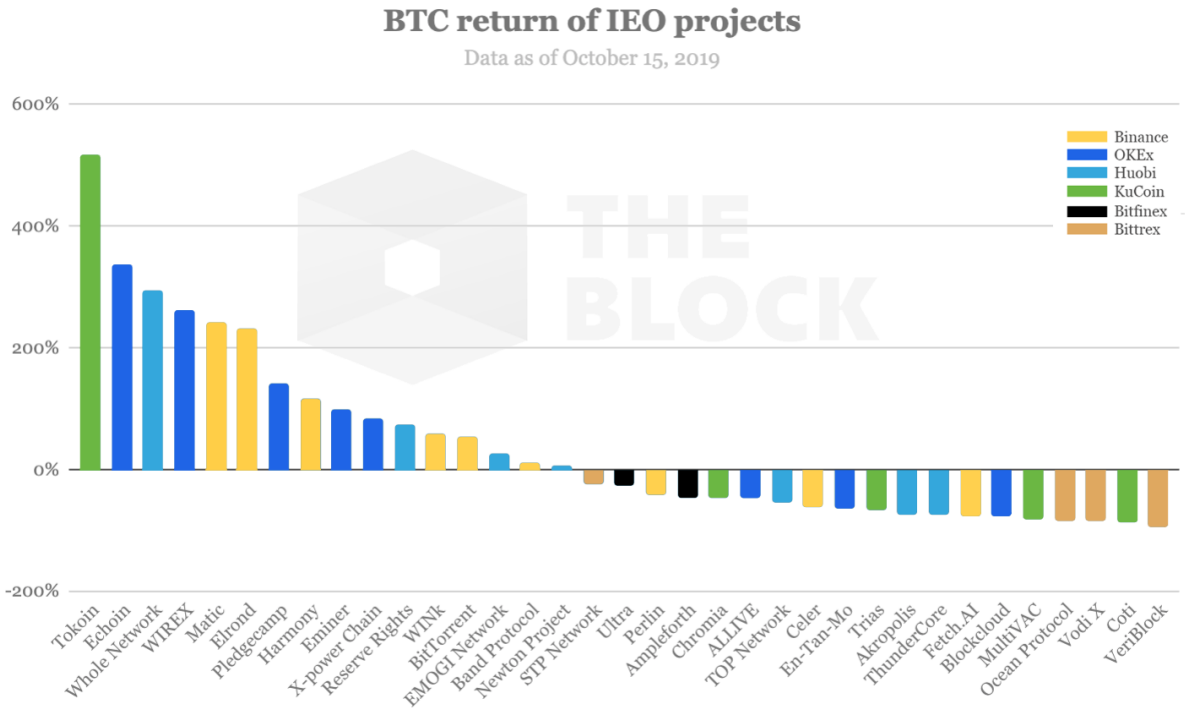
Binance popularized the concept with Binance Launchpad early this year; since then, approximately 270 projects have raised funds through an IEO. At least 57 exchanges have facilitated at least one IEO, according to The Block's research. Two little known exchanges, ProBit and Coineal, have facilitated a quarter of all the IEOs. But the vast majority of IEOs on these exchanges are low quality and very little data is available.



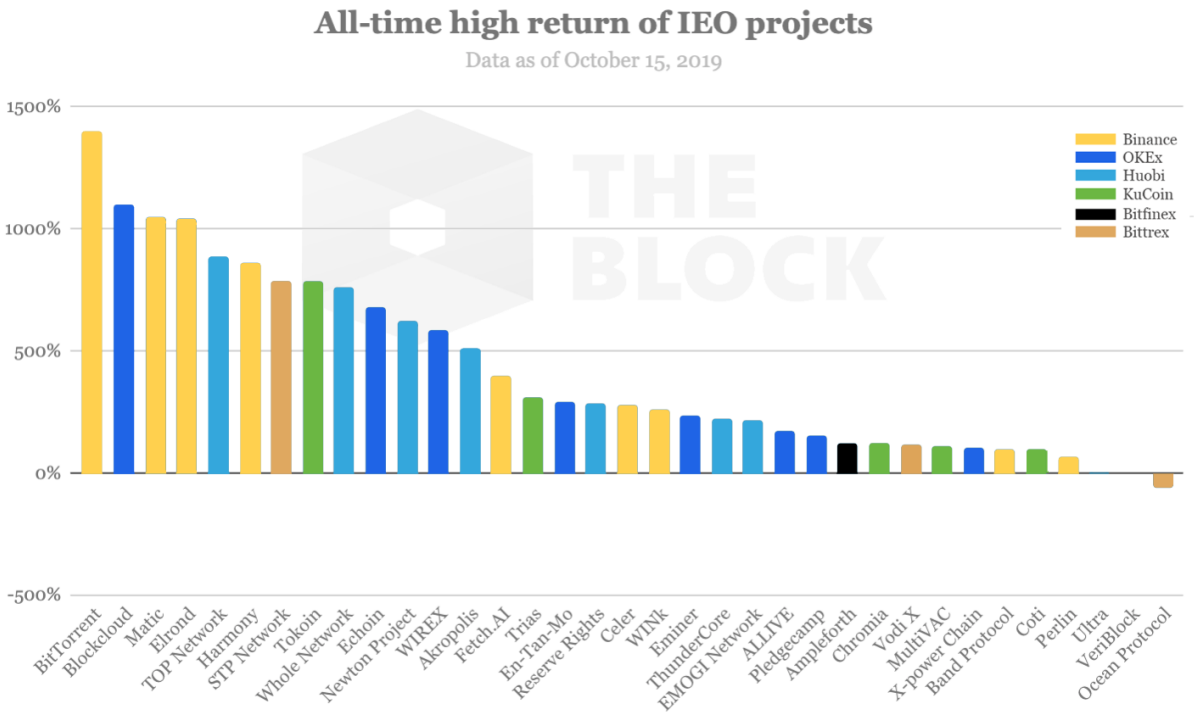
The Block has analyzed all projects that had an IEO on the more legitimate exchanges with a proven track record — Binance, Bitfinex, Bittrex, Huobi, KuCoin and OKEx. These exchanges have had 35 IEOs combined in 2019, out of which 15 (~43%) have had a positive return in terms of USD. In comparison, in late July, ~64% had a positive return in terms of USD. The best performing project, to date, has been Binance's Matic (445% return) while he worst-performing project is currently Veriblock that was launched by Bittrex (-90% return).



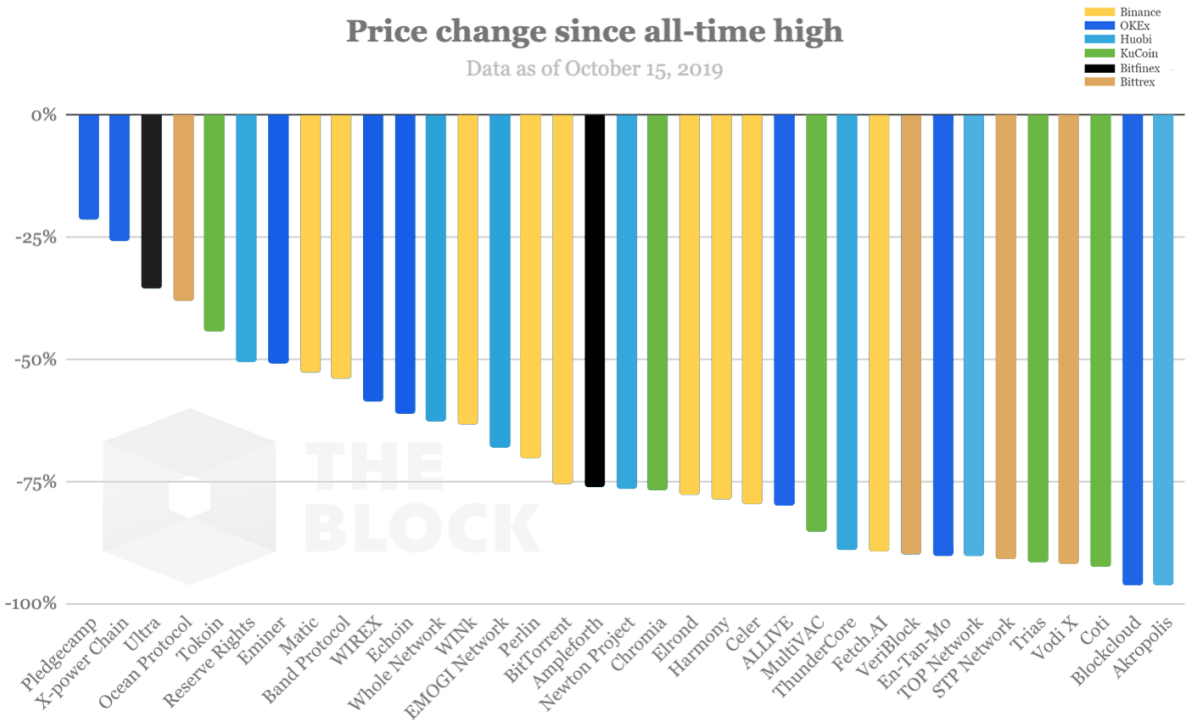
Perhaps a more indicative metric is a return in terms of bitcoin, which shows the projects that have outperformed or underperformed bitcoin since having an IEO. 16 projects, less than half, have outperformed bitcoin. KuCoin's Tokoin has the highest return (518%) in terms of BTC while Veriblock scores last again with -94% return.



IEOs' largest appeal is its speculative nature. The all-time high return of 13 projects has been higher than 500%. That means that if the investors sold at the all-time high price, 13 projects would generate them at least six times the amount of capital that they put in within just a few months.



But because most of the investors buy the tokens just to sell them for a higher price a few months later, the price is never sustained. All but 5 projects (86%) have lost 50% of value since their all-time high, and 57% of projects lost more than 75% of value since ATH. In comparison, in late July, about 75% of projects lost 50% of value since their all-time high, and 39% of projects lost more than 75% of value since ATH. It's apparent from data that the returns decrease as more time passes.



Binance is in the best position to facilitate token sales because of its access to the largest retail userbase and it can, therefore, be more selective with projects than other exchanges. The data shows that Binance has, by far, the highest average USD return on IEOs across the examined exchanges. OKEx has the second-highest USD return but the highest BTC return and also seems to sustain price slightly better than Binance IEOs. Bittrex, on the other hand, has by far the lowest (and negative) USD return.

Exchange	Count	USD return	BTC return	ATH return	Down since ATH
Binance	9	97%	59%	605%	-71%
OKEx	8	56%	92%	415%	-60%
Huobi	7	34%	29%	501%	-76%
KuCoin	5	25%	48%	284%	-78%
Bitfinex	2	-41%	-35%	62%	-56%
Bittrex	4	-67%	-71%	210%	-78%

A look at exchange confirmation times and settlement assurances

October 21, 2019

Quick Take

- Cryptocurrency exchanges have become a primary attack target for hackers
- One way exchanges manage their security is by setting the minimum number of block confirmations for cryptocurrency deposit
- The Block compares the confirmation times of eight cryptocurrencies + ERC-20 tokens across 18 exchanges to take a look at how exchanges view blockchain security and settlement assurance
- Our analysis found that Kraken has taken one of the more conservative approaches for accepting cryptocurrency deposits based on the confirmation time the exchange requires

Typically the custodians of large cryptocurrency holdings, exchanges have become a primary attack target for hackers. As such, exchanges have to balance user-convenience with security. And while exchanges do everything they can to minimize their attack surfaces, some attack vectors are beyond the exchanges' control. One of these vectors is the cryptocurrency themselves and the exploitable blockchains they are built on.

Due to the fall in cryptocurrency prices after the 2017 bull market and the decrease in miner revenue, 51% attacks have become a more common occurrence on blockchain networks.

In late 2018 and early 2019, we've seen 51% attacks carried out on lower-market cap coins like Bitcoin Gold all the way to top 20 coins like Ethereum Classic. In most cases, exchanges that support assets that are being 51% attacked close off their attack vectors by ceasing deposits and withdrawals to prevent hackers from

double-spending their transactions. In other cases, however, exchanges end up taking the brunt of the attack, as seen from the attacks Gate.io and Bittrex experienced.

While exchanges can't prevent 51% attacks and double spends, they can decrease their chances of being taken advantage of by adjusting the number of block confirmations required for assets they support. The logic here is that the more "work" accumulated by proof-of-work miners on top of a specific block, the more expensive and therefore less likely a block and its transactions will be reversed.

For this piece, The Block has collected the minimum confirmation requirements of 18 cryptocurrency exchanges and trading venues to analyze their positions on settlement assurances for the assets they support. We analyzed eight cryptocurrencies (plus ERC-20 tokens) for our piece. Below is a table of these exchanges and their minimum confirmation requirements.

	Binance	Kraken	Coinbase	Bitstamp	Poloniex	Gemini	Bittrex	Huobi
BTC	1	6	6	3	1	3	2	2
ETH	12	30	35	12	12	12	36	12
ERC-20	12	30	35	12	12	-	36	12
BCH	-	15	12	12	11	15	20	6
LTC	-	12	6	6	4	12	6	6
XMR	-	15	-	-	8	-	20	10
DASH	-	6	2	-	50	-	6	50
ETC	-	43,200	5,676	-	2,400	-	500	400
ZEC	-	24	18	-	8	12	30	24

	Liquid	BitMEX	Deribit	Bitfinex	itBit	Gate.io	KuCoin	FatBTC
BTC	1	1	1	2	6	2	2	3
ETH	50	-	-	12	-	12	12	12
ERC-20	50	-	-	12	-	-	12	12
BCH	1	-	-	-	-	6	2	6
LTC	6	-	-	5	-	3	4	6
XMR	6	-	-	12	-	12	3	-
DASH	6	-	-	2	-	4	20	12
ETC	50	-	-	-	-	60	100	250
ZEC	6	-	-	8	-	4	12	-

Based on our data, Kraken appears to take the most conservative approach for accepting cryptocurrency deposits, with one of the highest block confirmation requirements across the eight assets + ERC-20 tokens we analyzed. For example, the exchange requires a six-fold waiting period for BTC deposits compared Binance and requires an almost eight-fold waiting period for ETC compared to Coinbase.

Because blockchains are unique in their block generation times, we've converted the above charts to a time-based format, using the average block-producing intervals of the blockchains we've analyzed. This will give us a better sense of an exchange's view on settlement assurance for asset deposits. The chart below is the minimum number of minutes, on average, the exchanges we've analyzed require for cryptocurrency deposits.

	Binance	Kraken	Coinbase	Bitstamp	Poloniex	Gemini	Bittrex	Huobi
BTC	10	60	60	30	10	30	20	20
ETH	2.8	7	~8	2.8	2.8	2.8	8.4	2.8
ERC-20	2.8	7	~8	2.8	2.8	-	8.4	2.8
BCH	-	150	120	120	110	150	200	60
LTC	-	30	15	15	10	30	15	15
XMR	-	30	-	-	16	-	40	20
DASH	-	15	5	-	125	-	15	125
ETC	-	10,080	1,324	-	560	-	~117	~93
ZEC	-	60	45	-	20	30	75	60

	Liquid	BitMEX	Deribit	Bitfinex	itBit	Gate.io	KuCoin	FatBTC
BTC	10	10	10	20	60	20	20	30
ETH	~12	-	-	2.8	-	2.8	2.8	2.8
ERC-20	~12	-	-	2.8	-	-	2.8	2.8
BCH	10	-	-	-	-	60	20	60
LTC	15	-	-	12.5	-	7.5	10	15
XMR	12	-	-	24	-	24	6	-
DASH	15	-	-	5	-	10	50	30
ETC	~12	-	-	-	-	14	~23	~58
ZEC	15	-	-	20	-	10	30	-

Some interesting things we've noticed from this table:

- Kraken requires nearly a week for processing ETC deposits

- Although Bitcoin has, by far, more miner hashrate contributed to its network than Litecoin, it takes four times longer for Coinbase to process a BTC deposit than a LTC deposit
- Despite experiencing a 51% attack in 2019, Liquid processes ETC deposits at the same speed as ETH deposits
- Despite being impacted by an ETC 51% attack, Gate.io only requires 14 minutes (60 ETC block confirmations) to process an ETC deposit
- Five of the 18 exchanges we analyzed only require 10 minutes (1 block confirmation) for BTC deposits
- ETH has the lowest confirmation time requirements ranging from approximately 2.8 minutes to 12 minutes
- Coinbase accepts BTC deposits twice as fast as BCH, despite Bitcoin and Bitcoin Cash sharing the same proof-of-work algorithm and Bitcoin having nearly 44 times the hashrate of Bitcoin Cash
- Dash has the largest disparity for deposits with some exchanges requiring five-minute confirmations and others requiring 125-minute confirmations

To get a better sense of security equivalence across blockchains, we also converted block confirmation numbers to their dollar value from block rewards.[1] This allows us to compare blockchains on a "miner salary per unit time" basis, as Nic Carter describes. Below is the conversion table.

	Binance	Kraken	Coinbase	Bitstamp	Poloniex	Gemini	Bittrex	Huobi
BTC	$102,500	$615,000	$615,000	$307,500	$102,500	$307,500	$205,000	$205,000
ETH	$4,176	$10,440	$12,180	$4,176	$4,176	$4,176	$12,528	$4,176
ERC-20	$4,176	$10,440	$12,180	$4,176	$4,176	-	$12,528	$4,176
BCH	-	$43,500	$34,800	$34,800	$31,900	$43,500	$58,000	$17,400
LTC	-	$8,250	$4,125	$4,125	$2,750	$8,250	$4,125	$4,125
XMR	-	$1,943	-	-	$1,036	-	$2,591	$1,295
DASH	-	$1,283	$428	-	$10,688	-	$1,283	$10,688
ETC	-	$794,880	$104,438	-	$44,160	-	$9,200	$7,360
ZEC	-	$10,992	$8,244	-	$3,664	$5,496	$13,740	$10,992

	Liquid	BitMEX	Deribit	Bitfinex	itBit	Gate.io	KuCoin	FatBTC
BTC	$102,500	$102,500	$102,500	$205,000	$615,000	$205,000	$205,000	$307,500
ETH	$17,400	-	-	$4,176	-	$4,176	$4,176	$4,176
ERC-20	$17,400	-	-	$4,176	-	-	$4,176	$4,176
BCH	$2,900	-	-	-	-	$17,400	$5,800	$17,400
LTC	$4,125	-	-	$3,438	-	$2,063	$2,750	$4,125
XMR	$777	-	-	$1,554	-	$1,554	$389	-
DASH	$1,283	-	-	$428	-	$855	$4,275	$2,565
ETC	$920	-	-	-	-	$1,104	$1,840	$4,600
ZEC	$2,748	-	-	$3,664	-	$1,832	$5,496	-

One way to read the table above is to view it as the cost a potential attacker must incur if they were to attempt to double-spend their deposit transactions. For example, it would cost an Ethereum Classic attacker approximately $795,000 to reverse their deposit on Kraken based on the exchange's minimum required ETC confirmations. Using our table, an economically rational attacker attempting to profit from an exchange attack using ETC would make a deposit on Liquid, as that's the exchange that would cost them the least on a salary per unit time basis.

The cryptocurrency exchange ecosystem still lacks a standard for properly measuring security. As a result, exchanges will continue to offer sub-optimal user experience across a combination of waiting times and security.

Cost of a Binance listing: Insights from Blockstack's SEC filings

October 28, 2019

Quick Take

- Last week, Binance announced that it would be listing Blockstack's Stacks tokens (STX) on the exchange for a listing fee of "0 BNB"
- Despite this, Blockstack paid Binance 833,333 STX tokens upfront (worth approximately $250,000 using Blockstack's Reg A+ general offering price of $0.30 each) and agreed to pay Binance an additional 833,333 STX tokens annually "in consideration for the Stacks Token's ongoing and future listing" as revealed in Blockstack's SEC filings
- Binance claims that this payment was not disclosed in its press release because the company only recognizes the fees associated with the technical integration costs of the tokens as "listing fees"
- Although Binance promised last year that it would donate 100% of listing fees to charity, a spokesperson for the company said that Blockstack's payments would not be donated "as this is not a listing fee"

Last Wednesday, Binance announced that it would be listing Stacks (STX), Blockstack's native utility token. Similar to other listings in the recent past, Binance noted within its press release that the listing fee for STX was 0 BNB, suggesting that Blockstack paid Binance nothing in exchange for getting listed on the exchange. Generally, this would be the full extent of the information publicly provided about Binance's listing agreements. Fortunately, we have Blockstack's SEC filings to give us additional insights.

"Long-term Payment"

Within Blockstack's SEC filing, the company notes that it paid Binance 833,333 Stacks Tokens upfront and intends to pay Binance 833,333 additional Stacks tokens annually for up to three years "in consideration for the Stacks Token's ongoing and future

listing." Assuming the value of each token to be $0.30 (equal to the Reg A+ general sale price), this would equate to an upfront payment of $250,000 plus an additional payment of $250,000 annually. Blockstack further noted in the filing that it would pay Binance $100,000 for marketing services.

When asked why this was not disclosed in Binance's press release, Blockstack CEO Muneeb Ali commented to The Block:

"Their [Binance's] standard agreement has a listing fee which is called the 'Technical Integration Fee'. The technical integration fee is $0 as publicly disclosed in the filing. The 'Long-term Payment' is something new that is not part of Binance standard agreements and it was an idea that I had and I proposed it to them. This long-term payment is meant to watch out for the Blockstack ecosystem by incentivizing Binance to list Stacks over many years and aligns well with our long-term focus. The marketing fee is a joint marketing campaign that we plan to run later on, again that is not a 'listing fee' but a marketing campaign that we plan to launch in the near future."

In conversation with The Block, a Binance spokesperson confirmed Ali's claims. They stated that the long-term payment was "not a standard practice" as Blockstack has been the first company to provide this type of payment and that Binance's listing fees only refer to the fees associated with the technical costs of getting the tokens listed on the platform (although this is not explicitly mentioned in Binance's press release).

The spokesperson further noted that:

"The amount we disclosed in our listing announcements are the full listing fees chosen to donate to charity. This has been the case ever since we made the initial announcement to give listing fees to charity."

This is in reference to a change Binance had announced a year ago in which it would donate 100% of listing fees through an in-house charity organization called the Blockchain Charity Foundation. Projects would be required to propose their own figure for a "listing fee," which Binance would donate upon acceptance.

When asked if Blockstack's long-term payment would be donated to charity, the spokesperson replied, "No they won't be, as this is not a listing fee."

Sizable Deposit Requirement

Also within Blockstack's agreement with Binance, the SEC filing states that Blockstack provided Binance with a deposit of $500,000 and 2.5 million Stacks tokens to cover any costs of potential blockchain hacks or defects associated with Stacks. Assuming no adverse events occur, Binance would return 50% of the deposit after the first 12 months and the remaining 50% after an additional 12 months.

In the recent past, Binance's sizable deposit requirements have been an area of controversy. Last month, Jared Tate, the founder of DigiByte, claimed Binance had requested a deposit of $300,000 and 3% of the total DibiByte Coin (DGB) supply as part of its listing requirements. "We have zero funds & zero ability as a decentralized project to meet such a request" Tate exclaimed on Twitter.

Although Binance CEO Changpeng "CZ" Zhao did not deny Tate's claims, he tweeted:

Source: Twitter

I guess with CZ, he feels that some things are better left unsaid. Thankfully, the details within Blockstack's SEC filings give us some clarity.

Ecosystem Maps

Mapping out the blockchain ecosystem in New York City

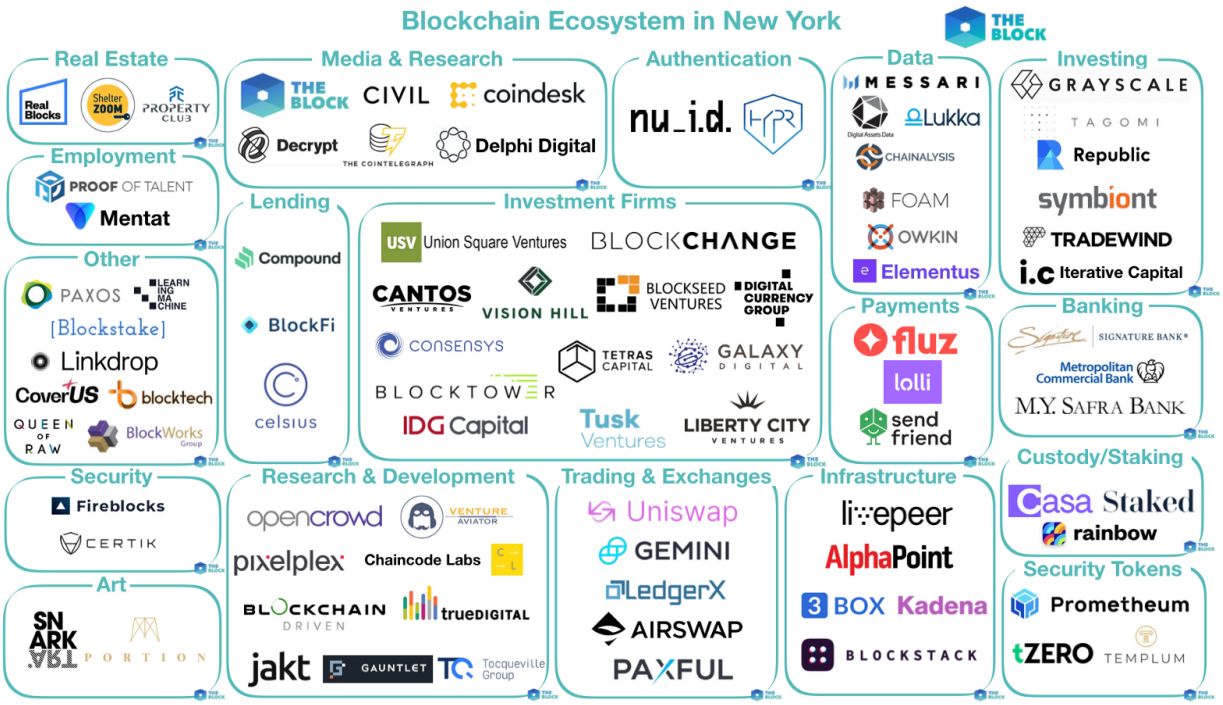
October 2, 2019

Quick Take

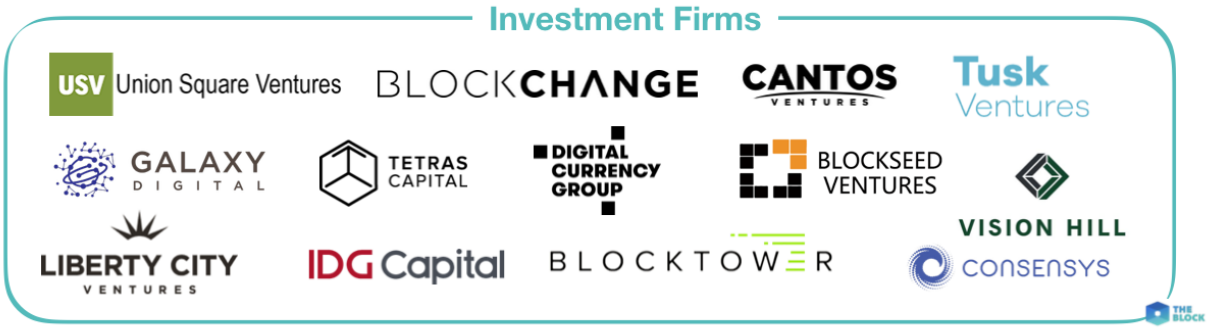
- Between 2010-2017, employment in the tech industry in New York City has risen by approximately 65%
- New York ranks second in venture capital investment, behind only San Fransisco
- Despite challenging licenses such as New York's BitLicense, New York has become a vibrant ecosystem for blockchain technology with 81 firms across 18 different sub-categories

The tech industry has been on the rise in New York City. According to government statistics, between 2010-2017, employment in the tech sector grew by approximately 65%. According to the New York Times, New York ranks second in attracting venture capital, behind only San Fransisco. As the tech industry has climbed, traditional financial service companies and banks have also been giving their businesses a technological overhaul.

Residing at the confluence point between finance and technology, Blockchain technology has found a welcome home in the world financial capital. Despite the challenge of obtaining licenses for blockchain companies, such as New York's famous Bitlicense, the Big Apple has become a vibrant ecosystem, featuring a wide array of companies in the space. The Block has mapped out a total of 85 firms across 18 different sub-categories in New York City that are working to bring innovation through blockchain technology or cryptocurrencies.



Investment Firms



Union Square Ventures is a venture capital firm based out of New York City (Polychain Capital, Dapper Labs, Protocol Labs, OB1)

Tusk Ventures invests in technology companies with high-growth opportunities, which may be in strictly regulated industries. Its portfolio includes Coinbase and Radar

Cantos Ventures is the venture capital arm of Cantor Fitzgerald that focuses on investing in developing technology companies. Cantos is based in New York and has invested in the blockchain lending platform Dharma & Stronghold, a trading platform

Vision Hill Advisors is a crypto-asset and blockchain focused fund of funds based in New York City

Digital Currency Group has been providing investment for Bitcoin and blockchain companies since 2015 (Notable investments: BitGo, Blockstream, Coinbase)

Blockchange is a venture capital firm headquartered in New York City investing in early-stage blockchain companies (Notable investments: The Block, Skuchain, Tokenize)

Liberty City Ventures is a Micro VC based in New York City that invests in technology startups

Blocktower Capital is a cryptocurrency investment firm based in the greater New York City area

Tetras Capital is a New York City-based crypto hedge fund that invests in blockchain technology

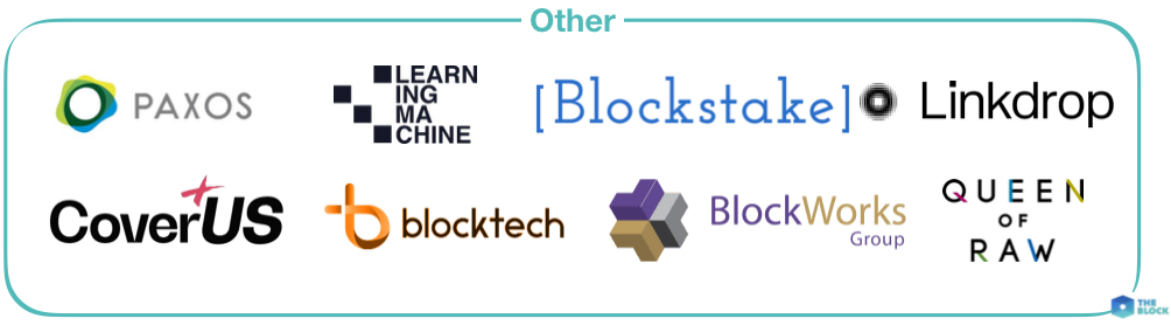
Galaxy Digital is a crypto merchant bank headquartered in New York, with offices in the Cayman Islands, New Jersey, Tokyo, and Hong Kong

ConsenSys is based in Brooklyn and provides capital to companies and protocols building on the Ethereum network (Notable investments: Grid+, MetaMask, Gnosis)

IDG Capital is an investment firm based out of Beijing that invests in early-stage tech companies

Blockseed is a blockchain accelerator and venture capital firm for early stage investment

Other



Paxos is a stablecoin fully collateralized 1:1 with USD, issued by a regulated trust company

Linkdrop is a Web3 marketing platform

Queen of Raw is a blockchain based retail platform that hopes to reduce waste and pollution in the clothing and textile industry

BlockWorks Group produces conferences and podcasts for the blockchain and cryptocurrency space

Learning Machine has built a distributed system for digital records that are recipient owned

CoverUS is a privacy based healthcare platform

Blockstake is a cryptocurrency mining company that owns mining hardware and operates multiple mining pools

Blocktech is an international blockchain studio

Research & Development

Gauntlet uses agent-based modelling and other tools from algorithmic trading to reduce the cost of experimentation, allowing teams to rapidly design, launch, and scale decentralized systems

TrueDigital develops digital asset derivative markets, asset transfer platform, and payment and settlement services

OpenCrowd is a consulting and development firm for blockchain technologies

Pixelplex is a blockchain development company

Venture Aviator is a software development company that offers blockchain services

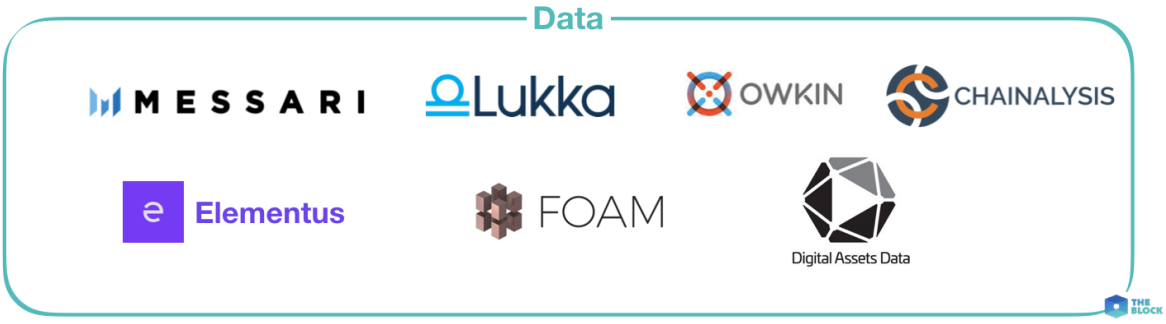
Jakt is an innovation product and innovation studio

TQ Tezos is a development group focused growing, strengthening and addressing the Tezos ecosystem

Chaincode Labs is a Bitcoin and cryptocurrency research and development group

Blockchain Driven is a blockchain advisor and consultancy

Data



Messari provides data metrics, transparency, and research on the cryptocurrency markets

Lukka builds accounting software for the blockchain ecosystem

Owkin is a blockchain-based system that allows an algorithm to trawl competitors' data with full traceability without revealing commercial secrets

Chainalysis developers tools and services to prevent, detect, and investigate cryptocurrency money laundering, fraud, and compliance violations

Digital Assets Data develops enterprise-grade software and data feeds for crypto hedge funds and other market participants.

FOAM Protocol is a decentralized marketplace for location-based data

Elementus is an explorer for public blockchains where users can extract and analyze the data

Media & Research

The Block is a cryptocurrency and blockchain media and research firm

Civil is a blockchain-enabled media company

CoinDesk (DCG subsidiary) is a news site covering crypto assets and blockchain technology

Decrypt is a media company covering cryptocurrencies and blockchain technology

Cointelegraph is a media organization for cryptocurrencies and blockchain

Delphi Digital is a research boutique for digital assets

Investing

Tagomi is a brokerage firm for cryptoassets

Republic is an equity investing and crowdfunding platform

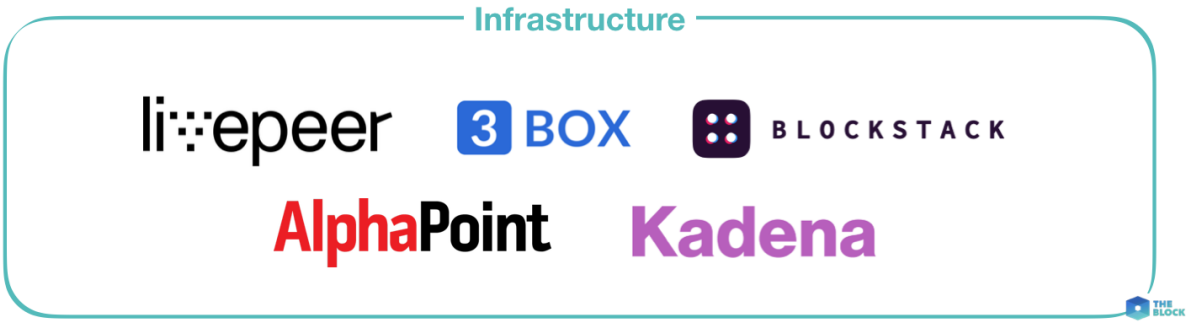
Symbiont is a distributed ledger meant to host financial instruments and manage their life cycle

Iterative Capital is an investment management firm that specializes in cryptocurrencies and blockchain technology

Tradewind Markets is a blockchain platform meant to digitize the precious metals market

Grayscale (DCG subsidiary) is a cryptocurrency asset management firm

Infrastructure



Livepeer is a peer-to-peer platform for live video broadcasting and streaming

3box provides infrastructure for managing Ethereum app user data without managing a backend server

Blockstack is a decentralized computing and identity network

Kadena intends to be a scalable private blockchain

Alphapoint is a software company that provides infrastructure for cryptocurrency exchanges and security token offerings

Trading & Exchanges

Gemini is a Cryptocurrency Exchange

Airswap is a peer-to-peer trading network for Ethereum based tokens

Paxful is a peer-to-peer bitcoin marketplace that connects buyers and sellers

LedgerX is a U.S.-regulated bitcoin derivative exchange and clearinghouse

Uniswap is a decentralized exchange for Ethereum based tokens

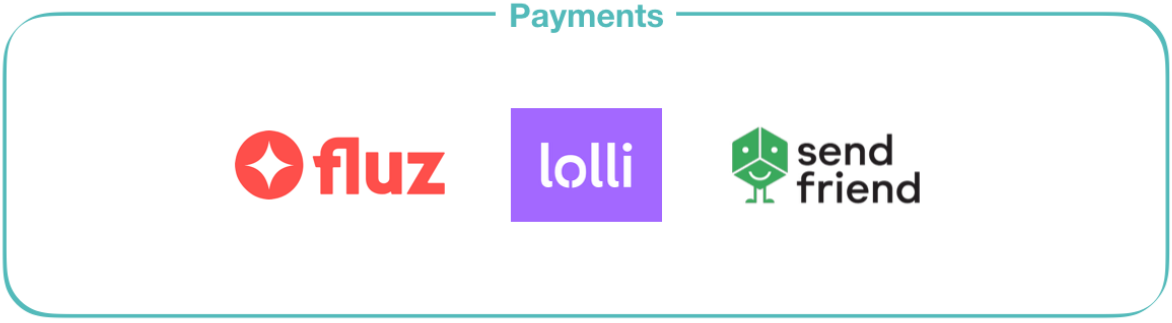
Security Tokens

Templum is a platform for security tokens

tZERO is a security token market

Prometheum is a trading platform for digital securities that deals with the issuance, trading, clearing, and settlement of the tokenized securities

Payments



SendFriend Inc. is a payments platform for sending money to the Philippines

Fluz is a cash-back application

Lolli works as a cash back service where users can earn up to 30 percent back in bitcoin by shopping online through any of its supported retail stores

Real Estate

RealBlocks is a a blockchain-based real estate platform that hopes to bring liquidity to the market through its tokenized real estate securities offerings

PropertyClub is a real estate crowdfunding platform

Shelterzoom is a blockchain real estate platform for property sales

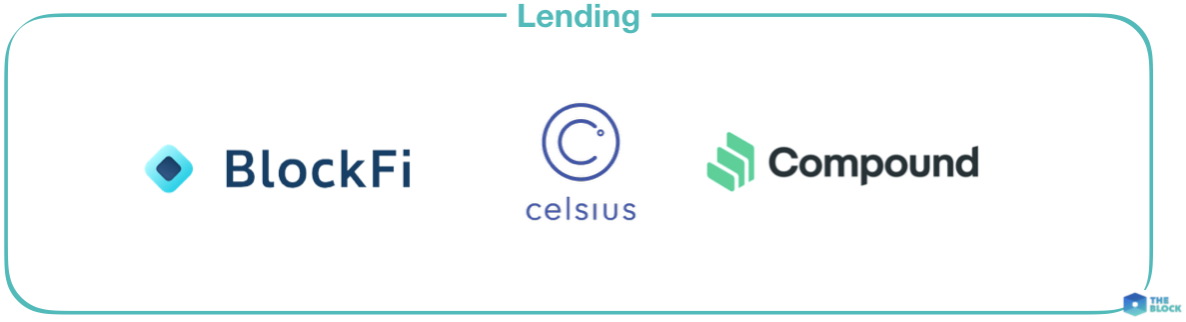
Banking

Signature Bank provides banking to Bittrex, a cryptocurrency exchange

Metropolitian Commercial Bank provides services to Crypto.com and other crypto related startups

M.Y. Safra Bank provides banking to cryptocurrency trading firms

Lending



Compound is an open-source protocol for money markets on Ethereum through which users can borrow and lend cryptocurrencies

BlockFi is a crypto borrowing and lending platform

Celsius Network is a lending platform

Custody/Staking

Casa is a personal key system that uses multi-sig to safely secure funds. Casa has also developed a ready-made Bitcoin and Lightning node that makes it easier for novices to have their node and be able to use the Lightning Network

Staked offers non-custodial staking services for numerous cryptocurrencies for institutional clients

Rainbow Wallet is an Ethereum wallet

Security

Fireblocks is a digital asset security company

CertiK is a smart contract security startup. The company uses formal verification to prove that the smart contracts are bug-free

Art

Snark.art is a blockchain platform for artwork

Portion is a blockchain platform for the exchange of art and collectibles

Employment

Mentat is a blockchain platform for freelance work

Proof of Talent is a recruiting firm for the blockchain and cryptocurrency industry

Authentication

NulD is a blockchain-based authentication company.

Hypr is a password-less authentication via biometric encryption. It plans to use blockchain technology to host a distributed, trustless store of biometrics validation data

Mapping out the blockchain ecosystem in Canada

October 9, 2019

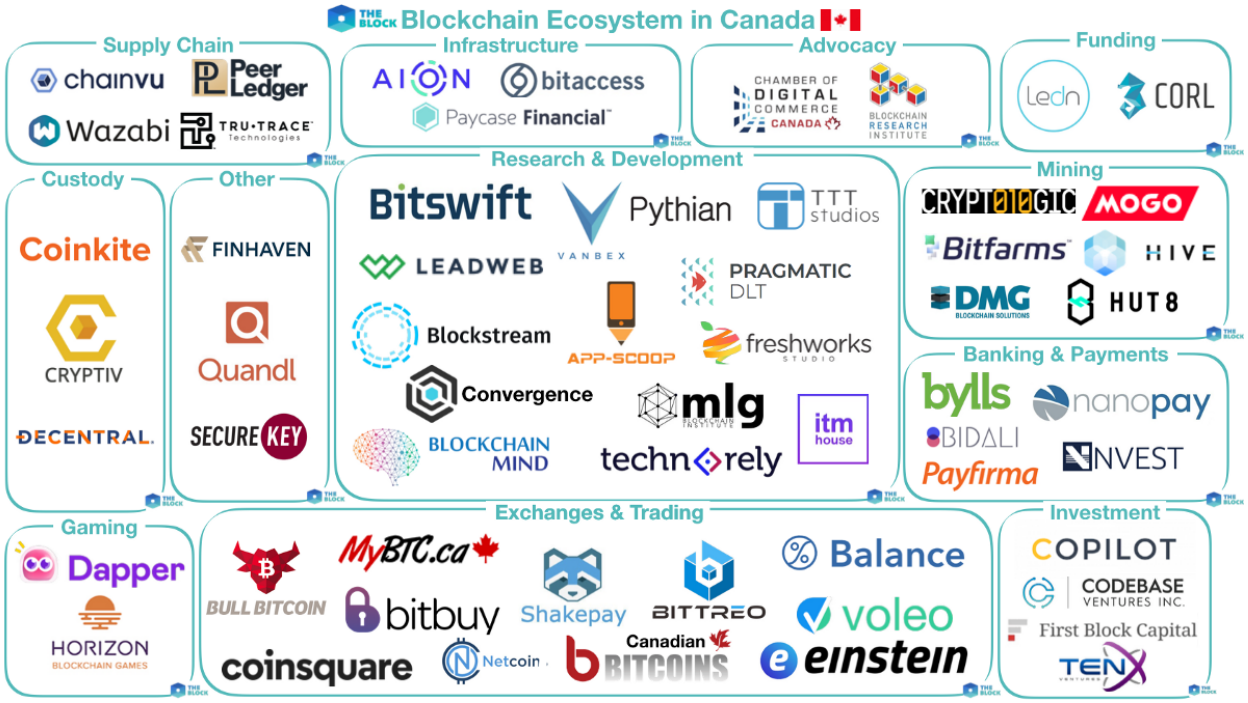
Quick Take

- Fifty-one percent of Canadian companies surveyed by Deloitte in 2018 were already investing in blockchain, and a study by Bank of Canada found that 5% of Canadians own bitcoin
- The nation has been well-positioned in attracting mining businesses due to its colder climate and low energy costs
- The Block has mapped out 59 companies across 12 different sub-categories headquartered in the Great White North

Canada has become home to an assortment of blockchain companies. A report by Chamber of Digital Commerce Canada found that 96% of Canadian businesses with 500 employees or more have considered incorporating blockchain technology into their business. A survey by Deloitte in 2018 found 51% of responding companies in Canada were already investing in blockchain, and a study by the Bank of Canada found that 5% of Canadians own bitcoin.

The nation has been well-positioned to be an industry player due to its low energy costs and high internet speeds, as well as its mining rig-friendly cold climate, which gives the nation a competitive advantage in attracting cryptocurrency mining operations.

While its regulatory landscape remains unknown, many blockchain companies have emerged and have prospered. The Block has mapped out a total of 59 companies across 12 different sub-categories that are headquartered in the Great White North.



Exchanges & Trading

BullBitcoin is an alternative to centralized exchanges for Canadians to buy bitcoin. Users can buy, sell, and spend bitcoin directly from their wallet and BullBitcoin is never a custodian throughout the process

Mybtc.ca is a Canadian brokerage exchange for Bitcoin

Shakepay is an exchange targeted at the Canadian market where users can buy and sell bitcoin

Coinsquare is a cryptocurrency exchange

Bitbuy is a cryptocurrency exchange

Balance gives users the ability to buy, sell and store digital assets and also form baskets of digital assets

Einstein Exchange is a digital currency exchange

Voleo is a trading app for investing for stocks and will include cryptocurrencies

Netcoins is an exchange for buying and selling cryptocurrencies

Canadian Bitcoins is an exchange for buying and selling cryptocurrencies

Bittreo is a bitcoin trading platform

Gaming

Dapper Labs develops blockchain-based games and non-fungible assets

Horizon Games develops blockchain-powered video games

Supply Chain

Chainvu is a blockchain-based solution for supply-chain management

Peer Ledger is a blockchain platform for supply chains

Wazabi, developed by DMG Blockchain, is a supply-chain solution for the marijuana industry

Trutrace Technologies is a blockchain-enabled supply-chain platform for the cannabis industry

Funding

Ledn provides credit to Canadian bitcoin businesses and consumers

Corl provides non-dilutive funding for startups and small business

Research & Development

Bitswift is a consultancy for businesses wishing to develop blockchain technologies for their business

Blockchain Mind is a blockchain consulting firm

TTT Studio is a software development company

Vanbex is a blockchain consulting company

Leadweb is a software development company

Technorely is an IT company that helps with the development of projects

Pragmatic DLT is a development company that provides technology solutions for businesses

ITM House is a research and development company for software

Blockstream is a research and development group focused on the development of Bitcoin and blockchain technology

App-scoop is a digital agency that works with enterprises and businesses to provide blockchain solutions

Convergence is a software development company

Freshworks Studio is a software development firm

MLG Blockchain is a blockchain consulting and development group

Pythian is an IT consulting and managed services company

Banking & Payments

Bidali is a payments platform that allows businesses to accept digital currencies

Payfirma offers an API for businesses to accept bitcoin payments

Nvest is building an international ecosystem of national retail banking institutions that utilize a network of physical branches for blockchain companies

Bylls is Canada's largest bitcoin payment processor

Nanopay is a payments platform for businesses and banks that uses blockchain technology

Mining

CryptoLogic is a cryptocurrency mining and software development company

DMG Blockchain Solutions is a cryptocurrency mining and development company

MOGO allows users to buy and sell bitcoin through its app and has also partnered with DMG Blockchain to get into the bitcoin mining business

Hut 8 is a cryptocurrency mining company

Bitfarms operates a cryptocurrency mining facility

HIVE is a cryptocurrency mining company

Investment

Copilot is building a decentralized blockchain marketplace with investment strategies

Codebase Ventures provides investment in emerging technology

Firstblock Capital is a cryptocurrency investment firm

TenX Ventures is a venture capital firm

Infrastructure

Aion is a smart contract platform for decentralized applications

Bitaccess is a blockchain technology company that offers products that include BTM, FAAST, Buy Bitcoin Canada, and Catena

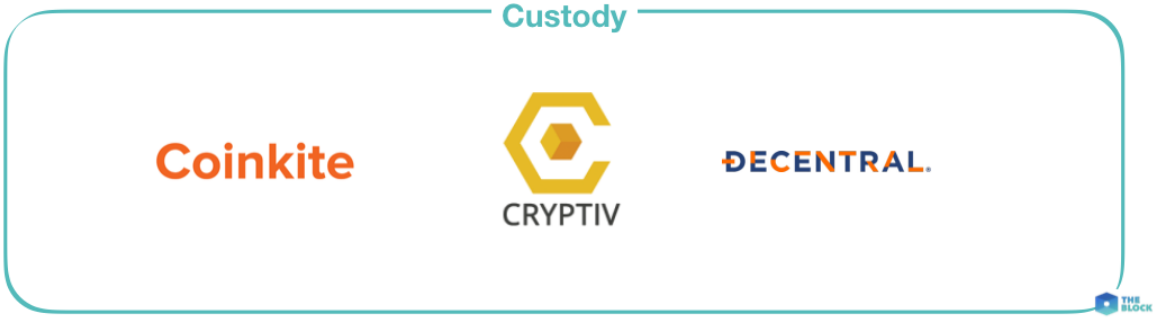
Paycase Financial is a financial services company that provides infrastructure and liquidity for blockchain companies

Advocacy

Chamber of Digital Commerce Canada is an advocacy group for the blockchain industry in Canada

Blockchain Research Institute is a foundation to help bring education to the blockchain industry and accelerate its usage

Custody

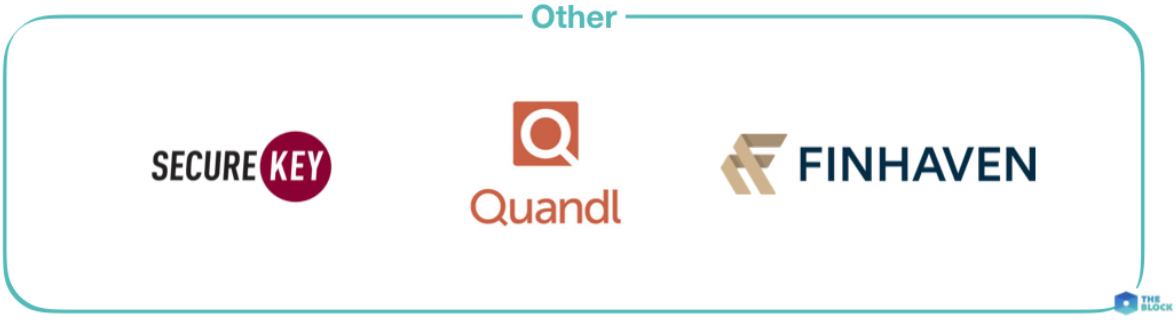


Coinkite is a Bitcoin hardware provider. Some of its products include Opendime, a bitcoin “bearer bond” and Coldcard, a bitcoin hardware wallet

CryptIV provides private key management for enterprise

Decentral is a blockchain company behind Jaxx wallet

Other



Finhaven is a platform for the issuance and trading of digital securities

SecureKey is working with IBM to create a blockchain-based digital identity system

Quandl, Nasdaq’s institutional data platform, offers data on blockchain and cryptocurrencies