# 1Q19

## CRYPTO RETROSPECTIVE

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CIRCLE RESEARCH

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# Market musings: Is it crypto spring?

After a significant sell off at the end of 2018, BTC prices remained fairly stable throughout 1Q19. BVOL, the rolling 30-day annualized BTC volatility as calculated by BitMEX, fell from a high of 78% on January 11th to a low of 24% on March 27th.

BTC and ETH were up 10% and 7% respectively in 1Q19. Notably, three exchange tokens (BNB, KCS, and HT) were among the top performers in 1Q19, each up over 150% q/q. This increase in price was likely driven by the emerging “IEO” (initial exchange offering) phenomenon, as these exchanges require participants to hold and use the native exchange token to participate.

Behind the scenes, the crypto community continued to make progress on multiple fronts. We saw multiple major blockchain launches (Grin, Beam, Cosmos) and product launches, within, for example, open finance (lending, synthetic assets) and Lightning Network (Lightning Torch, Casa & Joule, LApps, etc).

Crypto companies and data providers made great strides in raising awareness about the challenges and quality of crypto and exchange data and presented actionable alternatives. This was complemented by significant investment into crypto data companies in 1Q19.

Incumbents (such as JPM, FB, SQ, EY) made major announcements indicating that they recognize the longevity of the crypto ecosystem. However, we have yet to see the approval of a Bitcoin ETF proposal, the formal launch of custodial solutions (Fidelity), or the launch of physically settled futures (Bakkt).

On the regulatory front, multiple U.S. states (Wyoming, Colorado) successfully pushed for positive crypto legislature, and the SEC released guidelines providing a framework for whether or not a cryptoasset meets the definition of a security. Internationally, various countries (Canada, Japan) scrutinized regulations for riskier crypto trading activities such as margin trading, with commentary ranging from limitations to outright bans.

**In this report, we dig deeper into these themes and more.**

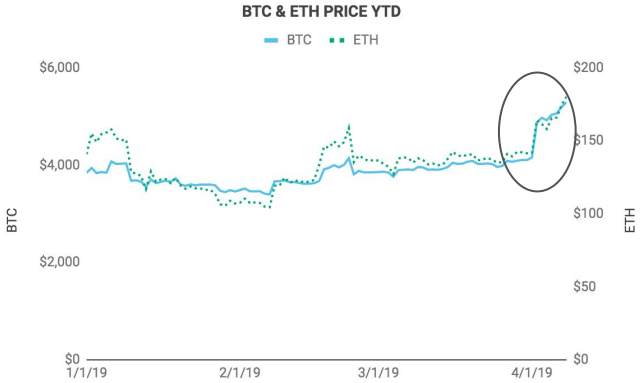
# Market musings: April rally

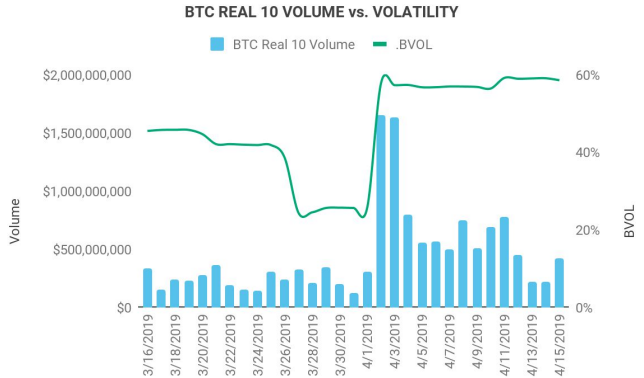
*Volume data provided by Messari*

On April 2, Bitcoin (BTC) rallied by over 20% to over $5000 within an hour (the highest level since November 2018) driven by a surge in volumes on major exchanges, leaving many to speculate what led to the sudden spike.

Media reports highlighted that the surge may have been driven by an **April Fool's joke** that a Bitcoin ETF had been approved or by a $100 million buy order across exchanges such as Bitstamp. Upon analyzing the data, **TradeBlock** **found that** the initial spike in trading actually occurred on Bitfinex, followed by Coinbase and Kraken. While tough to pinpoint the exact reason, potential catalysts include the unwinding of short positions on BitMEX, loan call backs or margin calls on borrowed BTC.

Bitcoin volatility as measured by **BVOL** jumped from 26% on April 1 to 58% on April 2 and has since remained elevated.




Note: BVOL refers to the rolling 30-day annualized BTC volatility as calculated by BitMEX

*Source: Messari*

# Highs, lows & must knows

**Update on 2019 crypto trends**

Open finance and stablecoins, especially the new entrants being developed by incumbents (JPM, Facebook), shaped a significant portion of the narrative YTD and should continue to do so throughout 2019. Meanwhile, security tokens have yet to generate investor interest, but the number of issuances is projected to increase by almost 250% y/y.

**1Q-2Q19 Developments**

Staking and lending services have grown increasingly popular among retail and institutions, offering new ways to earn returns on crypto holdings. A few reports unveiled that a large portion of reported trading volume is artificially inflated, leading data providers to start acknowledging the exchanges that exhibit real trading activity. Crypto exchanges were also at the center of the rise of initial exchange offerings (IEOs), a new fundraising method that leverages an exchange to host a token sale.

**VCs target blockchain analytics companies**

Venture investments into the data sector led the funding narrative in 1Q19, as four blockchain analytics companies raised capital and another was acquired by Coinbase. And while the rate of crypto fund launches is projected to decrease in 2019, cryptoassets under management increased by 40% q/q, the greatest quarterly rise in a year.

# Highs, lows & must knows

**Has crypto spring sprung?**

In 1Q19 and 2Q19 QTD, price performance has been driven by fundamental news and events. Nine of the top ten assets by market cap are trading up YTD vs. 4Q18 when all ten assets ended the quarter down. Similarly, market sentiment, as measured by investor intentions on Twitter, has shifted towards a more positive outlook since the start of the year.

**Network fundamentals and development remain strong**

The hashrate devoted to Bitcoin (BTC) is up 28% q/q, while Ethereum's total hashrate is down 17%, likely driven by the block reward reduction with the Constantinople upgrade. BTC and ETH transaction fees are lower despite increasing transaction count. The Lightning Network (LN) has seen a 100%+ increase in open channels and value held in the network q/q. Further, there has been a proliferation in LN infrastructure and apps in 1Q19.

dApps deployed on Ethereum are still significantly higher than on EOS and TRON, though the gap is closing. The average number of dApps deployed on Ethereum in 1Q19 was 61, down 48% q/q. Compare this to EOS, where the avg. number of dApps deployed in 1Q19 was 39, up 87% q/q.

**Market segment update**

We asked leaders from four parts of the business for their thoughts on different parts of the crypto ecosystem in 1Q19, including OTC trading, exchange, development and regulation.

# 2019 Crypto trend update

# Five Key Themes in 2019

**OPEN FINANCE**

**INSTITUTIONALIZATION**

**STABLECOINS**

**SECURITY TOKENS**

**BITCOIN**

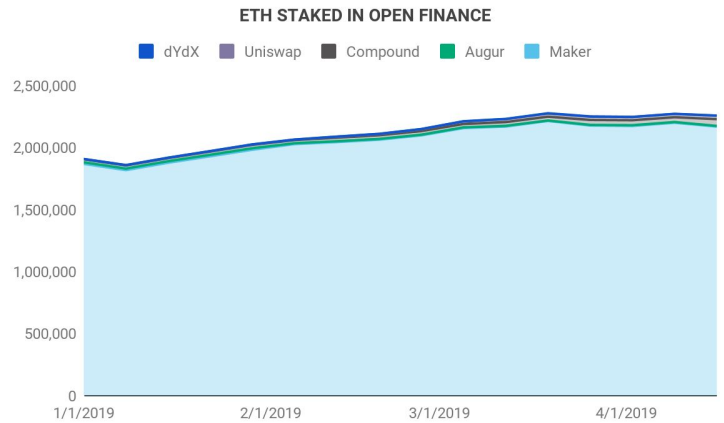
# Open finance: Growing ecosystem on Ethereum

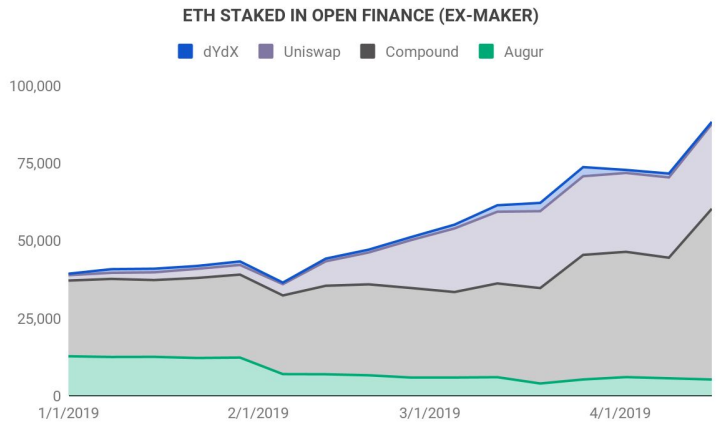
**2.3M**
ETH locked in Open Finance Apps*

**$66 million**
Borrowed (Jan-March 2019)

**16,404**
Loans 1Q19

**50+**
"Open finance" teams




The open finance ecosystem continued to get attention and adoption in 1Q19 with multiple constituents rolling out new and improved versions of their products and place more focus on user experience. ETH locked in the open finance apps displayed here rose from **1.9M**** ETH at the end of 4Q18 to **2.2M**** ETH in April 2019, **up 18%**. Notably, ETH locked in Uniswap contracts rose **15x**. Maker still dominates the category in terms of ETH locked up in open finance contracts. Maker dominance of the open finance projects listed here is 96% as of 4/16.



*Source: Mike McDonald, defi.network, medium.com/blogboard*
**dYdX, Uniswap, Compound, Augur, Maker*

# Open finance: Latest Developments

MAKER

**What**
Borrowing platform that allows user to borrow DAI, a stablecoin, against ETH.

**YTD notable events**
A series of voting polls open to MKR holders raised the stability fee from 1.5% to 7.5% as DAI exchange price remained below $1. Three more polls held in April raised the fee again to its current level of 14.5%

AUGUR

**What**
A decentralized prediction market. Read more from our report on prediction markets.

**YTD notable events**
Veil, a prediction market built on Augur featuring a friendly UI, launched on 1/15. The team also announced an upgrade will be introduced in 2019. V2 will feature DAI denominated markets, immediate dispute rounds, and more.

0x

**What**
Open infrastructure that supports decentralized digital asset exchange. Read more from our report on DEXes.

**YTD notable events**
Announced the design for 0x Mesh, which will make it easier for Relayers to connect and share liquidity. The team also released a proposal for stake-based liquidity incentives using the ZRX token.

Dharma

**What**
Non-custodial peer-to-peer credit market.

**YTD notable events**
Dharma pivoted from a protocol to a company when it launched its new margin loans market on 4/8. Since public launch, the platform has originated about $5 million in loans.

Compound

**What**
Non-custodial peer-to-peer crypto lending market.

**YTD notable events**
Compound announced a second version of the platform is on the way and will feature asset specific collateral and a community governance mechanism. V2 went live on the Rinkeby testnet on 4/15.

UMA

**What**
A decentralized financial contracts platform and price oracle that enables the tokenization of financial products.

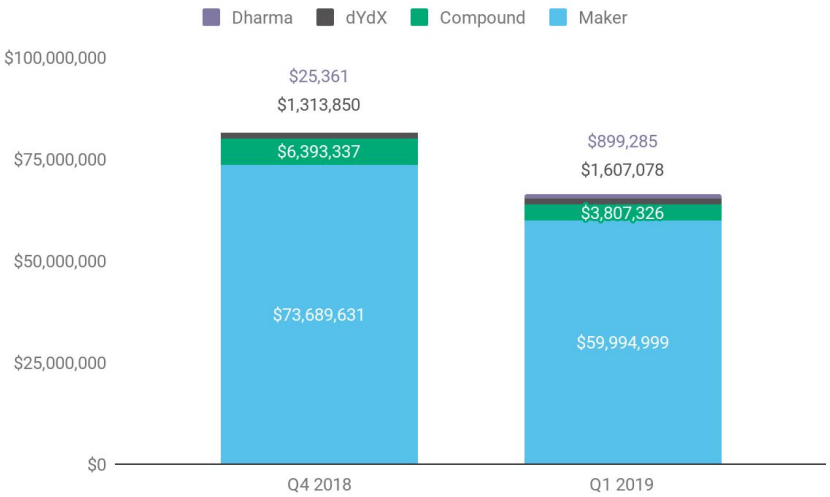
**YTD notable events**
UMA, in collaboration with Maker, made the S&P 500 universally available as an ERC20 token on 3/27. The USStocks token can only be purchased with and redeemed for DAI, but has seen very limited volume.



*Source: Maker, Augur blog, 0x blog, Dharma blog, LoanScan.io, Compound blog, UMA blog, DDEX.io*

# Open finance: Cryptoasset lending volume on open protocols

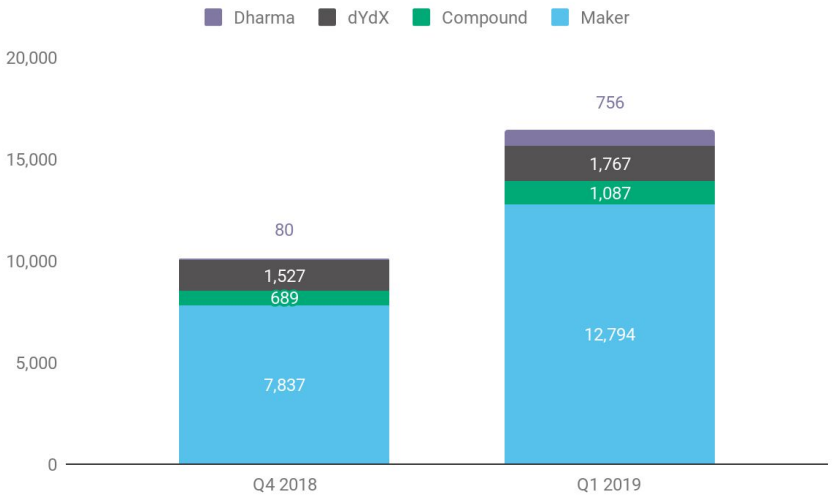
**Borrowed principal decreased in 1Q19**




**+3446%**

Change in volume on Dharma q/q due to launch of Dharma lending product (formerly Dharma Lever).

**But the number of borrows originated increased**




**-19%**

Change in MakerDAO volume as DAI stability fee is increased to 7.5%. The stability fee is now 14.5%.

Source: blogboard.com

# Institutionalization: Crypto expansion into traditional finance & tech

## Stablecoins, network payments & currencies

### Institutional stablecoins

JPMorgan launches JPM coin. Citi unwinds Citicoin project. Six int'l banks to use IBM/Stellar for stablecoins.

### Messaging platform

Facebook expands. Kakao to integrate crypto wallet.

### Central Banks

BIS reports that 70% are studying cryptocurrencies.

## Traditional financial market investment products & infrastructure

### Products and venues

Derivatives, eg, CME & CBOE futures (unwinding BTC futures). Crypto trackers and equity ETFs, eg, Citi DAR, GBTC Trust, Bitwise Hold 10 Index/HODL ETP, Blockforce & Invesco/ Elwood funds. Van Eck/SolidX & Bitwise ETF applications.

### Custody

Incumbents (Fidelity, Nomura, G4S), new startups (Anchorage) & Coinbase, BitGo, etc.

## Transforming assets/markets & consumer/enterprise

### Security Tokens

Overstock (tZero) launches. Agenus $100m STO. Sharespost entry.

### FinTech

Coinbase/Sofi partnership. eToro and Revolut enter US market.
Square growth and crypto initiative.

### Enterprise

IBM crypto services. EY publicly lists zero-knowledge proof protocol.

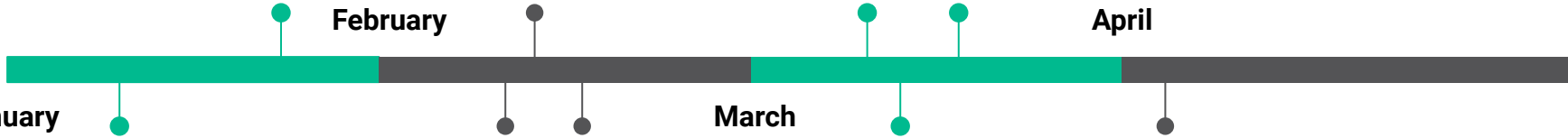
# Institutionalization: Regulatory developments

**January 23rd & 31st, 2019**
**UK FCA publishes guidance on cryptoassets and later approves firm offering crypto derivatives**
The FCA provides guidance on how crypto can be subject to regulation. Regarding derivatives, UK-based B2C2, an OTC trading firm can now offer exposure to top 6 cryptoassets.

**February 12th, 2019**
**Italy recognizes legal effectiveness of smart contracts**
An Italian task force for digital innovation proposes a bill to recognize legal enforceability of smart contracts.

**March 7th, 2019**
**Colorado passes "Digital Token Act"**
The new law, that will be enforced starting Aug 2019, exempts cryptocurrencies from state securities regulations.

**March 18-19th, 2019**
**Canada and Japan look to limit crypto margin trading**
Japan wants to place a cap on crypto margin trading, while Canada is proposing to ban it outright.




**January 7th, 2019**
**ESMA and EBA release reports on ICOs and cryptoassets**
The reports give an indication on European policy views concerning crypto and electronic payments.

**February 14th, 2019**
**Luxembourg provides legal framework for blockchain assets**
The Chamber of Deputies passed a bill to provide a legal framework for issuing financial instruments on a blockchain.

**February 19th, 2019**
**Wyoming passes a series of pro-crypto bills**
The state now recognizes digital assets as property, allows banks to be crypto custodians, and enables securities to be issued in a tokenized form.

**March 10th, 2019**
**Texas proposes ID verification for crypto transfers**
The bill states crypto recipients would be required to verify the identity of the sender.

**April 3rd, 2019**
**U.S. SEC releases digital asset framework & issues no action letter**
The framework will help in determining if a digital asset is a security, and the no action letter was issued to TKJ, a small aircraft carrier.

# Institutionalization: 1Q19-2Q19 regulatory developments

## Policy Innovation in Key Jurisdictions

- US SEC releases a framework for analyzing whether a digital asset is a security and issues a No Action Letter to a company looking to sell tokens on its platform.
- US SEC releases report stating crypto as a top examination priority and announces FinHub will host a public forum in May to discuss distributed ledger technology and digital assets.
- UK FCA publishes a guidance on how cryptoassets can be subject to regulation, acknowledging ICO tokens can vary in classification, and approves firms offering crypto derivatives.
- ESMA and EBA release separate reports to give an indication of the European policy views concerning cryptoassets and the scope of electronic payments as it concerns stablecoins.
- Italian task force for digital innovation proposes a bill to recognize the legal enforceability of smart contracts and DLT time-stamping.
- Luxembourg's Chamber of Deputies passes a bill that provides a legal framework for issuing financial instruments on a blockchain.

## Pro-Crypto Agenda Among US Elected Officials

- Wyoming state legislature passes bill that recognizes digital assets as property, clears way for banks to be crypto custodians, and enables securities to be issued in tokenized form.
- Colorado Governor signs into law bill that exempts crypto broker-dealers from state licensing requirements under certain circumstances.
- Ohio Representative re-introduces the Token Taxonomy Act to Congress, which intends to exclude digital tokens from US Securities, remove the tax associate with crypto-to-crypto transactions, and tax crypto held in retirement accounts the same as bullion.
- Connecticut state government files a bill that aims to authorize the use of smart contracts in commerce throughout the state.
- Twenty-one Members of Congress send a bipartisan letter to the IRS urging the tax authority to provide a more robust guidance around accounting and tax handling of cryptocurrency.



*Source: Misc.*

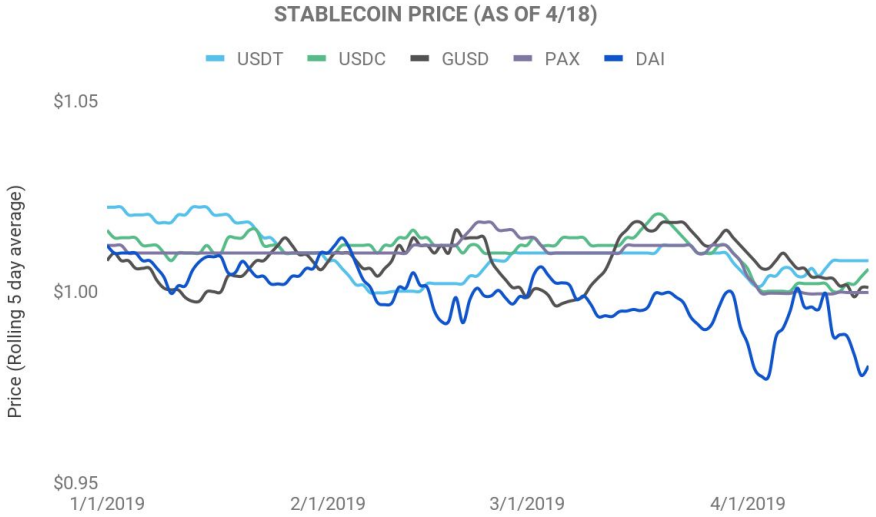
# Stablecoins: Dollar peg in focus

*As of 4/18*

Of the stablecoins displayed, USDC has been the least volatile and DAI the most in 1Q-2Q19. DAI has been struggling to reach its $1 target price due to an excess supply. YTD, DAI hit a low of $0.95. From **Diar's March 18 issue**, a potential reason could have been "a short window of opportunity to purchase Dai at a discount [on Stablewire] that threw Dai's ability to hold its peg."

Jason Choi **highlights** a more prominent headwind could be that DAI is paired with fewer tokens on exchanges like Coinbase and KuCoin, whereas stablecoins like USDC and USDT have a greater amount of token pairs. As a result, traders who mint DAI have to sell it for other stablecoins to trade in and out of altcoins, creating sell pressure on DAI.

In response, Maker token holders have voted in six total increases to the stability fee YTD to suppress demand for minting DAI and bring the price closer to the $1 target. The last increase brought the fee to 14.5%. Despite these hikes, the price of DAI has remained below $1. DAI is the only decentralized stablecoin of the lot.





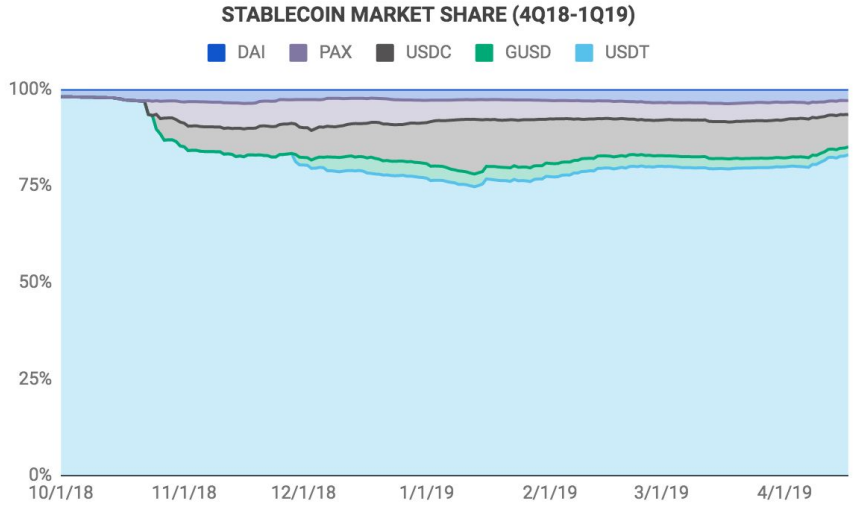

*Source: TokenAnalyst, Coinmarketcap, coinmetrics.io*
*Note: The stability fee is essentially the interest rate CDP holders pay to borrow DAI.*

# Stablecoins: Market dominance largely unchanged

*As of 4/18*

USDT's share of market cap bottomed in January 2019 though has since come back up. USDT remains the preferred option despite the availability of more transparent offerings and changes to Tether's terms of service highlighting that USDT tokens are backed by "cash equivalents and, from time to time, may include other assets and receivables from loans made by Tether to third parties, which may include affiliated entities."

USDC has the second largest share of total market cap among the five coins listed here. **TokenAnalyst points out** that DAI is the most transacted stablecoin by on-chain transaction count.






*Source: TokenAnalyst, Coinmarketcap*
*Note: The stability fee is essentially the interest rate CDP holders pay to borrow DAI.*

# Stablecoins: 1Q19-2Q19 developments

Celo

**What**

Mobile-first global payment platform with two tokens (one of which is a stablecoin) targeted at unbanked users in specific geographic markets.

**YTD notable events**

In early April 2019, Celo raised $30 million in funding led by a16z and Polychain who committed $15 million and $10 million respectively. Prior, the startup raised $6.4 million.

J.P.Morgan

**What**

A digital coin aimed at speeding up payments between JPM's corporate clients.

**YTD notable events**

In February, JP Morgan has developed a prototype for a stablecoin, called JPM Coin, which it has been working on to speed up wholesale payments between institutional clients. JP Morgan is expected to start testing the technology with select clients in coming months.

**What**

Facebook Coin, a highly secretive project, is targeted at users of it's messaging app, Whatsapp, and the remittances market and is likely to be some form of stable asset.

**YTD notable events**

FB is working on a coin for WhatsApp users. This is notable for the developing world it is difficult to open bank accounts, send/receive funds, and buy online. Other IM apps creating their own tokens include Telegram and Signal. These apps have a leg up in that they already have hundreds of millions of users.

**What**

Tether (USDT), the dominant stablecoin, is launching as a TRC-20 token on the Tron blockchain.

**YTD notable events**

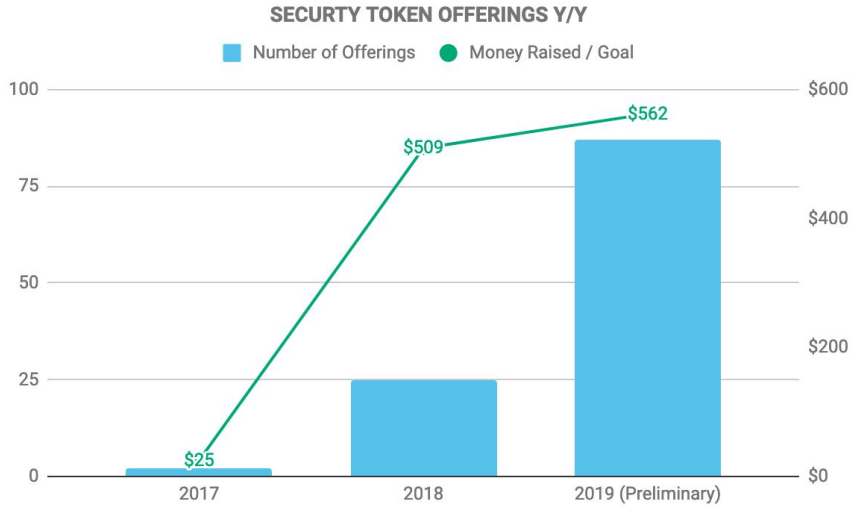
In March, Tether and Tron announced the launch of USDT on Tron to allow Tron users to improve the experience of transacting in dApps such as decentralized exchanges.

# Security tokens: Investor interest low but issuances increase

Security token offerings (STOs) are continued to be seen as a viable and compliant alternative to ICOs. Preliminary data from **Autonomous Next suggests** the number of security token issuances will **increase by 248%** in 2019. This growth may have been accelerated by the Harbor (Nov 2018) and tZero (Jan 2019) platform launches, which brought long awaited improvements to the underlying infrastructure.

New security token developments, however, have done little to gain investor interest. The money raised via STOs is projected to only increase by 10% in 2019, a **68% decrease** in the average raise per offering y/y. Low investor interest may be attributed to a perceived insufficient infrastructure to support a risk averse (technological and regulatory) and liquid market as well as a lack of quality security token issuers.

Despite current regulatory and market concerns, security tokens still offer desirable benefits compared to their traditional counterparts, including better access to global capital, fractional ownership capabilities, and lower issuance fees.






Source: Autonomous Next

# Security tokens: 1Q-2Q19 developments

tZERO

**What**
A security token trading platform owned and operated by Overstock.com.

**YTD notable events**
tZERO launched in January 2019 after spending 4 years in development. Its subsidiary, Pro Securities LLC, provides the alternative trading system (ATS). To date, the only token available for trading is its own TZROP, which was issued during a $134 million STO completed in August 2018.

HARBOR

**What**
An end-to-end compliance solution for digital securities backed by Andreessen Horowitz, Pantera Capital, 1confirmation, and others.

**YTD notable events**
Harbor launched in November 2018 with the announcement its first security token would be a REIT representing a stake in a $20 million mega-dorm for students at USC. In April 2019, the company said the deal had been cancelled as "the issuer was unable to come to favorable terms with the existing mortgage lender."

BLOCKSTACK

**What**
A decentralized computing network that supports dApps. Investors include Union Square Ventures, Y Combinator, Lux Capital, and others.

**YTD notable events**
This April, Blockstack announced that it has filed with the SEC under its Reg A+ exemption to raise $50 million for 295 million of its STX token. In order to be considered for the exemption, Blockstack had to file an offering statement with the SEC. According to the filing, Harvard Management has purchased a portion of tokens.

SECURITIZE

**What**
A compliance platform for digitizing securities backed by Coinbase Ventures, Ripple, and Blockchain Capital.

**YTD notable events**
In January, joined the IBM's Blockchain Accelerator and had Aspencoin migrate to its platform. Announced a partnership with Elevated Returns in February to tokenize $1 billion worth of real estate using Tezos. In April, launched a referral program with partners (Coinbase Custody, etc.) to help issue and manage security tokens on Securitize.

SATIS GROUP

**What**
ConsenSys partnership with Security Token advisory, Satis Group.

**YTD notable events**
The partnership will combine Satis Group's industry knowledge with ConsenSys' technology. It is intended to expand the security token advisory business of both companies and signifies the industry's shift in focus from ICOs to security token offerings (STOs). Satis Group will also consult ConsenSys spokes.

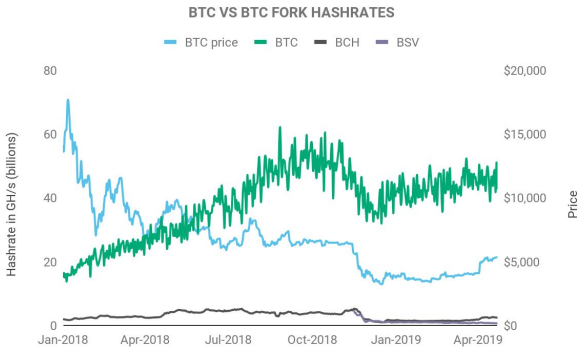


Source: ChicagoBusiness.com, ConsenSys

# Bitcoin: Slow, steady and undeniable growth

Despite the fact that Bitcoin is down ~70% from the all time high, the Bitcoin network and the infrastructure around the network continues to grow, mature and become more entrenched.

***Hashrate reversed trends q/q and has now almost doubled over the past year.***



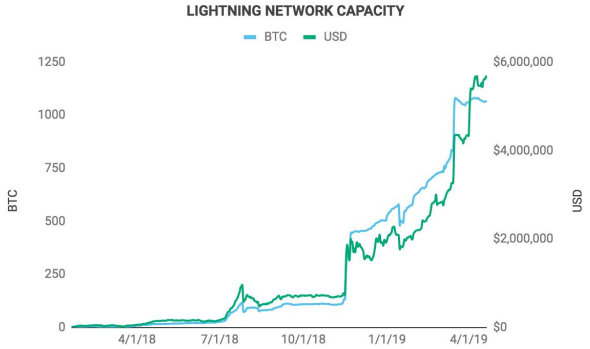

**+12%**

Chg. in BTC Hashrate 1Q19 q/q

**+82%**

Chg. in BTC Hashrate 1Q19 y/y

***Lightning Network capacity continues its y/y exponential growth by nearly doubling q/q.***



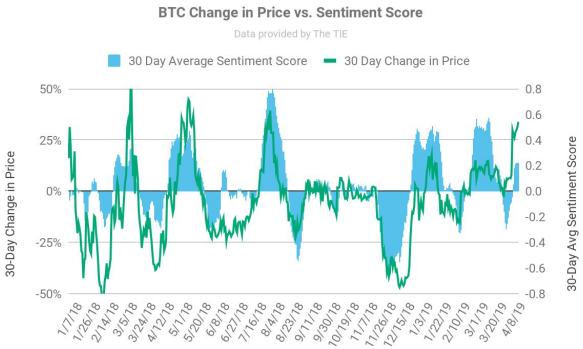

**+99%**

Chg. in LN BTC Capacity 1Q19 q/q

**+12K%**

Chg. in LN BTC Capacity 1Q19 y/y

***Monthly average market sentiment score was a full 16 points higher q/q.***




**-0.03**

4Q18 Monthly avg. sentiment score

**0.13**

1Q19 monthly avg. sentiment score

Qualitative highlights YTD that reinforce the thesis include the Bitwise ETF **proposal and presentation**, the **(soft) launch** of Fidelity Digital Assets custody offering, and the backing of Bitcoin core by Square in the form of **Square Crypto**.

# 1Q-2Q19 Developments

# Five Key Developments in 1Q-2Q19

**CRYPTO STAKING**

**CRYPTO LENDING**

**INITIAL EXCHANGE OFFERINGS**

**FAKE EXCHANGE VOLUMES**

**CRYPTO NETWORK LAUNCHES**

# Crypto staking: The rise of value and attention in staking networks

***Value Locked in Staking Networks: $5.8 billion***

One piece of big news this quarter was the launch of the Cosmos mainnet. At the time of writing (4/21), over $650M worth of tokens is locked in staking on the network, placing it among top three PoS networks by staked value.

Messari lists over thirty tokens that allow or require users to stake or engage tokens to earn a return by participating in the network. Staking yields on these networks run as high as 35%. The median percent staked across these networks is 35%.

We expect continued attention on this new way of earning returns as participants seek the most competitive yield and additional high profile staking opportunities enter the fray in 2019 and beyond (e.g. Polkadot, Dfinity, Ethereum). Further, crypto companies (e.g. custodians) will continue to announce staking services for delegators and stakers.

| Token | Consensus Mechanism | Staked/Engaged (% of Total) | Staking Yield (%) | Staked/Engaged Tokens |
|---|---|---|---|---|
| Ark | DPoS | 74% | 10% | 81,390,289 |
| Tezos | PoS | 69% | 7% | 544,591,151 |
| Blocknet | PoS | 65% | 12% | 3,712,566 |
| Cosmos | PoS | 64% | 11% | 121,452,973 |
| Zcoin | Other | 64% | 18% | 4,664,000 |
| Lisk | PoS | 59% | 4% | 68,565,215 |
| Particl | PoS | 55% | 7% | 4,457,308 |
| PIVX | PoS | 55% | 8% | 31,141,002 |
| EOS | DPoS | 54% | 2% | 490,297,747 |
| Tomochain | PoS | 53% | 8% | 31,465,091 |
| Dash | Masternode | 50% | 8% | 4,379,000 |
| Waves | PoS | 48% | 5% | 47,707,794 |
| NULS | PoS | 48% | 15% | 33,048,804 |
| Decred | PoW/PoS | 48% | 11% | 4,607,031 |
| NEM | Other | 44% | 4% | 4,536,514 |

*Source: Messari, Staking Rewards*
*As of 4/21*

# Crypto staking: A new way to earn returns

| | |
|---|---|
| What is staking? | In proof-of-stake systems, token holders are responsible for creating blocks. Token holders lock up, or “stake”, a minimum amount of tokens to validate transactions. In return, they are rewarded for doing so in tokens created through inflation. |
| What are reasons for staking? | • Avoid being diluted from inflation<br>• Differentiated source of income for investors regardless of market cycle<br>• New revenue stream for service providers (i.e. custodians, exchanges)<br>• Participate in governance to weigh in on strategic decisions |
| Who are key players? | • **Staking protocols:** EOS, Tezos, Decred, Cosmos, Livepeer<br>• **Funds:** Placeholder, CoinFund, CoinShares, Multicoin<br>• **Service providers:** Coinbase, Celsius, Staked, Chorus One, Bison Trails |
| What are challenges with staking? | • Type of income that rewards are classified as for tax purposes is unclear<br>• Service providers like exchanges could vote as they please with customers’ tokens without their consent<br>• No separation of staking to secure the network vs. to participate in governance<br>• Low voter or staker turnout |



Source: Misc., Reflections from the Inaugural Staking Summit by Meltem Demirors

# Crypto lending: Crypto borrowing and lending maintain popularity

Crypto-backed loans became increasingly popular among retail and institutional crypto holders during the bear market. Borrowers can deposit their crypto holdings as collateral and receive a cash loan without having to undergo a credit check. This allows them to stay invested during a down market and avoid taxes, while accessing liquidity. Traders can take out cash loans to trade on margin and create short positions.

Holders that do not need immediate liquidity can put their crypto to work by lending it out on, for example, decentralized peer-to-peer lending platforms like Dharma or Compound, or placing it in a depository account like BlockFi's BIA (which now has **$53 million** in its interest earning accounts).

### Centralized lending platforms

Popular centralized lending platforms include BlockFi and Genesis Capital. While BlockFi caters to both retail and institutional clients, Genesis' offering is targeted at professional traders and institutions. Centralized providers generally hold the collateral backing cash loans at custodians.

### Decentralized lending platforms

Decentralized lending systems are built on smart contract blockchain platforms like Ethereum and include Dharma and Compound. These are non-custodial platforms that enable peer-to-peer lending via smart contracts.

### Challenges

- Cryptoassets are highly volatile. Collateral can drop in value quickly in a short period, triggering partial or full liquidation via margin calls.
- There are more lenders than borrowers. As a result, certain providers are subsidizing the market by providing lenders a higher rate and charging borrowers a lower rate. This will not be sustainable.
- Regulation and jurisdictions in which crypto-backed loans fall is unclear.

# Crypto lending: Centralized borrowing and lending

| Name | LTV | Interest | Loan size | Loan term | Collateral type | Loan type |
|---|---|---|---|---|---|---|
| BlockFi | 20%/35%/50% | Borrow: 4.5%-11.25% | >$10K | 1 year | BTC, ETH, LTC | USD |
| Celsius Network | 25%/33%/50% | Borrow: 4.95%-8.95% | Unclear | Unclear | BTC, ETH, LTC, XRP, DASH, BTG | USD |
| SALT Lending | 30%-70& | Borrow: >5.99% | $5K-$25M | 1-36 mo. | BTC, ETH, LTC, DOGE | USD |
| Atomic Capital | Up to 85% | Borrow: 11%-13% | $100K-$100M | Unclear | BTC, ETH | USD |
| Genesis | Optional | Depends | >$100K | 2 weeks-6 mo. | USD (optional) | BTC, ETH, ETC, BCH, LTC, ZEC, etc. |



*Note: *6% on deposits <25 BTC or 500 ETH, 2% if more.*
*Source: Company websites*

# Crypto lending: Decentralized peer-to-peer borrowing and lending

| Name | LTV | Interest | Denomination | Loan term | Collateral type | Loan type |
|---|---|---|---|---|---|---|
| Dharma | 67% | Lend: 8% DAI, 2.5% ETH Borrow: 4% DAI, 0.1% ETH | No minimum | 90 days | DAI, ETH | DAI, ETH |
| Compound | 67% | Lend: 4.2% DAI, 0.1% WETH, etc. Borrow: 11.3% DAI, 6.1% WETH. etc. | No minimum | Unclear | DAI, WETH, BAT, REP, ZRX | DAI, WETH, BAT, REP, ZRX |
| Maker | 67% | Borrow: 14.5% | No minimum | Up to borrower | ETH | DAI |



*Source: Project websites*

# IEOs: A new way to raise funds

| | |
|---|---|
| What is an IEO? | IEO stands for initial “exchange” offering. It is a fundraising tool for early-stage crypto projects. IEOs are often referred to as rebranded ICOs. Project founders sell a portion of their native tokens in a public sale to raise funds. |
| How is it different from an ICO? | Unlike ICOs, crypto projects issue tokens through a third-party exchange that serves as intermediator. Investors purchase the project’s native tokens through the exchange’s platform, often using the *exchange’s* native token. IEOs are then listed on the exchange they used to raise funds. |
| What are the reasons for conducting an IEO? | **Exchanges:** Listing fee, increased trading volume on exchange, receive portion of project tokens, increased demand for exchange’s native token<br><br>**Projects:** Immediate listing (i.e. liquidity), exchange’s stamp of approval, exchange handles legal compliance, listing, issuance, code review, marketing, etc. |
| What are the risks of participating in an IEO? | Some exchanges that have launched IEO platforms have also been found to post fake trading volumes - not exactly trustworthy. |



*Source: Misc.*

# IEOs: Exchanges with IEO platforms & services

| Exchange | IEO Platform | IEOs to date | Exchange Token |
|---|---|---|---|
| Bgogo | Apollo | ARM | BGG |
| Binance | Binance Launchpad | BTT, FET, CELR | BNB |
| Bittrex | Bittrex International IEO | RAID (cancelled) | None |
| BitMax | BitMax Launchpad | DOS | BTMX |
| Bibox | Bibox Orbit | None | BIX |
| Cobinhood | Cobinhood | J Token (cancelled) | COB |
| Coinbene | Coinbene | RedFOX Labs | CONI |
| Exmarkets | Exmarkets Launchpad | SID, Aerum, CoinAnalyst | None |
| Huobi | Huobi Prime | TOP Network | HT |
| KuCoin | KuCoin Spotlight | MTV | KCS |
| OKEx | OK Jumpstart | BLOC | OKB |
| Probit | Probit Launchpad | None | PROB |



*Source: Misc.*

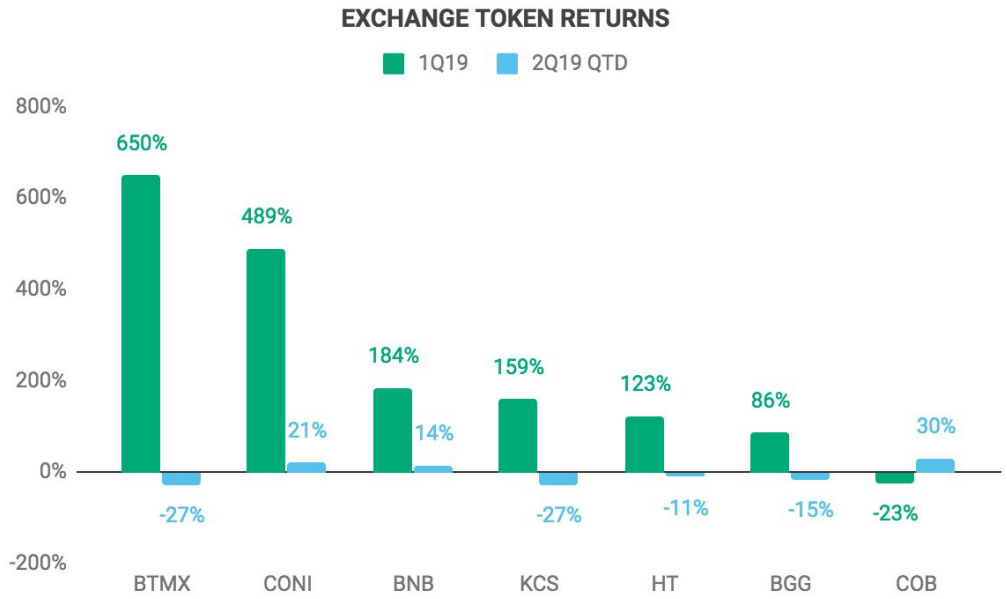
# IEOs: Exchange Token Returns 1Q-2Q19

*As of 4/19*

A key reason exchanges have launched IEO platforms and services is to increase usage and adoption of their native exchange tokens.

Exchanges that have native tokens only accept payment for tokens being issued via IEOs in the native exchange token. Notable examples include Binance, Huobi, and KuCoin.

Further, exchanges have imposed holding period requirements in order to participate. Binance requires participants to hold BNB for a period of 20 days. Huobi requires participants to have an average monthly holding of 500 HOT. Such actions drive up the demand for tokens and, thus, the price of these tokens.






Source: coinmarketcap.com

# Fake exchange volumes

*As of 4/9*

Multiple notable reports were released that explored the legitimacy of reported trading volumes. These research teams concluded that 75-95% of reported volume was artificial and that some of the top crypto exchanges by volume engaged in suspicious practices to attract listing fees and user activity. A key consequence crypto investors face when trading on such exchanges is high slippage -- the difference between the expected price of a trade and the actual price at which the trade is executed. As a result, numerous data providers have started to acknowledge the exchanges that exhibit real trading activity (e.g. **Blockchain Transparency Institute**, Messari Real 10 Volumes, Nomics **Exchange Transparency Ratings**).

## A few examples of suspicious activity

**Global footprint vs. trading volume**

A general comparison of Twitter followers, Google search results, and monthly website visits (as demonstrated by The Tie) can help distinguish legitimate exchanges from those that fake volumes. Reported volumes should reflect overall customer interest.

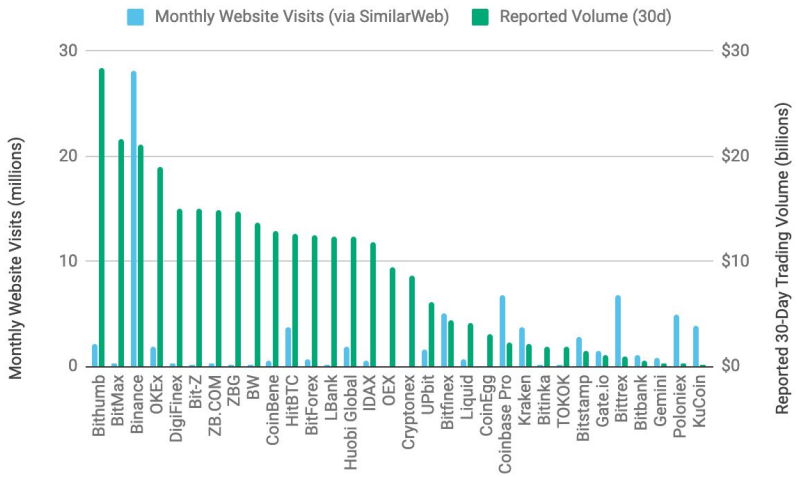
**Trade printing between bid and ask**

Order books exhibit synchronous buying and selling activity (should be random), a lack of small trades or round number offers, and an excessive spread relative to legitimate exchanges.

**Zero or monotonic volume zones**

Large gaps exist in which no trading volume occurs, lasting from a multiple hours to even days, that are not correlated with business hours or exchange up time. Monotonic volume is apparent when an identical volume amount is registered hourly (or daily).

## Website Visits vs. Reported Trading Volumes




*Source: Bitwise SEC presentation, BTI Market Surveillance Report (Apr-2019), thetie.io*

# Fake exchange volumes: Verified exchanges

| Blockchain Transparency Institute | | Bitwise & Messari | | Nomics | |
|---|---|---|---|---|---|
| Gate.io<br>Upbit<br>Liquid<br>Coinbase<br>Kraken<br>Bittrex<br>Poloniex<br>ItBit<br>BitSo | **BTI Verified**<br>BTI launched a “BTI Verified” self regulatory initiative to certify real volumes and provide services to exchanges that would like to enlist BTI to keep their platform clean. | Binance<br>Bitfinex<br>Bitflyer<br>Bitstamp<br>Bittrex<br>Coinbase<br>Gemini<br>itBit<br>Kraken<br>Poloniex | **Real 10 Volumes**<br>Messari’s "Real 10” refers to the ten exchanges that report significant and legitimate trading volumes via their APIs. This is similar to the methodology Bitwise took in its SEC presentation. | **A+**<br>IDEX<br>ZEBITEX<br>WCX<br>Blocktrade<br>**A**<br>Binance<br>Bithumb<br>Bitfinex<br>Coinbase<br>Gate.io<br>Gemini<br>Kraken<br>Ethfinex<br>Poloniex<br>*& 4 more* | **Transparency Score**<br>Following Bitwise SEC report, Nomics introduced Transparency Scores to rate exchanges by their willingness to provide auditable history. “Upstanding exchange operators have every incentive to provide high-granularity data” as this level of transparency attracts users and participants. |



*Source: BTI, Messari, Nomics*

# Network launches: Crypto network launches and upgrades

**January 3rd, 2019**

**Beam mainnet launches**

A privacy coin built on the MimbleWimble protocol. Launched just a year after the project was announced thanks to a VC backed development team.

**February 28th, 2019**

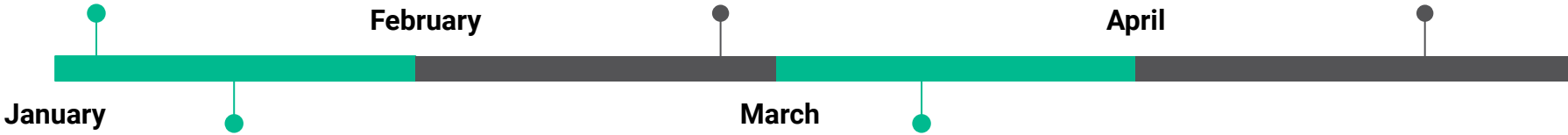
**Ethereum Constantinople & St. Petersburg network upgrades**

Ethereum took one step closer to its final Serenity phase by completing the Constantinople upgrades. St. Petersburg was executed to remove the vulnerabilities found in the first attempt to carry out Constantinople on January 16th.

**April 18th, 2019**

**Binance Chain goes live**

A custom blockchain developed by crypto exchange Binance, built to support a DEX and use its native BNB to pay for network transactions. This new chain leverages some aspects of Tendermint technology and currently uses dBFT as its consensus mechanism.




**January 15th, 2019**

**Grin mainnet launches**

Another privacy coin built on the MimbleWimble protocol. The project was announced in 2016 and took 3 years to launch since development was community driven and funded.

**March 13th, 2019**

**Cosmos mainnet launches**

Cosmos is a blockchain designed to improve interoperability between other blockchains. The project went live after spending 3 years in development.

# Network launches: Crypto network launches and upgrades


**What**
A privacy coin built on the MimbleWimble protocol and developed by a VC backed company with the same name.

**Launch**
The cryptocurrency launched on Jan 3 after spending about a year in development. Beam takes a commercial approach to building a store-of-value privacy coin (deflationary PoW emission model) and is focused on solving problems for business users. It currently runs as a startup but has long-term plans to decentralize operations.


**What**
A MimbleWimble based privacy coin built by community of developers. Continued development is funded by donations.

**Launch**
Grin went live on January 15, over two years since it was first announced. The project is lauded for its Bitcoin-like fair launch -- no premine, ICO, or founders reward. Grin is design to be a medium of exchange (featuring a constant block reward not subject to halvings) and is loosely governed by a technical council that is open to community participation.


**What**
The top dapp development platform took another step towards its final Serenity phase and transitioning to a PoS consensus mechanism.

**Upgrade**
The Constantinople and St. Petersburg hard fork took place on February 28. Constantinople introduced four upgrades, including a block reward reduction from 3 to 2 ETH per block. These updates were supposed to go live on Jan 16, but a vulnerability found last minute delayed the hard fork. St. Petersburg later removed the identified vulnerability.


**What**
A PoS blockchain that is designed to improve interoperability between blockchains. Created and developed by Tendermint, Inc.

**Launch**
The Cosmos network launched on March 13, and with it the Cosmos Hub mainnet, after ~3 years of development. Cosmos Hub is a public PoS blockchain that features a native ATOM token for staking purposes and transaction fees payable in various tokens. The current network leverages the Tendermint Core consensus mechanism.


**What**
A custom blockchain built by Binance to support a DEX (now publicly available) and BNB at its native token.

**Upgrade**
Binance launched its own blockchain on April 18, followed by the public release of its native DEX a week later. Binance Chain will feature BNB as its native token, which will be used to pay for network transactions. The protocol uses dBFT (and PoS) as its consensus mechanism and is currently supported by 11 pre-selected validators.

# Network launches: Crypto network launches and upgrades

| Network | Token | Consensus Mechanism | Circulating Supply | Y2050 Supply % Issued | Current Token Price | Token Price Change Since Event* |
|---|---|---|---|---|---|---|
| Beam | BEAM | PoW | 15,156,240 | 5.8% | $0.59 | +3% |
| Grin | GRIN | PoW | 8,356,800 | 0.86% | $2.71 | -53% |
| Ethereum Constantinople & St. Petersburg | ETH | PoW → PoS | 105,767,619 | 85% | $172 | +27% |
| Cosmos | ATOM | PoS | N/A | N/A | $5.78 | -10% |
| Binance Chain | BNB | dBFT/dPoS | 141,175,490 | 141% | $22.85 | +16% |



*Source: Messari, Coinmarketcap*
**As of 4/22*

# Crypto funding

# 1Q19 Crypto Funding Highlights

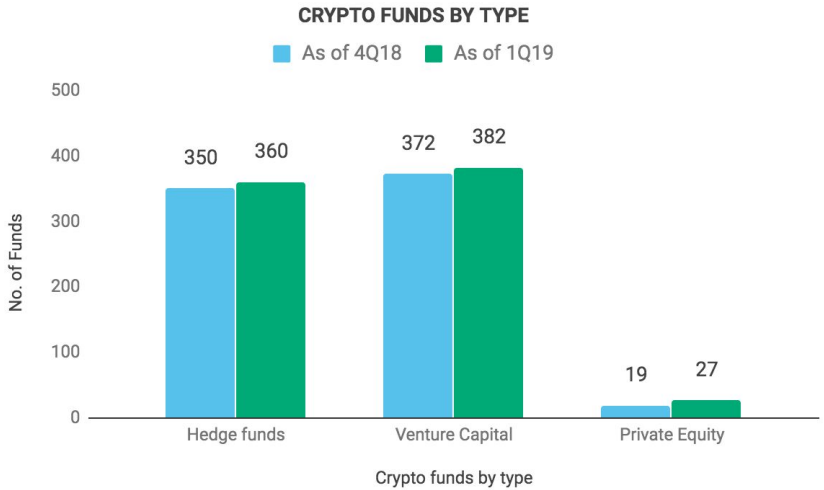
**TOTAL CRYPTO FUNDS:**
**769**
**+4.4% q/q**

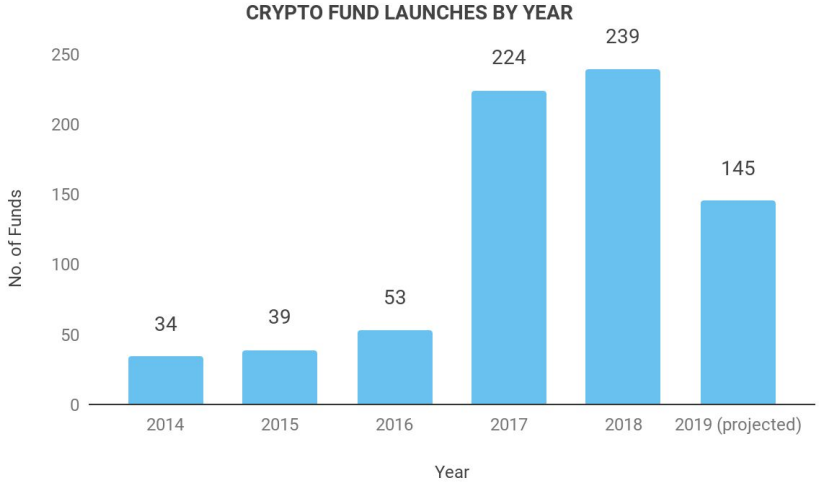
**TOTAL CRYPTO FUND HOLDINGS:**
**$14B+**
**+40% q/q**

**PROJECTED CRYPTO FUND LAUNCHES:**
**145**

**COMBINED INVESTMENT INTO DATA STARTUPS:**
**~$63M**

# Crypto fund launches expected to fall in 2019



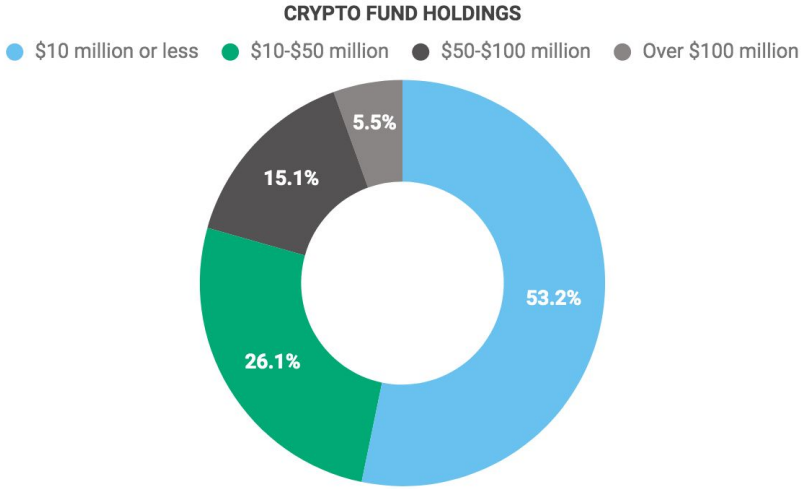



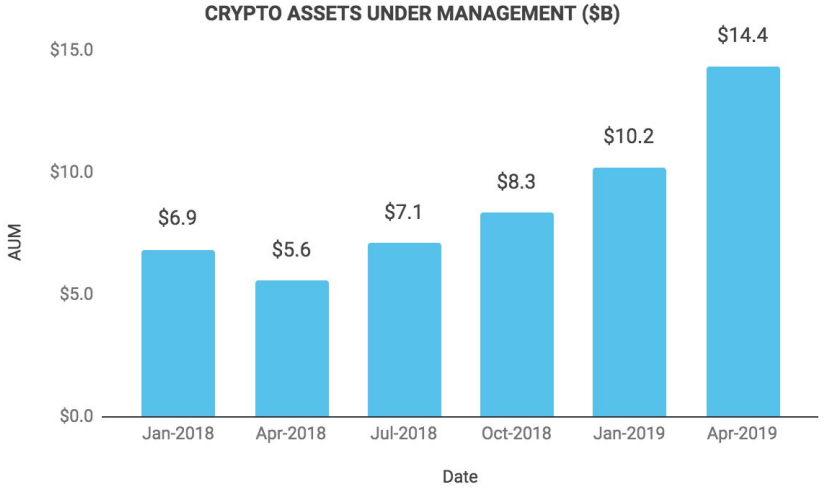

In 1Q19, total crypto funds increased by **3.8% q/q**. There was an increase across all categories, with the number of hedge funds **up 2.9%**, venture capital funds **up 2.7%** and private equity funds **up 42%** (off a small base). On the other hand, Crypto Fund Research projects a lower number of crypto fund launches in 2019 vs. 2018. This could be because many funds were launched out of the desire to take advantage of the 2017-2018 bull run. Prices have since come down by 70-90% across the board. Therefore, the desire to launch funds has likely fallen in tandem as people realize that launching a successful crypto fund will require implementing a more thoughtful strategy.



*Source: cryptofundresearch.com*
*Note: Includes venture capital, hedge funds, and private equity.*

# But crypto holdings are up 40% q/q



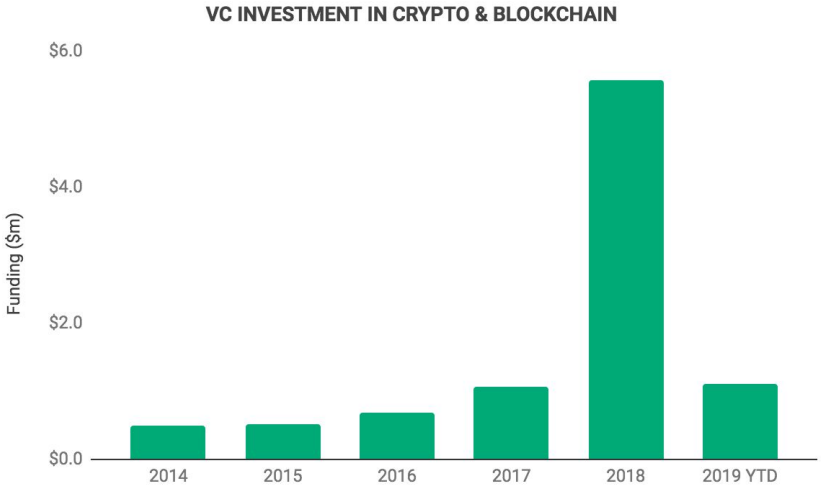



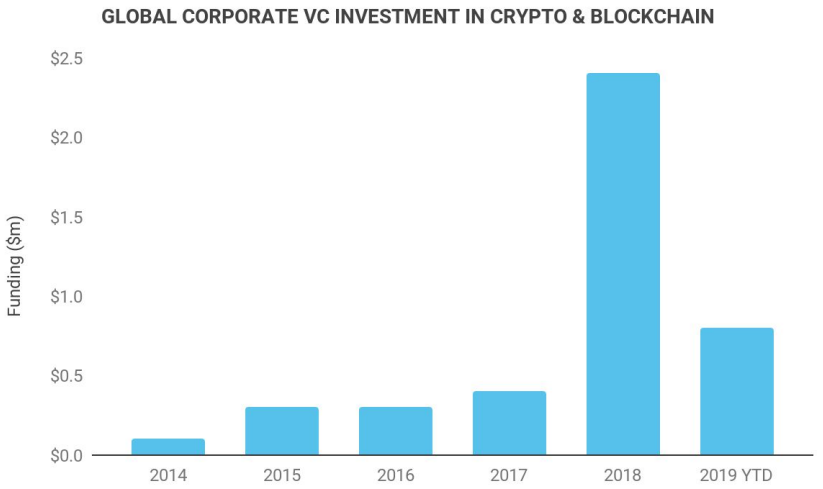

Small crypto funds still dominate the space, with over 50% of funds managing $10 million or less. However, cryptoassets under management increased by over **40% q/q** in 1Q19 vs. the **22% q/q** increase in 4Q18. This is the greatest quarterly rise in assets under management from 1Q18 to date.



*Source: cryptofundresearch.com*
*Note: Includes venture capital, hedge funds, and private equity.*

# Bets by corporate and traditional VCs in crypto soar




Reuters recently **published an article** highlighting traditional and corporate venture capital investment into crypto and blockchain startups. In 2018, traditional VC investment into the space totalled $5.6 billion and corporate VC investment totalled $2.4 billion (across 117 deals), according to Pitchbook data. YTD, traditional and corporate VC investment into the space is $1.2 billion and $0.8 billion (across 13 deals), respectively. Additionally, Reuters reports that the median value of corporate VC deals is $6.5 million YTD vs. $8 million in 2018. We highlight deals from 1Q-2Q19 on the following slides.



*Source: Reuters, Pitchbook*

# Venture investments into crypto companies in 1Q19

| COMPANY | DATE | INVESTORS | DEAL SIZE | DESCRIPTION |
|---|---|---|---|---|
| **Monerium** | Jan-2019 | Crowberry Capital, ConsenSys | $2 million | Blockchain e-money startup |
| **Totle** | Jan-2019 | Led by Arrington XRP | $1 million | Decentralized exchange (DEX) |
| **RealBlocks** | Jan-2019 | Led by Science Inc. | $3.1 million | Tokenized real estate |
| **TRM Labs** | Jan-2019 | Led by Blockchain Capital | $1.7 million | Compliance software |
| **Staked** | Jan-2019 | Led by Pantera, Coinbase, DCG | $4.5 million | Staking services |
| **Veil** | Jan-2019 | Paradigm, Sequoia, 1confirmation | Undisclosed | Prediction markets |
| **Casper Labs** | Jan-2019 | Led by Galaxy | $20 million | Smart contract platform |
| **Symbiont** | Jan-2019 | Led by Nasdaq Ventures | $20 million (Series B) | Enterprise blockchain |
| **Staked** | Jan-2019 | Led by Pantera Capital | $4.5 million | Delegated staking service |
| **The Graph** | Feb-2019 | Led by Multicoin Capital | $2.5 million | On-chain data |
| **Dharma** | Feb-2019 | Led by Green Visor Capital | $7 million | Decentralized lending |
| **Morgan Creek Digital** | Feb-2019 | Two public pensions, university endowment, insurance company, & more. | $40 million | Venture capital fund |
| **Chainalysis** | Feb-2019 | Led by Accel | $30 million (Series B) | Blockchain analytics |
| **Beam** | Feb-2019 | Recruit (Japanese Internet Giant) | Undisclosed | Privacy coin |
| **Coinmetrics** | Feb-2019 | Castle Island Ventures, Highland, Fidelity | $1.9 million | On-chain data |



*Source: Misc.*

# Venture investments into crypto companies in 1Q19

| COMPANY | DATE | INVESTORS | DEAL SIZE | DESCRIPTION |
|---|---|---|---|---|
| **Figure** | Feb-2019 | Led by PM Ventures, DST Global | $65 million | Blockchain-based fintech |
| **Niavura** | Feb-2019 | Led by London Stock Exchange | $20 million | Blockchain startup |
| **CipherTrace** | Feb-2019 | Led by Aspect Ventures, Galaxy | $15 million | Blockchain forensics |
| **Curv** | Feb-2019 | Team 8, DCG | $6.5 million | Crypto key management |
| **Solidus Labs** | Feb 2019 | Hanaco Ventures | $3 million | Crypto trade surveillance |
| **VALR** | Mar-2019 | Led by Bittrex | $1.5 million | South African crypto exchange |
| **StrongBlock** | Mar-2019 | Led by Pangea Blockchain Fund | $4 million | Private blockchain |
| **Commonwealth** | Mar-2019 | 1confirmation, Canaan Partners | $2 million | Governance |
| **Bison Trails** | Mar-2019 | Initialized, Accomplice, Notation | $5.5 million | Staking services |
| **Tagomi** | Mar-2019 | Led by Paradigm, Pantera, Multicoin | $12 million | Crypto brokerage |
| **Tendermint** | Mar-2019 | Led by Paradigm, Bain Capital, 1confirmation | $9 million | Blockchain consensus |
| **Numerai** | Mar-2019 | Led by Paradigm, Placeholder | $11 million (token sale) | AI hedge fund |



*Source: Misc.*

# Venture investments into the data sector increases

| CHAINALYSIS | CIPHERTRACE | NEUTRINO | | COINMETRICS |
|---|---|---|---|---|
| **$30** | **$15** | **$13.5** | **$2.5** | **$1.9** |
| **Million Series B** | **Million Series A** | **Million Acquired by Coinbase** | **Million Seed** | **Million Seed** |

"The customers of [blockchain analytics] companies are governments, legislative bodies, and exchanges that have to comply with KYC regulations. The customers here are well-funded and deep-pocketed entities which, in turn, works in favor of the data analytics companies....Early involvement in the blockchain data analytics space provides a wealth of historical information, like information about ransomware attacks and legal prosecutions, that cannot be easily obtained by new entrants (or, arguably, traditional software incumbents)."

-- Mohamed Fouda

*Source: Underlying data from crunchbase.com, tokendaily.co*
*Note: Mohamed Fouda notes that not all on-blockchain data represents real economic activity. Additionally, exchange data does not include all OTC market volume.*

# Venture Investments into crypto companies in April 2019

| COMPANY | DATE | INVESTORS | DEAL SIZE | DESCRIPTION |
|---|---|---|---|---|
| **SparkSwap** | Apr-2019 | Initialized, Pantera, Foundation Capital | $3.5 million | Decentralized exchange |
| **Cambridge Blockchain** | Apr-2019 | PayPal, Digital Currency Group, HCM Capital | $3.5 million | Data management |
| **Celo** | Apr-2019 | A16z, Polychain | $25 million | Mobile-first crypto payments |
| **GEO Protocol** | Apr-2019 | Led by Coinfund | Undisclosed | Interoperable payments |
| **Liquid** | Apr-2019 | Led by IDG Capital | Undisclosed | Japan based crypto exchange |
| **Lucid Sight** | Apr-2019 | Led by Salem Partners, Galaxy, EOS Fund, DCG | $6 million | Blockchain based gaming |
| **Offchain Labs** | Apr-2019 | Led by Pantera Capital | $3.7 million | Enterprise blockchain |
| **Coda Protocol** | Apr-2019 | Accomplice, Coinbase, Paradigm General Catalyst | $15 million | Public blockchain using ZKPs |
| **Horizen Labs** | Apr-2019 | DCG, Liberty City Ventures | $4 million | Helping businesses create blockchains |
| **Harmony** | Apr-2019 | Consensus, Lemniscap, BCA Fund | $18 million (token sale) | PoS dapp platform |
| **Chainalysis** | Apr-2019 | Mitsubishi UFJ Financial Group (MUFG), Sozo Ventures | $6 million | Blockchain analysis |
| **BOLT Labs** | Apr-2019 | Dekrypt Capital, ZCash Foundation, Xpring | $1.5 million | Payment channels |
| **ZenGo** | Apr-2019 | Benson Oak Ventures, Samsung, Elron | $4 million | Mobile wallet |



*Source: Misc.*

# Crypto market performance

# 1Q-2Q19 Market Performance Highlights

**1Q19 Price % Chg**
**BTC:** +10%
**ETH:** +7%

**2Q19 Price % Chg QTD***
**BTC:** +24%
**ETH:** +16%

**TOP PERFORMERS**
**1Q19:** RVN, ENJ, BNB
**2Q19 QTD*:** BCH, NANO, WAX

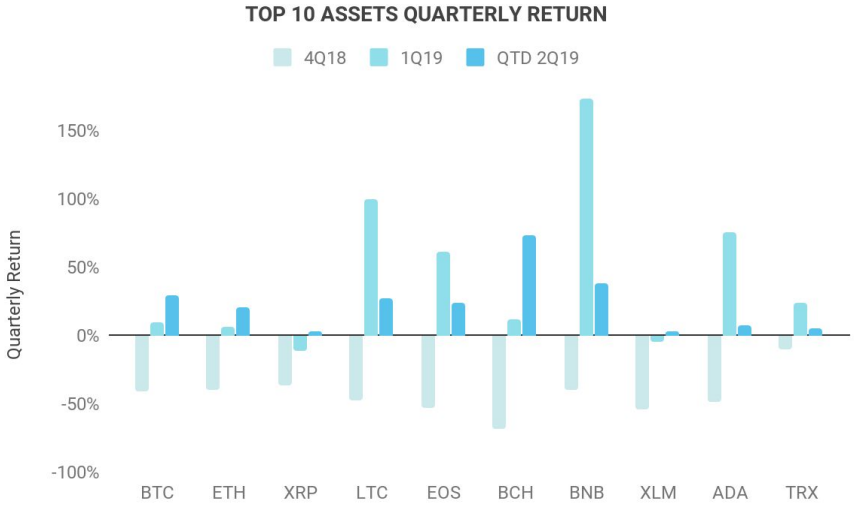
**BOTTOM PERFORMERS**
**1Q19:** DENT, R, ETN
**2Q19 QTD*:** KCS, BSV, HT

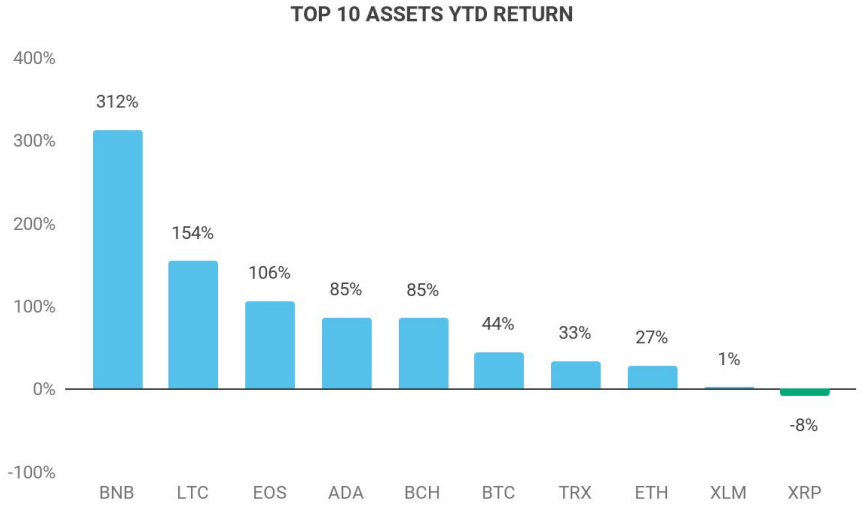


*As of 4/22
Source: Messari

# Price: Top Assets by Market Cap YTD

*As of 4/22*



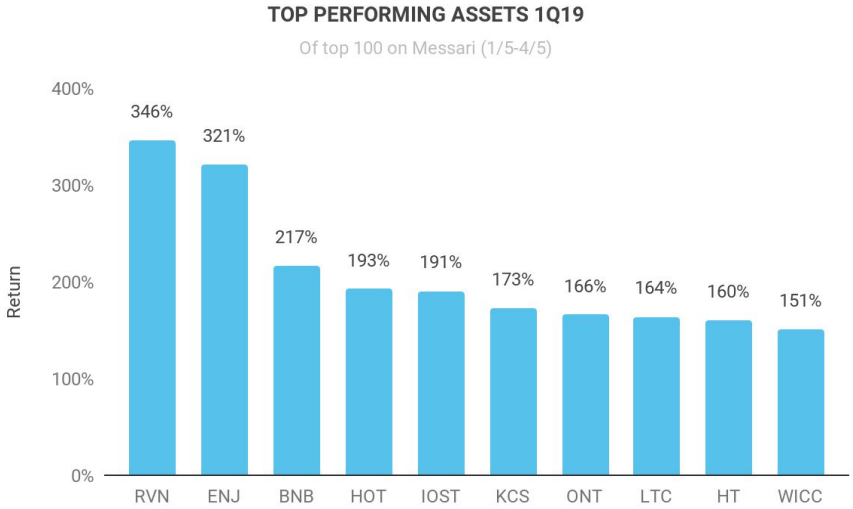

In 4Q18, all top large cap assets were down q/q. On the other hand, 1Q19 and 2Q19 QTD display more bullish trends and recovery from year end 2018 lows. Notably, nine of the top ten large cap assets are trading up YTD.

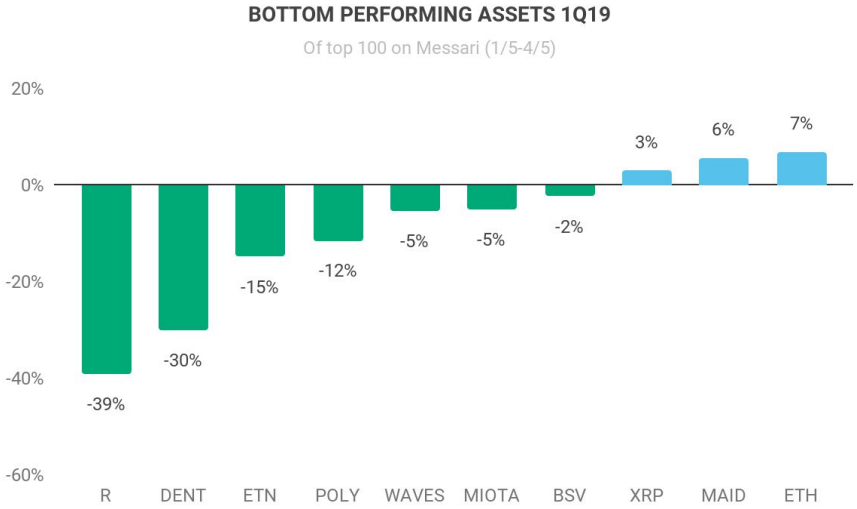


Source: Messari.io

# Price: Top & bottom performing assets of top 100 by market cap

*As of 1Q19*

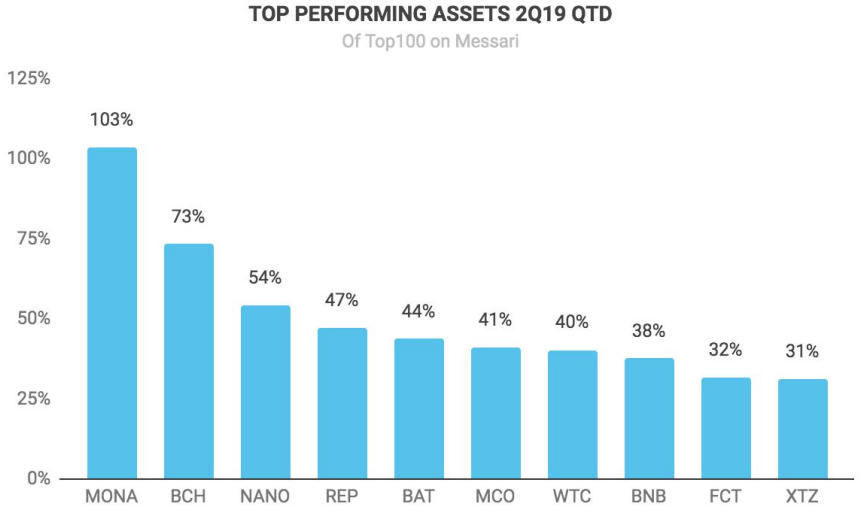


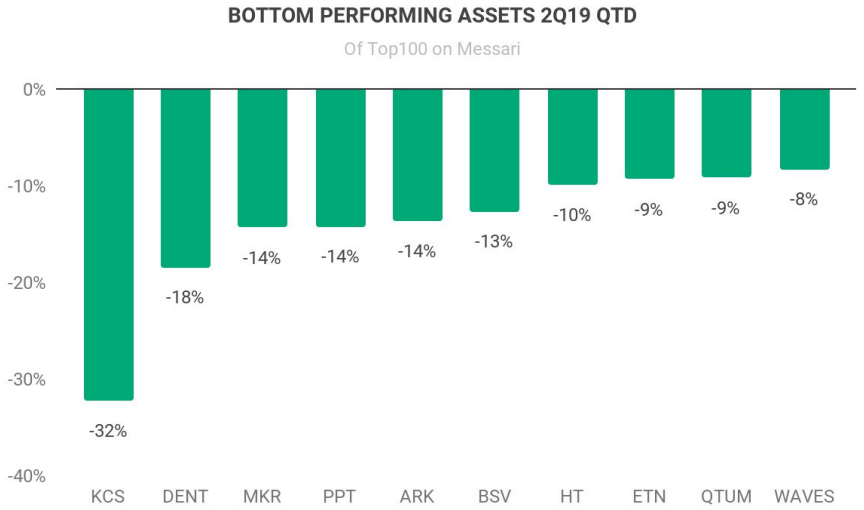




The price of many top performing assets in 1Q19 was driven by fundamental events and announcements. For example, of the ten best performing assets in 1Q19, three were exchange tokens - BNB (BinanceCoin), KCS (Kucoin Shares), and HT (Huobi Token). A key reason for this trend is the rise of initial exchange offerings (IEOs). IEOs require participants to use the exchange's native token as payment in the offering and even hold the token for a period of time to qualify for participation. Strength in the price of ENJ (Enjin), another top performer, was driven by the announcement that Samsung will include the gaming application in the new Galaxy S10 phone. RVN, the top performer in 1Q19, is backed by **Overstock**.

# Price: Top & bottom performing assets of top 100 by market cap

*2Q19 QTD (as of 4/22)*




Performance in 2Q19 QTD has also been driven by notable news and events. Augur (REP) announced v2 of the application on 4/7 to address challenges in v1, including the ability to denominate markets in a stablecoin, DAI. Coinbase Custody announced Tezos (XTZ) baking for institutional clients at the end of March, followed by news that Binance will do the same. Binance announced on 4/18 that it successfully deployed the genesis block of Binance Chain and plans to launch its mainnet on 4/23. At the beginning of April, Brave announced Brave beta where users can view ads to receive BAT tokens. Brave also recently announced Brave Rewards for Android users. In terms of worst performing assets, a key call out is BSV, which was delisted from key exchanges (Binance, Kraken, Shapeshift).



Source: Messari.io

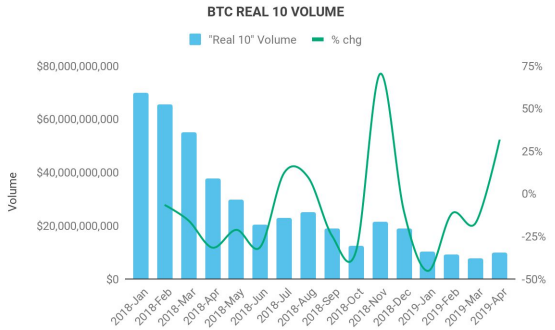
# Market Cap and Volume

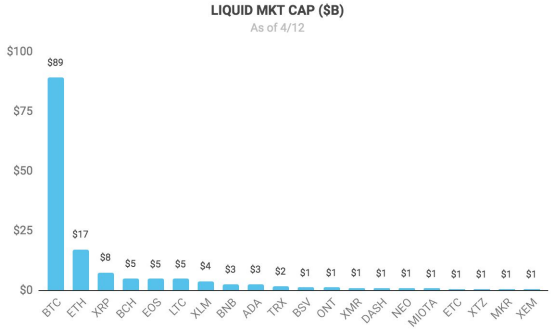
*Custom data provided by Messari (as of 4/15)*

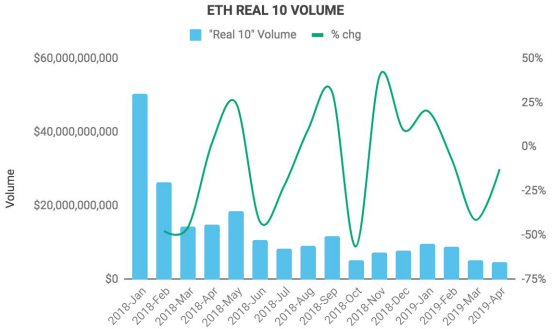
There has been increasing focus on providing accurate market data, specifically alternatives to misleading market cap and volume metrics.

Liquid cap is calculated as Messari's liquid supply metric by its volume weighted average price. Liquid supply is meant to **standardize the definition of "supply"** across different cryptoassets. Liquid supply is supply that is visible on-chain and is not known to have contractual or programmatic restrictions.

Real 10 volume **refers to** the sum of trading volume on exchanges that Messari deems to have legitimate volume. It serves as a proxy for total exchange volume, which can be misleading as it often includes volume driven by wash trading. It does not currently include *all* legitimate volume, including from exchanges that are known to have wash trading but do have some portion of legitimate volume.

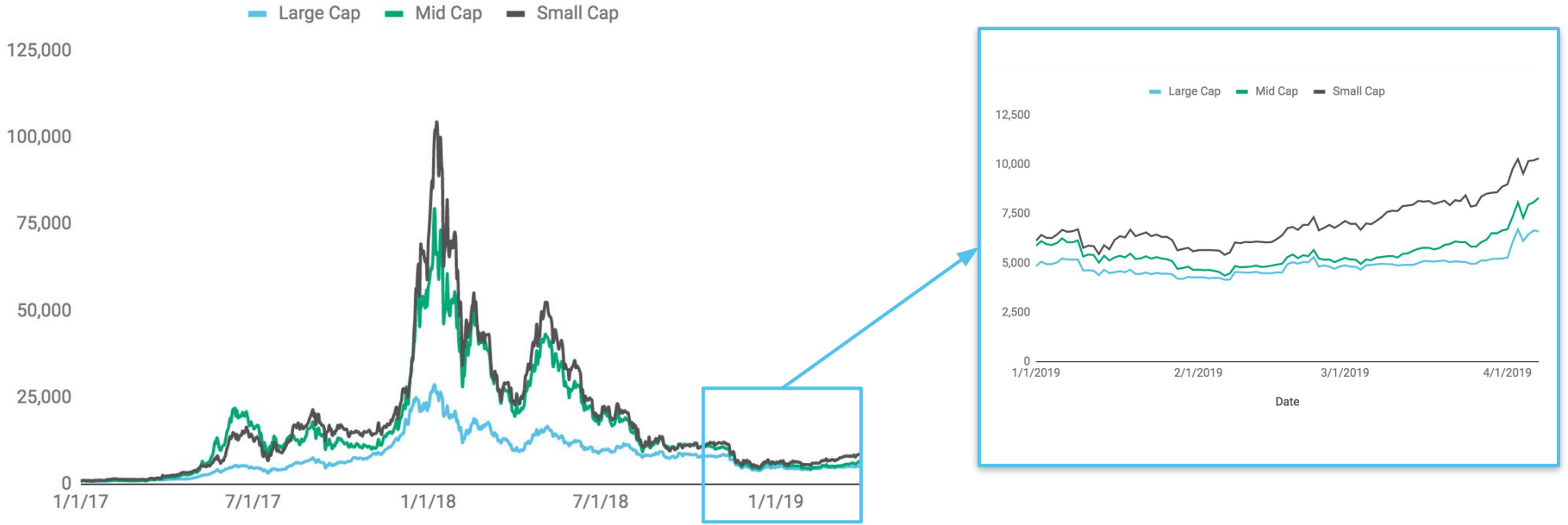






Source: Messari.io

# Bitwise Indices Performance




The charts here show the performance of the Bitwise 10 Large Cap, Bitwise 20 Mid Cap, and Bitwise 70 Small Cap indices over time. In 1Q19, the performance between the Large Cap index relative to the Small and Mid Cap index has converged, with volatility in the overall market down across the board in 1Q19.



Source: Bitwise Investments

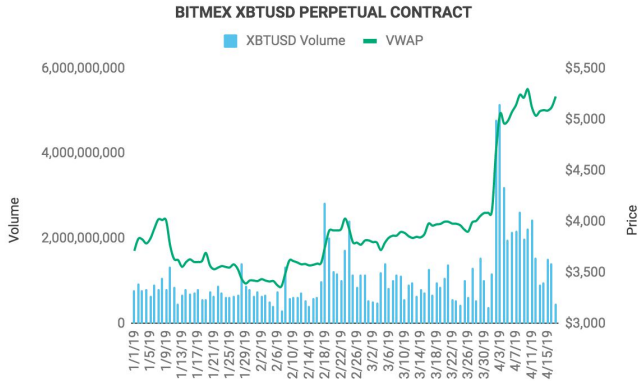
# Derivatives volume

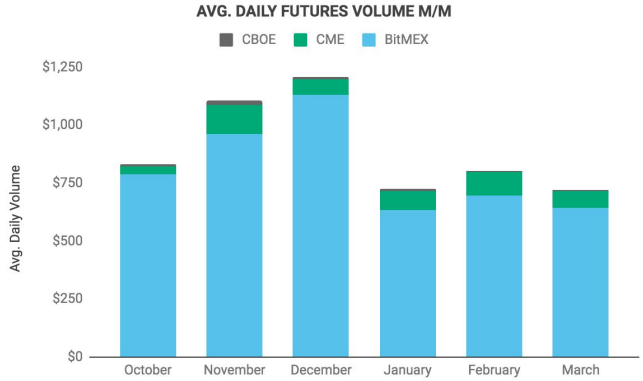
*Custom data provided by Kaiko*

Average daily Bitcoin (BTC) futures volumes were down in 1Q19 relative to 4Q18. In 1Q19, the average daily bitcoin (BTC) derivatives volume peaked in February across all three exchanges displayed here.

According to custom data provided by **Kaiko**, the 1Q19 average daily volume (ADV) of BitMEX's XBTUSD perpetual futures was $890M. In 2Q19 QTD, the ADV is $2.2B. Total XBTUSD volume was ~$80B in 1Q19 and ~$37B in 2Q19 QTD.

Bitcoin futures offered by CME still dominate regulated bitcoin product volumes, though ADV declined 29% in March 2019. CBOE **announced** that it would not be adding a futures contract from March onwards. One reason could be that monthly trading of CME's XBT futures **has dwarfed** trading of CBOE's futures.




*Source: Custom data by Kaiko. CryptoCompare Exchange Reports.*
*Note: BitMEX Avg. daily futures volume refers to its XBTUSD perpetual contract.*

# Price association between top assets by market cap was high in 1Q19

*90-day digital asset correlations (as of 1Q19)*

**BTC strong positive correlation with its clones and ETH**

Bitcoin appears to heavily influence the price direction of other top assets like ETH and XRP, as well as Bitcoin forks BCH and BSV and clones LTC and XMR.

**BNB and TRX exhibit noticeably lower correlations**

The price of BNB is tied to the performance of Binance, which launched its DEX testnet and sparked the Initial Exchange Offering (IEO) movement earlier this year. In February, Tron raised $7.1m via its BitTorrent ICO that required either TRX or BNB to participate.

**No relationship with gold or large-cap U.S. equities**

Bitcoin is often referred to as digital gold, but it has shown little-to-no recent correlation with its physical counterpart. Similarly, cryptoassets as a whole don't appear to be associated with U.S equities, suggesting this new asset class could be seen as a hedge against traditional markets.

| | BTC | ETH | XRP | EOS | LTC | BCH | BNB | XLM | ADA | TRX | BSV | XMR | DASH | NEO | ZEC | ZRX | S&P | GLD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BTC | 1 | 0.92 | 0.87 | 0.84 | 0.82 | 0.83 | 0.5 | 0.7 | 0.87 | 0.59 | 0.75 | 0.81 | 0.76 | 0.82 | 0.83 | 0.73 | 0.05 | 0.12 |
| ETH | 0.92 | 1 | 0.83 | 0.84 | 0.85 | 0.85 | 0.46 | 0.65 | 0.86 | 0.61 | 0.78 | 0.76 | 0.75 | 0.82 | 0.78 | 0.73 | 0.08 | 0.13 |
| XRP | 0.87 | 0.83 | 1 | 0.74 | 0.74 | 0.78 | 0.41 | 0.73 | 0.82 | 0.58 | 0.72 | 0.76 | 0.76 | 0.79 | 0.73 | 0.68 | 0.03 | 0.12 |
| EOS | 0.84 | 0.84 | 0.74 | 1 | 0.81 | 0.78 | 0.48 | 0.62 | 0.79 | 0.59 | 0.68 | 0.75 | 0.72 | 0.76 | 0.76 | 0.65 | 0.1 | 0.09 |
| LTC | 0.82 | 0.85 | 0.74 | 0.81 | 1 | 0.8 | 0.58 | 0.55 | 0.75 | 0.59 | 0.72 | 0.69 | 0.65 | 0.78 | 0.71 | 0.64 | 0.04 | 0.04 |
| BCH | 0.83 | 0.85 | 0.78 | 0.78 | 0.8 | 1 | 0.4 | 0.69 | 0.78 | 0.58 | 0.81 | 0.67 | 0.61 | 0.75 | 0.73 | 0.68 | 0 | 0.01 |
| BNB | 0.5 | 0.46 | 0.41 | 0.48 | 0.58 | 0.4 | 1 | 0.3 | 0.41 | 0.31 | 0.32 | 0.47 | 0.46 | 0.51 | 0.41 | 0.37 | -0.02 | -0.08 |
| XLM | 0.7 | 0.65 | 0.73 | 0.62 | 0.55 | 0.69 | 0.3 | 1 | 0.69 | 0.52 | 0.62 | 0.61 | 0.59 | 0.64 | 0.55 | 0.61 | 0.12 | 0.08 |
| ADA | 0.87 | 0.86 | 0.82 | 0.79 | 0.75 | 0.78 | 0.41 | 0.69 | 1 | 0.63 | 0.72 | 0.69 | 0.73 | 0.82 | 0.75 | 0.68 | 0.13 | 0.16 |
| TRX | 0.59 | 0.61 | 0.58 | 0.59 | 0.59 | 0.58 | 0.31 | 0.52 | 0.63 | 1 | 0.54 | 0.54 | 0.49 | 0.63 | 0.51 | 0.5 | 0.15 | 0.09 |
| BSV | 0.75 | 0.78 | 0.72 | 0.68 | 0.72 | 0.81 | 0.32 | 0.62 | 0.72 | 0.54 | 1 | 0.65 | 0.64 | 0.68 | 0.68 | 0.64 | -0.03 | 0.05 |
| XMR | 0.81 | 0.76 | 0.76 | 0.75 | 0.69 | 0.67 | 0.47 | 0.61 | 0.69 | 0.54 | 0.65 | 1 | 0.68 | 0.73 | 0.71 | 0.65 | -0.08 | 0.15 |
| DASH | 0.76 | 0.75 | 0.76 | 0.72 | 0.65 | 0.61 | 0.46 | 0.59 | 0.73 | 0.49 | 0.64 | 0.68 | 1 | 0.72 | 0.8 | 0.64 | 0.19 | 0.19 |
| NEO | 0.82 | 0.82 | 0.79 | 0.76 | 0.78 | 0.75 | 0.51 | 0.64 | 0.82 | 0.63 | 0.68 | 0.73 | 0.72 | 1 | 0.76 | 0.61 | 0.11 | 0.08 |
| ZEC | 0.83 | 0.78 | 0.73 | 0.76 | 0.71 | 0.73 | 0.41 | 0.55 | 0.75 | 0.51 | 0.68 | 0.71 | 0.8 | 0.76 | 1 | 0.7 | 0.15 | 0.11 |
| ZRX | 0.73 | 0.73 | 0.68 | 0.65 | 0.64 | 0.68 | 0.37 | 0.61 | 0.68 | 0.5 | 0.64 | 0.65 | 0.64 | 0.61 | 0.7 | 1 | 0.09 | 0.09 |
| S&P | 0.05 | 0.08 | 0.03 | 0.1 | 0.04 | 0 | -0.02 | 0.12 | 0.13 | 0.15 | -0.03 | -0.08 | 0.19 | 0.11 | 0.15 | 0.09 | 1 | 0.12 |
| GLD | 0.12 | 0.13 | 0.12 | 0.09 | 0.04 | 0.01 | -0.08 | 0.08 | 0.16 | 0.09 | 0.05 | 0.15 | 0.19 | 0.08 | 0.11 | 0.09 | 0.12 | 1 |

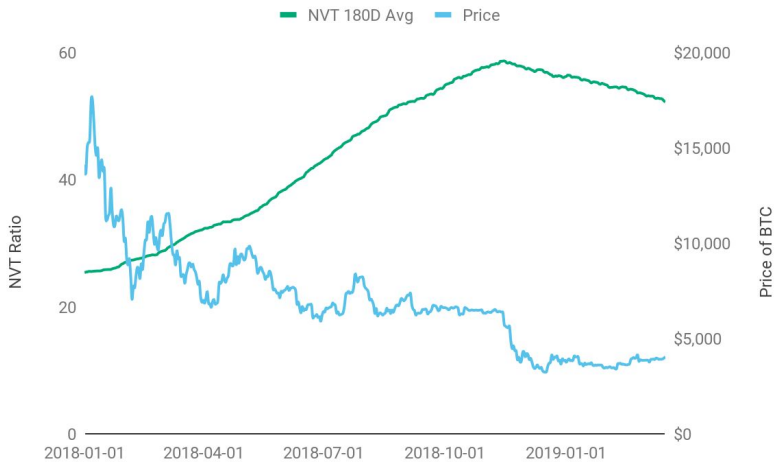


Source: Coinmetrics.io

# NVT ratios trend downwards despite stagnant network values

*As of 1Q19*

## Bitcoin




## Ethereum


The Network Value-to-Transactions Ratio (NVT) considers both the value and the utility of the asset or network. Therefore, this metric is used to determine whether a cryptoasset is overbought (high NVT ratio; high price speculation) or oversold (low NVT ratio; high demand as a utility) at a given time. Both Bitcoin and Ethereum have seen their NVT metrics trend **downwards** despite stagnant network values, suggesting the demand for network utility has increased.



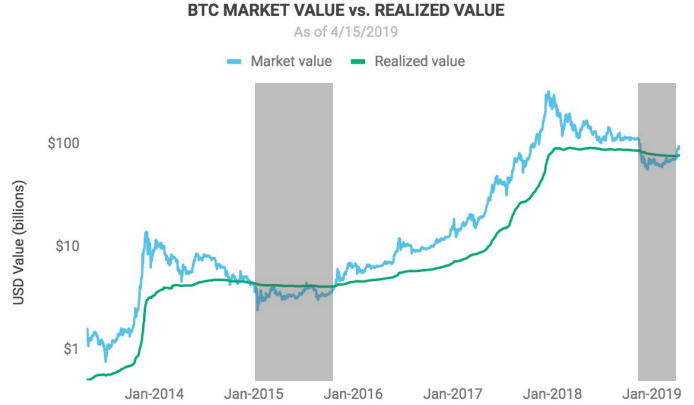
*Source: Coinmetrics.io*

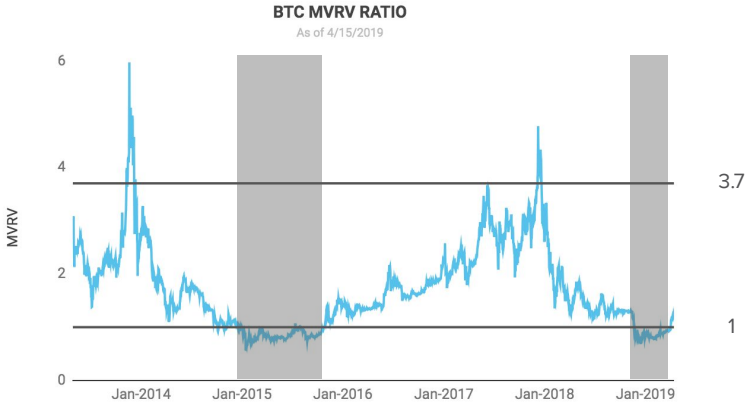
*Note: Coinmetrics highlights that UTXO networks like Bitcoin can batch multiple transactions into one. Just counting transactions for UTXO chains might not yield a reliable estimate of actual count.*

# MVRV *As of 4/15*

## Market Value-to-Realized Value (MVRV) Ratio

While **market value, MV,** (or cap) represents the latest price multiplied by the number of units outstanding, **realized value, RV,** refers to the aggregated market price of all BTC UTXOs (or those of a UTXO based coin) when last moved. Realized cap effectively adjusts for lost or unclaimed coins in total value calculations and coins users are hodling. The MVRV *ratio* may be used to determine a more accurate value for UTXO coins outside of current investor psychology.




## MVRV Thresholds

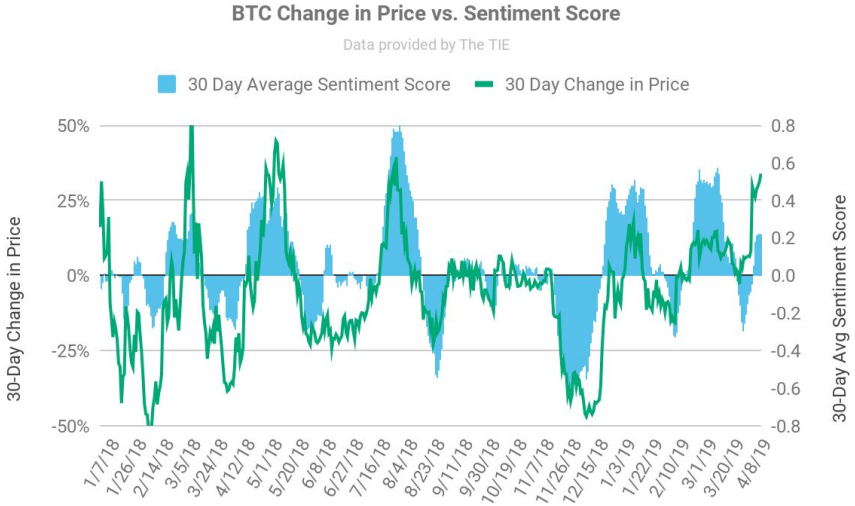
As discovered by Murad Mahmudov and David Puell, BTC MVRV measurements exhibit two historical thresholds: a ratio above 3.7 suggests overvaluation or periods of excessive exuberance, and a ratio below 1 denotes undervaluation.

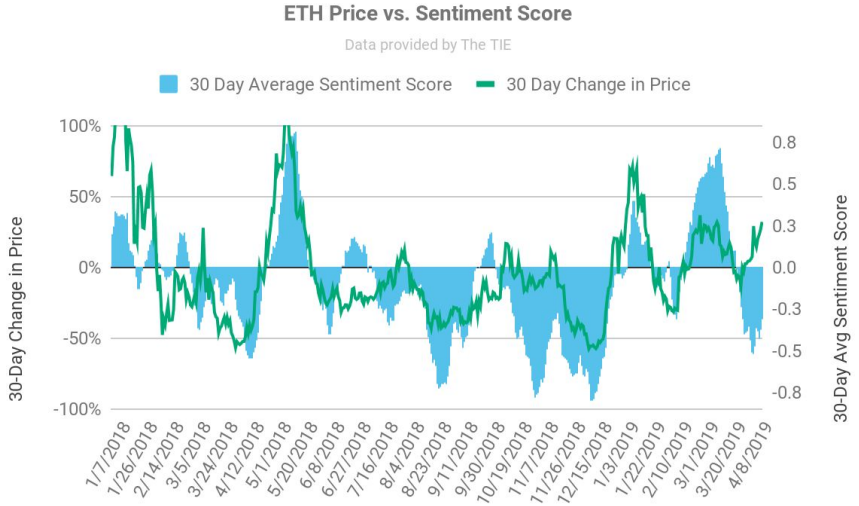
**BTC's MVRV remained below 1 through 1Q19. The ratio then quickly ascended above 1 on 4/2, when bitcoin's price topped $5000 for the first time in five months, and currently sits at a value of 1.2.**

*Source: Bitcoin Market-Value-to-Realized-Value Ratio, Underlying data from coinmetrics.io*
*Note: Murad Mahmudov and David Puell said established thresholds may be unreliable over time and that MVRV provides only a long-term market perspective. The sample size used to derive these suggestions is only 2. Therefore, not enough evidence is present to draw concrete conclusions.*

# Sentiment Data: Price vs. Sentiment Score

*Custom data provided by The TIE (as of 4/8)*




Market sentiment, as explained by The TIE, is “a quantified representation of investor intentions expressed on Twitter” void of noise generated by spam accounts. Sentiment has appeared to be a leading indicator for most BTC and ETH price movements, although average sentiment scores tend to exhibit a slightly stronger correlation with BTC price fluctuations than ETH (r=0.71 vs. r=0.64).

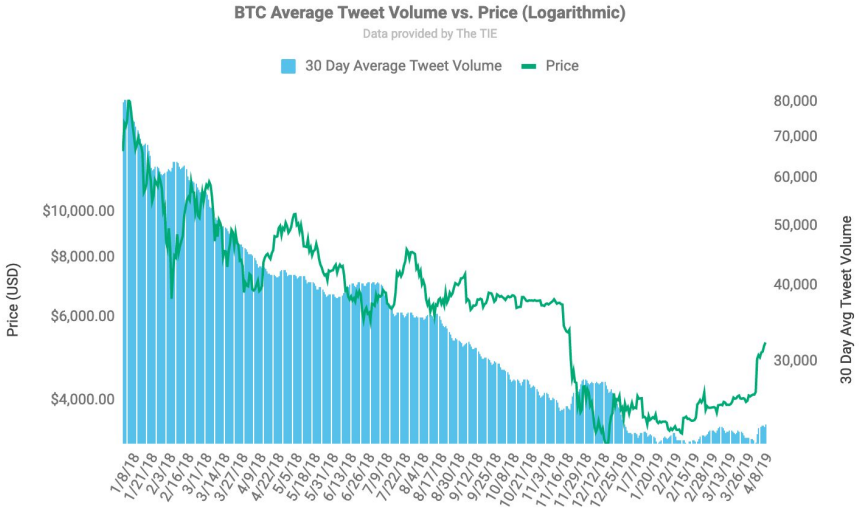
4Q18 showed an increasingly negative sentiment across the market, which was accompanied by a steep drop in prices. The start of of 2019 marked a shift towards a more positive sentiment trend, and asset prices have recovered accordingly. The recent surge in BTC has helped its average sentiment score trend higher, giving BTC a comparatively more optimistic near-term outlook.

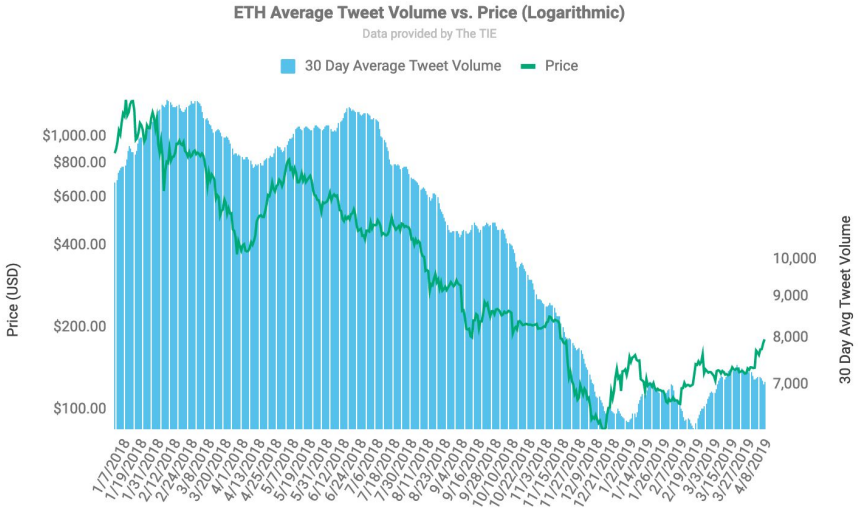


*Source: thetie.io*
*Read about methodology here.*

# Sentiment Data: Tweet Volume vs. Price

*Custom data provided by The TIE (as of 4/8)*




Tweet volumes indicate how much overall investor interest there may be surrounding a specific asset. Both BTC and ETH prices exhibit a strong correlation with their respective 30 day average tweet volumes (r=0.91 and r-=0.82). Twitter activity involving either cryptocurrency declined alongside prices throughout 2018 but saw a modest increase in 1Q19 as BTC and ETH prices have started to recover.

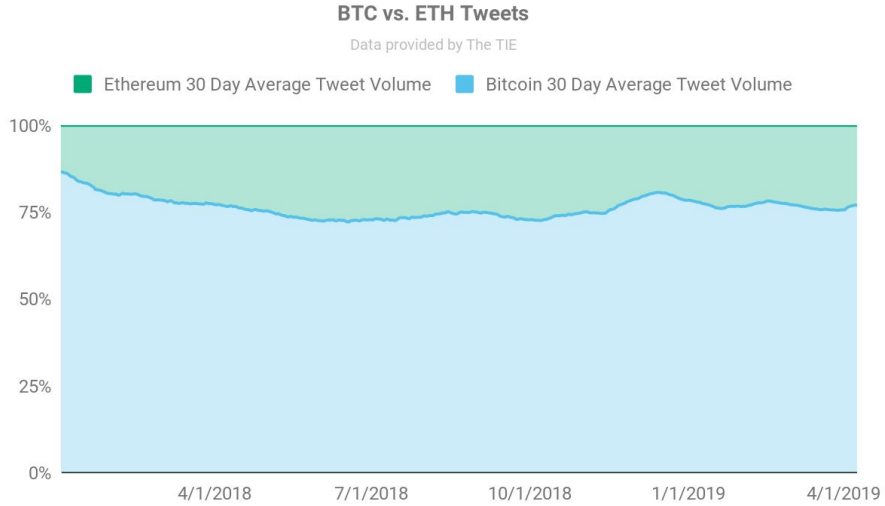
*Caveat: Tweet volume metrics only represent the quantity of Twitter activity about a cryptocurrency and do not give an indication as to whether the conversations are either positive or negative.*

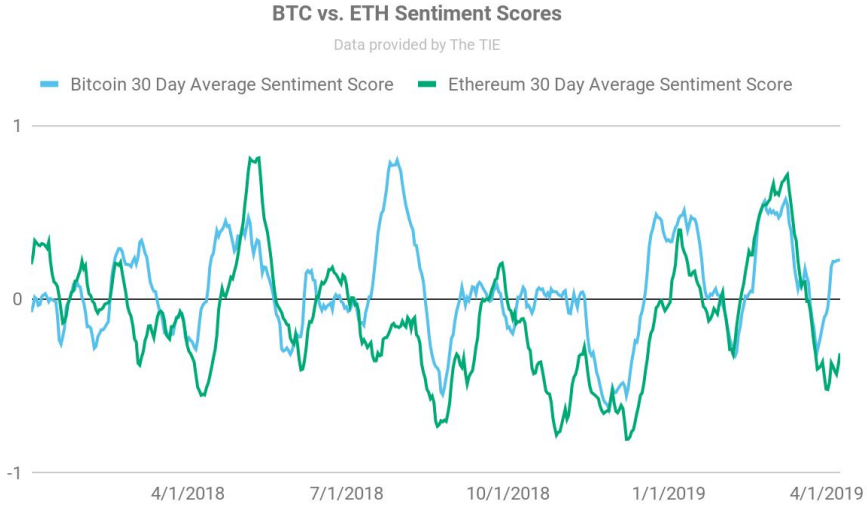


Source: thetie.io

# Sentiment Data: BTC vs. ETH

*Custom data provided by The TIE (as of 4/8)*




BTC has continued to gain a greater overall share of twitter volume in 1Q19. This may be due to the general decline in ICO sentiment (most token sales from 2017-2018 were held on Ethereum) or the increase in Bitcoin developments, such as the growth of the Lightning Network. This trend is interesting given the recent rise and early success of Open finance projects built on Ethereum.

In terms of sentiment, BTC and ETH have exhibited only a moderate correlation (r=0.55) since the start of 2018, though this measurement has increased slightly as of late. Price correlation, however, has remained strong (r=0.92) over the same period of time. This suggests the price of BTC has a greater impact on ETH compared to market sentiment. Moreover, BTC sentiment often leads that of ETH's, offering more evidence that BTC heavily influences the rest of the market.



Source: thetie.io

# Crypto network activity

# 1Q19 Network Activity Highlights

**ON-CHAIN TX VOLUME**
BTC: $106B
ETH: $24B

**CHANGE IN HASHRATE**
BTC: +28%
ETH: -17%

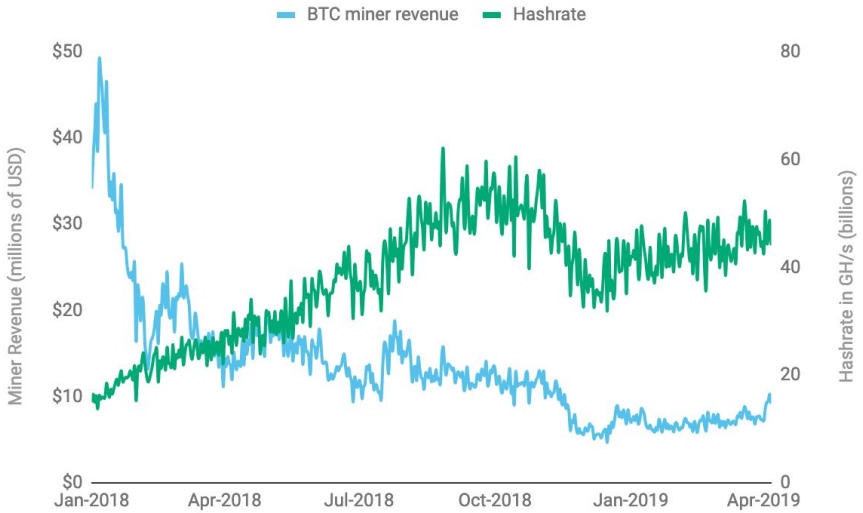
**AVG FEE PER TRANSACTION**
BTC: $0.40
ETH: $0.11

**LIGHTNING NETWORK GROWTH**
LN Capacity (BTC): +99% q/q in 1Q19
LN Channels: +120% q/q in 1Q19

# Hashrates remain strong despite comparatively low miner revenues

*As of 4/7*

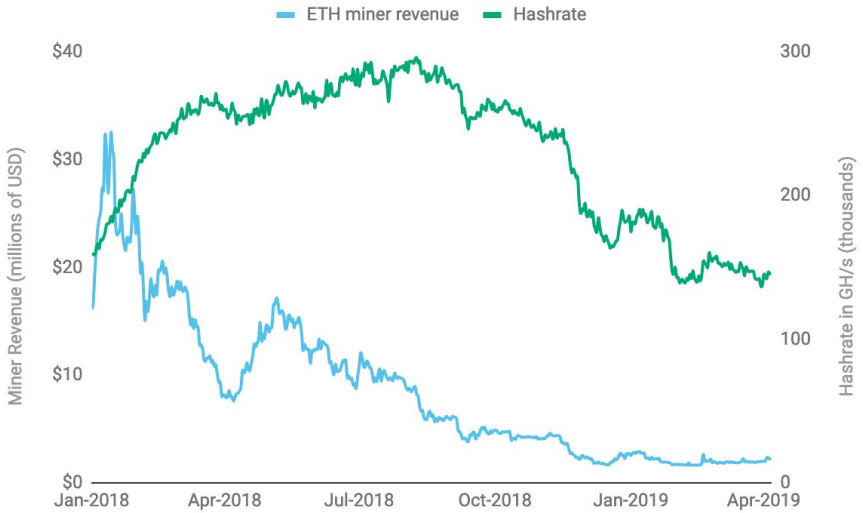
## Bitcoin




**+28%**

Change in hashrate since Dec 2018 lows

## Ethereum




**-17%**

Change in hashrate YTD due to block reward reduction

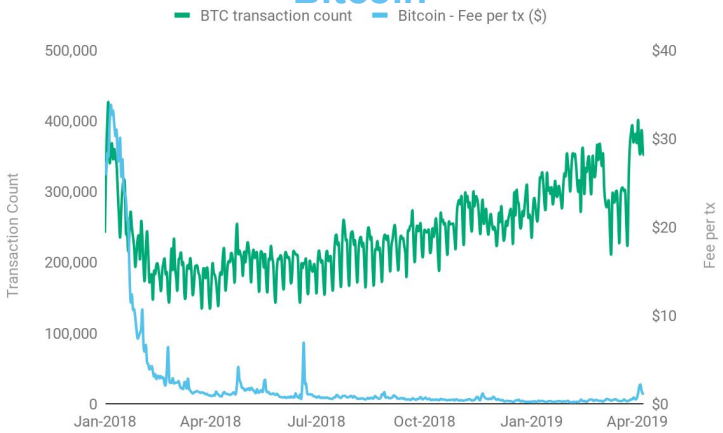


Source: Coinmetrics.io

# Transaction fees stay low even as transaction count trends upward

*As of 4/7*

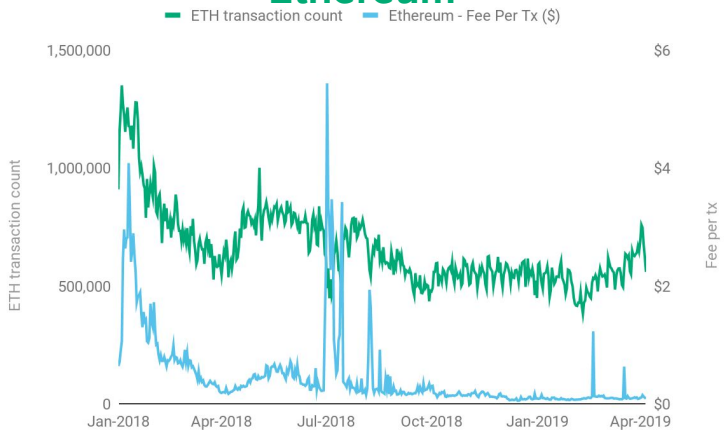
## Bitcoin




**-11%**
Change in average transaction fee q/q

**-86%**
Change in average transaction fee y/y (YTD)

## Ethereum




**-18%**
Change in average transaction fee q/q

**-80%**
Change in average transaction fee y/y (YTD)

*Caveat: Coinmetrics **highlights** that UTXO networks like Bitcoin can batch multiple transactions into one. Just counting transactions for UTXO chains might not yield a reliable estimate of actual count. Further, comparing transaction count on a chain where users employ batching to a chain where users don't could yield inaccurate conclusions. Transaction count can be easily gamed on low fee chains, making it difficult to compare the metric across different chains.*

# Daily adjusted transaction volume flattens along with asset price

*As of 4/7*

## Bitcoin


**-26%**

Change in adj. transaction volume q/q

**-54%**

Change in adj. transaction volume y/y (YTD)

## Ethereum


**-27%**

Change in adj. transaction volume q/q

**-85%**

Change in adj. transaction volume y/y (YTD)

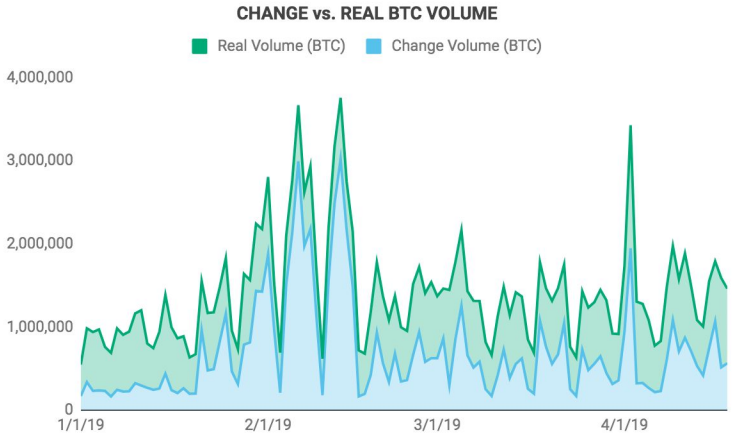
*Caveat: Transaction volumes can be **misstated** due to the existence of mixers, self-churn, privacy enhancements, spam, and change outputs (in UTXO chains). Coinmetrics provides an adjusted transaction volume metric for BTC, ETH, and other coins to isolate and make it easier to compare economically important transactions. However, adjusted transaction volume can be inflated by, for example, large holders repeatedly cycling their coins around wallets they own.*

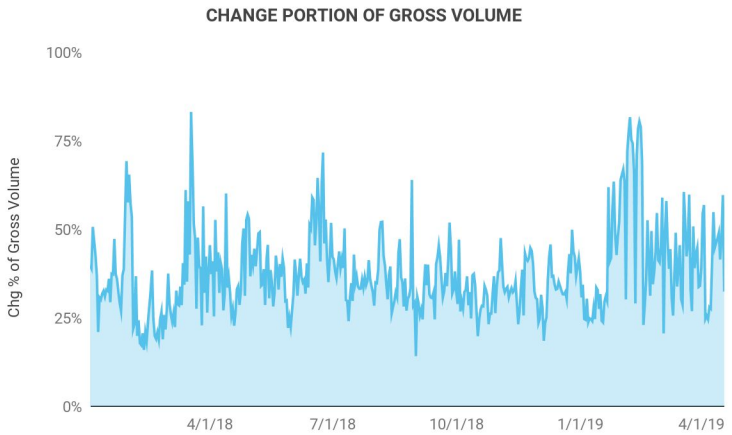


Source: Coinmetrics.io

# Change volume made up over 40% of gross BTC transaction volume YTD, on average

*Custom data provided by TokenAnalyst.io (as of 4/18)*



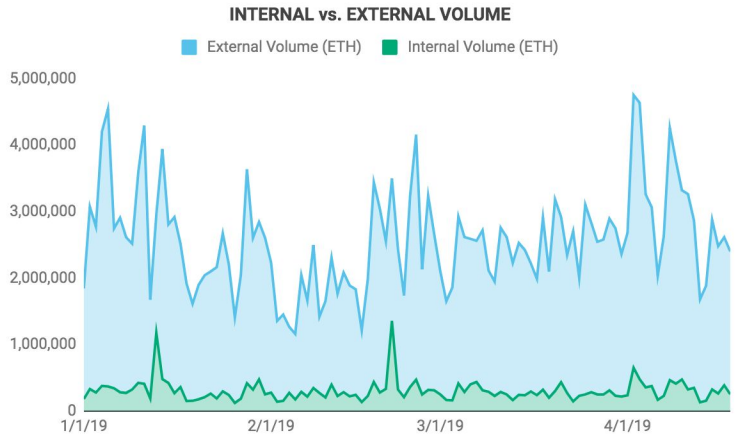

**TokenAnalyst** recently rolled out data highlighting real vs. change on-chain volume on Bitcoin. According to their historical data, on average, change volume comprised 34% of gross volume in 2018. In 2019 (YTD), average change volume has comprised 41% of gross volume. This reinforces the idea that taking raw transaction volume at face value on UTXO-based chains can be misleading.

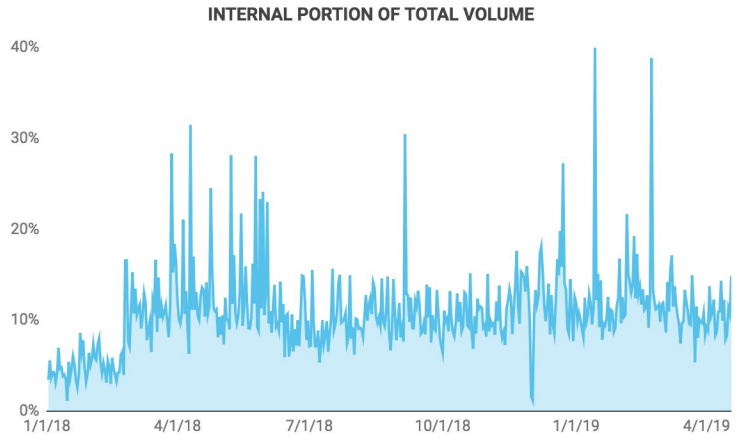


Source: TokenAnalyst.io

# Internal volume made up over 10% of gross on-chain ETH volume YTD, on average

*Custom data provided by TokenAnalyst.io (as of 4/18)*

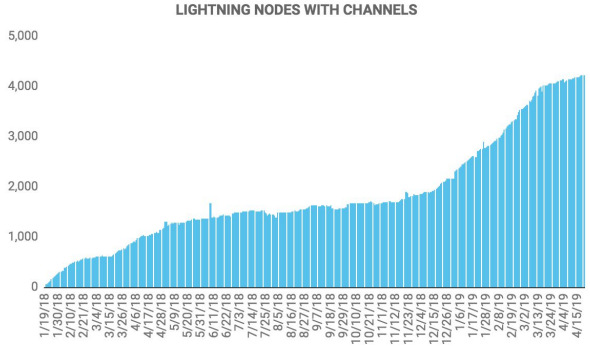


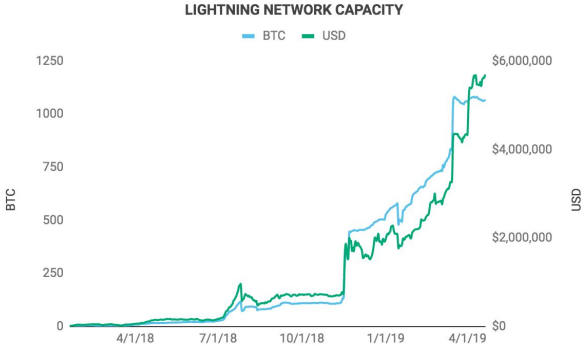



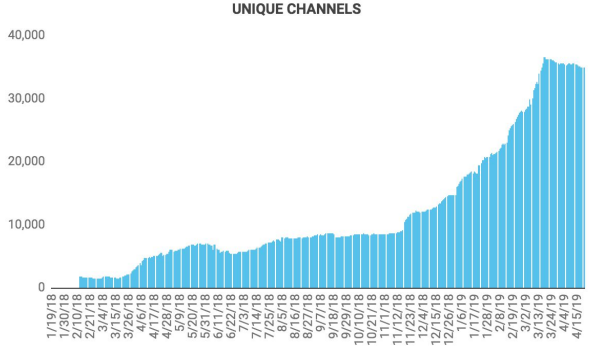

Similarly, internal volume on ETH comprised 10% of gross volume in 2018, on average. In 2019 (YTD), average internal volume has comprised 11% of gross volume. Internal volume refers to smart contract initiated transactions vs human initiated. Often times, they can be smart contract to smart contract transactions.

# Bitcoin Lightning Network continues to see significant growth

*As of 4/22*




**+78%**
Chg. in Nodes with Channels in 1Q19 q/q

**+383%**
Chg. in Nodes with Channels in 1Q19 y/y

**+99%**
Chg. in LN BTC Capacity 1Q19 q/q

**+123x**
Inc. in LN BTC Capacity 1Q19 y/y

**+120%**
Chg. in Unique Channels q/q

**+12x**
Inc. in Unique Channels y/y

The key benefit of the Lightning Network is that it facilitates instant micropayments for negligible cost. In order to interact with the network, users are advised to operate a lightning node, but certain wallets act as “hub operators” and allow users to plug into their hub without going through the process of setting up a local lightning or bitcoin node.



*Source: bitcoinvisuals.com*

*Note: Elizabeth Stark has mentioned that the number of lightning nodes will become increasingly harder to measure as nodes/channels will be unadvertised by default for privacy preserving purposes.*

# Lightning Network developments 1Q19

## Direct Lightning node payments have never been easier

**Casa extension.** Launched in Feb 2019, this browser extension enables users to control their Casa Node and reduces the friction of transacting via the lightning network.

**Lightning Joule.** An open source browser extension that connects a Lightning node to a browser to facilitate lightning network payments. It was created by Will O'Beirne and launched in Nov 2018.

Joule and Casa may have been some of the catalysts behind the staggering Lightning Network growth over the last 5 months.

## Experiencing the Lightning Network no longer requires a full node

**Blue Wallet.** A Lightning enabled Bitcoin wallet launched in Dec 2018. This wallet acts as a "hub operator" and allow users to plug into their hub without going through the process of setting up a local Lightning or Bitcoin node.

**Tippin.** Released in Feb 2019, Tippin is a browser extension and lightning wallet that integrates with Twitter, permitting users to tip each other in Bitcoin through the social media platform. It operates by connecting with a Lightning enabled wallet such as BlueWallet.

## Lightning Torch passed across Crypto Twitter

**Humble beginnings.** The Lightning Torch began as a social experiment by Twitter user @hodlnaut on Jan 19, 2019 and was intended to showcase Lightning's capabilities. @hodlnaut initially sent out 100k satoshis, and each subsequent recipient was instructed to add 10k satoshis before sending to the next user.

**Notable recipients.** Twitter CEO Jack Dorsey, LinkedIn co-founder Reid Hoffman, Fidelity Digital Assets, and many more.

**Virtuous End.** After 282 passes, the final 4.2 million satoshis were donated to Bitcoin Venezuela to aid those suffering from local economic hardship.

## Launch of Lightning based apps (or LApps)

**Ln.pizza.** Launched in Feb 2019, this LApp allowed pizza lovers to pay for Domino's via Lightning.

**Bitrefill.** The online platform that sells gift cards and mobile refills for crypto launched a new service (dubbed Thor) in Jan 2019 to support Lightning payments.

**Koala Studio.** An online gaming platform that collects payments for its games using the Lightning Network. It launched publicly in Feb 2019.

**Pollo Feed.** An automated chicken feeder powered by Lightning payments. Since Feb, users can watch a livestream of chickens and pay 3,000 satoshis to feed them.



Source: takethetorch.online

# Developers for public chains remained active despite market decline

*As of 4/7*

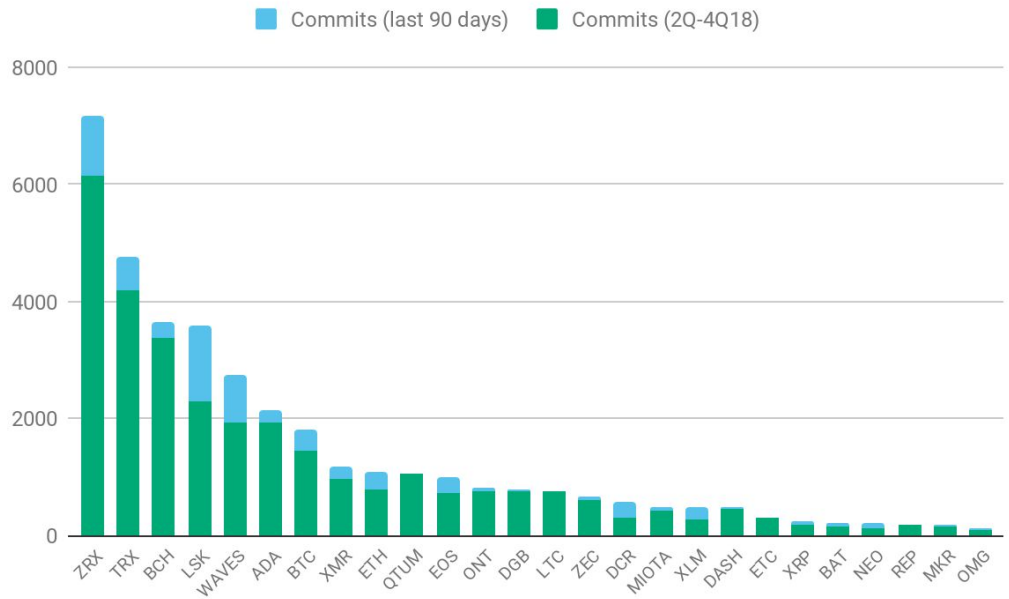
"The number of developers working on public coins has doubled in the last 2 years. 4k+ developers/month contribute code across 2.8k public coins."

"From Jan 2018 to Jan 2019, the number of monthly active developers fell 4% while the markets fell more than 80%."

"On average, 216 developers contribute code every month to Ethereum's repos. On average, more than 50 developers per month contribute to Bitcoin's repos."

**Electric Capital Dev Report**

*Caveat: Github data may also be misleading as it shows only the quantity of commits, and not the quality of the new code. Further, it is possible to fake commit activity on Github, which could give a false impression of development strength.*

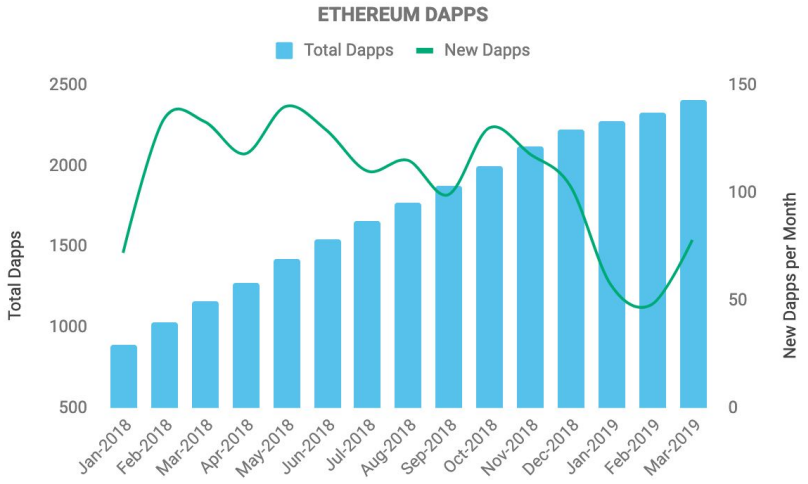


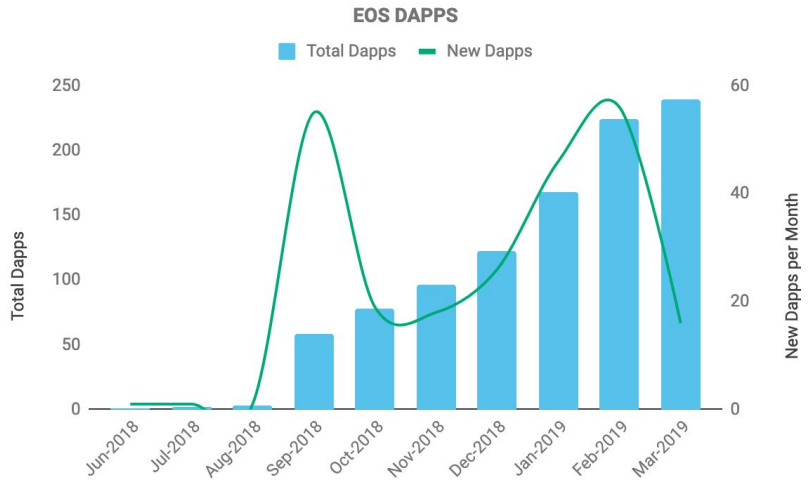



*Source: Messari, Ethereum developer report by Electric Capital*
*Note: Messari only pulls data from what it considers to be the project's primary repository.*

# Dapp Platform Activity

*As of 4/17*




**+61**

**-48% q/q**

Average number of dapps added per month YTD

**+39**

**+87% q/q**

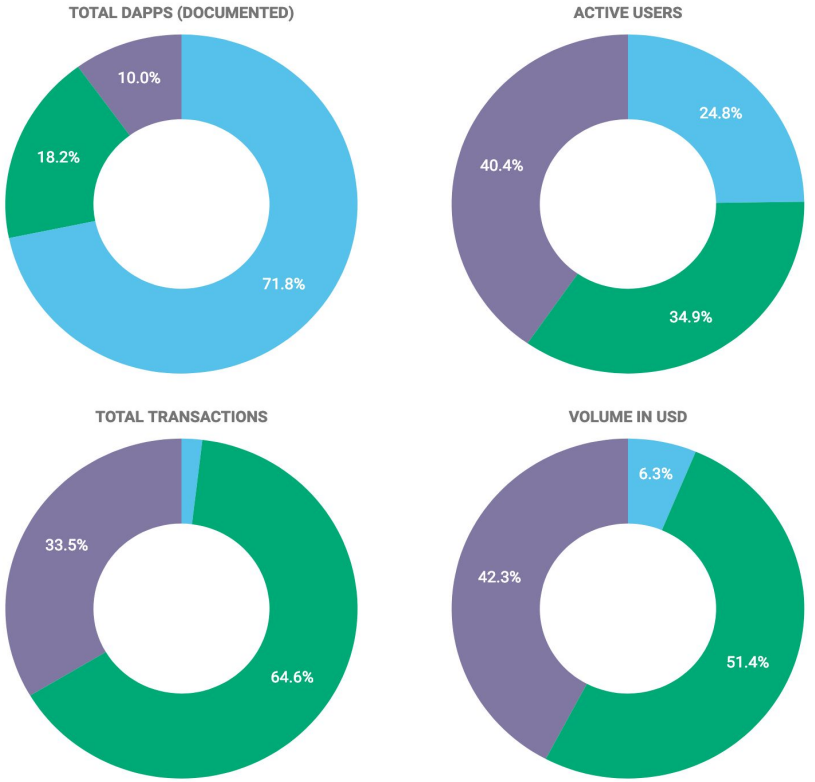
Average number of dapps added per month YTD

# Ethereum vs. EOS vs. TRON

Ethereum has 4x more dApps than EOS and ~7x more than TRON. This is likely because Ethereum has been around for longer (July 2015) relative to EOS and TRON (both June 2018) and has been tested over time, may be more secure, and may have more developer resources. However, this gap has started to close significantly over the last quarter.

EOS boasts ~1.5x more users and 34x more transactions than Ethereum. Similarly, Tron sees ~1.6x more users and ~18x more transactions than Ethereum. This could be because both EOS and TRON can process more transactions per second and have lower transaction costs. If this is the case, it goes to show that users of dApps don't care as much about underlying challenges in centralization, governance and control.

*Caveat: Metrics can be faked. On the surface, there could be many daily active users, but the accounts could be controlled by the same user attempting to make the dapp seem more popular than it is. Additionally, it's trivial to inflate transaction counts on low-fee blockchains.*






Source: dapp.com

# Market segment updates

# Market Segments

**OTC TRADING UPDATE**

**EXCHANGE UPDATE**

**DEVELOPMENT UPDATE**

**REGULATION UPDATE**

# OTC Trading: Dan (Head of Trading)

The market found a bottom in the 3K range. Brief difficulty readjustment coincided almost exactly with the local bottom. Sellers were pretty scarce going into the tail end of the selloff as paper sellers came in with a vengeance on the synthetics. Physical BTC was actually quite hard to source and we ended up liquidating alts primarily to replenish coffers, short synthetics against notional for alt then work alt to BTC, rinse, repeat. The marginal seller at the bottom was clearly corporate crypto treasury that was selling out of pure balance sheet necessity - this is likely why ETH bounced back harder from the lows. Inflows have been consistent with net buying over Q1.

# Exchange: Christina Pawlikowski (Product Manager, Poloniex)

Due to continued low volumes and volatility, exchanges are looking for new ways to generate more volume, like IEOs.  Binance popularized the strategy, but now a number of exchanges have moved into IEOs as a way of monopolizing volume for themselves and increasing their own token's value. Exchanges are also branching out into new ways of generating revenue, most notably by offering staking as a service. I'd expect both trends to continue as the market continues to mature and consolidate.

There has also been an increased focus on washing trading and fake volume across the industry, with reports coming out nearly weekly from organizations like BitWise, the Blockchain Transparency Institute, and the TIE.  Generally, I see this as a positive step forward for the industry as a whole, as highlighting where to find legitimate volume is good for traders and good for token projects.

# Development: Anders Brownworth (Chief Evangelist)

By many measures, the crypto winter has not dampened quality releases from projects across the crypto ecosystem. I remember helping build companies that survived--and thrived--the dotcom bubble and am seeing something similar play out now:  High quality projects across the crypto ecosystem, some funded by the 2017 ICO boom, continue to show significant progress.

Some of this progress was on display at the MIT Bitcoin Expo in March celebrating 10 years of innovation in the blockchain space. The 0x project introduced 0x Mesh to significantly improve liquidity discovery. Grin and Beam launched MainNets for their Mimblewimble implementations early in the quarter and Algorand recently moved to public TestNet for their unique consensus algorithm. Decentralized versions of many foundational Wall Street financial instruments continues under active development. Dharma publicly launched their decentralized borrowing and lending platform and dYdX deployed a new contract and announced the alpha of an overhauled trading platform. Development of security tokens also continues seemingly unabated by regulatory uncertainty. tZero launched its security token trading platform early in the quarter and TokenSoft launched its beta enterprise custody solution for security tokens.

These are just a few projects that demonstrate how innovation on the development front remains strong. While the downturn may have cut a little close to the bone, I'd expect the projects that continue to release innovative work through this period to be very well positioned in a potential upturn. Keep a close eye on the DeFi space for foundational financial products currently under development as they will heavily influence how value is realized in a decentralized future.

# Regulation: Benedicte Nolens (Head of Regulatory Affairs Asia and Europe, CCO)

The international crypto policy agenda remained extremely busy. We would highlight in particular: from a global perspective, the **FATF statement** dated February 22, 2019, for which the comment period closed on April 8, and that sets out the expectation that Virtual Asset Service Providers (VASPs) be subject to registration in member jurisdictions by the end of 2020 and that, thereafter, AML/ CFT processes apply*; [for the US, the SEC statement dated April 3, listing factors that may trigger a certain crypto asset to fall within the remit of the **Howey test**]; for North America, the joint Canadian regulatory consultation on a framework for licensing of crypto asset platforms, following closely on the back of the **Quadriga incident**; for Europe, the January 9 papers by **ESMA** and the **EBA** providing early indication of the European policy views concerning crypto assets, the definition of securities and investment schemes under MIFID, and the scope of e-money and payments as it concerns stable coins; and for the UK, the January 2019 FCA CP providing **extensive guidance** on crypto assets, and for which the comment period closed on April 5. Non G-20 markets also continue making regulatory progress, with several island nations having continued taking forward their tailored regimes for crypto assets, including the consultation in January for a tailored crypto custodian regime in Bermuda.

**Note this is subject to member country implementation, which may take time and may require national legislative changes.*

# Glossary

# Glossary

## 2019 Crypto Trend Update

**Open finance:** Open finance refers to traditional financial tools such as exchanges, lending, prediction markets, or derivatives built on a blockchain — specifically Ethereum.

**Security token:** Security tokens are regulated tokens backed by assets or securities that provide rights and ownership benefits akin to traditional securities.

**Stablecoin:** Stablecoins are price stable cryptoassets often pegged to a fiat currency.

## 1Q-2Q19 Developments

**Initial exchange offering (IEO):** IEO stands for initial exchange offering. It is a fundraising tool for early-stage crypto projects. IEOs are often referred to as rebranded ICOs.

**Proof of stake:** Proof of stake is a consensus mechanism that requires participants to stake (or lock up) tokens to validate blocks.

**Staking:** In proof-of-stake systems, token holders are responsible for creating blocks. Token holders lock up, or “stake”, a minimum amount of tokens to validate transactions. In return, they are rewarded for doing so in tokens created through inflation.

# Glossary

## Crypto market performance

**Liquid cap:** Messari's liquid supply metric multiplied by its volume weighted average price. Liquid supply is supply that is visible on-chain and is not known to have contractual or programmatic restrictions.

**Real 10 volume:** The sum of trading volume on exchanges that Messari deems to have legitimate volume.

**XBT:** Another abbreviation for Bitcoin, or BTC. The **abbreviation** is in line with standards by the International Standards Organization (ISO) highlighting that if a currency is not connected to a specific country, it should begin with "X".

**NVT:** Calculated as network value over on chain transaction volume. It is often compared to the PE ratio, a valuation metric used in equity markets.

**MVRV:** Stands for market value (price x supply) to realized value, the aggregated market price of all BTC UTXOs (or those of a UTXO based coin) when last moved.

# Glossary

## Crypto network activity

**Adjusted transaction volume:** A metric released by **Coinmetrics** that aims to display economically meaningful transactions.

**Bitcoin change volume:** Refers to outputs in a transaction that are sent back to the originating address as change.

**Lightning node:** Lightning nodes open payment channels with each other that are funded with bitcoin.

**Lightning channels:** Payment channels opened between nodes on the Lightning Network to transact with one another.