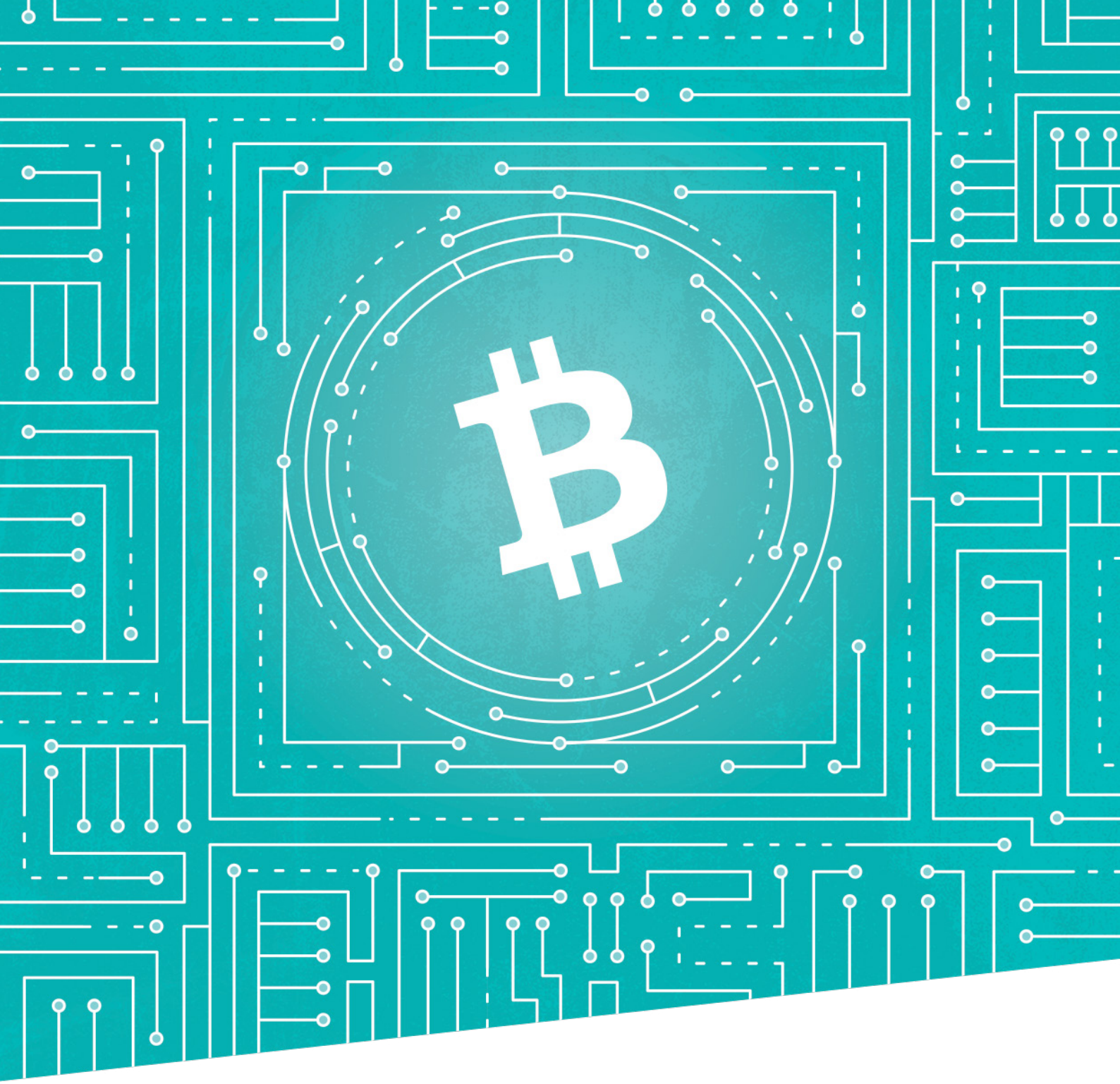


A LOOK AT BITCOIN CASH (BCH)

A PRIMER BY

BLOCKCHAIN

BITCOIN CASH HIGHLIGHTS

- **Top-5 cryptoasset:** Bitcoin Cash (BCH) has consistently ranked as one of the largest cryptoassets in terms of market value and ecosystem support (e.g., exchange listings, wallet support, etc.) since its creation in August 2017
- **Technology further diverging from Bitcoin (BTC):** BCH has continued to evolve its technology in new directions beyond simply offering just a 'bigger-blocks' alternative to Bitcoin (BTC) through the introduction of enhanced smart contract functionality, checkpoints, etc
- **Advantages offered by BCH over BTC:** These include greater maximum on-chain transaction capacity/throughput, lower average transactions fees, and additional smart contract functionality, although like many cryptocurrency design choices some of these advantages may carry tradeoffs (e.g., lower decentralization, greater attack surface)[1]

WHY USE OR BUY BCH?

Lower cost and greater capacity: more on-chain transaction capacity and lower transactions fees

Community backing: brand awareness, community strength, and backer resources, including Bitcoin.com, Bitmain, etc.

Widely accepted and supported: large number exchange listings (including 13 Tier-1 exchanges)

Evolution speed: capacity for change as measured by ability to regularly carry out hard forks, add new functionality

- **Community backing:** BCH continues to benefit from significant support from a number of important cryptoasset institutions and backers, such as Bitcoin.com[2], although another important backer, Bitmain, has recently suffered significant setbacks
- **BCH is most similar to:** Bitcoin (BTC), Bitcoin SV (BSV), Litecoin (LTC) and Ethereum Classic (ETC) (as a child-fork cryptoasset)

BITCOIN CASH (BCH) vs. BITCOIN SV (BSV)

- **Network split:** On 15 Nov. 2018, Bitcoin Cash experienced a hard fork (network split) that resulted in the creation two new cryptocurrencies: Bitcoin SV (BSV) and Bitcoin Cash ABC (which kept the BCH ticker symbol)[3]
- **Key differences between BCH and BSV:** Potentially greater maximum transaction capacity/throughput (advantage BSV), ecosystem support (advantage BCH), and relative decentralization (advantage BCH)
- **Casualties on both sides of 'hash war'...** Following the 15 Nov. network split, the combined BCH and BSV computing power (hash rate) steadily declined and remained roughly equal between both BCH and BSV; as of Dec., combined hash rate (~3k PH/s) is ~40% below pre-fork BCH level (~5k PH/s), although hash rate has also declined for BTC and many other coins during this time due to declining cryptoasset prices.
- **...but BSV miners are incurring significantly greater opportunity costs:** Post-fork, BSV miners have incurred significantly greater opportunity costs than BCH miners with losses rising to as high as ~40% in foregone profits for mining BSV vs BTC, raising questions about the sustainability of BSV's total hashing power[4]
- **Post-fork over 1m+ more BCH coins have moved compared to BSV:** Movement (activation) of coins on both chains was roughly equal for the first two weeks following the fork, but in late-Nov. / early December significantly more BCH coins moved compared to BSV coins
- **BCH price has outperformed BSV...** the ongoing BSV mining losses and the fact BCH has more exchange listings, major wallet software support, etc., than BSV, may help explain the price divergence observed between the two cryptocurrencies
- **...but overall the hard fork has been value dilutive:** since 15 Nov. the combined market value of BCH and BSV has underperformed BTC and and the next top-10 cryptoassets by 14% and 16%, respectively.

[1] https://blog.bitmex.com/bitcoin-cash-abcs-rolling-10-block-checkpoints/
[2] Disclosure: Roger Ver, CEO of Bitcoin.com, is also an investor in Blockchain.com
[3] https://forkmonitor.info/nodes/bch
[4] https://twitter.com/BitMEXResearch/status/1072078106884759552

BCH leads BSV by most unambiguous measures

Table 1: BCH vs BSV data overview*

OVERVIEW	NAME	BITCOIN CASH	BITCOIN SV	BCH VS. BSV
	Ticker	BCH	BSV	
	Launch date	1 August 2017	15 November 2018	
	Key differentiator(s)	Ecosystem support, community	Capacity/throughput (128mb block size)	
Valuation & Use	Price	$131	$78	68%
	Total Issued Coin Supply	17,567,663	17,566,861	0.0%
	Market (Network) Value	$2,301,363,853	$1,370,215,158	68%
	Network Value to Transactions (NVT) Ratio (30d)	4	16	-72.7%
	Daily Exchange Volume (30d average)	$281,277,110	$86,591,208	224.8%
	Volatility of daily returns (30d)	12.4%	8.1%	4.3%
	Avg. Transaction count / day (30d)	10,072	37,457	-73.1%
	Avg. transaction fee	$0.0050	$0.0039	28.2%
	Cumulative transactions since fork (Tx Count)	3,126,005	13,106,229	-76.1%
Ecosystem Adoption	Number of fiat pairs	14	8	6
	Number of crypto pairs (non-duplicate only)	59	9	50
	Number of exchange listings	90	59	31
	Number of Tier-1 exchange listings**	13	10	3
	Tier-1 exchanges	Binance, Huobi, Upbit, Bithumb, Coinbase Pro, OKEx, Bitfinex, HitBTC, Kraken, Poloniex, Bittrex, Bitstamp, Gemini	Binance, Bithumb, Bitfinex, Bittrex, HitBTC, Huobi, Kraken, OKEx, Poloniex, Upbit	
	Exclusive Partners / Platforms	Bitcoin.com	Coingeek SVPool	
Technology	Hash Rate (hourly petahash since fork)	1,911	1,485	426
	Number of Nodes	1,657	613	1,044
	Max. Block Size	32MB	128MB	
Community Strength	Reddit - group size	39,300	657	38,643
	Twitter	926,000	4,890	921,110
	Telegram	6,694	1,619	5,075

Advantage BCH Advantage unclear, ambiguous

Sources: Blockchain.com, CoinMarketCap.com, other primary sources

*Note: price and trading data collected as of 15 January, 2019

**Tier-1 exchanges are identified by self-reported trading volume data.

Overview

As the use of Bitcoin has grown in recent years so too has criticism over its relatively slow transaction speeds, limited capacity/throughput, and high transaction fees. These problems have become particularly acute during periods of significantly heightened use, such as during December 2017 when average transaction fees rose to as high as approximately $30-$40 per transaction, and some transactions took days to complete settlement. High fees and slow confirmation times undermine the application of cryptocurrencies to many use cases, such as everyday consumer and business payments, micro payments, and remittances.

The debate over how best to address such problems has taken place under the heading of "scaling", and the scaling debate was largely divided between two camps that disagreed over the right balance between on and off-chain capacity enhancements[5]:

a. Those in favor of increasing bitcoin's capacity on-chain by upping the one megabyte (MB) block size ceiling (which limited transaction throughput) set early on by Satoshi Nakamoto. This "larger blocks" group is represented by Bitcoin Cash (BCH).
b. Those who favored increasing capacity through other means beyond simply larger blocks, such as "second layer" solutions like the Lightning Network and sidechains. This "smaller block" group is represented by Bitcoin (BTC).

Following a multi-year and often acrimonious debate in the cryptocurrency community, BCH was created by a group favoring larger blocks (8MB initially, now 32MB) through a hard fork of BTC on the 1st of August, 2017. The hard fork resulted in all those holding BTC private keys at the time of the fork also holding the same amount of BCH. Later many custodial exchange and wallet platforms (firms holding private keys on behalf of their users) made BCH available to their users as well, providing BCH with millions of potential users from early on.

BCH Strengths

- **Network capacity**: greater on-chain transaction capacity and lower transactions fees, thus resulting in a lower on-chain transaction backlog and higher throughput
- **Ecosystem support** in the form of a significant number exchange listings (including 13 Tier-1 exchanges), supporting wallets, etc
- **Technical distinctions** such as enhanced smart contract functionality, checkpoints, more frequent mining difficulty adjustments (every 6 blocks for BCH as opposed to every 2,016 blocks with BTC), and a development roadmap that if implemented will lead to further divergence from BTC's current design
- **Brand awareness and community strength** as suggested by size of the Reddit community (approximately 40k members) and Twitter followers (@Bitcoin has approximately one million followers); early strong interest in Bitcoin Cash was captured in a Sept. 2017 survey of thousands of Blockchain.com users, where approximately one-third of users expressed interest in purchasing BCH
- **Backers**: significant support and backer resources, including Bitcoin.com, Bitmain, etc.
- **Capacity for change** as measured by ability to regularly carry out hard forks, meaning BCH can move relatively quickly to implement new functionality and changes in protocol rules

[5] It is worth clarifying that many on both sides of the scaling debate support both on and off-chain increases to transaction capacity. For example, Segregated Witness (or SegWit), which was adopted by BTC in 2017, does in fact support larger block sizes up to ~4 MB in size. In addition, many BCH proponents have expressed interest in second layer solutions like Lightning.

BCH Tradeoffs/Issues

- **Centralization** in the form of potential over reliance on key backers, mining centralisation, concentrated decision making, and frequent checkpoints
- **Technical resources** in the form of a relatively small key developer team, which may lead to implementation of new technical ideas with comparatively less peer review; fewer people working on new features
- **Technology maturity** in the form of its less tested higher block capacity; BCH also has not incorporated the SegWit upgrade, meaning BCH cannot solve transaction malleability, which makes it harder to build second layer protocols such as Lightning
- **Security** due to BCH's lower market value than BTC and the fact that BCH also employs SHA-256, meaning a 51% attack against BCH may be more easily launched than against BTC
- **Stability** in the form of relatively frequent hard forks requiring the BCH community to upgrade at the same time before a deadline
- **Governance** concerns, meaning the process by which developers, users and the miners of the cryptocurrency organize around future protocol upgrades. While such concerns are a hallmark of most every cryptoasset community, concerns specific to BCH have included the lack of community wide voting or consensus on protocol changes prior to the introduction of new code and unilateral decision making process (e.g., checkpoints etc.)[6]
- **Competition** in the form of less critical mass/network effects than rival BTC; Bitcoin SV also competes for a similar audience as BCH

Epilogue: The Bitcoin Cash 'Hash War'

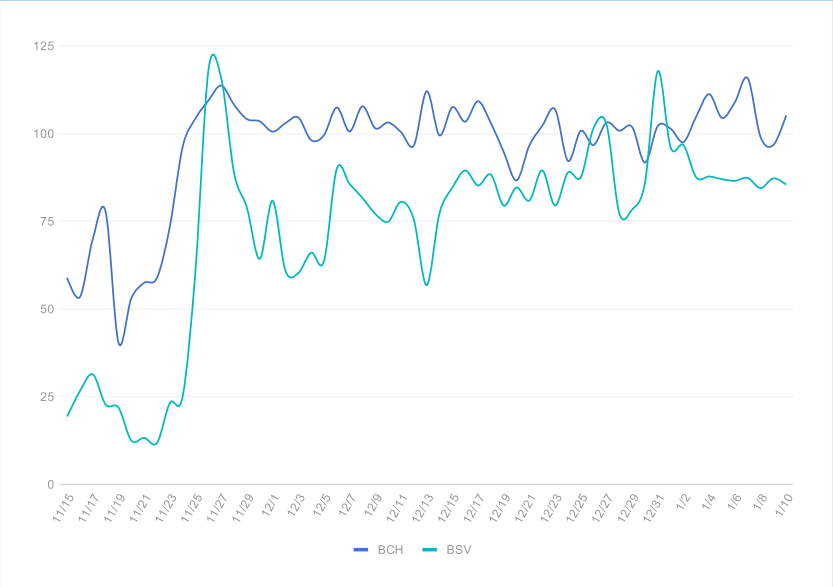
On 15 November, 2018, Bitcoin Cash hard forked into what is now still called Bitcoin Cash ABC, with the 'ABC' standing for "adjustable blocksize cap", and Bitcoin SV, with the 'SV' standing for "Satoshi's Vision". Prior to the fork there were threats made publicly by prominent backers that a "hash war" would occur following the fork, raising the possibility of damaging attacks on the opposing blockchain that could disrupt transactions or perhaps even destroy one of the coins.

Two months on from the fork none of the most dire possibilities came to fruition, and a publicly announced 'truce' by prominent backers has taken hold.[7] However, the Bitcoin Cash hash war resulted in significant financial opportunity costs to miners on both sides in the form of foregone profits that would have been earned if BTC had instead been mined of either BCH or BSV. Miner opportunity costs were ~$700k per day initially; total losses from the war were estimated at $10m and $8m for ABC and SV, respectively (Figure 1).

[6] https://www.coindesk.com/bigger-blocks-better-contracts-whats-bitcoin-cashs-next-fork
[7] https://coingeek.com/original-bitcoin-will-live-bitcoin-sv-bsv/

BSV miners have incurred significantly greater losses than BCH miners since the fork

Figure 1: BCH vs BSV mining profitability (opportunity costs) relative to BTC, Nov. 2018 - Jan. 2019*



*A score of 100 indicates neutral (zero) opportunity costs between mining BCH vs BTC
Source: Coin.Dance

BCH vs BSV

Bitcoin ABC (which goes by the ticker symbol BCH) should add new features such as smart contracts, oracle services (i.e., trusted data feeds that send real-world information to smart contracts) and on-chain scaling improvements through canonical transactions while maintaining the current max block size of 32MB. In contrast, Bitcoin SV expanded Bitcoin Cash's block size from its current 32MB to a maximum size of 128MB. Significantly larger blocks would imply that only the largest mining pools with significant capital expenditure capacity would mine the new block, raising even more concerns about potential centralization of BSV over BCH.

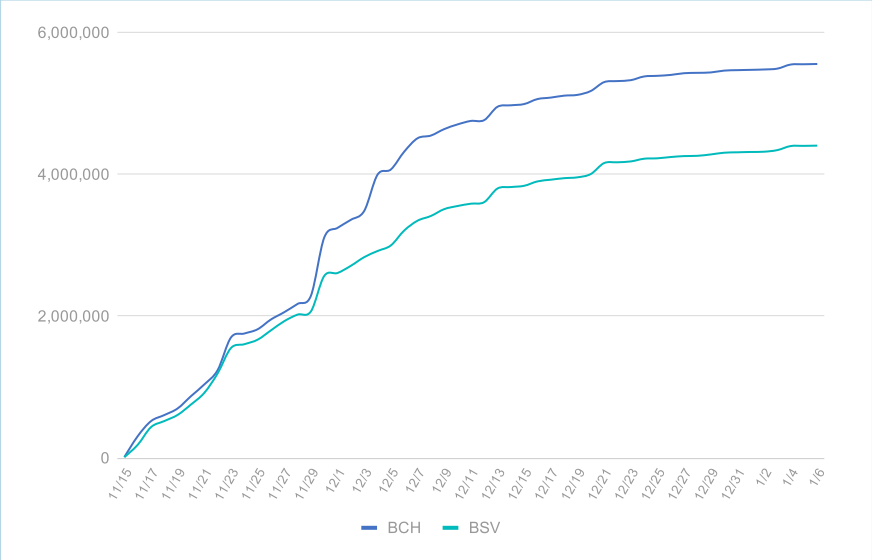
In terms of assessing BCH's strengths relative to BSV, the data in Table 1 indicates BCH leads by most unambiguous measures, including market value (+68%), daily trading volume (+225%) and ecosystem adoption in the formal of total exchange listings (+31) and Tier-1 exchange listings (+3).

The areas where BSV may appear to have an advantage are somewhat difficult to evaluate, such as lower volatility as compared to BCH. Increased price volatility can attract traders, which can in turn increase liquidity (which is generally viewed as a positive). It is also difficult to assess what percentage of BSV's transactions, which are greater than BCH's, represent bona fide economic activity. However, in fairness to BSV accurately determining bona fide economic transactions is a concern that is true of many cryptocurrencies with negligible transaction fees.

Since the fork, according to Coinmetrics.io data over one million more BCH coins have moved compared to BSV as of 6 January, 2019 (Figure 2). The movement (activation) of coins on both chains was roughly equal for the first two weeks after the fork, but in early December significantly more BCH coins moved over BSV coins. Possible reasons for the jump in BCH movement end of Nov./early Dec. includes sales of BCH by CoinGeek, reopening BCH trading on Poloniex, GMO and Blockchain, and the Coinbase cold storage upgrade.

Post-Fork 1m+ more BCH coins have moved than BSV coins

Figure 2: Post-Fork BCH and BSV Cumulative Coin Movement (Activation)



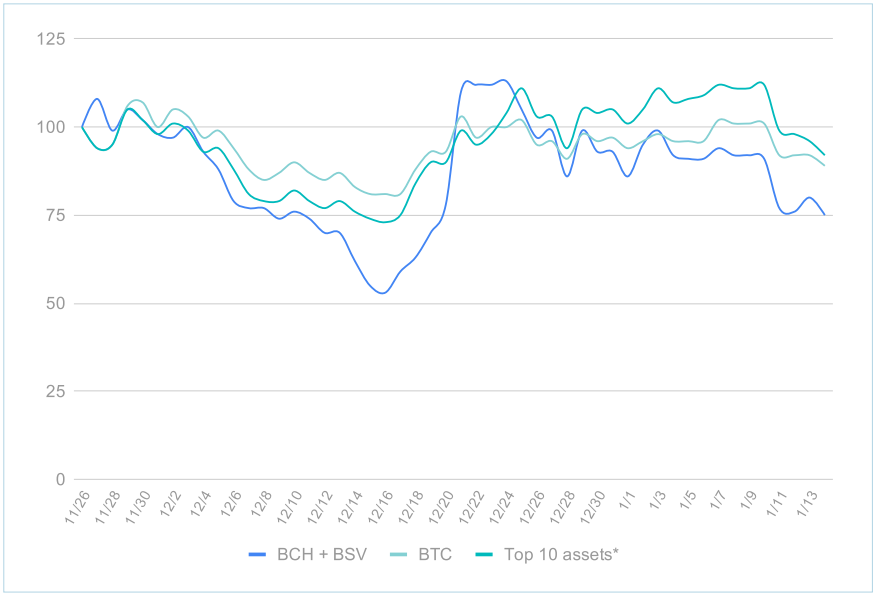
Source: Coinmetrics.io

Some caution must be exercised in interpreting coin movement data. For example, some of the observed greater movement of BCH coins may perhaps be due simply to the greater opportunity BCH users have to move coins compared to BSV coins. As of the time of writing, a number BCH supporting exchanges and wallets, including Coinbase and Blockchain, have yet to provide users with full access to their BSV coins. In other words, post-fork there has been more opportunity to sell BCH coins compared to BSV, but as more BSV coins become available to users the price of BSV could come under additional selling pressure.

It appears that the overall market confidence in Bitcoin Cash has decreased significantly as a result of the hard fork. The combined market value of BCH and BSV has underperformed bitcoin and the top-10 cryptoassets* by 14% and 16%, respectively, since 15 November. This underperformance may be driven by the costly hash war, the acrimonious spintering of the BCH community and uncertainties which lie ahead.

Nov. fork was value destroying

Figure 3: BCH + BSV market cap compared against BTC & top 10* crypto-assets post hard fork (rebased to 100)



* The next top-10 crypto assets include: ETH, XRP, EOS, XLM, LTC, TRX, ADA, IOTA, BNB and XMR

Source: Coinmarketcap.

Summary

Following the recent hard fork that resulted in the creation of Bitcoin SV, BCH has resumed its traditional status as one of the the top-5 cryptoassets (in terms of market value and ecosystem support in the form of exchange listings). BCH continues to evolve beyond its original raison d'être for coming into existence (lower transaction fees through larger blocks) to offer an even greater degree of distinction than BTC and other cryptoassets, such as enhanced smart contract functionality. While BCH is arguably on the whole more centralized at present than BTC, one upshot of being more unified is the ability to more quickly implement new technologies and ideas. Further differentiation may help BCH compete more effectively against BTC, which it continues to significantly lag behind in a number of important categories (e.g., total market value, trading volume and liquidity, average daily transactions).

Appendix: Additional BCH and BSV Resources

	BITCOIN CASH	BITCOIN SV
Overview	https://medium.com/@Bitcoin_ABC/bitcoin-abc-and-the-block-size-limit-29ca11510f06	https://bitcoinsv.io/vision/
Website	https://www.bitcoincash.org/	https://bitcoinsv.io/
Github	https://github.com/Bitcoin-ABC/bitcoin-abc	https://github.com/bitcoin-sv/bitcoin-sv
Twitter	https://twitter.com/Bitcoin	https://twitter.com/bitcoinsvnode
Reddit	https://www.reddit.com/r/Bitcoincash/	https://www.reddit.com/r/bitcoinsv/
Wikipedia	https://en.wikipedia.org/wiki/Bitcoin_Cash	https://en.wikipedia.org/wiki/Talk:Bitcoin_SV
Telegram	https://t.me/bitcoincashfork	https://t.me/bitcoinsvnode
Data and Charts	https://cash.coin.dance/stats	https://sv.coin.dance/blocks

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