What kind of assets are cryptocurrencies: an empirical evaluation

Macro WTF, Oct. 30 2019

Nic Carter

CASTLE ISLAND
VENTURES

CM
COINMETRICS

Objectives of this talk

- Answer the question: what sort of payment system are cryptocurrencies?

- How are they used in practice?

- Where are they situated in the taxonomy of current payment systems?

- What does this mean for bitcoin? For cryptocurrencies generally?

A simple typology of payments systems

Payments typology

	Type	Settlement	Fraud/NSF risk	Intermediation
Cash	Push	Immediate	Minimal	None
Check	Pull	Deferred	Present	Significant
ACH	Push/pull	Deferred	Present	Significant
Credit Card	Pull	Deferred	Elevated	Significant
Debit Card	Pull	Deferred	Present	Significant
Wire Transfer	Push	Immediate	Minimal	Minimal
Cryptocurrency	Push	Immediate-ish	Virtually absent	Minimal

Cryptocurrency at the base layer appears most conceptually similar to physical cash payments or to wire transfers

Summary stats on payment systems (U.S.)

|	Cash	Card (debit)	Card (credit)	ACH Debit	ACH Credit	Checks	CHIPS	Fedwire	On-us wire
USA payments by transaction count (millions, per year)									
2012	43,309	51,717	26,221	12,821	8,493	19,745	97	132	69
2013	45,929	56,020	28,199	13,574	9,026	18,943	103	143	61
2014	51,144	59,539	30,573	14,389	9,463	18,175	109	135	63
2015	67,150	64,268	33,398	15,472	10,020	17,300	110	143	65
2016	55,061	68,449	36,783	16,292	10,555	16,476	111	148	67
USA payments by aggregate transaction value (Billion USD)									
2012	909	4,417	2,441	61,793	69,404	27,826	364,818	599,200	152,280
2013	1,056	4,762	2,631	63,225	74,297	27,663	379,984	713,310	172,701
2014	1,227	5,156	2,876	62,351	79,059	27,449	390,695	884,551	201,443
2015	1,410	5,527	3,082	63,812	83,057	27,335	375,862	834,630	191,214
2016	1,487	5,899	3,310	67,381	87,415	27,171	364,331	766,961	178,704
Average transaction size									
2012	$ 21	$ 85	$ 93	$ 4,820	$ 8,172	$ 1,409	$ 3,757,137	$ 4,553,191	$ 2,213,372
2013	$ 23	$ 85	$ 93	$ 4,658	$ 8,231	$ 1,460	$ 3,685,587	$ 4,981,215	$ 2,831,164
2014	$ 24	$ 87	$ 94	$ 4,333	$ 8,355	$ 1,510	$ 3,571,252	$ 6,552,230	$ 3,207,691
2015	$ 26	$ 86	$ 92	$ 4,124	$ 8,289	$ 1,580	$ 3,404,547	$ 5,844,748	$ 2,941,754
2016	$ 27	$ 86	$ 90	$ 4,136	$ 8,282	$ 1,649	$ 3,288,186	$ 5,178,670	$ 2,687,278

Visualizing the differences in payment systems

US payment systems by annual transaction count, millions
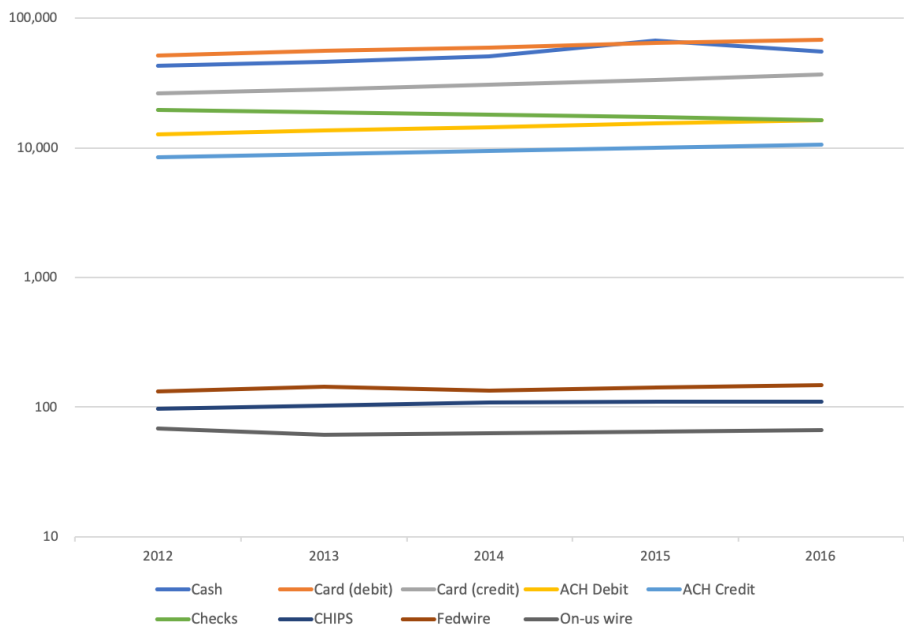
US Payment systems by average transaction size, in USD

Legend: Cash, Card (debit), Card (credit), ACH Debit, ACH Credit, Checks, CHIPS, Fedwire, On-us wire

Source: Statistics on payment, clearing and settlement systems in the CPMI countries, Bank of International Settlements (2017)
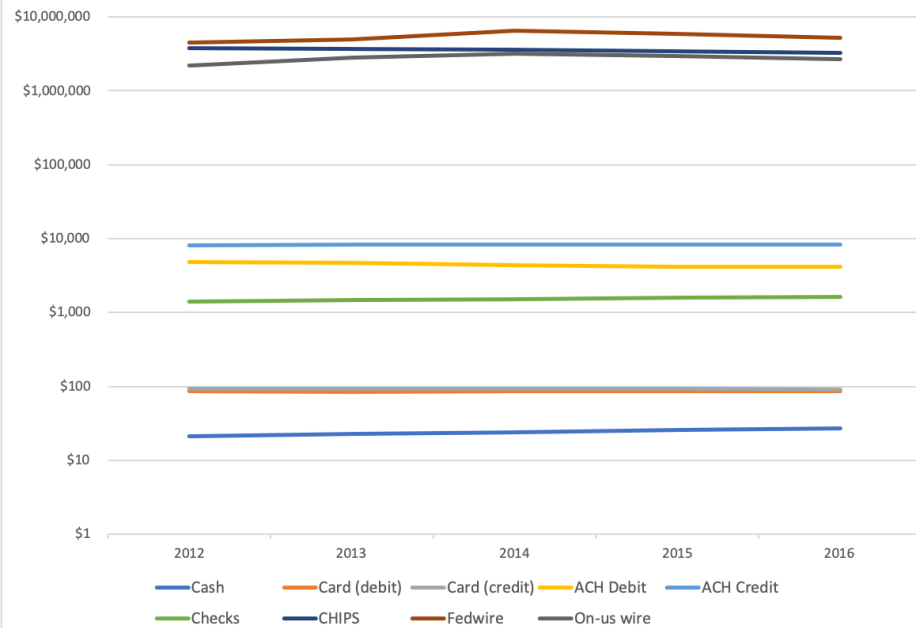
The inverse relationship between txn count and value in payment systems

Figure 1. Distribution of core noncash payments by type, number, and value, 2015

Number (in billions):
- Debit cards 69.5
- Credit cards 33.8
- Checks 17.3
- ACH debit transfers 13.6
- ACH credit transfers 9.9

Dollar value (in trillions):
- Debit cards 2.56
- Credit cards 3.16
- Checks 26.83
- ACH debit transfers 54.76
- ACH credit transfers 90.54
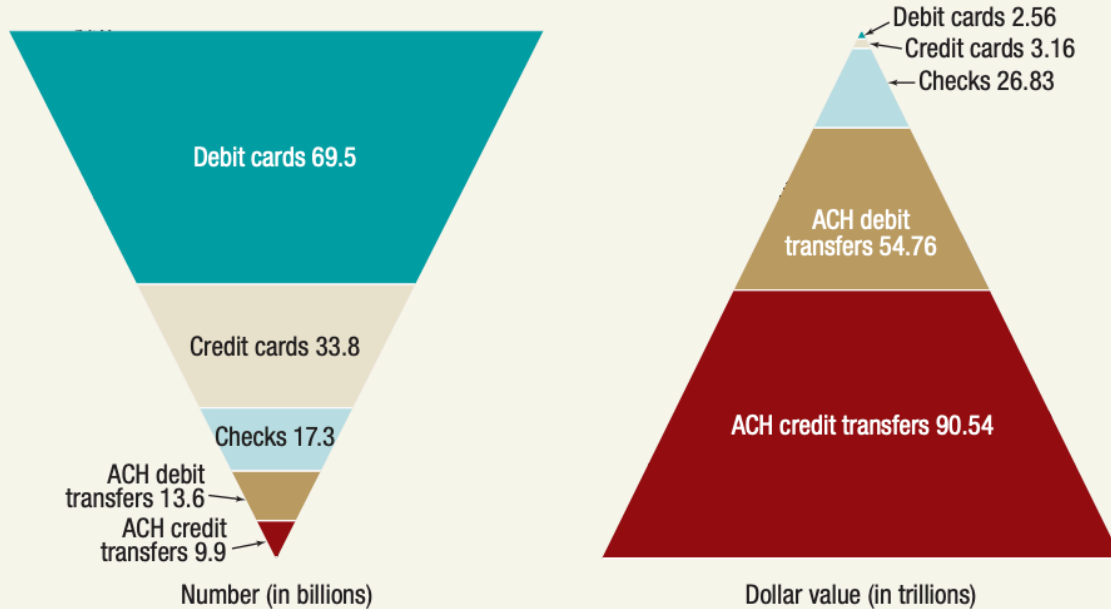
Note: Debit card includes non-prepaid debit, general-purpose prepaid, private-label prepaid, and electronic benefit transfers. Credit card includes general purpose and private label. Check, automated clearinghouse (ACH) credit transfers, and ACH debit transfers include interbank and on-us.
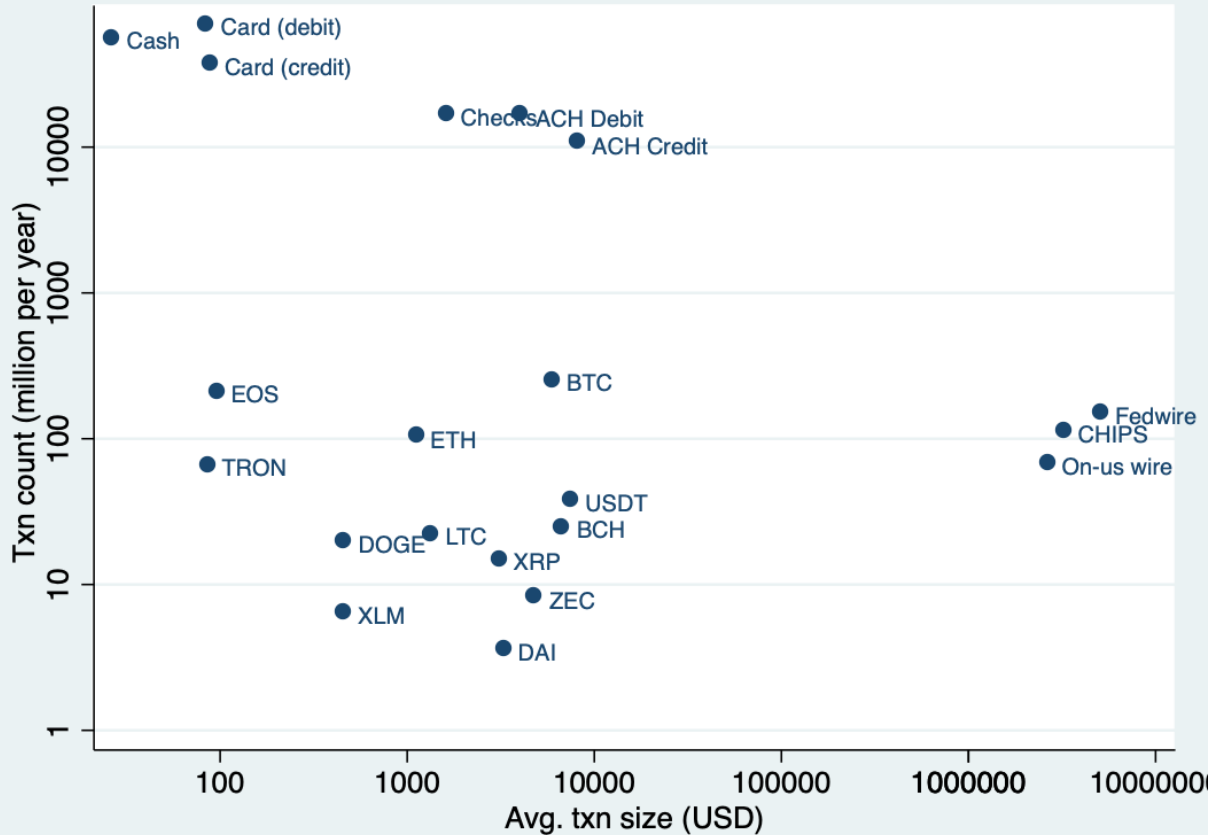
- Payment systems like debit and credit cards make up the lion's share of transactions by count (cash not included on this chart)

- Settlement/clearing networks like ACH and checks constitute most of the value

Federal Reserve Payments Study, 2016

Cryptocurrency payments size in practice

Average transaction size, native units only, USD equivalent

BTC (14dma) — ETH (14 dma) — USDT (14 dma) — XRP (14 dma)

Source: Coin Metrics
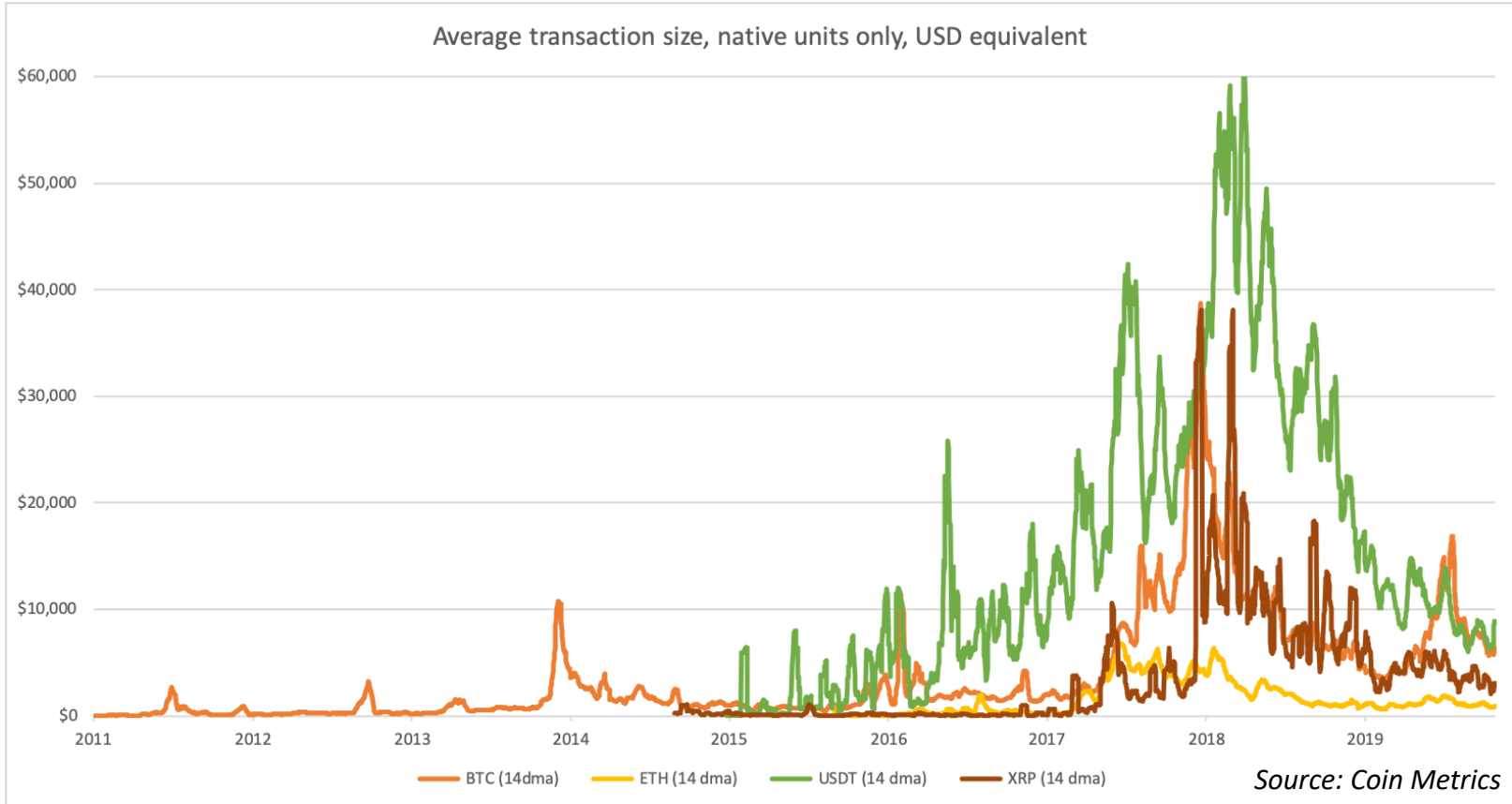
# Cryptoasset throughput versus other payment/settlement systems

- Major cryptoassets appear bounded by throughput on the base layer

- Should we treat them like settlement networks?

- Note: this data set only includes transfers of native units, not 0-value or token transactions

Source: Coin Metrics, Federal Reserve Boston, BIS

# Cryptocurrencies usage characteristics
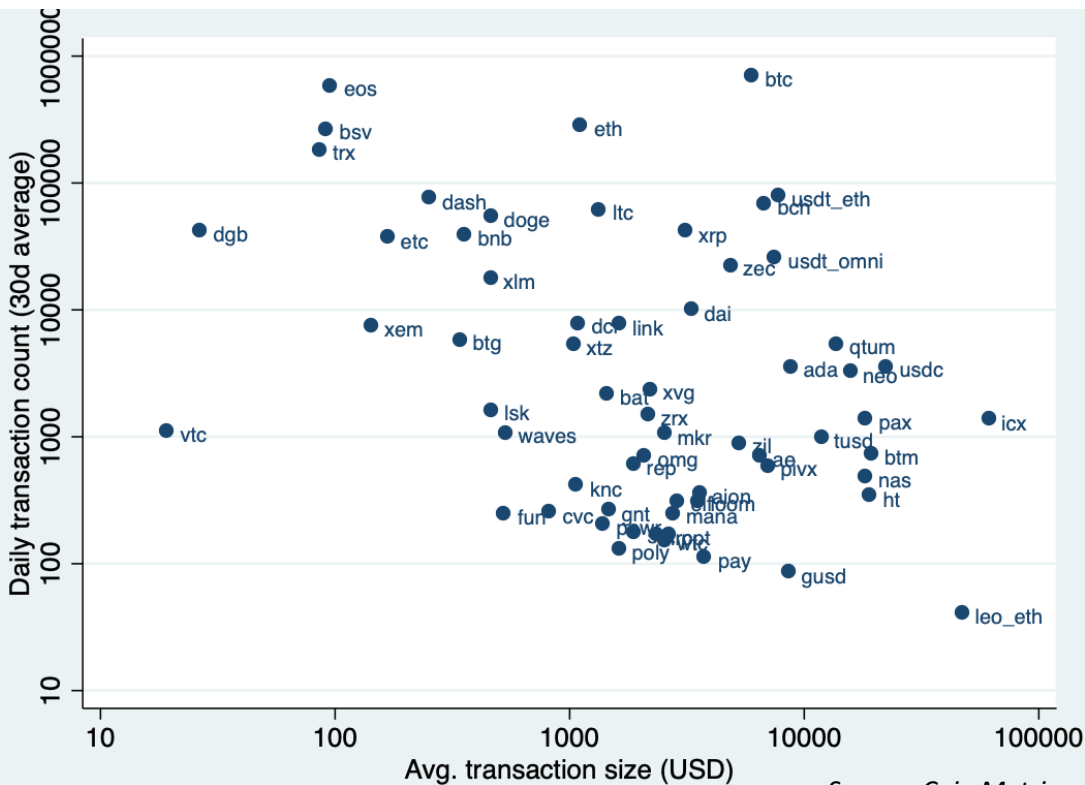
Source: Coin Metrics

- The chart on the left tracks transfers of native units (i.e. BTC on Bitcoin and ETH on Ethereum) while ignoring transactions attributable to other purposes, such as the insertion of arbitrary data

- Most cryptoassets exhibit high average transaction sizes, and generally demonstrate few transactions per day

- In practice cryptocurrencies are used for large, infrequent transactions

- Notice that the stablecoins all have relatively large average transaction sizes

Some typologies are empirically evident
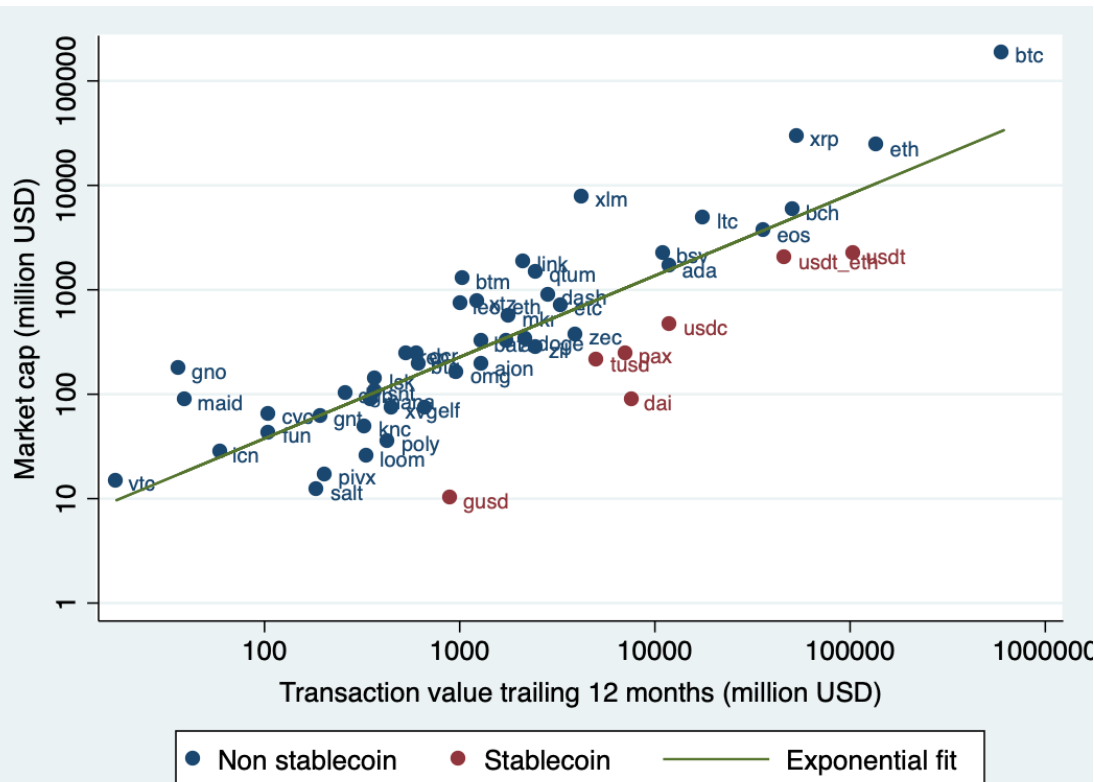
Source: Coin Metrics

- This analysis covers 60 cryptoassets and tokens accounting for 95% of the market

- Stablecoins exhibit **far more transactional value per unit of market cap** than their peers, evidencing unique usage patterns

- This implies that stablecoins are distinct from generic cryptoassets in that they have more transactional volume than their market cap would imply

SoV versus MoE: a distinction without a difference?

- Physical cash is used both as a transactional medium but also as a store of value

- The use of cash as a SoV has been rising in most countries, contrary to what many believe

- Declining interest rates make cash more attractive to hold (as the opportunity cost declines)

- As interest rates keep falling, cash and cash-like assets continue to look more attractive
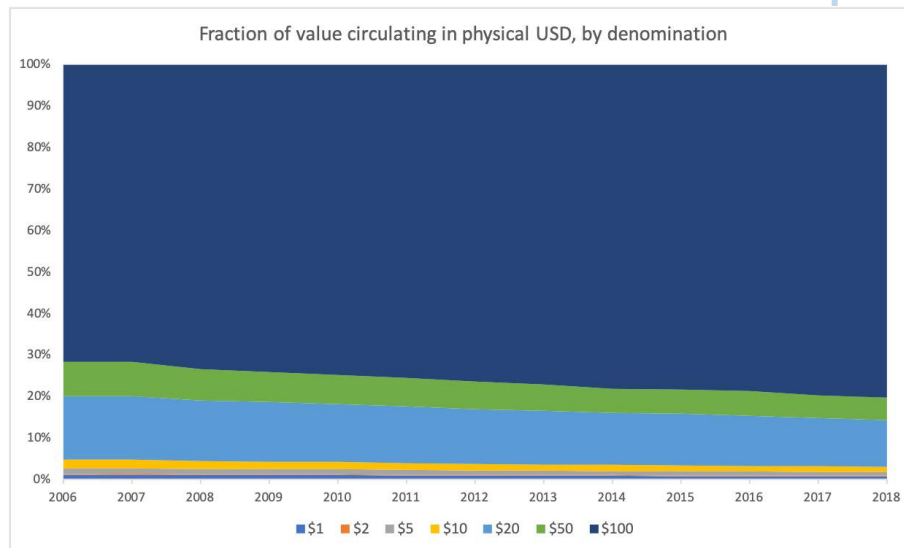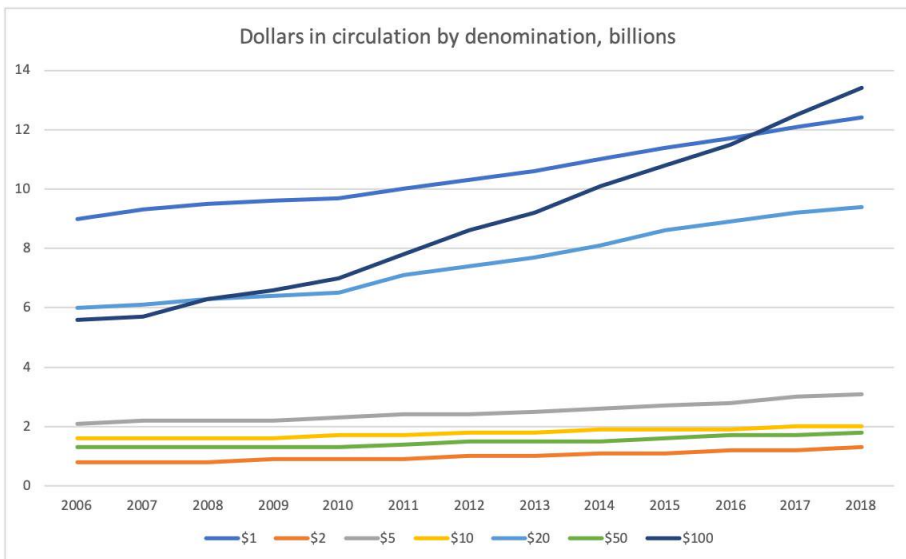
Key
- CIC expanding faster than GDP
- CIC declining
- No comparable data
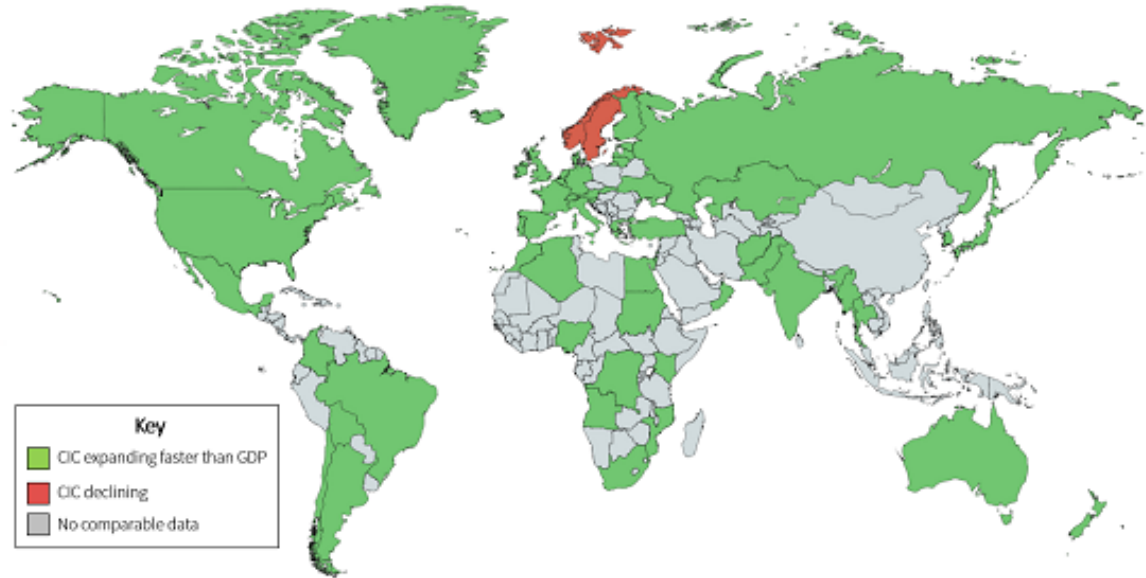
Source: Federal Reserve Bank of San Francisco

Cash usage for SoV purposes is skyrocketing

"Demand for currency is growing, particularly as a store of value"

– *Federal Reserve Bank of San Francisco*

Dollars in circulation by denomination, billions

Fraction of value circulating in physical USD, by denomination

So if cryptocurrency isn't suitable for petty cash transactions, what is it good for?

Bitcoin / crypto banks?

Re: Bitcoin Bank
December 30, 2010, 01:38:40 AM
Merited by mindrust (10), TheNewAnon135246 (5), LoyceV (3), DireWolfM14 (1), BitcoinCoreBTCC (1)

#10

Actually there is a very good reason for Bitcoin-backed banks to exist, issuing their own digital cash currency, redeemable for bitcoins. Bitcoin itself cannot scale to have every single financial transaction in the world be broadcast to everyone and included in the block chain. There needs to be a secondary level of payment systems which is lighter weight and more efficient. Likewise, the time needed for Bitcoin transactions to finalize will be impractical for medium to large value purchases.
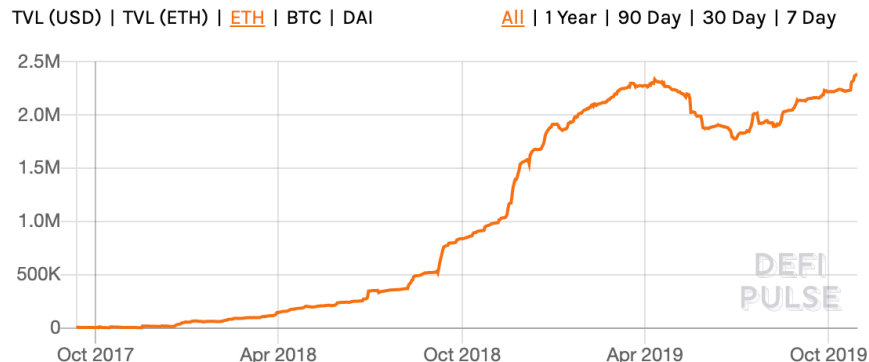
Bitcoin backed banks will solve these problems. They can work like banks did before nationalization of currency. Different banks can have different policies, some more aggressive, some more conservative. Some would be fractional reserve while others may be 100% Bitcoin backed. Interest rates may vary. Cash from some banks may trade at a discount to that from others.
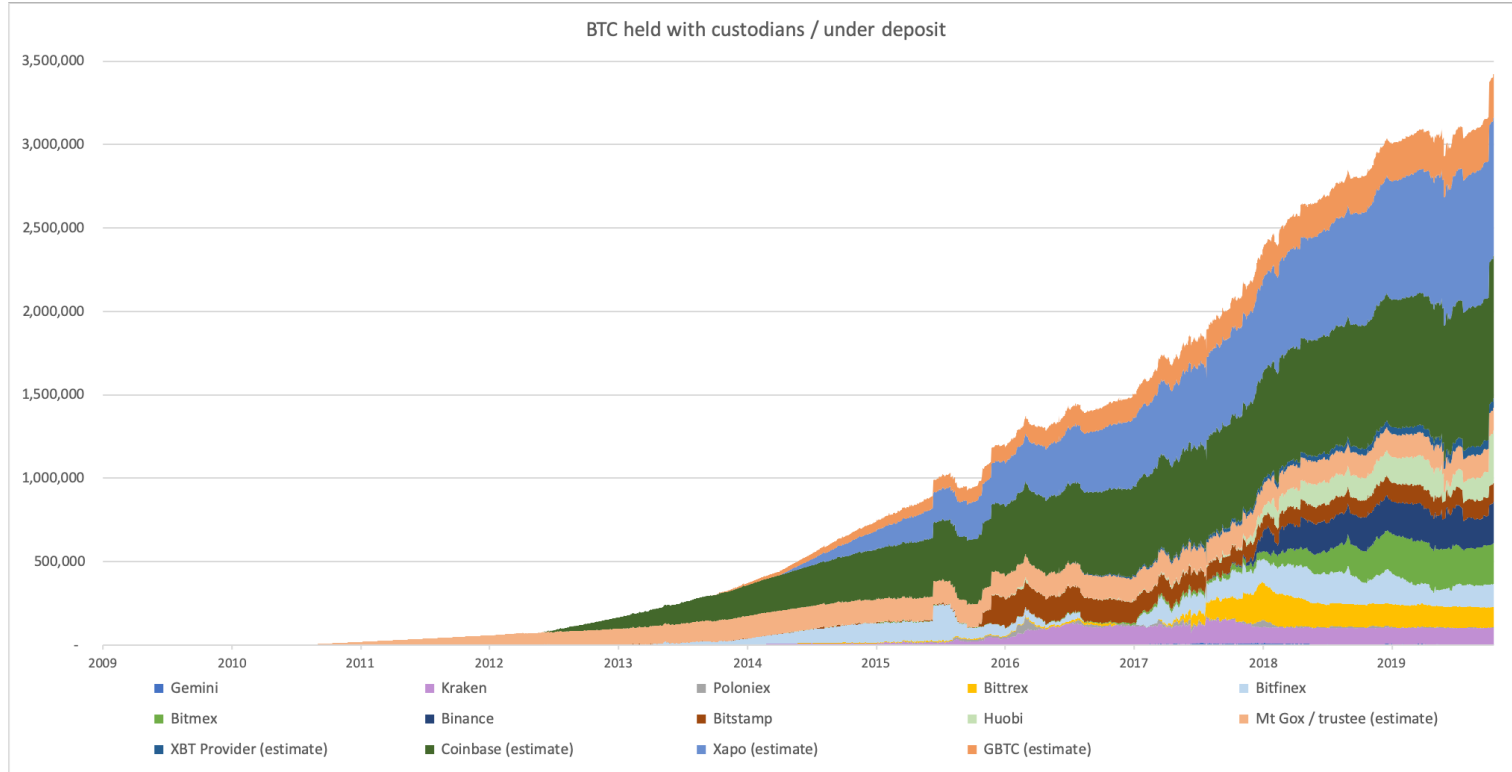
- Hal Finney (and many others) foresaw a world where Bitcoin operates as a high-powered auditable reserve currency / bank collateral / settlement medium

- ETH locked in DeFi = collateral for permissionless banking

ETH Locked in DeFi

TVL (USD) | TVL (ETH) | ETH | BTC | DAI   All | 1 Year | 90 Day | 30 Day | 7 Day

Bitcoin – high-powered crypto-bank collateral?

BTC held with custodians / under deposit

Legend: Gemini, Kraken, Poloniex, Bittrex, Bitfinex, Bitmex, Binance, Bitstamp, Huobi, Mt Gox / trustee (estimate), XBT Provider (estimate), Coinbase (estimate), Xapo (estimate), GBTC (estimate)

Notes:

- Coinbase, GBTC, Mt Gox / Mt Gox Trustee, Xapo, and XBT Provider data is accurate as of the most recent entry, but historical entries are interpolated and are hence just estimates

- This is a lower bound on custodial BTC and is not exhaustive

Sources: Coin Metrics, Grayscale, XBT Provider, Meltem Demirors
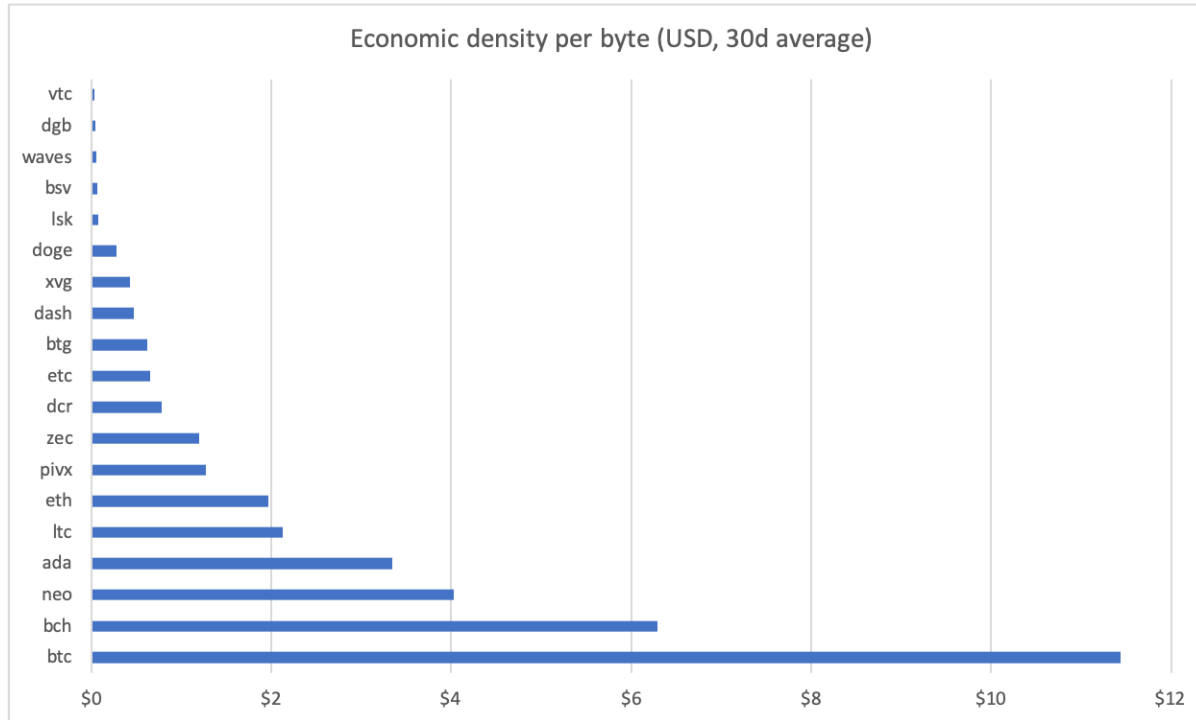
Growing intermediation

The growing share of custodial BTC calls for the adoption of ***Proof of Reserves*** schemes

Bitcoin supply distribution

Legend: ■ Custodial BTC (lower bound) ■ Presumed lost BTC ■ Noncustodial BTC
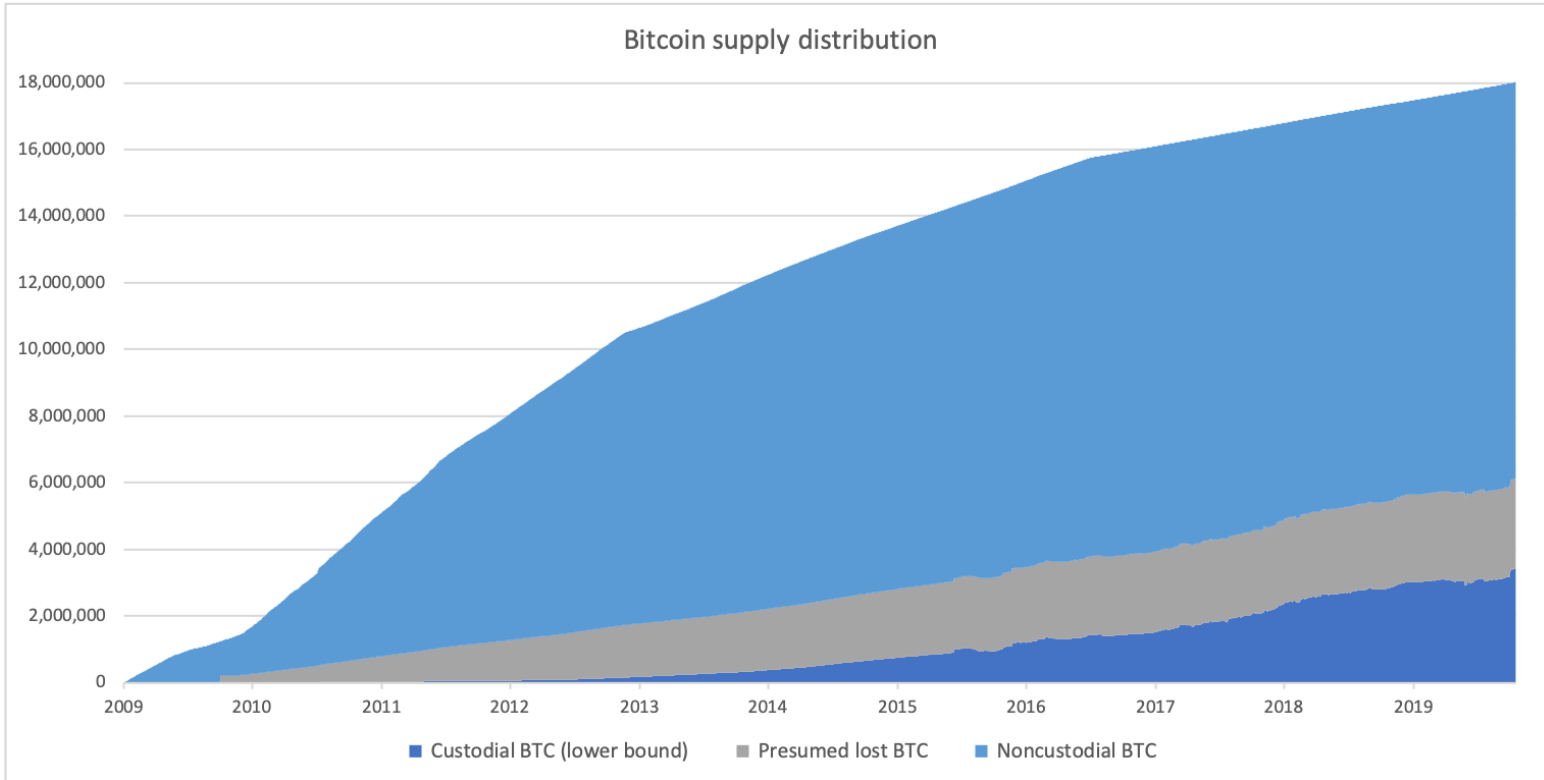
Should cryptocurrencies optimize for economic density?

Economic density per byte (USD, 30d average)

- Economic density measures the dollar-equivalent value of a single byte of final blockchain data ingested by nodes

- A system settling significant amounts of value while maintaining the cost-effectiveness of full nodes would have a very high *economic density*

- Note that this dataset only measures native token transactions (ERC20 txns are not included), so token-heavy chains are underrated by this measure

Source: Coin Metrics

Thank you

twitter: @nic__carter (that's two underscores)