Bitcoin adoption: What Regulators need to consider?

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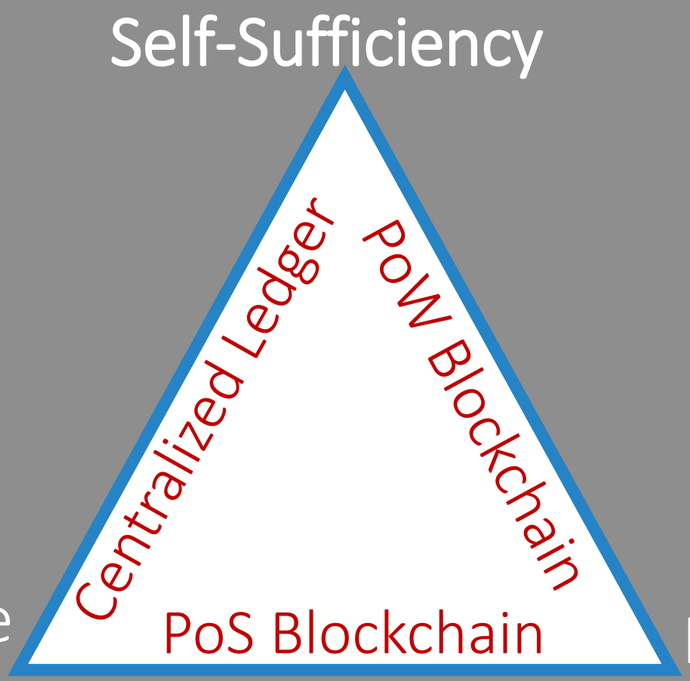
MIT

10. June 2021

Markus Brunnermeier

Blockchain Trilemma

- Recording keeping/ledger



Resource Efficiency

No Rent Extraction

Environmental damage

Abadi Brunnermeier (2020)

Medium of Exchange – Emerging 2 Tier System

- >100 million credit card transactions in U.S. per day
  www.cardrates.com
  - ≈40 bn a year scalability problem
- Emerging 2 tier system

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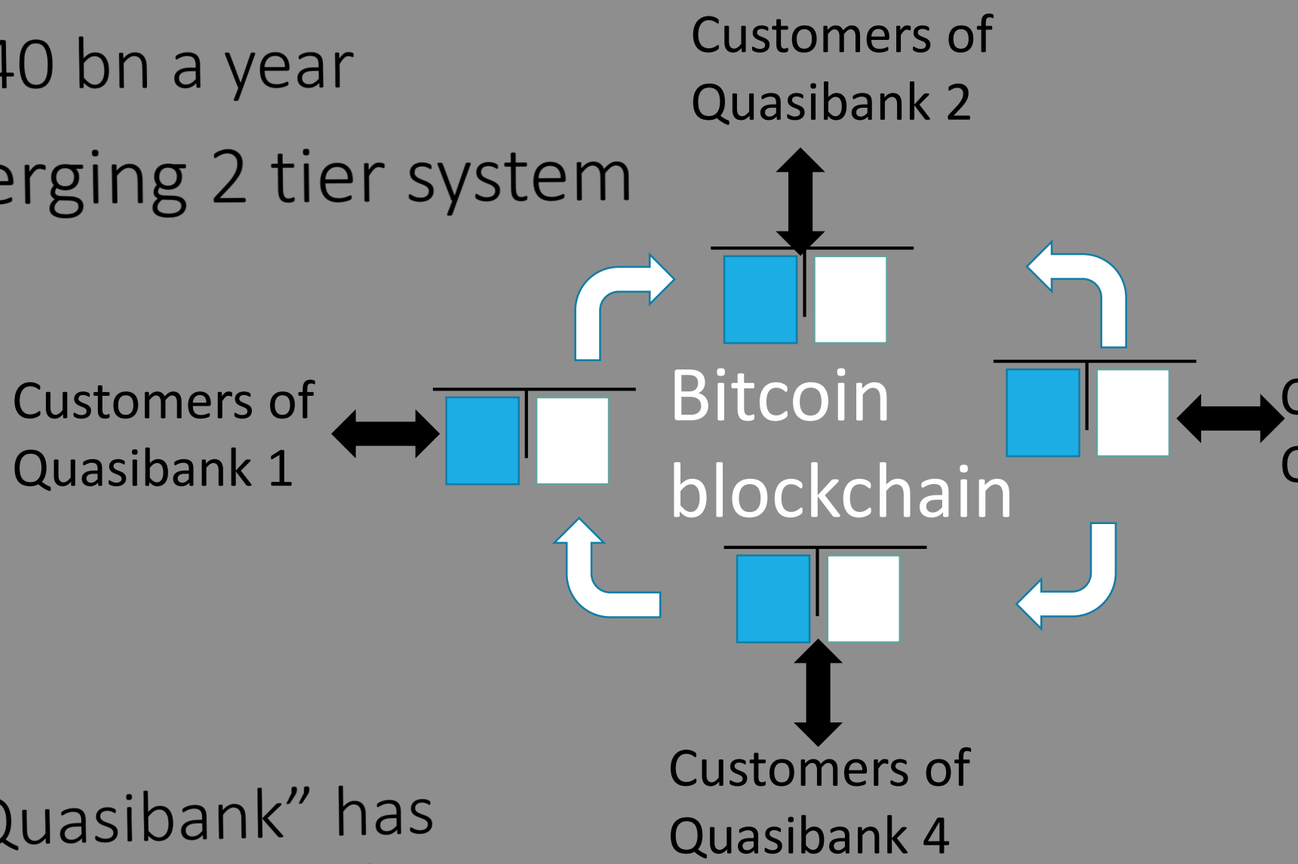


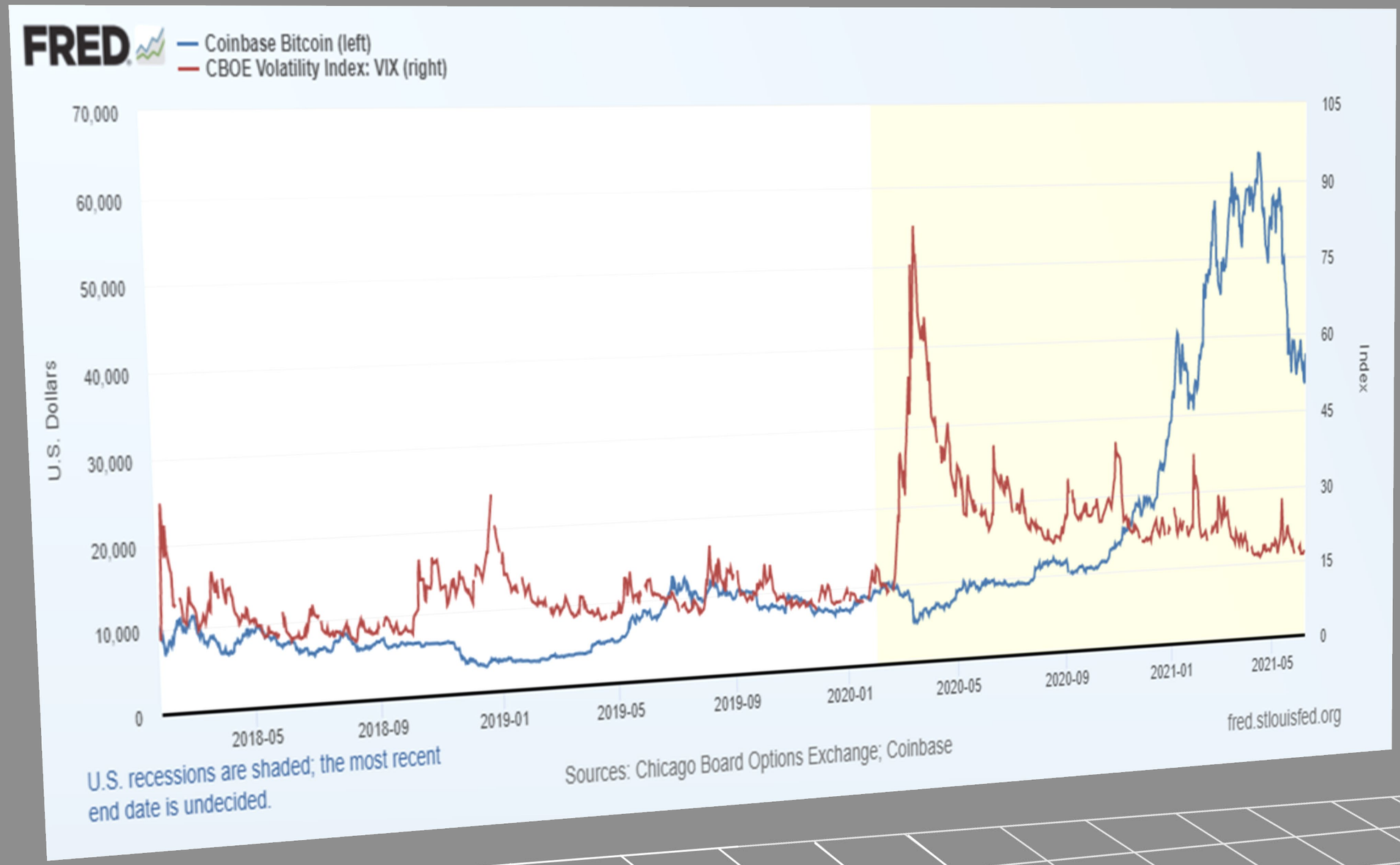
- "Quasibank" has centralized ledger
- New capital regulation for banks: 100% equity backing

Store of Value

- **Asset pricing**
  - Price = E[PV (Cash flow)] + E[PV (Service Flow)]+ E[PV(Δbeliefs)]

- Cash flow = 0
- Service flow
  - Medium of exchange: not scalable
  - Safe asset: Precautionary savings
    - Too risky – not “elastic” currency
    - No good friend analogy – correlation with VIX < 0
- Speculative asset
  - Harrison-Kreps type bubble
    - Asset price increases with turnover
  - FOMO
    - “Fear of missing out” – Ride the Bubble

No Safe Asset: Bitcoin and VIX - No Flight-to-Safety



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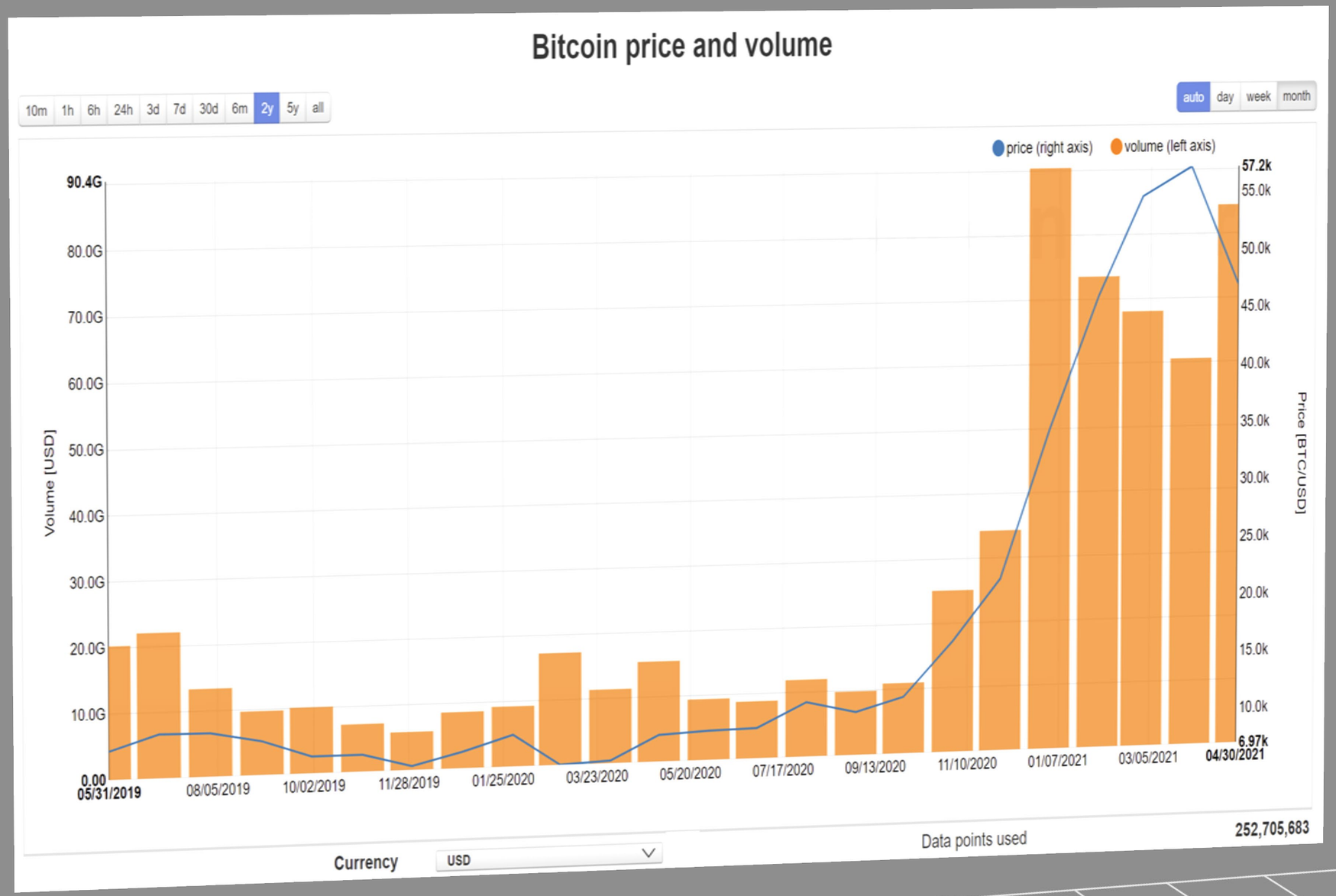
Restricted Supply rules only matter if there is demand

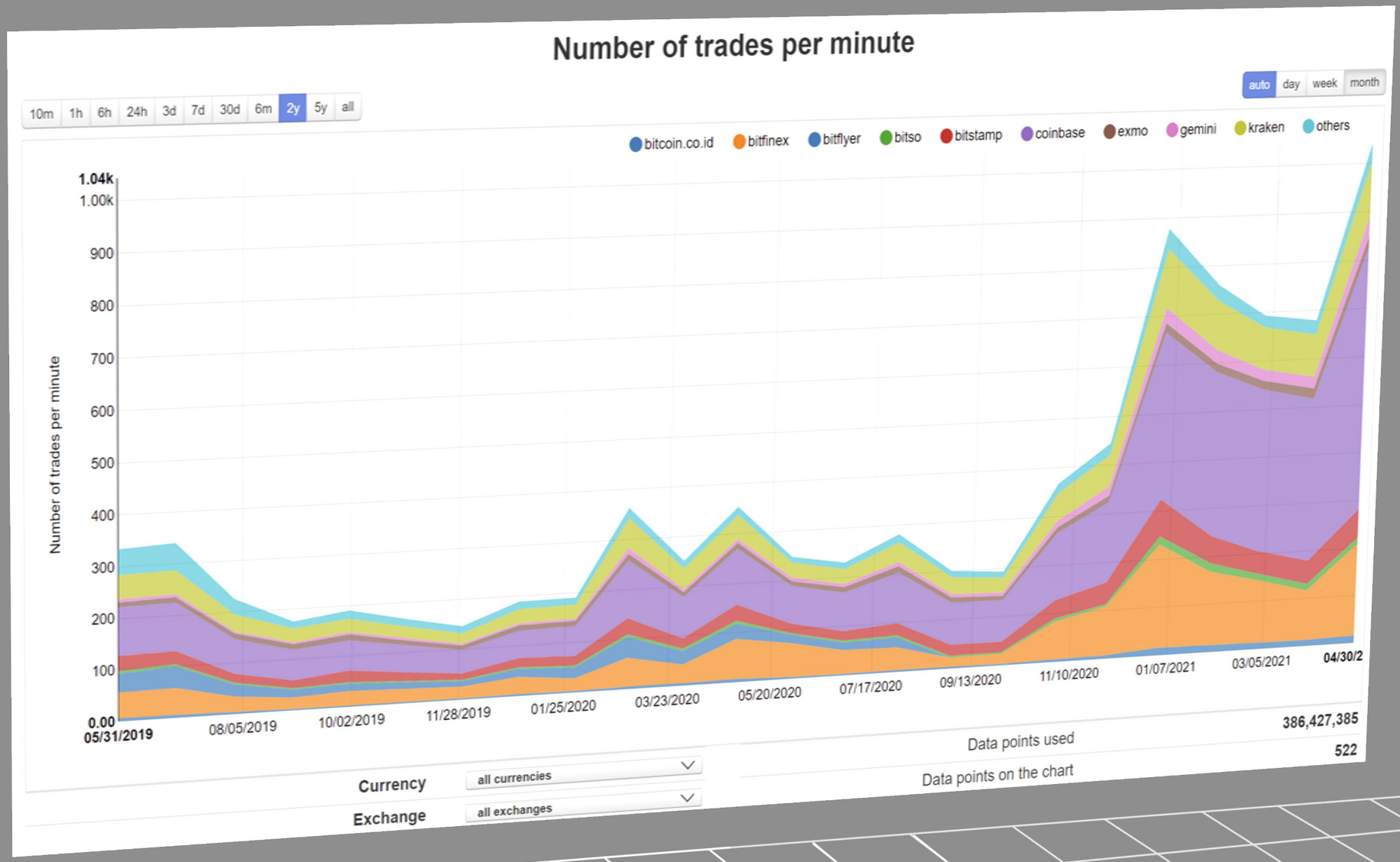
Speculative Asset: Bitcoin rises when trading volume rises



https://data.bitcoinity.org/

Speculative asset: Bitcoin rises when turnover rises

- Number of trades per minute



Financial Stability Issues

- Stable coins (Tether: USDT) 
  - Backed or not? (Bitcoin is not)
  - Invest in long-term assets issue “run-able” coins
    - Maturity and liquidity transformation without LOLR
  - “Narrow Bank regulation” needed
  - Invested in Money market funds
    - $30bn in commercial paper
    - “Giant” in the market (FT 10 June 2021)
- Crypto as Asset class
  - ETFs in Europe (Luxembourg) … more control in US

Bitcoin, Libra/Diem, …

- Without Bitcoin, Libra/Diem,…
- Payment revolution would not have happened
- Helps millions of people to be
  - More inclusive
  - Make cross-border payments
- Regulation should not stifle innovation

Poll

1. What is the most likely use case for bitcoin?
   a. Transaction medium
   b. Store of value
   c. Speculative asset
2. Who stands most to gain if institutional investors (mutual funds, ETFs, pension funds) were allowed to invest in bitcoin?
   a. Early adopters
   b. The broad public
   c. Asset management companies
3. What are the biggest risks of wider bitcoin adoption?
   a. Environmental impact
   b. Tax evasion
   c. Systemic risk
   d. Facilitating illegal activities

MIT MANAGEMENT SLOAN SCHOOL

Bitcoin Adoption: What Regulators Need to Consider

Antoinette Schoar, MIT Sloan School of Management

Markus' Academy, June 10, 2021

Roadmap for Today

- Current state of the Bitcoin ecosystem
- Main use cases and drivers of value
- Wider adoption: What is at stake for regulators?

This presentation is based on Makarov and Schoar (2020, and ongoing research), a whitepaper by Kogan, Lo, Makarov, Merton, Parker, Schoar (2021). And special thank you to Jiageng Liu for excellent research assistance.

Current State of the Bitcoin Ecosystem

- **Based on a permissionless "proof of work" blockchain protocol**
  - **Allows verification of pseudo-anonymous transactions in the absence of a centralized trusted party**
  - **High level of electricity consumption due to mining incentives**

- Main participants in the ecosystem
  - Miners: high level of concentration by individual miners and geography
  - Large holders ("hodlers"): significant concentration
  - Exchanges and other payment counterparties
  - Individual retail traders

Digital Footprint on the Blockchain

Hash	00000000000000000007316856900e76b4f7a9139cfbfba89842c8d196cd5f91
Previous Block	00000000000000000003ecd827f336c6971f6f77a0b9fba362398dd867975645
Next Block(s)	00000000000000000000817313d6b5fe4838ec6eff47fbe7c4b9f22a40c2a4f4
Merkle Root	66b7c4a1926b41ceb2e617ddae0067e7bfea42db502017fde5b695a50384ed26

tx:93955d40d918d014903843d258aada5c720a5d37afac7889268f459a97b148a3 12.53764047 BTC Fee: 0 BTC			
Newly Generated		3KF9nXowQ4asSGxRRzeiTpDjMuwM2nypAN	12.53764047 BTC
	→	Unable to decode address Metadata: !OLQG|!Goo{#jW4k	0 BTC
tx:a8178a7223372414ac060b4bba4b33b8b4847a756fa76a715af7fd11bfd143d5 1,388.19784059 BTC Fee: 0.001 BTC			
← prev tx 17A16QmavnUfCW11DAApiJxp7ARnxN5pGX	-1,388.19884059 BTC	3QKAn2B1uDquujLZnoynVoq1M9uac66Ysr	0.00795759 BTC
	→	1F8fDpYbMLMaz1tBEehqPJSN8XTL6t5TDz	0.01241006 BTC
		17A16QmavnUfCW11DAApiJxp7ARnxN5pGX	1,388.17747294 BTC
tx:efb3f60304532ebc80163b5f375fa8a94a39a8b0807b99703b6b646c1f7af5bf 0.71981868 BTC Fee: 0.001174 BTC			
← prev tx 3EocBKm4AgtX6Bi7P8HokjoVhCTZNWNP5q	-0.32250217 BTC	3JGTTdXUwfSDmb6mWptD4CaXYm6KTdfTPc	0.00882998 BTC
← prev tx 3KA8RU8rmQEMVwXSQPSBKqqewZw63Upfwx	-0.30897999 BTC	3HLUD8s8C4wKfaNTj1n9D3NKpNMLMgjWkk	0.7109887 BTC
← prev tx 33QJtiYPkQzYf5BNbCztHWowhco77sg18g	-0.08592033 BTC	→	
← prev tx 14J6bdZhJPeiJPEwcTGd7RWXRjUsMoqfxN	-0.00310334 BTC		
← prev tx 3DqmyW4NLHgNQP7T3i2gstNe1sx88rKyaB	-0.00048685 BTC		

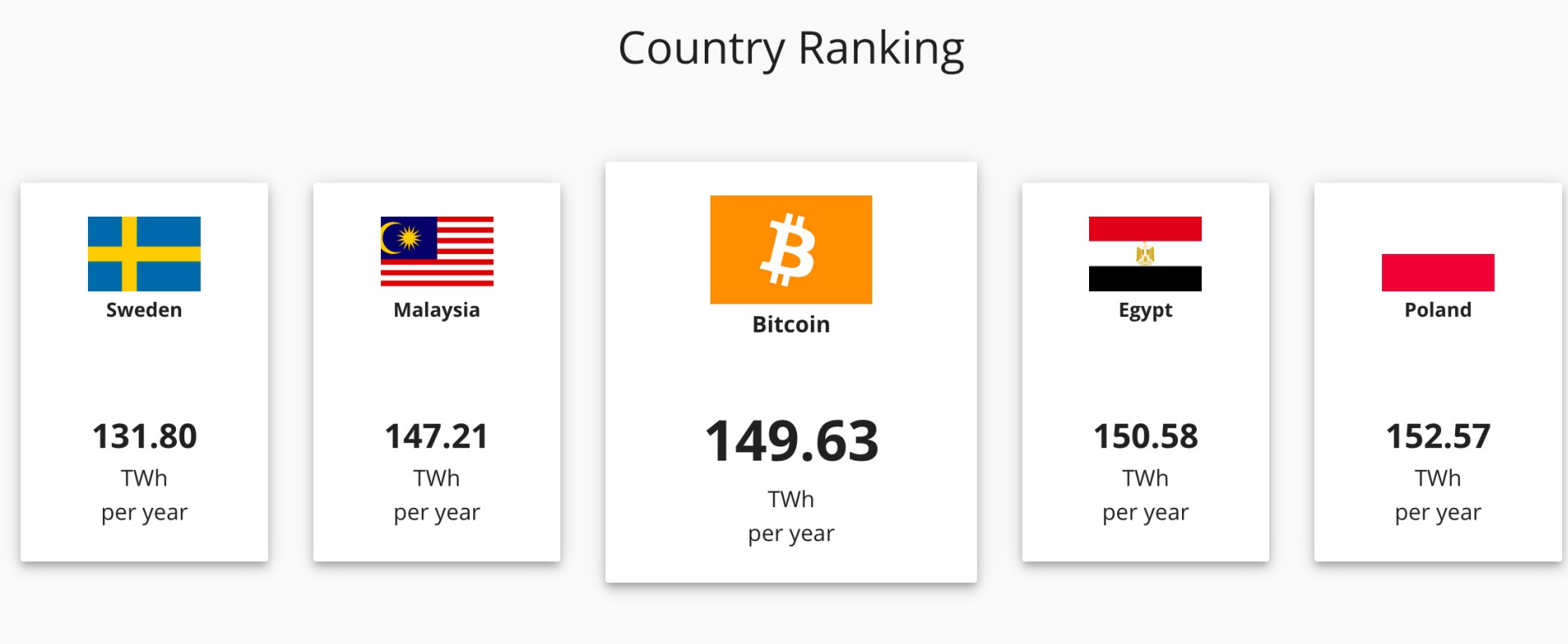
Source: BitInfoCharts.com

Digital Footprint of Bitcoin Transactions

- Bitcoin flows can be traced across addresses
  - But no ability to know the identity of the owner of the address unless an address interacts with nodes that require KYC standards
  - Ability to stay completely anonymous if you know what you are doing

- Costs of being anonymous decrease with wider adoption of Bitcoin
  - If BTC is not widely adopted, need to use exchanges to cash out
  - If BTC is widely adopted, it will become possible to bypass exchanges or other points of verification (KYC) completely, e.g. unregulated counterparties and merchants, trading across cryptocurrencies etc

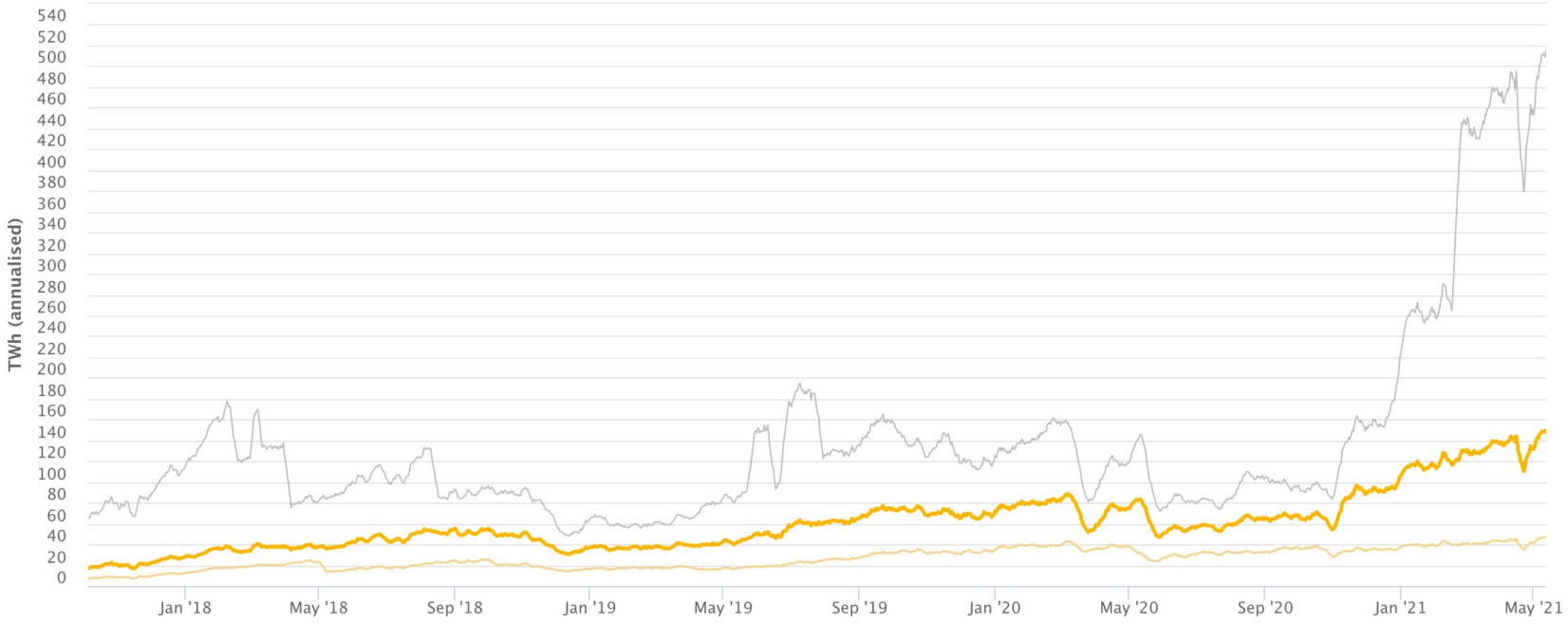
Very High Level of Energy Consumption



Cambridge Center for Alternative Finance

Non-Linear Increase in Energy Use with BTC Price Increase

Estimated Bitcoin Electricity Consumption: Lower Bound, Best Estimate , Upper Bound



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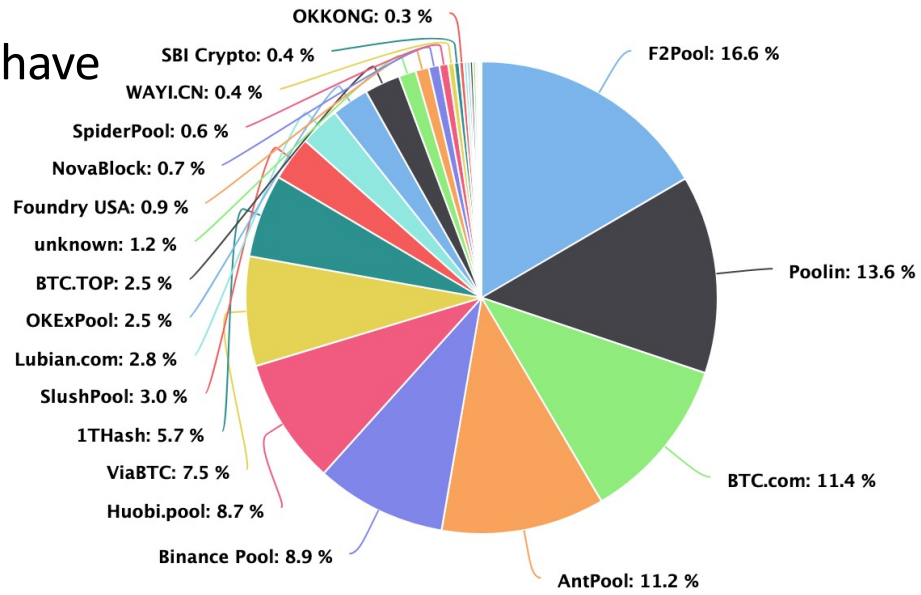
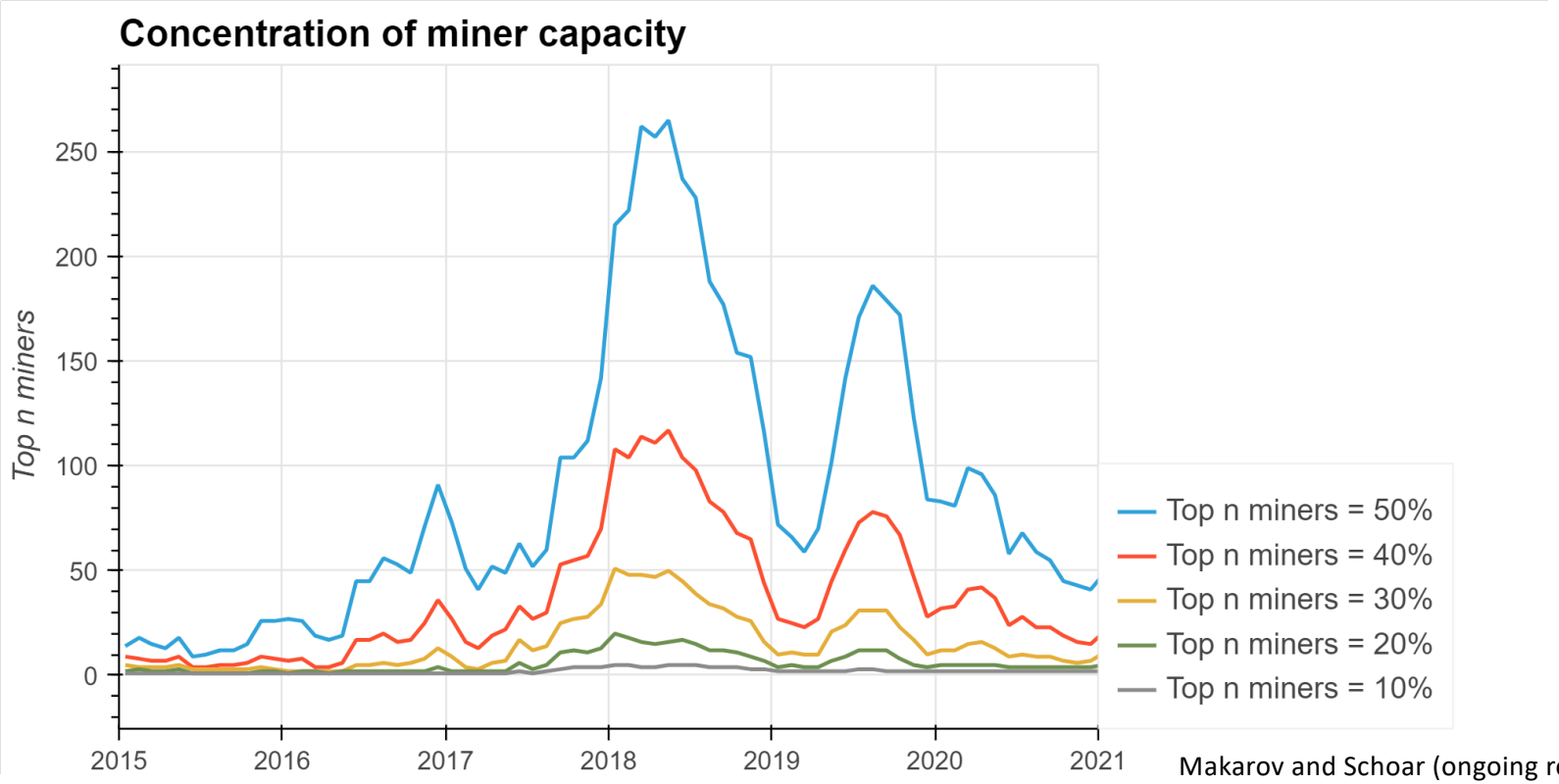
  - **Large holders ("hodlers"): significant concentration**
  - **Exchanges and other payment counterparties**
  - **Individual retail traders**

Miners: Provide Verification of Transactions

- Mining is done in pools
  - Provide coinsurance by pooling capacity of miners
  - Majority of pools are registered in China
  - Highly concentrated
  - Many pools either directly controlled or have strong links to Bitmain Technologies
- But mining pools are not miners
  - We identify miners based on pool distributions



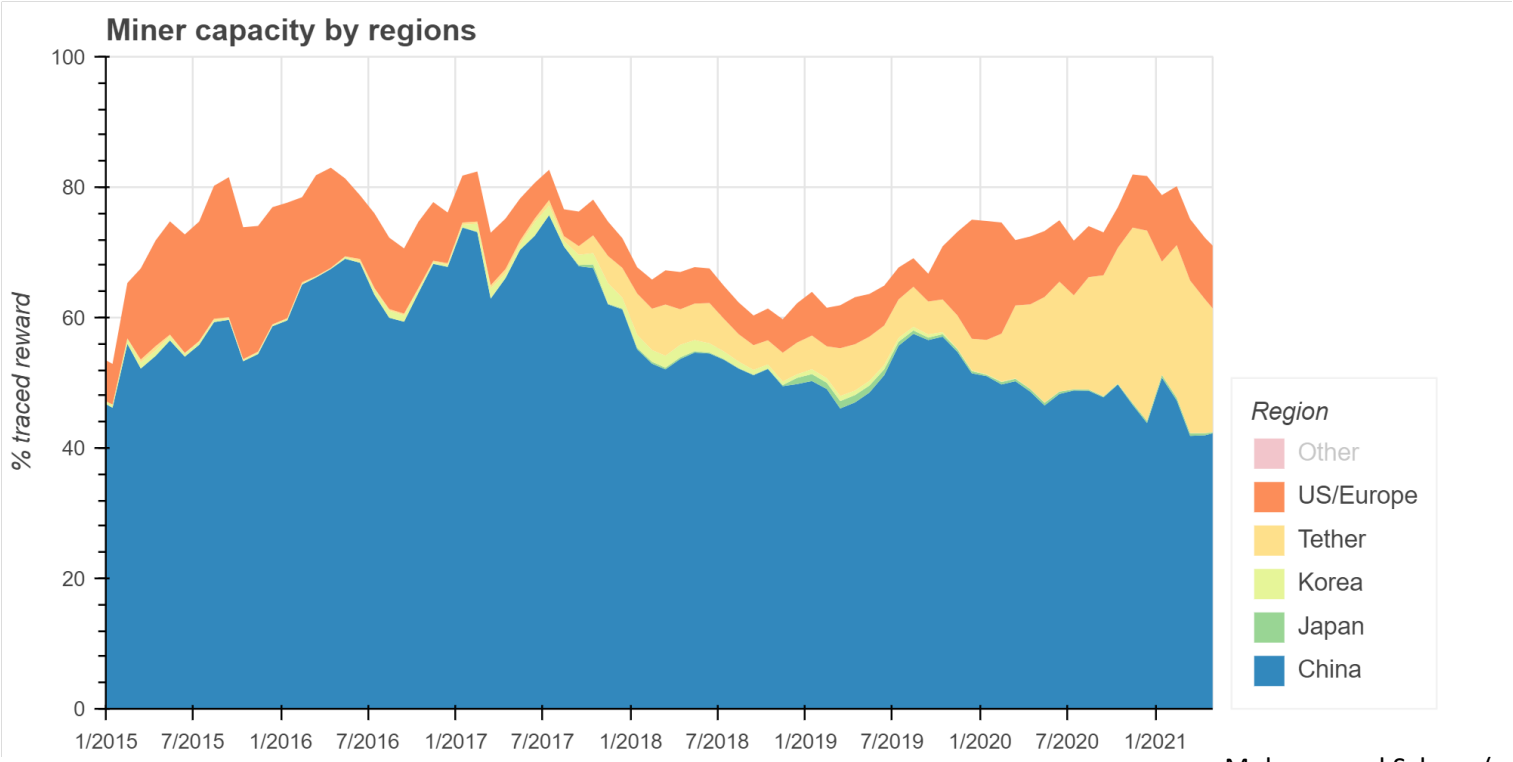
Miners: Significant Concentration of Mining Capacity



Makarov and Schoar (ongoing research)

Mining capacity concentrated in a small number miners. Concentration varies with the Bitcoin price

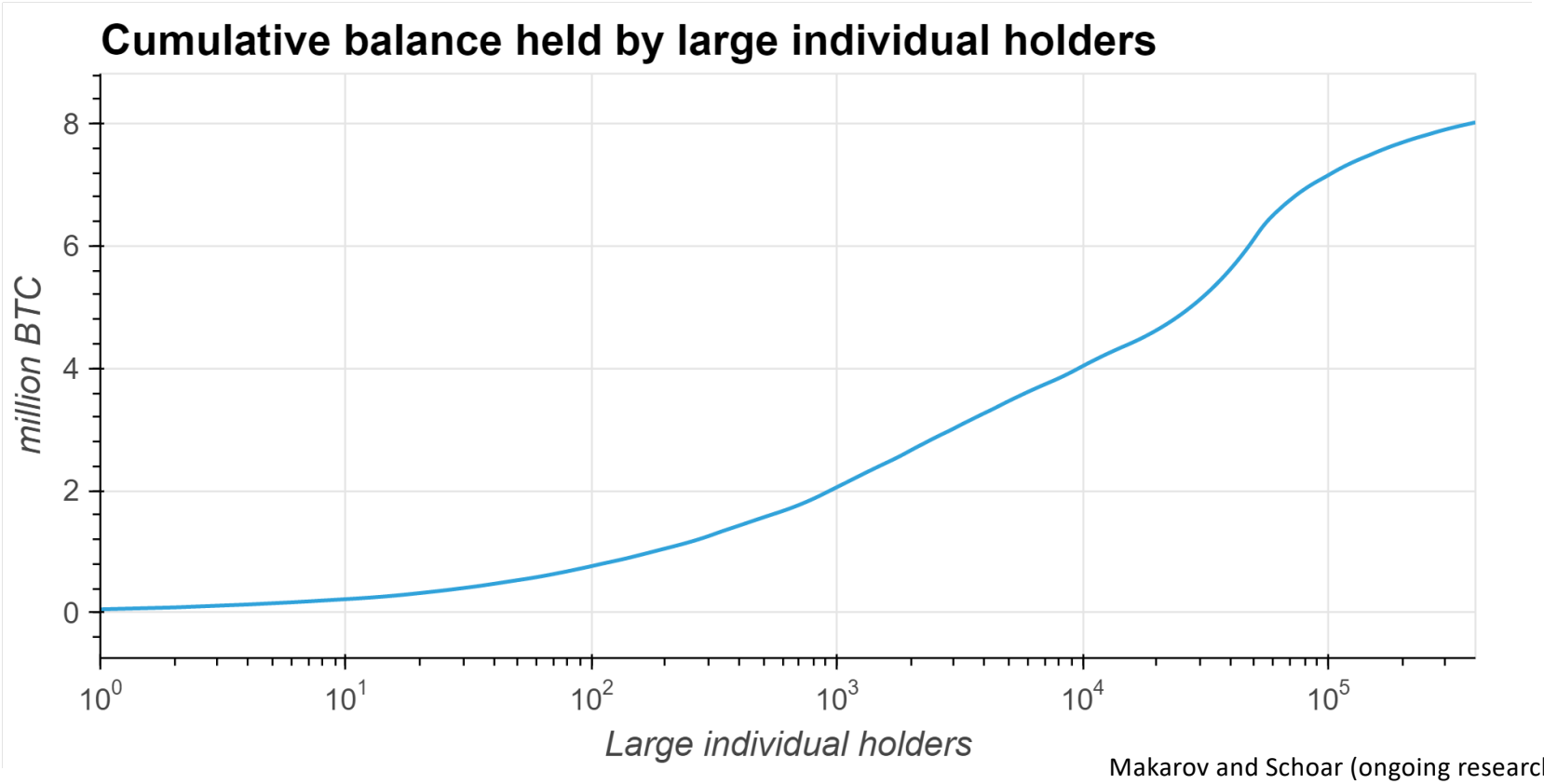
Miners: Most Miners Use Chinese Exchanges to Cash Out



Makarov and Schoar (ongoing research)

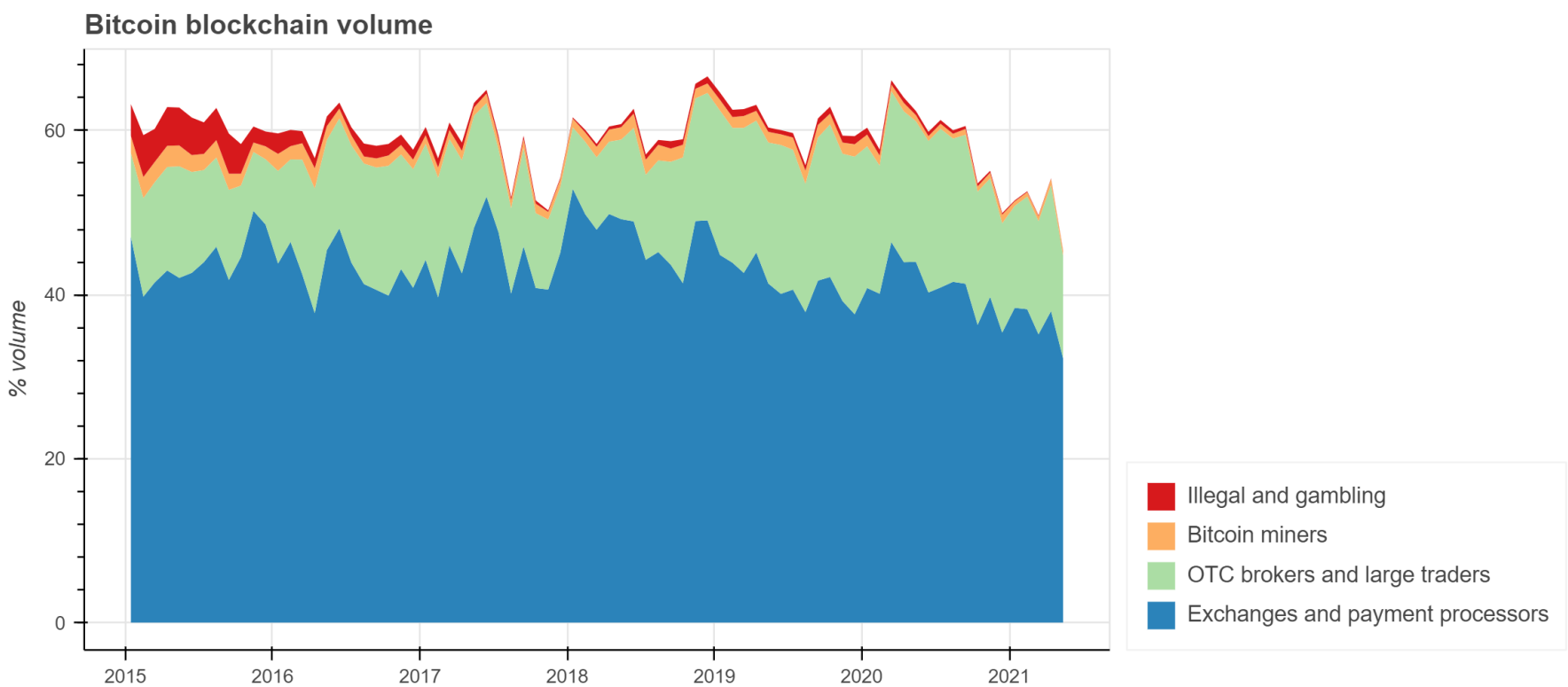
Majority of miners that we can trace use Chinese based exchanges or tether to cash out their rewards

Hodlers: Ownership is Very Concentrated



Makarov and Schoar (ongoing research)

Majority of Transactions on the Blockchain are Trading Activities



Makarov and Schoar (ongoing research)

Drivers of Value: Use cases of Bitcoin?

- Day-to day payment mechanism?
  - Transaction costs
  - Speed of settlement

➔ **Too slow and too expensive**

- Store of Value?

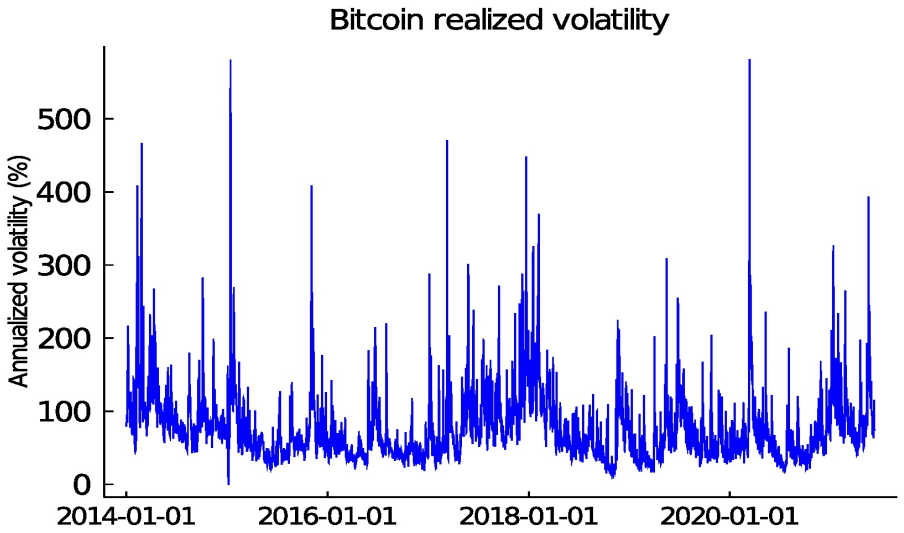
➔ **Very questionable given the statical properties of BTC returns**

- **Speculative asset!**

Bitcoin: Statistical properties

- High and persistent price impact: a net buy order of 3000 BTC ($100M) leads to 1% price increase, Makarov and Schoar (2020)

- Volatility stayed high despite increasingly large market cap



Bitcoin: Statistical properties (con't)

- Correlation of Bitcoin returns with the market has been increasing as Bitcoin has attained higher market capitalization
  - Bitcoin's correlation with risky assets has proven to be highest in times of market stress, such as March 2020, see Czasonis et al (2021)

- Historically, Bitcoin had an attractive Sharpe ratio
  - Current high valuation is built on the expectation that allowing US public institutions to invest in Bitcoin will bring new, price-insensitive capital to the market
  - But high Sharpe ratio is not sustainable in the long run when everyone who would like to invest in Bitcoin will have already invested in Bitcoin; Han and Makarov (2021)

Bitcoin: Diversification Benefits?

- Bitcoin is not a productive asset. Unclear what risk, other than inflation, Bitcoin can hedge against
  - Financial markets in most developed countries already offer inflation-hedging instruments such as inflation-linked bonds
  - A much cheaper and more efficient solution for most countries is to increase the supply of these instruments rather than rely on Bitcoin

Wider Adoption: What Is at Stake for Regulators?

- Current pressure on regulators
  - Large lobbying efforts to allow regulated financial institutions like pension funds, mutual funds, publicly traded firms or government entities to speculate in Bitcoin
  - What risks should society be willing to accept?

- Caveat: Not all crypto is the same
  - Underlying blockchain technology or smart contracts can have large value for society going forward and discussion should be separated from bitcoin
  - Stable coins, if well regulated and backed by government issued-currencies, could provide significant benefits for the payment system

Wider Adoption: What Is at Stake for Regulators?

- Loss of seigniorage
  - Seigniorage benefits shift from the public to a few earlier adopters
  - Total value of M1 in the G20 economies is $31 trillion. If Bitcoin replaces government backed currencies, seigniorage benefits are transferred to parties that do not provide public goods

- Systemic risk
  - Entrusting control of a widely-used store of value to unknown entities, not representing the interests of society nor accountable to public oversight, can create large disruptions and systemic risk. Malevolent private or state actors, could gain control and inflict large losses on the general public and FIs
  - Miners can hold up move to a more efficient protocol

Wider Adoption: What is at Stake for Regulators?

- **Shadow economy**
  - The wider the adoption of Bitcoin for payment purposes the easier it will be to use it for transactions without ever having to touch regulated (KYC) entities
  - Facilitates tax evasion since transactions cannot be traced to individual entities

- **Malfeasance**
  - Large holders of cryptocurrencies have an incentive to lobby government officials or regulators to promote investments in cryptos; potential for massive price impact of any visible announcement of adoption
  - Opaqueness of Bitcoin makes it much harder to enforce rules against market manipulation, bribes and self-dealing

Take away

- Bitcoin is predominantly a speculative asset
  - Very limited use as transaction medium or store of value
- Wider Bitcoin adoption may not be in the interest of the general public
  - Loss of seigniorage benefits
  - Large risks to financial stability, national security, and increased likelihood of financial malfeasance

Thank you!