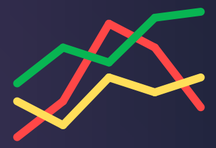
Using Bitcoin for Financial Transactions

Risks and Concerns



Josh Hatfield

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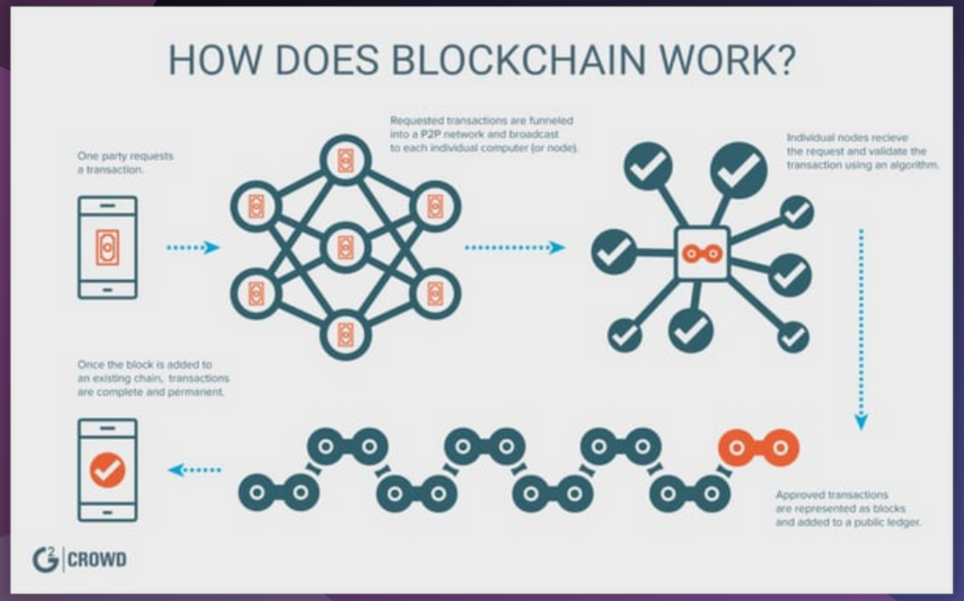

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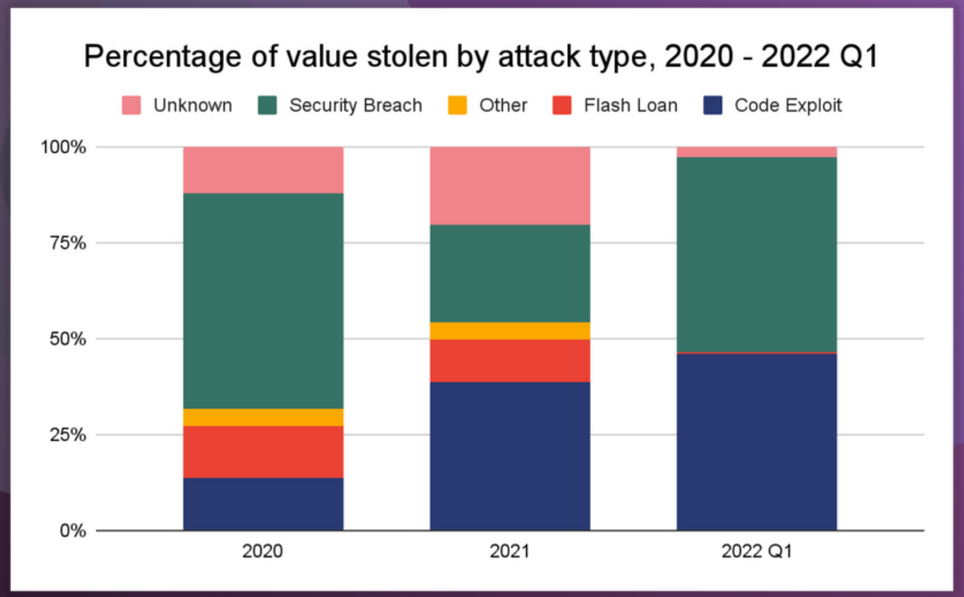


Figure 2. Percentage of value stolen by attack type, 2020 - 2022 Q1. (n.d.). Chainalysis. Retrieved November 3, 2022, from https://blog.chainalysis.com/reports/2022-defi-hacks/.

Overview and Security Risks

- Due to decentralization, Sybil attacks can lower the **51% hashrate** pool for control of a blockchain, thereby blocking transactions or committing double-spending (Sultanik et al., 2022)
- Oracles relay deterministic functions based on external conditions; can be exploited to **bypass slippage checks** and alter price calculations (Federal Bureau of Investigation, 2022)
- There will always be **exploits** in the mathematical code making up blockchains such as ECDSA randomness or CVE-2022-21449 (Wang et al., 2020)

Environmental Concerns

- Bitcoin consumes approximately **0.55% of global electricity production**, roughly equivalent to countries like Sweden or Malaysia (Cambridge Center for Alternative Finance, 2021, as cited in Carter, 2021)
- China's crackdown has led to more unconventional methods outside of its hydropower plants; natural gas now contributes **31% of electricity mix** in China (Hinsdale, 2022)
- Although relationally chaotic and nonlinear, there seems to similar trends between **prices and electricity consumption** (Maiti, 2022)

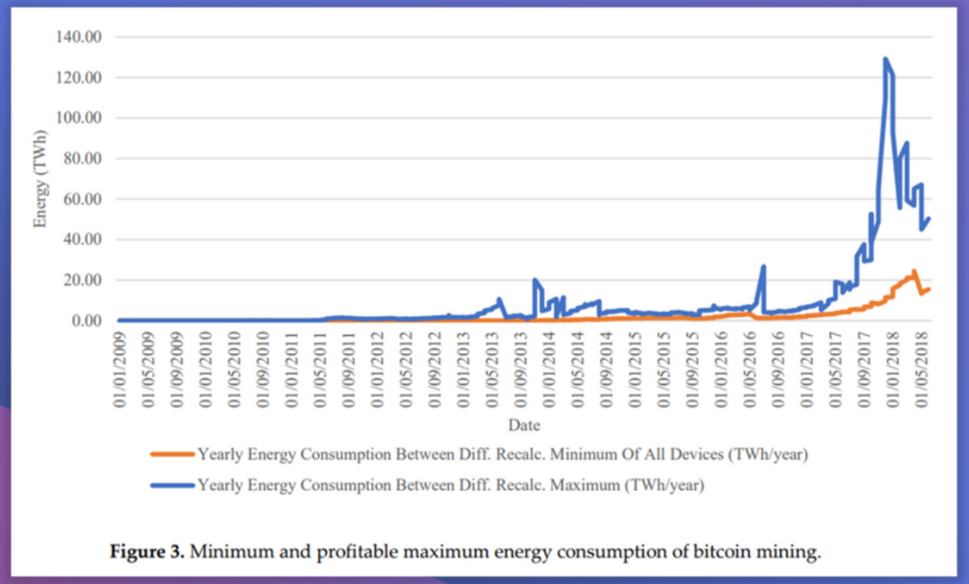


Figure 3. Minimum and profitable maximum energy consumption of bitcoin mining.

Figure 3. Küfeoğlu, S., & Özkuran, M. (2019). Minimum and profitable maximum energy consumption of bitcoin mining. Cambridge Working Papers in Economics. Retrieved November 3, 2022, from https://www.repository.cam.ac.uk/bitstream/handle/1810/294129/cwpe1948.pdf?sequence=1.

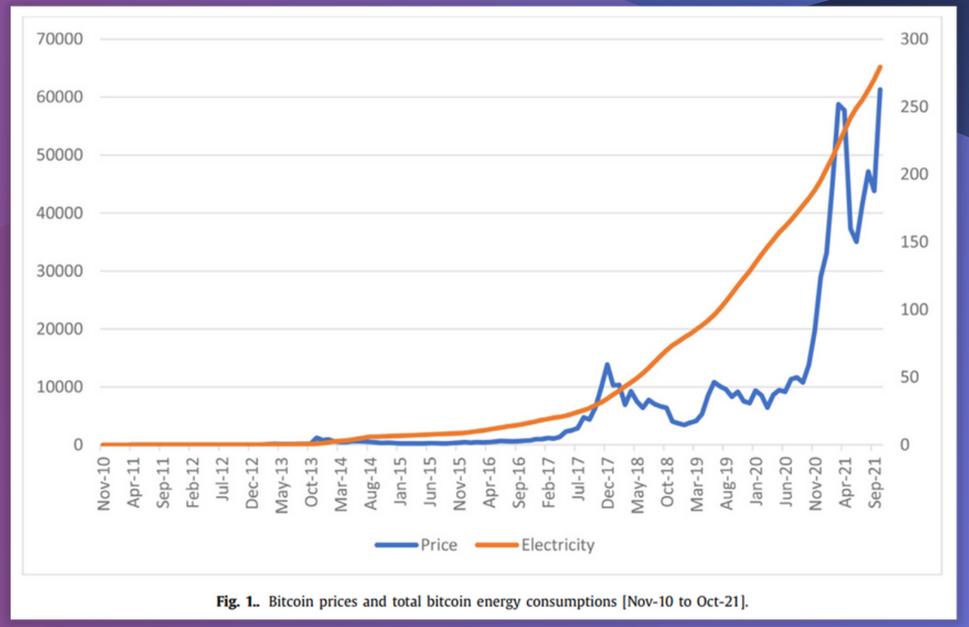


Fig. 1.. Bitcoin prices and total bitcoin energy consumptions [Nov-10 to Oct-21].

Figure 4. Maiti, M. (2022). Bitcoin prices and total bitcoin energy consumptions [Nov-10 to Oct-21]. ScienceDirect. Retrieved November 3, 2022, from https://www.sciencedirect.com/science/article/pii/S259005442200015X.

Economic Factors

- Intraday **volatility is extreme** compared to ETF and index funds like the S&P500 (Sarkodie et al., 2022)
- Nearly **80% of all the Bitcoin supply is illiquid**; this creates economic buy-side crises (Schultze-Kraft, 2020)
- Decentralization indicates that entities like banks or governments **cannot insure** losses from stolen or legitimate transactions
- Being dependent on electricity, the value proposition relies on whether the Bitcoin **price outweighs the mining costs**

Figure 5. Sarkodie, S. A., Ahmed, M. Y., & Leirvik, T. (2022). Logarithm of daily high and low bitcoin prices. ScienceDirect. Retrieved November 3, 2022, from https://www.sciencedirect.com/science/article/pii/S1544612322002264#:~:text=We%20find%20that%20bitcoin%20trade,footprint%20in%20the%20long%20run.&text=A%20dynamic%20shock%20in%20trade,carbon%20footprint%20by%20almost%2050%25.

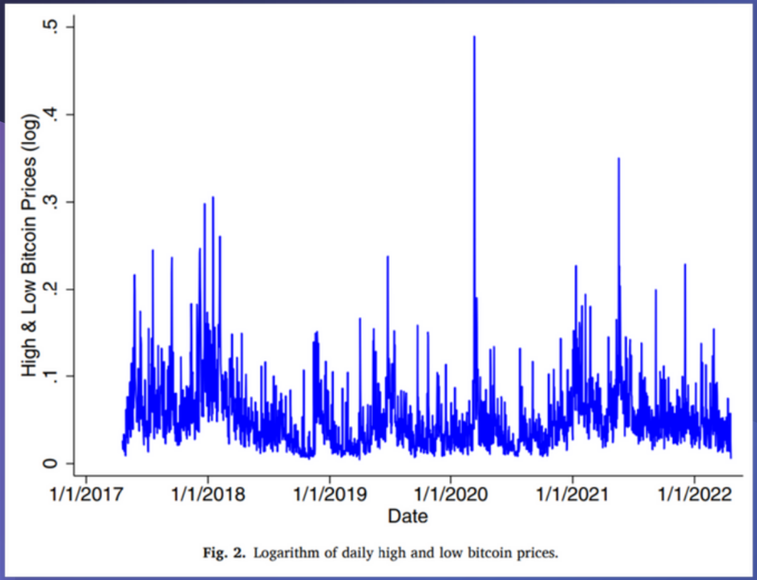
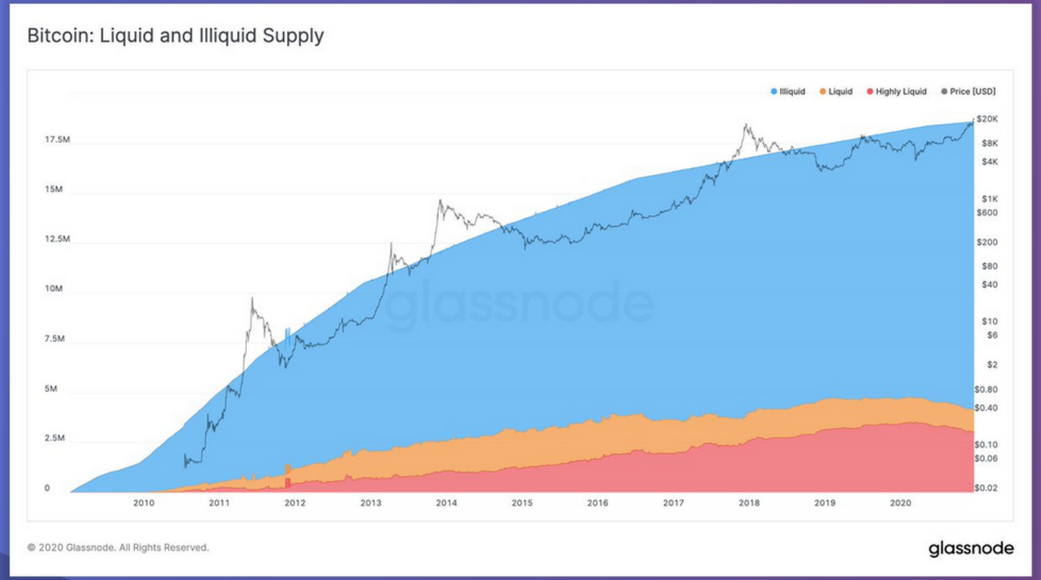


Fig. 2. Logarithm of daily high and low bitcoin prices.

Figure 6. Heeg, K., & Schultze-Kraft, R. (2020). Bitcoin: Liquid and Illiquid Supply. Glassnode Insights - On-Chain Market Intelligence. Retrieved November 3, 2022, from https://insights.glassnode.com/bitcoin-liquid-supply/.



References

Carter, N. (2021, May 5). How Much Energy Does Bitcoin Actually Consume? Harvard Business Review. Retrieved November 4, 2022, from https://hbr.org/2021/05/how-much-energy-does-bitcoin-actually-consume

Federal Bureau of Investigation. (2022, August). *Cyber Criminals Increasingly Exploit Vulnerabilities in Decentralized Finance Platforms to Obtain Cryptocurrency, Causing Investors to Lose Money*. (I-082922-PSA). https://www.ic3.gov/Media/Y2022/PSA220829#foot1

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References (cont.)

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Hinsdale, J. (2022, May 4). *Cryptocurrency's Dirty Secret: Energy Consumption*. State of the Planet. Retrieved November 4, 2022, from https://news.climate.columbia.edu/2022/05/04/cryptocurrency-energy/

Maiti, M. (2022). Dynamics of bitcoin prices and energy consumption. *Chaos, Solitons & Fractals: X*, 9, 1-5. https://doi.org/10.1016/j.csfx.2022.100086

Sarkodie, S. A., Ahmed, M. Y., & Leirvik, T. (2022). Trade volume affects bitcoin energy consumption and carbon footprint. *Finance Research Letters*, 48, 1-8. https://doi.org/10.1016/j.frl.2022.102977

Sultanik, E., Remie, A., Manzano, F., Brunson, T., Moelius, S., Kilmer, E., Myers, M., Amir, T., & Schriner, S. (2022). [Report HR001120C0084]. Are Blockchains Decentralized? Unintended Centralities in Distributed Ledgers (pp. 1-26). New York, NY: Trail of Bits. Retrieved November 3, 2022, from https://assets-global.website-files.com/5fd11235b3950c2c1a3b6df4/62af6c641a672b3329b9a480_Unintended_Centralities_in_Distributed_Ledgers.pdf.

References (cont.)

Schultze-Kraft, R. (2020, December 29). *78% of the Bitcoin Supply is Not Liquid*. Glassnode Insights – On-Chain Market Intelligence. Retrieved November 3, 2022, from https://insights.glassnode.com/bitcoin-liquid-supply/

Wang, Z., Yu, H., Zhang, Z., Piao, J., & Liu, J. (2020). ECDSA weak randomness in Bitcoin. Future Generation Computer Systems, 102, 507–513. https://doi.org/10.1016/j.future.2019.08.034

Questions?