

Blockchain & Cryptocurrency Mining

OVERVIEW

A new form of transaction authentication has emerged. A small but growing contingent of participants are recording transactions on an electronic public record known as the “blockchain”.^{1, 2} This may eventually replace much of the global transaction “validation” and “authentication” process. If this occurs, it could massively impact the banking and legal institutions we have relied upon for over 700 years.

TRADITIONAL AUTHENTICATION

Even before the days of the House of Medici, monarchs and countries have looked to trusted third parties to vouch for the ability of another party to honor commercial obligations. Letters of introductions became letters of credit which became check books, credit cards and now Venmo. In each case, we rely on a third party to vouch for a counter party to fulfill their obligation. JP Morgan estimates there are \$54T in global payment flow annually.³ The infrastructure to ensure this process flows smoothly is large and expensive.

If a new method existed whereby the authentication happened essentially immediately, and for a fraction of the cost, the new method could disintermediate the banks, lawyers, and regulators whose primary job it is to do just that.

FUNDAMENTALS USE ABOVE ALL ELSE

One constant throughout time is: Technology that reduces costs is eventually adopted. The use of the blockchain to validate transactions is becoming more widely adopted. As transactions occur and need to be validated, tens of thousands of computers located all over the world independently compete to validate transactions. The group of computers that validate the transaction first are compensated for their service. The compensation for the validation is the award of a Bitcoin or similar cryptocurrency. In addition to the lower cost of the validation, many believe the security may actually be higher.

How? By having the entire public record of transactions maintained by tens of thousands of independent participants in hundreds of countries.

It is unknowable whether a better or cheaper technology may in the future take the place of the current blockchain. It is also unknowable whether the blockchain could be hacked and transaction records be altered or destroyed. However, in the more than 15 years of its existence, it appears that as the current blockchain gets longer and more validators enter, the more difficult, bordering on impossible, compromising the blockchain becomes.

CRYPTOCURRENCY MINING

The process of authenticating transactions on the blockchain is known as “mining”.⁴ The remuneration for this authentication service is in the form of a “digital coin” or “cryptocurrency”. This acceptance of blockchain validation has been accelerating in the last few years.

The actual process is quite complicated as you would imagine. At a very high level, “miners” can either mine alone or join a “mining pool.” Miners combine their computing power with other miners and thereby increase their chance to solve the complicated mathematical problem. The “pool” that solves the problem first shares the reward.

These operations ensure a transaction has not previously occurred, validates it, and adds it as a “block”, to the public record, aka “the chain”. Validating and recording transactions to the blockchain should attract authenticators as long as it is profitable or until a new technology replaces it. A rising price of a cryptocurrency, we will use Bitcoin as the example, should attract new validators until the Bitcoin price or profit drops. The balance between the potential for an unlimited number of new “validators” to enter and the declining amount of Bitcoin awarded establishes an extremely efficient supply demand balance. Bitcoin is the most notable cryptocurrency and has a built-in elegance.

Without crushing you with details, the system is designed to prevent one or a handful of “big players” to dominate. For a more complete explanation, [read the original 2008 Bitcoin white paper](#), [see this link](#).

ECONOMICS OF MINING

For purposes of illustration I will focus comment on how the Bitcoin blockchain works. The Bitcoin blockchain is a “proof of work” chain. Other blockchains, for example Ethereum and Solana, are a “proof of stake”. Keeping it simple, the proof of work chains are generally deemed to be “safer” and the award to the miners – Bitcoins – are contractually limited in the amount of total issuance. The maximum issuance is what gives Bitcoin miners confidence that the value of the Bitcoin will rise.

The basic economics of “mining” revolve around four variables: the cost of the computers, how quickly they compute, the cost of energy they use, and the value of the cryptocurrency they receive for a successful authentication.⁵ The pool rewards (Bitcoin) are shared with pool participants in proportion to the amount of computational power (also called hash rate) that they contribute to the mining pool.

The faster the computer, the faster it solves the problem and the less energy it uses. The lower the cost, the higher the profit. Eventually, slow computers lose money (cost of power and maintenance) and remove themselves from the pool.

CRYPTOCURRENCIES

Some technologies used to authenticate specific types of transactions on the blockchain should be attractive enough to command wide commercial usage. This generates cryptocurrency awards (coins) and, if there is a finite amount available, such as is the case with Bitcoin, the price of the coins may rise. However, caveat emptor. Four years ago, there were an estimated 6000 types of cryptocurrencies in existence. Today the number is closer to 8,900.⁶ They all are a little different and some, due to the ability for unlimited issuance, may be scams.⁷ The one thing about which most people agree is that in just a few years more than 95% of the cryptocurrencies in existence today will probably be worthless.

I don't know how much capital was invested, and

subsequently lost, building the internet: Hundreds of billions of dollars is my guess. The same will likely be true for many cryptocurrencies. Perhaps like the 3000 US car companies that over a 40-year period whittled down to the Big 3, it may be years before who we know who the big winners might be in cryptocurrency.⁸

WILL BLOCKCHAIN CATCH ON?

Human nature has always moved towards better quality and lower costs. Blockchain technology has the potential to deliver faster, less expensive authentication systems with fewer errors. The odds of it succeeding continue to grow everyday due to the network effect known as Metcalfe's Law⁹. As was the case with telephones and email, the more people that use them, the more valuable the network becomes. The more people earn and resell cryptocurrency, the more accepted cryptocurrency should become.

Strong evidence of the growing adoption comes from one of blockchain's previously most vocal skeptics, JP Morgan's CEO, Jamie Dimon. As April 2024, he appears to have modified his position. In the last two years JPMorgan in developing and deploying its own blockchain and cryptocurrency, JPM coin, to speed up and reduce the cost of transactions.¹⁰

“Blockchain is real, it's a technology,” Dimon said. “We use it, it's going to move money, it's going to move data, it's efficient... Cryptocurrencies, there are two types. There's a cryptocurrency that might actually do something... And then there is one which does nothing.”

In the process, we believe the systems to authenticate could become much, much more valuable. The combined worth of two companies alone that facilitate global transactions, Visa and Mastercard, is just shy of \$1 trillion.¹¹

INVESTING IN THE BLOCKCHAIN

The opportunities to invest in the blockchain are extensive. Most of the news coverage revolves around speculating on the price of Bitcoin or Bitcoin ETFs. The volatility of cryptocurrencies is an estimated 6 to 80 times higher than stocks or bonds. Trading cryptocurrency coins is highly speculative, and most people speculating will probably lose money.

Despite the early problems and scams, the Securities and Exchange Commission did a complete about-face and approved Bitcoin ETFs in early 2024. A few months later they approved the ETF of Ethereum cryptocurrency. Now that institutions have the ability to safely own digital currencies, and financial institutions have the ability to make money by custodying, trading and distributing crypto, the odds are very high this asset class will be around for some time to come.

Another way to invest in the emerging industry is to be a “miner”, or a participant in authenticating transactions. In order for the independent verification of transactions to remain viable, the miners doing the authentication must be able to make a profit. Miners compete with one another as each new transaction is added to the block chain; they record the new transaction and authenticate the entire block of past transactions. Without miners there can be no blockchain. Without a reasonable profit potential there can be no miners. Could a lower-risk way to profit from crypto is to be a miner?

BE CAUTIOUS

I own Bitcoin, Ethereum, as well as ETFs that hold both. I own them because I believe the blockchain will be a major transaction authenticator at some point in the future. The blockchain can only exist if someone validates transactions and gets paid for doing so. Rewards for validated transactions on the blockchain are in Bitcoin. The reward for validating is cut in half every four years. Therefore, in order for validating transactions to remain profitable, some combination of the following must occur: 1) the price of computers must come down, 2) the speed to compute must rise enough to offset the 50% award reduction and/or 3) the price of Bitcoin must rise. I suspect, to some degree, all will occur, and believe the price of cryptocurrencies could rise at a rate well in excess of inflation.

Like Amazon's stock price, which has collapsed many times in the last 26 years (once more than 90%,¹²), investing in the future of blockchain and cryptocurrencies is rife with risk, volatility, and potential losses. Most people should avoid trading it. For those who believe in the fundamental purpose it may play in the future, owning a little and holding for a long time may be prudent.

For those with really long-time horizons, a few tiny acorns planted today could become large oak trees twenty-five years from now.

Christopher F. Poch
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¹ <https://www.ibm.com/blockchain/what-is-blockchain>

² Private record authentication also exists

³ <https://www.jpmorgan.com/insights/payments/payment-trends/payments-are-eating-the-world>

⁴ <https://www.investopedia.com/tech/how-does-bitcoin-mining-work/>

⁵ <https://www.investopedia.com/tech/how-does-bitcoin-mining-work/>

⁶ <https://explodingtopics.com/blog/number-of-cryptocurrencies>

⁷ <https://www.investopedia.com/terms/d/dogecoin.asp>

⁸ https://en.wikipedia.org/wiki/Automotive_industry_in_the_United_States

⁹ <https://www.peterfisk.com/2020/02/metcalfes-law-explains-how-the-value-of-networks-grow-exponentially-there-are-5-types-of-network-effects/>

¹⁰ However, Dimon has led JPMorgan in developing and deploying its own blockchain and cryptocurrency, JPM coin, to speed up and reduce the cost of transactions. It would come as no surprise nor would it be out of character if Dimon was motivated to create his own crypto wallet and attempt to become the industry standard for security and reliability.

¹¹ Source: ThomsonOne: Market cap Mastercard \$468B and Visa \$528B 8/19/2024

¹² <https://www.cnn.com/2018/12/18/dotcom-bubble-amazon-stock-lost-more-than-90percent-long-term-investors-still-got-rich.html>

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