

An Economic Appraisal of Blockchain's Impact on Finance and Market Competition

Gunhee Lee¹ and Ted Kim^{1#}

¹Seoul Academy, Republic of Korea

#Advisor

ABSTRACT

This paper provides an economic appraisal of blockchain technology's impact on the two representative pillars of an economic system: finance and market competition. It is argued that although cryptocurrencies designed upon blockchain technology are perceived as alternative currencies and speculative financial assets today, their roles are limited in the economic sense. However, blockchain technology can promote market competition in the internet sector by the virtue of decentralization. In comparison to the highly concentrated market power of current internet companies, new dynamics of market competition based on Web3 are discussed.

Introduction

The public debate on blockchain technology has mainly revolved around its impacts on macroeconomy: economic stability and growth. While opponents of blockchain and its applications tend to focus on disruptive impacts on economies, proponents argue that blockchain is creating new economic opportunities and serves as an engine of economic growth. To illustrate the former, cryptocurrencies built on blockchain technology have long been criticized as speculative investment assets that can lead to economic instability. For example, the Terra-Luna crash in 2022 reflects the argument. After the value of TerraUSD (UST)¹ had experienced a severe drop on May 9, Luna, its sibling cryptocurrency, plummeted nearly 96% in only 24 hours on May 12, collapsing to near zero (Likos, 2022). The downfall of UST and LUNA gave rise to a rippling effect throughout the entire cryptocurrency market and about half a trillion dollars of the total market cap evaporated within the following week. (Sigalos, 2022). Some commentators described the event as a Bear Stearns moment of the crypto market, while others called it a revival of the Dotcom Bubble² of the early 2000s. It was a nightmare for investors who were dazed by technical jargon, such as a stablecoin or algorithmic pegging, and invested their life-long earnings in blockchain-based cryptocurrencies.

The other side of the debate often juxtaposes blockchain with the internet revolution. Supporters of blockchain and its applications assert that blockchain will revolutionize technologies, markets, and economies as the internet did. Although the internet brought about the Dotcom Bubble and thus economic instability in its infancy, it is undeniable that the basic thesis of early investors in the new economy was right: the internet was the future (Birch, 2022). A recent study conducted by Professor John Deighton at Harvard Business School and a colleague found that the digital

¹ TerraUSD (UST) is an algorithmic stablecoin that is built on the Terra blockchain. It is called a "stablecoin" because its value was designed to be pegged to the US dollar, making it a stable crypto asset that maintains its value regardless of the high volatility of the crypto market.

² The U.S. stock market experienced a rapid rise in the valuations of internet-based companies and thus the total market capitalization. During the period from 1995 to 2000, there was an exponential increase in the value of equity markets, particularly the technology-focused Nasdaq index, which soared from less than 1,000 to over 5,000. However, in 2000, a shift occurred, and between 2001 and 2002, the equity market entered into a bear market when the bubble burst (Hayes, 2019).

economy's contribution to the U.S. economy has grown eightfold since 2008 and now accounts for 12% of the total U.S. GDP. (Deighton & Kornfeld, 2021). The supporters of blockchain contend that blockchain will follow in the footsteps of the internet. An under-addressed question in the debate is how blockchain may change our economic system from the ground. The stability and growth debate appears to be pointless unless the economic system, upon which economic stability and growth are manifested, is fully discussed. Economic systems represent the way how individuals and their economic actions are organized together in a system (Sah & Stiglitz, 1984). Economists have paid large attention to the subject because it explains the heterogeneity of performance across economies through time (North, 1994): some economies with particular economic systems have survived shocks and turmoil and yielded high economic performance in the long term while others have not. Thus, studying blockchain's impacts on economic systems allows us to understand our economies' long-term performance. Although blockchain's short-term effects on economic stability and growth are still worth attention, going beyond is imperative to appraise the implications of blockchain in the long term.

In this regard, this review critically discusses blockchain's impact on economic systems. In particular, this review attempts to shed light on potential as well as ongoing fundamental changes that blockchain is presumably bringing to the two pillars of an economic system: finance and market competition. It is argued that while blockchain has a limited role in restructuring the current financial systems, the nature of market competition is undergoing radical changes. It is worth noting that the scope of blockchain's impact is not necessarily limited to the two areas. However, understanding these areas serves as a cornerstone upon which we can deepen the debates on blockchain and its implications.

A Brief Introduction to Blockchain Technology

Blockchain technology is a distributed and decentralized system that allows for the secure and transparent recording of transactions across a network of computers. In a blockchain, transactions are recorded in blocks that are linked together in a chronological chain, creating an immutable ledger that cannot be altered or tampered with (Crosby et al., 2015). Thus, blockchain technology is deemed to facilitate the process of recording transactions and tracking assets. Assets can take the form of tangible items, such as cash, cars, or houses, as well as intangible ones like intellectual property, patents, copyrights, and branding (IBM, n.d.). Figure 1 illustrates how a blockchain works in financial transactions.

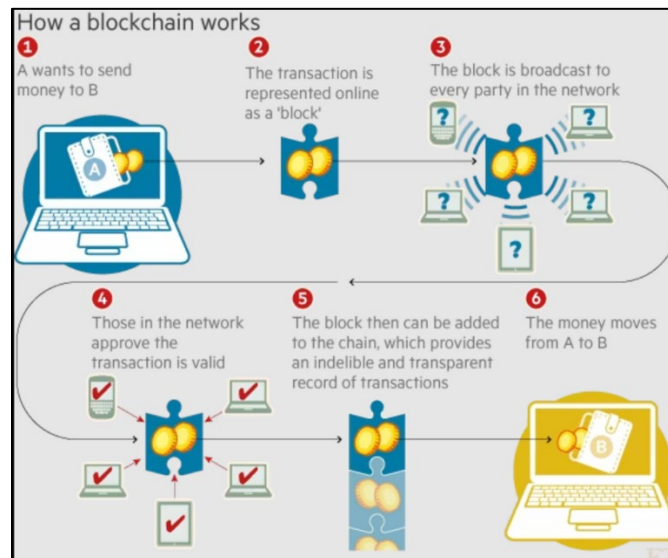


Figure 1. Financial Transactions Using Blockchain Technology. From “*Technology: Banks Seek the Key to Blockchain*” by J. Wild, M. Arnold, and P. Stafford, 2015, Financial Times.

Blockchain technology entails several advantages in transactions over traditional ledgers. One of the primary benefits is that it provides a high level of security, as each block in the chain is cryptographically verified and the network operates on a consensus mechanism that requires agreement from all participants for new transactions to be added. This makes it virtually impossible for any single entity to manipulate or corrupt the ledger. Another key advantage is its transparency, as all participants in the network have access to the same information and can verify the integrity of the ledger. This can increase trust and reduce the need for intermediaries in transactions, potentially leading to faster and more efficient processes (Wild et al., 2015).

Blockchain technology was invented to design and build Bitcoin, the first and most well-known application of blockchain technology. It was created in 2009 by an unknown person or group of people using the pseudonym Satoshi Nakamoto. The intended purpose of Bitcoin was to provide a decentralized digital currency (cryptocurrency) that could be used to facilitate peer-to-peer transactions without the need for intermediaries such as banks (Nakamoto, 2008). Bitcoin's blockchain is based on a consensus mechanism called Proof of Work (PoW), which ensures the validity of transactions and prevents double-spending. PoW requires computational work to be done to add a new block to the chain, which helps to prevent fraud and maintain the integrity of the system (Nian & Chuen, 2015)

Bitcoin's short history has been marked by periodic high volatility. In the early years, the value of Bitcoin was relatively low, and it was mostly used by tech enthusiasts and early adopters. However, the value of Bitcoin started to increase rapidly in 2013, reaching a high of over \$1,000 per coin. This led to a surge in interest in Bitcoin and blockchain technology, and many new companies and applications not only in finance but also in the technology sector were created. However, this rapid growth was not sustainable, and in 2014, the value of Bitcoin plummeted, leading to a period of stagnation and skepticism about the technology. It wasn't until 2017 that Bitcoin started to see another surge in value, reaching an all-time high of nearly \$20,000 per coin. This was followed by another crash in 2018, and the value of Bitcoin has been volatile ever since.

Overall, despite these ups and downs, the potential of Bitcoin and blockchain technology has continued to attract interest from investors, developers, and businesses around the world. The intended purpose of Bitcoin's blockchain is to provide a secure and decentralized way to transfer value without relying on a centralized authority. The blockchain allows transactions to be verified and recorded transparently, ensuring that all parties can trust the system without the need for intermediaries. (Nakamoto, 2008). This property makes the blockchain technology ideal for applications where trust and transparency are critical, such as in financial transactions, supply chain management, and digital identity verification (Iansiti & Lakhani, 2017).

Blockchain, Cryptocurrencies, and Financial Systems

From the genesis of Bitcoin, blockchain technology has given birth to many cryptocurrencies. Cryptocurrencies are essentially digital currencies that are built on blockchains and cryptography (Chan et al., 2020). Although other digital currencies existed before the emergence of blockchain technology, cryptocurrencies are distinct because of their high level of security, transparency, and anonymity. With their sharp rise in value on the market and increasing popularity, two different interpretations of cryptocurrencies have emerged: cryptocurrencies as alternative currencies and speculative financial assets.

The two interpretations and respective uses cannot fundamentally go together because cryptocurrencies as alternative currencies and speculative financial assets require different properties. Baur and his colleagues (2018) put emphasis on volatility as a key property that distinguishes one use from another. Low transaction costs, global accessibility, lack of government involvement, and ability to purchase certain goods, such as illegal drugs, with cryptocurrencies make them attractive as a medium of exchange to some potential users. However, the acceptability of the currency, confidence in the system, and volatility of the virtual currency's price may cause potential users to be hesitant. Furthermore, if a cryptocurrency is considered a speculative investment, the demand for the asset can add to the price volatility, which is favored by investors, and further distract potential users who see cryptocurrencies as alternative currencies.

If cryptocurrencies were primarily utilized as a form of payment for goods and services, they could potentially rival fiat currencies, such as the US dollar or Euro, leading to an impact on the value of the fiat currency and subsequently influencing the monetary policies enforced by the central banks. However, if cryptocurrencies were predominantly seen as speculative financial assets, they would compete with a vast array of other financial assets such as government bonds, stocks, and commodities, resulting in a more marginal role. Regardless of whether they are regarded as a currency or a speculative financial asset, the extent of their potential impact on the overall economy would hinge on the success of cryptocurrencies in comparison to current currencies and financial assets (Baur et al., 2018). This section discusses some relevant economic theories and empirical studies and evaluates the potential of cryptocurrencies as currencies and financial assets.

An Economic Appraisal of Blockchain's Impact on Finance

Blockchain and Cryptocurrencies as alternative currencies

The intended use of Bitcoin well represents the alternative currency view. As explained on its dedicated website, the central idea of Bitcoin is to “operate with no central authority or banks; managing transactions and the issuing of bitcoins is carried out collectively by the network” (Bitcoin.org, n.d.). Supporters of cryptocurrencies often hail Bitcoin and cryptocurrencies as revolutionary alternative currencies characterized by fast peer-to-peer transactions, worldwide. This claim is nonetheless subject to critical evaluations from economic perspectives.

First, cryptocurrencies cannot be seen as currencies in a theoretical sense. For example, Yermack (2013) explains that a bona fide currency must meet three criteria: a mode of transaction, a unit of account, and a store of value. With the Bitcoin example, Yermack critically argues against the view of cryptocurrencies as alternative currencies: Bitcoin fails to meet all three aspects. The lack of liquidity in Bitcoin exchanges and the difficulty of mining new Bitcoin keep Bitcoin from being used as a daily mode of transaction. The supply of fiat currencies is adjusted and regulated by the central bank of a country according to the demand for the specific currency in the money market and the purpose of monetary policy, such as price stability or economic expansion. Thus, users of fiat currencies have easy access to and use them as a daily mode of transaction. However, Bitcoin and other cryptocurrencies often fail to meet this aspect. For example, Bitcoin's supply mechanism is designed to be predictable and limited. The total supply of Bitcoin that will ever exist is capped at 21 million, and this cap is hard coded into the Bitcoin protocol. The supply of new bitcoins is controlled by a process called "mining."³ Once all 21 million bitcoins have been mined, no new bitcoins will be created, and the only way for bitcoins to be introduced into circulation will be through transactions. This supply mechanism is in contrast to that of traditional currencies. In addition, Yermack contends that Bitcoin's extreme volatility and large per-unit value make it inadequate as a store of value and a unit of account.

Nevertheless, Bitcoin enthusiasts, such as MicroStrategy CEO Michael Saylor, believe “Bitcoin is the future of money” (Hodson, 2022) because its transaction requires no third-party intermediaries and is irreversible, leading to low or almost zero transaction cost (Iansiti & Lakhani, 2017). To evaluate this claim, the definition of transaction costs in the transaction cost economy (TCE) should be briefly reviewed. Dahlman (1979) broadly categorizes transaction costs into three types: search and information costs, bargaining and decision costs, and policing and enforcing costs. Search and information costs are the costs associated with searching for information and determining the availability and best price of a desired good. In addition, bargaining and decision costs refer to the expenses involved in reaching an acceptable agreement with the other party and creating a suitable contract. Policing and enforcement costs refer to the expenses required to ensure that the other party adheres to the contract's terms and to take appropriate measures (often through the legal system) if they do not comply.

³ Mining is the process by which new bitcoins are created and transactions are verified on the Bitcoin network. Miners use specialized software and hardware to solve complex mathematical problems, and the first miner to solve the problem is rewarded with a certain number of new bitcoins.

In a study on the transaction costs of Bitcoin, it is empirically shown that Bitcoin's transaction cost is lower than 16 major currencies (Tsukerman, 2016). It can be explained by the unique nature of Bitcoin and other cryptocurrencies: policing and enforcement costs are low or nil and there is no middleman. While the reason for low transaction costs is based on near-zero transaction fees, another important source of transaction costs is neglected: search and information costs. Nobel Prize Laureate Peter A. Diamond demonstrates that search friction can result in a monopoly market price in a perfectly competitive market set-up (Diamond, 1971). It implies that when a user of a currency experiences a hard time finding a transaction partner, transaction costs can soar even with the existence of many potential transaction partners in the market. Similar observations can be easily found in transactions involving Bitcoin and other cryptocurrencies as sellers and buyers face significant difficulties finding one another. A user named "laszlo" on bitcointalk.org who was willing to pay 10,000 bitcoins for two large pizzas back in 2010 must have faced this difficulty (Patularu, 2022).

Empirical evidence also dismisses Bitcoin's intended use as an alternative currency. Baur and colleagues (2018) found that about a third of all Bitcoins are owned by users who only receive and never sell Bitcoin. This suggests that Bitcoin (and other cryptocurrencies) is largely used as a speculative financial asset rather than a currency. Since its first introduction, the total market cap of Bitcoin has increased to 3 trillion dollars ("Crypto Market Cap Back under \$1 Trillion as Bitcoin Falls below \$25,000," 2022). With its long-term upward trend in price, the big volatility of Bitcoin and other cryptocurrencies also gave a reason for profit-seeking investors to flock into the crypto world: Bitcoin historically recorded an average daily volatility of 3%, which is far higher than those of major currencies (Baur & Dimpfl, 2021).

Blockchain and Cryptocurrencies as Speculative Financial Assets

The value of cryptocurrencies as speculative financial assets is a contentious issue that has generated a great deal of debate among financial experts and investors. Proponents of cryptocurrencies argue that they offer unique benefits that traditional financial assets cannot provide, such as decentralization, anonymity, and security. They also claim that cryptocurrencies are immune to government manipulation and inflation, making them a safe haven asset during economic instability. This belief has led to the historically upward trend in prices of many cryptocurrencies and the public's enthusiasm towards the crypto market.

However, this view is also subject to critical evaluations from theoretical and empirical perspectives. First, by definition, cryptocurrencies cannot be regarded as financial assets. The US Bureau of Economic Analysis defines financial assets as "deposits, stocks, bonds, notes, currencies, and other instruments that possess value and give rise to claims, liabilities, or equity investment". Traditional financial assets include "bank loans, direct investments, and official private holdings of debt and equity securities and other instruments" (*Financial Assets*, 2018). To evaluate whether cryptocurrencies are financial assets, their properties should be scrutinized. In an empirical study, Cheah and Fry (2015) defy the view of cryptocurrencies as speculative financial assets. By using statistical models, they prove that the fundamental value of Bitcoin is zero. They point to two components of financial assets: fundamental value and speculative bubble. Firstly, Bitcoin is found to be prone to speculative bubbles as other financial assets do. Moreover, they estimate the significant amount of the bubble factor in Bitcoin (Dowd, 2014). The remaining question is whether the long-term fundamental value exists. The study provides evidence that, in the midst of a bubble, the increases in Bitcoin prices are so extreme that the estimated long-term intrinsic value is not statistically different from zero. This outcome highlights the prevalence of the bubble in the observed prices and comes at a time when Bitcoin is being cautioned against as "voodoo" by many. Thus, without fundamental long-term value, cryptocurrencies cannot be regarded as financial assets.

Another consideration is the question of whether cryptocurrencies can be effective assets in an investment portfolio. The value of a speculative financial asset should be judged based on its ability to hedge against the risks of other assets in a portfolio, according to Modern Portfolio Theory (MPT). Modern Portfolio Theory (MPT) is a framework for investment portfolio optimization that was introduced by Harry Markowitz (Markowitz, 1952). It is a

mathematical approach that seeks to maximize the expected return of a portfolio for a given level of risk or minimize the risk for a given level of expected return. According to MPT, investors should not only consider the expected returns of individual assets, but also the interdependence of these assets and the diversification benefits that can be achieved by combining them in a portfolio. This means that a well-diversified portfolio can reduce the risk of losses caused by individual asset volatility. MPT assumes that investors are risk-averse and seek to maximize their returns for a given level of risk (Elton et al., 2009).

Cryptocurrencies seem to offer low value as an asset class in an investment portfolio. In an empirical study, Liu and Tsyvinski (2018) find that three representative cryptocurrencies – Bitcoin, Ripple, and Ethereum – cannot serve as a hedge against the risks of other traditional assets. They find no long-term significant correlation between the returns of cryptocurrencies, and the stock market and macroeconomic factors. Similarly, they are not affected by the returns of currencies and commodities. Instead, their analysis reveals that cryptocurrency returns can be best predicted by factors that are unique to the cryptocurrency markets. Cryptocurrencies’ limited correlation to other financial assets and limited diversification benefits means that they cannot be an effective asset class in an investment portfolio.

There are also practical reasons why cryptocurrencies are bad alternatives to traditional financial assets. As the crypto market is largely unregulated, traders with major liquidity have abused and manipulated the market with various tactics. Of these tactics, the most common ones are the "pump-and-dump scheme"⁴ and “wash-trading”⁵ which can easily be regulated, for example, in the stock market (Eigelshoven et al., 2021). Furthermore, malicious traders have taken advantage of the fact that the majority of crypto traders are uninformed about the market and sensitively respond to social media. As a result, misinformation, and herding effects - a phenomenon where investors follow a general market trend - are also common (Eigelshoven et al., 2021). This high correlation between the flow of information, in the form of Tweets, and the price fluctuation of Bitcoin (Matta et al., 2015) is illustrated in Figure 2 below.

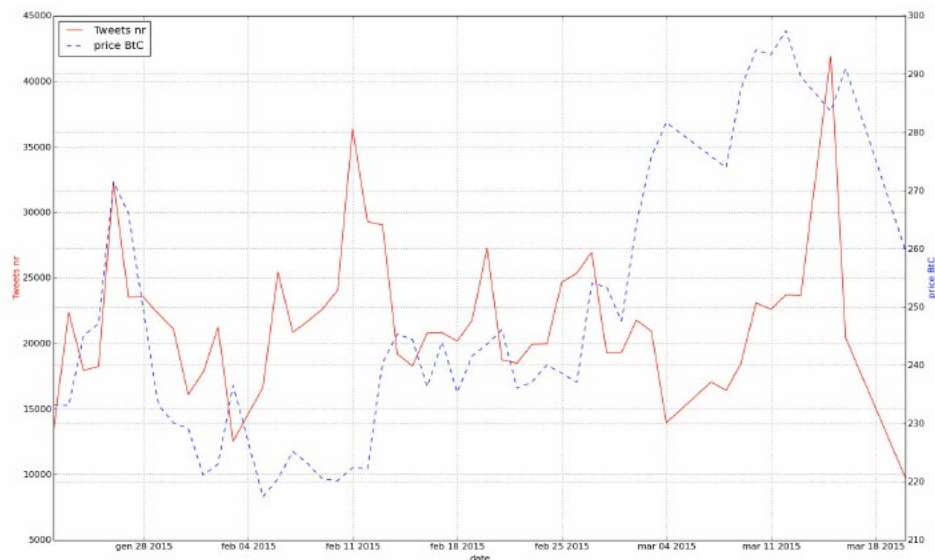


Figure 2. The similarity between Bitcoin's price and number of Tweets From “Bitcoin Spread Prediction Using Social And Web Search Media” By M. Matta, I. Lunesu, and M. Marchesi, 2015, Conference: Workshop Deep Content Analytics Techniques for Personalized & Intelligent Services, p.4

⁴ A form of financial fraud that increases price through misleading or false statements.

⁵ A form of financial manipulation where artificial activity is created by simultaneously selling and buying an asset.

Blockchain and Market Competition

In economic theories, competition among firms is deemed desirable for the greatest welfare in an economy. However, modern industries have shown a remarkable move toward concentration (Martin, 2019). For example, two-thirds of 900 sectors in the U.S. economy became more concentrated between 1997 and 2012. This trend is pronounced in the technology industry where only a handful of firms boast their dominance (“The Rules of the Tech Game Are Changing,” 2021). What is witnessed here seems to reflect the triumph of Schumpeter’s creative destruction and monopolistic competition over Arrow’s economic welfare (Baker, 2007).

One of the negative consequences of this high industry concentration is income inequality. Admittedly, there are many reasons behind the current income inequality. Some people pay attention to income inequality between 1% versus 99%, while others do so between CEOs versus typical workers and between skilled and non-skilled workers. Also, as the Occupy Wall Street movement in 2011 criticizes, the significant pay gap between the financial sector and the rest of the economy explains income inequality. However, Bloom (2017) argues that inequality between companies accounts for the current income inequality between individuals. According to an analysis of data from American companies, as seen in Figure 3 below, it is found that the average wages of employees in the top percentile bracket have risen significantly, whereas those in the lower percentiles have remained relatively unchanged. Furthermore, highly paid individuals tend to gravitate towards companies that offer higher overall wages, resulting in a concentration of such individuals within these companies (Bloom, 2017).

Even within highly successful companies of today, sources of income inequality are prevalent. For example, Jin and Parrott (2022) describe how today’s successful internet companies exploit workers and thereby aggravate income inequality as follows:

...Gig economy platforms bring in billions of dollars in revenue, while the frontline workers who deliver their services earn poverty wages and are shut out of decisions that impact their lives. Social media companies and media platforms earn billions of dollars in ad revenue from algorithmic feeds that elevate misinformation and damage vulnerable communities. Platforms’ creator funds typically reward creators with the most views and engagement, leading to the concentration of income among those who already have ample sources of revenue while failing to broaden access for less-well-off aspiring creators... (pp.71-72)

Blockchain enthusiasts believe that blockchain is not only a revolutionary technology but also an economic driver that will change the nature of market competition from monopolistic to more competitive. In particular, proponents of the so-called Web3 argue that Web3, which is built on blockchains, will revolutionize the way how decisions are made within companies, how companies achieve market power, and thus how companies compete in markets. Stackpole (2022) defines Web3 as “an extension of cryptocurrency, using blockchain in new ways to new ends” (p.7). Jin and Parrott (2022) characterize Web3 as “a decentralized, blockchain-based internet ecosystem owned and operated by its users” and “a movement toward a better, fairer internet” (p.67). Proponents of Web3 argue that while the current internet giants, such as Google or Meta, own highly concentrated economic power and hinder market competition, Web3 will allow users to have the opportunity to reclaim control from a limited number of centralized institutions that are exploitative.

Therefore, this section addresses the question of how blockchain will change the internet and the dynamics of market competition between companies, with a particular focus on the internet sector. In addition, its welfare implication for income inequality is discussed.

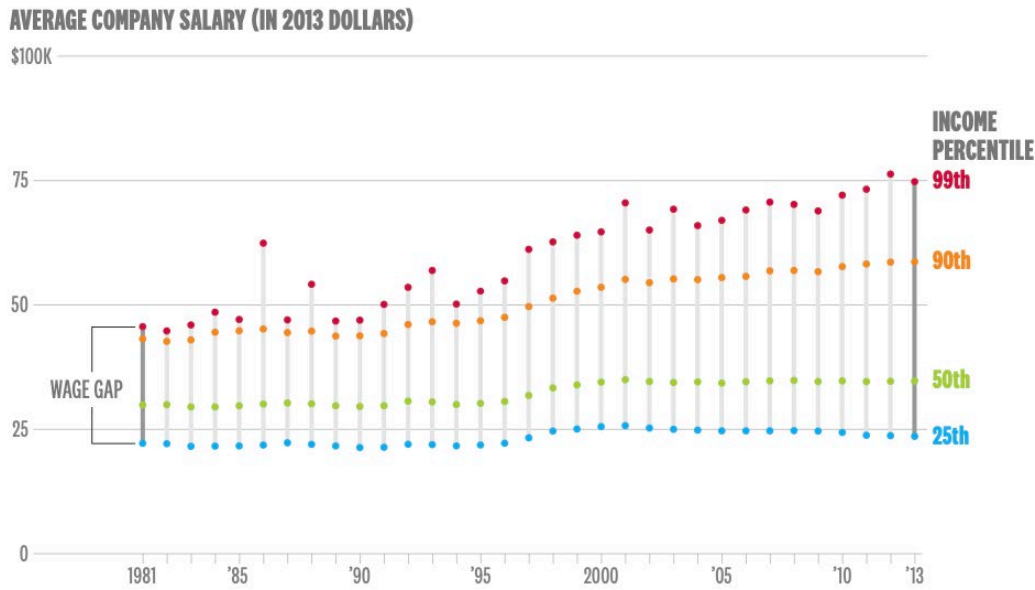


Figure 3. Average Company Salary (In 2013 Dollars) Between 1981 and 2013 From “Corporations in the Age of Inequality” By N. Bloom, 2017, Harvard Business Review, March 2017, p.6

An Economic Appraisal of Blockchain’s Impact on Market Competition

Status Quo of Market Competition in the Internet Industry

Joseph Schumpeter, the father of economics of innovation, spelled out “creative destruction” and resulting monopolistic competition early on (Schumpeter, 1942). He argued that monopolistic market power is the main motivation for firms to innovate. However, his view should not be misinterpreted in the way that innovation leads to monopoly and a monopolist's status persists for the long term. In fact, Schumpeter cautioned against the fatalistic attitude towards monopoly. He acknowledged that the most significant and enduring competitive force arises from the introduction of new products that outperform existing offerings, leading to the decline of established monopoly businesses (Bourne, 2019).

However, in contrast to Schumpeter’s assertion, today’s tech giants seem to maintain their monopoly or oligopoly status for the long term. The traditional explanations of why only a handful of firms possess economic power still hold: economies of scope and scale. Furthermore, some scholars argue that political activities, such as lobbying and political campaigns, by large firms significantly contribute to the concentration of economic power (Henderson, 2020). Scholars have pointed out several characteristics of today’s market competition that pulled away from the ideal of perfect competition and are peculiar to the internet sector.

The first is the significance of big data (Newman, 2014). For example, Google sucks in a large sum of search advertising revenue thanks to its unmatched size of search queries, accounting for 83.84 % market share as of June 2021 (Bianchi, 2023). Other tech giants, including Meta and Amazon, are no exception in entrenching monopoly or oligopoly power with big data. These tech giants gather a vast amount of user data through various means, such as search history, website visits, social media interactions, and more. They then use this data to provide personalized experiences and targeted advertising to their users. For example, Google's search engine tracks users' search histories to understand their interests and preferences, and then serves them relevant ads based on their search queries. Similarly, Meta collects data on users' social media interactions and uses them to personalize their news feeds and suggest content that aligns with their interests. Tech giants also use big data to expand their businesses. For instance, Google leverages

its vast data sets to develop new products and services, such as Google Maps and Google Assistant. Similarly, Meta uses user data to improve its advertising platform and attract more advertisers to its platform. Overall, tech giants' ability to collect and leverage user data is a key factor in their success and dominance in the industry.

Second, production functions in the digital space are largely characterized by zero or near-zero marginal cost (Rifkin, 2014). Jeremy Rifkin's theory of zero marginal costs argues that the marginal cost of producing and distributing digital goods and services in the digital space approaches zero as production scales up and technology advances. This means that the cost of producing each additional unit of a digital product becomes virtually free once the fixed costs of production, such as software development and server maintenance, have been incurred. This cost characteristic of digital goods and services favors tech giants because they have already established the necessary infrastructure by investing vast capital in the fixed costs of production. Coupled with the power of big data, this enables mono- or oligopolists to offer “free” goods or services and to diversify offerings under the name of “long tail” without incurring significant costs (Petit, 2016), leading to further growth of dominant market players.

Third, the current disproportionate distribution of economic power can mainly be attributed to the prevalence of platform businesses. Often described as “Uberization”, today’s tech firms aim to become the Uber of their fields by establishing a platform that connects users. Platform businesses are often characterized by network effects: a phenomenon where one party’s perceived values of participation in certain transactions are affected by others’ participation (Liebowitz & Margolis, 1994). For example, Facebook and LinkedIn are valuable for potential users because there is already a myriad of users on the same platforms. The effect implies a continuous or even growing imbalance in economic power among firms. Platform firms that have enjoyed network effects can further widen the gaps by having access to the most talented workers in the industry and by having billions to invest in R&D. Big data obtained from a large population of users can also feed into the virtuous cycle. Thus, strong network effects render “size beget size”.

Overall, high concentration by a few tech giants has become a pervasive phenomenon. Given that highly concentrated economic power held by a handful of firms contributes to income inequality, changing the dynamics of market competition has significant welfare implications as well.

Blockchain, Web 3, and the Dynamics of Market Competition

The purpose and architecture of Web3 should be understood in the context of the development of blockchain technology. Stackpole (2022) briefly explains the historical development of the internet by breaking them into three phases: Web 1, Web 2, and Web 3.

Web1 refers to the early days of the internet when websites were static and primarily used for displaying information. Web1 was a one-way communication model, where information was provided to users, but users couldn't interact with the website or other users. In contrast, Web 2, the internet as we know it today, is characterized by interactive and social features such as social media, user-generated content, and online collaboration tools. Web 2 is a two-way communication model, where users can interact with websites and other users, create and share content, and participate in online communities. With the advent of blockchain technology, the concept of Web3 has emerged and is expected to change the internet environment. Web 3 refers to the future of the internet, which is characterized by decentralization and the empowerment of individuals. Web3 is built on blockchain technology and enables decentralized and secure transactions without the need for intermediaries. Web 3 aims to give individuals more control over their online experiences, data, and transactions, and to create a more equitable and democratic society. Overall, Web 1 was a simple and static version of the internet, while Web 2 introduced more interactive and social features. Web 3 takes this a step further by enabling decentralization and giving individuals more control over their online experiences and transactions.

In the context of Web 3, blockchain technology enables a decentralized and secure way to store and transfer data and value. This means that users can own and control their data, without the risk of it being lost or stolen, and can transact directly with others without the need for middlemen. This also means that individuals and communities can transact directly with each other without the need for centralized platforms like Amazon, Facebook, or Google.

Potential examples of how Web 3 will dismantle the market dominance of a few tech giants are abundant and some of the current businesses exemplify the point in case (Jin & Parrott, 2022).

Decentralized marketplaces are one example of how Web 3 can disrupt the market dominance of internet platforms. These marketplaces allow buyers and sellers to transact directly with each other without the need for a centralized platform. This gives more power to individual sellers and buyers and reduces the influence of large corporations. For example, OpenBazaar is a decentralized marketplace that allows individuals to buy and sell goods and services without the need for a middleman or centralized platform.

Web3 also has the potential to disrupt the market dominance of social media platforms like Facebook and Twitter. Decentralized social media platforms like Mastodon and Peepeth offer alternatives to centralized social media platforms by allowing users to own and control their data and interact directly with each other without the need for intermediaries. For example, Mastodon is an open-source decentralized social network that operates on a federated model, meaning that users can choose which server they want to use and can still interact with users on other servers.

Decentralized finance (DeFi) is another area where Web 3 could disrupt traditional centralized models of the internet. DeFi platforms allow anyone to lend or borrow money without the need for traditional financial institutions. This creates new opportunities for people who may not have had access to traditional banking services and reduces the power of centralized financial institutions. For example, Uniswap is a decentralized exchange that allows users to swap cryptocurrencies without the need for an intermediary.

Decentralized economic transaction means decentralized economic power. The rules of the competition that have pervaded today's industries may not apply to the emerging blockchain world. Admittedly, this claim does not come without criticism. Skeptics argue that blockchain has widened inequality by allowing only a selected few to build an enormous fortune in the crypto world. However, it is our choice to build a more equal economy on the new internet. The governance of Web 3 can be democratic if designers of specific services are willing to do so. While shareholder capitalism outstripped democratic participation in the previous internet, Web 3 can give back self-determination and agency to participants. Moreover, the distribution of ownership can forge an economic system that shifts away from dominance by a few platforms with massive data, customers, and intellectual properties (Jin & Parrott, 2022).

Conclusion

This review discusses blockchain's impact on economic systems. In particular, this review introduces some economic perspectives that inform us of how blockchain is changing or will bring changes to two pillars of an economic system: finance and market competition.

Although cryptocurrencies that are built on blockchain have significantly disrupted financial systems by suggesting alternative currencies and financial assets, this review's critical economic appraisal shows that cryptocurrencies have limited potential to be further developed as alternative currencies and speculative financial assets. In contrast, the potential of blockchain to change the internet and therefore the dynamics of market competition in the internet sector is wide-open. Although the previous generation of the internet has contributed to the concentration of market power and thus exacerbated income inequality, the new generation of the internet, built on blockchain, has great potential to move our economy from a highly concentrated to a more competitive system.

The promise of blockchain technology is yet to materialize. The discussion of how to design an ecosystem and incentives is still underway. However, if we choose to build an economic system that is more transparent, democratic, and fairer, blockchain technology will provide us with great potential to overcome ever-lasting economic inequality in modern capitalism.

References

- Baker, J. B. (2007). Beyond schumpeter vs. arrows: Antitrust fosters innovation. *Antitrust Law Journal*, 74, 575–602.
- Baur, D., & Dimpfl, T. (2021). The volatility of bitcoin and its role as a medium of exchange and a store of value. *Empirical Economics*, 61(5), 2663-2683. <https://doi.org/https://doi.org/10.1007/s00181-020-01990-5>
- Baur, D. G., Hong, K. H., & Lee, A. D. (2018). Bitcoin: Medium of exchange or speculative assets? *Journal of International Financial Markets, Institutions and Money*, 54, 177–189. <https://doi.org/10.1016/j.intfin.2017.12.004>
- Bianchi, T. (2023). Online search market - Statistics & Facts. In Statista.
- Birch, D. G. W. (2022, June 19). If The Crypto Crash Is Another “Tulip Bubble” That Is Really Good News. *Forbes Digital Assets*. <https://www.forbes.com/sites/davidbirch/2022/06/19/if-the-crypto-crash-is-another-tulip-bubble-that-is-really-good-news/?sh=1a0d0bea51f1>
- Bitcoin.org. (n.d.). What is Bitcoin? Bitcoin.Org. Retrieved June 27, 2002, from <https://bitcoin.org/en/>
- Bloom, M. (2017). Corporations in the Age of Inequality. *Harvard Business Review*, March 2017, 3–9.
- Bourne, R. (2019). Is This Time Different? Schumpeter, the Tech Giants, and Monopoly Fatalism.
- Chan, S., Chu, J., Zhang, Y., & Nadarajah, S. (2020). Blockchain and Cryptocurrencies. *Journal of Risk and Financial Management*, 13(10), 227. <https://doi.org/10.3390/jrfm13100227>
- Cheah, E., & Fry, J. (2015). Speculative bubbles in Bitcoin markets? An empirical investigation into the fundamental value of Bitcoin. *Economics Letters*, 130, 32–36. <https://doi.org/https://doi.org/10.1016/j.econlet.2015.02.029>
- Crosby, M., Nachiappan, Pattanayak, P., Verma, S., & Kalyanaraman, V. (2015). Blockchain Technology: Beyond Bitcoin. <http://www.blockchaintechnologies.com/blockchain-definition>
- Crypto marke cap back under \$1 trillion as bitcoin falls below \$25,000. (2022, June 13). *The Economic Times*. <https://economictimes.indiatimes.com/tech/technology/crypto-market-cap-back-under-1-trillion-as-bitcoin-falls-below-25000/articleshow/92179150.cms>
- Dahlman, C. (1979). The problem of externality. *The Journal of Law & Economics*, 22(1), 141–162.
- Deighton, J., & Kornfeld, L. (2021). The Economic Impact of the Market-Making Internet: Advertising, Content, Commerce, and Innovation: Contribution to U.S. Employment and GDP.
- Diamond, P. (1971). A model of price adjustment. *Journal of Economic Theory*, 3(2), 156–168.
- Dowd, K. (2014). New private monies: a bit-part player? (No. 174; Hobart Paper).
- Eigelshoven, F., Parry, D., & Ullrich, A. (2021). Cryptocurrency market manipulation: A systematic literature review. *International Conference on Information Systems*.
- Elton, E. J., Gruber, M. J., Brown, S. J., & Goetzmann., W. N. (2009). *Modern portfolio theory and investment analysis*. John Wiley & Sons, Ltd.
- Financial assets. (2018). The U.S. Bureau of Economic Analysis. <https://www.bea.gov/help/glossary/financial-assets>
- Hayes, A. (2019). Dotcom Bubble. *Investopedia*. <https://www.investopedia.com/terms/d/dotcom-bubble.asp>
- Henderson, R. (2020). The Business Case for Saving Democracy. *Harvard Business Review*.
- Hodson, P. (2022, June 3). Five of the stranger things happening in the market these days. *Financial Post*.
- Iansiti, M., & Lakhani, K. R. (2017). The Truth About Blockchain. *Harvard Business Review*, 95(1), 118–127.
- IBM. (n.d.). What is Blockchain Technology? Retrieved February 12, 2023, from <https://www.ibm.com/topics/what-is-blockchain>
- Jin, L., & Parrott, K. (2022). Web3 Is Our Chance to Make a Better Internet. *Harvard Business Review*, 67–77.
- Liebowitz, S. J., & Margolis, S. (1994). Network Externality: An Uncommon Tragedy. *Journal of Economic Perspectives*, 8(2), 133–150.
- Likos, P. (2022, May 17). Crypto crash: How stable are stablecoins? *U.S. News*. <https://money.usnews.com/investing/cryptocurrency/articles/crypto-crash-how-stable-are-stablecoins>

- Liu, Y., & Tsyvinski, A. (2018). RISKS AND RETURNS OF CRYPTOCURRENCY (No. 24877; NBER Working Paper Series).
- Markowitz, H. M. (1952). Portfolio selection. *The Journal of Finance*, 7(1), 77–91.
- Martin, R. (2019). The High Price of Efficiency. *Harvard Business Review*, January-Fe, 1–15.
- Matta, M., Lunesu, I., & Marchesi, M. (2015). Bitcoin Spread Prediction Using Social And Web Search Media. Conference: Workshop Deep Content Analytics Techniques for Personalized & Intelligent Services.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. *Decentralized Business Review*, 21260.
- Newman, N. (2014). Search, antitrust and the economics of the control of user data. *Yale Journal on Regulation*, 30(3), 401–454.
- Nian, L. P., & Chuen, D. L. K. (2015). Introduction to Bitcoin. In *Handbook of Digital Currency: Bitcoin, Innovation, Financial Instruments, and Big Data* (pp. 5–30). Elsevier Inc. <https://doi.org/10.1016/B978-0-12-802117-0.00001-1>
- North, D. C. (1994). Economic Performance Through Time. *American Economic Review*, 84(3), 359–368. <https://www.jstor.org/stable/2118057>
- Patularu, A. (2022, May 21). BITCOIN PIZZA day, a DAY of CELEBRATION. *Bitcoin Magazine*. <https://bitcoinmagazine.com/culture/bitcoin-pizza-day-a-day-of-celebration>
- Petit, N. (2016). Technology giants, the moligopoly hypothesis and holistic competition: A primer.
- Rifkin, J. (2014). *The zero marginal cost society: The internet of things, the collaborative commons, and the eclipse of capitalism*. St. Martin's Press.
- Sah, R. K., & Stiglitz, J. E. (1984). *The Artchitecture of Economic System: Hirarchies and Polyrarchies* (Working Paper No. 13314). <http://www.nber.org/papers/w1334.pdf>
- Schumpeter, J. (1942). *Capitalism, socialism and democracy*. Routledge.
- Sigalos, M. (2022, May 28). \$60 billion collapse of major cryptocurrency is not the industry's Bear Stearns moment — senators and regulators explain why. *CNBC*. <https://www.cnn.com/2022/05/28/60-billion-terra-washout-not-cryptos-bear-stearns-moment-regulators.html>
- Stackpole, T. (2022). What is Web3? *Harvard Business Review*, 2–19.
- The rules of the tech game are changing. (2021). *The Economist*.
- Tsukerman, M. (2016). The Block is Hot: a Survey of the State of Bitcoin Regulation. *Berkeley Technology Law Journal*, 30(4), 1128–2015.
- Wild, J., Arnold, M., & Stafford, P. (2015, November 1). Technology: Banks seek the key to blockchain. *Financial Times*. <https://www.ft.com/content/eb1f8256-7b4b-11e5-a1fe-567b37f80b64#axzz3qe4rV5dH>
- Yermack, D. (2013). Is Bitcoin a Real Currency? In *NBER Working Paper Series*. <https://doi.org/10.2139/ssrn.2361599>