

Cryptocurrencies on the Tech Wave

—The Rise of Another Official Currency or Just a Dystopian Investment

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Abstract: Cryptocurrencies are a new form of currency that have gained widespread attention in today's age of rapid technological advancement. The underlying blockchain technology provides many advantages for cryptocurrency transactions, including decentralization, anonymity, and security. But there are always two sides to a story, and despite the fact that cryptocurrencies have solid technical backing, their development has been severely hampered by issues like the high stability of individual coins and the potential dangers of the technology itself, which have led many nations to pass laws restricting cryptocurrency use. Taking a literature review method, this paper explores the features of cryptocurrencies, their potential for institutionalization as legal tender, and their primary effect on the economy. This paper concludes that the widespread adoption of cryptocurrencies as a viable alternative to fiat currencies is highly improbable in the foreseeable future.

Keywords: cryptocurrency, bitcoin, economic impact, future development

1. Introduction

The financial landscape is changing right before our eyes. As a result of the rise of digital assets and the development of novel financial channels, tools, and systems, new models for financial transactions and new channels of capital are emerging. Markets for cryptocurrencies have changed several times, and at a rate that is unprecedented in the history of financial markets. More than 550 different cryptocurrencies have been identified since Bitcoin's initial public offering in January 2008. As of 2022, there is a plethora of academic study and expert commentary on the cryptocurrency market. A number of concerns have arisen regularly in relation to cryptocurrencies as the number of coins available, technological progress, and government regulation of the market all continue to accelerate.

The purpose of this paper is to provide a brief overview of the cryptocurrency market and its relationship to the more established financial sector. In particular, we will be looking at how cryptocurrencies differ from conventional currencies, how they affect various parties, etc., right now.

This paper is helpful for the cryptocurrency industry's research field because it provides a comprehensive analysis and organization of cryptocurrencies based on a literature review.

2. Definitions

2.1. Introduction to Cryptocurrency

Since Satoshi Nakamoto's 2008 announcement of Bitcoin's creation and the advent of blockchain technology, cryptocurrencies have expanded at an exponential rate, catching the attention of investors and the public at large. The market capitalization of all cryptocurrencies briefly surpassed \$3 trillion in November of 2021 [1], capping off a banner year for the sector. The market capitalization of the largest cryptocurrency, Bitcoin, and the second largest cryptocurrency, Ethereum, both reached all-time highs. There is now the world's first country to recognize cryptocurrency as legal tender.

All of these indicators point to the continued growth of the cryptocurrency market. However, are cryptocurrencies capable of replacing traditional fiat currency? In what follows, we will do some hypothetical thinking to figure out what might happen.

2.2. Definition of Cryptocurrency

This part will distinguish cryptocurrency, digital currency and virtual currency.

2.2.1. Digital Currency

There needs to be a clear distinction made between cryptocurrency and other forms of electronic or virtual currency. Simply put, electronic money is another form of currency. The only difference is that digital currency is only available in digital or electronic form and can only be owned and used through an electronic wallet or a designated connection network, as opposed to physical currency such as banknotes. The development of the electronic yuan for use in China is a prime example of this [2].

2.2.2. Virtual Currency

Even though the term "virtual currency" is often used interchangeably with "cryptocurrency," it is more properly classified as "digital currency", another name for digital money. However, unlike traditional currencies, virtual currencies are issued, managed, and controlled by a private issuer. They may not be as stable in value or subject to regulation as bank-issued fiat currencies. Thus, in a nutshell, there are two types of virtual currencies: those backed by a central bank and those that are not. And the second is where you typically find virtual currencies [3].

2.2.3. Cryptocurrency

One type of digital currency is cryptocurrency. Cryptography is the practice of using encryption algorithms and other forms of cryptography to ensure the safety of a transaction network. Since cryptocurrencies still have the features of a virtual currency, they are not governed by any central authority. It is not dependent on any centralized authority (like a bank or a credit card company) to function. By exchanging their respective private and public keys, the two parties to a transaction can easily send and receive payments directly with one another. More context will be provided later.

In general, cryptocurrencies are superior to virtual currencies and digital currencies. The term "cryptocurrency" refers to a specific type of digital currency, and "virtual currency" refers to a broader category of digital currencies. They share an inseparable bond but have distinct identities. Their relationship can be explained by the diagram above (Figure 1).

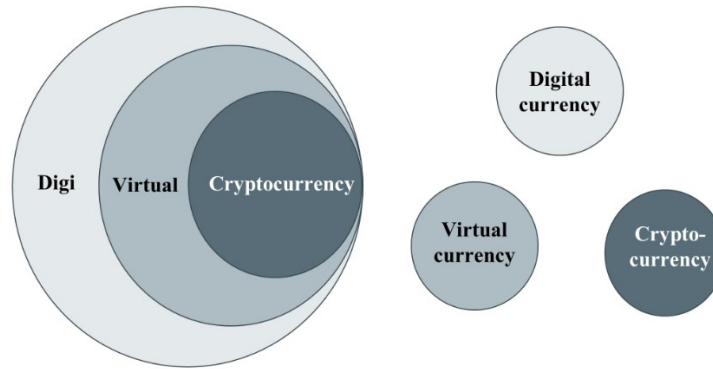


Figure 1: The relationship between digital currency, virtual currency and cryptocurrency. (made by the author)

2.3. Technology Behind Cryptocurrency: Blockchain

As was previously mentioned, cryptocurrencies are a decentralized form of currency that operates primarily through digital networks. The most well-known cryptocurrency, Bitcoin, cannot function without the blockchain technology that underpins its transactional infrastructure. You can visualize a blockchain as a long chain with many blocks in it. Each transaction's corresponding data is recorded on a block, much like in a ledger. Each block contains data that is related to the data in subsequent blocks; when one block's data is updated, all subsequent blocks must be updated as well [4]. A blockchain is essentially a distributed ledger that stores and records data from multiple computers. As a corollary, all users will have access to financial data. Bitcoin's consensus mechanism makes it possible for everyone to serve as the network's watchdog. Whenever a new transaction takes place, the blockchain broadcasts the relevant information to the network, but the transaction is not finalized until 51% of the network's users give their consent. So, it is fair to say that, with the help of blockchain technology, every person connected to the network performs the function of a system administrator.

Following is the figure 2 showing how a new transaction is added to the system.

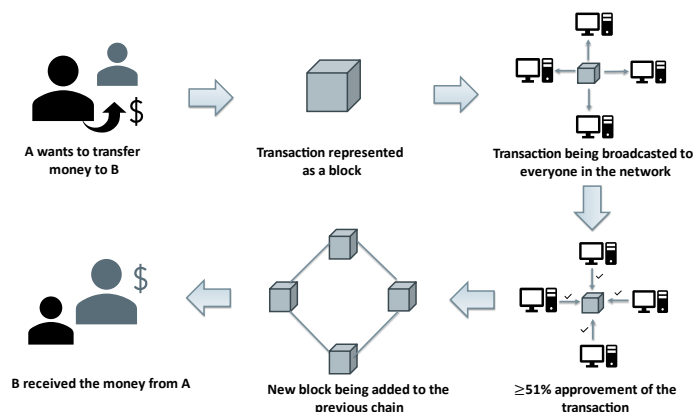


Figure 2: The process of a transaction being confirmed to occur in a blockchain system. (source: Published in Bex500 School, Mar 9, 2020, 3 min read, How Does Blockchain Work?)

When a Bitcoin owner conducts a transaction operation, as depicted in the figure 2, the transaction data is first added to a local transaction pool before being determined. Until 51% of the network's

users confirm that the transaction information is reliable, the miner will broadcast information about the transaction to the entire network.

2.4. Features of Cryptocurrency

The next section will introduce several features of virtual currencies, using Bitcoin as an example.

2.4.1. Decentralization

Decentralization is the primary distinguishing characteristic of cryptocurrencies. Thanks to blockchains' distributed ledger technology, businesses and consumers can transact directly without involving a third party. Instead, parties can conduct business with one another in a direct, peer-to-peer fashion. Because of this lack of central authority, users have more freedom of action and choice [5].

2.4.2. Anonymity

Cryptocurrencies' anonymity stems largely from their complex and irreversible encryption process. The hashing algorithm (a mathematical algorithm) is used to generate the user's unique identifier and wallet address in the Bitcoin transaction system [6]. When using a hashing algorithm, even a small change to the source data can have a profound effect on the calculated value [7]. Because of this, there is much less chance that the user's true identity, Internet Protocol (ip) address, etc. will be revealed (As depicted in figure 3).

Due to the impossibility of deducing this information backwards due to this property, the possibility of cryptographic evil sending and monetary loss is greatly diminished.

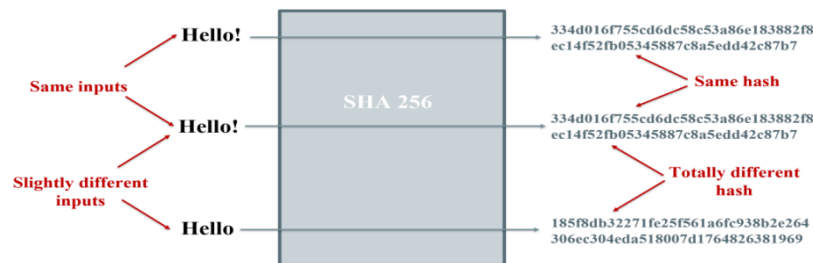


Figure 3: How the Hash Algorithm works. (SHA-256) (made by the author)

2.4.3. Security

As was previously mentioned, a blockchain is a decentralized, ever-growing chain of data. Each new transaction that needs to be validated must include details about each data block in the entire preceding history. Because of this consensus mechanism in the blockchain, if someone wants to alter the transaction history of the ledger, he must also alter the transaction history contained in all previous blocks and successfully fool more than 51% of the users [8]. The level of security afforded cryptocurrencies stored in a blockchain depends on how difficult it is to tamper with the data [8].

3. The Availability of Cryptocurrency as a Currency

3.1. Whether or Not Cryptocurrencies Themselves Have Economic Value

It is indeed common knowledge that cryptocurrency values fluctuate wildly; since its release in 2008, the most well-known cryptocurrency, Bitcoin, has seen wild price swings. On November 10, 2021, it reached an all-time high of \$68,928.90 and an all-time low of \$65.53 [9]. When faced with a

discrepancy of nearly \$70,000, observers are left to wonder what Bitcoin is really worth. Is there any actual worth to the cryptocurrency itself?

However, this is not the case. Legendary investor Warren Buffett has said that Bitcoin is worthless on its own [10]. There is a 0.4% chance that Bitcoin will go to zero, according to a report from two Yale economists in 2018 [11]. So, if that's the case, then why is Bitcoin currently selling for so much?

Buying virtual currency is not like other purchases where the customer receives merchandise of equal value. Instead, a purchase of bitcoins must be reflected in the subsequent transaction's value. Their bitcoin is worthless until they sell it to someone else, at which point it appreciates in value. In fact, the value of cryptocurrency is quite close to that of the fiat currency we use today. To illustrate, consider a \$100 bill and how worthless it would be if it were never put to use and instead just held in one's hand. However, the moment the bill is exchanged for a commodity, its value is established.

Cryptocurrencies are very similar to fiat currencies at the moment, but due to their wild volatility, they cannot replace fiat currencies or take on the same responsibilities.

3.2. Volatility of Cryptocurrencies

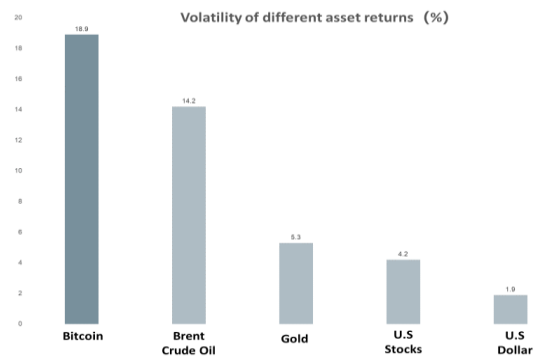


Figure 4: Volatility of different asset returns. (%) (made by the author)

Why does the price of Bitcoin continue to fluctuate if Bitcoin has no intrinsic value? It was all related to the hype cycle of Bitcoin (as the above figure 4 shows, bitcoin's float is more than a dozen times that of the US dollar). In the first part of the cycle, a groundbreaking new technology is introduced. The second phase was ushered in by an article penned by RPost CEO Zafar Khan, who claimed that the hype cycle had begun in late 2013 and that the price of Bitcoin had peaked at \$31 in 2011. A second price bubble reached \$266 two years later. Soon after, Bitcoin's price exploded, reaching a peak of \$1,242 [12].

But many people, blinded by the second wave of the spike's popularity, invested without giving it much thought, hoping against hope that the price would continue to rise and bring them profits. These individuals, however, frequently forget that what rises must inevitably fall. These inexperienced investors are the first to flee the market when things start to go south, and their hasty exit only solidifies their inevitable loss.

Similar situations will persist so long as the bitcoin hype cycle persists. Once enthusiasm is generated, investors will put their money to work despite the risk of repeat losses. As time goes on, this creates a self-reinforcing cycle that drives the price of bitcoin higher and higher.

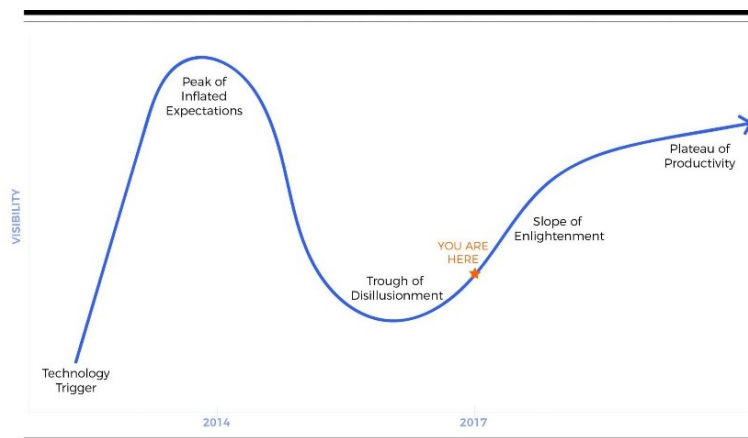


Figure 5: The bitcoin hype cycle. (Source: gartner.com)

3.3. The Dangers of Cryptocurrencies for Consumers

Despite the fact that cryptocurrency users are guaranteed complete anonymity, as was previously mentioned, this also makes them extremely vulnerable to fraud.

The 51% attack is the most well-known form of Bitcoin hacking. An attack on a cryptocurrency's blockchain launched by a group of miners with control of more than half of the network's mining hash rate. Despite the fact that it was stated that every transaction needs to be approved by more than 51% of users in order for it to happen, the possibility still exists that a small group of criminals could control enough network nodes to alter the blockchain. To stop payments between users, these attackers could block confirmation of new transactions. Developing a consensus mechanism, such as proof-of-work, is done with this issue in mind [13].

Cryptocurrencies are vulnerable to a wide variety of scams, not just technical ones. For instance, many impulsive bitcoin purchases were made after a hacker took over Bill Gates' Twitter account and tweeted about how great bitcoin is [14]. Social media can influence or mislead cryptocurrency buyers because the vast majority of cryptocurrency buyers are not experts but rather average people looking to speculate. This explains the rise in the price of dogecoins following Elon Musk's promise to "take dogecoin to the moon" [15] or the decline in the value of Bitcoin following his statement that he would no longer accept Bitcoin as payment for Tesla vehicles [16].

3.4. Different Attitude Towards Cryptocurrency

Different possibilities presented by cryptocurrencies are what have prompted countries to take them seriously, with most opting to pass legislation to limit their use and market impact. Complete bans, legislative restrictions, and encouragement of openness are the three main types of policies implemented by these nations. It is indeed common knowledge that countries like China, Russia, India, etc. have outright bans on all forms of sexual activity. The United States, the European Union, and the United Kingdom are all examples of countries that have passed laws that place restrictions on cryptocurrency use while still acknowledging its legitimacy.

The U.S. Financial Crimes Enforcement Network (FinCEN), for instance, has stated that cryptocurrency transactions are subject to the Bank Secrecy Act (BSA) and that U.S. financial institutions are obligated to assist U.S. government agencies in detecting and preventing money laundering [17].

Further, similar to the United States, the European Union recognizes cryptocurrencies not as currency but as an asset class. For this reason, it has issued the Market in Crypto Assets Regulation (MICA) [18] to establish rules for the industry. The Financial Conduct Authority (FCA) in the United

Kingdom, which also does not recognize cryptocurrencies as legal tender, has issued Guidance on Crypto-Assets for market participants to clarify the scope of FCA regulation and the obligations of investors [19].

El Salvador is notable because it is one of the more open countries that has adopted Bitcoin as legal tender. The law went into effect in September 2021, and Bitcoin joined the U.S. dollar as legal tender in El Salvador. However, the controversy and disagreements have never subsided in the three months since the bill became effective. The adoption of bitcoin as legal tender in El Salvador raises a number of macroeconomic, financial, and legal issues, according to the International Monetary Fund (IMF) [20]. Meanwhile, leftist unions and student associations have regularly demonstrated in front of the Legislative Assembly, demonstrating that civil protests have continued unabated in the country. A recent poll found that 77% of Salvadorans do not support the bitcoin law [21].

There is still some interest in investigating cryptocurrency in El Salvador, but progress will be slow.

4. The Impact of Cryptocurrencies on the Economy

Cryptocurrency, as an extremely powerful emerging technology, has had a great impact on the economic market, and details will be analyzed below from two perspectives.

4.1. The Impact of the Central Bank

In the first place, the emergence of decentralized currencies like cryptocurrencies has had a significant effect on the otherwise centralized banking system. The decentralized nature of cryptocurrencies is seen as undermining the authority of central banks because they cannot play a role in controlling the money supply and macro-regulating the market, despite not being constrained by the abilities of centralized governments, banks, or institutions. Considering that "There must be a more efficient and effective monetary policy with the rise of cryptocurrencies. For this reason, "Since more and more people are starting to use cryptocurrencies, cash flow is being weakened, and central banks' ability to adjust monetary policy through interest rate changes is being hindered [22].

In a nutshell, the advent of cryptocurrencies like bitcoin poses an unknown risk to the ability of central banks to regulate the macroeconomy.

4.2. The Impact for Tax Policy and Government Revenue

Cryptocurrency usage also brings up a slew of tax issues that weigh down financial systems. The report, titled 2021 American Family Plan Tax Compliance Agenda, was commissioned by the United States Treasury and outlines the department's plans to combat tax evasion and other illegal activities made easier by cryptocurrency. The "tax gap" in the United States, the difference between taxes paid and owed, is widened by the cryptocurrency economy. And the White House projects a deficit of \$7 trillion over the next decade [23].

However, the underlying cause of tax evasion is difficult to identify. The Internal Revenue Service has been issuing warnings to taxpayers to include cryptocurrency transactions on their tax returns in recent years. While traditional stockbrokers are required to send detailed tax forms to their clients, cryptocurrency exchanges are not. In addition, under the current rules, it is unclear how businesses can assist their customers in completing tax returns [24].

4.3. The Impact to the Stock Market

One study published by the International Monetary Fund used daily data on price volatility and returns to determine the impact and relationship between the U.S. and cryptocurrency and stock markets,

finding significant effects on both. The analysis shows that the spillover effect of Bitcoin's price volatility on the S&P 500 and MSCI Emerging Markets indices has increased by about 12-16 percentage points since the start of the COVID-19 pandemic, while the spillover effect on returns has increased by about 8-10 percentage points (shown in figure 6). The Bitcoin effect is large enough to account for 14-18% of the variance in stock price volatility and 8-10% of the variation in stock returns, proving that the cryptocurrency has a material impact on global stock markets.

Based on their findings, the authors argue that cryptocurrencies aren't a marginal asset class and could threaten financial stability due to their extreme price volatility [25]. They also predict that the correlation between the two will grow stronger over time.

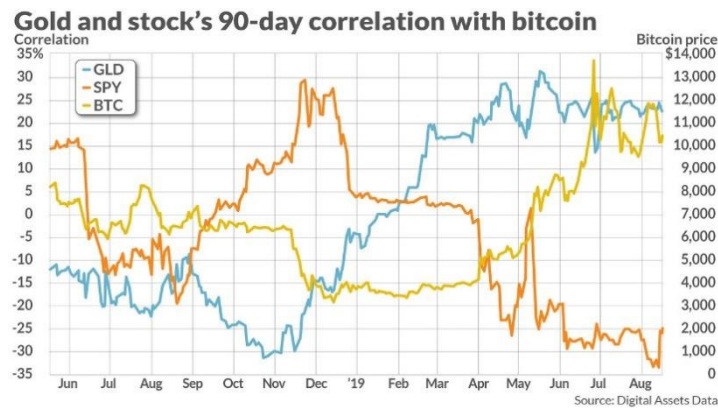


Figure 6: Crypto vs. equity markets, Aug.2019. (Source: Digital Assets Data, Aug. 24, 2019 at 3:15 p.m. ET, By Mark)

5. Conclusion

The first thing that is obvious about the trajectory of cryptocurrencies is that they cannot replace fiat currency as the dominant "currency". Despite the advantages of a decentralized payment mechanism for cryptocurrencies, which allows for more precise targeting of transactions, as discussed above, such a system is not necessarily more technically efficient than existing mobile payments. Furthermore, the anonymity of cryptocurrency payments can open the door to a wide variety of criminal risks, including but not limited to dark web transactions, scams, etc. For example, Bitcoin's terrible floating rate and irrational trading behavior doom the cryptocurrency to a future as legal tender, where value stability is a primary requirement.

Second, the underlying blockchain technology of digital currencies. Blockchain is an exciting new technology whose development promises great things for the future. Its central features, decentralization and openness and transparency, are widely applicable and offer solutions to problems in a variety of fields and workplaces. Blockchain technology has the potential to greatly benefit sectors like public welfare, which have historically struggled with low efficiency, opaque funding practices, and other issues due to a lack of centralized record-keeping. When taken as a whole, the potential uses for blockchain technology are enormous.

It is indeed safe to say that the financial markets have taken notice of the decentralized, anonymous, and complex nature of cryptocurrencies. While cryptocurrencies have many useful applications, including improved peer-to-peer transaction accuracy and speed, they cannot fully replace fiat currencies. In addition to the enormous impact cryptocurrencies have on central banks and U.S. stocks, cryptocurrencies are too volatile to be adopted as legal tender.

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