Cryptocurrencies' Past, Present and Future

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Abstract

The growth of Cryptocurrency has been considered as a future legitimate tender of currency with great possibilities, and it has contributed to lots of different fronts like investments and forms of trading, on the contrary, has caused several troubles. As virtual currencies are developing rapidly, people should comprehend basic concepts and their global influences of them. Our research paper has included the histories and functions with rules and regulations comprehensively. Our goal is to make sure that the audience understands cryptocurrency by the details and examples given and explore further diversification of critical thinking on the topic. We have retrieved lots of resources from articles, websites, and statistical data and discussed insightful analysis to make sure the accuracy is guaranteed. Our study would be beneficial to people with zero understanding of the concept of cryptocurrency.

Keywords: *Blockchain; Cryptocurrency; Bitcoin*

1. Introduction

If we could turn back time and go to the year 2009 to tell people that a recently launched weird coin that has no physical entity and has a price below 1 USD will be worth more than 60000 USD twelve years later, most people would probably think we are joking. But nowadays, we are no longer unfamiliar with the term cryptocurrency. Perhaps you have a friend who bought a computer using what he/she earned from buying the mysterious "Bitcoin"; perhaps you heard that your idol JJ Lin bought a Metaverse mansion worth SG$41000 using Decentraland's Ethereum based currency Mana; or you probably saw the news that China's central bank announced that all the transactions of cryptocurrencies in China are illegal…

Cryptocurrencies are digital currencies secured by cryptography, and many are decentralized networks based on blockchain technology [1]. It's fascinating how fast the industry of cryptocurrency has grown and how much attention it has been attracting for the last few years. However, high-speed growth almost always brings problems or controversies in the meantime, and cryptocurrencies are not exceptions; they have faced problems such as environmental issues and are seen as potential threats to global financial stability.

As currencies that have been attached importance to lately and currencies that have high potentials in the future, cryptocurrencies' past, present, and future are within our concern. We think it's valuable to investigate the history of cryptocurrencies, their investment value, some problems they have, and regulations about them to help us and our readers gain a broader and deeper understanding of aspects of the cryptocurrency market.

2. Discussion

2.1 The History of Cryptocurrencies

2.1.1 The basic concept of cryptocurrencies

A cryptocurrency is a digital or virtual currency that is secured by cryptography, which makes it nearly impossible to counterfeit or double-spend. Many cryptocurrencies are decentralized networks based on blockchain technology– a distributed ledger enforced by a disparate network of computers. A defining feature of cryptocurrencies is that they are generally not issued by any central authority, rendering them theoretically immune to government interference or manipulation [2].

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2.1.2 The origins of cryptocurrencies

It's fairly common knowledge that cryptocurrency is a decentralized digital medium of exchange that isn't issued by a government or bank [3]. As governments and banks became more powerful, people began to pay more attention to protecting their privacy. Cryptography is one of tools. Then bitcoin came along. But before Bitcoin, people had experimented with anonymous digital trading systems. The idea of anonymous trading originated with David Chaum, an American computer scientist and cryptographer. In 1990, he created DigiCash, an encrypted electronic payment system. The system uses an anonymous signature method that allows users to use digital signatures without revealing their identity during transactions. But the biggest drawback of the system is that it is centralized, owned by Chaum's own company, which is responsible for verifying all signatures. This shortcoming eventually led to the company's bankruptcy in 1998. I'll focus on bitcoin as an example.

As the public has finally begun to learn more about cryptocurrencies, the industries behind them have emerged. Companies like Bitcoin in the United States have helped make buying bitcoin easier by asking questions like "where to buy bitcoin" to reassure investors about the underlying technology.

Bitcoin services in the United States are becoming more mature. In the US, consumers can receive bitcoin on the same day transactions are processed, eliminating the fear period of waiting for bitcoin to go public. That's because delays can significantly reduce the value of bitcoin.

The cryptocurrency space is constantly changing and evolving, but U.S. Bitcoin is constantly making strategic moves to stay at the forefront. With the popularity of Bitcoin and cryptocurrencies, demand has increased, and in order to consistently provide customers with the easiest way to purchase, US Bitcoin has expanded and offered services that its competitors do not.

2.1.3 Several types of cryptocurrencies

2.1.3.1 Bitcoin

Bitcoin is a decentralized digital currency created in January 2009. It follows the ideas set out in a white paper by the mysterious and pseudonymous Satoshi Nakamoto.12 The identity of the person or persons who created the technology is still a mystery. Bitcoin offers the promise of lower transaction fees than traditional online payment mechanisms do, and unlike government-issued currencies, it is operated by a decentralized authority. Bitcoin is known as a type of cryptocurrency because it uses cryptography to keep it secure. There are no physical bitcoins, only balances kept on a public ledger that everyone has transparent access to (although each record is encrypted). All Bitcoin transactions are verified by a massive amount of computing power via a process known as "mining." Bitcoin is not issued or backed by any banks or governments, nor is an individual bitcoin valuable as a commodity. Despite it not being legal tender in most parts of the world, Bitcoin is very popular and has triggered the launch of hundreds of other cryptocurrencies, collectively referred to as altcoins. Bitcoin is commonly abbreviated as BTC when traded [4].

2.1.3.2 Ethereum (ETH)

Ethereum is a platform powered by blockchain technology that is best known for its native cryptocurrency, called ether, or ETH, or simply ethereum. The distributed nature of blockchain technology is what makes the Ethereum platform secure, and that security enables ETH to accrue value. The Ethereum platform supports ether in addition to a network of decentralized apps, otherwise known as dApps. Smart contracts, which originated on the Ethereum platform, are central component of how the platform operates. Many decentralized finance (DeFi) and other applications use the contracts in conjunction with blockchain technology. As the cryptocurrency, Ethereum is second in market value only to Bitcoin as of January 2022. As a cryptocurrency, Ethereum is second in market value only to Bitcoin as of January 2022 [5].

2.1.3.3 Tether (USDT)

Tether (USDT) is a blockchain-based cryptocurrency whose tokens in circulation are backed by an equivalent amount of U.S. dollars, making it a stablecoin with a price pegged to USD $1.00. Tether tokens, which were developed by the crypto exchange BitFinex, are the native tokens of the Tether network and trade under the USDT symbol. As of October 2021, USDT is the fifth-largest cryptocurrency by market capitalization, worth more than $68 billion [7]. Furthermore, tether says it will deposit $1 for each USDT it issues. USDT holders can exchange the same amount of US dollar cash to Tether at any time with USDT. The practice of anchoring US dollar gives Tether the right to credit derivative currency, becoming a copycat of the Federal Reserve in the currency circle.

2.1.3.4 Some significant trends

Here's the data for two of these cryptocurrencies over the last few years.Figure 1 shows that bitcoin first gained popularity in 2014. Four years later, in 2018, bitcoin gained popularity again, reaching $3.2 trillion in transactions.In 2020 and 2021, the value of bitcoin increased dramatically, reaching nearly $70,000.Similarly, Figure 2 shows that Ethereum started in 2018 and reached a high price of nearly $5,000 in 2020 and 2021.

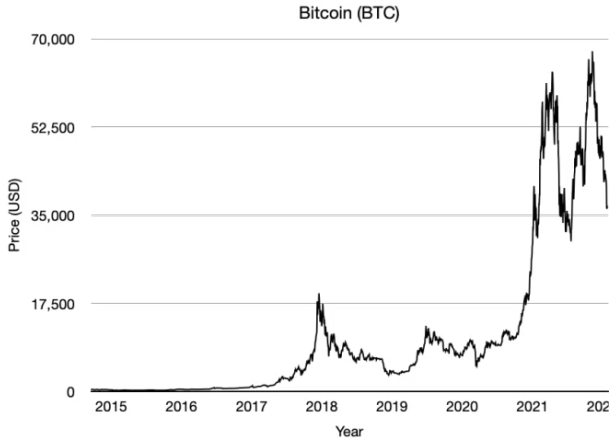

Figure 1 Bitcoin

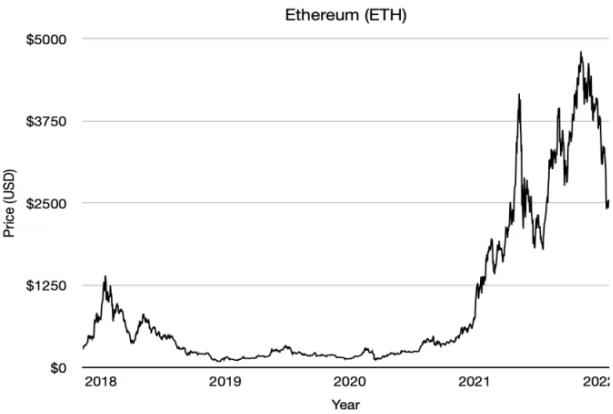

Figure 2 Ethereum

2.1.4 Blockchain

2.1.4.1 The concept of blockchain

A blockchain is a distributed database that is shared among the nodes of a computer network. As a database, a blockchain stores information electronically in digital format. Blockchains are best known for their crucial role in cryptocurrency systems, such as Bitcoin, for maintaining a secure and decentralized record of transactions. The innovation with a blockchain is that it guarantees the fidelity and security of a record of data and generates trust without the need for a trusted third party. One key difference between a typical database and a blockchain is how the data is structured. A blockchain collects information together in groups, known as blocks, that hold sets of information. Blocks have certain storage capacities and, when filled, are closed and linked to the previously filled block, forming a chain of data known as the blockchain [8].

2.1.4.2 The market overview of blockchain technology

Now, as many financial institutions, stock exchanges and Internet of Things companies use blockchain technology, the blockchain technology market will grow during the forecast period. There are many key factors driving the growth of this market, the most important being the ability to share ledgers and constantly coordinate databases. Blockchain database is hosted by millions of computers at the same time, and its data can be accessed by anyone on the Internet, so group fast chain technology will have a huge consumer market in the near future and will also bring great convenience to people.

2.1.5 NFT

2.1.5.1 The concept of NFT

In the simplest terms, NFTs transform digital works of art and other collectibles into one-of-a-kind, verifiable assets that are easy to trade on the blockchain.NFT means a lot to many influential people such as artists, and investors pay to own NFT versions of digital images.For example, Jack Dorsey's first tweet sold for $2.9 million, a video clip of a LeBron James slam dunk sold for over $200,000 [9].

2.2 Cryptocurrencies as Investments

2.2.1 Cryptocurrency Owners

Cryptocurrency has been an increasingly popular investment option among investors around the world. The trading volume of the most popular cryptocurrency, Bitcoin, has had a continued growth since 2015 and reached its peak in 2021. According to a questionnaire by Statista, in 2021, five countries with the highest percentage of respondents that indicated they owned or used cryptocurrencies are Nigeria (42%), Thailand (31%), The Philippines (28%), Vietnam (27%), and Turkey (25%) [10]. In the meantime, the three countries with the largest number of cryptocurrency owners are India (100 million), the United States (27 million), and Nigeria (13 million) [11].

Speaking of owners' demographics, there are more male cryptocurrency holders than female holders. A possible explanation for more male engagement could be that cryptocurrencies are risky assets, and women tend to invest more cautiously compared to men [12]. Young people, typically the ones under the age of 34, are more engaged in cryptocurrencies than older people, probably because of that younger people, who've grown up in the information age being familiar with various new technologies, are more likely to find new ideas related to the internet, like digital currency, fascinating. In detail, while about 16% percent of U.S. citizens said they have invested in or traded cryptocurrencies before, the most active group of men aged 18-29 has an involvement rate as high as 43% [13]. In addition, lots of holders around the world are well-educated, with 82% of them having a bachelor's degree or higher, and well-off, with 36% of them having an annual income over US$100k [11]. Their education probably helped them to better understand blockchain technology and therefore understand the idea

of cryptocurrency, while their wealth gives them the capital to invest in brand new, mysterious, and risky assets. In the United States, there hasn't been a large difference in the percentage of holders in every ethnicity, but Asian, Hispanic, and Black adults are slightly more likely to invest than White adults.

2.2.2 Why do people invest in cryptocurrencies

There are several reasons why people would like to own cryptocurrencies. First, cryptocurrencies have the potential for long-term growth, as well as short-term excessive growth [14]. In detail, the price of Bitcoin has increased from less than $1000 in 2015 to around $40000 nowadays; and the price has increased by an amount of $20000 in about half a month in 2020 and about $24000 in about one month in 2021. Second, people may buy cryptocurrencies like Ethereum to purchase goods in games related to metaverse and NFTs. Third, people may invest because they appreciate the blockchain technology that cryptocurrencies use. Blockchain technology enables to people to trade directly without a third party, hence providing privacy and reducing governmental influence; it is considered safe from fraud; and it ensures cryptocurrencies' scarcity, as cryptocurrency coins can only be mined or traded, unlike flat money that can be printed and thus susceptible to inflation [15].

There are also possible psychological factors. 26% of people in a survey claimed that they invest in cryptocurrency because of the excitement it brings, probably because of the uncertainty and volatility of cryptocurrencies [15]. People might also invest due to the fashionable image cryptocurrencies have, or to follow celebrities who announced their purchase of cryptocurrencies.

2.2.3 Data Sources & Formulas

In this section, the data of cryptocurrency prices and stock prices are downloaded from Yahoo Finance. Data for gold price are downloaded from https://www.gold.org/goldhub/data/gold-prices. I used the 'AVERAGE', 'VAR.P', 'STDEV.P' and 'CORREL' function in Excel. Some other formulas I used are listed below. P represents value, e.g., P_{365} equals the price of a stock or cryptocurrency on the last day of a year (except if it's a leap year).

$$DailyReturn = R = (P_n - P_{n-1})/P_{n-1}$$

$$CARG(1year) = g = \left(\frac{P_{365}}{P_1} - 1\right) \times 100\%$$

$$AnnualizedVolatility = v = STDEV.P(R_1 \sim R_{365}) \times \sqrt{365}$$

$$SharpeRatio = \frac{(g - riskfreerate)}{v}$$

2.2.4 Risk and return

In general, cryptocurrencies have high volatility and high returns. This means that cryptocurrency prices fluctuate quite rapidly, and their price, over the past few years, increase more than an average stock.

Table 1. Risk and return of cryptocurrencies compared to other assets.

2017-2018	average daily return	standard deviation
Gold	0.02307%	0.0062337
Apple	0.07855%	0.015037
Bitcoin	0.2929%	0.046634
Ethereum	0.5972%	0.064659
2020-2021	average daily return	Standard deviation
Gold	0.0396%	0.010838
Apple	0.2028%	0.023636
Bitcoin	0.3414%	0.039959
Ethereum	0.6047%	0.052759

In this section, the two most popular cryptocurrencies, Bitcoin and Ethereum are discussed as representatives of cryptocurrencies. Table 1 shows that Bitcoin and Ethereum have a significantly higher average daily return and standard deviation than gold's (Gold is a representative of stable assets) and a considerably higher one than Apple's (Apple stock is a representative of a typical tech stock), in both Year 2017-2018 and Year 2020-2021. Comparing the two cryptocurrencies themselves, Ethereum, which was established later than Bitcoin, has a higher average daily return and is more volatile than Bitcoin.

The main reason for the unstable price of cryptocurrency is that they are new currencies only bound to scarcity and has no intrinsic value under the conventional view. Therefore, the price is largely affected by investors' attention. According to Liu and Tsyvinski, the price of Bitcoin is significantly influenced by both positive and negative investors' attention, it rises when there's more search of the word "Bitcoin" in Google searches and falls when there's more search of negative information like "Bitcoin hack" [16].

Also, Bitcoin's lack of recognition as a method of payment has hindered its utility as a store of value. Throughout its history, the price of Bitcoin has been

primarily driven by speculative interest, acting bubble-like with major price changes. It is predicted that the value of Bitcoin will become more stable "as Bitcoin continues to see greater mainstream adoption, but the future is uncertain [17]".

Table 2 investigate Bitcoin, Ethereum, and Apple's yearly performance. The Sharpe ratio of the two cryptocurrencies vary hugely from year to year, indicating the unstable performance of the assets. The absolute value of the Sharpe Ratio is usually quite high compared to that of Apple's, which indicates that cryptocurrencies' performance is more extreme: either impressive, like the 13.82 Sharpe Ratio of Bitcoin in 2017, or quite badly, like the Sharpe Ratio of both stock in the year of 2018.

In the meantime, it seems like there isn't a significant correlation between the returns and volatility of cryptocurrencies each year. We see that though return varies hugely from year to year, shown by compound annual growth rate (CARG), annualized volatility stays in a smaller range; higher return doesn't necessarily equate to higher volatility, e.g., Bitcoin 2019 CARG: 12.60%, annualized volatility: 71.6%; Bitcoin 2020 CARG: 300%, annualized volatility: 69.2%.

Table 2. CARG, Annualized Volatility and Sharpe Ratio of Different Assets.

	BTC			ETH			AAPL		
	CARG	Annualized Volatility	Sharpe Ratio	CARG	AV	SR	CARG	AV	SR
2015	0.3701	68.80%	0.51	N/A	N/A	N/A	-0.0208	32.16%	-0.13
2016	1.2189	47.96%	2.5	N/A	N/A	N/A	0.1238	28.03%	0.37
2017	13.1802	95.24%	13.82	N/A	N/A	N/A	0.4804	42.98%	1.07
2018	-0.533	79.21%	-0.7	-0.8274	107.02%	-0.79	-0.0705	34.52%	-0.26
2019	0.126	71.57%	0.15	-0.0796	78.47%	-0.13	0.8874	31.43%	2.76
2020	3.0056	69.21%	4.31	4.6406	94.23%	4.9	0.7824	56.02%	1.36
2021	0.5967	80.19%	0.72	4.0422	106.84%	3.76	0.3806	30.15%	1.2

2.2.5 Correlations with other factors

2.2.5.1 Among Cryptocurrencies

The correlation between Bitcoin and Ethereum, shown in Table 3, has stayed strong at around 0.8, only with a slight decrease in 2021 down to 0.76. This suggests that cryptocurrency is still viewed largely as a single entity, and there's significant interdependence among the coins, with the value of other coins price probably significantly affected by the value of Bitcoin, the most popular cryptocurrency by far. This evidence suggests that diversifying one's investment in cryptocurrencies can hardly spread risk.

Table 3. Correlation between Bitcoin and Ethereum.

Correlation: BTC and ETH	
Total	0.805013192
2018	0.81500962
2019	0.820857605
2020	0.838777198
2021	0.761213248
2022	0.89780686

2.2.5.2 With Gold Price

The correlation between the value of Bitcoin and the price of gold, shown in Table 4, has varied, but in general, the correlation was insignificant. Interestingly, the two have both been nominated as inflation hedges due to their scarcity: there's only a finite amount of Bitcoin and gold. Matkovskyy and Jalan state that "Bitcoin can be considered a macro hedge against realized inflation in bullish euro; GBP and JPY markets offering higher returns during periods of very high inflation [18]."

Table 4. Correlation between Gold and Bitcoin.

Correlation: Gold and BTC	
Total	0.093887199
2015	-0.054172445
2016	0.129454946
2017	0.021524802

2018	0.074171945
2019	0.156493184
2020	0.32670928
2021	-0.044313683

2.2.5.3 With stocks

Investors have long been looking for assets that have little or negative correlation with the general stock market to spread risk, as they will suffer a huge loss if they invest in largely correlated stocks and those don't perform well collectively. Cryptocurrency has raised investors' attention by being a potential option to be hedged against the general stock market, i.e., a "safe haven".

We first compared the correlation among the S&P 500, which represents the general stock market, and the price of Apple stock and Meta (previous name: Facebook) stock, which are two big tech stocks, in Table 5. There is a significant correlation between the general stock market and individual tech stocks: Apple's stock price has a 0.734 correlation with the S&P 500 while Meta's stock price has a 0.622 correlation with the S&P 500. There's a slightly weaker correlation between the two individual tech stocks we've chosen, Apple and Meta, at 0.56.

Table 5. Correlations between S&P 500 and large-cap tech stocks.

Correlations			
	S&P 500 and AAPL	S&P 500 and FB	AAPL and FB
Total	0.7335	0.6226	0.5671
2015	0.6643	0.6445	0.5490
2016	0.5659	0.5076	0.3549
2017	0.5180	0.4992	0.5424
2018	0.7454	0.5709	0.4467
2019	0.7430	0.5677	0.4717
2020	0.8291	0.7447	0.7676
2021	0.6853	0.5702	0.5047

Looking at the correlations between Bitcoin with those stocks and the indicator, we do find the correlations to be significantly lower, at about 0.10 on average, shown in Table 6. In some years, there are even negative correlations, e.g., the Year 2016 for all S&P 500, Apple, and Meta versus Bitcoin; the Year 2018 for S&P 500 and AAPL versus Bitcoin. This provides evidence for Bitcoin being a good "safe haven".

However, there is an increased correlation between the performance of Bitcoin and the performance of the stock market in the years 2020 and 2021, years where the world economy was severely influenced by the COVID pandemic; at 0.425 and 0.262 respectively. In early 2020, Bitcoin fell almost 50% while stocks fell as much as 34% [19]. The news in 2022 hasn't been too promising either: "amid a nearly 7% decline in the S&P 500 since the start of 2022, Bitcoin is down 17% while gold is flat" [19]. The evidence discredits Bitcoin's characteristics of a "safe haven" used to spread risks. However, even when Bitcoin and the stock do have a strong correlation, I do doubt that their fall in price is caused by the same reason or related reasons.

The correlation between Bitcoin and individual stocks (Apple and Meta) hasn't been significant. Although there is an increased correlation between Bitcoin and Apple and Meta in the Year 2020, the correlation fell to previous levels in the year 2021.

Table 6. Correlations between Bitcoin and those stocks.

Correlations			
	S&P 500 and BTC	AAPL and BTC	FB and BTC
Total	0.1517	0.1123	0.0894
2015	0.0423	0.0063	-0.0961
2016	-0.0432	-0.0333	-0.0678
2017	0.0670	0.0305	0.0702
2018	0.0704	0.1196	0.0138
2019	-0.1179	-0.1177	0.0347
2020	0.4250	0.3982	0.3636
2021	0.2619	0.1028	0.0962

2.3 Regulations, Concerns, and the Future

2.3.1 Effect of Government Regulation

The Government also plays an important role in the cryptocurrency market. There are several types of government regulations for cryptocurrencies. In the U.S., common regulations include sales regulation, securities laws, and licensing requirements.

It is not hard to see the impact of government intervention on cryptocurrencies.

Among all those cryptocurrencies, bitcoin (BTC) and ether (ETH) are the two most popular crypto. BTC and ETH together represent almost 75% of the total market of cryptocurrencies. So, we will mainly focus on the effects of regulations on BTC and ETH [20].

Cryptocurrency is not perfect. Computer skill requirement means the barriers to use and store personal cryptocurrencies is high. Many of the cryptocurrencies also have stability issues.

One of the biggest reasons for regulation is that cryptocurrencies are becoming a new method for money laundering. According to Europol, Europe's police agency, 3-4% of the continent's annual criminal takings, with the value of £3bn-4bn, are crypto-laundered.

To make cryptocurrency-related markets more standardized, governments around the world began to regulate the market. US government started to regulate trades in the crypto market to reduce the level of crypto money laundering. In 2013, the Financial Crimes Enforcement Network (FINCEN) clarified even though the personal use of cryptocurrencies is not clarified as a money service business (MSB), activities like crypto exchanges and conversion of virtual currencies do fall under the definition of MSB [21]. Whereas Canada is the first country to establish taxation on virtual currencies. This taxation method aims at minimizing the risks of cryptocurrencies trading: including money laundering, drug trading. Cryptocurrencies were once announced tradable in China, in 2013.

The chart below shows the early government intervention on Bitcoin.

From the table 7, government regulation was easing in the early last decade. However, it didn't last long. The regulation became stricter recently.

Table 7. Regulations in Different Countries.

Scope	Countries	Additional Information
Prohibition	China	December 5th, 2013, China's central bank announced that financial institutions are not allowed to hold cryptocurrencies. Individuals and small parties can trade cryptocurrencies in the market.

	Russia	In February 2015, Russia's Prosecutor General's Office claimed that Bitcoin trade is illegal.
Protection from money-laundering and illegal activities.	Singapore	Financial intermediaries verify clients' identities and report suspicious transactions
	USA	Bitcoin users and miners are obligated to gather suspicious information about cryptocurrencies tradings and report it to the authorities.
Taxing Bitcoin	USA	In real-world economic transactions, selling, exchanging or using Bitcoin to make payments can result in tax liabilities.
	Japan	The tax would cover gains from bitcoin transactions and purchases made with bitcoin. Banks and securities firms will be banned from trading in bitcoin.

Reference: Marcin Szczepański, "Bitcoin: Market, economics, and regulation," European Parliamentary Research Service, 2014

Virtual Currency Today, "Regulation of Virtual Currencies: A Global Overview," Virtual Currency Today, 2015.

After 10 years of development, money laundering is still a major problem of currencies like BTC and ETH. Besides that, more serious problems like the damage to the domestic payment system and being used to evade restrictions on cross-border financial flows.

In 2021, Chinese authorities decided to ban all virtual currency trading and speculation. Egypt, Iraq, Qatar, Oman, Morocco, Algeria, Tunisia, Bangladesh followed China's step to ban all cryptocurrency trading. All cryptocurrency-related business activities are "illegal financial activities" and strictly prohibited, according to a joint announcement by China's central bank and nine other government departments. Cryptocurrency regulation has been included in bipartisan infrastructure bill talks by U.S. legislators in recent months. It is believed that the tax on cryptocurrencies will keep on increasing [22].

Because cryptocurrencies are highly unstable and the information failure among cryptocurrency users is huge. The value of those currencies' stock is likely highly elastic. A perfect example is Elon Musk and Dogecoin. Elon Musk, the CEO of Tesla, tweeted Dogecoin and caused heat in the crypto market. The stock price of Dogecoin reached 0.581 dollars and the total value of its market cap to 805.6 billion dollars in 2021.

Meta universe is a new trend in the market. It became popular after Facebook changed its name to Meta in 2021. As a result, the meta-universe became a real heat and its relative cryptocurrency, ETH, experienced a rapid increase in the stock market. The market cap reached 360.7 billion dollars in 2022. Furthermore, ETH and BTC arrived at their Maximum stock price on the same day, Nov 7th, 2021, making it more convincing that cryptocurrencies are highly dependable.

Although regulations like the one the Chinese government imposed banned all the trade of cryptocurrency in China, it didn't seem to affect the stock value significantly. Instead, the recent drop in ETH and Bitcoin is caused by two other reasons: The first reason is the rising interest rate in the US. Because inflation rate in America is at 7% according to data from the Labor Department -- higher than it's been in 39 years. So, the fed is likely to raise the interest rate in March 2022 and is tightening its quantitative easing program. This, combined with the omicron variant, means people are seeking safer investments. In this case, higher-risk options like cryptocurrency tumbled. The second reason is that competitors of BTC and ETH are taking their market share. There are many quality cryptocurrencies in the market, and many of them have great investment value. The expensive price of BTC and ETH makes normal investors change their goals to new cryptocurrencies as they are cheaper and have bigger potential.

As a result, although government regulation can limit the use of cryptocurrencies, it cannot influence their stock value significantly.

2.3.2 Mining issues of bitcoin

Before the authors cover the problems that one may face when mining bitcoins, one must know exactly what bitcoin mining is and how it works. So basically, the bitcoin mining process is mostly about the updates of the bitcoin transaction ledger, which is called the blockchain,

once the computer solves the mathematical problem generated by the system, your mining program would tell which of the current unstabilized transactions will be grouped into the next block of transactions. Then the compilation of the block represents the user's identity as a temporary banker of bitcoins that can update the blockchain. The block that the user has created and his/her solution are sent to the whole network so every other computer can do verification for it. Then every computer which validated the user's solution will be updating its copy of the blockchain with his/her decision of transaction in the next block. In conclusion, the person who gets the solution of the equation will be granted the right to update the blockchain and a fixed number of bitcoins, however, the quantity of the available mines will be decreasing progressively. Users can decide whether to keep the bitcoins until they appreciate or they can just sell them for money.

The mining of bitcoins requires an extremely well-equipped and high configuration computer to solve the complex work problem generated by the system, the better the computer is, the more possible answers can be made in a second, which means the greater the computer's calculation power is the greater the efficiency is. Those computers provide people with a greater opportunity of guessing the right answer [23].

As people are mining cryptocurrencies, many flaws are appearing at the same time, and it's hard for people to ignore those defects because they're causing damages at some point. As mentioned earlier, the whole process of mining bitcoins requires a massive amount of electricity to operate the computers because it consumes a lot of energy for the GPU or CPU to maximize their ability to process, so there's a high cost for the electricity usage. While the computers of bitcoin miners are operating and trying to work out the answer to the equation, it takes trillions of tries which cost tons of energy, and it turns out to consume 707 kilowatt-hours each transaction even not including the extra energy usage such as the cooling systems [24]. Those downsides of bitcoin mining can be harmful to either the environment or the economy, higher demand for electric power will lead to an increase in the price of electricity, moreover, causing lower HDI, increase in inflation, less foreign investment, higher business costs, and so on. On the other hand, higher carbon emissions would lead to global warming and depletion of natural resources which are all lethal to our environment.

2.3.3 Impacts of cryptocurrencies

As the cryptocurrency industry keeps growing, there have been several things affected by them; the global economy, banking industries, and environmental sustainability are very representative for most of the cases.

Bitcoin has existed for twelve years and made a lot of difference. Apart from being a new type of currency, they have also impacted the global economy. By the time that cryptocurrency has made a figure, more investors started to become interested in those kinds of virtual currencies because they have shown great progress and proved that they're profitable. Bitcoin is the one that bears the brunt. But on the other hand, cryptocurrency investment would be risky by its volatility.

Secondly, there's no central authority that approves crypto transactions, which means that crypto transactions are out of the control of the middleman and are capable of transferring money on the network. Since there's no middleman charge you for extra money, such as the procedures or maybe service fees, but instead only crypto miners which don't belong to any authorities to verify your transactions, you can save money and have a much more convenient transaction online. Due to the complexity of making remittances to family or friends outside the country, cryptocurrency can be a great way to transfer money with lower costs and be transparent [25]. Cryptocurrency adoption has the potential to simplify, improve, and modernize financial services, and several recent industry developments can assuage banks' concerns about the dangers and enable them to focus on the potential advantages instead. Banks might keep bitcoin or the key to access cryptocurrency in a customer's digital wallet securely and efficiently. Banks may be able to attract new, inexperienced individual investors by providing tools that make it simpler for their customers to embrace cryptocurrencies. Customers may invest in cryptocurrency on the back end or through other financial tools, and banks may provide interest-bearing cryptocurrency accounts. Banks can avoid fraudulent transactions, illegal activities, and fraud by using these platforms. The laws may make it simpler for banks and financial institutions to operate. Major financial institutions to do due diligence on consumers who engage in cryptocurrency transactions, alleviating their fears about the risks involved. Banks can help bitcoin users with their security concerns. Many people are concerned about the possibility of their wallets and exchanges being hacked. Public blockchains, particularly stablecoins, can assist banks in expediting payment processes. When it comes to transaction processing, blockchain technology outperforms clearing houses in terms of speed and cost. Because the fulfillment of the transaction is reliant on computer code rather than human conduct, participants engaging in a smart contract arrangement must have a lower degree of trust. Banks might contribute to the development of trust by acting as trusted third parties for smart contracts such as mortgages, commercial loans, letters of credit, and other transactions [26]. As mentioned earlier, the mining of cryptocurrency is highly energy-intensive, according to a study, the electric power that has been used to mine a single bitcoin block can be equal to the electric power consumed by average American

households for more than two months, and there is more variety of cryptocurrency that consume maybe even more electric power. The consecutive growth of the blockchain and the increasing miners is leading to the whole mining process becoming more complex and competitive, which means that the energy requirement is increasing at the same time. That's an absolute disaster for our environment because as most of the mining process is taking place in the US and people are mostly burning fossil fuels to gain electricity, in a further explanation, the burning of fossil fuels would be increasing the carbon emissions at the same time as it's a type of hydrocarbon that contains sulfur compounds and might also cause acid rain. In addition, the countries that are dependent on fossil fuels heavily are the places where most bitcoin mining takes place. However, some protocols appeared as methods to save electricity, such as "proof-of-stake (PoS); proof of history; proof of burn; proof of capacity" and even more. They are developed for the conservation of computing powers [27].

To conclude, although there are some consequences after the rapid development of virtual currencies, cryptocurrency has improved over the past couple of years with remarkable growth and a higher credit rating.

3. Conclusion

The first part of this paper elaborates on the concepts related to cryptocurrency and blockchain technology, the types of cryptocurrencies, as well as specific examples of several cryptocurrencies, and briefly analyzes the specific trends in recent years with two separate examples. Besides, the first part ends concludes with a brief introduction of NFT, which is very popular these days.

The second part of this paper analyzes in detail several factors that motivate people to invest in cryptocurrencies, and studies how the stock characteristics of cryptocurrencies have changed based on a large amount of data, as well as the underlying reasons behind all the facts that have happened.In addition, as cryptocurrency is characterized by high risk and high return, the second part also analyzes the degree of risk and return obtained by buying cryptocurrency.

The third part of this paper analyzes the influence of the attitude of governments around the world to cryptocurrency and the intensity of supervision on the development of cryptocurrency. In connection with the first part, it analyzes the influence of the recent popularity of the meta-universe on the cryptocurrency market. In addition, the mining of bitcoin, one of the cryptocurrencies, is discussed in detail. This part ends the whole paper by looking into the future development of cryptocurrency and blockchain technology.

When writing this paper, we also encountered many difficulties. For example, at the beginning, our group had different views on the content setting, and it took a long time to determine the topic. After the questions are decided, we can start to separate our parts. Because we are still high school students, we still have difficulties in understanding English materials, but we still overcome the difficulties and find the information we want on the Internet and in the library. In addition, the topic we choose is related to cryptocurrency and blockchain technology. Because the knowledge in this field is still in a relatively new type, there is relatively little available information in this field in the world at present, which is also one of the biggest problems we encountered in the process of writing this paper. Although there were many difficulties, we finally completed this paper through constant group communication, discussion with the professor and of course, unremitting efforts behind it.

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