

Bitcoin: A Blessing or a Curse

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Abstract. Bitcoin is considered the first and largest crypto currency with a blockchain system of recording transactions on thousands of machines at once enabling peer to peer transfer. There is no doubt that Bitcoin has received strong attention from the real world. Its innovative concept, reliable technology and advantages in application attract many people's attention. But Bitcoin has also brought many negative effects. To provide an organized response to the question around the potential benefits and harms of using Bitcoin, we designed an Impact Index comparing the impact from both sides of this topic. We found that the impact of the curses (negatives) is significantly bigger than the impact for benefits. However, more advanced technology, more regulated approach and changes in payment and financing methods may become the savior of Bitcoin.

Keywords: Bitcoin; Cryptocurrency; Impact Index.

1. Introduction

Bitcoin is a decentralized cryptocurrency founded by Satoshi Nakamoto in 2009. The identity of Satoshi Nakamoto remains unknown. Bitcoin is considered the first and largest cryptocurrency. It is a virtual currency with a blockchain system of recording transactions on thousands of machines at once enabling peer to peer transfer.[1] A decentralized public ledger can in theory prevent hacking and the involvement of criminals within the blockchain. Bitcoin Miners are individuals who produce new Bitcoin and record the transactions of Bitcoin. Every ten minutes, a small amount of Bitcoin is acquired by Bitcoin miners, but this total reward amount halves every 4 years by design. [2]

Blockchain technology is considered to have positive significance for future financial development. However, Bitcoin has also brought many negative effects. This research aims to provide an organized response to the question around the benefits and potential of using Bitcoin, an Impact Index is designed to compare the impact from both sides of Bitcoin. We found that the impact of the curses (negatives) of Bitcoin is significantly bigger than the impact for benefits. However, it is believed that more advanced technology, more regulated approach and changes in payment and financing methods may become the savior of Bitcoin.

2. The Benefits of Bitcoin

2.1 Anonymity

Bitcoin transactions have a certain degree of anonymity using public key cryptography or asymmetric cryptography, one owner only needs to know the other's public key, a recognized string of letters and numbers.[3] The private key, the owner's true recognition key, is secured and other users cannot see it. Only when Bitcoin transactions are processed, the user needs the private key to digitally sign the transactions.[4] In the process of transaction, Individuals no longer need to worry about their information stolen by other users or financial institutions. However, research showed that both Bitcoin users and Hot Wallet Bitcoin miners do not hold anonymity as particularly important.[5] Most cryptocurrency holders view the potential gains from investments in Bitcoin as the main reason they hold Bitcoin. 78.23% of users have either never or only used Bitcoin once.[6] It could be suggested that that if investors want to trade anonymously and strengthen supervision to promote stability, improve trust and substitutability, this will bring benefits.

2.2 Countering Hyperinflation

In poorer countries affected by poor government financial management, discrimination or hyperinflation, Bitcoin may be an alternative means for enterprises to conduct transactions, allowing financial transactions to continue in a market that may fall into chaos, and ultimately bringing some stability to the currency.[7] Bitcoin is transparent with its finite supply, with a limited supply of 21 million.[8] This makes Bitcoin a controllable currency. It is decentralized and free from any political or exchange manipulations, which can be an antidote for inflated currency. Argentina is a successful example of a country using cryptocurrency to partially stable their inflated Pesos. Many enterprises now accept Bitcoin, as Wences Cesares, a leading investor said, “Bitcoin is a currency that the people feel has served them well”.[9] Another example that makes cryptocurrency a good possible solution for hyperinflation is Zimbabwe. Zimbabwe had been experiencing catastrophic inflation in 2008 with an annual inflation rate 89.7 sextillions (10^{21}). [10,11] Could Bitcoin now be an option for the Bank of Zimbabwe to stabilize their economy If this event happens again.

2.3 Helping LDC's Development

Bitcoin may well contribute to the economic development of less developed countries (LDC) within areas like Africa. Bitcoin is not limited by government or financial institutes. Bitcoin does not need a centralized bank, or any bank account or card to transfer money from one market or country to another.[12] Access is not limited by national laws that may discriminate against gender or religion. Consumers can simply use their mobile phone and the “message” function in their phone, to receive Bitcoin.[13] This means that when enterprises want to invest in less developed countries, Bitcoin can avoid a lot of administrative controls, which will help funds enter less developed countries for investment, and thus promote the economic development of less developed countries. The popularity of mobile devices such as mobile phones provides a good hardware foundation for the use of Bitcoin. By 2020 there was 725 million people with mobile phones in Africa, all eligible to use Bitcoin and other cryptocurrencies.[14]

3. The Harms of Bitcoin

3.1 Criminal Activity

Anonymity can protect users' information security. however, anonymous transactions will undoubtedly lead to the promotion of criminal activities. The ransom of a kidnapping case in Ukraine in 2017 was transacted in Bitcoin.[15] During 2011 to 2013 alone, Bitcoin worth more than \$200 million was involved in the illegal sale of drugs.[16] Bitcoin's anonymity also allowed double spending, when secret payment methods undo the transaction, buyers get goods without paying the seller.[17]

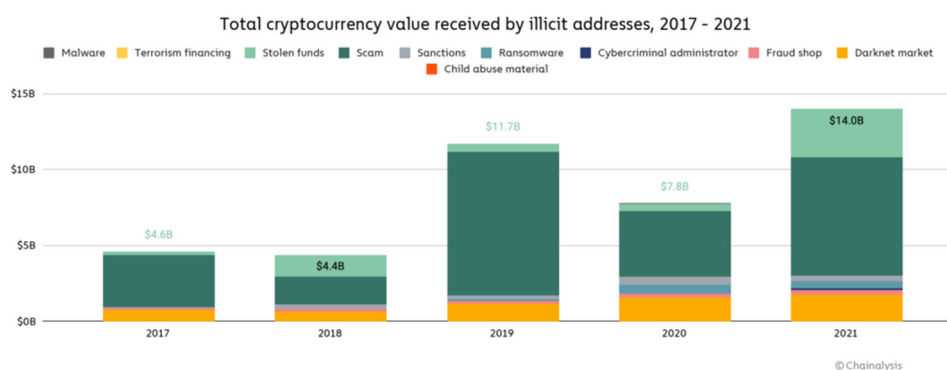


Figure 1. Total cryptocurrency value received by illicit addresses¹⁰

Figure 1 shows an increase in the cryptocurrency value used by illicit addresses. From 2017 to 2021, the value of cryptocurrency transmitted to darknet market doubled, transmitted to the scams

also doubled, and the total overall amount almost tripled. This demonstrates a continuous increase in the value of cryptocurrency used in criminal activity.

In a sense, the emergence of cryptocurrencies such as Bitcoin makes criminal activities more convenient and further reduces the cost of laundering black money. It can be said that Bitcoin makes criminal activities more frequent.

3.2 Volatility

Inherent volatility has hindered the fungibility of Bitcoin as a “medium of exchange”, the definition of money.[18] The Bitcoin system is designed to have a limit of 21 million Bitcoins in total and every 4 years, the number of reward Bitcoin halves.[19] As a result, Bitcoin’s value appreciates due to increasing demand combined with diminishing supply. The hype or tribalism around Bitcoin in social media is another contributor to the fluctuating price.[20]

Bitcoin Volatility Time Series Charts

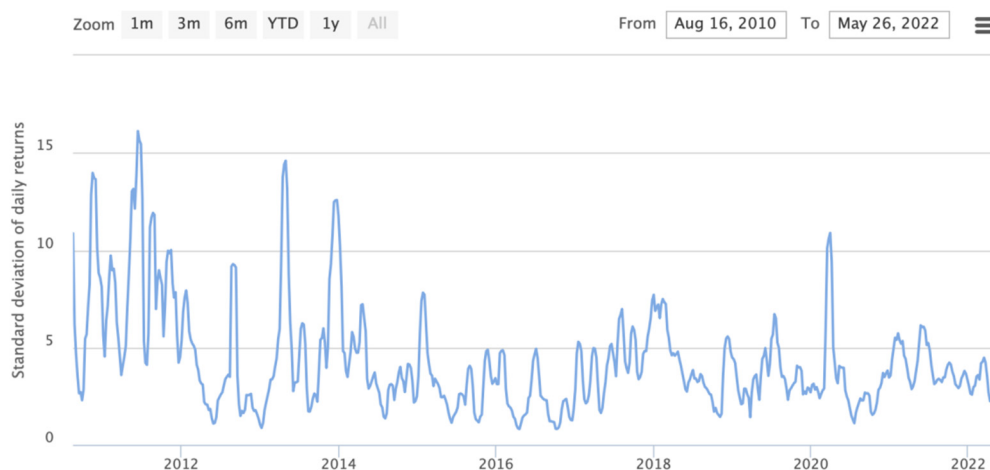
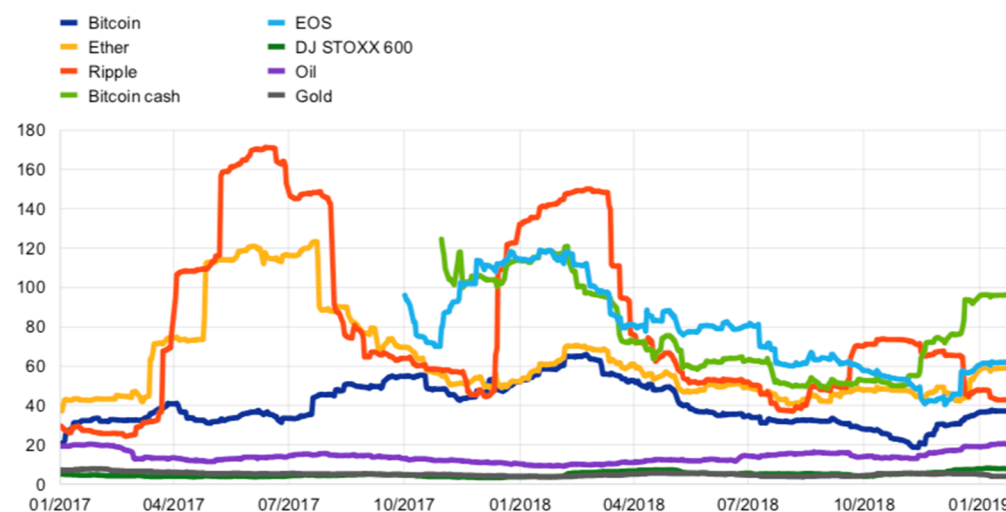


Figure 2. Bitcoin volatility times series charts13

Historical average return volatility

(percentages)



Sources: Cryptocompare, Datastream and ECB calculations.

Note: Volatility is the 90-day standard deviation of daily returns of the asset or the market. Daily data from 1 January 2017 to 31 January 2019.

Figure 3. Historical average return volatility14

Figure 2 and figure 3 show the volatility of Bitcoin over time. Compared with commodities such as gold and crude oil, the return rate of Bitcoin has higher volatility. However, compared with other cryptocurrencies, the volatility of Bitcoin returns is significantly smaller. Although Bitcoin is not as volatile as other cryptocurrencies, it is still considered as a highly volatile currency with a standard deviation of 70.08%.[21] A deviation of this level demonstrates “significant fluctuation of the returns”.

3.3 Tax Evasion

Governments are experiencing direct harm as Bitcoin investors are reluctant to pay tax, as it has been said, such is the nature of man.[22] Due to the anonymity of Bitcoin, governments cannot track transactions of Bitcoin, therefore allowing some dishonest users to evade taxes. The U.S. treasury has so far failed to give any response to ensure tax compliance. Moreover, there is a lack of clear definition around jurisdiction of Bitcoin trading and spending in part due to its constantly changing nature, making it harder for governments to identify who has evaded taxes.[23] Until 2021, there was a 1 trillion dollar tax gap in the U.S., posing a significant risk to the country’s monetary management.[24] However, some companies have devised trackers, such as Koinly and Cointracker, they claim that they can track the user’s personal information, albeit after paying 700 dollars.[25]

4. Impact Index

4.1 Impact Index Design

To provide an organized response to the question around the potential benefits and harms of using Bitcoin, we designed an Impact Index comparing the impact from both sides of this topic.

The Impact Index = (Impact Intensity + Impact Rating) * Probability.

Below are the rating criteria for Impact intensity, Impact Rating, and Probability:

Impact Intensity Table:

Benefit characteristic	Harm Characteristic	Score
This benefit has a series of knock-on effects. That are likely to magnify the effect in the medium term.	This harmful aspect has a series of knock-on effects. That are likely to magnify the effect in the medium term.	1
Can cause direct governmental benefit?	Could threaten the working/existence of government	1
May benefit populations HDI	May harm a populations HDI	1
This benefit will last more than 1 year	This harm will not be recovered in 1 year	1

Impact Intensity = Sum of scores

Figure 4. The rating criteria for Impact intensity

Impact Rating table:

Percentage of population affected	Definition	Rating
• 0% to 3.99%	Negligible	0.5
• 4% to 9.99%	Minor	1
• 10% to 16.99%	Visible	1.5
• 17% to 24.99%	Medium	2
• 20% to 34.99%	Moderate	2.5
• 35% to 49.99%	Significant	3
• 50% to 69.99%	Major	3.5
• Over 65%	Fundamental	4

Figure 5. The rating criteria for Impact Rating

Probability Table:

Risk Likelihood	Criteria	Likelihood
Probable	This impact will have a large chance to happen in the 12-24 months than not	75%
Possible	This impact will have less chance to happen in 12-24 months than not	38%
Moderate	This impact will have low chance to happen in 12-24 months	18%
Unlikely	This impact exists but with an unlikely chance to happen in 12-24 months	8%
Rare	Virtually no chance to happen in 12-24 months	3%

Figure 6. The rating criteria for Probability

4.2 Impact Index Calculation

We calculate the impact index of the three major points that is identified from both sides of the argument. The benefits, anonymity, helping LDC's development, and countering hyperinflation. The harms include tax evasion, volatility, and criminal activity.

For anonymity, 1 on impact intensity is rated because only the last question is answered. But we give 4 on impact rating, because all users benefit from anonymity. The probability is 75% because this impact is very likely to happen, this yields an index of 3.75.

For helping LDC's development, we rate a 3 on impact intensity, because only the last question is not achieved. This benefit, due to the volatility of Bitcoin, might not last in the longer term. We give a 1.5 on impact rating, because not all users in Africa possess a mobile phone, or surplus funds to invest.[26] This impact is quite moderate, 18%, taking longer than 2 years to bring phone ownership to most African citizens. This yields an index of 0.81

For countering hyperinflation, we give a 3 on impact intensity. We give a 4 in impact rating, because all of the population will be affected if Bitcoin is implemented. The impact is 38%, because only some countries have indicated possible digital currency adoption in part. This yields an index of 2.66.

From the above three aspects, the sum of indexes for benefits of Bitcoin is 7.22.

For tax evasion, we give a rate of 3 on impact intensity, because this will not harm population HDI. The percentage of population affected, is 65%+, so we give a 4. For the risk likelihood, we give 38%, not everyone is inclined to evade tax. Overall, an index of 2.66 is achieved.

For volatility, we give a 3 in impact intensity. This impact will have a rate of 4 due to the fact that all Bitcoin users are experiencing volatility. For the risk likelihood, 75% is given because volatility is ongoing. This results in an index of 5.25.

1.5 for criminal activity is awarded because the harm done is long term but limited to a small part of transactions 1%. Although this will cause a huge loss of money. The impact likelihood will be 75% because this impact continues to grow giving an index of 1.875.

In conclusion, the sum of indexes for benefits is 7.22. for the curses it is 9.785. The impact of the curses (negatives) is significantly bigger than the impact for benefits.

5. Conclusion

In addition to the above analysis, there are many factors that can affect the development of Bitcoin, such as reward system, environmental protection and Government regulations. From the perspective of reward system, some believe the Bitcoin reward system is unfair and detrimental to Bitcoin's long-term development. Bitcoin miners record each transaction's code and connect them in a blockchain. However, large miner pools are now dominating the Bitcoin mining industry, subverting the concept of being fair and devolved. Bitcoin mining now involves big investment mining together rather than individuals. This makes mining a centralized business, dominating the reward system. In terms of environmental protection, Bitcoin's energy use is far less than traditional banking which needs 2340 million GJ of energy per year, Bitcoin only consumes 3.97 million GJ of energy. This implies that Bitcoin is a more environmentally friendly choice. The regulation at the legal level will also affect the development of Bitcoin in the future. Three quarters of Bitcoin mining is taking place in China with 65% to 75% of the network's total processing power or 'hash rate' but the Chinese government are considering a move to outlaw this activity. Once the Chinese government bans Bitcoin, it will have a very significant impact on the production, trading and future development of Bitcoin.

Confucius said, "Everything has beauty, but not everyone sees it". Bitcoin is a disruptive innovative technology and has split opinion accordingly. Many believe that Bitcoin has the potential to create a democratic and free currency that could help poorer nations access funds, overcoming infrastructure problems and state intervention.

Lack of regulation and Bitcoin's volatile and non-productive asset nature creates extreme volatility that can wipe away an investor's hard-earned assets in an instant. There are some curses that we can just not avoid. The question is can we live with them or can we minimize them? If users adopt some aspects of regulation and less anonymity then the result maybe more stability. It is still doubtful though as much research indicates that currency holders seek only high gains driven by the fear of missing out on the latest trend. With stability comes trust and longer-term possibility of further acceptance. Some believe cryptocurrency has a truly amazing potential as an asset class, whereas others see no value or utility and even treat it as an elaborate Ponzi Scheme. Ponzi Scheme is a type of scam that pays back the investment from previous contributors not from any real gains. This cycle continues as long as people trust the investment. A characteristic of a Ponzi Scheme is a "no risk high return investment". Recently, Bitcoin had initiated an investment opportunity that guaranteed a 7% return every week. Bitcoin investment is decentralized, unlicensed, unregistered and impossible to track. Investors are buying in to the expectations of very high returns. As Bitcoin is a non-productive asset class, returns are fueled by those that make new investments alone. Previously unsustainable financial investments have included the Madoff scheme of the Great Financial Crisis of 2008.

Although we concluded the impact of curses outweighs benefits from the impact index, Bitcoin also has potential benefits by adapting more technology and a more regulated approach in the future, these threats may convert to benefits. More advanced technology, more regulated approach and changes in payment and financing methods may become the savior of Bitcoin.

There are many other factors affecting Bitcoin, such as reward system, environmental protection and Government regulations. From the perspective of reward system, some believe the Bitcoin reward system is unfair and detrimental to Bitcoin's long-term development. Bitcoin miners record each transaction's code and connect them in a blockchain. However, large miner pools are now dominating the Bitcoin mining industry, subverting the concept of being fair and devolved. Bitcoin mining now involves big investment mining together rather than individuals. This makes mining a centralized business, dominating the reward system. In terms of environmental protection, Bitcoin's energy use is far less than traditional banking which needs 2340 million GJ of energy per year, Bitcoin only consumes 3.97 million GJ of energy. This implies that Bitcoin is a more environmentally friendly choice. The regulation at the legal level will also affect the development of Bitcoin in the future. Three quarters of Bitcoin mining is taking place in China with 65% to 75% of the network's total processing power or 'hash rate' but the Chinese government are considering a move to outlaw this

activity. Once the Chinese government bans Bitcoin, it will have a very significant impact on the production, trading and future development of Bitcoin.

How the bitcoin will develop in the future is a new field of understanding but a very important one. But now over 100 million people hold bitcoin assets as it is easily stored and transported over borders. In the short time since its inception, it has grown to be worth over \$1 trillion. The people have voted already.

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