

# **The Revolutionary Potential of Cryptocurrency**

*Not only can cryptocurrency revolutionize traditional financial systems into safer, quicker, and more transparent ones, but they can even replace fiat currencies.*

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WORDS LIKE “Decentralization,” “Blockchain,” “Coin-mining,” and similar vocabulary have become buzzwords for not only techies and entrepreneurs but nearly everyone in the past few years. These terms are thrown around more than “Prada” and “Louis Vuitton” during the Paris Fashion Week. However, a large percentage of the population still do not know what these terms exactly mean and what they do. This lack of knowledge has brought fear and criticism towards these concepts, especially cryptocurrency.

Any unknown technology can cause skepticism or distress. When people’s financial security and money are involved, the unfamiliarity with the new technology can lead to complete rejection of the innovation. That is what happened with cryptocurrency more than ten years ago when Bitcoin, the first digital currency, was introduced to the world. People did not quite understand it, and some thought it was a scam. Bitcoin being such an intangible innovation made it even more difficult for people to grasp its potential. People could not wrap their minds around a non-physical, computerized currency. Until recent years there was a misconception that cryptocurrency was an asset class and investable security that went up and down in value just like a stock. That limited people from realizing cryptocurrency’s full potential.

Cryptocurrency is much more than an investment tool. It has the potential to revolutionize traditional financial systems into safer, quicker, and more transparent ones. For those that do not know, cryptocurrency is a system in which exchangeable virtual coins with monetary value, which function like a typical currency, are created. [3] These coins are created using a technology called Blockchain, a system of accumulating blocks that keep records of past actions taken place on the system. [4] Think of a Shared

Google Documents file used to track people's actions: someone initially creates the empty file, and people add information to it as they use it. The idea behind Blockchain is similar: someone initially creates a blockchain system, and as people use the system, their actions or transactions are imprinted on the system in blocks. Any new information that enters the system is stored in a new block connected to the previous block. So, in a blockchain system, a map of blocks stores every information that has ever entered into the system using cryptography.

Cryptocurrency has defining characteristics. These characteristics of cryptocurrency is made possible by Blockchain Technology, which a visual representation of is given in Figure 1. It is decentralized, meaning it does not require a governing authority to run and maintain the system of cryptocurrency. Users are anonymous so that no personal information can be stolen. All information that enters the system is stored automatically and is tamper-proof, and the system determines the conditions under which new cryptocurrency units can be created. [2] Cryptocurrency has the potential to unite financial systems globally, creating one decentralized economy.

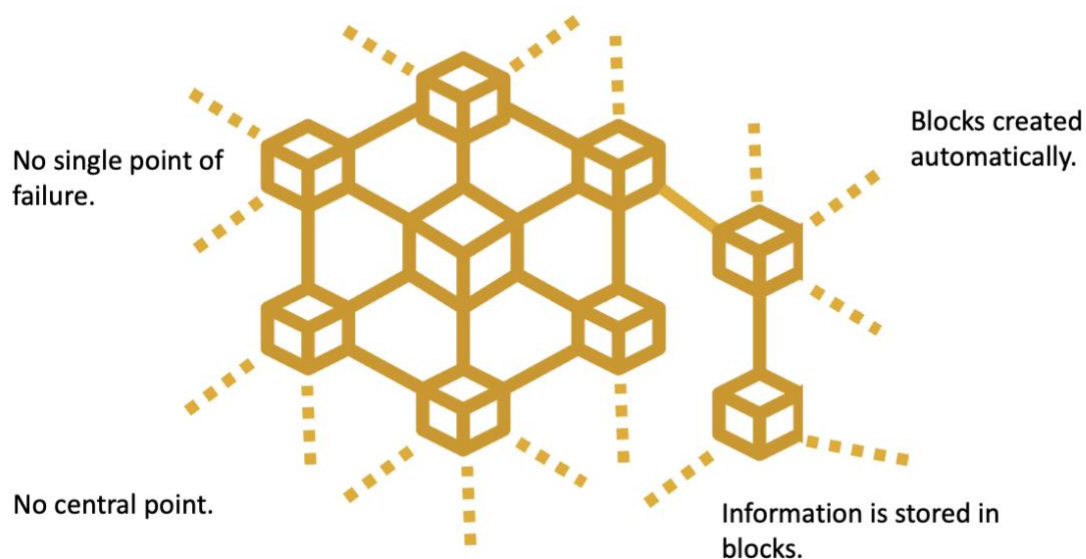


Figure 1: The Blockchain Technology and Its Features

However, just like every technology and innovation, cryptocurrency has imperfections, which brings criticism and doubt about its usefulness and sustainability in the long run. It is normal to have concerns and questions about such a new and imperceptible technology. “Are not cryptocurrencies scams that make people believe they are currencies?”, “Will their intrinsic values ever stabilize or remain as volatile as today? “Is it a reliable and safe platform for monetary exchanges and legitimate replacement for current systems?” might be a few that come up straight away? This article will address all of these concerns about cryptocurrency by showing why these concerns will be insignificant in the future. More importantly, it will detail the revolutionary benefits of cryptocurrency and show its potential to replace fiat currencies.

### **Yes, there are risks to adopting cryptocurrencies, but they are all solvable.**

There are risks associated with the adoption of cryptocurrency in our daily lives. There is no denying that. However, some of these concerns are not as important today as the critics and the general public make them be. Moreover, the more valid risks for the current stage will probably be insignificant in the future. So, outlining the risks and understanding why they are current concerns will help address them and detail how they will not impose any danger in the future. These risks and concerns can be categorized as economic, technical, and societal risks.

#### *The Economic Risks & Unclear Purpose of Cryptocurrencies*

One of the main concerns surrounding cryptocurrency is that it might not be fully fit to be an alternative for physical money. There are several reasons behind this concern, and the main reason is that the cryptocurrency industry has become a new asset for people to trade. Cryptocurrencies acting as tradable securities such as stocks have caused significant volatility in their values. There is currently a limited number of cryptocurrency users, so their percentage of the total market capitalization is high. Therefore, “any single user’s trade would have a disproportionate impact on market price. Hence

exchange rates of cryptocurrencies against fiat currencies may change quickly.” [2] The volatility attracts speculators that try to take advantage of the volatility of cryptocurrencies and make a profit. Speculation causes even further volatility for cryptocurrencies. This volatility, “when analyzed through the lens of the conventional ‘functions of money paradigm favored by economic textbooks (money as a medium-of-exchange, a store-of-value, and a unit-of-account), poses problems for the ‘moneyness’ of the tokens (Yermack, 2015).” [1] The moneyness problem of digital currencies contradicts the vision behind their creation and adds doubt about the feasibility of these digital coins being an alternative to physical money.

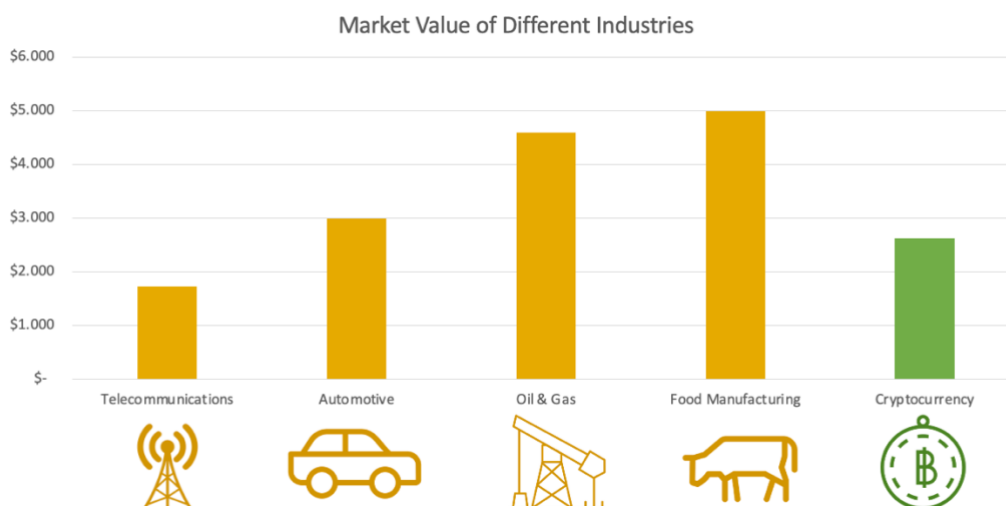
The current volatility will not remain in the future as cryptocurrencies keep growing and expanding. “The market capitalization of well-established cryptocurrencies such as Bitcoin will increase, making them resistant to rapid exchange rate fluctuations.” [2] Therefore, each investor will hold an insignificant portion of the total market capitalization of cryptocurrencies. Thus, a single transaction will not be able to influence a large and popular cryptocurrency’s price. This will get rid of speculators and stabilize the price of established cryptocurrencies, such as Bitcoin or Ethereum.

Moreover, the instability in the price of cryptocurrencies influenced the creation of stablecoins. These stablecoins are “tethered or pegged to fiat currencies, or ‘backed’ in some way with assets that have fiat currency prices.” [1] With more complex stablecoin designs, it is possible to create a cryptocurrency independent from the existence of fiat currencies but stable in price. Even though it is unclear whether stablecoins can replace physical money from a legal perspective, “from an economic standpoint, their stability in purchasing power might contribute to an increase in their adoption as money in the future. (Bullmann et al., 2019).” Developing safer and established cryptocurrencies on top of the population’s increased knowledge and adoption will mitigate volatility. This will inch cryptocurrency towards being regarded as a digital alternative for physical money.

Another concern for cryptocurrency being a viable alternative for physical money in the long term is the questions surrounding its legitimacy. The leading cause of the questions surrounding cryptocurrency’s legitimacy is that its focus on privacy has caused “concerns with legal bodies and authorities .”[1] Legal bodies’ hesitancy toward cryptocurrency leads to doubts about its long-term

availability and adoption as an alternative money unit. Especially because governments can essentially kill cryptocurrency if they desire to do so. “The most effective mechanism is simply regulation. Cryptocurrencies have value only when they can be converted back to local currency. By effectively strangling the exchange process, governments can make cryptocurrencies unworkable.” In addition to regulation, governments can use technical disruptions to prevent cryptocurrency, as coin-mining relies on efficient technology. [6] Therefore, cryptocurrency has to benefit governments in a way, either politically or economically, and not inconvenience them to stay alive in the long run. ‘

While governments may have the power to ban cryptocurrency, they will not. Banning cryptocurrency would have significant economic and political implications for governments. One reason for it is the large percentage of wealth invested in cryptocurrency to earn additional capital. As of November 2021, 7% of the world’s wealth was invested in cryptocurrencies. [22] The cryptocurrency market is valued between \$2.35 and \$2.9 trillion, more than the telecommunications industry, valued at \$1.74 trillion. [23] A wealth comparison between the cryptocurrency industry and traditional industries are given in Figure 2. Banning cryptocurrency would mean foregoing a way of earning money for people and could lead to a loss of wealth in the country. People might move their cryptocurrency holdings to a different country. Therefore, it would hurt the economy and cause political tensions between the government and the public. Therefore, it is hugely unlikely for the government to pull the plug on cryptocurrency in the current climate of our world.



## Figure 2: Cryptocurrency Industry vs. Popular Industries

More importantly, cryptocurrency and its implementations have started being adopted by corporations and the finance sector. “Even permissioned payment systems run by corporations but still called cryptocurrencies entered the stage. Eyal (2017) concludes that ‘if attendees at recent blockchain events are any indication, cryptocurrencies have caught the attention of the mainstream financial technology (FinTech) sector’ (Eyal, 2017, p. 39).” As the finance sector and large corporations start experimenting and adopting cryptocurrency technology, the greater the influence cryptocurrency is going to have on economies and legal authorities. It will also become an established technology used by legitimate businesses, legitimizing cryptocurrency further.

This will also lead governments and other legal authorities to adopt the technology. USA’s President, Joe Biden, has recently passed an [executive order on regulating cryptocurrencies](#) in March 2022. “President Biden will issue a wide-ranging executive order today for multiple government agencies to develop policy recommendations on digital assets and cryptocurrencies.” [13] Some countries are ahead of the US, having started preparations to implement their own cryptocurrencies as alternative national currencies. For example, “Ecuador (Yanez, 2015) and Isle of Man (Caffyn, 2015) are working on the integration of cryptocurrencies into their respective state administrations.” [2] Like Luxemburg, some are a little less ahead, not integrating digital currencies into their nations but regulating them. [2]

Another reason for the skepticism towards cryptocurrency’s purpose is that not every cryptocurrency created is “digital cash” with the purpose of being a device for the use of exchange of goods or services. An excellent example of this is the popular cryptocurrency Ethereum. The token Ether and tokens running on Ethereum’s platform (second-layer tokens) “exist first and foremost to activate smart contracts rather than aiming to provide a payment solution for goods and services .”[1] The unclear purpose causes distress for many people, as it complicates understanding these digital coins. More importantly, it clouds cryptocurrency’s purpose of replacing physical money and innovating monetary exchanges and the finance industry.

What complicates this further is the rise of scams using cryptocurrencies. Some people have been taking advantage of the cryptocurrency market by using it for scams. The primary way people have been scammed is through “pump-and-dump” schemes. These schemes consist of creating a new coin with a fancy name and then getting the word out about this coin to a large group of people using a celebrity or an influencer. People buy these coins, pumping the coin price to unreasonably high levels, at which the celebrity and the coin’s designers sell their holdings, which are the majority holders of the coin. Once the majority of the coin is sold off, the coin price drops off, leaving people with losses. [6] More importantly, it has caused people to mistrust the general cryptocurrency industry. On top of digital coins' volatility and various functionality, these “meme” coins have led cryptocurrency to deviate from its vision and goal. Thus, there has been broad skepticism on whether cryptocurrencies can last in the long term.

The main reason for this is that the cryptocurrency market has developed without regulations or governing bodies. However, the adoption of cryptocurrency by established businesses will increase the public’s knowledge of the cryptocurrency market and safe practices within it. With greater knowledge and safer practices, people will know which cryptocurrencies and coin designers to trust. People will also build a sense of when a cryptocurrency might be a scam, just like they build one for physical money scams. Plus, “regulators like the U.S. Securities and Exchange Commission are finally starting to pay attention.” [6], which will lead to a safer market with recognized rules. It will also increase public confidence in using cryptocurrencies. The study by Luno, a cryptocurrency startup, shows that “Nearly 90 percent of investors said they would buy more Bitcoins if the government regulates it.” [26] Regulation will mitigate cryptocurrency scams and encourage the creation of safer coins with a specific purpose.

### *Technical Risks of Cryptocurrency*

Cryptocurrency relies heavily on new technology, which comes with its risks. There are many apprehensions about cryptocurrency’s technical side. The first of them is its security and safety. Cryptocurrencies are owned through cryptocurrency accounts, consisting of an account address and a private key. The account address is comparable to a bank account number, and the private key is similar

to the Personal Identification Number (PIN). [2] For cryptocurrencies, “owner security is weakened because the cryptocurrency account address can be calculated from the private key, and thus the very knowledge of the private key is sufficient to acquire control of cryptocurrency units stored.” [2] Therefore, anyone that acquires knowledge about someone’s key could also acquire all the cryptocurrency stored in the account. Plus, the number of attempts to access an account is not limited. People can use services for storing cryptocurrencies, which are online wallets. However, in that case, “all that the hackers need to do is successfully attack the server of that service, and then they will acquire the cryptocurrencies stored there in hot wallets.” [2] Therefore, cryptocurrency accounts are vulnerable to theft.

While there are unlimited attempts to guess someone’s private key, it is nearly impossible to get someone’s key simply by trying. “Private key is a random number within the range of 1 to  $2^{256}$ . There are more possible private keys than atoms in the universe.” [2] Therefore, the only two ways someone could lose the funds in their account are accidentally giving out their information to someone or through worms. One way to reduce the risk of involuntarily revealing a private key is to use a hardware wallet. Hardware wallets generate, store, and back up private keys. A password and two-factor authentication usually protect these wallets. [8] There are trusted and established systems with robust security “such as the hardware Bitcoin wallets, e.g. Trezor, made by SatoshiLabs (2016) or Ledger Blue, made by Ledger (2017).” In addition to hardware wallets (also called hot wallets), cold wallets to write and protect private keys are available. Cold wallets are offline. [2] Therefore, they eliminate the risk of hackers stealing a private key. Thus, it is easy to keep a cryptocurrency safe for the person taking the appropriate risk measure.

Moreover, the increase in the adoption of cryptocurrency by established bodies, as well as increased regulations and examination by governments, will lead to improvements in technologies related to maintaining the safety of cryptocurrency systems. As stated earlier, Luxemburg, New Jersey, and New York in the US have started regulating the cryptocurrency market. Ecuador and Isle of Man are prepping to incorporate digital currencies into their administrations. Moreover, many countries, such as Spain, Poland, and Slovenia, have acknowledged cryptocurrency as a legitimate market and have started taxing



citizens for related activities, like mining or capital gains. [2] As the importance of cryptocurrency increases for established corporations and governments, there will be an increase in the research and innovations done in the field. Increased research and innovation in the field will accelerate resolving the current problems, such as worms and hackers. Where there is demand, there is supply. So as the demand for safe and secure systems and practices around cryptocurrency arises, its supply will follow.

Another huge technical risk for cryptocurrencies is that their transactions are irreversible. “The cryptocurrency technology does not allow a transaction to be reversed, even when subject to a court order.” [6] Therefore, if a user sends another user money through a cryptocurrency account for a good or service, but then the other user refuses the good or service, the money sent is lost. If a user sends money to a non-existing or wrong account, the money sent is, once again, lost. Irreversible transactions constitute a significant flaw in the cryptocurrency system. It can be hard to purchase something online using cryptocurrency, knowing that someone can spend money for nothing if that opposite party does not hold their end of the bargain. On top of that, accidents and mistakes happen all the time, both among consumers and businesses. When it does happen, not having the ability to fix them is a considerable limitation in financial services.

There is one way to address this issue. It is for a large group or a community of developers to execute a hard fork of the cryptocurrency. “A hard fork is a radical change to a network’s protocol that makes previously invalid blocks and transactions valid, or vice-versa.” [9] A hard fork is like a software update by the developers that grow dissatisfied with the functionalities of the current version of the Blockchain. Once implemented, a hard fork divides the Blockchain into two, with one path following the new, upgraded Blockchain and one following the old. As users stop using the old path to build new blocks, the old version becomes obsolete, leaving the new path as the only version. An illustrative representation of a hard fork is given in Figure 3. The main reasons for executing a hard fork are correcting security risks, adding new functionality, and reverse transactions. [9] For example, “after The DAO hack, Ethereum community executed hard fork (Castilo, 2016). In the new chain were stolen funds returned to original owners”. [2] Therefore, it is not impossible to reverse transactions. It takes a more

complex path and the involvement and effort of multiple people to execute, which is not ideal. Even though it is possible, this system has much room for improvement.

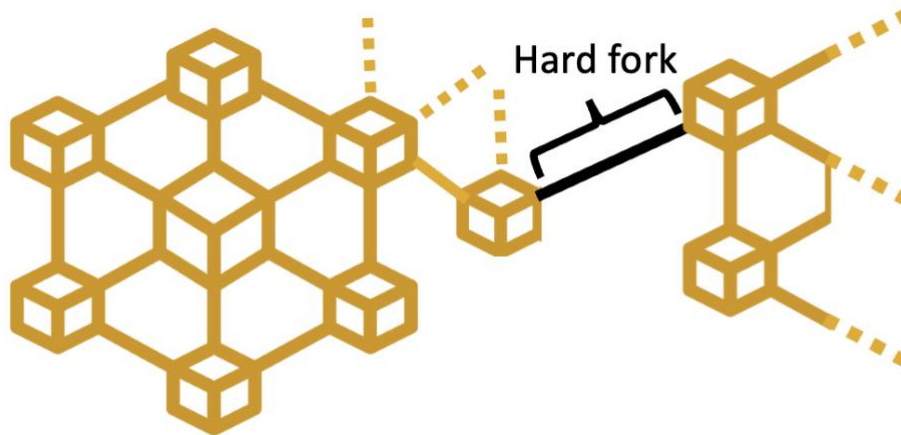


Figure 3: Hard Fork on a Blockchain

### *Social Concerns of Cryptocurrency*

Cryptocurrencies pose social risks in two areas: crime and sustainability. “The creation of a new account initially guarantees the owner’s full anonymity.” [2] The anonymous nature of accounts can lead to crimes such as money laundering, financial thefts, abductions, extortions, or bribery. Since the user’s anonymity protects the criminal’s identity, it is almost impossible to track and find criminal activity with censored payment systems. So it is generally criminals that benefit from anonymous payment systems like cryptocurrency. Therefore, the use of unregulated cryptocurrency can lead to an increase in financial crime.

Currently, there are technologies available to stop these financial crimes, called Anti-Money Laundering (AML) and Know Your Client (KYC) mechanisms. [10] [11] “Existing AML and KYC mechanisms can make it more difficult for the perpetrator to spend the money. These mechanisms may even lead to the identification of the perpetrator.” [2] It is essential to acknowledge that these mechanisms

are ineffective when the perpetrator spends the money in countries that do not implement these technologies or spend minimal amounts.

However, this does not mean there is no key to preventing cryptocurrency-related financial crimes. Regulation of cryptocurrency platforms would help prevent financial crimes from happening through digital currencies. The current unregulated environment of the cryptocurrency system has led to the creation of coins that allow for crime to happen. These coins keep transactions anonymous and impossible to track. However, “Certain cryptocurrency transactions, such as those recorded by Bitcoin, Litecoin, and Dash, are difficult but possible to trace.” [12] Through regulation, only cryptocurrencies that are possible to trace can be kept available, and only the creation of ones that are easy to trace can be government-approved. A similar case has happened before. “The first major efforts that were made by the USA Government to regulate virtual currencies was the prosecution of e-gold in 2007. E-gold was backed by gold and other precious metals to facilitate transactions through the trade of precious metals. However, it was discovered that the company that backed e-gold had approved transactions that clearly supported illegal activity and other money laundering activities.” [12]

Moreover, feather forking, similar to hard forks to reverse transactions, could be used to force users to give up their anonymity and report their identity. “Use of the Feather Forking Attacks would curb the anonymity of accounts.” [2] In addition, cryptocurrencies that allow the state or a legal entity to block transactions could be created if countries embraced a single approach toward digital coins. However, this would somewhat go against one of the cryptocurrencies' key attributes, decentralization. “The state could block transactions from accounts with a higher level of anonymity than that allowed by the state. This blocking would apply globally.” [2] Solutions to issues caused by the anonymity feature of digital currencies depend on the approaches taken by developers and states, but it is possible.

However, it is not beneficial to do the same as in the E-Gold case and eliminate all cryptocurrencies. Doing so would most likely “eradicate only the legitimate uses of Bitcoin (and other cryptocurrencies), leaving users conducting clandestine transactions unscathed” since criminals can keep their identity anonymous and keep using the system regardless of government action. However,

appropriate regulation could be the answer to preventing crime in virtual currencies. The US Congress enacted the BSA (Bank Secrecy Act) for institutions to report financial transactions and authorized the Secretary of the Treasury to implement it, which delegated the authority to one of its bureaus, FinCEN. Under this act, “if an entity qualifies as a MSB (money-service business), federal regulations deem that entity a financial institution, thereby mandating the entity to register with FinCEN, file reports, keep accurate records, and implement anti-money laundering programs” [14] and Bitcoin and cryptocurrencies fall in that category. FinCEN has also proposed a Guidance for virtual currencies, which “currently provides the only instruction in determining how regulators intent to handle virtual currencies going forward, especially with respect to money laundering.” [14] However, this Guidance was released in 2013. However, the revised version of it can be very effective in deferring financial crimes committed using virtual currencies. As this article draws on it, “regulating virtual currency exchanges deters money laundering .”Therefore, regulation can lead to a cryptocurrency system where crime is much harder to commit.

The second societal risk of adopting cryptocurrency pertains to sustainability on Earth. It takes a tremendous amount of energy to extract the Bitcoin programmed into the system. “Bitcoin mining network consumed at least 40.0 TWh, and possibly as much as 62.3 TWh, of electrical energy over 2018. This consumption is comparable to the amount of electricity consumed by countries like Hungary (40.3 TWh) and Switzerland (62.1 TWh).” [7] Looking at the carbon footprint of this energy consumption puts Bitcoin’s environmental impact into perspective. This impact is also shown on Figure 4. “The average carbon footprint per transaction would then range from 233.4 to 363.5 kg of CO<sub>2</sub>. By comparison, the average carbon footprint for a VISA transaction equates to 0.4 g of CO<sub>2</sub>, while a Google search is the equivalent of 0.8 g.” [7] Therefore, cryptocurrency mining can have a massive detrimental impact on our environment and might not be preferable to adopt.

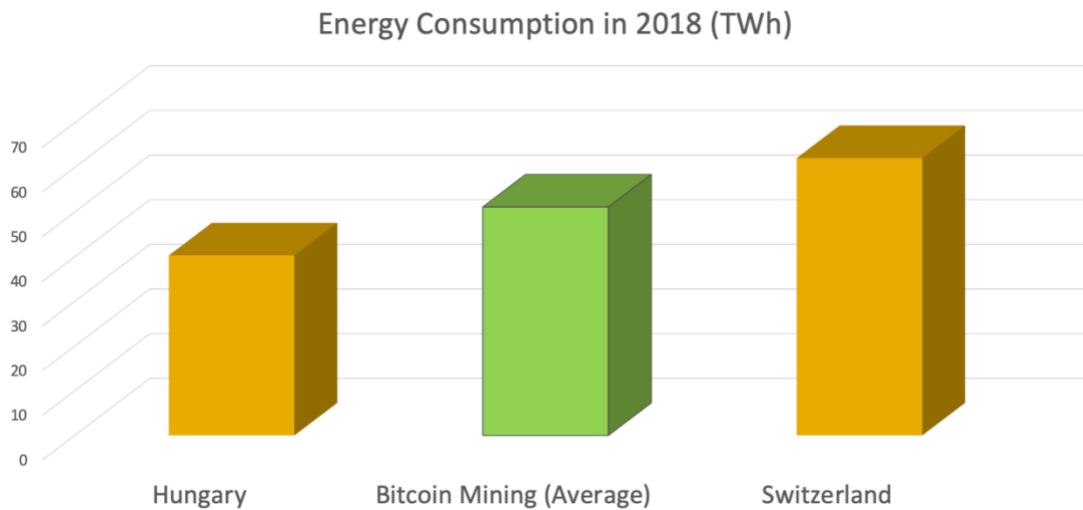


Figure 4: Energy Consumption of Bitcoin vs. That of Countries in 2018

Nevertheless, the cryptocurrency community is aware of the problem and acknowledges its danger. Solutions spanning from theoretical to practical have already been started to form by the community. “Some systems use a semi-centralized model (like Ripple or Stellar) that are more green, but the trust assumptions are different than a fully decentralized system like bitcoin,” says Joseph Bonneau, a cryptographer and assistant professor of computer science at New York University who used to work at Google.” [19] These systems can mitigate the energy consumption concerns due to bitcoin mining but would be fundamentally different from the vision behind current cryptocurrencies. However, some current cryptocurrencies are greener options than ones like Bitcoin, which take up more energy to mine. One example is Ethereum. “Ethereum mining is typically performed on general-purpose graphics processing units (GPUs) that you can find in everyday computers. These are, theoretically, “greener because the hardware could be repurposed for other things if the currency dies out,” Bonneau says.” [19] Another solution examined by the community has been completely changing the current mining process called proof-of-work (PoW). The new system is called proof-of-stake. Instead of using PoW, “users lock up quantities of cryptocurrency for periods of time, which secures the Blockchain used by that currency. In return, they receive cryptocurrency rewards, as if they had mined cryptocurrency themselves.” [19] Essentially, the solution might be finding a middle ground between maintaining the decentralized, secure networks of current cryptocurrencies and decreasing energy consumption to generate them.

Another solution to this problem is implementing law and policy changes. “Internationally accepted environmental principles advocate the need to internalize negative externalities such as from polluting industries” [20]. Therefore, miners can be forced to find and switch to more green practices of mining cryptocurrencies. “The purpose is not simply to raise revenue, but making polluters financially responsible for the harm caused encourages a switch in the activity to a less polluting method as well as de-socialising the cost.” [20] In addition to internalizing negative externalities, the government can implement subsidies on miners who implement green mining efforts. This again enforces a switch to more environmentally friendly practices of mining cryptocurrencies. Every signatory to the UN Paris Agreement has agreed that global finance “agreed that global finance ought to flow towards enabling low greenhouse gas emissions” [20]. In addition. The UN Paris Agreement states that “technology should be utilized to achieve greenhouse gas mitigation, " making countries in the agreement implement policy changes on handling sustainability issues regarding cryptocurrencies.

Finally, it should be kept in mind that the adoption of digital currencies would lead to a decrease in physical money issues. This decrease would also prove beneficial for the environment, as there will be less need to cut down trees to produce more physical money. Plus, less physical currency will be wasted as it gets outdated, decreasing pollution due to discarding physical money. Overall a decrease in the usage of physical money would have a positive impact on the environment. Therefore, with the appropriate policy changes, and technological innovations, the adoption of digital currencies could benefit the environment, supporting the sustainability of our world.

Many of the solutions proposed in this section depend on actions and scenarios that slightly compromise cryptocurrency's key characteristics, such as anonymity, decentralization, tamper-proof and irreversible nature of the information. Due to the way our societies are built and our states operate, there will have to be a certain level of government intervention and regulation to begin adopting and legitimizing cryptocurrencies. Nevertheless, as expertise on both coin development and the cryptocurrency's nature advances, there will be not only less need for government intervention but also

less tolerance for it. Therefore, the risks of cryptocurrencies could be mitigated without compromising the key attributes of digital coins further down the line.

### **There are numerous benefits of adopting digital currencies.**

Cryptocurrencies have been around since 2008. If cryptocurrencies had more disadvantages than benefits, they would have been banned and eliminated by every country. The reason Bitcoin and cryptocurrency are not only still around but have been gaining popularity in the last decade is because of the incredible benefits it presents.

Cryptocurrency allows for a hedge against inflation, shown in Figure 5. Inflation is often caused by printing more money while the amount of goods or services available does not change. “If you print money, households will have more cash and more money to spend on goods. If there is more money chasing the same amount of goods, firms will just put up prices.” [15] However, there is only a limited amount created for most cryptocurrencies, especially the popular and established ones. For example, “The maximum number of coins is strictly limited by 21 million Bitcoins.” [16] Therefore, cryptocurrency available in a set and a limited amount will prevent inflation from reducing the purchasing power of a population. The long-term impact of inflation is enormous. In a 25-year span, a 3% annual inflation rate, which is generally considered low, would decrease purchasing power by 50%. This effect is so much higher in countries with unstable or developing economies. “According to Hanke and Kwok (2009), the month-on-month inflation rate in Zimbabwe was above 100% from 2007 to 2008.” [2] Therefore, a digital currency can help economies, especially the ones developing. This power of cryptocurrency has even started to become noticed. “The withdrawal of 500 and 1000 rupee notes from circulation in India has sparked interest in Bitcoin among India’s consumers (Graham, 2016). “[2]

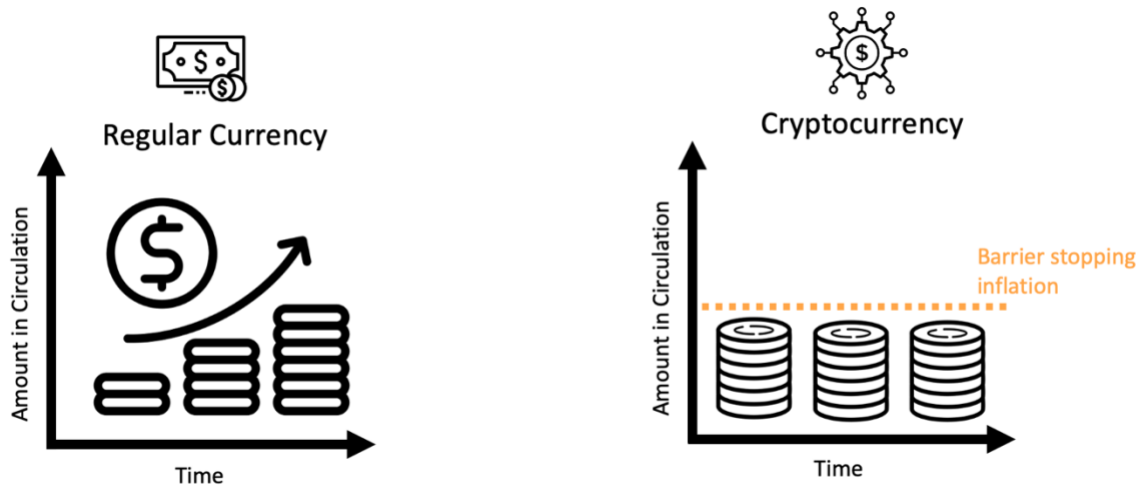


Figure 5: Cryptocurrency Preventing Inflation

Another significant benefit of cryptocurrencies is their ability to retain information automatically, with 100% accuracy. Every transaction made using a virtual currency is saved on its Blockchain. This way, “it is possible to verify the existence of a document at a given time in an unforged manner and at very low cost. The authenticity of an agreement and signatures can be verified in this way.

Cryptocurrencies can be used for the record-keeping purposes currently in state control: property registration, vehicle registration, etc. It can also replace the services of notaries in certifying documents and the services that maintain vital records about the population.” [2] Therefore, the ability of cryptocurrency to automatically save and hold information not only prevents forgery and crime but also automates the job of auditing transactions. Automatic information retention with total accuracy could revolutionize and improve financial services significantly.

Cryptocurrencies are also great for international transactions and micropayments, as they have incredibly low (sometimes negligible) fees compared to fiat currencies. Their efficiency in international transactions is mainly due to their decentralized nature, as it eliminates the middle man in fiat currency transactions, such as banks. “Fees for cryptocurrency transactions are very low. The fee for a Bitcoin transaction corresponds to \$0.80 (Voorhees, 2017) and there are cryptocurrencies with fees several orders of magnitude lower.” [2] Thus, it is favorable to use cryptocurrency to purchase something from a different country, saving companies that rely heavily on imported goods a lot of money. It would also favor the average consumer when purchasing items from abroad. As someone who grew up in Istanbul,



Turkey, my family would always have to pay hefty fees when we bought something from a different country. Using cryptocurrencies in these purchases would have helped save us a lot of money and time, as shown in Figure 6. Plus, cryptocurrency transactions take very little time than transactions using fiat currencies, as it does not require a middle man. “International payments by conventional fiat currencies take days and are delayed by bank holidays, for instance. Cryptocurrency transactions usually take minutes to tens of minutes,” again due to its decentralized nature. [2] Therefore, cryptocurrency has the capacity to lead to a more connected economy around the globe.



Figure 6: Cryptocurrency Transaction Between Countries

On top of accelerating transactions and reducing fees, the decentralized nature of cryptocurrencies allows for records and data of transactions to be more accessible. “Without any central party or central administrator, these networks of databases can be operated smoothly and securely. Every participant can access common information simultaneously.” [18] This allows people to have a more robust ground in

their financial interactions without going through a third party. Plus, it allows the public to own their data and records, instead of a third party owning their data, which could increase security “because data that has been recorded on the blockchain is difficult to alter and not under the control of one party.” [18] It also allows the government and law agencies to track financial transactions easier and as they are happening. The decentralized currency can lead to a more transparent and financially safer society.

Not only are cryptocurrency transactions faster, but creating an account and owning cryptocurrency is faster. Consider the steps someone has to go through to open a bank account: drive to the bank, wait in line for their turn, sit down with the banker, and answer many questions. It is significantly more complicated in certain countries. For example, “the procedure of opening an account for the company in Ukrainian banks is overcomplicated and can be refused without explanation.” [16] In contrast, you only need an electronic device such as a phone or computer to create a cryptocurrency account, and it takes minutes to create an account and start using the currency. Platforms you can create cryptocurrency accounts or wallets take “approximately 5 minutes to create a BTC wallet and immediately start using it without any questions and commissions.” [16] Therefore, adopting cryptocurrency can make it easier for people to own and store their wealth.

The Blockchain technology that underlies cryptocurrencies prevents human error in dealing with bank accounts and faulty transactions and helps with data presentation and organization. Plus, it prevents crime by preventing records of transactions and data from being tampered with. “Blockchain utilizes a peer to peer network, a distributed time-stamping server and tamper-proof records of transaction data that makes it even more secure and helps to order data in a much organized way.” [18] The blockchain technology behind cryptocurrencies also eliminates the possibility of getting personal information stolen. “To prevent tampering of transaction data as agreed upon, the use of complex algorithm and consensus helps in ensuring data safety.” [18] Plus, the pseudo-anonymity of cryptocurrencies allows consumers to keep their identity as private as wished. “Transacting parties are not identified by their actual proper names or otherwise used identifiers but that those parties still have identifiers (cryptocurrency account addresses).” [2]

Moreover, certain cryptocurrencies allow assigning specific tokens to certain assets by smart contracts. The most popular cryptocurrency for creating smart contracts and tying tokens to assets is Ethereum. These smart contracts make identifying, trading, and handling these assets easier. These tokens can identify ownership of high--value property, like cars or real estate. Even lotteries and elections can be conducted using smart contracts. [2] Even companies can use coins to issue stocks and dividends, and banks can issue bonds in the form of digital tokens. For example, Oddity, a makeup company, has recently launched a digital “security token” that runs on the Ethereum blockchain. [17] This way, people can invest in the company before the company’s initial public offering (IPO). Oddity gets cash for its operations, and investors get a discounted price to buy Oddity stock compared to its IPO price. Therefore, the scope of benefits these coins have is unlimited and has the potential to accelerate and ease how we do any type of work.

Smart contracts, coin-coloring, bundling of products, and more uses of cryptocurrencies are being discovered. In addition to these specific benefits, cryptocurrency and blockchain adoption can lead to skilled job creation, wealth creation, advances in security, and applications could produce functions incredibly beneficial, both in the social and industrial sense. Blockchain technology has even been “advocated as being capable of delivering environmental and social benefits under the UN’s Sustainable Development Goals.” [20]

## **Can Cryptocurrencies Replace Fiat Currencies?**

The major economic and societal benefits of cryptocurrencies, as well as an increased public understanding of their risks and usages, lead to their adoption with increasing prevalence. This worldwide adoption of cryptocurrencies leads to a critical question: Could cryptocurrencies replace fiat currencies as national currencies? There are many advantages of digital currencies to fiat currencies. However, the feasibility of virtual currencies becoming primary currencies for nations is a question remaining to be

answered. This section will examine whether cryptocurrencies can become actual currencies for nations and the possible results of such an implementation.

We look at five critical points in examining the possibility of cryptocurrencies becoming accepted as national currencies. The first is that cryptocurrencies are “at the cutting edge of technological innovation as it pertains to currency” [21]. They are in completely digital form by design, and as is the case with all cutting-edge technology, cryptocurrencies allow for ease when it comes to using, carrying, and storing. It removes the difficulties resulting from owning physical currencies. “cryptocurrency dispels with the complications of coins, banknotes, and written checks” [21]. “Consumers want a cashless economy through digital currency. They want a faster and hassle-free payment system for various reasons., which include dissatisfaction with fiat currency and the expensive middlemen.” [24]

Cryptocurrency’s purchasing power is protected better than any fiat currency. This is because cryptocurrencies do not have an intrinsic value, and a central authority does not determine their value. Instead, supply and demand determine their values. “The invisible hand of Adam Smith replaces the controlling hand of a sovereign monetary authority (central bank)” [21]. With no central bank controlling the price and a fixed supply, cryptocurrencies are more stable at maintaining purchasing power over long periods of time. Inflation is not possible with cryptocurrencies, as stated earlier.

The third point we examine is the privacy of cryptocurrencies vs. the publicness of current fiat currencies. The private form of cryptocurrencies disrupts the monopolistic control of current fiat currencies. With no monopoly in currencies, “multiple cryptocurrencies would increase competition, reducing cost of transactions and increasing efficiency.” [21] Once again, this is in favor of traditional views on economics and efficiency in markets. Therefore, cryptocurrencies would allow for a better functioning currency market.

The fourth point to keep in mind is that cryptocurrencies allow a functioning economy without the control of the central banks, traditional banking institutions, and financial intermediaries. These authorities always keep their priorities in mind before the public. Cryptocurrencies allow for governance and trust to be shared with the public. Cryptocurrency “moves trust from central authorities to network

participants, enabling information and governance to be shared,” which makes it possible for the public’s stakes to be a priority. [21] In addition to governance and functions in favor of the public, decentralization allows for greater security for currencies, as “they are not susceptible to central points of failure.” [21] In the case of fiat currencies, a strategic failure of a central bank could have devastating economic implications for the whole nation.

These four are critical points in understanding that cryptocurrencies would be more efficient than current sovereign fiat currencies. However, the fifth and last point to examine is most important regarding the feasibility of adopting cryptocurrencies as national currencies. A global renovation of the primary financial tool used in economic transactions has happened many times before, transitioning from barter to metals such as gold and silver to paper money. Looking at the transition from gold to paper currency, “most ordinary people continued to perceive their sovereign fiat currency was somehow backed by gold” after the paper currency was established. [21] Even the official acknowledgment that the Gold Standard ended and gold was no longer in the heart of the global monetary system was not enough to break the link in the public’s mind that gold played a critical role. In fact, gold did continue to play a fundamental, back-stop role in the Bretton Woods monetary system set up to replace the Gold Standard following the Second World War. In this system, the US dollar replaced gold as the unit of account for individual national currencies at a fixed exchange rate, with US dollar fixed in value vis-à-vis gold.” [21] Eventually, the public accepted the new currency as the fundamental form of currency. The monetary system stopped tracking the US dollar based on gold, making the US dollar its sovereign currency. The same situation for cryptocurrencies is very likely. Currently, they are pinned to national currencies. However, if governments decide to adopt it, seeing its multiple advantages over current physical currencies, cryptocurrencies can become their sovereign currencies, making them feasible to become national currencies.

Moreover, a big question is whether cryptocurrency is money. The current legal definition of money claims that money has to fit four specifications: anything of value that serves as a generally accepted medium of financial exchange; a legal tender for repayment of debt; a standard of value; a unit

of accounting measure; and a means to save or store purchasing power. [24] Cryptocurrency fits all except the legal tender requirement of money. However, when the monetary system changed from the Bretton Woods and Gold Standard to fiat currency, fiat money replaced representative money, like the gold standard, as legal tender for debt repayment. How we defined money changed as money was not backed by a stable commodity anymore, instead, the legal tender definition became that money is back by the faith and credibility of the government. Supporters of Bitcoin and cryptocurrency claim that “Bitcoin is backed by its high production cost.” [25] It is up to the state to determine how money is defined and viewed. The perception of money has to be changed so that money is redefined to accommodate technological advances”. [24] Therefore, “What Bitcoin can turn out to depend on the approach by regulators and the jurisdictions’ legal definition of it .”[24] As governments and legal bodies accept that money’s definition has changed and has to be repurposed, it can lead to the adoption of cryptocurrencies as national currencies.

Some states have started acknowledging its benefits, and some have already adopted it. Some have adopted a similar version of it. For example, the US has created Emoney and its own “cryptocurrency” as a reaction to the threat from the rise of popularity of real cryptocurrencies. [21] The US has also recently passed an executive order to examine cryptocurrencies. [13] In addition, academics, researchers, and countries have started examining whether to embrace digital currencies as national currencies. Malaysia, for example, is embracing the innovation of using cryptocurrencies in virtual exchanges. [24] Bitcoin startup Luno researched the Malaysian economy, and looking at the results and data showed there is increasing use of Bitcoin as a form of money. [26] However, the major shortcoming Malaysia faces is its lack of regulation. “The CBM has spoken up on this and claimed that when a government sanctions the digital currency, a much wider population would inevitably take a greater interest in it and in turn expand the market.” [24] China has adopted this change in an intelligent way. “It is now the first country in the world to develop and run its own national digital (currency).” [24] As governments embrace this change, there will be a shift towards using cryptocurrency as an actual currency. It will either be a substitute for fiat currency or work complementarily.

## **Final Thoughts**

There are obvious risks to adopting cryptocurrencies in the financial sector and embracing them as national currencies. However, these risks could be solved with more regulation, legal bodies' acknowledgment of digital currencies, improved public knowledge, and improved technology. What makes cryptocurrencies even more attractive is their numerous benefits to societies, governments, and industries. This has led to authorities starting to examine the technology and the public's increasing curiosity and knowledge about the system, which will, in turn, mitigate concerns and risks associated with digital currencies, which will improve the system and its usages. This cycle will allow cryptocurrencies to inch closer towards being perceived and used as actual currencies, whether they are used as a replacement or as complementary to traditional fiat currencies. Not only can cryptocurrencies revolutionize traditional financial systems into safer, quicker, and more transparent ones, but they can even replace fiat currencies.

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