



HACETTEPE UNIVERSITY

Department of Computer Engineering

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Final Report

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# **Crypto-coins as National Currency & Future of World's Money**

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**Abstract.** Cryptocurrencies are digital currencies built on blockchain technology, independent of central banks. Public, as well as many businesses are new to the idea, thus it is not the most common payment method, even in countries where it is legal to use. Possible issues with thefts being irreversible, and criminals being untraceable renders cryptos untrustable in the eyes of some experts. The market is generally unstable and open to butterfly effects. Yet, cryptos have gained popularity and value in the Covid pandemic, mainly due to a rising need for remote income streams and freedom. Governments having no control over the value or stream of crypto, adopting it as a legal tender poses a major risk; yet El Salvador did it, considering it as a socio-economic investment. A backlash followed.. Crypto being a growing market and occupying the headlines, central banks around the World felt pressure to add more functionalities to their fiat currencies by launching their Central Bank Digital Currencies. We conclude that cryptocurrency is neither the ultimate solution nor the future of money; and money will continue to change form.

## 1. Cryptocurrencies

A Blockchain is a transaction ledger, built across a peer-to-peer network. It is decentralized, meaning that there is not an authority figure but some form of consensus among peers. Applications of blockchain include cryptocurrencies, smart contracts, voting systems, and more. Bitcoin being the best-known among thousands, cryptocurrencies are digital currencies implemented on blockchain technology.

To be noted that, in this paper, Bitcoin is often mentioned interchangeably with cryptocurrency, since it is considered the most popular and pioneer cryptocurrency by many. Therefore, the discussion might not imply the same outcomes for every cryptocurrency since their inner workings may be significantly different.

Cryptocurrencies are innovative, yet rather a very new (It has been just a decade since Bitcoin Genesis Block.) form of exchange. The public lacks understanding; thus, it is an uncommon means of exchange for those who are not particularly interested. It is not yet a globally accepted form of payment, unlike for example credit cards. In Turkey, go to a market or pizza shop, tell them about paying in crypto, they will at best laugh at you. You can find very few places that will accept your payment. However, is that a valid statement for every country in the world? Is there any country that plans to use a cryptocurrency as their legal currency? What waits for us in the future?

Fear of the Reputation - Should you trust crypto coins?

According to European Central Bank (2021),






Bitcoin is a digital token that can be exchanged electronically. It does not exist in physical form. Bitcoins are created and kept track of by a network of computers using mathematical formulas, rather than by a single authority or organization. You cannot have the same level of confidence in it as you can in an official currency like the Euro, which is backed by the

central banks of the European area. As guardians of the Euro, we work to guarantee your right to pay with the Euro and to preserve its value. Because Bitcoin is not issued by a central public authority, Bitcoin users are not protected. It is possible for hackers to steal Bitcoin. If this happens, you have no legal protection, nobody will be responsible for your loss.

As illustrated, some experts suggest not putting much trust in cryptocurrencies. Unlike credit card payments, blockchain transactions are irreversible, irrecoverable. After a block is set, no one can help you. Yes, cryptography algorithms used by blockchains such as SHA-256 are uncrackable, whereas your wallet app can be. In a case of theft, there is no authority you can complain to, or get your money back from. Cannot go to the bank as in the traditional scenario and say it was not you.

Another remark is that, since a distributed ledger (blockchain) is public (any transaction is visible to anyone), to ensure privacy, anonymity techniques are implemented. Sender and receiver addresses on a transaction are just character sequences, not associated with anyone's real identity, anonymous. However, the downside is, anonymity may provide a safe space for black market activities such as drug trade. Even though accounts might still be somehow traceable, and even though each token is fungible - holding identical value - the reputation of crypto is still hurt because of the psychological rejection: they do not want your "dirty money" that may be associated with crime.

## Gaining Popularity: Covid Era

Cryptocurrencies ▾ Exchanges ▾ Watchlist										
Filters USD ▾ Back to Top 100										
Rank	Name	Symbol	Market Cap	Price	Circulating Supply	Volume(24h)	% 1h	% 24h	% 7d	
1	 Bitcoin	BTC	\$961,257,041,098	\$50,835.82	18,909,050 BTC	\$28,107,418,926	-0.42%	4.00%	5.63%	...
2	 Ethereum	ETH	\$488,743,877,378	\$4,111.87	118,861,814 ETH	\$17,817,952,278	-0.63%	2.75%	1.97%	...
3	 Binance Coin	BNB	\$91,389,991,359	\$547.90	166,801,148 BNB *	\$1,845,174,059	-0.25%	1.88%	2.45%	...
4	 Tether	USDT	\$77,371,217,464	\$1.00	77,346,559,655 USDT *	\$68,258,020,267	0.07%	0.04%	0.04%	...
5	 Solana	SOL	\$58,546,348,220	\$189.80	308,469,602 SOL *	\$2,117,137,443	-1.29%	5.40%	3.79%	...

From December 23<sup>rd</sup>, 2021, CoinMarketCap.com

With Covid-19 pandemic and lockdowns, being at home, many people searched for new income streams, explored these new markets, learned about new economic rules of the World, started chatting with their friends about their x\_coins tokens and how they rise or drop. They invested in faster internet connections, digitalized more aspects of their lives; helped crypto markets thrive by keeping money in circulation. Bitcoin has reached a trillion-dollar market cap.

## Did Cryptos Defeat Covid?

The Pandemic also tested investors' trust in governments and central bank policies. But were cryptos good alternatives in this period? Vukovic, Maiti, and Grubisic (2021) conclude that, during Covid-19, the desire for a "safe haven" (a safe investment that protects its value even in an economic crisis; immune to market crash, pandemic, war, political instability, etc.), was not satisfied by crypto coins.

"According to the study of Klein (2018), Bitcoin has fewer characteristics as a haven compared to gold. Cryptocurrencies showed a higher correlation with riskier assets between the period of

March and April 2020 (Bloomberg). Bitcoin slumped from \$8000 to \$4000 in a few days in mid-March 2020. However, within a month, Bitcoin hit strong resistance around \$7500, as market players reacted positively to the news that Covid-19 outbreaks had started to stabilize in some of the worst affected countries. (...). Bitcoin is a highly volatile asset (...), it shows a positive correlation with downward markets (Klein, 2018).”

As demonstrated, in a crisis, the crypto market is not safer than any other. Yet, disregarding the warnings, seeing a potential, big names like Tesla and Mastercard invested in Bitcoin. And in fact, this April, and again in November, Bitcoin exceeded \$60.000.



Bitcoin in 2021, Google.

## Volatility

Unlike its fame, the crypto market is still significantly small compared to fiat and gold. Therefore, even small forces can have big effects (NDTV, 2021). Speculations manipulate investors' behaviors, magnifying the effects. In May 2021, Bitcoin price sharply dropped when Elon Musk, recognizing the excessive non-sustainable energy usage of proof-of-work mining, announced that Tesla would not be accepting Bitcoin for purchasing vehicles.

The majority (58%) of individual cryptocurrency owners in the US are younger than 45, and already wealthy, Fries (2021) observed. They are comfortable playing with high-risk high-gain quick-gain investment options. However, when they win big or lose big, they exit the market and contribute to volatility.



Depicted by a meme, crypto traders are used to market fluctuations.

Investors still trust and invest in fiat currencies and precious metals, even at low interest rates. Because they are rather somewhat stable, compared to the roller-coaster crypto market. Individuals expect/desire security and tranquility, rather than going from millionaire to homeless in a day.

From this desire for stability, “stablecoins” emerged. Tether (USDT) is a good example. The strategy is to lock the value to an external asset: US Dollar. 1 USDT = 1 USD. The downside is that we are trying to associate a decentralized asset with a government-issued centralized asset.

## **2. Crypto versus Fiat**

What is a fiat?

Most currencies we use in everyday life are “fiat” currencies, “normal” money. Physically on paper or metal coin, or digital; fiat currencies are issued, backed-up, controlled, printed, maintained, legalized by Governments and Central Banks. Fiat is not tied to a physical commodity like gold, thus open to the risk of inflation (Chen, 2021).

Limited supply

Some cryptocurrencies, for instance Bitcoin, have a limited supply, unlike fiat currencies. Satoshi Nakamoto issued a limited supply of 21 million Bitcoins when it all started in 2009. He modelled this approach from gold mining: the rarer, the more valuable. That is why Bitcoin block reward halves every 4 years, to not let it all be mined until the year 2140 (Sahoo, 2021). At the time of writing this report, there are 18.9 million Bitcoins already mined.

The disadvantage of currencies with limited supplies is, they may fall behind in competition with new emerging currencies, or currencies with unlimited supplies; because they cannot evolve and adapt, cannot be issued/printed more.

What determines the value of a Crypto coin?

As discussed before, cryptocurrencies are not backed-up or controlled by a centralized authority. So, what determines their value?

The market. Price is determined by how much people are willing to pay: supply and demand. Miners of course want to sell their bitcoins to higher prices than their mining costs; competing cryptocurrencies change balances of the market; governments bring regulations related to the usage of these coins in their regions (They might force taxation and scare investors away.); speculations are made... Also, just as in any trade, bad news renders the future value uncertain.

Faith. When Nakamoto created the Genesis Block, the value was zero. With time, more and more people believed it is worth something, and started acting like it really does. Therefore, it does. Still, Fabio Panetta (2021), a Member of the Executive Board of the European Central Bank, warns that crypto-assets are not backed-up by any accountable entity that can guarantee the value.

## What If Government Acknowledges Blockchains as Legal Means?

We believe that citizens of many underdeveloped countries would not fully trust their governments to apply the best monetary policies or privacy practices. Citizens request freedom, not in criminal means but liberal and democratic means to be away from the constant surveillance of their somewhat totalitarian governments. All while still being protected against anarchy, since blockchain has its own rules for not favoring malicious behavior. The biggest challenge would be, to come to terms with and convince their government to allow a decentralized system. It will be mentioned in the fourth chapter that, some countries have completely banned cryptocurrencies.

We imagine, if a government acknowledges legality of let's say Smart Contracts,

- Ownership of real estate can be verified fast and safely, without tedious paperwork.
- Digital notarization can bring very fast solutions to official contracts.
  - The above two matters without needing to involve trusted third parties.
- You can give just your public address to a bank worker, protecting your identity details.
- An innovative justice system can be deployed. Code is the Judge. No more dishonest lawyers. No more discrimination.

All while, of course, obeying the constitutional laws.

## Risks of Accepting Crypto as National Currency

Here comes not a risk, but not a benefit either: For a transaction to be done, no involvement of a third-party intermediary (bank) is needed. But the involvement of the network is needed. There is no fee to a bank; however, there is still a fee to the miner.

As Reiff (2019) points out, if crypto begins replacing fiat, fiat will lose value. The economy will need to adopt major changes. It is even possible that people will lose some of their assets during the transition.

Normally, the government's actions can increase/decrease the value of their fiat currency. If we transition to decentralized crypto, the government has no control/supervision. It is good that they cannot make mistakes and damage the system, but it is bad that they also cannot help it rise. They cannot print money to balance pressures. They would have to depend on mining, to create money (Reiff, 2019). Central Banks normally have control over their own fiat money, and they can save the country from disasters. In crypto, some bad incident happening to this maybe-worldwide currency in another country has the potential to bankrupt this country.

Some questions emerge too. How will other countries react to this country? How will the import/export of goods, debts, etc. be affected? Will they boycott at first, and eventually will have to accept it?

### 3. El Salvador's Plans

#### El Salvador Legalizes Bitcoin



El Salvador, a Central American country, had been using US Dollar as their legal tender; however, US Federal Reserve's policies in the Pandemic had not been in El Salvador's best interest (Sharma, 2021). A need was born to release this dependency.

In addition, as President Nayib Bukele discussed, the expectation was that, with Bitcoin, remittances (international money transfers) would become faster and cheaper in terms of fees. The importance of this is, remittances constituted around a whopping 23% of El Salvador's total economic output in 2020, corresponding to \$5.9 billion (Sharma, 2021).

From the president's words: "Young people just wanted to leave, to go to the US. But now we have a Salvadoran dream.". This move could be considered a new vision for the country; causing the human capital flight to reduce, letting the country be known as "the Bitcoin country", rather than "the gang violence country" (Nugent, 2021).

As of September 7th, 2021, Bitcoin and US Dollar are both legal tenders in El Salvador; a first in the World. Across the country, 200 Bitcoin ATMs were installed. Digital wallet app Chivo was launched, gifting citizens \$30 in Bitcoin on sign-up. Chivo reached two million users in two months (Nambiampurath, 2021). Companies were forced by law to accept this new form of payment, with the freedom of transferring it to Dollars right after purchase.



Starting from September 6, president Bukele tweeted many times when new Bitcoins were bought. El Salvador's reserve on December 7<sup>th</sup> is 1370 Bitcoins, worth \$ 70 million at the time.

## Backlash

It was a controversial decision since Bitcoin is a roller-coaster, as explained in the first chapter. Although there were voices of support, there were also voices of worry among Salvadoran citizens. On the other hand, neither street protests, nor criticisms had an effect (Nambiapurath, 2021). On top of that, technical difficulties with the wallet app and new ATMs were frequently reported issues. Head of the central bank Douglas Rodriguez commented that it requires time to adapt to changes.

The Bitcoin enthusiast policy of the Salvadoran government disrupted their relationship with IMF (International Monetary Fund), just as they requested a 1 billion Dollars assistance package in June. IMF rejected, not willing to support them, mainly due to lack of transparency of cryptocurrencies (Nugent, 2021).

## Volcano Bitcoin City

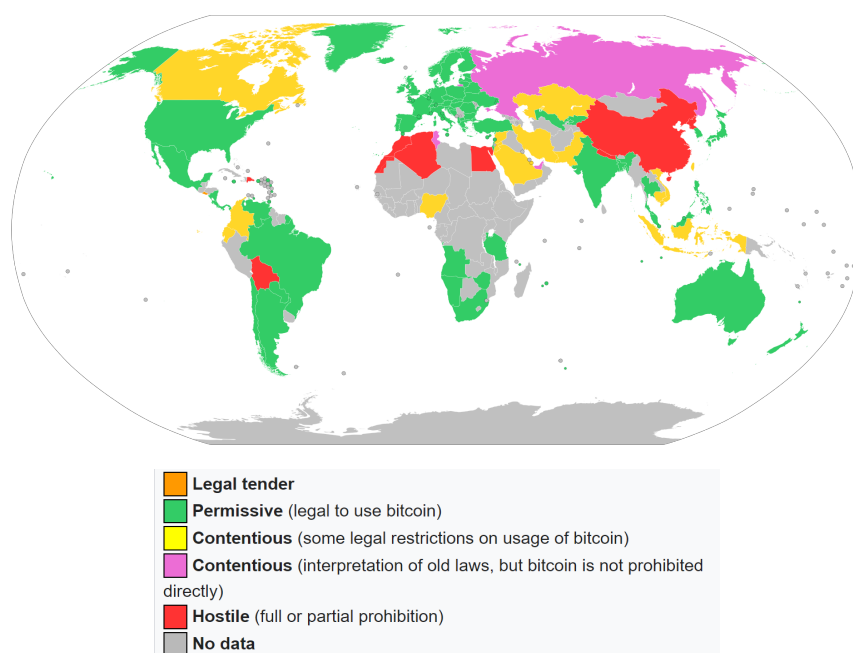
President Bukele revealed a Bitcoin City project. A circular coin-shaped city, around Conchagua volcano, utilizing the volcano's geothermal energy to mine Bitcoin.

Despite the criticisms regarding this project being impractical; it might be an environmentally friendly alternative to using fossil fuels for proof-of-work mining since the volcano will release its renewable energy even if no one uses it.



## 4. Digital Currencies Around the World

### Legal Status of Bitcoin in Today's World





## Turkey

Cryptocurrencies are legal to trade and hold. Yet, a banking ban was brought in April 2021: it is illegal as a payment tool, due to the possibility of irrecoverable damage and risks, as stated in Resmi Gazete.

## Panama

Panamian congressman Gabriel Silva, envisioning crypto coins as the future, proposed a bill: "Crypto Law: Making Panama Compatible with the digital economy, blockchain, and the internet", just a day after El Salvador's Bitcoin move. Silva desires to establish a legal ground with regulations, encourage a more transparent government, create new job and investment potentials (Dossett, 2021).

## Central Bank Digital Currencies

Especially after the pandemic, it could be observed that fewer and fewer people use paper cash. Due to the shift to digital, many central banks around the World plan to launch their Central Bank Digital Currencies (CBDC). These are not cryptocurrencies, they are issued and regulated by central banks, which brings trust and stability, along with the speed and low cost of the digital world. Some countries are at the testing phase before launching their CBDCs, in Sweden e-krona, in Russia CryptoRuble, in China RMB are some examples.

## Australia

Australia has no problem letting citizens use cryptocurrencies for purchases. Yet, they have plans for a "licensing framework for cryptocurrency exchanges" as well as their own Central Bank Digital Currency, as they are not willing to let Silicon Valley determine their future (Aljazeera, 2021).

## The Bahamas

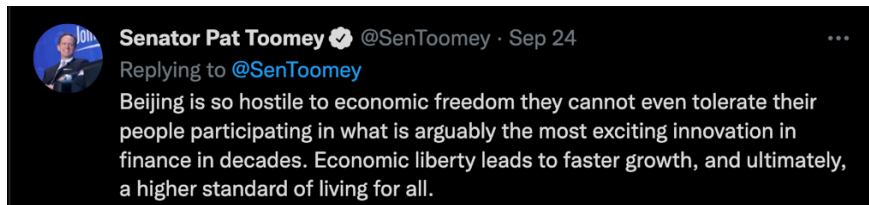
A country established on 700 islands, 30 are inhabited. In The Bahamas, banking system is somewhat unreachable, and one must fly to a different island to deal with their banker, due to the distributed geography. "Sand Dollar" is already launched, tied to the Bahamian Dollar in value, aims to overcome this, and promote financial inclusion (Aredy, 2021).

## Russia

A centralized CBDC, CryptoRuble, is announced by President Putin in 2017. Pilot-testing is expected to be conducted in 2022. Regardless of the "crypto" in the name, it will be issued by the government, not mined. Putin is mainly interested in the encryption part since it will allow the state to make sensitive transactions with the world without fear of sanctions (Frankenfield, 2021).

## China

September 2021, China illegalized all cryptocurrency transactions and mining, within its borders and overseas. The People's Bank of China emphasized that the decision was made for national stability. Upon the news, Bitcoin lost 6%, Ethereum lost 9% value (Halaschak, 2021). Also considering most mining hardware being manufactured in China, this might be bad news for everyone, as there might be a possible ban in near future.



China did not ban crypto for nothing; they removed a competitor to their central authority. Digital Renminbi (RMB), issued by the Chinese central bank, which aims for faster and cheaper transactions than the existing financial system, is in public testing since April 2021. More than 150 million RMB is gifted to users to incentivize usage; corresponding mobile apps which enable shopping have reached 100,000 downloads in one month (Aredy, 2021; Popper & Li, 2021).

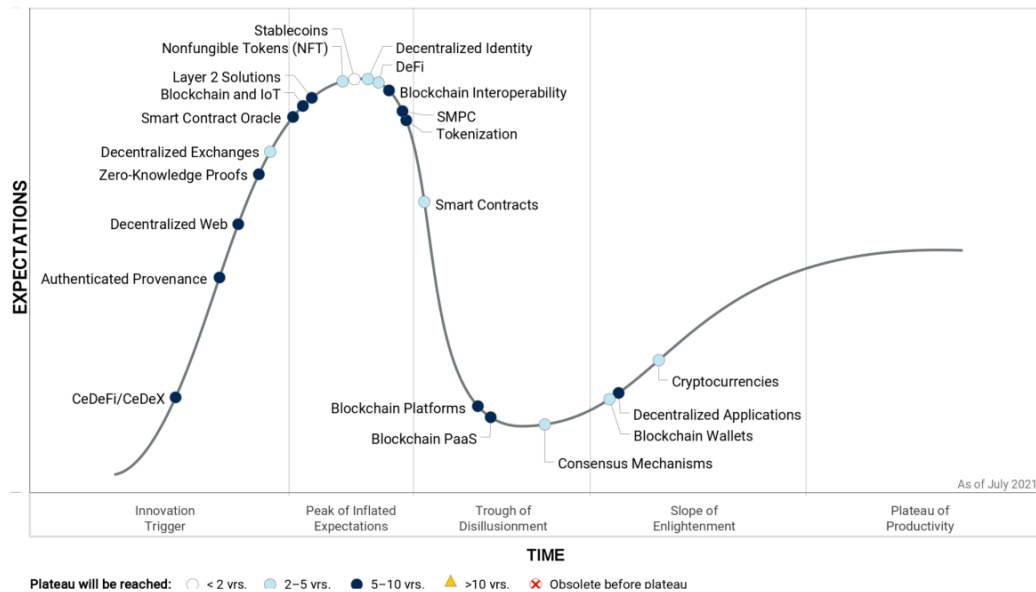
## 5. Conclusion

Because of all the risks discussed in this paper, it does not seem feasible to replace national currencies with cryptocurrencies. Should take into account that new cryptocurrencies are created every day, yet most do not survive for long. No need to put all our savings into it, better watch out!

Although it was discussed in chapter 1 that the Crypto market is still small; having reached 2.5 trillion Dollars and continuing to grow, it is significant. As Crypto markets start threatening their control over their money, we are to witness many more countries launching their own Central Bank Digital Currencies, European Central Bank executive Panetta foresees.

Money as we know it, is evolving, changing form. Central Bank Digital Currencies are an important shift towards a cashless society where underground economy and tax fraud could be completely eradicated. Blockchain is a remarkable invention to showcase the power of people, a study on human psychology that is worthy of time.

## Hype Cycle for Blockchain, 2021



On the whole, Blockchain technologies are gradually reaching a better position in the Hype Cycle of Business by Gartner. For any technology to reach productivity, it needs to be used, continue to be engineered. Ambitions, baby steps, innovations, crises along the way... This is what makes us human.

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