

Czech University of Life Sciences Prague

Faculty of Economics and Management

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Bachelor Thesis

**Comparative Analysis of Bitcoin and Traditional
Currencies: Can Bitcoin Provide a Global Hedge against
Inflation of Flat Currencies?**

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Thesis title

Comparative Analysis of Bitcoin and Traditional Currencies: Can Bitcoin Provide a Global Hedge against Inflation of Flat Currencies?

Objectives of thesis

The main objective of the thesis is to answer the question of whether Bitcoin is reliable enough to provide an alternative against the inflation of fiat currencies or not.

The author pursues the goal of answering the aforementioned question based on the empirical analysis performed by the author in her practical part. In addition to that, the author also seeks to describe the development of Bitcoin cryptocurrency over the course of the last 5 years.

Methodology

The main approach selected by the author is quantitative with numerous techniques that will help the author to answer the main research question. In the theoretical part of the thesis, relevant sources in printed and electronic form will be used. In the practical part the author incorporates volatility analysis, trend analysis, and correlation analysis as the main techniques.

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approx 40 – 50 pages

Keywords

Bitcoin, inflation, depreciation, appreciation, exchange rate, centralization, decentralization, fiat money

Recommended information sources

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Declaration

I declare that I have worked on my bachelor thesis titled "Comparative Analysis of Bitcoin and Traditional Currencies: Can Bitcoin Provide a Global Hedge against Inflation of Flat Currencies?" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 15.03.2023

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Comparative Analysis of Bitcoin and Traditional Currencies: Can Bitcoin Provide a Global Hedge against Inflation of Fiat Currencies?

Abstract

The main goal of the following thesis is to answer the question of whether Bitcoin is reliable enough to provide an alternative against the inflation of fiat currencies or not. The author pursues the goal of answering the aforementioned question based on the empirical analysis performed by the author in her practical part. In addition to that, the author also seeks to describe the development of Bitcoin cryptocurrency over the course of the last 5 years.

The main approach selected by the author is quantitative with numerous techniques that will help the author to answer the main research question. The author incorporates volatility analysis, trend analysis, and correlation analysis as the main techniques.

All in all, based on her empirical analysis and the comparison of the results of the author's study with other academists and researchers, the author can conclude that as of the beginning of 2023, there is no way that Bitcoin or any other cryptocurrency can provide a hedge against the global inflation due to high volatility of crypto assets and no regulation, which is a crucial component.

Keywords: Bitcoin, inflation, depreciation, appreciation, exchange rate, centralization, decentralization, fiat money

Komparativní analýza bitcoinu a tradičních měn: může bitcoin zajistit globální jistotu proti inflaci tradičních měn?

Abstrakt

Hlavním cílem následující práce je odpovědět na otázku, zda je bitcoin dostatečně spolehlivý na to, aby poskytoval alternativu proti inflaci tradičních měn či nikoliv. Autor sleduje cíl a odpovídá na výše uvedenou otázku na základě empirické analýzy provedené autorem ve své praktické části. Kromě toho se autor také snaží popsat vývoj kryptoměny Bitcoin v průběhu posledních 5 let.

Hlavní přístup zvolený autorem je kvantitativní s četnými technikami, které pomohou autorovi odpovědět na hlavní výzkumnou otázku. Mezi hlavní techniky autor začleňuje analýzu volatility, analýzu trendů a korelační analýzu.

Celkově vzato, na základě své empirické analýzy a srovnání výsledků autorovi studie s jinými akademiky a výzkumníky může autor dojít k závěru, že od začátku roku 2023 neexistuje žádný způsob, jak by bitcoin nebo jakákoli jiná kryptoměna mohla poskytnout zajištění proti globální inflaci kvůli vysoké volatilitě krypto aktiv a žádné regulaci, což je klíčová součást.

Klíčová slova: Bitcoin, inflace, deprecie, aprecie, směnný kurz, centralizace, decentralizace, tradiční/oficiální měna

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List of abbreviations

BTC ...	Bitcoin
USD ...	United States Dollar
OLS ...	Ordinary Least Squares
CPI ...	Consumer Price Index
PPI ...	Producer Price Index
GDP ...	Gross Domestic Product
DeFi ...	Decentralized Finance

1 Introduction

The author, like anyone else who has been an active subject in economic relations, has a genuine interest in cryptocurrencies, which slowly become more and more popular and relevant in modern society. In light of recent circumstances, which prompted inflation all over the world to skyrocket, the author is tempted by the question of whether cryptocurrencies can really become alternatives to fiat money and what is even more important, can cryptocurrencies help people to escape inflation which inevitably diminishes the purchasing power of money? The relevance of this topic is high as people all over the world are keen on keeping savings, which are quite often kept in fiat money, such as USD, British Pounds, and other international currencies. Undoubtedly, it is wise to say that all those currencies, regardless of their strength and history, are subject to inflation as well, which often leads to situations where people try to buy precious assets in order to escape inflation, which can significantly decrease the real power of savings over time.

Yet, when talking about cryptocurrencies, one can suggest that it is something in between, whereas those currencies are not fiat money, and they are also far from precious metals and other assets that are often used by people. Henceforth, it is quite logical to pose oneself similar kinds of questions, such as the one, which is the leitmotiv of the following work. After all, the author seeks to find an answer to the question of whether Bitcoin, the world's leading and most powerful cryptocurrency, provides a global hedge against the inflation of fiat currencies.

In order to reach an unbiased answer, the author uses primarily empirical methods that are not anyhow influenced by people's feelings and preferences, as the empirical approach is something that will provide a result that is underpinned by pure mathematics.

2 Objectives and Methodology

2.1 Objectives

The main goal of the following thesis is to answer the question of whether Bitcoin is reliable enough to provide an alternative against the inflation of fiat currencies or not. The author pursues the goal of answering the aforementioned question based on the empirical analysis performed by the author in her practical part. In addition to that, the author also seeks to describe the development of Bitcoin cryptocurrency over the course of the last 5 years.

2.2 Methodology

The main approach selected by the author is quantitative with numerous techniques that will help the author to answer the main research question. The author incorporates volatility analysis, trend analysis, and correlation analysis as the main techniques.

To be more specific, when it comes to the correlation analysis, the author uses the Pearson correlation coefficient, which is computed according to the following formula:

$$r = \frac{\sum(Xi - X \text{ mean})(Yi - Y \text{ mean})}{\sqrt{\sum(Xi - X \text{ mean})^2(Yi - y \text{ mean})^2}} \quad (1)$$

Pearson correlation coefficient indicates the strength of the relationship between two variables, where the interval of possible values for the coefficient stretches from -1 (indicates a strong negative correlation) to 1 (indicates a strong positive correlation).

Then, after estimating the correlation coefficient, the author computes the t-value, which will help the author to identify if the strength is statistically significant. The value is computed according to the following formula:

$$t \text{ value} = \frac{Rxy\sqrt{n-2}}{\sqrt{1-Rxy^2}} \quad (2)$$

For the hypothesis testing, the author uses a significance level equal to 5%, which is a traditional level for the majority of tests.

For the volatility analysis, the author uses two formulas – the first one is related to the computation of standard deviation, which is computed according to the following formula:

$$\mathbf{Standard\ Deviation} = \sqrt{\frac{\sum(X_i - X\ Mean)^2}{n}} \quad (3)$$

Consequently, the author calculates the coefficient of variation, which is computed as follows:

$$\mathbf{Coefficient\ of\ Variation\ (\%)} = \frac{\mathbf{Standard\ Deviation}}{\mathbf{Mean}} * \mathbf{100} \quad (4)$$

For the trend analysis, the author uses the OLS, standing for the ordinary least squares method for estimating parameters. The OLS method is computed according to the following formula:

$$\mathbf{OLS} = (\mathbf{X^T X})^{-1} \mathbf{X^T Y} \quad (5)$$

The author relies on secondary data obtained from Yahoo Finance and The World Bank.

3 Literature Review

3.1 Bitcoin

3.1.1 History

Bitcoin is a kind of decentralized digital money that may be traded directly between users without the need for a central bank or other intermediaries. In 2009, an anonymous creator or creators under the name "Satoshi Nakamoto" released it to the public. Bitcoin may have its origins in the widespread distrust of traditional financial institutions and centralized banking systems that followed the global financial crisis of 2008. Bitcoin was developed as a result of a widespread breakdown of confidence. Bitcoin was created as a solution to these issues; it is an open-source, decentralized, and secure method of doing financial transactions online (Chohan, 2022).

Figure 1, a materialized bitcoin

Source:

Person,

2022



Any and all Bitcoin transactions are recorded in a public, distributed ledger called a blockchain. The Bitcoin network couldn't function without the immutable ledger of transactions known as the blockchain. Each block in the chain contains a list of transactions

and a reference to the block in the chain that came before it, creating an immutable and tamper-proof record of all transactions. When Bitcoin first appeared online, it was mostly used to purchase illicit goods and services via the anonymous and shady dark web. However, as its usage spread, its value increased, and it rapidly became a desirable investment opportunity for many (Malik, 2016).

The price of bitcoin has displayed extraordinary volatility over the period of several years, with substantial swings in both directions. In April 2021, the price of a bitcoin was at \$64,000; by June of the same year, it had fallen to about \$30,000, a record low. As far as I know, this was an all-time low price. The use of cryptocurrencies like Bitcoin and others like it has been met with significant regulatory and legal hurdles. Governments and financial institutions have been cautious to fully embrace cryptocurrency because to concerns that it may be used in illicit activities such as money laundering or other illegitimate pursuits. Some countries have gone as far as outlawing or severely restricting cryptocurrency usage, while others have tried to regulate its circulation via licensing and fees (Pack, 2022).

Despite these challenges, Bitcoin and other cryptocurrencies have seen increasing adoption, with increasing numbers of stores and websites accepting them as payment. Major corporations and financial institutions like Tesla and PayPal have joined the cryptocurrency trend in the last few years by buying in or accepting them. The biggest bitcoin exchange in the world, Coinbase, is one of these companies. In addition to its potential in the financial industry, the blockchain technology that supports Bitcoin has shown promise in a wide variety of other applications. Supply chain management and identity verification are just two examples of industries that might benefit greatly from adopting blockchain technology (Hernandez, 2022).

3.1.2 Application

- **Using Bitcoin as Money or Currency**

Every day, more and more people are exchanging one Bitcoin for another, whether online or in person. Because it is not controlled by any central authority, bitcoin may be used to make direct payments to one another, bypassing traditional financial institutions. As the high cost and delayed processing times of conventional banking institutions may be a

substantial barrier to international commerce and remittances, this has important consequences for both. Bitcoin's digital nature and the ease with which it can be transferred online also make it a practical and widely accepted form of currency. Major online companies including Microsoft, Overstock, and Expedia have joined the ranks of those that accept bitcoin as payment. However, there are still obstacles preventing Bitcoin from becoming a mainstream form of currency. For instance, businesses may find it challenging to set prices in bitcoin due to the currency's extreme price volatility. It might also be challenging for customers to identify retailers that take bitcoin due to the fact that it is not yet generally recognized. However, these problems are being solved little by bit, and bitcoin's usage as currency is expected to grow in the future years (Kang, 2022).

- **The Value of Bitcoin as a Safe Investment or “Safe haven”**

Bitcoin may also be used as a kind of long-term savings. The limited quantity and decentralized features of Bitcoin make it a desirable asset for anyone seeking to protect their wealth from inflation or diversify their holdings. Bitcoin's decentralized nature means its value is immune to the monetary and political instability that plagues more conventional currencies. In addition, unlike conventional currencies, bitcoin's finite supply implies it is immune to inflationary forces. Once Bitcoin's maximum quantity of 21 million has been mined, no more will be generated. In other words, bitcoin is a deflationary currency, which may help preserve its purchasing power in the long run. As a result of its price swings, bitcoin is not a completely safe investment. Bitcoin's price is volatile, even over short time periods, and may not be a good investment for people who cannot stand to lose money (Hougan, 2021).

- **Bitcoin as a Means of Gainful Exchange**

In addition to its usage as a medium of exchange, Bitcoin is also attracting the attention of investors who hope to profit from the cryptocurrency's future development. Speculating on the value of bitcoin entails risks and potential gains that must be weighed before any financial choices are made. Bitcoin's decentralized nature is one of its primary benefits as a financial investment since it protects holders from the type of centralized oversight that may negatively impact more conventional forms of capital. And unlike conventional investments,

the value of bitcoin is not contingent on the performance of any underlying asset or company. Bitcoin investing, like any other investment, is not without its hazards. Because of its price's tremendous volatility, bitcoin may be a bad bet for investors who can't stand to lose money often. There is a lot of doubt regarding bitcoin's long-term potential since it is a new and unproven investment (Mattke, 2021)t.

3.1.3 Current Status

Cryptocurrencies, a digital form of currency that uses cryptographic techniques to secure and verify transactions, have continued to gain traction and generate significant interest in the financial and technological communities. Cryptocurrencies are digital form of currency that uses cryptographic techniques to secure and verify transactions. The year 2022 had a number of significant changes in the cryptocurrency market. These developments, which ranged from favorable to negative, have had an effect on the sector as a whole.

The proliferation of decentralized finance (DeFi) systems in 2022 were one of the most important developments to take place in the world of cryptocurrencies at that time. The ability of people to trade, lend, and borrow cryptocurrencies without the involvement of middlemen is made possible by these platforms. This has the potential to dramatically disrupt established financial institutions. However, because of the proliferation of decentralized finance platforms, there has been a rise in worries over security, regulation, and the possibility of fraud. This is especially true given that the sector as a whole is still mostly unregulated (Kumar, 2022).

In addition, a number of nations have continued to investigate the prospect of introducing their very own digital currencies backed by their respective central banks (CBDCs). These currencies would be issued by central banks, and they might offer an alternative to regular currencies that is both safer and more efficient. However, the introduction of CBDCs could also pose challenges to the current landscape of cryptocurrencies, particularly if they are designed to compete with or replace existing cryptocurrencies. This is particularly the case if CBDCs are designed to compete with or replace existing cryptocurrencies (Ozili, 2022).

Despite the fact that there has been a rise in both interest and investment in the sector, cryptocurrency has also been subject to a number of difficulties and failures. For instance, in May 2022, the market for cryptocurrencies had a huge fall, resulting in several cryptocurrencies losing a considerable amount of their value. This occurred. This catastrophe was primarily owing to a variety of issues, the most important of which were an overall market correction, increasing regulatory scrutiny, and worries over environmental effects.

The influence that cryptocurrencies have on the environment has also become a big worry in 2022, especially in view of the increasing emphasis that is being paid to issues pertaining to climate change and sustainability. The fact that the mining process for several cryptocurrencies needs considerable quantities of energy has given rise to concerns over the environmental effect of the business. In order to find a solution to this problem, a number of different projects have been started, some of which include the creation of alternate mining techniques and the promotion of renewable energy sources.

In the year 2022, the cryptocurrency sector has continued to face significant difficulties associated with regulatory frameworks. The possibility of fraudulent activity, money laundering, and other illegal acts that are linked with cryptocurrency has prompted governments and financial authorities from throughout the globe to voice their worries. As a direct reaction to this, a number of nations have either enacted or proposed new legislation with the intention of increasing the amount of supervision and transparency afforded to the business.

The falls of FTX and Luna are expected to have a temporary detrimental impact on the cryptocurrency market, as they may lead to a lack of trust among investors and greater volatility. This may result in lower prices. The degree of the destruction, as well as how soon those who were impacted can get back on their feet, will both play a role in determining the total effect. It is essential to keep in mind that the markets for cryptocurrencies are famously unstable and are prone to experiencing abrupt price fluctuations as a result of a wide range of reasons. These factors include market sentiment, changes in regulatory policies, and technical breakthroughs. As a result of this, it is hard to forecast the precise effect that the collapses of FTX and Luna will have on the cryptocurrency market over the course of the longer term (Uhlig, 2022).

The overall state of the cryptocurrency market in 2022 is one that is marked by a combination of enthusiasm and uncertainty. Despite the great potential for disruption and innovation, the sector continues to face substantial issues related to regulation, security, and sustainability. These challenges continue to represent considerable risks. It will be essential for all of the players in the business to collaborate in order to solve these concerns and support responsible development and innovation in the field as the industry continues to undergo changes.

3.2 Inflation

3.2.1 Causes

Inflation refers to the gradual change in the price level of a given country over the course of one year. Traditionally, inflation is measured in percentages, since it is the most convenient way to visualize changes that are happening in a given country in relation to the price level. Generally speaking, there were many discussions about causes of inflation over the course of the last century, but the most common approach to causes of the phenomenon is classifying all possible reasons behind the phenomenon into three categories – demand-pull inflation, cost-push inflation, and build-in inflation (Roger, 1998).

First, the author begins with demand-pull inflation, which is primarily caused by increasing demand for goods, which inevitably leads to the creation of a new equilibrium, where prices for goods will be higher. Traditionally, this inflation is caused by the overheating of the economy, when unemployment is low and people have a lot of money to spend, which inevitably drives inflation higher. Another reason that causes this kind of inflation is an increase in the money supply, which might arise from expansionary fiscal and monetary policies. Another aspect that is often blamed for this kind of inflation is the high value of savings that individuals have – due to a lot of money in possession, people are willing to offer themselves more and more, which also leads to a higher price level. This is the most common kind of inflation, and this inflation is usually observed in developed countries (Holzman, 1960).

Then, the second kind of inflation is cost-push inflation, which is caused by an increase in the price of inputs, which inevitably boils down to a higher price of goods offered on the domestic market. This inflation is traditional for countries that do not have a strong domestic currency, whose value is constantly fluctuating, thus leading to a higher price of imports and as a consequence, a higher price of goods. Generally, speaking, this inflation is traditional for developing countries, which often try to persuade trade policies aimed at the increase in the value of exports, which is usually achieved by depreciating domestic currency. In fact, those countries often succeed in their policies, but those policies have a negative effect on domestic populations and also increase disparities between poor and wealthy inhabitants (Barth, 1975).

The third kind of inflation is build-in inflation, which is mostly driven by expectations about inflation, which lead consumers to spend more and it prompt workers to demand higher wages. Sometimes, governments and firms refuse to raise those wages out of concerns for accelerating inflation, which often leads to serious misunderstandings between households and firms, as well as with the government (Nashed, 2014).

3.2.2 Types

In fact, there can also be different types of inflation, according to the pattern of the development of the indicator and its pace. Thus, the very first kind of inflation is creeping inflation, which is often characterized by a slow increase in the price level over years, such as 1% in one year and then 1.5% in another year. This kind of inflation is traditional for developed countries due to the fact that almost all countries in the world pursue a particular inflation target usually equal to around 1.5%-2%. This is done for the stimulation of firms since experiencing an opposite phenomenon – deflation has terrible consequences for firms that are not really willing to produce anything or enter into expansionary periods due to the fact that their real profit falls over time (Guth, 2000).

The second type of inflation is walking inflation and this particular kind of inflation is explained by a higher increase in the level over time, such as 3 or 5 percent annually, while the third kind of inflation is the galloping one, which is often described by inflation rates exceeding one-digit numbers and finally reaching two-digits, such as 10% or more (Guth, 2000).

Finally, the worst kind of inflation, which was often observed in Venezuela and Zimbabwe is hyperinflation, which is described by percentual change exceeding the level of 50%, which is crucial for economies, and it also harms inhabitants of a given country in a horrific way (Sargent, 1973).

In fact, it is also wise to mention the phenomenon, which is opposite to inflation – deflation. Deflation is an annual decrease in the price level and despite the good impression that the description of the phenomenon can create in the eyes of ordinary consumers, this phenomenon is also negative, but it primarily hurts firms, who lose motivation to expand and continue to supply their goods to the market. The nature of deflation and its repercussions drive the overwhelming majority of governments all over the world to set a particular really low level of inflation as the target for the economy. Traditionally, this target is around 1.5-3%, which is explained by the fact that this is not so harmful to consumers but at the same time, it keeps producers motivated (Hammond, 2012).

3.2.3 Measures of Inflation

The author has already specified that inflation is measured in percentages, but there is much more to the concept of measuring inflation than percentages. In fact, there are three fundamental measures of how inflation can be calculated.

The very first kind of measure used is the CPI or consumer price index, which measures the overall price of a particular basket of goods and services, which are traditionally offered in a given economy. After calculating the index for each year, economists usually compute annual change based on the original value of the index and its comparison with the previous year (Bryan, 1993).

The second kind of measure used for inflation is PPI or producer price index, which focuses on measuring the prices for essential inputs and resources, such as fuel, farm products, chemicals, and other precious resources from which commodities are being produced. The idea of this index lies in the fact that PPI is inevitably connected to the CPI and whenever there are changes in the PPI, they inevitably affect the CPI and ordinary consumers, since all actors of the economy are related to each other (Sidaoui, 2009).

Finally, the very last method to measure inflation is the GDP deflator which measures the aggregate prices of all goods and services produced by a given state. This indicator is much more complex as it includes the PPI and the CPI simultaneously, thus providing a more precise result with the regard to two indicators at the same time (Litra, 2009).

3.3 Fiat Currencies

The term "fiat money" refers to a kind of currency that is supported by the government but is not linked to a tangible asset such as gold or silver. The legal mandate of the government and the government's power to enforce the value of the currency as a medium of exchange is the two primary factors that determine the value of fiat money. In this sense, fiat money is seen as a sort of "legal tender," which refers to a form of currency that is permitted by law to be used for the payment of obligations. From a historical perspective, the introduction of fiat money occurred around the turn of the 20th century as a substitute for the gold standard. Prior to this, the value of a currency was pegged to the price of gold, which meant that the government's power to produce new money was severely constrained (Ritter, 1995).

A monetary system known as the "gold standard" was one in which the value of a nation's currency was pegged to a predetermined quantity of gold. In practice, this meant that the central bank of a nation would swap its paper money for gold at a predetermined rate. However, despite its contributions to the stabilization of international currency rates and the promotion of global commerce, the gold standard did have significant drawbacks. The beginning of the 20th century saw the beginning of the decline of the gold standard, which occurred when governments started printing more paper money than they had gold reserves to back it up. Because of this, there was inflation as well as economic instability. During the Great Depression of the 1930s, several nations abandoned the gold standard in order to pursue expansionary monetary policies and revive their economies. This was done in order to prevent further economic collapse (Bordo, 1995).

Following the conclusion of World War II, a brand new international monetary system was put into place – The Bretton Woods Monetary System. This system made use of the United States dollar as the reserve currency of the world and let other nations trade their

dollars for gold. The Bretton Woods monetary system was a worldwide financial framework that was formed in 1944 in the town of Bretton Woods, which is located in the state of New Hampshire in the United States. At the close of World War II, delegates from the 44 ally countries came together to draft it, and it remained in force all the way up until the early 1970s. After the destruction caused by the war, the primary goal of the Bretton Woods system was to build a stable international monetary system and to encourage economic growth and development. These goals were accomplished via the use of the Bretton Woods system. In order to accomplish this objective, the system was built on a fixed exchange rate regime, and the United States dollar was designated to serve as the reserve currency for the whole globe (Bordo, 2007).

Figure 2, Mount Washington Hotel, the place where the new system was agreed

Source:

Tucker,

2022



Within the framework of the Bretton Woods system, all currencies were set in relation to the United States dollar, which in turn was fixed in relation to gold at a rate of \$35 per ounce. Because of this, it was possible for any central bank to convert their dollars into gold at the predetermined rate. In response, the United States government said that it would be willing to exchange any foreign central bank's requested dollars for gold. By limiting the range of possible exchange rate movements to a tight band, the system ensured that international commerce and investment remained steady and could be accurately anticipated. Because of this, nations were able to engage in international trade knowing that the value of

their currencies would remain stable in comparison to that of the US dollar. This made it possible for these nations to participate in worldwide commerce with complete assurance (Eichengreen, 1993).

Each member nation was required to have a particular number of US dollars in reserve, which was equal to a set proportion of the country's own currency that was in circulation. This was done so that the fixed exchange rate could be maintained. This prevented the country's currency from becoming either too scarce or too plentiful, two conditions that may have contributed to either inflation or deflation in the economy. In addition, as part of the Bretton Woods system, the International Monetary Fund (IMF) was founded to provide financial support to nations that were having deficits in their balance of payment. Loans might be made available to member countries by the International Monetary Fund (IMF) in order to assist such nations in maintaining the stability of their currencies and reestablishing their balance of payments (Bordo, 2017).

The Bretton Woods system, despite its achievements, was confronted with a number of difficulties in the 1960s. The United States was running a significant trade deficit, and other nations were amassing US dollars as reserves. This caused the US gold reserves to come under pressure. In response to this issue, the United States government started a process of currency devaluation in 1971, which essentially severed the relationship between the US dollar and gold (Igwe, 2018).

Eventually, the system was finally brought to its knees in the 1970s when the United States began printing more dollars than it had in gold reserves, which resulted in inflation and a decline in people's faith in the value of the dollar. When President Richard Nixon of the United States put a stop to the ability to convert dollars into gold in 1971, he essentially destroyed the gold standard. Since then, the majority of nations have moved to what is known as a fiat currency system, in which the value of a country's currency is not dependent on the worth of any particular physical product but rather on the supply and demand of the market (Igwe, 2018).

As the global economy expanded, governments found it more impossible to maintain a stable value for their currency, which led to the introduction of fiat money as a solution to

this problem. The ability of governments to have more discretion in the management of their own economies is recognized as one of the primary benefits of the use of fiat money. When governments use fiat money, they are able to generate more currency whenever it is required to support their activities, which may contribute to the expansion of the economy. In addition, governments are able to exert a higher level of control over their own economies by adjusting interest rates and managing inflation with the use of fiat money.

However, there are also certain disadvantages associated with the use of fiat currency. One of the most significant causes for worry is the potential for it to bring about inflation, which is defined as a decline in the value of money in comparison to the products and services that it may be used to buy. This may be placed if there is an excessive amount of money created or if the government reduces interest rates in an effort to promote the economy. A further worry with fiat currency is that it is susceptible to meddling by political actors. The value of a nation's currency may be manipulated by its government for a variety of political purposes, including the promotion of exports and the alleviation of the burden of debt. In the worst possible scenarios, this may result in hyperinflation or even the complete devaluation of the currency (Hoppe, 1994).

In spite of these worries, fiat money continues to be the most common kind of currency used in today's contemporary global economy. This is because it gives governments the freedom they need to manage their economies, while simultaneously allowing for higher liquidity and making it easier to use in day-to-day activities. Another reason for this is because it allows for better ease of use in daily transactions.

4 Practical Part

4.1 Trend Analysis

The very first analysis that is used by the author is trend analysis. With the help of trend analysis, the author first observes the development of Bitcoin price to US dollar over time and then the development of the dollar index based on the table presented below containing monthly observations for both variables over the course of the last 5 years. The author believes that Bitcoin serves as a perfect example of a cryptocurrency, while the US dollar serves as a perfect example of fiat money.

Table 1, the dataset used for the trend analysis

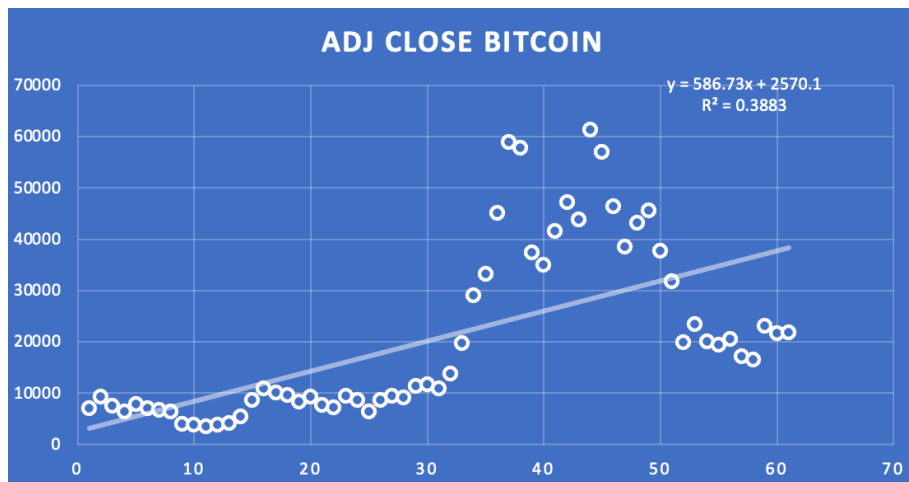
Date	Adj Close Bitcoin	Adj Close Dollar Index
01.03.2018	6973.529785	89.970001
01.04.2018	9240.549805	91.839996
01.05.2018	7494.169922	93.989998
01.06.2018	6404	94.629997
01.07.2018	7780.439941	94.489998
01.08.2018	7037.580078	95.139999
01.09.2018	6625.560059	95.190002
01.10.2018	6317.609863	97.129997
01.11.2018	4017.268555	97.269997
01.12.2018	3742.700439	96.169998
01.01.2019	3457.792725	95.580002
01.02.2019	3854.7854	96.160004
01.03.2019	4105.404297	97.279999
01.04.2019	5350.726563	97.480003
01.05.2019	8574.501953	97.75
01.06.2019	10817.15527	96.129997
01.07.2019	10085.62793	98.519997
01.08.2019	9630.664063	98.919998
01.09.2019	8293.868164	99.379997
01.10.2019	9199.584961	97.349998
01.11.2019	7569.629883	98.269997
01.12.2019	7193.599121	96.389999
01.01.2020	9350.529297	97.389999
01.02.2020	8599.508789	98.129997
01.03.2020	6438.644531	99.050003

01.04.2020	8658.553711	99.019997
01.05.2020	9461.058594	98.339996
01.06.2020	9137.993164	97.389999
01.07.2020	11323.4668	93.489998
01.08.2020	11680.82031	92.139999
01.09.2020	10784.49121	93.889999
01.10.2020	13780.99512	94.040001
01.11.2020	19625.83594	91.870003
01.12.2020	29001.7207	89.940002
01.01.2021	33114.35938	90.580002
01.02.2021	45137.76953	90.93
01.03.2021	58918.83203	93.230003
01.04.2021	57750.17578	91.279999
01.05.2021	37332.85547	89.839996
01.06.2021	35040.83594	92.440002
01.07.2021	41626.19531	92.169998
01.08.2021	47166.6875	92.629997
01.09.2021	43790.89453	94.25
01.10.2021	61318.95703	94.120003
01.11.2021	57005.42578	95.989998
01.12.2021	46306.44531	95.669998
01.01.2022	38483.125	96.540001
01.02.2022	43193.23438	96.709999
01.03.2022	45538.67578	98.309998
01.04.2022	37714.875	102.959999
01.05.2022	31792.31055	101.75
01.06.2022	19784.72656	104.690002
01.07.2022	23336.89648	105.900002
01.08.2022	20049.76367	108.699997
01.09.2022	19431.78906	112.120003
01.10.2022	20495.77344	111.529999
01.11.2022	17168.56641	105.949997
01.12.2022	16547.49609	103.519997
01.01.2023	23139.2832	102.099998
01.02.2023	21651.18359	103.629997
12.02.2023	21834.31836	103.578003

Source: Yahoo Finance, 2023

Then, the author proceeds first to the trend analysis for the price of Bitcoin, which is presented in the figure below.

Figure 3, trend analysis for Bitcoin

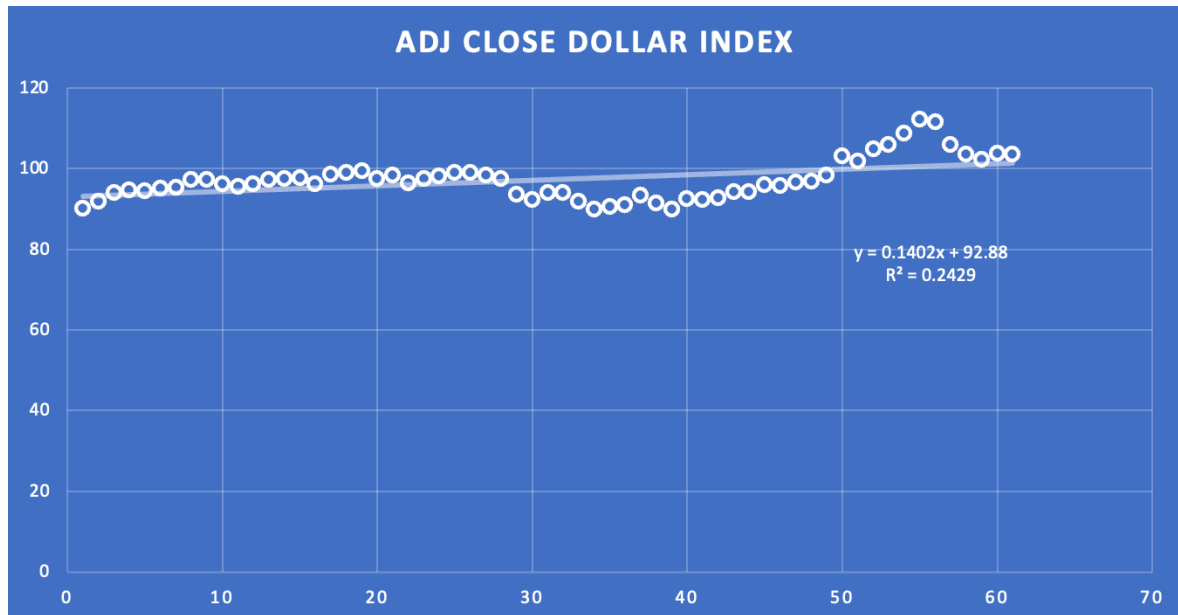


Source: own processing

According to the trend created for the monthly price of Bitcoin, it can be concluded that the average increment is equal to 586.73 US dollars, technically meaning that on the selected time period, the price of Bitcoin was experiencing a monthly increase of 586.73 USD, which is a good sign helping the author to conclude that over the last 5 years, the price of bitcoin managed to continue to increase. Yet, when looking at the scatterplot and the trend, it becomes evident that the price of bitcoin was much higher, but the coin experienced an astonishing shock first in the end of 2021 and then at the beginning of 2022, which eventually lead to the worst performance of Bitcoin in the last 3 years. Nevertheless, the dynamics are still possible and when comparing the figures for BTC price in 2023 with the values from 2018, it can be suggested that it is a good investment option in terms of return.

Then, the author continues with the trend analysis of the dollar index, which is presented in the figure below:

Figure 4, trend analysis for the dollar index



Source: own processing

Based on the second trend created for the dollar index, it can be said that the monthly increment based on the last 5 years was equal to the increase of 0.14 points, which is also a good result suggesting that the position of the United States Dollar was slowly increasing on the international arena. What is more, it is visible that in the last 5 months, the dollar showed incredible results with one of the best financial performances over the course of last years, when the price of one US dollar finally exceeded the price of one euro.

Then, in the context of the author's study and the question posed by her at the beginning of the bachelor thesis, it is also wise to analyze the trend of the global inflation rate. For this purpose, the author uses the second dataset reflecting the development of world inflation over time, which was collected from the World Bank. Below, the author presents the second database used for the computation.

Table 2, inflation dataset used for the trend analysis

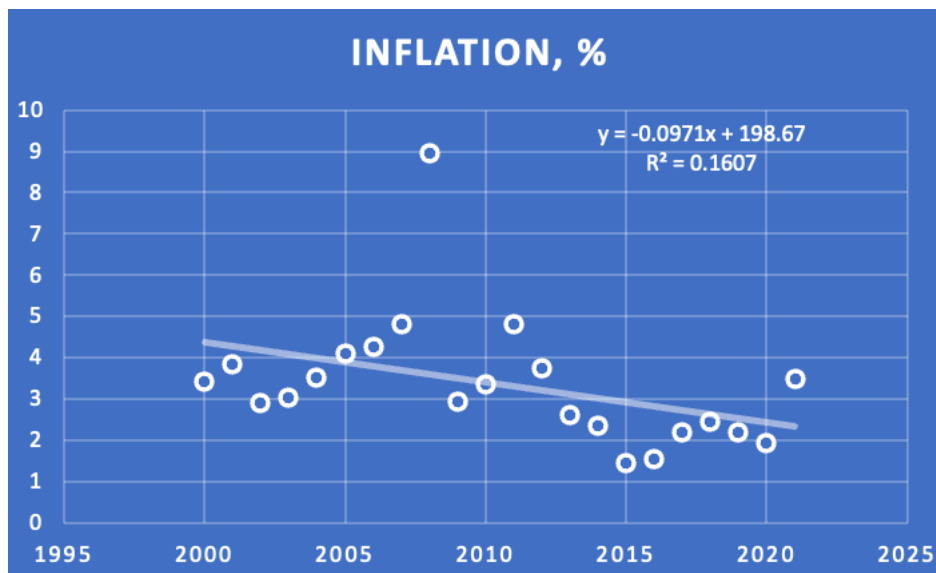
Year	Inflation, %
2000	3.43351563
2001	3.83657262
2002	2.90799857
2003	3.02504526
2004	3.51799903

2005	4.10725071
2006	4.26717463
2007	4.81023704
2008	8.94995335
2009	2.92856433
2010	3.34686867
2011	4.82239636
2012	3.72532666
2013	2.62105002
2014	2.34626866
2015	1.43431763
2016	1.55001642
2017	2.19201011
2018	2.43873656
2019	2.18690155
2020	1.92096801
2021	3.49505757

Source: The World Bank, 2022

Then, the author proceeds to the trend analysis with the help of Microsoft Excel:

Figure 5, trend analysis for global inflation



Source: own processing

Based on the trend generated by the development of the global inflation rate, it can be said that the average yearly change is negative with a value of 0.09 percentage points annually, which justifies the fact that inflation was decreasing over the course of the last 22 years (from 2000 to 2021). Yet, when considering the inflation rate, it is wise to say that it is a macroeconomic variable, and its development is largely affected by ongoing economic

phenomena. For this purpose, there can be distinguished 2 periods – the period before 2008, when the Great Recession started and led to the increase of inflation up to 9%, and the period after the Great Recession, where the indicator was slowly decreasing until 2020. For sure, it is expected that the ongoing conflict in Ukraine and the energy crisis in Europe will also drive inflation high, but it is still not expected by the author that this increase will reach the same level as it did in 2008, during the Great Recession. Of course, there is no way that one can underestimate the current economic crisis, but it is already evident that their magnitudes of them are slightly different.

4.2 Volatility Analysis

The second analysis that will help the author to understand the potential of bitcoin to become an alternative to fiat money is related to volatility analysis, whose fundamental idea lies in calculating the degree of volatility (measured in standard deviation and then transformed into the coefficient of variation). Undoubtedly, there is no way for highly volatile currencies to become alternatives to fiat money since the savings of people are usually kept in assets that have the lowest possible degree of volatility with a really low presence of risk. The author uses the dataset presented in **Table 1** and below, the offers the result of the volatility analysis for Bitcoin first based on the formulas (3) and (4).

Table 3, volatility analysis for bitcoin

	Bitcoin
<i>Standard Deviation</i>	16716.47651
<i>Coefficient of Variation</i>	81%

Source: own processing

The standard deviation for bitcoin based on the monthly time series reflecting the development of the coin over the last first years indicates that the volatility is equal to 16,716.47 US dollars, which clearly seems to be a really high number. Then, the author proceeds to calculation the coefficient of variation, which is equal to 81%. Undoubtedly, the variation of 81% is astonishingly high and it really prevents the author from calling Bitcoin a safe investment option.

Then, the author proceeds to the analysis of the US dollar according to the same formulas – (3) and (4). The author presents the result in **Table 3**.

Table 4, volatility analysis for US dollar

	US Dollar
<i>Standard Deviation</i>	5.050993054
<i>Coefficient of Variation</i>	5%

Source: own processing

After calculating the standard deviation for the US dollar index, it becomes evident that the volatility is equal to just 5 points, while the variability expressed in percentage is equal to 5%, which is a very low value, especially when comparing it to 80% for Bitcoin. In addition to that, the author suggests that the dynamics of the development of the US dollar is positive due to the fact that almost the entire variability of the index was caused by a positive change in the value of the index, i.e., the dollar was appreciating, which is good for investors.

4.3 Correlation Analysis

Then, the author proceeds to the correlation analysis between Bitcoin and US dollar, which is conducted based on the formula (1). After calculating the correlation coefficient, the author applies the formula (2) for identifying if the relationship between the two can be categorized as a statistically significant one. Below, the author offers the table with the aforementioned calculations.

Table 5, correlation analysis for Bitcoin and US dollar

	Bitcoin
US Dollar	-0.169833499
t value	-1.323746225

Source: own processing

The correlation between bitcoin and the US dollar is equal to negative 0.16, which suggests that the two currencies are negatively correlated with each other, but the strength of this correlation is rather low. Then, the author proceeds to the hypothesis testing based on the t value obtained during the correlation analysis:

- Ho: the correlation is not significant (US dollar and BTC prices are not related)
- Ha: the correlation is significant (US dollar and BTC prices are related)
- $\alpha = 0.05$

- T-test
- T value = 1.32
- $1.32 < 2 \Rightarrow H_0$ is not rejected. In fact, there is not enough evidence to suggest that the price of Bitcoin and the US dollar are significantly related to each other.

Then, the author proceeds to the case of the particular country that has adopted Bitcoin as an official currency – El Salvador. The author seeks to understand the main motives and consequences of adopting Bitcoin as one of the main currencies (alongside the US dollar).

4.4 Case Study: El Salvador

For her analysis, the author uses the following dataset:

Table 6, the dataset used for the analysis of El Salvador

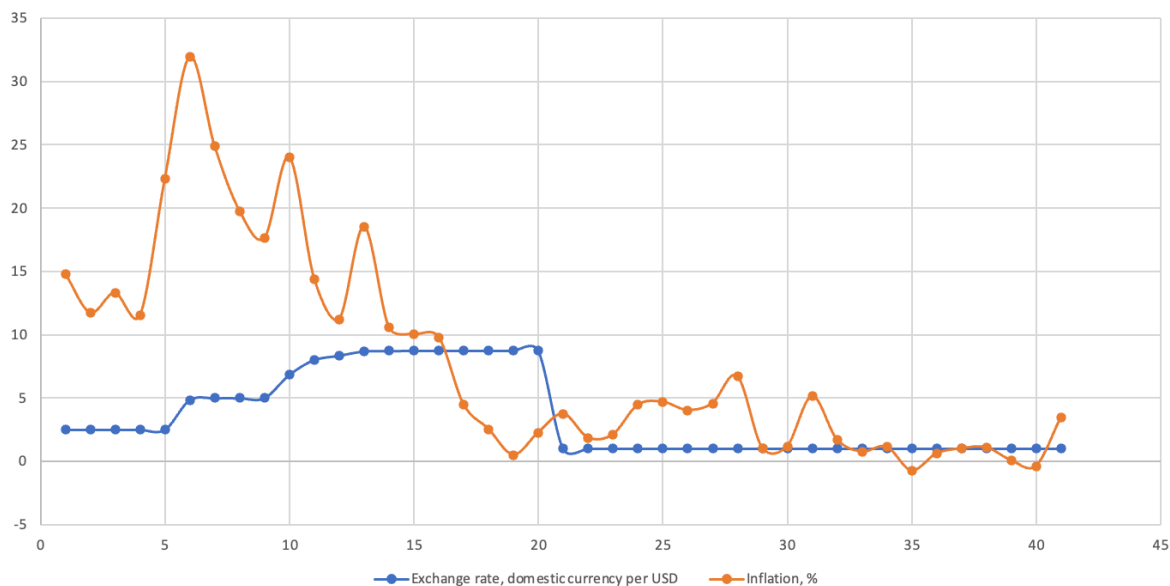
Year	Exchange rate, domestic currency per USD	Inflation, %	GDP growth, %
1981	2.5	14.79715163	5.720990452
1982	2.5	11.72888687	6.308471376
1983	2.5	13.31431773	1.539025284
1984	2.5	11.50716951	1.33525803
1985	2.5	22.32837506	0.614316239
1986	4.85215	31.93501615	0.194673038
1987	5	24.86450034	2.508169213
1988	5	19.76116179	1.878176962
1989	5	17.63407994	0.964059197
1990	6.84833333	23.99916511	4.832900578
1991	8.01666667	14.40267488	1.494087568
1992	8.36083333	11.21448138	7.021963316
1993	8.70250833	18.50668833	5.818315557
1994	8.72875	10.58580665	4.692061727
1995	8.75458333	10.02965645	4.734081402
1996	8.755	9.788920402	0.811461899
1997	8.75625	4.490136279	3.137970067
1998	8.755	2.547059776	2.6522773
1999	8.755	0.51482713	2.162033737
2000	8.755	2.271287568	1.127906977
2001	1	3.750820575	0.87961366
2002	1	1.865525036	1.572918448

2003	1	2.120390917	1.565393031
2004	1	4.451943924	0.889404486
2005	1	4.690948709	2.705463473
2006	1	4.037123594	4.348349795
2007	1	4.578085724	1.858478587
2008	1	6.707922935	2.130553037
2009	1	1.055950297	2.086107412
2010	1	1.179335769	2.107887579
2011	1	5.128923767	3.806881243
2012	1	1.729734816	2.822623757
2013	1	0.757669185	2.235624415
2014	1	1.141344675	1.708706265
2015	1	0.731384487	2.4
2016	1	0.604049087	2.5390625
2017	1	1.012354033	2.247619048
2018	1	1.090330006	2.412444113
2019	1	0.075324135	2.437471578
2020	1	0.371590212	8.177217438
2021	1	3.466925853	10.27847612

Source: The World Bank, 2023

First, the author proceeds to the comparative analysis of the country's inflation and exchange rate, which is presented in the figure below:

Figure 6, comparative analysis of exchange rate and inflation



Source: own processing

The selection of the exchange rate as one of the variables that will be analyzed is explained by the fact that the exchange rate is one of the most important variables whose volatility is one of the biggest determinants of high inflation. In the case of El Salvador, it is visible that the country was somewhat trying to maintain a fixed exchange rate of 2.5 units of domestic currency (colón) per 1 USD, but their attempts were fruitless due to the growing scale of economic problems and low value of national reserves, which is essential to maintain a fixed exchange rate. Yet, the exchange rate policy was not really effective as it did not really prevent colón from depreciating, which caused a fair amount of turbulence in the inflation rate of the country which prior to 2001 was going up and down in a drastic way. Yet, the decision to abandon the fixed exchange rate and dollarize the economy in 2001 eventually lead to a period of historically low inflation and helped the country to finally break the vicious circle of high inflation. The analysis of the most important events of the country's economy is crucial for understanding the reason behind adopting bitcoin as a national currency in 2021- the country, which experienced a significant economic expansion after dollarizing the economy sought to find a new catalyzer for an economic miracle, which was, according to the country's officials and their president, the bitcoin.

Then, the author proceeds to the second dataset, which reflects on the economic growth of El Salvador slightly prior to adopting bitcoin as the main domestic currency and after the announcement and the eventual adoption.

Table 7, economic growth of El Salvador and quarterly bitcoin price

Year	Quarter	Economic growth, %	Bitcoin price
2021	Q1	2.6	29,376
2021	Q2	26.5	57,750
2021	Q3	11.6	35,908
2021	Q4	3.5	41,551
2022	Q1	3.4	47,169
2022	Q2	2.6	56,285
2022	Q3	2.2	19,242
2022	Q4	1.9	19,104

Source: The World Bank, 2022

When observing the economic growth of El Salvador over time, it is wise to specify that in the first quarter of 2021, the country's officials had not yet started any talks or readings in the Parliament related to the adoption of Bitcoin as an official currency. The talks and readings started in the second quarter of 2021 when the magnitude of economic growth was the highest. Eventually, bitcoin was adopted as an official currency in the third quarter of 2021, where the indicator of economic growth had the second-highest figures. Yet, it is visible that over time, as the price of bitcoin started to go down, the economic growth of El Salvador started to shrink. The author consequently conducts a correlation analysis for two variables – economic growth in % and the price of Bitcoin in USD.

Table 8, correlation analysis for Bitcoin and GDP growth of El Salvador

	Economic growth, %
Bitcoin price	0.521875945
t value	1.498590522

Source: own processing

In fact, the correlation between the two is equal to 0.52, which suggests that there is a mild correlation between the Bitcoin price and the GDP growth of El Salvador. Then, the author proceeds to the hypothesis testing of the calculated correlation coefficient:

- Ho: there is no correlation between GDP growth and the Bitcoin price
- Ha: there is a correlation between GDP growth and the Bitcoin price
- $\alpha = 0.05$
- T value = 1.49

- $1.49 < 2.1 \Rightarrow H_0$ is not rejected.

In fact, there might be a correlation between the two, but there is not enough evidence to suggest that this correlation is statistically significant.

The author will proceed to elaboration on her results in the results and discussion chapter.

5 Results and Discussion

To begin with, it is wise to begin the elaboration on the results by saying that despite the fact that fiat money is not really backed by any commodity or precious asset, they still do not have high volatility. Of course, it is wise to always make a distinction between the world's leading currencies, such as USD, British Pounds, Euro, Swiss Franc, and a bunch of other currencies, such as the domestic currencies of developing countries. Currencies in general are backed by countries themselves, whose economic performance, as well as political presence in the international arena are responsible for possible changes in the foreign exchange market. In addition to that, the author managed to prove the point that fiat money, based on the example of the world's most important one – the US dollar, is not really volatile as the variability of this currency is equal to just 5%. Yet, the author fully understands the polemic with cryptocurrencies and the potential prospects of replacing fiat money, as in essence, cryptocurrencies seem to be really good assets and alternatives. Nevertheless, the author reached the conclusion, when she managed to compute the variability of Bitcoin over the course of the last 5 years and it is equal to 81%, which is too much for a currency to become a reserve currency, in which ordinary people will be putting their savings. Generally speaking, the idea of cryptocurrencies and justification of people believing that those currencies can serve as alternatives to fiat money, which is also not really backed by any asset is logical, but the problem is that the whole concept of centralization is something that backs fiat money. Given the fact that no centralization is present in the crypto world as of the beginning of 2023, it is highly expected that those currencies, as well as Bitcoin, will continue to be classified as highly risky and speculative to some extent. Therefore, based on her analysis, the author suggests that cryptocurrencies in general will not be able to provide a global hedge against inflation due to their incredibly high volatility, which is also concluded by Almeida (2022) and Georgeson (2018). However, the author believes that the prospect of becoming an alternative to fiat money still exists, but a prerequisite step would be creating at least some mechanism of control or, in other words, centralizing the crypto market. After all, when analyzing the causes of the fluctuation of Bitcoin, it becomes evident that the two biggest crises happened after the crash of Luna, which turned out to be something quite similar to a scam, and after the crash of the FTX platform, which turned out to be a Ponzi scheme, according to Fu (2022). The author believes

that centralization is the way out and it is something that will help to avoid such crises and finally strengthen the position of cryptocurrencies in the world of finance.

Then, another important argument for the fact that there is no way that cryptocurrencies can provide a hedge against global inflation is the situation with El Salvador. In fact, as the author has identified, the country managed to significantly boost its economic growth right after initiating talks about accepting Bitcoin as a national currency alongside the US dollar. Yet, the adoption of the US dollar in 2001 saved the country and tackled the ongoing problem of inflation. In fact, dollarizing the economy is not a bad idea after all due to the fact that there is almost no way for the US dollar to collapse, as of 2022-2023, so it was a safe move from the national government, which is also concluded by Marshall (2023). Nevertheless, the problem with adopting Bitcoin is the fact that the country tied itself to something rather speculative, whose price is highly vulnerable to external shocks, such as the crash of Luna and the crash of FTX. Inevitably, this affects the country in a horrific way because they did not only adopt Bitcoin as an official currency, but they have also kept a part of their reserves in Bitcoin. Given the fact that the value of the asset decreases by almost 300%, it is also evident that the same change happened with the national reserves of El Salvador, which is crucial for such a small country. Of course, if those negative situations would have never happened, the economic expansion of El Salvador would have continued even further, but the country was really misfortunate since it adopted cryptocurrency is probably the worst moment. This once again proves the fact that Bitcoin cannot itself substitute fiat money and provide a global hedge against inflation, and even if it could, there is no guarantee at all that all person's savings or country's reserves will not diminish under the force of another external shock triggering Bitcoin to fall even further into the abyss. After all, one does not usually gamble with all of his fortunes as Kshetri (2022) has correctly mentioned it.

6 Conclusion

All in all, based on her empirical analysis and the comparison of the results of the author's study with other academists and researchers, the author can conclude that as of the beginning of 2023, there is no way that Bitcoin or any other cryptocurrency can provide a hedge against the global inflation due to high volatility of crypto assets and no regulation, which is a crucial component.

In addition to that, the author believes that a fundamental difference between cryptocurrencies and fiat money is the fact that despite both not being backed by any physical commodity or asset, fiat money is still not a risky asset for keeping savings because they are backed by entire governments and governmental systems itself. In other words, the author believes that something that really saves those "real" currencies is the very idea of centralization itself. Henceforth, the author believes that there is an opportunity for cryptocurrencies to replace fiat money and even outperform them in relation to providing a hedge against inflation, but this will only happen when the crypto market will be willing to embrace at least some degree of centralization, which will prevent major crises, such as the Luna crash and FTX fall from happening.

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