

**T.C.
ISTANBUL AYDIN UNIVERSITY
INSTITUTE OF GRADUATE STUDIES**



**THE IMPACT OF CRYPTOCURRENCIES ON MONETARY
SYSTEMS**

MASTER'S THESIS

Yamen NATAFJI

**Department of Business
Business Administration Program**

AUGUST, 2021

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(Y1812.130044)**

**Department of Business
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Thesis Advisor: Assoc. Prof. Hülya Boydaş HAZAR

AUGUST, 2021

Onay Formu

DECLARATION

I hereby declare with respect that the study “The Impact of Cryptocurrencies on Monetary Systems”, which I submitted as a Master thesis, is written without any assistance in violation of scientific ethics and traditions in all the processes from the Project phase to the conclusion of the thesis and that the works I have benefited are from those shown in the Bibliography. (09/08/2021)

Yamen NATAFJI

FOREWORD

I want to thank all of you who have been helping me in my master's degree and encouraged me to take this opportunity. I want to extend my sincere appreciation to my thesis advisor Assoc. Prof. Hülya Boydaş Hazar for her supervision, constructive guidance, inspiration, and encouragement, who helped me in every way to make this study better.

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THE IMPACT OF CRYPTOCURRENCIES OF MONETARY SYSTEMS

ABSTRACT

Investing in cryptocurrencies has received increasing interest from entities and governments over the past years. In this thesis, we studied the basic concepts of money and the functions of money, as well as a comparison between digital currency and traditional currency, the concept of cryptocurrencies, their types and date of emergence, their features, the basics of cryptocurrencies, the benefits of trading in them, the main players in cryptocurrencies, elements of cryptocurrencies, The cryptocurrency mining mechanism was also explained.

The technology of the blockchain, its types and benefits and how to use the blockchain when trading cryptocurrencies has been studied. The mechanism for regulating cryptocurrencies by governments and countries was discussed, and the controls imposed by countries and banks for trading in cryptocurrency were clarified.

The most important previous studies that examined the correlation and impact of cryptocurrencies with financial indicators were reviewed. We have studied the correlation and the joint effect of the relationship of Bitcoin with weekly time series data of the leading financial assets over the past ten years.

The multiple linear regression model was applied, as well as the Granger causality test to study the effect of Bitcoin prices on the most important leading financial assets. The empirical study shows the existence of a mutual effect of the price of Bitcoin on some financial assets, this effect is subject to supply and demand for cryptocurrencies.

Keywords: Cryptocurrencies, Monetary Systems, Block Chain, Bitcoin

PARA SİSTEMLERİNE KRİPTO BİRİMLERİNİN ETKİSİ

ÖZET

Kripto para birimlerine yatırım yapmak, son yıllarda kuruluşlardan ve hükümetlerden artan bir ilgi gördü. Bu tezde, paranın temel kavramlarını ve paranın işlevlerini inceledik, ayrıca dijital para birimi ile geleneksel para birimi arasında bir karşılaştırma, kripto para kavramı, türleri ve ortaya çıkış tarihleri, özellikleri, kripto para birimlerinin temelleri, bunlarda ticaretin faydaları, kripto para birimlerindeki ana oyuncular, kripto para birimlerinin unsurları, kripto para madenciliği mekanizması da açıklandı.

Blok zinciri teknolojisi, türleri ve faydaları ile kripto para ticareti yaparken blok zincirinin nasıl kullanılacağı araştırılmıştır. Hükümetler ve ülkeler tarafından kripto para birimlerini düzenleme mekanizması tartışıldı ve kripto para ticareti için ülkeler ve bankalar tarafından uygulanan kontroller açıklığa kavuşturuldu.

Kripto para birimlerinin finansal göstergelerle ilişkisini ve etkisini inceleyen en önemli önceki çalışmalar gözden geçirildi. Son on yılda önde gelen finansal varlıkların haftalık zaman serisi verileriyle Bitcoin ilişkisinin korelasyonunu ve ortak etkisini inceledik.

Bitcoin fiyatlarının en önemli önde gelen finansal varlıklar üzerindeki etkisini incelemek için çoklu doğrusal regresyon modeli ve Granger nedensellik testi uygulandı. Ampirik çalışma, Bitcoin fiyatının bazı finansal varlıklar üzerinde karşılıklı bir etkisinin varlığını göstermektedir, bu etki kripto para birimleri için arz ve talebe tabidir.

Anahtar Kelimeler: Anahtar Kelimeler: Kripto Para Birimleri, Para Sistemleri, Blok Zinciri, Bitcoin

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ABBREVIATIONS

| | |
|-----------------|--|
| ARMA | Autoregressive Moving Average |
| AUD | Australian Dollar |
| BIST 100 | Borsa Istanbul 100 |
| BOE | Bank of England |
| BOJ | Bank of Japan |
| BTC | Bitcoin |
| CPI | Consumer price index |
| DLT | Distributed Ledger Technology |
| DW-test | Durbin–Watson statistic test |
| EBA | European Banking Authority |
| ECB | European Central Bank |
| EU | European Union |
| EUR | EURO |
| FOMC | Federal Open Market Committee |
| Forex | Foreign Exchange Market |
| FTSE | The Financial Times Stock Exchange |
| GARCH | Generalized Auto Regressive Conditional Heteroskedasticity |
| GBP | Great Britain Pound |
| GDP | Gross domestic product |
| GDPR | General Data Protection Regulation |
| IBAN | International Bank Account Number |
| ICO | Initial Coin Offerings |
| ICO | Initial Coin Offerings |
| IMF | International Monetary Fund |
| JPY | Japanese Yen |
| P2P | Peer-to-Peer |

| | |
|--------------------|------------------------------|
| PoW | Proof Of Work |
| PSD2 | Payment Services Directive |
| S&P 500 | The Standard and Poor's 500 |
| USA | The United States of America |
| USD | United States Dollar |
| USDT | Tether cryptocurrency |
| USDX | Dollar index |

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I. INTRODUCTION

A. Monetary System:

A monetary system is set to be a collection of institutions and systems that allow a government to deliver money to the economy of a country.

Not only national treasuries or central banks but also the Mint are the entities and mechanisms involved in this process. The national treasury, together with the finance ministry if one thrives, is responsible for the country's financial administration and expenditure.

The central bank is the entity in charge of a country's currency and money supply, as well as running and regulating commercial banking and interest rates. The Mint is the government-approved entity responsible for producing and manufacturing coins for use as official currency.

People all throughout the world require safe, inexpensive tools to manage their finances and survive. Despite technological advancements in banking and finance, cash transactions are still widely used and preferred. Cash money refers to the physical forms of banknotes, paper currency, and coin currency.

In emerging economies, paper-based currency accounts for over 85% of all global consumer transactions; in India and Indonesia, the cash-to-other-forms-of-transactions ratio is even higher, at 98 percent and nearly 100 percent, respectively.

Despite the availability of a wide range of debit, credit, and stored-value options in industrialized economies, Cash transactions are still higher than usual.:

Around half the population in the United Kingdom, 55 percent in the United States, and more than 67 percent in Germany. (Said, 2019)

Emerging economies are the most frequent users of cash money, despite the availability of debit, credit, and stored-value alternatives in industrialized economies.

With the rapid advancement of technology over the last 15 years, as well as the expansion of the Internet and online apps, a need for digital and online payments

has grown.

Payments via PayPal and credit cards were not well received or met all the expectations of consumers.

Bitcoin was created as a result of this evolution, the world's first decentralized cryptocurrency built on blockchain technology base, in response to the needs.

B. Definition of Money

Money is generally an economic unit that is accepted, recognized, and centralized as an exchange intermediary in an economy and used to facilitate trading transactions for goods and services.

We Commonly refer Money as currency.

Money begins as a commodity with a physical trait that allows market players to use it as a means of trade. Money can be officially issued as legal tender or fiat moneys, money substitutes and fiduciary media, market determined, and electronic cryptocurrencies. (Danial, 2019)

1. Functions of Money:

Money needs to fulfill three functions: (1) A medium of exchange, (2) a store of value, (3) a unit of account.

- Medium of exchange means it is a payment mechanism; we can use it to pay someone for something, or to extinguish a debt or financial obligation.

It doesn't need to be universally accepted to be a good medium of exchange, but it should be widely accepted context for which it is being used for.

The most common purpose assigned to money is that it serves as a medium of exchange, allowing people to buy and sell items without the need for a double coincidence of desires, such as in barter, when someone selling rice in return for wheat can sell it for money and buy wheat. (Lewis, 2018), (Danial, 2019)

- Store of value: Means that in the near term our money will be worth the same as it is today. To be a good store of value, we need to be

reasonably confident that our money will buy more or less than the same amount of goods and services tomorrow, next month, or next year, thus, money preserves value through time and space.

Money's function as a store of value entails deferring purchases or consumption until later, hence the link between present and future time frames is critical.

Money becomes an asset in this case since it is acquired. It is the most proper way to claim such products and services; as a result, Individuals prefer to save wealth in the form of money rather than assets such as houses, stocks, and other investments.

The most liquid form of wealth is money; the most liquid form of money is cash; for the assets the most liquid form of it is currency; and the most liquid form of money is cash.

Money can be rapidly and cheaply traded for either product and services, and its value is relatively stable, at least for the time being.

Despite their differences in liquidity, all assets, including savings accounts, bonds, governmental securities, treasury bills, even inventories and real estate, function as stores of value.

In modern economies, currency is kept in the form of bank deposits.

The money's value is quickly eroded, when a store of value breaks down, often this process referred to as hyperinflation. Individuals and entities develop quickly alternative ways to denominate value and make transactions, for example bartering or using a 'hard' or more successful and stable currency. (Lewis, 2018), (Danial, 2019), (Franco, 2015)

Unit of account:

Money is also employed as a standard unit of measurement, with prices for numerous commodities stated in dollars. This is a widely used and standardized metric, means it is something that we can use to compare the value of two items, or to count the total value of our assets. If we record the value of our possessions, we need some units to price them in, to get a total. Usually that is our home currency (Euro or USD or whatever), but we could in theory use any unit.

The money necessarily needs to have a well-accepted or understood price against assets to be a good unit of account, otherwise it is hard to figure out the total value across all our assets, if we need to do so to convince others of that value.

Some believes good money should achieve all these functions, others believe that the three functions can be fulfilled by different instruments. For example, there is no valid reason why something used as a medium of exchange (i.e., something that can be used to immediately settle a debt) must also be a long-term store of value. (Lewis, 2018)

2. Cash money and Digital Money:

In economics, the physical form of currency is called cash money, such as banknotes and coins. Cash money (physical money) is amazing, we can transfer (or spend or give away) as much of what we have as we want, when we want, without any third parties censoring or approving the transaction or taking a commission for the privilege. Cash money doesn't cheat valuable identity information that can be stolen or misused.

When we receive cash money, we know that the pay can't be charged back or undone in a later date, unlike the digital transactions such as some bank transfers and credit card payments, which is a pain point for merchants.

Under normal circumstances, once we have cash, it is under our control, and we can transfer it again immediately to somebody else.

Immediately, the transfer of physical money liquidates the financial obligation and leaves nobody waiting for anything else.

The traditional physical cash doesn't work at a distance, and that is a big issue. We can't transfer physical cash to someone on the other side of the room, except if we carry it in person.

Beside that on the other side of the planet, the digital money will become highly useful.

Physical money differs from digital money in that it relies on bookkeepers who are trusted by their customers to keep accurate accounts of balances they hold. In other words, we cannot directly control our digital money ourselves until Bitcoin came along.

To possess digital money, we should open an account in someone else's bank, PayPal, E-wallet. The 'someone else' is a third party whom we trust to keep books and records of how much money we have with them or, more specifically, how much they must pay us on demand or transfer to someone else at our request. Our account with a third party is a record of an agreement of trust between us: simultaneously how much we have with them, and how much they owe us.

Without the third party, we would need to keep bilateral records of debts with everyone, even people who we may not trust or who may not trust you, and this is not feasible. For example, if we bought something online, we could attempt to send the merchant an email saying, 'I owe you \$50, so let us both record this debt'. But the merchants probably would not accept this; firstly, because they probably have no reason to trust us, and secondly, because our email is not very useful to the merchants, they can't use our email to pay their staff or suppliers.

Instead, we instruct our bank to pay the merchant, and our bank does this by reducing how much our bank owes us, and, at the other end, increasing how much the merchant's bank owes them. From the merchant's point of view, this extinguishes our debt to the merchant, and replaces it with a debt from their bank. The merchant is happy, as they trust their bank (well, more than they trust us), and they can use the balance in their bank account to do other useful things.

Unlike cash money, which stabilize using the transfer of physical tokens, digital money stabilizes by decreasing and increasing balances in accounts held by trusted intermediaries. This probably seems obvious, though we may not have thought of it this way, for example Bitcoins are a form of digital money which share some properties of physical cash.

There is a big difference between physical card payments, where we tap or swipe the physical card and online card payments, where we type the numbers.

In the industry, a credit card online pay is called as a 'card not present' transaction and swiping our online credit card at the cashier's till in a shop counts as a 'card present' transaction.

Online (card not present) transactions have higher rates of fraud, so in an effort to make fraud harder, we need to provide more details, such as our address and the additional three digits on the back of the card. To compensate the cost of fraud

prevention and the losses from fraud, merchants are burdened higher fees for these types of payments.

Unlike many forms of digital money that by law require personal identification, Cash money is an anonymous bearer asset which does not record or contain identity information.

If we want to open an account with a bank, or other trusted third party, regulations require that the third party can identify us.

Therefore, we should provide information with independent evidence to back that up among a photo ID to match our name and face, or we can supply a utility bill or other official registered communication from a government department to validate our address.

Identity information also collected and used not just when opening accounts but also for validation purposes when some electronic payments are made when we pay online using a credit or debit card, we need to provide our name and ID as a first gateway against roguery.

There is exemption to this identity rule, there are some cards with stored value that don't require identity, for example low-limit cash cards used to pay salaries in some countries or public transport cards in many countries.

The payments do not need to be linked to identity where cash money proves this.

Many of credit card information is repeatedly stolen along with personally identifying information like name, addresses, etc. which creates more wages costs.

- There are many questions, First, is it a main right to be able to make payments which are shielded from the eyes of the state governments?
- Second, as like they do with physical cash, should people have the ability to make anonymous digital payments?
- Third, what range should our financial transactions be anonymous or private at the very least? and if any exist, what are the logical limits to that privacy?
- Fourth, Should the private sector or the public sector supply the means

for electronic payments and financial privacy?

- Fifth, should a state be able to block an individual's ability to make digital payments, and with what limits?
- Sixth, how can we work in financial privacy with the prevention of support for illegal activities?

Inevitably, the base questions around financial privacy are raised when understanding the innovation that game-changing which is *Cryptocurrencies*. (Lewis, 2018). (Franco, 2015) (Responsible, 2019)

C. Cryptocurrency:

A cryptocurrency is new form of digital currency that uses cryptography to verify transactions and secure and to manage and control the creation of new currency units.

We can digitally transfer traditional money such as the US dollar, but this is not the same as how cryptocurrencies work.

The technology that supports cryptocurrencies sets them different; once broadly recognized, we will be able to use them to pay for products online in the same manner that we do with traditional currencies.

The problem is that the globe's current monetary systems are riddled with defects.

Some instances are as follows:

- Payment methods like wire transfers and credit cards are outdated.
- A group of intermediaries, such as banks and even brokers, frequently deduct a fee from the transaction, causing it to be delayed and costly.
- Globally, the gap between rich and poor is expanding.
- Around 3 billion individuals over the world are unbanked or underbanked, accounting for over half of the world's population.

Cryptocurrency's purpose is to resolve these problems. (Franco, 2015)

1. Background of Cryptocurrency:

We can define cryptocurrencies as follows: “A cryptocurrency is a digital medium of exchange that relies on a decentralized network, that facilitates a peer-to-peer exchange of transactions secured by public-key cryptography”.

Cryptocurrencies are a new and cutting-edge digital currency which aim to empower a global monetary system aim for replacing or even to substitute national constitutional fiat , and also look forward to dominate the modern monetary or financial systems with a sole transferable asset that is traded in the globe and has a global exchangeable valuation.

Cryptocurrencies have a variety of characteristics, which include:

- It has a peer-to-peer data transfer and connection mechanism; thus, it is naturally decentralized.
- The total number or supply of coins that can be minted or supplied is finite and fixed. (Which cause the price and availability to be influenced).
- A public ledger (in other words Blockchain) or often called database , is used to preserve records of transactions and coin transfers, preventing double spending.
- Include a computational mechanism, sometimes known as "Proof of Work," that verifies the blockchain's integrity and the transaction data included in subsequent blocks.

Mostly, the network's computing power is provided by "Miners."

Because most cryptocurrencies have a finite number of coins in circulation, the algorithm's complexity and computational resource requirements scale with the number of coins mined.

All these cryptocurrencies have their own unique characteristics. However, the disparities in technological implementations and procedures are not important to the subject of this thesis.

To show how cryptocurrencies work and how they're used, I'll use Bitcoin as an example, which we can consider as the "standard" of cryptocurrencies, and

altcoins normally share most of their similarities with the Bitcoin.

Bitcoin is an open source, global, and decentralized peer-to-peer network that allows the transmission of money in the desired currency.

It does so on a global scale and with the use of a key pair (whether public or private), with the public address operating in the same way as an IBAN number or an email address may be shared with a specific person or even business for commerce purposes.

The decentralized nature of the Bitcoin network is critical since the money only exists in the mind of the user and no third-party incursion is permitted to affect the network. That means that all network transactions must go through a special process of verification using digital signatures, and all transactions must be publicly broadcast and kept in a public ledger known as "Blockchain."

Because the system keeps track of who owns the virtual currency and all transactions are examined and confirmed, this approach removes the problem of double spending.

Following that, these transactions are carried out through the mining process, in which users donate their computing power to solve a computational problem (a "Proof of Work") in order to validate the legitimacy of a transaction and encrypt transactions within the block chain.

If they are the first to mine a new block, those that help contribute to the Bitcoin network by mining are rewarded with Bitcoins.

The proof of work is growing progressively, and it is becoming harder as the overall number of Bitcoins available for circulation is capped at 21 million, with the goal of declining behavior as the cap approaches.

Bitcoin is one of the most well-known instances of cryptocurrency, but newer coins are being introduced to the market on a daily basis by Initial Coin Offerings (ICOs).

These offerings of coins can be thought of like a kick starter projects designed for new coins that may have a different circulation system, algorithm, or proof of work.

The core ideas outlined above, on the other hand, apply to the majority of

cryptocurrencies.

From a societal standpoint and based on Satoshi Nakamoto's ideas in his whitepaper "Bitcoin: A Peer-to-Peer Electronic Cash System", the motivation was to start implementing a system leads to decentralization of authorities (Banks), the ability to conduct peer-to-peer based transactions with a public databases record and is to get off the concerns of frauds.

However, to implement the avoidance of third party interfering which is considered to be the basic principle behind cryptocurrencies, the problem of regulations becomes more unclear, as it would be incompatible with the fundamental tenets of most od cryptocurrencies and other online or virtual communities, which value anonymity and decentralization. (Responsible, 2018), (Danial, 2019), (Laurence, 2017)

2. Basics of Cryptocurrencies:

It is well understandable how our daily, government-issued cash is stored in financial institutions like banks. And that we will all need an automated teller machine or an online bank account in order to withdraw money or initiate transfer to others.

With bitcoins, we can eliminate completely financial institutions such as banks and centralized intermediaries. This is due to the blockchain technology the cryptocurrencies rely on, a decentralized process not controlled by a single entity.

3. Cryptocurrencies History:

Bitcoin was the original cryptocurrency, and we've heard of it more than anything else in the crypto sector; it was Satoshi Nakamoto's first blockchain product.

Satoshi Nakamoto first proposed Bitcoin in the year of 2008, describing it as a "pure peer-to-peer form" electronic money. Years before the initial introduction of Bitcoin, many attempts at developing cryptocurrencies were made, but Bitcoin was the first successful cryptocurrency.

Mining is the technique by which Bitcoin and other cryptocurrencies are created. Mining bitcoins requires strong computers to solve complex issues, which is

not the case with mining minerals.

Before 2011 we could only hear of one cryptocurrency which was Bitcoin, after that date it was decided to find other coins to avoid Bitcoin weaknesses, commonly introduced as altcoins. And that was to enhance Bitcoin's design flaws in areas such as security, speed, privacy, and more.

However, there are nearly more than two thousand cryptocurrencies accessible for the time being and the mentioned figure is growing. (Quest, 2018)

Key crypto benefits:

To focus more on the advantages of cryptocurrencies against the normal fiat currency (or any other type of decentralized money), below are the benefits that prove the superiority of cryptocurrency:

Reducing corruption:

“With great power comes great responsibility, but when we give a ton of power to only one person or entity, the chances of their abusing that power increase” Lord Acton (British politician at the 19th-century) said: “Power tends to corrupt, and absolute power corrupts absolutely.”

The key idea behind the cryptocurrency aim to distribute power among all the members of the network or among many people to resolve the issue of great power. (Danial, 2019)

Eliminating extreme money printing:

Central banks are institutions run by the government, and when governments confront major economic problems, central banks can simply print money, which is referred to as "quantitative easing."

A government may be able to devalue its currency or restructure its debt in order to avoid default. By printing additional money, but this is the equivalent of tying a ribbon around a broken limb.

It fixes the problem sometimes, but the harmful consequences might outweigh the initial dilemma. To illustrate more, when too much money printed in a country without a balance in the World Bank, such as Iran or Venezuela, the value of its currency plummets to the point where citizens are unable to buy basic products

and fundamental needs, and the money becomes worthless.

The majority of cryptocurrencies, on the other hand, have a finite number of accessible coins.

There is no right for a central authority to decide to add more coins or increase them in case all coins were in circulation. (Danial, 2019)

Giving people charge of their own money:

We are effectively handing over all authority to central banks and the government when we use traditional cash money.

It's great that investors have faith in their country, but his government may easily freeze his bank account and refuse him access to his funds at any time. In the United States, for example, if an investor owns a corporation and does not have a formal will, the government has the authority to seize all of his assets when he dies. Some countries, like as India, can simply revoke bank notes, as it did in 2016.

We, and only we, have access to our funds when we use cryptocurrencies. (Danial, 2019)

Cutting out the middleman:

A middleman, such as a financial institution like banks, calculate percentage every time we make a traditional cash money transfer. In the case of cryptocurrencies, all network participants are blockchain intermediary; their indemnification is very different from the financial institutions formulation that's why we cannot compare them. (Danial, 2019)

Serving the unbanked:

A large number of people around globally lack the ability to access bank accounts or any payment system. Anyone with a phone in his hand can initiate a payment any where in the world thanks to the cryptocurrencies, and by that the digital commerce will expand dramatically. (Danial, 2019)

Cryptocurrency and blockchain myths:

A lot of misconceptions about the cryptocurrency spread during the 2017 Bitcoin noise.

The cryptocurrency price reductions that followed the spike were influenced

by these legends. It's vital to keep in mind that the cryptocurrency market, as well as blockchain technology and its offshoots, are still in their infancy, and things are constantly evolving.

Some of the most typical misunderstandings are listed below:

Cryptocurrencies are good only for criminals:

The central government cannot control the cryptocurrencies which rely on blockchain since it is considered a decentralized technology. The mentioned characteristics help to consider cryptocurrency appealing to offenders. Citizens who follow the law, on the other hand, can benefit by them.

For example, if investors have lost faith in their local bank due to corruption and political unrest in their country, they can use cryptocurrencies to save their assets.

However, one of the primary benefits of various cryptocurrencies is anonymity, which means that the investor's name is not revealed when they make transactions. (Danial, 2019)

We can make anonymous transactions using all cryptocurrencies:

We can make unknown transactions using all cryptocurrencies, The majority of people associate cryptocurrencies with anonymity.

Bitcoin and other cryptocurrencies, on the other hand, do not have any anonymity because all transactions are done on a public blockchain.

However, certain cryptocurrencies, such as Monero, value anonymity, which means that no one can see the amount, source, or destination of transactions. (Danial, 2019)

The only application of blockchain is Bitcoin:

This is far from truth, cryptocurrencies like Bitcoin and other are considered a small part of the Blockchain technology.

It is believed that the Bitcoin was founded by Satoshi as an example to present the Block Chain technology; nevertheless, blockchain technology can be applied to almost every business or industry in the world. (Danial, 2019)

All blockchain activity is private:

Block Chain technology is not only open for a specific or private users, it is a public network available to all type of general users.

Though some crypto organizations construct their own private blockchains for usage only by company partners and workers, the blockchains that underpin well-known cryptocurrencies like Bitcoin are open to the public; anybody with a personal computer may view live transactions.

For example, Bitcoin transaction data can be monitored in real time at *www.blockchain.com*. (Danial, 2019)

Risks of cryptocurrencies:

Cryptocurrencies are not risk free just like anything else. Their risks must be comprehended whether we invested in them, traded them, or even hold onto them for future.

The instability and week regulations considered to be the most significant hazards associated with cryptocurrencies. Volatility reached new heights in 2017, when majority of cryptocurrencies prices plummeted beyond 1,000 percent.

Nonetheless, the cryptocurrency chaos died down after 2017, and the price fluctuations became more predictable, following the same patterns of financial assets such as stocks and bonds. The unpleasant thing is that both exposure to regulations and a lack of regulation can result in risk events for cryptocurrency investors. (Danial, 2019), (Quest, 2018)

4. Transactions:

To understand cryptocurrencies' transactions easier and faster, we must spotlight on crypto gadgets.

Some of the principles include wallets of cryptocurrency and exchanges:

Wallets:

Crypto wallet are essentials to begin our transactions in cryptocurrencies.

Some cryptocurrency wallets, which hold our purchased cryptos, are similar to digital payment services like Apple Pay and PayPal, but generally, they're different from traditional wallets and come in different formats and levels of security.

We must get the most secure type of wallet, such as hardware or paper

wallets, instead of using the convenient online ones. (Laurence, 2017), (Danial, 2019)

Exchanges:

We will be ready to go crypto shopping after we get a crypto wallet, and one of the best destinations is a cryptocurrency exchange.

The online web services are the place where we can buy cryptocurrencies by our traditional money, store our cryptocurrencies, or even exchange different types of cryptocurrencies.

Many exchanges have been risky to hacking attacks and scams in the past, so storing our cryptocurrencies on an exchange is considered high risk.

The best step is moving our new digital assets to our personal, secure wallet when we are done with our transactions.

Exchanges present in different forms and shapes:

A first type of crypto exchange act as a centralized middleman, like traditional stock exchanges, that is something crypto fan believe is a slap in the face of the cryptocurrency market which is seeking to remove a centralized middleman.

A second type of crypto exchange is supplying a service decentralized where buyers and sellers come together and transact in a peer-to-peer (P2P) manner.

A third type is called hybrid security, it merges the benefits of the other two types to create more secure experience and a better for investors. (Laurence, 2017), (Danial, 2019)

D. Statement of the Problem

Although cryptocurrencies have become well established and are accepted as a means of payment, the use of such currencies is not without its problems and regulation challenges.

While there is much written about cryptocurrencies in the press and media, there is less scholarly research on the impact of cryptocurrencies on monetary systems.

The goal of this study is to see how the growth of cryptocurrencies would

affect the monetary system, specifically the fiat currency and monetary policy.

E. Importance of Research:

This thesis examines how the growth and spread of cryptocurrencies affect the monetary system, we will start with examining the impact on money supply and demand.

More so, this study is of utmost significance to bank owners, central banks' heads and official regulating bodies in enriching the information related to the impact the new cryptocurrencies have on financial bodies and will help the regulatory bodies to take more serious actions to regulate the trading of cryptocurrencies, control it or benefit from the previous mistakes and take the appropriate steps to evaluate them based on an accredited system.

The study will go in depth of the historical values of the Euro as a fiat currency and Bitcoin as the main and most tradable cryptocurrency.

And by checking if there is a relationship between the said values, we can analyze the difference in value and if there is a direct relationship in the continuous increase or decrease in the cryptocurrencies value.

F. Hypothesis of Research.

H0: There is no statistically significant relationship between the price of the cryptocurrency and the price of dollar.

H0: There is no statistically significant relationship between the price of the cryptocurrency and the price of euro.

H0: There is no statistically significant relationship between the price of the cryptocurrency and the price of gold.

G. Aims of Research:

In order to address hypothesis of research, I will do the following:

- Study the characteristics of cryptocurrencies and comparing it with fiat currency and discusses what regulatory frameworks are in place for cryptocurrencies in the world.

- Explains the meaning of cryptocurrencies and whether it is considered 'money' and therefore a currency or legal tender.
- Study the growth and spread of cryptocurrencies affect the monetary system, we will start with examining the impact on money supply and demand.
- Explore the relationship between cryptocurrencies, money supply in the monetary system, and studying the effects of cryptocurrencies on the changing amount of fiat currency.

II. BLOCKCHAIN TECHNOLOGY:

A. Introduction:

Blockchain is a system of collects information together in groups in a way that makes it complex or impossible to hack, change, or deception the system. A blockchain is basically a digital ledger of transactions that is distributed and duplicated across the whole network of computer systems on the blockchain.

With the help of public key cryptography, blockchain technology ensures the removal of the double spend problem, safe code is provided to clients (as classified password) and all other agents shared with a public key.

The transaction is initiated when a new owner sends a public key to the original owner, after signing the transaction digitally the transaction is considered to be confirmed.

The blockchain stores public keys, which are cryptographic addresses. Every currency has an address, and a transaction in the crypto economy is nothing more than a transfer of coins from one address to another. The blockchain's most astonishing feature is that public keys are not linked to the identity of the real owner.

The transactions on Blockchain are available publicly but the owner identifications are not disclosed to anyone. (Pilkington, 2016)

The majority of cryptocurrencies rely on a technology known as Blockchain; however, some cryptocurrencies use a Distributed Ledger Technology (DLT) system with a different methodology.

The name Blockchain comes from the fact that it is thought to be a linked data blocks, as Figure 1 shows below.

This structure has records in each block. The list of cryptocurrency records is made up of transaction records that reflect all activities carried out using the mentioned cryptocurrency.

The green block which identified as genesis block is the initial block in any Blockchain, and the next blocks will describe its properties after being programmed.

Figure 2.1 shows also the blue blocks which are the standard blocks reflect the record number growth and the passing of time.

Normally, one block only can follow another block, but a split can occur if two blocks are linked at the same time, as seen in Figure 2.1 with the red block.

However, based on a difficulty criterion, Blockchain will halt one of the new chains. (Hollekim Eirik R.,2018)

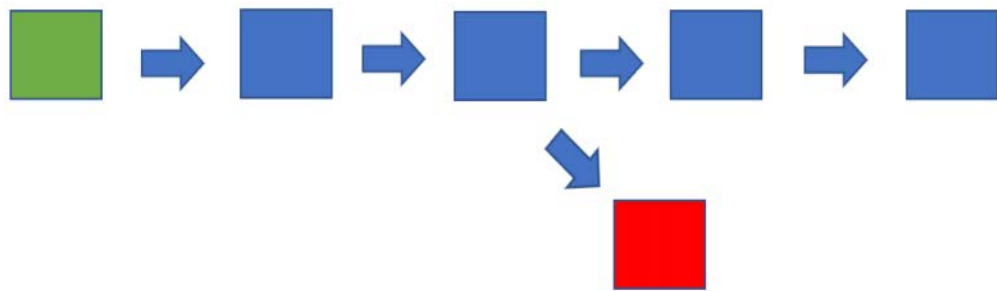


Figure 1 Blockchain Structure (Hollekim Eirik R.,2018)

The blockchain is made up of a number of different parties. The term "blockchain" was introduced by Satoshi Nakamoto. (Nakamoto in 2008). In the paper, a Bitcoin payment mechanism was proposed in which no trust between parties is necessary.

Cryptographic proofs replaced trusted third parties (such as banks payments).

The proof of work system was used to create these proofs. In the Bitcoin blockchain, a block is a data package made up of the hash of the previous block., list of transactions and cryptographic nonce (A nonce is a random or semi-random number that is generated for a particular use, typically related to information technology and cryptographic communication).

The cryptographic nonce must be found in such a way that the block's hash meets some requirement. Finding the perfect nonce is a difficult task. Proof is called proof-of-work because it necessitates some computing work.

As seen in Figure 2.2, the blocks are joined together.

As a result, modifying any block in the chain without also changing all

the one to build on. (Nakamoto, 2008)

When a cryptocurrency transaction takes place, It's written down in a shared database.

Since the transactions are coded, no one can reveal who is doing them, but the unique addresses and amounts moved between the unidentified accounts will be detected. (Peters and Panayi, 2015).

Directly, miners verify the transaction for this payment to be done. Individuals that verify transactions and participate to blockchain by adding additional blocks are identified as miners. Miners, make sure that presenter is in position of the money he is transferring. Miners get compensated in cryptocurrency. When Bitcoin originally started, the incentive was fifty Bitcoin for every block contributed to network, but the value is now half every 210,000 blocks. The reward was 12.5 BTC in April 2018, and by this parameter the total supply of Bitcoin at 21 million. Which mean by reaching 2040 there will be no blocks left to mine for. (Nakamoto, 2008)

1. Benefits of Blockchain:

Blockchain technology has Several advantages. The most notable feature is its decentralized design, which makes it less susceptible to manipulation and corruption. (Fanning and Centers, 2016)

This is in stark contrast to the currency market, where a small number of financial institution like huge commercial banks and central banks dominate the whole market. As a result, the system is vulnerable to a single point of failure because it relies on faith in the central authorities.

The Forex crisis in 2015 is an example of such a failure, in which a few large banks and financial organizations collaborated to set rates of foreign currencies to the harm of customers and enterprises. (Baron et al, 2015)

One explanation for these institutions' growing strength and ability to engage in manipulative schemes, according to Ju et al (2016), is that they act as mediators for the routing of funds and their repositories.

Liquidity and financial assets are under their control. When a system is decentralized, however, probability of manipulation becomes more unlikely, which

clearly demonstrates a great advantage to blockchains in terms to lower the dominance of financial institutions'.

Another significant advantage of blockchain transactions is that they are faster and less expensive than traditional fiat currency transactions. (Responsible A. et al, 2019)

PayPal, for example, earns no more than 3% on currency transfers and trades, whereas the fees associated with cryptocurrencies are a small fraction of those associated with PayPal., ranging between 0.1% to 0.25%. (Underwood, 2016)

However, the reduced prices are mainly because of the lack of regulatory standardization on the transactions. (Yoo, 2017)

In the future, it is expected that those fees will increase in case of imposition of regulations.

Swan (2017) agreed with this benefit of blockchain technology, concluding that using the technology of blockchain increasingly will assist to minimize foundation costs by requiring fewer people and resulting in lower upfront expenditures and repairs.

Blockchain technology is ideal for facilitating effective payment systems in developing countries because traditional payment systems are both underdeveloped and untrustworthy.

Blockchain's latest advances show that it may play an important part in future payment systems. (Basis), for example, is a cryptocurrency that allows users to safely link their tokens to a bundle of products or assets.

Despite the fact that it has not yet attained the same market size and reach as its forerunners (such as Bitcoin), this currency has a steadier pricing. It might be connected to the US Dollar and upgrade the peg to a consumer price index to make (Basis) like money from a standard central bank (CPI).

This might be done by adjusting the supply of Basis tokens in response to changes in the Basis-US Dollar exchange rate.

By implementing a decentralized protocol algorithm. This enables governments to use cryptocurrencies to conduct monetary policy in almost the same

method that central banks around the world do

Because it does not require direct human judgment and action, it is sometimes known as an algorithmic central bank. (Al-Naji et al, 2018)

Ripple, a system based on money order services, is a good example.

TenX is a Singapore based firm that is collaborating with MasterCard and Visa to develop a new system that allows buyers to pay sellers using company check cards. (Yoo, 2017).

The Federal Reserve has investigated the feasibility of using blockchain to process interbank payments.

When a corporation, on the other hand, converts the virtual currency into dollars at the end.

It is no longer a question of whether authorities must approve cryptocurrency transactions it is if retailers must accept cryptocurrency.

One of the most significant advantages of blockchain is that payments are validated 24 hours a day, seven days a week. This is in stark contrast to the traditional payment method, which only clears a few times each day and does not include public holidays or weekends.

According to Pieters and Vivanco (2017), certain governments have implemented rapid payment systems for a variety of national currencies, this system is considered to be quicker in processing transactions than the technology provided by the Block Chain.

TARGET Instant Payment Settlement, which appeared and launched in Europe 2018, is an example of this. It enables businesses and people to transfer payments in seconds, regardless of their bank's office hours.

It works as a continuous market for entities who want to use central bank money; the sole requirement is that the entity meets the TARGET eligibility requirements and makes payments in central bank money. (Responsible A. et al, 2019)

1. Types of blockchains:

Two types of blockchain networks can be distinguished based on how they are run and who can join them:

- Public blockchains
- Private blockchains
- A: Public blockchains:

Bitcoin was the first blockchain implementation, and it is a public blockchain, which means that joining a public network is completely free and open. Anyone with a computer capable of running specialized blockchain software can join and participate in the network.

Typically, essential software is open source and freely available.

Although Bitcoin was the first and most extensively utilized application of public blockchains, more than two thousand additional cryptocurrencies have been launched since then and are still operating. (Mulár, 2018).

- B: Private blockchains:

A private blockchain is one that runs within a network made up entirely of licensed nodes.

This restriction is usually implemented by using a distinct genesis block, which is the chain's initial block.

Because there is no common sub chain between two nodes with distinct genesis blocks, their chains are completely different, and they will not accept the chain of the other node.

Private blockchains are frequently used as testing instances for other blockchains.

Before deploying coins with smart contracts to the public chain, private instances are utilized to test them.

Private blockchains are portrayed by blockchain communities as distributed databases with complete histories that cannot be altered.

Because the entity owns 100% of the nodes, private blockchains make little or no sense in a completely private environment controlled by only one entity. (Narayanan, 2018)

B. Cryptocurrency:

1. Definition of Cryptocurrencies:

To determine a definition of cryptocurrencies is no easy task.

Such a blockchain, cryptocurrencies have become a buzzword to indicate to a wide array of technological developments that use a technique better known as cryptography.

In other terms, the cryptography process is the technique of information protection by converting it to a cipher text that can only be interpreted with a secret key.

Cryptocurrencies are secured via this technique using a skillful system of public and private digital keys.

Cryptocurrency is independent and does not depend on any central authority, by using blockchain decentralized network this independence is achieved for storing transactions.

According to (Lansky, 2018), cryptocurrency is a system that must meet all following conditions:

- The system of cryptocurrency keeps a notes of cryptocurrency units and their monarchy.
- The system of cryptocurrency does not entail a central authority distributed achieve consensus on its state.
- The cryptocurrency system determines possibility of creating new units of cryptocurrency.
- Exclusively, the monarchy of bitcoin units may be demonstrated.
- If it is able to produce new cryptocurrency units, the system must describe the circumstances around their creation as well as how to

determine the monarchy of these new units.

- At the same time, if two different instructions for changing the monarchy of the same cryptographic units entered, the system performs one of them at most.
- The cryptocurrency system permits transactions in which the monarchy of cryptographic units is modified; nevertheless, only an entity that can prove the current possession of these units can issue a transaction statement.

2. The Origin of Cryptocurrencies:

Cryptocurrencies began to gain popularity in the aftermath of the financial crisis in 2007-2008. This crisis has sparked debate on the traditional perspective of money and its capitalistic structure, Banks and financial organizations, in particular, have important roles to play.

As a result, for the said, a new way of conducting business emerged, challenging the market economy driven by profit while being socially administered as a public resource for the benefit of all. The financial crisis in 2009 led the appearance of Bitcoin which was not an accident for sure. (Halaburda, 2016).

Bitcoin had a poor start, with only a tiny group of financial experts discussing the new technology. Bitcoin films debuted in 2014, and blockchain conferences debuted in 2015.

The following year, books on blockchain were produced, and as a result, the popularity of Bitcoin and blockchain grew in parallel with the price of Bitcoin. (Bheemaiah, 2017).

The popularity of Bitcoin, on the other hand, created a wave of alternative digital currencies, with more than 2000 cryptocurrencies listed on CoinMarketCap, a website that tracks their prices. (CoinMarketCap, 2018)

3. Types of Cryptocurrencies:

There are various sorts of cryptocurrencies and in order to categorize them. To show the diversity of the cryptocurrency market, we divide them into three

divisions, as suggested by an essay on NASDAQ's official website.: (Goodboy, 2018)

- Transactional cryptocurrencies
- Platform cryptocurrencies
- Utility cryptocurrencies

Transactional cryptocurrencies: Bitcoin and all other cryptocurrencies that offer improvements to the Bitcoin protocols, such as Litecoin, are transactional cryptocurrencies.

Due to the fact that they are substitute coins to Bitcoin, these transactional cryptocurrencies are known as altcoins.

Platform cryptocurrencies

Can be defined as cryptocurrencies that operate on a platform for software development and can include smart contract functionality. A platform cryptocurrency like Ethereum is an example.

Utility cryptocurrencies are cryptocurrencies created to perform a certain task. Ripple is the greatest example of a cryptocurrency that serves a practical purpose. because its goal is to make fiat money transfers more efficient and affordable.

Another example of utility cryptocurrencies is TRON, which can be used to communicate for relevant data on TRON, an information database server built on the Ethereum platform.

TRON is a cryptocurrency token that can be used to share for information on TRON. (TRON.NETWORK, 2018).

Cryptocurrencies, as per the European Central Bank (ECB) classification, neither do they have legal standing, nor do they have legal tender because they are not widely used to exchange value and therefore do not have official legal tender. As a result, cryptocurrencies cannot be considered money. Cryptocurrencies, on the other hand, can be used as contractual money when a buyer and seller agree to accept a specific virtual currency as a form of payment. (ECB, 2015 as cited in Bheemaiah,

2017).

Cryptocurrencies, because of their blockchain technology, have aspects that are unique to the economy. In the course of researching cryptocurrencies, scalability and speed of operation are frequently mentioned as areas where several of them have demonstrated shortcomings.

In addition to initial coin offerings, volatility and correlation across cryptocurrencies are important subjects to discuss (ICOs). ICOs are a type of fundraising in which investors are given cryptocurrencies or crypto tokens in exchange for their money. **Figure 2.3** below which was published by the International Monetary Fund (IMF) (He et al., 2016) illustrates the scope of cryptocurrencies in contrast to digital money and virtual currency, two terms frequently used interchangeably by the general public.

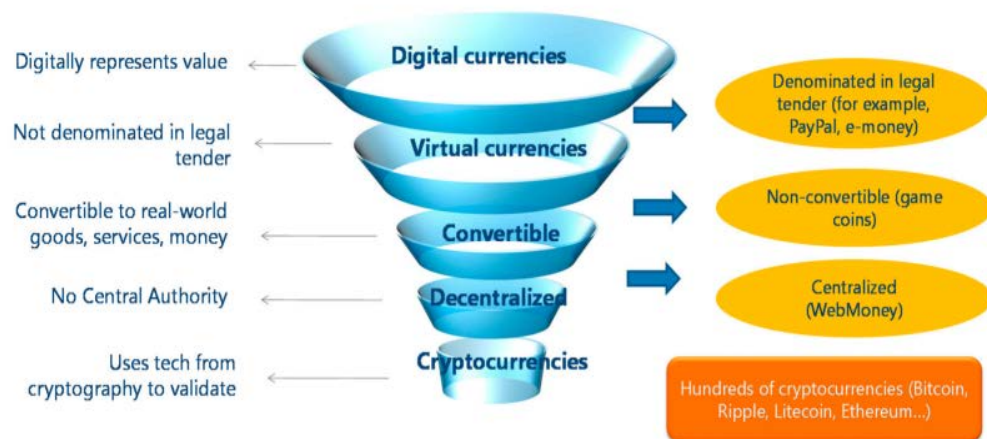


Figure 3 Field of Digital Currency Classification (He et al., 2016)

4. Concept of Cryptocurrencies:

We'll give some insight on the cryptocurrency (or coin; we'll use both terms interchangeably later) concept. Particularly the line between cryptocurrencies and other concepts that should be distinguished from them. In practice, the term cryptocurrency is often error used in a very broad sense.

As will be shown later, it should be making a distinction among both coins and crypto securities.

- A. Cryptocurrencies vs Tokens:

Cryptocurrencies should indeed be identified from encrypted "tokens," which serve a different purpose than exchange mediation. Tokens are provided as part of a crowd sale. to raise funding for a certain project or business.

They give the lead to a great group of crypto assets (i.e. digital assets stored on a distributed ledger and protected by cryptography) that include some form of claim against them (assets, cash flows, future commodities or services, residual value, etc.) as a result of blockchain technology.

Some tokens are referred to as "investment tokens" or "security tokens" because they resemble traditional instruments like stocks or bonds.

Other tokens, referred to as "utility tokens," give their owners access to certain products or services. We can use them to obtain specific services or products, they are not, however, an exchange tool because they are often exclusively usable on the token platform. (Responsible A. et al, 2019)

- B. Cryptocurrencies – Cryptosecurities:

A term that has recently been used to describe a concept of "Cryptosecurities" should also be differentiated from the definition of "Cryptocurrencies".

Blockchain technology is used for securities and regular shares registering, issuing, and transferred, ensuring that a company's capitalization table is always precise, current, and accurate. Because cryptography would secure this technological process, these securities have been characterized as cryptosecurities.

The concept of cryptocurrencies and cryptosecurities are linked by the fact that they both utilize blockchain technology. (Responsible A. et al, 2019)

- Cryptocurrencies – Blockchain:

In recent years, cryptocurrencies and blockchain have become popular subjects.

While the two notions are frequently used together in the same phrase and are plainly related, one should never confuse the two.

Blockchain is a technology distributed as the base for the crypto market and considered to be a backbone for it. It is the technology that underpins the current

plethora of cryptocurrencies.

Its scope and sphere of use, however, are not restricted to that.

As previously said, blockchain may be used in a variety of economic sectors and has a wide range of applications; nevertheless, it is critical to distinguish the specialized utilization of blockchain technology between such application fields and cryptocurrencies.

When it comes to cryptocurrencies, though, regulators do not need to be concerned about suffocating innovation. (Responsible A. et al, 2019)

Players of cryptocurrency:

The bitcoin market is a new stage on which several players each perform a certain involvement.

We will examine the important actors to clarify how the cryptocurrency market functions in further detail, without aiming to be encyclopedic.

- Cryptocurrency users:

Cryptocurrency user is the first and very important player, it is a natural person or legal entity who obtains coins to use them to:

- Purchase real or virtual merchandise or services,
- Putting them to work as an investment.
- Initiate P2P payments,

A user of cryptocurrency can collect money in many ways:

- He could purchase the coins using fiat money or another cryptocurrency on a cryptocurrency exchange.
- He can purchase the coins from another bitcoin user directly through a trading site; this type of transaction is known as a P2P exchange.
- He can mine a new coin if the cryptocurrency is based on a PoW consensus method. (i.e., by resolving a "cryptographic puzzle" and paying for a new coin, help validate transactions).
- In some circumstances, he can purchase his coins directly from the

promoter for either a free ICO or a crowd.

- If someone sells services or products for cryptocurrencies, they can get coins in return.
- He may receive bitcoins as a gift from another bitcoin user. (Responsible A. et al, 2019)
- Miners:

The miner is a second player who solve cryptographic puzzles (via software) to add transactions to the ledger in the hope of getting coins as a reward.

The blockchains problem is that mining uses up computer resources that not related to records directly. When the blockchain pose the puzzle, many miners work on solving it.

The puzzle can be solved by a sequence of computations, anyone can find an answer of the puzzle so long as he is ready to spend enough computing resources.

As results, if there are one thousand miners, the computational resources like electricity to run computations used by 999 miners will be consumed.

When the value of virtual currency increase, the number of miners will increase significantly.

The mean time required to solve the puzzle is 10 minutes, and the huge amount of electricity will be wasted.

To safeguard the accuracy of the blockchain, a certain number of miners must be involved whether electricity is consumed is related to the number of miners required to maintain accuracy.

A miner helps the network by validating transactions and is compensated with newly mined coins via decentralized new issuance. It can be users of cryptocurrencies or parties who mine coins to sell for other cryptocurrencies or paper currency. (Like Euro or US dollar). (Yano et al, 2020) (ECB, 2015)

- Cryptocurrency exchanges:

"Cryptocurrency exchanges" is the third key players in Cryptocurrencies, they are entities or persons who offer exchange services to cryptocurrency users against

payment of a certain fee, commonly.

Cryptocurrency exchanges allow to cryptocurrency users to buy new coins with fiat currency or to sell their coins for fiat currency.

Exchanges operations allow cryptocurrency users to convert bitcoins (and other cryptocurrencies) to fiat money.

Some exchanges allow the transmutation of different cryptocurrencies, such as between bitcoin and other altcoins.

Exchanges accept various types of orders such as market orders or limit orders.

The orders are put in an order book that is run through an order matching algorithm.

Exchanges collect fees from both parties in the trade, most exchanges run constantly on a 24/7 timetable.

- Typically, they function as a type of exchange office. The following are some well-known cryptocurrency exchanges:
- Bitfinex “<https://www.bitfinex.com>”
- HitBTC “<https://hitbtc.com>”
- Kraken “<https://www.kraken.com>”
- And Coinbase GDAX “<https://www.coinbase.com>”

Some cryptocurrency exchanges are pure exchanges, which accept payments solely in other cryptocurrencies, notably Bitcoin (for example, Binance) (<https://www.binance.com>). Others, on the other hand, collect money in paper currencies, such as the United States dollar.

Even so, a number of cryptocurrency exchanges restrict the number of coins that can be purchased by a single customer. In addition, it's important to note that several bitcoin exchanges also function as guardianship wallets. (for example Bitfinex).

In general, cryptocurrency exchanges provide its consumers with a variety of

payment methods, including credit cards, remittance, PayPal transactions, or other coins.

Some cryptocurrency exchanges offer merchants who accept cryptocurrency payments with conversion services, as well as time series data and statistics on the cryptocurrency market, such as price and market movement and volatility of the coins transacted. (Franco, 2015), (Responsible A. et al, 2019)

- Trading platforms:

“Trading platforms” play an important function in the exchange of cryptocurrencies, especially, allow cryptocurrency users to buy coins with cash.

Trading platforms are market that make together different cryptocurrency users that are either looking to buy or sell coins, providing them with a platform on which they can directly trade with each other (i.e., an “eBay” Trading platform).

Sometimes referred to Trading platforms as “P2P exchanges”.

They differ from cryptocurrency exchanges in several ways:

Firstly, they do not sell or buy coins themselves.

Second, they are entirely controlled by software, implying that there is no single point of authority and that they are not managed by a single entity or organization which supervise and executes transactions.

A buyer and a seller linked to the trading venues to enable them or even to make a transaction in person or on over the net, frequently in cash. LocalBitcoins (<https://localbitcoins.com>) is an example of a Bitcoin trading platform.

Trading View (www.tradingview.com), one of the most advanced trading platforms currently offered, also includes a social component that allows investors and traders of all kinds to connect and exchange thoughts, inquiries, and thoughts.

- Wallet providers:

Cryptocurrency wallet providers are those entities or any natural or legal person that provides private cryptographic key protection services on behalf of its clients for the possession, holding, storage, and transferring coins.

Whereas wallet holds cryptographic keys for a cryptocurrency user’s, a

cryptocurrency wallet provider exemplary translates a user's transaction history of cryptocurrency into an easily readable format, which looks like a regular bank account.

There are various types of cryptocurrency wallet providers:

- Sponsor crypto wallet providers who keep a cryptocurrency user's cryptographic keys in their possession (e.g., Coinbase).
- Hardware crypto wallet providers (e.g., Ledger Wallet) that give cryptocurrency customers with hardware solutions for discreetly storing their cryptographic keys.
- Cryptocurrency wallet Applications providers who supply customers with online apps to connect to the network, transfer and accept currencies, and locally preserve their encryption keys. (Jaxx is an example of the said apps); (Responsible A. et al, 2019)
- Coin creators:

Coin creators are entities or individuals who were able to own an up to date cryptocurrency's technical basis and established the first regulations for its use.

The identity of the coin's creator (in certain circumstances) is acknowledged (e.g., "Ripple, Litecoin, Cardano"). However, frequently their identity is set to be unknown (eg. Bitcoin, Monero).

Some continue to contribute to the development and maintenance of the cryptocurrency's code and underlying algorithm, while others simply vanish (e.g., Bitcoin). (ECB, 2015), (Responsible A. et al, 2019)

- Coin offerors:

The coin offerors are last group of key players to be featured.

Coin offerors are individuals or entities that display coins to cryptocurrency users over the initial release of coin, either free of charge under a special (sign-up) program, (e.g. "Stellar") or against payment through a crowd sale, usually to boost its initial popularity.

A coin offeror may be the same character who created the coin, or a different

individual or entities. These coin offerors present the coins to cryptocurrency users are created or pre mined prior to the coin's official release.

After the release, cryptocurrency users can still generate more coins; coins that are shared or spread out this way are either partially or entirely pre-mined or pre-created.

In the final situation, the coin vendor frequently keeps a sizable portion of the coins (e.g. same situation in Stellar).

None of the coins have been pre-mined or have had their whole quantity pre-created, and none of the coins have a specific coin offeror. (Responsible A. et al, 2019)

5. Elements of Cryptocurrencies:

- **Nodes:**

A node is an electronic instrument that performs bookkeeping in the blockchain network, allowing the whole thing to be decentralized. As long as the device is linked to the Internet and has access to the blockchain network, it can be a phone, computer, or even a printer.

Users must download and install the necessary software to turn their PC into a node.

The free program will instantly link up to several network branches "nodes" upon installation.

Each branching in the network communicates directly with the others, typically only six at a time.

There are roughly 12,000 nodes, each of which is connected to six other nodes. As insignificant as it may seem, if we only wanted to communicate with six connected nodes, we only have to send the message to the nodes they are connected to, and they will relay it to the nodes connected to each of them, which in turn will send the message to the remaining 12,000 nodes. (Danial, 2019)

- **Transaction:**

Transactional cryptocurrencies are designed to be used as money and to be

traded for goods and services. There must be two factors in order for the transaction to be legitimate: witnesses and a rationale. A transit of tokens takes place from the originator to the beneficiary, within the Bitcoin network is usually cited as a reason.

The sender composes a message and transmits it to the receiver's address over the network messaging system. If the sender writes to someone and says, "I will give you a dollar and everyone in this town will see it," the situation is irreversible, and the transaction cannot be reversed. It's as simple as that to make a Bitcoin or Ethereum transaction.

A transaction must proceed with funds and a message sent by the sender. Nodes can see the transaction once the senders have money and send it, once it has been justified. (Danial, 2019)

- Transaction Value:

Transaction value is the price a purchaser pays for a shipment, A transaction can be worth any amount, whether it's large or small. For example, An amount equal to one hundred millionth of a US dollar of one bitcoin is a possible transaction amount for Bitcoin. (0.00000001).

The relatively tiny amount of value attached to the message system is recognized. It's also known as "1 Satoshi" (respect towards the individual who created the Bitcoin system). We can have as many wallets as we like, the largest value of transaction value is whatever amount we have in that wallet. (Danial, 2019)

- The Coin:

Because coins signify physical currency in our minds, we think of cryptocurrencies as a coin.

When we remember a coin, it weaves in the old, familiar jargon of our memory a new concept. The cryptocurrency coin is not the same as a traditional coin, which is normally circle and flat with etchings on both sides.

In truth, all pictures of Bitcoin as a golden round currency that we see in the media or on the internet are fictitious. Even while the coin appears to be a string of binary computer language bits such as ones and zeros, it is not.

In truth, neither a physical nor an electronic currency exists, and the coin isn't

even cryptographic. It is a messaging system of intra network cryptographic that cannot be hacked or forged. The reason of it cannot be hacked or forged is because it is based on an encrypted decentralized system.

Simply expressed, the coin denotes that no reversible move of transferring a specific value stated in the payment order has occurred. Due to the system's lack of trust, the system immediately confirms that commitment, which determines whether the message being sent from these addresses has enough coin to be delivered. (Antonopoulos, 2017)

Because we are trading our purchasing power, cryptocurrency coin transaction is initially pure and efficient.

Most individuals, on the other hand, are unfamiliar with the system's internal workings, and the term "coin" makes them feel at ease by referring to the object of the value being sent.

The vow had to be generated from value in order to be valuable. We can't just assign a monetary value to something at random. It must first have some type of actual worth before it may have market or face value; otherwise, the value is untradeable.

This is the most important aspect of our discussion on the trading and economics of cryptocurrencies. The actual price of a coin is determined by the amount of physical efforts required to create that 'coin.' In order to create each 'coin,' effort and resources must be expended, which is why it is referred to as mining.

Cryptographic value is to be calculated by the expenditure of Cryptography methods and computing infrastructure, which is carried out by mining process, just as valuable metals must be mined physically.

The nature of the Bitcoin system is that coins are created as a compensation for "mining process", which needs the expenditure of resources and cannot be acquired charginless.

The cost of generating a coin is done in Ethereum through resources expenditure, however it is going to be substituted from the "Proof of Work" approach to the "Proof of Stake" design after couple of months, which will prevent

any unanticipated developments.

In any situation, some form of value must be applied. When the miner who put in this effort receives the coin, he will be able to spend it in any way he desires. The miner can get benefit from its price in an exchange for any products or resources in case it is being accepted by the buyer.

The miner is the one who receives it from the system, and the system offers him and only him a set quantity of coins in exchange for his mining (In this situation, the coins are only a valuation with no physical characteristics).

The miner can only spend that coin within the network when he spends it.

He can buy anything he wants only if the person from which it is purchased from is on the net and has a valid payment address. Value can be traded for anything during mining using a message that makes the transaction, which is referred to as a coin. (Danial, 2019), (Laurence, 2017), (Quest, 2018)

- Wallets:

A crypto-monetary wallet is a component of the software to manage our electronic money. Even if we prefer not to carry around traditional wallets and prefer to keep our cash and credit cards in our pockets, if we want to use any form of cryptocurrency, we must have a digital cryptocurrency wallet.

Cryptocurrencies, unlike other traditional assets such as gold and cash, are not held in a bank reserve. Without the use of crypto wallets, such as the air that keeps the system alive, the entire concept of cryptocurrency dies.

Despite the notion that Bitcoin is decentralized, it is still managed and controlled by a network. That is, while Bitcoin is widespread and miners are slightly anonymous, the network stores the complete blockchain.

The blockchain is so big that miners only have transactions and blocks on their computers for about 30 days; the network stores the entire blockchain in a centralized manner.

Some cryptocurrency wallets are almost equivalent to online transaction services such as Apple Pay and PayPal, but they are typically distinct from conventional wallets and exist in a variety of formats and security areas.

We can consider the “Wallet” as a post box which reserves our received money orders, not the sort that we put in our pockets. This mailbox will be used to send messages out as part of a transaction (specifically called an address).

If a mailbox has already earned coins, then it can be spent. If the mailbox is devoid of coins, the address will be unable to send transaction messages.

A wallet is a program that we install on our computer or mobile device that searches through all of our transactions to Identify which transactions are related to this address in the entire ledger.

Every transaction is classified as outgoing or incoming, and the difference between the two is our balance or the amount we can spend.

Another issue to be aware of the distinction between hot and cold wallets:

- oHot wallets always linked to the web and are available at all times.

- oOn the other side, cold wallets are those that cannot be accessed by internet, therefore they are not online. (Laurence T., 2017)

- Mining:

Miners use software to solve cryptographic challenges and upload the operations to the blockchain record in the hopes of receiving bitcoin as a compensation. Because this activity aids in the extraction of new cryptocurrencies from the system, it is referred to as mining.

This group is open to anyone; the computer must estimate a random number that is a solution to an equation generated by the blockchain system.

In actuality, the computer must calculate up to sixty-four-character strings or two hundred fifty-six-bit hashes and compare the results to the problem being solved to determine whether they are correct.

That is why it is critical for miners to have a strong computing machine. The faster the computer, the more estimations It is capable of doing so in a split second, which boosts his chances of victory in this game. If he is successful in his estimation, he will receive Bitcoins and will be given the opportunity to create the blockchain's next page of Bitcoin transactions.

Due to the fact that mining is based on guesswork, each block is assigned to a new miner who estimates the number and is tasked with updating the blockchain.

The individual who has complete control of the chain and consistently wins has the most computer power and 51 percent of the votes.

It is improbable that the same miner will succeed each time, due to the law of statistical probability.

On the other hand, this game is occasionally unfair, as the device with the most computing power would be the first to solve the challenge equation and thus "win" more frequently. The price of mining is determined by only a few factors: the cost of energy used to power the devices, the cost of equipment and software purchased, and any cost of workers incurred by the miner to complete the jobs.

In most cases, hardware expenses are one-time only, with the possibility of replacement fees if the CPUs burn out and need to be replaced. We can then utilize the coins to trade once we've obtained them in this manner. That's one way to go about it.

We'll take a closer look at the mining process, which is what brings the coins to life.

The mining process is actually a network of millions of equations aimed at resolving a puzzle. Mining efforts are rewarded in coins, while mining itself is a computational process.

The coin will be given to the first person who solves the problem. The puzzle is about hashing, which is a type of cryptography using mathematics that employs a single direction deterministic mechanism.

That means hashing a word, an unpredictable string of letters that couldn't be reversed will be obtained. We could hash this entire thesis and get a string of characters as the result., for example: if we hash the statement: "The rise and fall of the Roman Empire"

the "hash" of the sentence is:

5C94D7845A6A2163D39CA32A0D19122C6B95FA591CF58636DBEBB47
5EDA4A160

The hash of that statement is so strong that changing one character, or even capitalizing that character modifies the complete cipher.

The growth and collapse of the Roman Empire will be discussed in the same way, but with a little variation.

The initial alphabet has been turned to lowercase in this example.
AFC44E6D243443A56A2D65357FA98EA61A6A5997BD2975C4435B9A4BCCCF
B763

The two hashes appear to be extremely different when viewed side by side.

Even if we understood how it was hashed, we wouldn't be able to undo it.

These are merely the fundamentals of hashing; there are other publications available to help us grasp the cryptographic process and hashing in greater depth.

When it comes to mining, two things happen. When a transactional process is finished and an order to proceed the transaction by the network to another account, the following happens:

The first thing the nodes do when they obtain a transmission is examined to verify if it is a genuine transmission, particularly, if the transmitter possesses an adequate money.

The next element to verify is that the order is configured correctly and that all of the necessary information is included. The nodes undertake around 16 check processes, and if everything is in order, they add the transfer of funds to the waiting line; however, the transition process has not yet been validated.

On an hourly basis, there are hundreds of these messages in the queue. The miners then take all of the transaction identifications and put them together to create a hash. There is a certain process to hash them, and it requires a few information. The Transaction ID, the hash of the previous block, the header, and a nonce must all be included.

The nonce is an auto generated number, however it is here that the puzzle must be solved.

If we take all of the data in the block and process the hash module on it, we

will get a precise series of figures, just as the line "The rise and fall of the Roman Empire" mentioned previously. Let us examine the phrase again and the hash that corresponds to it: "the rise and fall of the Roman Empire"

AFC44E6D2433A56A2D65357FA98EA61A6A5997BD2975C4435B9A4BC
CCFB763

We cannot modify any element of the statement, but we can add odd characters after it, according to the regulation. If the goal was to look up the hash that began with the letter 0 (zero),

We cannot reverse recreate the hash mechanism, As a result, we'll have to keep experimenting with alternative character strings to attach to the sentence in order to get the hash start with 0.

This is how it would seem: "the rise and fall of the Roman Empire 5134525"

"52CBF3DF5DFA63DA68F55AA5BC321F36597E53D96001B5D1E14668
DE79F444E7"

This would fail because the generated cipher didn't start with 0, as required to solve the puzzle. The later attempt: "the rise and fall of the Roman Empire 4749q0r58tj"

"423C9570BC80747EC346626C8049208DBA52753BA303516817D9CFC6
390D1D10"

This hash was not a success as well; after many hundred attempts, the only number that worked was: "the rise and fall of the Roman Empire 0912989897934"

Which led to the following hash:

"0C3EE05D5788E2FD0DFE4D49AE6109A1AFE36523F0D99ED6DC48A4
ECF8681622"

As a result, the hash satisfied all requests, and the puzzle is now complete.

The coins are rewarded to the miner who managed to solve the problem at the time it was solved, and all of the transactions that were included become fragment of a block with a unique hash that is a section of the entire track and cannot be changed.

If we edit the block, the hash will change, alerting the system to a mistake and

causing it to reject the block.

Finally, mining ensures the currency' security while also adding new money to the system. (Quest, 2018), (Danial, 2019)

Cryptocurrencies Regulation:

Cryptocurrencies have grown in popularity during a moment of significant legal upheaval.

It is also necessary to improve regulation and legislation in order for a financial system to be stable and fair. Each country reacts to cryptocurrencies and their technology in a unique way.

Only a few governments have taken a stand on cryptocurrency regulation.

Furthermore, it is expected that regulating cryptocurrencies will increase their consistency, making them more suitable for the money definition and qualities mentioned previously. Revised Payment Services Directive (PSD2) and The General Data Protection Regulation (GDPR) are both introduced.

When PSD2 was implemented, it allowed non-financial organizations to arrange pure payment services, and institutions to plan such facilities for their clients.

PSD2 also allows payment services to be performed without the need of cards or online banking.

GDPR is a privacy regulation that begins to constrain business and how they retain and gather customer data.

Because GDPR is a regulation rather than a command, It may have the desired effect across the board, and does not have to be passed into law in every nation such as the United Kingdom, resulting in a consistent GDPR compliance structure.

PSD2, on the other hand, is a goal or a directive that “as an official EU legislation” it will be applied across all European countries in order to achieve those aims, implying that the laws would change from country to country. (European Union, 2018)

Businesses that violate the GDPR face fines of up to 20 million euros or 4

percent of global annual revenue, whichever is larger. A regulation can depreciate the value of cryptocurrencies in the short term, resulting in losses for investors.

As long as there is no collective bandit, It is highly improbable that cryptocurrency will be harmed in the long run. There are certain governments that support cryptocurrencies, such as Switzerland, while others, like as China, condemn them outright.

China has previously cracked down on cryptocurrencies, shut down exchanges, and forced miners to work in other countries, but the country is now looking into ways to use digital money to help the genuine economy, and it wants to maintain a competitive edge in the field of blockchain advancement. Formally cryptocurrencies is not banned, but China has made it very hard to do any large scale crypto business there.

The largest exchange in the world and big exchanges like Binance moved out of China and adopted the use of stable coins like USDT and enjoys a large lead which net-net is a big loss for China. A report released by the Canadian legal company (McMillan LLP) outlines the regulatory attitudes of the United States, Canada, and China.

The article investigates how the United States is tightening regulation by classifying cryptocurrencies as bonds and subjecting them to its regulatory framework.

There is no apparent agreement on where to draw the regulatory line.

As a result, there may be a period of transition during which bitcoin organizations and traders relocate to nations with more favorable rules. Turkey and India are some of the countries that even though they are enchanted by cryptocurrencies they are also worried from them.

A few months ago, Turkey's central bank banned the use of cryptocurrencies as a form of payment method due to its lack of regulation and possible losses due to the exchange rate.

The result of this procedure is to label cryptocurrencies only for investment and trading purposes, and not general payment use.

Until now India have not banned cryptocurrencies, although they have voiced a proposition to do so, multiple times, which is thumping when results showed that in one month over \$2 billion have been traded in Indian cryptocurrencies exchanges.

This ban could be the result of the governments being worried about the fast-rising popularity of cryptocurrencies trading.

In the European Union and United Kingdom, the noise created by cryptocurrencies is making these governments curious yet careful. These countries located right in the middle between China's ban and the USA rules, and they are conflicted in how to best regulate cryptocurrencies.

Instead of treating cryptocurrency like a currency, they put large tax rendering them more like a stock, index or other investments, despite the cryptocurrency also being used as a currency.

The United Kingdom support innovation crypto startups and financial services.

In Europe the rise of cryptocurrencies acceptance is noticeable. In 2018, it was found that only 7% of the French people had cryptocurrencies which correspond to a slow start.

France, Spain and Italy have already allowed cryptocurrencies, but did not recognize their legal tender status qualifying cryptocurrencies as means of exchange, which is different from e-money by the regulators.

Despite of the use of contradictory regulatory environments, the USA can still be considered the country with the most cryptocurrencies businesses and the largest for that matter, and the USA has a better chance to prove its adaptiveness. (European Union , 2018)

III. LITERATURE REVIEW:

The expanding needs for investments' alternatives and the new rise and interest of the cryptocurrencies in the global market, have attracted academics and investors to research and study the new currencies. Whether to find a correlated relationship between the cryptocurrencies and traditional fiat currencies or to use them as a hedge to diversify their investments portfolios.

The recent creation of virtual currencies is an example of development in investment, and these virtual currencies are now being used for exchanges across the world.

Some cryptocurrencies employ within the virtual communities only while other currencies tend to have a wider reach as well as two-way exchange flow with the cash money.

Within the larger category of virtual currencies, there is a subgroup of digital currencies.

Digital currencies operate without the intervention of a counterparty, and their use is becoming more widespread within the economy as a whole.

Bitcoin was the first cryptocurrency that used cryptography and peer-to-peer networking to maintain its integrity. (Almansour et al., 2020)

The European Central Bank (ECB) considers cryptocurrencies to be a subset of virtual currencies, classifying Bitcoin, Ethereum, and other cryptocurrencies as virtual currency schemes since they look like cash money and have a standardized payment method.

It defined these currencies as an unregulated type of digital money that is typically created and controlled by its creators and utilized and accepted by members of a certain virtual community.

It is explained that three types of virtual currency can be separated based on:

- Virtual currencies which can only be used in a closed system such online games.
- Virtual currencies that are from one side linked to the economy: a transformation rate exists to purchase the currency (with traditional money) and the purchased currency can subsequently be used to buy and exceptionally also to buy (e.g. Facebook Credits);
- Virtual currencies that are bilaterally linked to the economy: there are transformation rates both for purchasing virtual currency as for selling such currency; the purchased currency can be used to buy merchandises.

The European Central Bank has divided virtual currency schemes into two categories: centralized or decentralized; “Centralized virtual currency” is a private virtual currency mechanism with little or no connection to the actual world such as “Second Life’s Linden Dollar”.

Bitcoin, Ethereum, and other alternative coins (also known as altcoins) are listed by the European Central Bank as decentralized virtual currency schemes having bi-directional (i.e. bilateral) virtual currency. (Responsible et al., 2018)

Based on the price exchange, investors can trade bitcoins by buying or selling.

Buying and selling requests which represents currency’s supply and demand, determine the exchange rate of cryptocurrencies with other currencies. Users can purchase both virtual and physical goods through the virtual money scheme.

The biggest argument in the economy surrounding Bitcoin, on the other hand, is whether it should be considered a currency or not.

Currencies must possess three characteristics:

- Stability.
- Used as a transaction exchange medium.
- Can be used as an account unit.

Although Bitcoin possesses the characteristics of a money, its increased demand and volatility as an asset rather than a currency raises questions about

whether it truly fits the standards of a currency. (ECB, 2015), (Miglietti et al., 2019)

The increase in price that has been seen throughout 2017 can be attributed to an increased public awareness of bitcoin throughout the United States due, in part, to increased media coverage.

Bitcoin, Litecoin, and other virtual currencies are not considered, by the European Central Bank (ECB, 2015), a “full forms of money as defined in economic literature or currency from a legal perspective.”

The fact that some people do not consider it as a currency mainly because one of virtual currency's clear flaws or disadvantages is its extreme volatility. The European Central Bank, states that “in consideration of virtual currencies as a median of exchange, their price volatility should be taken into account”. (ECB, 2015)

If the desire for Bitcoin and Ethereum as an investment asset rather than a currency grows, the risk associated with their volatility could lead to market speculation. (ECB, 2015), (Miglietti et al., 2019)

The strong gains in cryptocurrencies, according to Gkillas and Katsiampa (2018), may be a reaction to their high fluctuation. The current exchange rate spinning in Bitcoin and Litecoin may prompt speculation about whether the currencies are experiencing speculative illusions or bubbles.

An investment price or asset that surpasses its basis value is referred to as an illusion or bubble.

The difficulty of identifying speculative bubbles is a difficult one. This is because it is difficult to tell the difference between irrational investor euphoria and a rational response to reduced risk based solely on price behavior. The strong gains in cryptocurrencies, according to Gkillas and Katsiampa (2018), may be a response to their high volatility.

The existing exchange rate fluctuations in Bitcoin and Litecoin may prompt speculation about whether the currencies are experiencing speculative illusions or bubbles. An investment price or asset that surpasses its basis value is referred to as an illusion or bubble. (Gkillas and Katsiampa, 2018)

Cryptocurrencies, like Bitcoin, are virtual third-type currencies (iii: as stated

above): they may be purchased and sold using traditional money, and they can be used to purchase both digital and physical goods and services.

The ECB proposed a "second" and largely updated definition of virtual currencies in a study titled "Virtual Currency Schemes" in 2015.

Virtual currencies are the digital value representations that neither the central or government creates nor guarantees and have the legal status of the currency or the money, according to the report. (Responsible et al., 2018)

Cryptocurrencies are a subsection of virtual currencies, which are described by the International Monetary Fund (IMF), as a digital representation of private developers' value and specialized in its own account unit, similarly to the European Central Bank (ECB). As stated by (IMF), the term of virtual currencies covers a wider range of currencies, starting from simple IOUs (Informal certificates of debt) by issuers such as Internet or airline miles and mobile coupons; or currencies backed by assets such as gold and Dollar, and cryptocurrencies like Bitcoin. (Responsible et al., 2018)

The European Banking Authority ("EBA") refer to cryptocurrencies as digital representations of value that are neither issued by a central bank or public authority nor necessarily attached to a fiat currency but are used by legal or natural persons as a medium of exchange, a unit of account and can be transferred, stored, or traded electronically. (Responsible et al., 2018)

The World Bank has qualified cryptocurrencies as digital representations of value that are denominated in their own unit of account, distinct from e-money, which is simply a digital payment technique, representing and denominated in fiat money.

The World Bank has defined cryptocurrencies as digital currencies that depend on cryptographic techniques to achieve consensus, contrary to most other policy makers. (Responsible et al., 2019)

It is remarkable, however, that the Great Britain Pound GBP adheres to both the legal and economic definitions of currency. (Crain Communication, 2017)

As a result of the foregoing, we have found out that the term cryptocurrency

in the regulatory field of cryptocurrencies is not universally recognized.

Furthermore, most policymakers have refrained from completely defining the phrase. Only the World Bank has provided a coherent definition among those mentioned above.

Most policymakers, on the other hand, treat cryptocurrencies as a subset or a type of virtual or digital currencies.

A cryptocurrency could be a digital representation of value that

- is intended to constitute a peer-to-peer (P2P),
- is used as a general-purpose medium of exchange,
- is secured by a technique known as cryptography and
- can be converted into legal tender and vice versa.

The growth of Bitcoin in 2009 drew a lot of attention to the question of whether cryptocurrencies are a viable, legal money alternative.

Despite widespread fear that cryptocurrencies are producing an environment conducive to a large-scale bubble, it is critical to examine whether these new assets behave similarly to major international fiat currencies.

Over the previous five years, the bitcoin market has grown significantly.

The overall market capitalization had surpassed \$55 billion as of August 2017, with daily trading activity frequently reaching \$1 billion.

From 2014 to early 2017, bitcoin trading via Chinese yuan rose significantly, despite the fact that it was initially traded mostly in US dollars.

Due to the huge power, they exert on the network and low electricity costs, this growth may be attributed to the surge of bitcoin mines (and mining pools) situated throughout China. (Corbet et al., 2017)

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The quick rise in Bitcoin's popularity, as well as the surge in the number of blockchain wallets, has piqued economists' attention, resulting in a slew of academic papers and studies on the subject. (Erdas & Caglar, 2018)

Yermack (2013) investigated whether Bitcoin should be classified as a currency based on how the three primary functions of money are defined, namely as a medium of exchange, a store of value, and a unit of account. The author of his analysis points out that Bitcoin's volatility is far higher than the volatility of other currencies. This, he argued, reduces Bitcoin's utility as a means of exchange and a unit of account.

In addition, Yermack found no correlation between Bitcoin's daily exchange rate and the dollar's exchange rates against the British pound, euro, Swiss franc, yen, and gold, and they looked into the impact of stock markets, exchange rates, and oil prices on Bitcoin's price.

The findings of multiple linear regression reveal that the euro exchange rate, the Dow Jones Index, and the price of oil have statistically significant effects on the long-term value of Bitcoin. (Yermack, 2013)

Most universal studies analyzed Bitcoin's relationship to financial markets and role in them from 2010 to 2021.

Ciaian et al. (2016) discovered characteristics of Bitcoin that may aid in its global adoption as a currency. Their findings confirmed that supply and demand have an effect on Bitcoin's volatility and price.

They came to the conclusion that the size of the bitcoin economy and the speed with which bitcoin is circulated have an impact on its price.

They also discovered that investor speculation had an effect on bitcoin price; nevertheless, their economic estimations contradicted prior studies that suggested that global macro-financial development has an impact on bitcoin price.

They discovered that global economic movements have no effect on the price of bitcoin, and that its volatility is difficult to anticipate.

Their conclusion was that this data contradicted several past Bitcoin studies and that there is a dispute regarding bitcoin's ability to be used as a worldwide money. (Ciaian et al., 2016)

Chu et al. (2015) executed a statistical analysis of the rate of exchange of Bitcoin versus the US dollar, using 17 of the most prevalent financial distributions to examine bitcoin's rate of exchange against USD. Chu et al., found that the "US dollar to bitcoin exchange rate grew more than 50-fold" between September 2011 to May 2014.

Furthermore, they discovered that a bitcoin investment had "very high volatility but also extremely high profits." (Chu and colleagues, 2015)

Gkillas and Katsiampa (2018) investigated the behavior of five cryptocurrencies' returns using value theory. They analyzed market data for Bitcoin, Ripple, Ethereum, Bitcoin Cash, and Litecoin in their study, which covered the years 2010 to 2017. These cryptocurrencies collectively account for 85 percent of the overall cryptocurrency capitalization in 2018.

The five cryptocurrencies examined had varying levels of risk, and they found that Bitcoin Cash was the riskiest, with Bitcoin and Litecoin posing the lowest risk.

It's worth noting that it was found by researchers that all cryptocurrencies had high jeopardy, which might result in huge droppings or big gains, and that cryptocurrencies' high volatility could explain their high returns. (2018, Gkillas and Katsiampa)

Baek and Elbeck (2015) investigated the fluctuation in prices of Bitcoin by examining the returns of the Bitcoin market using a variety of economic variables. They investigated the risk of the Bitcoin market in comparison to the stock market, as well as whether basic economic variables influenced Bitcoin market results.

"All external economic factors do not appear to have any statistically significant impact on bitcoin returns," the study concluded. According to Chu et al., the "US dollar to bitcoin exchange rate grew more than 50-fold" between September 2011 to May 2014.

The only result was that bitcoins are 26 times more volatile than the S&P 500 Index and the Bitcoin market is high speculative and driven by institute market participants. (Baek and Elbeck, 2015)

Sapuric and Kokkinaki (2014) studied the relation of the fluctuation of Bitcoin to main currencies prices from July 2010 until April 2014, the method they used was to compare the rate of exchange of Bitcoin comparing to the US dollar and the London price of gold.

The conversion rates between various fiat currencies and bitcoin were tracked, with the results recorded. There was a significant relationship between the low volume of Bitcoin trading and the volatility of the Bitcoin prices.

They conclude that the volatility of the currency is significantly higher if raw changes in the Bitcoin prices are considered than other major currencies used in their analysis. (Sapuric and Kokkinaki, 2014)

The results on the volatilization of cryptocurrency were studied again by Phillip et al. (2017)

They looked at two hundred twenty-four different cryptocurrencies to see what kind of time-varying volatility they could find in financial returns. According to their experimental data assessment, they discovered that those two hundred twenty-four cryptocurrencies have a lot of stochastic volatility. (Phillip et al., 2017)

When Corbet et al. (2018) looked at the link connecting Bitcoin, Litecoin, and Ripple and other financial resources such as gold, the S&P 500 Index, and the US prices, they discovered that cryptocurrencies are quite distinct from conventional fiscal and economical assets.

They indicated that no correlation existed between “gold, the S&P 500 index, bonds, and cryptocurrencies” such as Bitcoin, Litecoin, and Ripple in terms of volatility. (Corbet et al.,2018)

Atik et al. (2015) investigate the relationship between Bitcoin and the rate of exchange in Turkey from the year 2009 to 2015. They looked at the world's most traded currencies to see if Bitcoin has an impact on other exchange rates.

They employed co-integration analysis to investigate the causal relationship

between Bitcoin daily exchange rates and the most widely used cross-currency exchange rates in the world.

The findings show a one-way causation relationship between Bitcoin and the Japanese yen, as well as a delayed impact between the yen and Bitcoin. (Atik et al., 2015)

Using the GARCH model, Bouoiyour and Selmi (2015) investigated the relationship between gold, silver, and Bitcoin prices and financial market volatility. They came to the conclusion that gold, silver, and Bitcoin as safe and satisfying money haven functions remain constant over time, and Bitcoin works as a weak safe haven in the short term and as a hedge in the long term.

They discovered that negative shocks influence Bitcoin values more than positive shocks. (Bouoiyour and Selmi, 2015)

GARCH models were used by Dyhrberg A (2016) to investigate bitcoin's financial asset capacity. The asymmetric GARCH model revealed a number of parallels between the dollar and gold, indicating that the latter had advantages as a medium of exchange. Medium of exchange characteristics are clear and bitcoin reacts statistically significantly to the federal funds rate which points to bitcoin acting like a currency.

The GARCH showed that bitcoin may be useful for investors in expectation of negative price shocks to the market and risk management.

Because of its decentralized character and small market size, the conclusion shows that bitcoin is midway between a money and a commodity. This isn't to say that bitcoin isn't better than other investments. She concluded that Bitcoin includes some of the advantages of both commodities and currencies in the financial markets and can be a useful tool in wallet management. However, because bitcoin is primarily uncontrolled and decentralized, it will never behave exactly like today's currencies.

Kristoufek (2015) investigates the likely impact of Bitcoin pricing in China's market and discusses how the Chinese economy affects Bitcoin prices. He discovered that, despite being a speculative asset, the Bitcoin price is affected in the long run by its compatibility for the money supply in commerce and other

fundamental economic variables.

He concluded that Bitcoin is a one-of-a-kind asset, both in terms of its absence of a secure investment tool and its unpredictable nature.

Furthermore, the study found that the Financial Stress Index and Bitcoin's price have a positive and substantial link. (Kristoufek, 2015)

Georgoula et al. (2015) used analysis of time series to estimate Bitcoin prices based on main economic variables; they also used Google Trends and Wikipedia to get technological data.

According to their findings, the value of Bitcoins has a negative substantial relationship with the USD and EUR exchange rates.

Their findings show that the Bitcoin's price has a beneficial effect on the number of Bitcoins available in the market, and that the price of Bitcoin has a substantial adverse association with the S& P 500 Index. (Georgoula et al., 2015)

Szetela et al. (2016) used ARMA and GARCH models to investigate the relationship between selected exchange rates and Bitcoin price. The results of GARCH models show that there is a conditional variance between Bitcoin and the US euro, dollar, and yuan, however ARMA models showed that there was no reliance between Bitcoin's return and the other exchange rates. (Szetela et al., 2016)

Icelliglu and Ozturk (2017) examined the causal relationship between Bitcoin and a variety of other currencies, over the short and long run, including the dollar, euro, pound, yen, and yuan from the year of 2013 to 2017. Granger Causation Test and Johansen Test were used to investigate the causality relationship between Bitcoin and a certain exchange.

The findings of Granger and Johansen's t causality tests revealed that there is no causal relationship between the price of Bitcoin and the price of other exchanges. (Icelliglu and Ozturk, 2017).

Sovbetov (2018) looked at the factors that influence the pricing of five of the most popular cryptocurrencies. The findings revealed that five cryptocurrencies are determined in the short and long term by financial characteristics like as market risk, volume of trading, and also volatility. In addition, the data demonstrate that the S&P

500 Index has a positive long-term impact on Bitcoin, Litecoin, and Ethereum, but that its sign changes to negative as it loses relevance in the near term. (Sovbetov, 2018)

Corbet et al. (2017) used both ordinary least squares (OLS) and GARCH estimating models to conduct research into the effects of monetary policy decisions made by the ECB, FOMC, BOE, and BOJ on bitcoin returns.

The findings reveal that monetary policy decisions made by the FOMC in the United States, based on rates and data, have an impact on bitcoin's price.

They discovered that the announcements of quantitative easing in the United Kingdom, the United States, the European Union, and Japan had a considerable impact on volatility.

The findings reveal that, despite its unique characteristics, Bitcoin appears to be subject to the same economic forces as conventional fiat currencies and is therefore not immune to government intervention. (Corbet et al., 2017)

Tomić et al. (2020) studied qualification of central banks to management monetary policy successfully in conditions of common use of cryptocurrencies in pay transactions.

They compared the case in the cryptocurrency market with the phases of Internet development and the state on other markets of electronic pay systems.

They finished that, cryptocurrencies do not have the capability to risk the traditional monetary system at the current level, bearing in mind the early ripeness of this market, In the case of private cryptocurrency usage growth, central banks could partially or completely lose power over monetary policy. (Tomić et al., 2020)

Gulec et al. (2018) used Granger Causality models and Johansen Co-integration to discover the relation between Bitcoin price and the selected financial indicators, the period term from March 2012 until May 2018.

The findings revealed that Bitcoin value in the market is on the rise, with substantial volatility, and that there is a link between interest rates and the price of Bitcoin which is a moving target. (Gulec et al., 2018)

In their study, Almansour et al., (2020) They utilized a time series

forecasting-ARIMA model to look examine the impact of commodity markets and exchange rates on bitcoin returns from 2014 to 2019.

The findings concluded that the exchange rate of foreign currencies (US Dollar / JPY, US Dollar/ EURO, US Dollar/ GBP, and US Dollast/ AUD) has no meaningful impact on Bitcoin returns.

However, when the significance level is 0.10, the GBP is found to have a substantial association with Bitcoin returns, which could be owing to the same causes that affect both USD/ GBP and Bitcoin returns in recent times. (Almansour et al., 2020)

Erdas and Caglar (2018) developed a hybrid model to investigate the relationship between commodity prices and overall indices, which may have an impact on Bitcoin investors' decisions in global markets.

They came to the conclusion that Bitcoin may exist in the future in conjunction with market commodities and other global factors, as well as governments' recognition of the Bitcoin currency as an approved means of exchange due to its improved reliability. They found that a change in Bitcoin prices influence the price of S&P 500 Index. Therefore, S&P 500 Index investors have been closely monitoring and operating on the S&P 500 market for overall market financial developments.

However, they did not find a causality relationship between Bitcoin market value and other variables such as US dollar, Brent oil, and BIST 100 Indexes. (Erdas and Caglar, 2018)

Kim et al. (2020) applied GARCH models to the financial assets, Bitcoin, S&P500 and Gold.

They looked at the proposed method for determining the links between Bitcoin volatility and time varying conditional correlation.

They discovered that the S&P 500 can beat the problem that the GARCH models couldn't compute.

Their empirical study revealed a positive trend varying relationship between the cryptocurrency market and the US stock market or gold market price since the

COVID-19's appearance, and the most recent data revealed that there was a positive trend varying relationship between these two markets since the COVID-19's appearance.

Their regression modeling revealed that the most popular cryptocurrency, Bitcoin, has a better performance than competitors when compared to the price of gold and the price of the US stock market.

Both investors and governments will benefit from their discoveries. The restriction of this research is that their proposed regression modeling methodology to the high volatility finance assets is not multiple data analysis but pairwise data analysis. (Kim et al., 2020)

IV. EMPIRICAL ANALYSIS AND RESULTS:

This chapter examines the Impact of Bitcoin on monetary systems.

We take Bitcoin, as the most popular cryptocurrencies in the market and analyze the asymmetric causal relations of the leading financial assets: (Bitcoin price, dollar index (USDX), EUR/USD exchange, GBP/USD exchange, gold price, oil brent price, FTSE 100 index, S&P 500 index).

Many of statistical analysis Methods were used to investigate the relations between financial assets such as Granger causality test and multiple linear regression.

The goal of this study is to use an asymmetric causality test and many statistical analysis methods to look at the causality linkages between the price of Bitcoin and commodities markets, currency values, and global price index.

The remainder of this chapter is as follows:

A brief description of the data specifications is provided in section 1, experimental results are reported in section 2, and conclusions are outlined in 3rd section.

- Data Description:

First, it is important to refer to that we studied the relationship between Bitcoin price and more than 30 time series data of financial assets; In this paper we used only eight of the leading financial assets that we found have significance correlation with Bitcoin price.

The data employed in this study is based on the historical global weekly price indices, extracted from a financial website (*www.investing.com*); the data has been studied over the past ten years, time interval period extend from (1 June 2011) to (1 June 2021), our data include a total of (522) weekly observations.

Natural logarithm of the time series data was taken before the analysis, it is aimed to eliminate the difference scale effect between time series that used in

application.

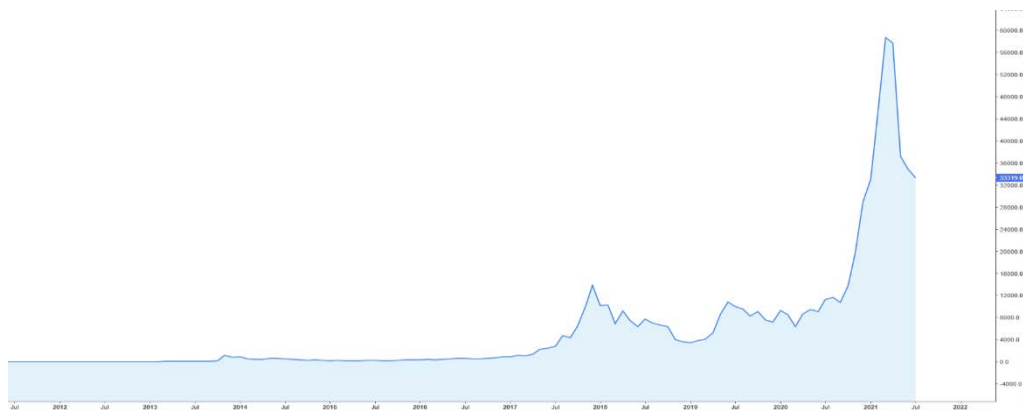
We used (EViews V.12) software to obtain statistical analysis of data.

Our analysis focuses on Bitcoin pricing (BTC/USD) because Bitcoin currency has the largest market share in the cryptocurrency marketplaces. We took eight time series data:

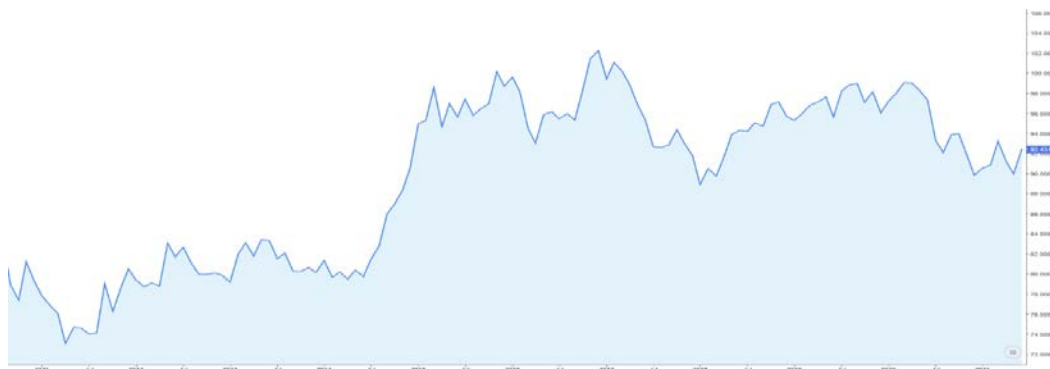
Table 1 Reflects eight time series that described above.

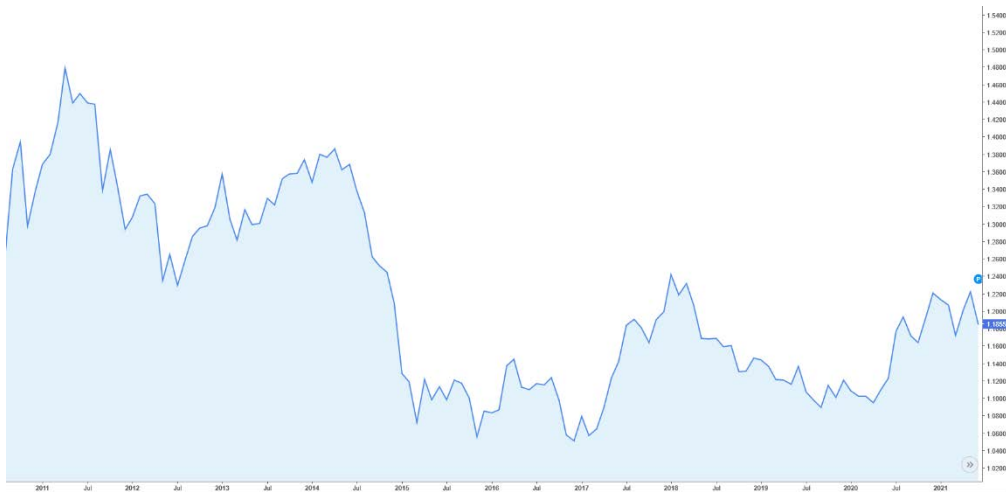
- 1: BTC/USD exchange.
- 2: Dollar index (USDIX).
- 3: EUR/USD exchange.
- 4: GBP/USD exchange.
- 5: Gold price.
- 6: Oil Brent price.
- 7: FTSE100 index (London Stock Exchange).
- 8: S&P 500 index.

BTC/USD

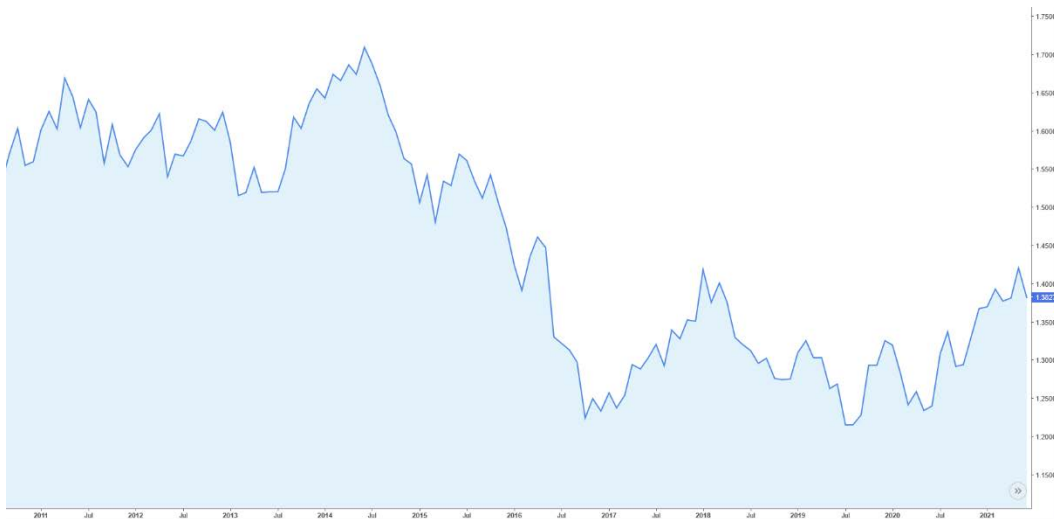


Dollar index (USDIX)





EUR/USD exchange



GBP/USD exchange

Gold

price



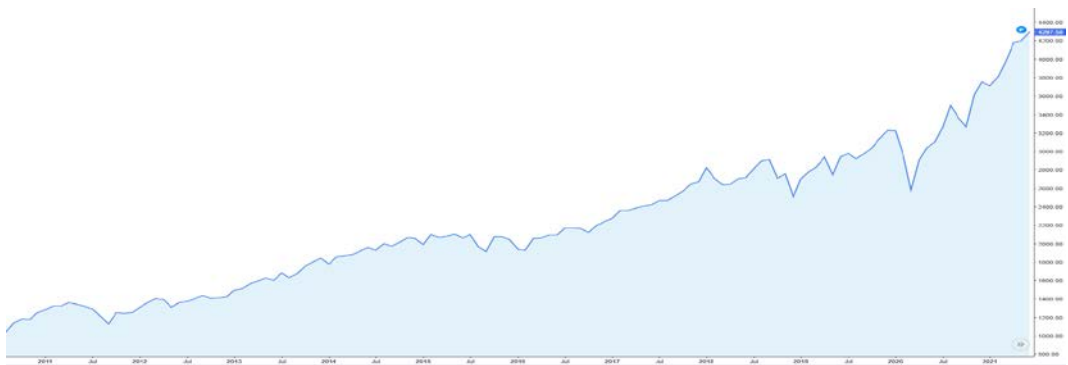
Oil Brent price



FTSE 100 index



S&P 500 index



Source: Investing.com

A. Dickey-Fuller Test to Study Stationary of Time Series:

Dickey-Fuller analysis must be used to investigate time series data depending on the unit roots test. If the Dickey-Fuller test indicates that one or more of the variables is not stable, the initial distinction should be considered before employing the Granger causality test; additionally, if the findings of the unit roots test for the first difference indicate that the data is non-stationary, the second difference of time series data should be considered before applying the Granger causality test. **Table 4.2** demonstrates the outcomes of the “DF unit root test”

Table 2 Results of Dickey-Fuller test

| Cross-section | ADF lags | t-stat | p-value |
|-----------------|----------|----------|---------|
| BITCOIN_PRICE | 0 | 0.65217 | 0.86260 |
| EUR_USD | 1 | 1.01023 | 0.92360 |
| FTSE__100_INDEX | 0 | 0.61639 | 0.85350 |
| GBP_USD | 0 | 0.59052 | 0.84820 |
| S_P_500_INDEX | 0 | 0.62091 | 0.85470 |
| USDX | 1 | -0.52238 | 0.49620 |
| GOLD_PRICE | 1 | 1.16510 | 0.93980 |
| OIL_BRENT | 0 | 0.66714 | 0.86560 |

Source: Author’s Computation.

The results of the unit roots computations are shown in Table 4.2 illustrate that the p-values for eight time series data are higher than the significant level of 0.05, indicating that the null hypothesis is accepted; nonetheless, the data are stationary. The first differences were found in some time series data to be stationary, and all variables become stationary when we took first differenced in non-stationary time series.

B. Granger Causality Relationships Test:

After all the time series data became stationary, causality relationships between Bitcoin prices and the leading financial assets, global indexes and exchange rates are analyzed via Granger causality test.

Granger causality analysis is a technique for determining whether one time series can accurately predict another. By removing the presence of asymmetric information in financial time series, it is aimed to independently determine the effect

of positive and negative shocks.

Table 4.3 reports the results of applying **Granger causality test**.

Table 3 Results of Granger causality test.

| Null Hypothesis: | F-Statistic | Prob. |
|--|--------------------|----------------|
| EUR/USD does not Granger Cause BITCOIN PRICE | 0.00128 | 0.9715 |
| BITCOIN PRICE does not Granger Cause EUR/USD | 4.24717 | 0.0398* |
| FTSE 100 INDEX does not Granger Cause BITCOIN PRICE | 0.18263 | 0.6693 |
| BITCOIN PRICE does not Granger Cause FTSE 100 INDEX | 6.46550 | 0.0113* |
| GBP/USD does not Granger Cause BITCOIN_PRICE | 9.5454 | 0.9922 |
| BITCOIN_PRICE does not Granger Cause GBP/USD | 5.81312 | 0.0163* |
| GOLD PRICE does not Granger Cause BITCOIN PRICE | 0.06063 | 0.8056 |
| BITCOIN_PRICE does not Granger Cause GOLD PRICE | 1.05523 | 0.3048 |
| OIL BRENT PRICE does not Granger Cause BITCOIN PRICE | 0.17014 | 0.6802 |
| BITCOIN PRICE does not Granger Cause OIL BRENT PRICE | 3.70875 | 0.0547 |
| S&P 500_INDEX does not Granger Cause BITCOIN PRICE | 4.81417 | 0.0287* |
| BITCOIN_PRICE does not Granger Cause S&P500 INDEX | 9.79747 | 0.0018* |
| USDX does not Granger Cause BITCOIN PRICE | 0.11415 | 0.7356 |
| BITCOIN PRICE does not Granger Cause USDX | 5.26560 | 0.0222* |

Source: Author's Computation.

From **table 4.3** we find that neither gold price nor oil brent price show causality relationship with bitcoin price where $p\text{-value} > 0.05$, we can conclude there is no correlation between bitcoin price and the price of both gold and oil; Thus, the increasing and decreasing trend to gold price or oil Brent price do not seem to have an effect on Bitcoin price.

The results of Granger test indicate one way causality relationship between Bitcoin and each of (USDX, EUR/USD, GBP/USD, FTSE 100 index), Thus, it is possible to make some conclusion: a positive or negative (direct or inverse) trend in Bitcoin prices effects on of (USDX, EUR/USD, GBP/USD, FTSE 100 index) both positively and negatively.

When the causation is investigated in the opposite direction, the rises and declines are seen. In each of (USDX, EUR/USD, GBP/USD, FTSE 100 index) do not significantly affect Bitcoin prices.

According to the results from **table 4.3**, we found there was a two-way causal relationship between Bitcoin exchange rates and the S&P 500 Index where $P\text{-value} < 0.05$.

If the trend component of Bitcoin prices declines, it has a mixed effect negative and positive on the S&P 500 stock index. It was discovered that Bitcoin investors lack a standardized investment strategy. As a result, investors in the S&P 500 may find themselves in a different position as Bitcoin's price fluctuates. In other words, investors who are part of the world's largest companies consider Bitcoin price volatility into their investment decisions.

Contrarily, it appears that if a positive shock occurs at Bitcoin prices, the S&P 500 Index tends to be adversely affected. It is considered that the increase in the Bitcoin price is negatively priced by the S&P 500 investors. As a result, it was found that the S&P 500 investors adopt a highly sensitive opinion towards the Bitcoin price fluctuation.

C. Pearson Correlation Test:

Pearson Correlation was used to study the relationship between bitcoin price and financial assets, from table 4.4 it is possible to see that Bitcoin price is significantly correlation with all variables where $p\text{-value} < 0.05$, there is no significance correlation between Bitcoin price and gold price where $p\text{-value} > 0.05$.

According to the results from **table 4.4**, there is a positive relationship between bitcoin price and each of (DXM1 USD, FTSE 100, S&P 500).

This is an indication that when (DXM1 USD, FTSE 100, S&P 500) increase, the bitcoin returns would be increased as well and vice versa.

Moreover, negative relationships between Bitcoin returns and each of (EUR/USD, GBP/USD, GBP/USD, Oil Brent) were found, that means if the value of time series data (EUR/USD, GBP/USD, GBP/USD, Oil Brent) scaled down, the Bitcoin prices would be appreciated.

Table 4 Pearson Correlation test.

| | | DXM1 USD | EUR/USD | GBP/USD | Gold | Oil Brent | FTSE 100 | S&P 500 |
|---------------|----------------------------|---------------------|----------------|----------------|-------------|----------------------|---------------------|------------------------|
| Bitcoin price | Pearson Correlation | .678** | -.534-** | -.714-** | - | -.593-** | .676** | .967** |
| | p-value | .000 | .000 | .000 | .510 | .000 | .000 | .000 |

Source: Author's Computation.

A. Multiple Linear Regression Model:

In the last stage of analyzing the data we applied **Multiple linear regression** to predict in Bitcoin price (dependent variable) depend on all (USD, EUR/USD, GBP/USD, FTSE 100 index) independent variables.

Table 4.5. reports the results of applying Multiple linear regression.

Table 5 Results of Multiple linear regression.

| Dependent Variable: BITCOIN_PRICE | | | | |
|-----------------------------------|------------------|-----------------------|-------------|----------------|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| EUR/USD | 34.99372 | 1.562215 | 22.40007 | 0.0000* |
| FTSE 100 INDEX | 1.233700 | 0.266129 | 4.635714 | 0.0000* |
| GBP/USD | -1.300937 | 0.354650 | -3.668230 | 0.0003* |
| S&P 500 INDEX | 5.973781 | 0.126392 | 47.26380 | 0.0000* |
| USD | 35.83756 | 1.746352 | 20.52139 | 0.0000* |
| C | -203.6658 | 7.182008 | -28.35777 | 0.0000* |
| R-squared | 0.971955 | Mean dependent var | | 6.540382 |
| Adjusted R-squared | 0.971683 | S.D. dependent var | | 2.608707 |
| S.E. of regression | 0.438982 | Akaike info criterion | | 1.202712 |
| Sum squared resid | 99.43597 | Schwarz criterion | | 1.251651 |
| Log likelihood | -307.9078 | Hannan-Quinn criter. | | 1.221880 |
| F-statistic | 3576.604 | Durbin-Watson stat | | 1.970000 |
| Prob(F-statistic) | 0.000000* | | | |

Source: Author's Computation.

According to the results from **table 4.5** the regression equation of Bitcoin price:

$$\text{Bitcoin price} = -203.66 + 34.99 \times (\text{EUR/USD}) + 1.23 \times (\text{FTSE 100}) - 1.30 \times (\text{GBP/USD}) + 5.97 \times (\text{S\&P 500}) + 35.83 \times (\text{USD})$$

P-value<0.05 for all coefficients of equation; Thus, coefficients values are statistically significance.

Coefficient of determination (R^2) is 0.9719 and it is very large value;

Coefficient of determination is the proportion of the variance in the dependent variable that is predictable from the independent variables.

P-value<0.05 in Fisher test for examine the significance of the equation which indicate that the equation is statistically significant.

To check the efficacy of regression model we must examine the normality of residuals, Testing Autocorrelation.

a. Normality Test for Residuals:

Jarque-Bera Test was used to examination the normality of residuals, p-value=0.586>0.05 that mean the residuals are distributed normally.

Figure 4.1 reflects graph of normality test (Jarque-Bera) for residuals.

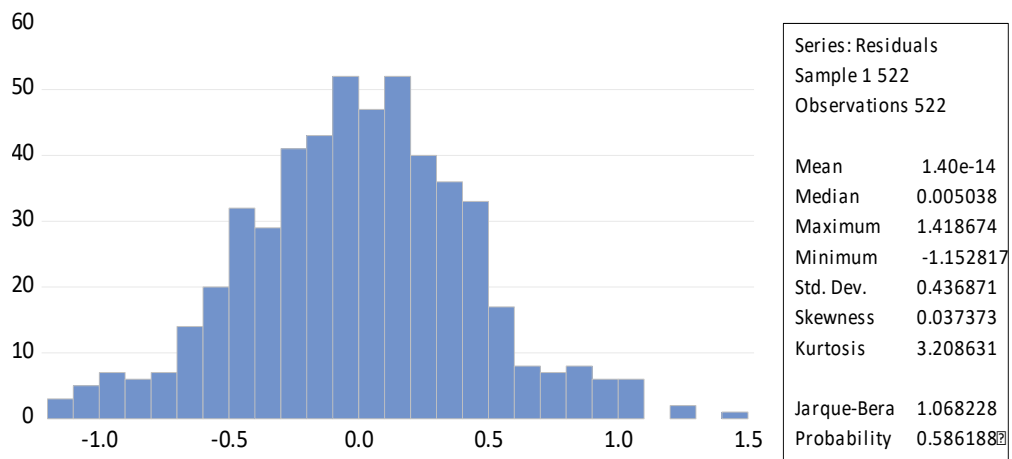


Figure 4 Graph of Normality test for residuals.

Source: own figure.

b. Durbin-Watson Test for Testing Autocorrelation:

Autoregressive models that perceive dynamic effects over time-varying processes have been applied in the stock market throughout history.

This is based on the idea that the dependent variable's previous values have an impact on its current values.

If the hypothesis's effect is confirmed, a lagged dependent variable must be included in the model to detect the dynamic effect. (Chan et al., 2017)

For the general model, the autocorrelation test was employed to determine if a

lagged dependent variable should be included in the multiple regression model (table 4.5).

The Durbin-Watson test is one method for determining whether or not there is autocorrelation. If the test statistic in the DW-test is near to 2, then absence of autocorrelation is indicated by the test result.

It indicates a positive autocorrelation if it is near zero, and a negative autocorrelation if it is near to four. (Armstrong, 2012).

The p-value in the general model (table 4.5) is 0.000, indicating that the test is statistically significant.

In addition, the Durbin-Watson test obtained a test statistic of 1.970, ruling out the presence of autocorrelation in the bitcoin prices dataset in this study.

The hypothesis H1 (Alternative hypothesis) that “the autocorrelation exists” can be rejected for the first-order autocorrelation based on the interpretation of this number in the Durbin-Watson test.

Then H0 (Null hypothesis) was adopted, which states that "there is no autocorrelation among residuals."

As a result, the residuals are not systematic, and the model does not require autocorrelation correction. the methodology does not contain the lagged dependent variable. (Durbin & Watson, 1971).

In addition to the DW-test, the scatter plot of residuals in figure 4.2 shows no autocorrelation over time.

As can be observed, the scattered numbers around the 0 line are either too low or too high, demonstrating randomness. (Chan & Chu, 2017)

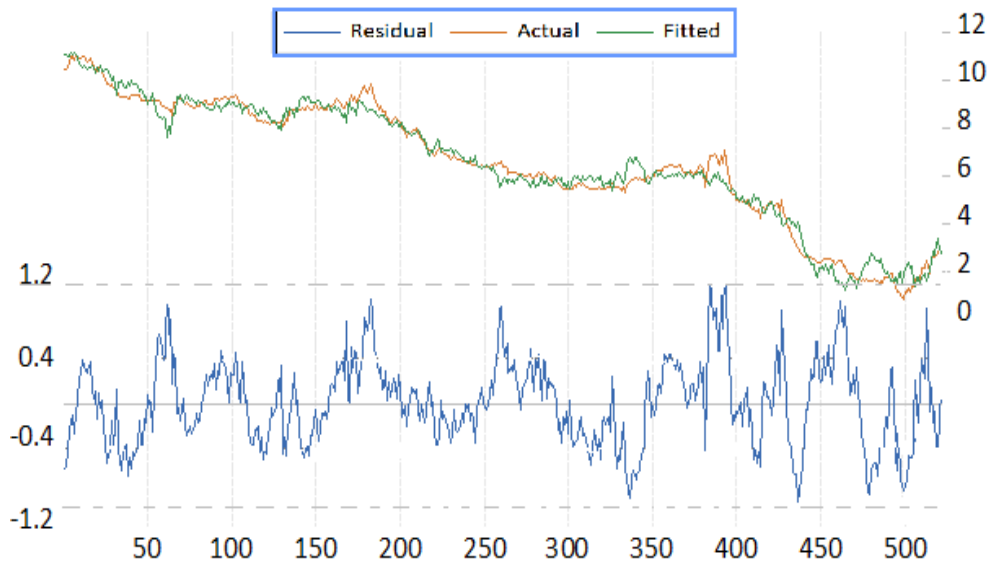


Figure 5 Graph of residuals for predicted value over time.

Source: own figure

The previous regression model provides us the fact that the price of bitcoin is related in many financial assets, and we may consider the impact of cryptocurrencies on monetary systems.

V. CONCLUSION AND RECOMMENDATIONS:

A. Conclusion

Empirical analysis concluded that Bitcoin price have causality relationship with many of leading financial assets, and we may consider the impact of cryptocurrencies on monetary systems.

The results showed a positive relationship between (DXM1 USD, FTSE 100, S&P 500) and Bitcoin gains. This means that when the value of the S&P 500 index rises, so will the value of Bitcoin, and vice versa.

Additionally, there were negative or inverse correlations discovered between (EUR/USD, GBP/USD, GBP/USD, Oil Brent) and Bitcoin returns.

That is, if the value of (EUR/USD, GBP/USD, GBP/USD, Oil Brent) fell, the price of Bitcoin would rise.

According to empirical evidence, there is an inverse relationship between macro financial indicators and bitcoin returns; that is, a decline in stock prices causes shareholders to sell their financial assets, which probably resulted in a rapid drop in the current currency but may raise the revenue of cryptocurrencies if investors direct their money toward them.

Financial assets have a favorable link with the price of cryptocurrencies in all circumstances.

The results of this study, which attempted to investigate exchange rate effects on bitcoin returns, revealed that Bitcoin returns are statistically strongly influenced by the values of leading financial assets. This indicated that the change in leading financial assets statistically significantly affects Bitcoin returns. In other words, bitcoin's value is determined by the movements of other major financial assets.

Because all cryptocurrencies are controlled by private entities, it is critical to study their impact on the monetary system. Independent and private decisions made by private entities regarding money supply and demand may influence central banks'

ability to conduct monetary policy.

When the market matures and the number of participants continues to grow, it is reasonable to assume that cryptocurrencies will eventually affect certain aspects of the monetary system.

A reduction or complete loss of influence on medium of exchange in monetary system would intensify economic and financial problems. The fundamental strategy for avoiding monetary control loss of involvement is to initiate a liable, disciplined, and proven monetary policy.

Maintaining the central bank's objectivity and independence, as well as depoliticizing monetary policy, are self-evident institutional assumptions. Simultaneously, the central bank must be open to alternative developments and ideas resulting from recent innovations.

The increasing pressure of cryptocurrencies will not be solved by ignoring reality or by simply banning or limitation their use.

Cryptocurrencies have grown in popularity as a result of e-commerce. Along with the numerous varieties of cryptocurrencies, their gradual evolution has enabled them to perform similar functions to cash money.

High volatility is frequently associated with cryptocurrency owners actively participating in the economy via supply and demand. Bitcoin's value is not controlled by macroeconomic fundamentals such as inflation, GDP, or interest rate, and additionally, it is not dependent on any other currency.

Rather than that, the exchange rate of bitcoin is entirely determined by supply and demand. Consequently, the possible replacement effects of fiat currency with cryptocurrencies facilitated the discussion on the supply and demand of cryptocurrencies, for example: In May – 2021 Bitcoin plunged 15% after Elon Musk tweets that Tesla Company will not accept Bitcoin as a form of payment.

The findings indicate that the effects of cryptocurrencies would vary in the short and long term, posing difficulties for the application of the monetary system.

B. Recommendations

In this regard, stakeholders can focus on the relationship between the most popular financial assets and cryptocurrencies by combining numerous cryptocurrencies and analyzing the relationship with financial assets. Furthermore, future research could focus on the volatility of cryptocurrencies in relation to supply and demand, trading volume, and the relationship between global financial markets indices and various types of cryptocurrencies. We recommend looking into the impact of supply and demand, trading volume, and cryptocurrencies on the monetary system.

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RESUME

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