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Can cryptocurrency come to fulfil the functions of money?

An evaluation of cryptocurrency as a global currency

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<p>The research presented in this paper covers the developments regarding cryptocurrency in an attempt to understand the virtual currency's role in monetary history, specifically with the intention of developing an in-depth understanding of cryptocurrency's ability to function as money. The research uses a holistic approach towards understanding cryptocurrency's adoptability as a global currency, by examining the intrinsic internal qualities within cryptocurrency as well as external influencers such as regulation, public acceptance and technological as well as economic changes that may bring about the virtual currency's incorporation into the global economy. The benefits of cryptocurrency as money are evaluated, along with the limitations and some specific risks involved with it. The research concludes that there are various significant technological benefits in utilizing blockchain-based currency systems, which may come to be incorporated into the global economy, and that there is a need for the modernization of present payment systems coinciding with technological advancement. A form of cryptocurrency could fill in the gap, or rather the benefits of blockchain may be incorporated into a new form of virtual currency which is centralized as opposed to the decentralized cryptocurrency. The possibility of a form of virtual blockchain-based currency emerging as a parallel currency functioning alongside fiat currency remains to be a moderately strong possibility, depending on the direction of technological, societal and economic developments. However, it is unlikely cryptocurrency would emerge to replace fiat currency in the foreseeable future.</p>	
Keywords	Cryptocurrency, fiat, money, blockchain, monetary policy

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Glossary

CBGC Central bank issued digital currency.

IoT Internet of things.

ICO Initial coin offering

1. Introduction:

Cryptocurrency is a concept which has gained a significant amount of publicity and media attention following its inception in the last decade. Despite the attention and discussion surrounding this concept, it persists to be one that creates confusion in the public sphere, as there remains to be uncertainty regarding what cryptocurrency is in its actuality and what will be the eventual future of the cryptocurrency phenomena.

There continues to be opiated ideas about whether cryptocurrency is a speculative commodity, a currency, something in-between, or something else entirely. Cryptocurrency was only invented a decade ago, therefore it is understandable that there remains to be a gap in knowledge about what exactly should it be defined as, why is it of any importance to society, as well as what role will it come to eventually take in society. Despite the fact that the popularized term for it contains the word "currency" in it; cryptocurrency is not officially recognized as a legal currency in the vast majority of the world, and while it was originally designed to function as a peer-to-peer payment mechanism (Nakamoto, 2008) it is clear that in the last recent years cryptocurrency has largely emerged into being a speculative asset and therefore has been regarded more as an investment opportunity for individuals. As a result, cryptocurrency has shown a high degree of volatility and this has also led to the common assertion that cryptocurrency is simply a speculative asset which is prone to bubble-like characteristics (Conrad et al., 2018: 6). Therefore, may eventually come to lose its initial popularity with time as the initial publicity around the subject wears off. However, despite the volatility shown in the movement of cryptocurrency in the past years, there are certain technological benefits inherent within cryptocurrency, which have led to some signs that imply there is a possibility of the virtual currency eventually becoming adopted on a wider-scale as a payment mechanism for more efficient transactions. Currently many cryptocurrency enthusiasts are also hopeful that these instinct technological benefits will eventually emerge to pave the way for cryptocurrency to develop into a serious global currency.

This research therefore aims to cover this complex topic by examining if cryptocurrency has the potential to emerge into a form of global currency by coming to fulfill the functions of money. In order to do this, this research examines the cryptocurrency phenomena from a variety of angles, covering the technology behind cryptocurrency, to developments of fiat money and global financial issues, examining the volatility and the drivers behind the value of cryptocurrency, regulatory framework towards cryptocurrency, and finally examining the public attitude towards the adoption of cryptocurrency as well as speculating on current trends that may push forth towards a more blockchain-based currency future. The research question is to some degree theoretical, as it is difficult to answer the complex future-orientated question with a high degree of certainty. Therefore, this research approach aims to fill in some of the gaps in knowledge and develop a more comprehensive understanding of the cryptocurrency phenomena as it is. Furthermore, gain deeper insights to what may be its eventual position in the context of monetary history.

2. Methodology

The research conducted in this academic paper has primarily focused on the use of secondary sources, reviewing material from existing literature on this topic from various sources, in an attempt to gain holistic insight and understanding regarding this complex issue. The research has examined the results of several studies, reports issued by institutions, available data, as well as benefited from reviewing literature by experts, and sought out information from news articles to further contribute to the knowledge. The research covers both more qualitative literature as well as quantitative data in order to gain a wider perspective from which one can further analyze, and the type of literature covered includes legal, academic and societal perspectives. The structure of this paper is based around reviewing studies, data and other literature combined with the author's own progressive analysis and interpretation of the research material. Initially the topic introduced, and towards the end of the research, a summarized analysis of the information presented in the body is conducted, before reaching the conclusion.

The form of this research paper is to some extent theoretical and therefore requires some degree of speculation and interpretation, the intention is to present the evidence and analysis in an unbiased form, reaching a conclusion by utilizing the present data, expert opinions and continuous analyses based on the sources currently available.

3. Introduction to cryptocurrency

3.1 A brief history of cryptocurrency:

Cryptocurrency can be defined as a digital asset which uses cryptography in order to secure and verify transactions, as well as regulate the number of units in circulation. Cryptocurrency has been considered unique in nature, as it is the first type of "currency" to utilize a sophisticated type of cryptography, referred to as the "blockchain". The blockchain functions as the primary means of verifying transactions and upholding the currency's legitimacy, utilizing a proof-of-work algorithm (Chohan 2017: 3).

Upon its invention, cryptocurrency became one of the first de-centralized digital currencies, and arguably the most common. While the term cryptocurrency is a popular way to refer to the cryptographically backed digital currency, currently there is no single universal consensus on the term. Therefore, one may find a variety of interchangeable terms that are widely used to refer to the same concept, including terms such as "digital currency" and "virtual currency" and "crypto tokens".

While digital currency systems existed prior to the creation of cryptocurrency, including a cryptographic digital money called "E-cash" created by a cryptographer in 1983 (Chohan, 2017). It was only in the year 2008 that the first properly defined cryptocurrency initially appeared on the market, known by the name "Bitcoin". This cryptocurrency was initially issued by a creator who is to date only known by the pseudonym "Satoshi Nakamoto". With the intention of creating a peer-to-peer digital cash system, that would exist outside of centralized regulation or authority (Nakamoto, 2008). Therefore, a currency which was intended to solely to be property of the currency holder.

Shortly after the invention, the value of the new digital currency "bitcoin" when compared to the US dollar was measured in only about a cent. However, during the following year, bitcoin saw a rapid rise in value reaching a total of 27 US dollars by end of 2009. In the early 2010s, bitcoin

began to gain more mainstream adaptation, and in 2014 Microsoft was one of the first major corporations which declared it will begin accepting payment transactions by bitcoin (Smith, 2014) and by the end of 2017, bitcoin had reached its highest value of 19,783.21 US dollars (Figure 1). The rapid development of bitcoin created a lot of speculation and interest in the area of cryptocurrency.

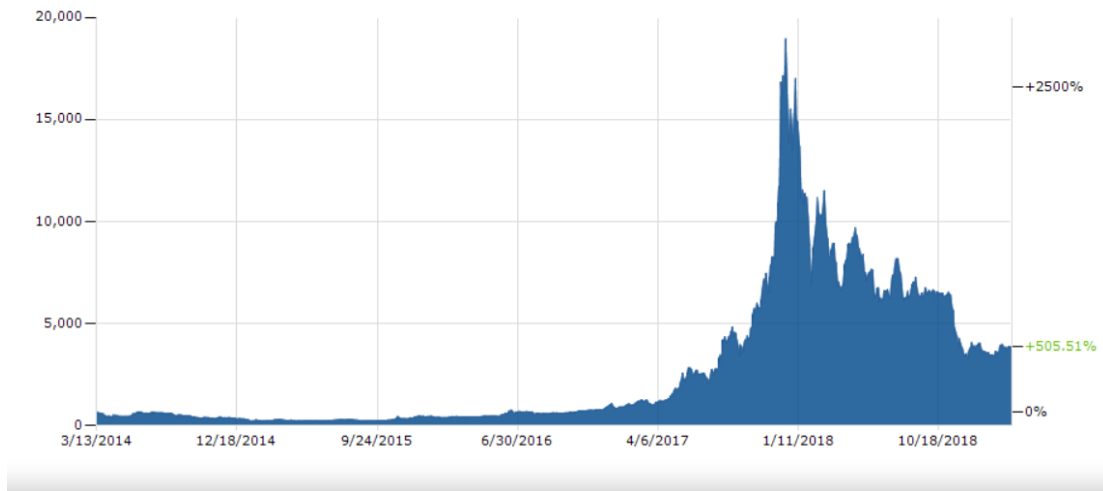


Figure 1: Bitcoin Price (BTC – USD) (MarketInsider, 2019)

While bitcoin has been publicly recognized as the first cryptocurrency to come into existence, it was only shortly after the creation of bitcoin that other cryptocurrencies using the blockchain-algorithmic concept began to appear on the market, including currencies such as “Litecoin” (2011) using Scrypt as a hashing algorithm, “Ripple” (2013) and Ethereum (2015) a cryptocurrency capable of supporting Turing-smart contracts.

At this moment, there is an estimated number of cryptocurrencies totaling over 2000 in circulation and this figure has been growing over the recent years. The combined total market capitalization of cryptocurrencies at its highest peak was estimated to be nearly at 800 billion US dollars (CoinMarketCap, 2019). Demonstrating that cryptocurrency has in the past decade rapidly gained popularity and therefore, also demanded the attention of financial regulators and governments. Since the introduction and adoption of cryptocurrency into the public sphere, there has been widespread disparity among states regarding the implementation of regulatory oversight on

cryptocurrencies. As well as a lack of clarity concerning the global consensus on how to define cryptocurrency; this includes certain ambiguity about whether cryptocurrency itself should be regarded as a medium-of-exchange or 'money' or if it should be regarded more as a financial commodity, leading to certain regulatory disparity. The banking industry has also taken a somewhat eager interest in examining virtual-currency based payment systems in order to create more efficient transactions. Central banks have begun experimenting with the issuing of a central bank digital currency, which would utilize blockchain technology while still remaining a centralized form of currency in nature (Grym, et al., 2017: 9).

In 2018 Malta became the first nation to introduce an organized framework of regulation on cryptocurrency, with the aim to regulate the behavior of cryptocurrency and blockchain based businesses and aim to prevent the commonly emerging scenario of ICO (Initial coin offering) fraud (Wolfson, 2018).

As it stands now, it is apparent that cryptocurrency still resides in the early stages of its adoption and has some time to go until reaching maturity. Therefore, the long-term significance of its invention in history is yet to be fully realized.

3.2 Blockchain: The technology behind cryptocurrency

One of the fundamental aspects of cryptocurrency is its ability to create and verify transactions without the need for any third-party authority to over-see the legitimacy of any given transaction. While the current institution of money relies on the authority of intermediaries such as banks backed by the state in order to verify transactions, cryptocurrency relies on a cryptographic technology called the blockchain.

The blockchain functions to verify the legitimacy of transactions through a series of technical processes, incorporating distributed ledger technology. The blockchain is in essence a distributed digital ledger stored on a node which contains the entirety of existing data of all the prior transactions and works to continuously update the data as more transactions are made within

the ledger. The process functions by tracking the order of transactions chronologically, which then creates a “chain” of incremental transactions. The data is publicly distributed within the ledger with all participants who are users of the blockchain, with each participant granted equal access to the ledger’s history, therefore once new data is entered to the ledger this data is then synchronized with each user (OECD blockchain primer, 2018).

The data within the blockchain is secured with the use of cryptography, and the chain works to continually legitimize any further transactions through a network-effect of consensus by all the participants within the ledger, the technology therefore combines the use of peer-to-peer file sharing advancements with cryptography, essentially, allowing the authenticity of transactions to take place in a decentralized peer-to-peer manner. Although the blockchain can also be designed to also operate in a more centralized form, as has been the case with select cryptocurrencies such as Ripple (Bashir, 2018: 507). While the verification process may use a decentralized peer-to-peer network, it does not necessarily require the trust of the network users to verify transactions, as the ledger functions through self-controlling algorithms which are built into its own system.

Each blockchain is designed with an alphanumeric address, a “hash” which identifies the chain, this unique address exists to prevent attempts at duplicating or manipulating the blockchain. Each block not only contains its unique hash, it also contains the hash of the block prior to it. Every record which has been created within the blockchain is permanent, and it is not possible to reverse the changes that have occurred, each change or transaction which gets recorded into the system is followed by an automatic update, linking that specific transaction to each transaction that has come before it – therefore creating a chronological chain of records with each new transaction (OECD blockchain primer, 2018). It is this aspect of immutability that is one of the underlying advantages inherent in its system. An additional advantage of the blockchain is that using a digital ledger allows for the possibility for it be programmed, meaning users can create new algorithms tied to the ledger which can automate transactions between the nodes.

All transactions in the economy require some form of verification in order to be legitimate, and the blockchain functions as a means of verification which happens automatically and can be triggered instantaneously while not requiring the existence of any third-party overseers to verify

the transactions. This brings about another inherent value in the blockchain technology, which is its ability to cut costs by significant margins by removing the need for intermediaries for verification (Church, 2017: 3).

There are various other potential benefits to using a blockchain based verification system for the use of transactions, which is partially the reason that blockchain based transactions implemented on a wider scale are in experimentation in many parts of the world as of this moment. These benefits include the possibility to lower settlement risks and to have faster international cross-border transactions (Church, 2017: 4). Additionally, the incorporation of blockchain based payment systems may aid in solving the issues concerning lack of access to capital among unbanked individuals which has particularly been a significant restriction to many individuals residing in developing nations.

While blockchain technology has initially emerged from the creation of cryptocurrency, as bitcoin has been recognized as the first application of blockchain technology; the technology itself is applicable to numerous other areas, and has been widely considered to be an extremely disruptive technology with the potential of creating lasting changes across a long range of industries, extending outside the economic area into the political, scientific and social domains (Bashir, 2018: 9). However, blockchain can also be considered to be a foundational technology, as it can set the future foundations for many businesses, as well economic and social systems.

Currently there exists an emerging trend of adaptation of blockchain occurring in the financial and banking sector, as the Bank of America, New York Stock exchange, JPM Morgan have been implementing experiments with blockchain, with the intention of replacing some manual transaction processes with blockchain based transactions. Central banks have begun experiments with the creation of centralized blockchain based central bank digital currency (Bech et al., 2017: 57). While the European Union has announced plans to further increase funding into researching the potential of blockchain technology to nearly 340 million by 2020 (Bashir, 2018: 10).

One of the most promising and transformative potential uses of blockchain is the possibility of "smart-contracts", a term referred to a contract which is self-executing and allows for the immediate and automated transactions to occur once the conditions of the agreement have been

met (Christidis et al., 2016: 2292). The creation of automated smart-contracts may have large implications for the way businesses operate and could progress on to replace many traditional forms of contracts. In theory, with the utilization of digital currency backed smart-contracts, a business would be able to pay its supplier the moment when the items are shipped, and the transfer of property between the two individuals would occur instantaneously as soon as the transfer of payment has taken place, rather than relying on the execution of a traditional contract.

The full possibilities for the uses of blockchain are still unclear. It is however, quite certain, that whether cryptocurrency progresses onwards to develop into a form of worldwide currency, or if it just remains as an alternative payment system in some limited scope, the technology behind cryptocurrency, the blockchain, will with a high degree of probability be incorporated into many societal structures, and will come to have a significant impact on the future of business as well as implications for society as a whole.

4. Fiat money and economic issues

4.1 Brief examination of evolution of money to Fiat:

According to conventional economic theory, the three primary functions that money should fulfill to be considered money are: a medium of exchange, a store of value and a unit of account (Smithin, 2000: 5-6).

Fiat money is the term which is used to refer to the global currency of the modern world. Fiat money can be, in simplistic terms, defined as currency that does not contain intrinsic value, rather fiat money earns its legitimacy through the legal recognition of authority, which in this case refers to the state.

In terms of monetary history, fiat currency in its current form in the world economy, is a rather recent development. For most of the world's monetary history since the use of money was first thought to be adopted around 6th century B.C, the world monetary system was based around the

use of commodity as a currency (Velde, 2010: 27). Under this monetary system, a valuable commodity would be primarily used and accepted as a medium of exchange, along with serving as a store of value and unit of account. Commodity-based currency has most often been based on the utilization of a precious metal, such as gold or silver, due to these commodities fulfilling the primary functions of money quite effectively. Precious metals have certain intrinsic properties which make them a suitable form of barter, these properties include limited supply but not too limited, high procurement costs yet relatively easy to procure compared to certain other metals, durability, and being relatively easy to store (Rowlatt, 2013). Due to these properties, the use of precious metal-based commodities as currency has been widely observed around the world in history. The system of commodity money can be considered to some degree to be self-regulating, as under a commodity-based monetary system the value of the currency would be highly tied to the availability of the commodity, gaining additional value from scarcity. In a case of a shortage, the value of the commodity would naturally rise to accommodate the scarcity, while alternatively if the availability of the commodity would instead overflow the society; this would trigger inflation to occur, and the value of the commodity would reduce downwards towards its intrinsic value again.

With the use of commodity money, the supply of money was not as easily regulated by central authorities, and therefore the scope of monetary policy was limited to a certain degree. A chapter following the use of commodity-money was the eventual transition into representative money. Representative money was a form of commodity-exchange money, under the monetary system of representative money, paper money could be issued yet the value of this money would be backed by a commodity, and therefore could be exchanged for a fixed amount of the commodity it represented (Wray 1999: 29). During this stage in monetary history, representative currency was largely backed by gold.

As discussed, fiat money in contrast to commodity money does not hold intrinsic value, rather fiat currency needs to be declared to be a means of legal tender by a central authority. Under the fiat monetary system, the state retains the sole rights for the production of money, and the money exists as a kind of extension of the state. Therefore fiat-money, rather than having to rely on the natural element of scarcity to maintain and influence its value, earns value through the process and balance of supply and demand, which can be both monitored and influenced by

monetary and fiscal policy set by the central bank and state itself. It is largely due to the fact that fiat money can be influenced by monetary policies, that fiat has established a secure and dominant role in recent times.

It is still worthwhile to consider the initial reasons that brought about its existence and the forces that pushed forth for fiat to eventually come to replace representative money. The initial transition from the use of commodity money into fiat money first appeared due to certain developments. While fiat currency in its modern form is still recent, experiments with forms of fiat currency can be observed in certain stages of history, with the issuing of a form of fiat currency often being followed by the need to stimulate greater funding for government expenditures (Schlichter 2011: 6). Which brings about one inherent benefit in fiat currency from the perspective of the state, which is that a fiat-based currency system allows for more flexibility and the ability to respond to crisis situations rapidly with a greater degree of control, while commodities such as gold do not have a supply which is inherently tied to the economic demands of the given society, and supply of a commodity does not change regardless of the economic situation. Essentially fiat-money allows the government to maintain better control of the economy and establish a regulatory framework with monetary policy in order to manage economic fluctuations and mitigate risks (Schlichter, 2011: 40).

There were some major developments which eventually led to a transition from gold-backed currency into fiat currency, including the emerging financial-crises of the early 20th century, along with strains placed on the economy due to worldwide warfare. Just as the world had recovered from one of the worst financial recessions of the 1930s, nations around the globe entered into a new era of warfare which would further dry out the financial reserves of the states. During and after the war efforts, there was a push for a greater need to stimulate the economy, although due to on-going conflict, many nations found themselves to have insufficient reserves of commodities (Bordo, 1993: 161). The Bretton Woods standard progressed onwards to form a gold-US dollar exchange standard, which allowed member foreign currencies to be converted into dollars which would be backed by gold. In the 1970s, the united states once again found its interests to be in conflict with the representative money standard, as on-going efforts to finance conflicts in Vietnam and other government expansionary projects were largely backed by inflationary practices which in return created widespread inflation in the United States (Bordo,

1993: 177). It occurred that representative money had certain limitations for state funding, these became apparent especially in cases of economic downturns. It was difficult for the state to find means to effectively and easily simulate in the economy, as the process of building and sustaining reserves is time-consuming and requires access to resources. The ability to print money, therefore allowed the state a new means of which to fund itself in situations of crisis and implement monetary policies to balance the effects of inflation.

While there are select inherent advantages with the possibility of the state to print and control the supply of money, the new era of fiat money relies on a certain relationship of trust between the citizens and the state. This trust-based system can be thought to have certain advantages and disadvantages for the economy. As the currency is not backed by any physical-commodity, the currency faces the risk of hyperinflation in case monetary policies are performed poorly, and an over production of the money is pumped into the economic system. A common critique of fiat money is the tendency for the currency to decrease in purchasing power as the government continues to produce more of it over time, fiat currency may be prone to inflation over time with excess demand, however the effects of this inflation can be accounted for and the process of it slow, as states has the means to control it (Wray 1999: 21). The aspect of trust is therefore extremely fundamental to the existence of fiat money, as without the trust in the legitimacy of the state, the currency risks losing value overtime. Commodity-money on the other hand serves other purposes than the government liability. It is therefore because of the trust-relationship towards the state, that the public is willing to sacrifice time and provide labor to the economic system in exchange for fiat currency, despite the lack of any intrinsic value. The system of fiat can therefore be considered to be a kind of collective agreement of our consciousness, the value is based on our belief that it has value and that the state's legitimacy will remain intact. It can therefore be assumed that without systematic trust in the state, the whole system faces a risk of collapsing.

Since this transition from commodity-backed currency into the new world of fiat currency, there has emerged debate about the long-term consequences of the adoption of fiat as the world's global currency, concerning the long-term stability of the currency. In 2008, the world witnessed another massive financial crisis which became the worst global financial crisis since the 1930s Great Depression – this development led to an increased level of distrust towards the traditional

financial institutions and contributed to a greater distrust towards the capability of governments to mitigate the risks during and after financial crises (Roth, 2009).

It was during the year of the 2008 financial crisis, that the first virtual currency "bitcoin" was introduced as a potential of peer-to-peer payment method. From examining the history of money, one can see how the concept of money has changed overtime due to new developments, especially following new understanding of limitations in prior monetary systems. While fiat-money has a dominant and strong position as a global currency in the world, and as mentioned contains certain inherent benefits, it is still an early invention in the wider scale of monetary history. With this information one can further speculate that the concept of what is money and what will be adopted as money may come change due to external or internal influences in the future as well.

4.2 Properties of fiat money and cryptocurrency

Fiat money and cryptocurrency share certain similarities, however there are also certain notable differences between the two. In this section, a few key differences and similarities between the two will be highlighted in order to understand which are main factors that differ between them, and therefore to also gain insight as what potential advantages or disadvantages these differences entail.

Legality:

Fiat currencies are currently considered "real money" in terms of legal tender, they are issued by the central bank and backed by the authority of the state. In order to finalize most transactions, the use of fiat currency is often needed. Fiat currency has a dominant position and is accepted across borders as an official currency.

As it currently stands, cryptocurrencies are not considered officially legal tender in the vast majority of the world, they are not issued by central banks, and in theory they act completely independent of any state control. Cryptocurrencies have also faced heavy regulatory restrictions

as well as complete bans in certain regions of the world (Library of Congress, 2018). Therefore, it can be considered that legally cryptocurrencies operate in an ambiguous arena.

Supply:

The supply of fiat currency is, in theory, infinite. The supply of fiat is unlimited; therefore, the value of the currency is highly correlated with supply and demand, and the success of the currency is highly tied to stability of the state which is issuing it. As there is no cap for the production of the currency, the responsibility of producing the supply is delegated to central authorities that seek to maintain a stable economic balance.

The vast majority of cryptocurrencies in circulation have been designed with a finite supply. This limited supply mimics the scarcity of commodity backed currency as opposed to fiat currency. With the issuing of a new cryptocurrency, there is generally a set numerical limit to the amount in circulation. Unlike with fiat, is therefore possible to know the number of a given cryptocurrency in circulation. The supply in circulation cannot be affected with the implementation of monetary policies (Seetharaman et al., 2017: 231).

Verification of transfers:

Fiat currency relies on an intermediary for the verification of transfers, which can be at times a time-consuming and cost-sensitive process. Many cryptocurrencies relay on algorithmic processes which are automated to verify the legitimacy of a transfer or a network-effect of verification. However as in the case of many cryptocurrencies, transactions fees remain to be high (Chohan, 2017).

Physical properties:

Fiat currencies can exist in a diverse number of forms, with the possibility to take on a digital or physical form. Cryptocurrencies on the other hand exist solely as digital forms of code. There is no other alternative form of cryptocurrency.

Control:

Fiat currencies can be maintained and controlled through monetary policies initiated by central banks, this allows a possibility to mitigate potential crisis situations and economic fluctuations. Due to the ability of the state to control the currency, fiat remains primarily stable in value. The stability provides fiat with the properties that make the currency a suitable medium of exchange, unit of account and store of value.

As with decentralized cryptocurrencies, there is no direct method of controlling for sudden fluctuations and therefore, the value of cryptocurrencies is influenced by other independent variables. In comparison to fiat, the value of cryptocurrencies has demonstrated to be prone to high fluctuations (Conrad et al., 2018: 6). The inability to directly counter fluctuations in value through monetary policy, may pose certain risks to the stability of the currency.

Settlements:

Fiat currencies operate through intermediaries overseeing transactions, this ensures verification of the transfer of funds. The electronic settlement time for a transfer for funds across borders may however take several days.

The settlement time for cryptocurrencies in comparison can be nearly instant, as cross border transactions can take place without having to rely on a third-party intermediary (Church, 2017: 4). However, this also can lead to certain risks, as the ability to cancel a transaction that has been sent to the wrong account is not possible with cryptocurrency-based transactions.

4.3 Financial crisis, lingering issues and effectiveness of monetary policy:

While speculation concerning the effectiveness of a fiat currency system has existed since its initial inception, one could argue that the 2008 financial crisis marked a unique turning-point, with growing worries regarding the effectiveness of the state to mitigate through economic crises. In order to understand the potential attractiveness towards the adoption of a new form of currency, such as cryptocurrency, it is useful to consider what obstacles which exist in the currency system may push forth towards a desire to navigate towards a new system.

One could consider the financial crisis of 2008 to be a warning signal towards all policy-makers in the area of economics, as the lingering effects of the crisis have led to some rather unusual economic times. Along with the financial crisis of the previous decade, the global economy has also been faced with new economic challenges, such as increasing globalization and economic integration, shifting of wealth, economic inequality, climate change and the availability of natural resources, and a massive shift towards technology, digitalization and automation (OECD, 2018: 2). Regardless of which currency will come to be the dominant one of the future, the nature of the future economy will be function with new norms and be faced with a different set of challenges.

The lingering effects of the global 2008 financial crisis have arguably given some fuel to the excitement around cryptocurrency and it is partially due to the concern around the effectiveness of the state's ability to implement traditional monetary policy that lead to the question of "can cryptocurrency become money?" to be asked.

Certain issues have emerged which have halted the ability of fiat currency to produce economic prosperity, these include the tendency towards financial crises, a lack of inclusiveness in the financial system, and fundamentally asymmetrical properties in debt. As it stands now, capital in the economy is highly concentrated in a very narrow selection of the population, and this naturally causes an increase of stress on debtors and has contributed to the environment of growing disaffection towards current economic systems (Senner, 2011: 6-7). Since the wake of the 2008

financial crisis, a massive monetary stimulus was created in attempt to restore market stability and to meet inflation targets, quantitative easing was implemented and interest rates were significantly cut and have remained low in the Euro-area, and other unconventional monetary policies have been implemented in order to stabilize the economy. While these policy decisions did manage to stabilize the crisis situation by stimulating the economy, there have been certain concerns about the consequences of these unconventional policy decisions. Despite the economic stimulus over the past decade, growth has shown to be stalled, especially in the European Union region, both business and consumer confidence has shown to be on the decline and high levels of policy uncertainty continue to persist (OECD, Interim Economic Outlook, 2019). Monetary policy normalization has been paused due to less than anticipated growth within regions, while this has aided financial market conditions in recovery, it has also contributed to a potential built up of financial vulnerabilities. The prolonged period of lower than normal interest rates have contributed to high levels of debt in both the private and the public sector, and asset valuations continue to be stretched (OECD, Interim Economic Outlook, 2019).

Mainstream economic theories have come to focus on interest rate targeting over monetary targeting with the intention of gaining price stability, however the over-reliance on interest rate targeting may have contributed to the lack of a holistic approach towards monetary policy and macroeconomics, some argue that this approach has been to a certain extent inefficient (Senner 2018: 21).

Increasing digitalization and an increasingly sharing-based economy may also pose threats to the current status quo of the economy, as with increased automation, previously secure forms of labor may be increasingly automated, and signs shifting towards a sharing-based economy are increasingly present (Sundararajan, 2016: 30).

While there are a number of issues that are currently facing the global economy, the effectiveness of monetary policy to eventually overcome these economic issues will likely impact the public's perspective on the stability of the economy. If increasing signals of worsening economic conditions start to emerge, or in the case of another financial crisis similar or worse to that of 2008, it is possible that public demand for other currencies may grow out of distrust and a general sense of anxiety towards the persisting economic conditions. There were signs of this widescale

distrust during some of the worst chapters of the financial crisis of Greece in 2015, as Greek citizens began purchasing bitcoins in much larger margins than usual and investing more into the virtual currency than other nations (Pagliery, 2015). Similarly, this phenomenon was observed during the decline of the peso in Argentina in 2018, as the peso lost 50% of its value against the US dollar, bitcoin transactions began to spike and bitcoin ATMs emerged across the country (Heath, 2018). Venezuela has recently faced an extreme case of hyperinflation which has led to the state currency become nearly void of value, it's been observed that many Venezuelans out of a sense of desperation have adopted bitcoin and other cryptocurrencies into use instead of relaying on the national currency, as despite issues in volatility, many feel that the virtual currency is comparatively more stable and provides a better store of value than the national currency bolívar (Di Salvo, 2019). As these are not isolated incidents, they can be considered to reflect a tendency and willingness to adopt virtual alternative currencies in case of economic uncertainty regarding one's own nation (DeVries, 2016: 3). It is generally understood that for any political or economic structure to survive through the long term, sufficient levels of public institutional and systematic trust are needed in society (Roth, 2009: 8).

5. Characteristics of Cryptocurrency:

5.1 Addressing volatility:

The issue of volatility has been widely cited as the primary reason that cryptocurrency cannot function efficiently as a global currency, as bitcoin is the dominant force in the crypto-market, the correlation between bitcoin and other cryptocurrencies is highly positive with alternatively cryptocurrencies having followed the movement of bitcoin quite closely in the past (Coinpredictor.io, 2019). Therefore, it is useful to address the volatility of bitcoin, in order to understand the driving factors behind this phenomenon.

The degree of volatility experienced by cryptocurrencies is widely unconventional compared to other market assets (figure 3). In a study published in the journal of Risk and Financial Management (Conrad et al., 2018) the volatility of bitcoin was examined in correlation to other market assets, such as S&P500 stocks, gold and other metals, with the aim of understanding both short- and long-term volatility components of cryptocurrencies. Interestingly the study observed a negative correlation between the S&P500 stock market volatility and the volatility of bitcoin.

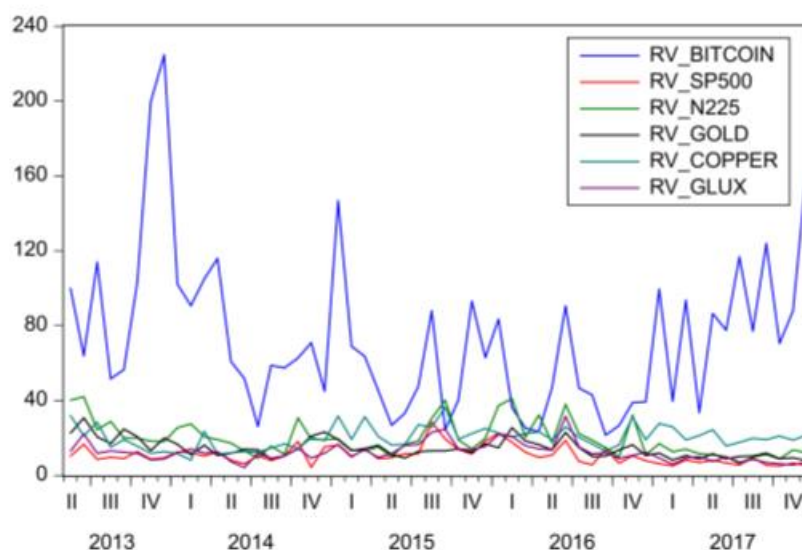


Figure 2. Annualized monthly volatility (Conrad et al., 2018)

The study also showed that dissimilarly to volatility in the stock market, bitcoin volatility displays pro-cyclical behavior. Showing an increase in volatility with increased economic activity. Another observation was that bitcoin behaves contrary to gold in regard to stock market volatility, this finding creates skepticism towards the idea that bitcoin can be compared to a commodity such as gold. This skepticism is reflected in another study (Al-Khazali, 2018) which studied the relationship between macroeconomic news on the volatility of gold and bitcoin, in order to draw comparisons and examine similarities in regard to the behavior towards macroeconomic news. Gold as commodity has shown to display a negative co-movement towards the announcement of positive macroeconomic news, this is generally due to its safe-haven properties. The study found that while gold volatility is primarily insensitive to such surprises in the news, that bitcoin volatility has displayed a positive correlation to surprise macro-economic announcements in news, creating some debate about the safe-haven properties of bitcoin.

An empirical study (Balcilar, et al., 2017) examined the relationship between the volume of bitcoin and its volatility and returns. The study concluded that there was no positive relationship between the volume of bitcoin and the volatility of bitcoin in the conditional distribution, however it did demonstrate some positive correlation between the volume and returns of bitcoin. The volatility observed has demonstrated to be unprecedented in comparison to most other asset classes, and therefore the patterns of volatility are somewhat difficult to compare and draw predictions on.

5.2 Factors that influence the value of cryptocurrency:

One of the most inquired questions surrounding cryptocurrency is, where does it get its value from? The "Bitcoin Bubble" gathered a lot of public attention to what drives the value of cryptocurrencies, as the world observed Bitcoin's value grow exponentially and reach significant new highs in value.

While there has been a substantial amount of studies and models created to understand the value of fiat money, the drivers in the value of cryptocurrency are still unclear to the wider public. In order to understand if a form of cryptocurrency could effectively fulfill the functions of money; it is fundamental to know what drivers create fluctuations in the value, if these drivers can be

accounted for, if they can be controlled to what extent, and can cryptocurrencies maintain a stable enough value to be useful as a medium of exchange, a store of a value and an unit of account. As shown in the previous chapter, as it stands the value of many cryptocurrencies have been extremely volatile, and in this current scenario, cryptocurrencies would do a poor job at fulfilling these functions largely due to the volatility. In order to understand whether cryptocurrency has the potential to become an accepted global currency, the drivers need to be examined.

According to empirical studies done by researcher Poyser (2017) there are approximately three major influencers that drive the value of cryptocurrency, these include both internal and external drivers. According to the research, the most significant of these factors is the supply and demand of a given cryptocurrency, which is impacted by other factors such as the transaction cost, difficulty of mining, the coins in circulation, and rule changes. External factors influencing the value of cryptocurrency include the general attractiveness and popularity of the currency as determined by the crypto-market, which is influenced by market trends and general speculation regarding the currency. The legalization and adoption of cryptocurrency is another major driver influencing the value, which includes restrictions and potential bans that can impact the value. Other macro financial factors also influence the value, although less significantly compared to the other drivers, these include exchange rates, stock market performance, current interest rates, and the value of gold.

Much of the research currently available on the value fluctuations, has examined and identified bubble-like characteristics in the value movement of cryptocurrency. A contributing factor to the rapid rise in value for Bitcoin, has been a general online-awareness and popularity of the cryptocurrency. According to researcher Kristoufek (2013) in a study quantifying the relationship between Bitcoin and Google-search trends, a positive relationship between the number of Google-searches for Bitcoin and the value of Bitcoin was identified. With the value of Bitcoin increasing with internet-popularity as defined by volume of Google-searches. The research found this relationship to be bidirectional, as in the price was influenced by volume of online searches, as well as the volume of searches appeared to be influenced by the price. The study concluded that market-trends and speculation are highly responsible for driving the value of Bitcoin, and therefore warned of the potential for bubble-characteristics to emerge.

Another study on cryptocurrency price drivers (Phillips & Gorse, 2018) demonstrated that the relationship between online-activity surrounding cryptocurrencies and the price of the cryptocurrency, was further strengthened during bubble-market regimes. The research also found very little correlation between price of a cryptocurrency and online activity in the short-term, but a significant correlation between the price and online-activity in the long-term. Showing that online social media and search trends regarding cryptocurrency are not a precise measure of price fluctuation in the near future, but a positive relationship emerges when examined over a longer period of time.

One speculation as to why the value of cryptocurrency has an exceptionally high tendency to express volatility, is due to it being an evolving market, and nascent markets tend to be prone to higher fluctuations in general. As observed with bitcoin, a new phenomenon can contribute to a greater degree of hype, which then leads to speculation, and as more information is generated about this phenomenon, the excitement surrounding the topic further feeds into the speculation.

Another research paper (Griffin & Shams, 2018) studied if the rapid increase in the price of bitcoin was impacted by price manipulation rather than market demand. The research was able to demonstrate by using algorithms to track transaction history in the blockchain, that there were high quantities of suspicious activity that occurred each time the price of bitcoin experienced a decrease in value. The transaction activity regarded in the ledger showed that another US-dollar backed cryptocurrency called "tether" was used to purchase large volumes of bitcoin in cases of a value reduction. This activity was reported to be timed during market downturns. The research concluded that there was a high probability of sophisticated price manipulation taking place during the bitcoin peak and went to state that the results of this manipulation could account for 50 percent of the rise in bitcoin value, and a further 64 percent in the rise of other cryptocurrencies. Critics of the study argue that the explanation for the purchasing of bitcoin following a decrease in value, can be explained by market-demand, and that market participants may seek to stabilize prices in case of downturns or increase purchasing activity during the dip, and this activity does not constitute as price manipulation. However, an earlier study indicated similar results, after analyzing the behavior of bitcoin from prior to 2013 towards the peak years, it was found that suspicious activity existed within the transaction history just prior to 2013, and the study

concluded that there is a high possibility that an single player may have been behind the USD/BTC exchange rate rising from 150 US dollars to 1000 US Dollars in only two months (Gandal, 2017: 95).

This evidence shows that cryptocurrency in its present state, may be vulnerable to further price manipulation, and that the value can be artificially stimulated. While this issue is changing gradually, it understandable to an extent how the lack of regulatory oversight of the cryptocurrency market, could leave it vulnerable to this type of manipulation.

In a paper issued by the bank of Canada called "Bitcoin Standard" (Weber, 2016) a comparison between the Gold standard and a potential Bitcoin-based economy was presented and theorized that the value of a cryptocurrency such as bitcoin, would in ways mimic the value of another commodity like gold, if adopted by the global economy. Similarity to gold, bitcoin demonstrates to some degree a known and deterministic rate at which it is produced, meaning individuals would find it simpler to estimate the value. It is easier to determine the amount of bitcoin in circulation as the data within the ledger is transparent, than it is to speculate on the discovery of gold. Although it should be noted that unlike gold, cryptocurrencies do not contain intrinsic value. The value would however likely be somewhat influenced by the scarcity aspect.

Research also demonstrates that cryptocurrencies, when it comes to market valuation and transaction volumes, are impacted by the state issued regulations (Auer et al., 2018: 63). Demonstrating that setting a new regulatory framework, or the announcement of new regulations placed on cryptocurrency, has a direct effect on the perceived value of it. New announcements about regulatory bans, or changes in the treatment in securities law, appear to have the strongest adverse effects on the value of cryptocurrency. On another note, the opposite has also shown to be true, as positive news regarding the accommodation of cryptocurrency into existing framework has shown to increase the value (Auer et al., 2018: 52).

As the future of regulatory framework concerning cryptocurrencies is still widely unclear in the larger scale, it is probable that some fluctuations within the value can be attributed to a general sense of uncertainty in the market, as participants may anticipate either further restrictions or bans on cryptocurrency activity, or alternatively foresee more inclusive regulations that allow

cryptocurrencies to continue to grow in popularity. While it is sometimes thought that the value of cryptocurrencies operates outside of traditional legal barriers, research indicates that as it stands now, the value can be impacted by government action.

There has been some research indicating that an additional external influence that has demonstrated to have some, although limited, correlation towards the value of cryptocurrency is stock market fluctuations. At least, it has been observed that there is some correlation between the stock-market and the valuation of the crypto-market at certain points in time (Chambers, 2018). Although there has been some debate on whether this is significant, and as demonstrated in the earlier volatility study, as there appears to be negative correlation between stock-market volatility and bitcoin volatility. The stock-market correlation hypothesis has shown to have some mixed results, which has also created speculation on whether bitcoin's value can be to some degree tied to the safe-haven concept. Some speculation as to why there has shown to some correlation between the stock market and cryptocurrency value, can be perhaps explained by some investors diversifying risk from traditional stock-market assets into cryptocurrency assets, however reacting similarly towards crypto-assets with news regarding the stock market, as confidence in the market can be slightly correlated with an increase in the price of cryptocurrency. Essentially investor perceptions of the current stock market may end up to some degree impacting the perceptions of the crypto-market. While from the other perspective, one can consider that investors would wish to invest more into cryptocurrency in case of stock-market downturns as a safe-haven investment.

Research on the driving forces behind the value of cryptocurrency has revealed a variety of influencing factors, and further shown how the crypto-market is prone to sudden fluctuations, largely due to it being an immature market. Currently, the general sense of uncertainty witnessed in the crypto-market can explain some of the volatility experienced in the past years. A combination of speculation, popularity, media attention, public awareness of increasing regulations, price manipulation and changes in perception have impacted the value of cryptocurrencies around the globe. Since several of these driving factors are ones that are more prominent due to a general sense uncertainty in the direction of cryptocurrency, one could theorize that the crypto-market has a potential to stabilize with time and maturity. Once the initial factor of popularity driven speculation wears off, and a standard of regulations have been

established towards cryptocurrencies, it is possible that the tendency towards fluctuations will show signs of settling down. If cryptocurrencies begin to stabilize with time, and the speculation towards the market begins to decrease, the value of a given cryptocurrency could likely become to be more so correlated with supply and demand mechanics, and similarly to commodities, influenced by a degree of scarcity.

5.3 Cryptocurrency as a medium of exchange, unit of account and store of value:

The question "what is money" has had a significant amount of research dedicated to solving it. While it has been difficult to define exactly in definitive terms what constitutes as money and what doesn't, it is obvious that money is a crucial part of civilization and the human condition.

The most common view of mainstream economic theory is that money should be available to effectively function as a medium of exchange, unit of account and store of value. Although there has been debate about defining money by these functions alone (Smithin 2000: 5). There has also been the assertion, that money itself is a socially constructed category, and therefore it is best seen as that, and is established by social relations between various economic agents in a given society (Ingham, 2000: 26). The medium of exchange aspect in these three functions, has widely been considered to be the most fundamental, as it has been commonly believed that the primary function of money is to make the process of transferring goods and services more efficient and minimize transaction costs (Ingham, 2000: 26). However, it can be argued that ability of money to function as a unit of account, meaning a measure by which one can value other items by, and a store of value, meaning an asset which can be stored and will still retain predictable purchasing power at some future point in time, are equally fundamental to the concept of money.

While the issue of what exactly constitutes as money has a wide variety of perspectives. In order to assess if cryptocurrency can fulfill the functions of money, this section will aim to analyze cryptocurrency as fulfilling the classical mainstream functions of money, using the knowledge from the previous chapters.

When addressing this issue, it is perhaps simpler to study the value of a single cryptocurrency such as bitcoin, as bitcoin is the most prominent of the cryptocurrency market, and considering

that other forms of cryptocurrency have shown to express co-movement with the movement of bitcoin (Gandal, 2016: 10).

Currently, bitcoin does serve as a medium of exchange, however in quite limited capacity. It is possible to exchange bitcoin for goods and services in a selected number of retail stores which operate around the world, and bitcoin can also be exchanged for peer-to-peer services by any individual who has a crypto-wallet and is interested in exchanging goods or services for bitcoin.

The range of e-commerce stores accepting cryptocurrency and development towards a general cryptocurrency accepting ecosystem, saw a rise since the start of its momentum in 2015 (Hileman et al., 2017: 107). Meaning, that bitcoin's, along with other cryptocurrency's, ability to function as a medium of exchange may improve with time if adoption rates of the currency by both businesses and individuals would also come to increase with time. However, it should be noted that while the virtual currency can function as a medium of exchange, it does not reflect that the currency would be especially efficient in functioning as a medium of exchange. It is worthwhile to note, that while bitcoin and other cryptocurrencies may be used as a medium of exchange, the eventual purpose of most owners is to convert cryptocurrency back into a form of fiat currency which currently serves as a better medium of exchange. Transactions fees can be another obstacle to the use of cryptocurrencies such as bitcoin as a medium of exchange, as in cases of congested networks and spikes in the number of individuals making transactions, the transaction fees can spike to unusually high values. In the past few years, the number of individuals who own bitcoin and are actively using it as a form of money to pay for goods and services, are limited compared to the number of owners who are holding the currency as an investment (Hileman et al., 2017: 26). This can be to an extent explained by the extraordinary volatility of the currency. This brings about the next point, does cryptocurrency function as a store of value?

One of the crucial aspects that is essential for any currency or commodity to serve as a store of value, is its ability to retain a stable and somewhat predictable value. As discussed earlier, one of the significant obstacles in the adaptation of cryptocurrency as money, is that the currency has shown to extremely volatile in the past few years. While holders of the currency may have welcomed this radical shift in value when the price of bitcoin was rapidly rising, the flip side of this rise was the expected and inevitable fall. It is not essentially useful for individuals to exchange

a currency, of which a unit of that currency can be used in one point in time to purchase a pizza from a retail store, and a couple of years following that date be able to purchase an automobile with the same unit. However, as discussed in the section "factors that drive the value of cryptocurrency" the value of cryptocurrency, especially the high volatility can partially be attributed to certain conditional factors, such as investor speculation, new market conditions, presence price manipulation, and uncertainty of the regulatory environment. Perhaps as the cryptocurrency market begins to mature, and the regulatory framework is established and known, the volatility may start to stabilize as there gradually emerges a better understanding towards what cryptocurrency is and the inherent technological characteristics which were created to function as a peer-to-peer payment mechanism. One issue is that to this date, despite cryptocurrency initially being invented to be used as a payment method, the virtual currency as observed has primarily been widely viewed as a financial investment opportunity, and therefore the value of it has also corresponded to this perspective, the virtual currency market reacts in synch with people's collective perceptions of it.

A further global incorporation of cryptocurrency as a payment mechanism, may eventually, alter the public's perspective of cryptocurrency as an investment opportunity into a form of currency. The issue of volatility is of course, also a factor that makes cryptocurrency unable to effectively at this point in time to fulfill the unit of account function of money. It is difficult to measure any asset in relation to the value of a cryptocurrency such as bitcoin, as the value continues to fluctuate. This in theory would require retailers and suppliers to frequently recalculate the value of assets, which would cause confusion and be time-consuming, hence not proving to be an effective unit of account. However, in theory, given that the conditions were suitable, cryptocurrency in essence could fulfill the function of both a store of value and unit of account. Given that most cryptocurrencies exist in a limited capacity with a cap, similarly to a commodity such as gold, one could envision how the factor of scarcity would eventually allow the currency to become a more effective store of value, and unit of account.

6. Regulatory atmosphere and monitoring of cryptocurrencies

6.1 Regulatory framework of cryptocurrency:

One of the main issues regarding the regulation of cryptocurrency, is the fact that the currency has the means to operate without centralized intermediaries and is essentially borderless. Which has raised concerns about how effective regulation can be to target the currency. However, it has been studied, that announcements regarding new regulatory moves initiated by governments, have caused reactions from the cryptocurrency market. The effects of added regulations have shown to be one of the contributors affecting both the value and the transaction volume of the currency (Auer et al., 2018: 52).

The primary reasons for implementing regulatory oversight of cryptocurrencies can be classified as follows: 1) the need to combat the use of funding for illegal activities 2) the need to protect both consumers and investors against potential fraud and 3) the desire to promote the integrity of financial markets as well as economic stability.

However, as it can be observed that there is a great deal of disparity when it comes to regional decisions on how to regulate cryptocurrency. As the cryptocurrency phenomena is still new in its development process, there has yet to be a unanimous global consensus on how to approach the issue in a regulatory manner. Currently, the world lacks a specific consensus on how to even define cryptocurrency as a term, as certain terms such as digital currency, virtual commodity, payment token, crypto-tokens and so forth, are used interchangeably depending on the region. Although there is not a world-wide agreed upon approach to regulating the currency currently, with the increased flow of information and public awareness towards issue, one can identify certain emerging trends regarding cryptocurrency which can be addressed.

One common theme among various regions in the world is the level of caution which has been shown towards the new virtual currency. Many regions, including such as Australia, Canada and the European Union, have taken initiatives to prevent money-laundering and terrorism funding through the use of cryptocurrency, enacting laws which aim to prevent the possibility of

cryptocurrency developing into a useful tool for illegal activity. In many nations, cryptocurrency can be used to purchase goods and services in establishments which accept cryptocurrency payments, they are not however officially considered legal tender as government issued fiat money is (The Law Library of Congress, 2018).

Most national central banks around the world have offered warnings to the public considering crypto-token schemes, initial coin offerings, and provided education concerning the risks involved with the purchasing and trading of the new virtual currency. Certain nations have decided to proceed further than issuing warnings, with nations such as Pakistan, Morocco, Vietnam and Nepal issuing complete total bans on any cryptocurrency activity (figure 2). While other nations, such as China, Thailand and Iran, have not placed direct bans on cryptocurrency activity but rather created thorough indirect restrictions to the access of the virtual currency by banning financial institutions from facilitating transactions of cryptocurrency within the nation's borders, as well as the banning of initial coin offerings.

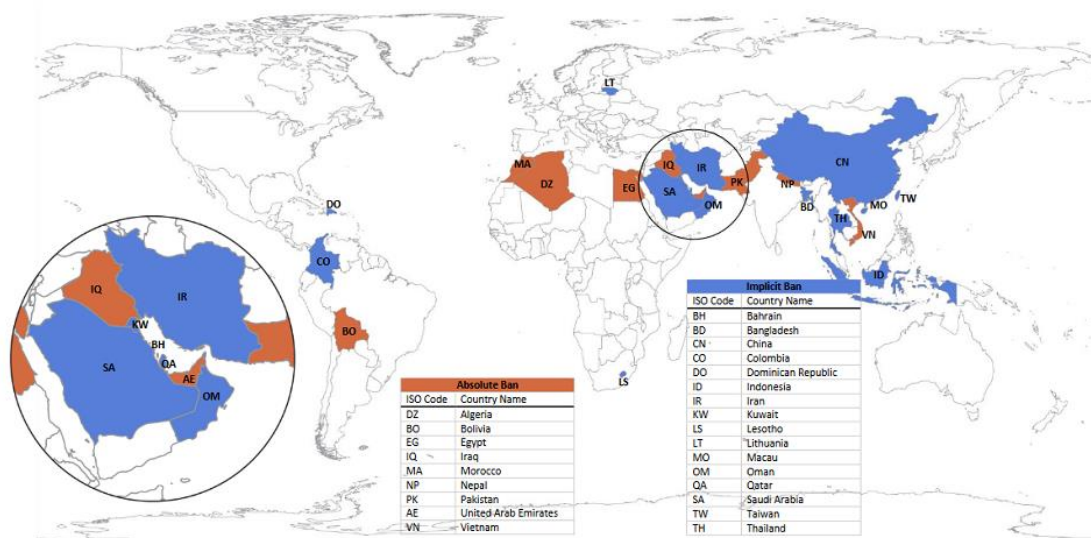


Figure 3. Legal status of cryptocurrencies (The Law library of Congress, 2018)

While the act of banning cryptocurrency related activity can be interpreted as some nations perceiving the virtual currency as either a potential threat to stability, or a door towards illegal activity, some regions of the world have taken a more accepting approach to the new virtual currency. Certain regions have in a sense welcomed the new development and taken steps to start incorporating cryptocurrency into society as well as began the development of more

cryptocurrency positive regulatory frameworks. This has also had the effect of attracting more investment into this area, nations that have implemented more positive frameworks for cryptocurrencies include nations such as Luxemburg, Malta, Spain, and the Cayman Islands (The Law Library of Congress, 2018).

One of the most pressing issues around the world when it comes to the adoption of cryptocurrency, is the issue of taxation. As regions cannot agree on how to define cryptocurrency, there exists a variety of opinions on how cryptocurrency should be taxed. As it currently stands, depending on the region one is in, cryptocurrency may be taxed as anything from an asset, financial asset, be subject to income tax with losses deductible or not, a foreign currency, or capital gains tax. In our current framework of society, a currency cannot become a serious competitor for the adoption in a global scale if there is not a clear consensus on how to implement taxes on the currency.

In the European Union, cryptocurrency investments are not subject to value added tax, and currently the EU does not have any specific broad regulatory framework to address cryptocurrencies. There is however continuous research towards cryptocurrency as well as blockchain developments, and the EU has recently been monitoring and studying the behavior of the virtual currency in order to better understand how to implement the proper regulatory framework towards it (Houben & Syners, 2018: 9).

The central bank of Finland has issued alternating reports discussing the cryptocurrency phenomena, with some issued warnings towards, although a paper released in 2017 provided a more positive note, calling cryptocurrency "revolutionary" (Huberman, et al., 2017: 36).

Switzerland on the other hand has made effort to establish itself as a type of cryptocurrency-hub and promote FinTech start-ups. As of late 2017, the Canton of Zug in Switzerland has been accepting both Bitcoin and Ether as payments for various administrative costs, and municipal services up to a certain amount can be paid for by bitcoin. In the Swiss tax system cryptocurrencies are considered to be foreign currencies, and therefore subject to wealth tax (The Law Library of Congress, 2018: 77).

Despite the ambiguity in relation to the regulation of cryptocurrency, it appears that the vast majority of nations have taken notice of the phenomena and are currently in the process of finding alternative means of how to incorporate the virtual currency into the existing framework. It is not too surprising, considering the new nature of cryptocurrency, that many nations have taken the approach of studying and monitoring the developments further before implementing a regulatory framework on towards it. As it is unclear to many states if the cryptocurrency phenomena is essentially a passing trend or a significant change towards something new that will have lasting economic impacts in the long-run.

The tendency of some nations to heavily restrict or ban cryptocurrency activities demonstrates that there exists a perspective that there is a varying level of threat concerning the developments, and if this perceived threat will continue to grow, there is a possibility that cryptocurrency will in the future come under heavy restrictions or regulations which could contribute to the virtual currency moving “underground”. This would be especially a high possibility in the case that cryptocurrency became a popular vehicle for illegal activities, such as funding for terrorism or a way to promote money-laundering. Overall, it is clear that governments will have a fundamental role in shaping the regulatory framework and policies that will eventually come to determine the adoptability of cryptocurrency in the upcoming future.

6.2 Banks, financial institutions and CBDC:

While there hasn't been a common consensus on how to regulate cryptocurrency, there has been certain alternative courses of action that have taken place in the banking sector.

In our current economic setting, the banking system can be considered the creator of all of the world's money supply. Banks traditionally have an important role of being the intermediary between financial transactions. The usual role of commercial banks has been to primarily function as the middleman between transactions, a bank can verify the identity of a sender, maintain oversight on the account balance, and confirm the receiver's address. Essentially banks function in a centralized and organized manner, taking on the role of the trusted third party that operates between various financial transactions. The banking industry has therefore been to a degree quite decisive with taking an active role towards the new public interest for alternative digital currencies

such as cryptocurrencies. Some of the initial studies and experiments considering cryptocurrencies were conducted by the banking industry, specifically in order to understand the phenomena better and monitor how digital currencies may come to impact that banking sector (Grym, 2018: 2).

One of the interesting means by which the banking sector, particularly central banks, have reacted to the popularity of cryptocurrency, is by considering the issuing of their own digital alternative currency. The issuing of central bank digital currency (CBDC) has been in experimentation among many central banks around the world. The idea of CBDC is to be a payment method which is digitalized and widely accessible, combining the use of the blockchain distributed ledger technology to promote settlement efficiency for transactions (Bank for International Settlements, 2018: 10). The demand for a CBDC is partially motivated by several factors, including a growing interest in incorporating technology to the financial sector, the emergence of new payment methods and services, the growing attention towards digital tokens such as cryptocurrencies, as well as the gradual disappearing of cash, as alternative means of payment are becoming more popular (Bank for International Settlements, 2018: 9).

A CBDC could serve as a widely accepted and safe alternative for a payment method in replacement of cash, for example. As it currently stands, outside of a banking account, an individual may only store wealth through the reserve of cash, which has been shown to be statistically on decline in many regions (Roubini, 2018). The potential disappearing of cash altogether could leave the public with limited access to central bank funds, therefore the creation of a central bank backed digital currency, would therefore be especially a good alternative in regions where cash is gradually becoming obsolete.

If the public has a higher interest in maintaining an anonymous form of payment, a centralized bank issued "pseudo cryptocurrency" may take on a role of an anonymous paying mechanism. Although, there has been some debate about whether a central bank issued digital currency should remain anonymous or not.

Whether central banks eventually decide to issue their own form of blockchain-based digital currency or not, if the popularity of other digital currencies will further increase in the future,

banks may come to find themselves to be facing increasing competition from private currencies, issued and traded by individual entities. As the creation of new virtual currencies is essentially quite easy to do. A situation of parallel currencies could in theory impact the effectiveness of the central bank monetary policy, although recent reports demonstrate that digital currency at this point in time is unlikely to be a serious threat to central banks and financial stability (Financial stability board, 2018). While the issue of parallel currency is not the sole motivating factor for the creation of CBDC, this scenario may be a further push for such a move in the future. The main benefits of such a system, would be to modernize digital payment systems, allowing for an easier transfer of wealth from one individual to another despite distant and borders. Individuals would have access to legal tender in a digital form which can be transferred immediately and anonymously, and this development would also aid in the situation of unbanked individuals, allowing direct access to central bank funds for those who have lacked the means earlier.

There are some limitations to how efficiently central banks may be able to create general public digital currencies. As central banks have security requirements necessary to avoid money laundering and other liability issues and may therefore, wish to avoid issuing their own anonymous digital currency as to prevent the risk of illegal activity. One method to avoid the promotion of using central bank money for illegal activity would be to issue CBDC which is not anonymous in nature, but instead allows for easy tracking of the movement of money. However, if it comes to light that there is greater public demand for an anonymous means of payment, this issuing of CBDC may not prove to be as popular in case of it being issued in a non-anonymous form.

Furthermore, there have been additional issues that may arise from a CBDC, if a public version of CBDC was issued, this would have the potential to lead to greater uncertainty in commercial bank deposit funding. The introduction of a CBDC would eventually lead to the central bank playing a larger role in the financial systems than presently, which would bring about some systematic changes in global financial framework. Another potential threat especially for smaller and emerging economies, is the potential shift towards dollarization; the scenario that individuals in a nation begin using a foreign currency over their own national currency, which can have the adverse effect of individuals abandoning the use of their national currency (Grym et al., 2017: 8). It is also worthwhile to note, that there are legal restrictions to the applicability of a CBDC, and

the legality and applicability of this may be highly regional. Creating a cross-border framework for working with CBDC would likely be necessary in the case that it was released. The use of bank-issued digital currencies may also face becoming more prone to the existing risks that are currently present in various cryptocurrencies.

Regardless of whether banks eventually chose to utilize a form of blockchain-based digital currency as a payment mechanism, from analyzing these initial experiments one can conclude that there exists a certain public desire towards modernizing the world's payment systems and innovating away from potentially outdated payment infrastructure.

While the issuing of a form of digital currency which is created and controlled by a central bank, would only technically be a form of "pseudo-cryptocurrency" as it would by nature be centralized to a degree, the attention shown by central banks across the world to this new potential form of virtual currency has given some degree of legitimacy to the technological benefits of using a digital ledger-based payment system which is incorporated into currency. Demonstrating that even if cryptocurrencies do not come to replace current global currencies, that cryptocurrencies do entail some intrinsic characteristics which may be highly beneficial, and therefore can be studied and mimicked in order to improve modern payment systems.

7. Cryptocurrency as a global currency

7.1 Trends and growth in the adoption of cryptocurrency:

The success of cryptocurrency coming to fulfill the functions of money, is inherently tied to the acceptance of the public to adopt the currency for the use of money, as the currency in its current most common state, operates in a decentralized manner and therefore relies heavily on the network effect of adoption in order to become an efficient means of payment. Despite any technological benefits that are intrinsic to it, the currency stands little chance of becoming "money" on the widescale if there is a lack of public-trust and willingness to adopt the currency into use. As money is, after all, a collective agreement by a given society. Therefore, monitoring

public beliefs, trends in the adoption rate, as well as accounting for the difference between speculative investment into cryptocurrency, and the use of it as a medium of exchange, is important to understanding whether there appears to be greater potential for mass adaptation.

Currently, as discussed within the context of this paper, cryptocurrency faces a number of challenges in the development of becoming an accepted currency, which are present in the legal, social and economic context. Despite this, there has been some evidence indicating that cryptocurrency may come to gain a more stable form and gain popularity. For one, the largest cryptocurrency exchange platform "Coinbase" has more than 13 million registered users, and furthermore there are an estimated over 23 million bitcoin wallets currently in existence (Blockchain.com, 2019).

While it is noted that since the creation of the blockchain based cryptocurrency that there has been increasing popularity towards the topic, it can be difficult to measure exactly where this popularity is emerging from, due to the anonymous nature of the ledger. It is also worthwhile to consider the various geographic, socio-economic, and legal differences and how they may impact the willingness to adopt the currency.

A study which monitored the geographic and socio-economic adoption of the cryptocurrency bitcoin from its initial invention in 2009 up until the end of 2017; found that there was minimal adoption of the currency during the years 2009 to 2014, and identified that the sharpest and rapid increase in its adoption started gaining momentum only in 2015 (Parino et al., 2018). The analysis further demonstrated that there existed geographic disparity between the adoption rates, as nearly all early adopters were geographically present in developed nations, and an increased adoption rate from developing nations was only witnessed in the year 2015. The study also demonstrated a positive correlation between socio-economic welfare and the willingness to adopt the virtual currency, as demonstrated by several indexes, such as internet availability, GDP per capita, economic freedom index and the human development index. Considering the highly risky and speculative nature of cryptocurrencies, especially in the prior recent years, it is understandable that individuals with higher disposable incomes would be more prone to purchasing cryptocurrencies when factoring in the risk.

A global benchmarking report (Hileman et al., 2017) covered data from activities regarding cryptocurrency, including users, mining, popularity of crypto wallets, and the geographic landscape of cryptocurrency, the report highlighted certain key trends in the adoption of cryptocurrency. The benchmarking report covered factors such as the growth in popularity of cryptocurrency demonstrated by the increase of individuals using cryptocurrency wallets and showed that the crypto-market capitalization had more than tripled within the year 2016-2017. Geographically, it was shown that the adoption of cryptocurrency was most significant in the regions of North America and Europe which had experienced the most cryptocurrency exchanges, with the Asia-Pacific region following closely. The adoption and activity rate in emerging countries located in Asia, Africa, Latin America and Middle-east has also shown a rapid increase during the duration of the study. The study also furthered demonstrated that investor activity into cryptocurrency was more prominent, compared to individuals adopting cryptocurrency as a medium of payment.

Due to the decline in the price of cryptocurrencies since the fall of bitcoin, some investors have taken the approach of waiting for institutional adoption before making the decision of whether to further invest into the cryptocurrency sector. One of the common reasons that has been speculated as a factor which causes consumers to experience hesitation towards the purchasing of cryptocurrency is due to the uncertainty of the institutional infrastructure and the direction that this will take in the future. The ability to trade, store and settle assets within an institutional framework will be highly crucial for the adoption on a wider scale. There are however a select number of observable trends towards the building of further cryptocurrency supporting infrastructure. For example, it has been estimated that the number of bitcoins ATMS has grown over the years from just a couple of hundred to over 4,000 (Young, 2019).

One of potential global trends which can be observed at this moment in time, which may come to potentially further boost the adoptability of cryptocurrency as a means of payment, is the general public increase in digital payments, and mobile payments in particular. Mobile-payments refer to the use of applications which allow for the transfer of funds to occur via smartphone payment, rather than the use of cash, cheque or credit cards. While most mobile-payment systems do not currently utilize cryptocurrency as a means of payment, the popularity of these

forms of payments may reflect a technological shift in the payment landscape, and a general desire to modernize payment systems to increase settlement efficiency (Grym et al., 2017: 6).

In 2018, Facebook hinted that the organization had plans of becoming a major player in the cryptocurrency market by announcing that it was in the process of developing a cryptocurrency that could be used to make payment transfers via the popular Facebook-corporation owned messaging application "WhatsApp". Facebook confirmed that the company is developing a "cryptocurrency stablecoin" which will be fixed to the U.S dollar in order to combat the issue of volatility. With the general idea to improve the efficiency and ease of payment systems (Frier, 2018). By utilizing peer-to-peer direct payment methods through the company's applications, the company has the potential to start including the option of paying via one's Facebook wallet for online vendors, not vastly different from the way that users currently have the ability to verify login identity with a Facebook account.

The idea of incorporating cryptocurrencies to the social-media experience may be regarded a positive move when considering the adoption of cryptocurrencies. As discussed earlier, one of the fundamental limitations to the use of cryptocurrency is lack of active users and distributors, as although it is possible to transfer cryptocurrencies with ease across borders, it is not necessarily as easy to find use for the cryptocurrency without first exchanging it to fiat currency. To some extent, cryptocurrency and social-media compliment one-another, as both the success of social media and cryptocurrency relay to some extent on the network effect. If a dominant social media company such as Facebook were to successfully finalize and incorporate a cryptocurrency into the social-media payment infrastructure, then due to the sheer number of Facebook application users distributed around the globe, it is possible that this issued cryptocurrency could rapidly emerge to become the most popular cryptocurrency being used as a payment mechanism.

The acceptance of cryptocurrency by retail companies can also be considered a influencing factor regarding the general adoption of the virtual currency. Currently a select number of major retailers have started accepting cryptocurrencies as a means of payment, some of these include companies such as Microsoft, Shopify, ExpressVPN and Newegg among others. It should however be noted, that the adoption of cryptocurrency payment infrastructure by retailers is highly interlinked with consumer demand, as it stands now, most cryptocurrency users do not use the virtual currency

as a medium of exchange. This means that existing consumer demand for retail companies to begin accepting cryptocurrency payments remains on the lower end (Jonker, 2018: 10). This factor in itself can be considered to be an obstacle for the adoption of cryptocurrency, as naturally retailers will often look towards consumer demand prior to making the decision to offer these digital payment services, and consumers may look towards retailer availability when considering whether to adopt the use of cryptocurrency for making payments.

The general public ignorance due to conflicting information surrounding the issue of cryptocurrency can also be attributed as one of the major barriers which is preventing adoption on a larger scale, especially combined with the regulatory indecisiveness and general ambiguity on the global scale. At this present point in time, there remains a lack of clarity surrounding the topic, as on one hand one can witness that there are numerous tech-companies announcing plans for the creation of their own cryptocurrency, certain regions are building more inclusive regulatory frameworks to adapt to the phenomena, certain central banks are experimenting with the idea of issuing centralized blockchain-based currency, and a select number of popular retailers accept payments through the virtual currency, yet simultaneously activities surrounding cryptocurrency are facing bans other regions, governments and financial institutes have decisively issued warnings surrounding potential scams and the financial dangerous of purchasing cryptocurrency.

These aspects combined with the emergence of news and popularized media attention in the past few years towards cryptocurrency-based scams and hacks that have occurred in several organizations which hold cryptocurrency funds, are likely to raise some concern for many potential new users. The general lack of clarity on the issue is itself a limitation to the potential adoption and popularity.

7.2 The blockchain based economy:

In order to envision a future economy where cryptocurrency has come to fulfill the functions of money and is widely accepted as a payment mechanism within society, it's quite important to consider which factors would push forth for such a development to take place, whether there are present foreseeable indicators of modern society navigating towards this direction, and what would be the intrinsic benefits of cryptocurrency based payments in this kind of a setting.

While the prospect of cryptocurrency emerging into a dominant position and eventually replacing fiat currency any time in the near foreseeable future seems to be rather improbable considering the existing obstacles; as noted there are certain intrinsic benefits within blockchain based currency of which the public is becoming more aware of, along with other significant societal trends, which could in theory push forth towards an economy which incorporates cryptocurrency-based payments at least to some larger degree. A selected number of these factors will be examined in this chapter in order to further understand the value of cryptocurrency in the context of the shifting economy and utilize this information to theorize about a setting that would allow this transformation to occur.

One of the most significant emerging trends within the present sphere of the global economy that has been widely discussed in the past few years, including in the context of blockchain, is the gradual shift towards a sharing-based-economy. In the past decade, there has been a gradual shift observed in the economy, where previously centralized dominant corporations are increasingly experiencing heavy competition from less centralized peer-to-peer services which function through an application, certain popular examples of these services include the likes of Airbnb and Uber (Sundararajan, 2016: 30). In a sharing-based economy, services and utilities are provided by individuals directly to their peers, according to skill, ability and resources. There has been discussion that as the economy begins gradually shift towards a sharing-based economy, the nature of employment, salary and benefits, will begin to transform along with this new form of economy. In a sense, this type of transformation could find advantages in the adoption blockchain technology-based payment mechanisms in order to optimize the methods of providing peer-to-peer services.

Another emerging trend that has been in discussion over the past decade, is the emergence of the Internet of Things (IoT) which refers to a future setting where the widespread use of the internet has been incorporated into everyday life, including into everyday tools, furniture and structures. In the scope of the IoT, every building, vehicle, and even household furniture, could be connected to the online-network, and therefore constantly be producing and sharing data, as well as allowing individuals to be connected continuously around the clock (OECD, 2018: 3). From these two developments, one can consider that there is an increasingly high probability that the

future will be different in certain notable ways, for one the future will be less centralized and will further promote the trend of consumers shifting towards peer-to-peer services, as well as being highly technologically-synched with massive amounts of online-data being continuously produced under such a setting. If these trends end up dominating the global arena, one can identify certain opportunities under this type of a future scenario. For one, in a peer-to-peer sharing based economy, the nature of service-contracts, payments and agreements may come to be quite different. Presently, many online services such as Airbnb operate through a mechanism of taking the role of the middle-man in facilitating the exchange of services, and handling the payment for the service, therefore the contract of the exchange happens through the company's platform despite the peer-to-peer nature of the services. However, it is possible, that this facilitating and payment of the service may begin to happen automatically without the need for a "middle-man" to facilitate it, and this is made possible by the concept of "smart contracts" (Sundararajan, 2016: 93).

Smart contracts function in a form of being self-verifying, allowing for the automatization of payments to occur at the precise moment that the conditions of the contract have been met, essentially allowing the contract to self-execute that which written in the agreement. The idea behind smart contracts is to make contractual agreements more efficient, as well as removing the need for a third-party to facilitate the contract. While the concept of smart contracts has been around since the 1990s, it wasn't until the invention of the blockchain that this concept became closer to becoming a reality. As earlier discussed, the blockchain stores all data, transactions and history within a ledger, meaning that in the case of a smart-contract, once a condition has been agreed upon and then executed, it is in theory, not possible to change those conditions or manipulate the data after it has been registered in the ledger. The blockchain secures all existing data in its history in a secure and organized manner. In a theoretical example, if person "A" wished to purchase a car from person "B", a smart-contract would state the conditions which would have to be met in order to for the transfer of the vehicle from person "B" to person "A" to be valid. Once these conditions have been met, by for example, a transfer of funds as agreed upon, the smart-contract would self-execute itself through data-driven code and therefore the ownership rights for the vehicle would automatically be transferred from person "B" to person "A". In theory, this type of contract would reduce the amount of funding needed for consolidating lawyers as well as reducing the amount of time needed in-between to facilitate the purchase.

In order to allow contracts to self-execute and the transfer payments to occur immediately in the moment of which the conditions are met, the use of a digital blockchain-based currency would be utilized within the contract. In an economy where smart-contracts begin to be utilized in the wider scale, transactions in retail, finance industries, real estate and so forth, would continuously become more automated further promoting a more decentralized model of exchanging goods and services. In a world where smart-contracts are commonly chosen to execute agreements, it would lessen the effort for any one individual to create a contract with any other individual, agree on a set of conditions, and be assured that payment will proceed to occur once those conditions have been met – this step may be a beneficial one in an increasingly peer-to-peer based sharing economy. Under this type of a setting, the use of cryptocurrencies as a means of generating automated instant payments, would become increasingly wide-scale and a societal norm. One could foresee how in this particular type of setting; the use of cryptocurrencies would become a common parallel in the global economy.

When it comes to the Internet of Things, the concept has faced obstacles due to security concerns of data being transmitted via an online-cloud service, challenges in the speed of processing data and the potential for data leaks and other security issues on the on a wider scale (Díaz et al., 2016: 935). One of the suggestions for overcoming a few of these obstacles, is the implementation of blockchain technology to secure the data in the IoT. The implementation of blockchain based technology supporting the IoT, would additionally allow for the possibility of automated micropayments to occur via smart-contracts with the use of cryptocurrency (Huckle et al., 2016: 463). Micropayments would occur via established smart-contracts connected to “things” which would then automate payments during the process of use. An electrically run vehicle could, for example, be self-paying the use of electricity through micropayments that occur during the use or similarly a “smart house” may pay for its electricity via micro payments – removing the need for a third-party to send a traditional bill for the customer to transfer funds via a bank account, in order for the payment to occur.

One other advantage of the use of blockchain based payments in the economy, is the ability to verify payments, as well as reduce bottlenecks and cut costs in the supply-chain. As an example of this, in the year 2017, the World Food Bank conducted an experiment to utilize blockchain

based currency systems in a refugee camp in Jordan's Azraq camp. Presently one of the pressing issues when it comes to the transferring of aid funding towards nations and populations who are in need, are the costs associated with administrative tasks, especially when attempting to gather accurate data on the use of the funds and preventing either corruption or fraudulent use of funds. In this experiment, the individuals in the refugee camp were provided with blockchain based currency to purchase goods and services, the blockchain ledger allowed for transparent data to be collected immediately after the purchase took place. The end results concluded that it was possible to cut administrative costs by significant margins by incorporating this technology (Schramm 2018: 33).

The full applications of blockchain based technology and autopay functions via cryptocurrency are still unknown, and early in development. And while in theory the concept of a more decentralized economy with a sharing-based-economy, utilizing smart-contracts and blockchain based verification and securement of data is plausible, and furthermore provides some degree of legitimacy towards the wider adoption of cryptocurrencies by the public as a means of payment, it is important to note that there are certain limitations and issues with the adoption of this concept.

One of the issues facing blockchain based technology at this moment is its scalability, as blockchain ledgers continue to be subject to vulnerabilities caused by sudden spikes in traffic and other security issues such as the possibility of hackers to potentially steal users identification keys. There has appeared to be some degree of difficulties in the ability of the blockchain to manage large volumes of transactions which are taking place simultaneously, as this has often resulted in congested networks as well delays in transaction verification. There is also the underlying issue of security, while blockchain-based currency for the most part has shown to be secure, and it is in theory extremely difficult to hack the blockchain ledger itself, some evidence has shown that attackers may find ways to exploit the properties of the blockchain in order to manipulate it (Li, et al., 2017: 10). it is important to consider that blockchain is a new technology and the scale of security risks involved in a highly utilized blockchain-based economy are therefore still unknown, these risks would need to be examined thoroughly before expanding public trust towards such as system. Without trusted third-party intermediaries facilitating various transactions and verifying the legitimacy of these transactions, individuals would become more responsible for ensuring

their own protections in these transactions. As individuals operating in smart-contracts, would still need to be able to understand the conditions and rights within those smart contracts. There is also a possibility that a wide-scale system which is run on automated smart-contracts and micropayments, would create a certain kind of rigidity in society that does not account for general human tendencies and the need for greater flexibility, by automating a series of processes which would otherwise allow for more flexibility by having a human intermediary facilitating the whole process.

By examining these current trends in society, as well as the possibilities that are presented with a blockchain based cryptocurrency, new opportunities for the direction of economy are revealed. While the wide-scale utilization of cryptocurrency itself fulfilling the function of money can be difficult to predict in advance, understanding the potential opportunities and the potential changes that such an adoption could create is useful in analyzing the probability of such a development to take place.

7.3 Analysis: cryptocurrency as a global currency

This research has examined the potential of cryptocurrency developing into a global currency from a number of angles, seeking to understand the benefits, opportunities and obstacles which are present regarding this issue. The purpose of this chapter is to summarize and further analyze the findings of this research in relation to cryptocurrency's ability to function as a global currency, in order to draw to a conclusion.

As has become evident throughout this research, cryptocurrency possess certain beneficial properties which contribute to its appeal as a currency. Firstly, the ability to secure and verify transactions instantaneously and allow for the possibility to remove barriers concerning cross-border transactions. Given that society increasingly functions in a technological arena where data can be transmitted instantly despite national borders, simultaneously people are increasingly moving towards online e-commerce purchasing over retail, and as significant sums of money are stored electronically in online-bank accounts, one could conclude that it would be a logical step forward to move towards a currency-system where money can be transferred as effortlessly as data through one individual to another, without the time-lag caused by relying on third-party

intermediaries, and this could have profound implications for economic activity. Although one should consider that this brings about certain security issues, as while it is simple to transfer funds using a form of virtual currency, it is extremely difficult to reverse a transfer once it has been initiated. The ability of cryptocurrency to provide a new anonymous payment method and allow increased capital access for unbanked individuals particularly in developing nations are also beneficial attributes, as cryptocurrency can be accessible to anybody who possesses an online-device and has access to the internet. Creating an ecosystem which allows the possibility for many unbanked individuals to transfer capital around the world, an accomplishment which could greatly aid against financial inequality. As business-transactions increasingly move online, it will be foreseeably easier for individuals to start online businesses and manage payments across borders, overcoming the lack of access to banking or money exchange rates; given that cryptocurrency payments become more widespread and common. Another quality is the ability for cryptocurrency to act as a replacement currency in nations where the national fiat-currency has become devalued, therefore allowing individuals, to an extent, to bypass some of the financial burdens that come with a weak national currency and a vulnerable state. However, in this case in particular, there is a kind of potential threat of cryptocurrency becoming an alternative parallel currency that leads people to abandon their national currencies in exchange, which can then impact the effectiveness of monetary and fiscal policy by the national state (Grym et al., 2017: 8).

Currently, there is no existing global framework which would allow cryptocurrency to transform into a global currency while simultaneously allowing for efficient control and regulation of the currency. Although it appears as evidenced by data, that nations around the globe are presently working on created better frameworks and regulatory initiatives which eventually might allow for more unanimous control mechanisms to emerge. However, at present, it is difficult to envision how widescale regulations regarding cryptocurrency would come to impact the way the currency functions.

The experimentations considering central bank digital currency demonstrate that certain beneficial aspects of cryptocurrency may instead be incorporated into the current existing framework of fiat currency, meaning that rather than cryptocurrency coming to replace fiat currency, aspects of cryptocurrency may be merged with the current economic system. A central

bank issued digital currency may potentially overtake the popularity of independently issued cryptocurrency, although as discussed in this research paper, these CBDC may also be prone to certain risks.

The benefits of blockchain-based technology have also been examined in the context of allowing administrative costs to be cut rather significantly, in the case of transferring funding for foreign aid (Schramm 2018: 33). Centralized blockchain based currencies have the benefit of keeping a ledger of data, which can be easily tracked throughout the currency's movement. This aspect of transparency may reduce the risk of financial fraud in certain cases. The incorporation of blockchain-based payments into smart-contracts and eventually the Internet of Things, may lead to a revolutionary change of how payments occur in society, as the utilization of micropayments becomes mainstream.

While many of these aspects referred to in this chapter, demonstrate the potential utilization benefits of cryptocurrency, there remains to be short-comings of cryptocurrency functioning as money. As discussed earlier, the issue of volatility remains to be a significant factor preventing independent cryptocurrencies from being adopted wide-scale as a means of payment, or a store of value, with the exception of limited cases in nations with devalued currencies. The drivers behind the value of cryptocurrencies have shown to be complex and varied, highly influenced by speculation, media hype, and potentially price manipulation. This has been a limiting factor, preventing independently issued cryptocurrencies from efficiently fulfilling the primary functions of money. When regarding the trends and growth in the adaptation of cryptocurrency, studies have largely demonstrated that individuals for the most part have concerned themselves with cryptocurrency as an investment opportunity, not as an alternative form of money. It should be noted that as the cryptocurrency phenomena is still recent, it is difficult to separate the cryptocurrency developments in the larger scale from the "bitcoin bubble" trend that was observed in the years 2015-2017, which was largely fueled by mass interest, speculation and media hype. If given another decade of public and regulatory adjustment towards cryptocurrencies, this would allow for greater accuracy to analyze the full-utilization and function of the virtual currencies with less interference from potentially situational factors.

8. Conclusion

The research in this paper has examined the theoretical idea of cryptocurrency coming to fulfil the functions of money and the incorporation of cryptocurrency as a global currency in the world economy. This has been researched through a variety of directions using a varied approach from many angles in order to understand the phenomena of cryptocurrency and the adoptability of it by society at large. The nature of this topic has proven to be quite complex, with a variety of factors that will should be examined in a future date in order to understand the direction that this progresses to in the future.

To summarize the findings in the research, it is clear that the inception of the first cryptocurrency sparked new ideas regarding the present concept of money, and created further discussion concerning the incorporation of technology into money. The history of money has been prone to changes over time, often reflecting the demands of the existing society, and one could further speculate that the world's present economic systems may not be as stable and as permanent as they currently appear to be. There are certain pressing vulnerabilities in the global economic system as it currently stands, which presumably may be overcome with the implementation of calculated policy measures and a further emphasis on mitigating the existing risks. As despite these vulnerabilities, it is rather improbable that within the scope of the near future there will be a sudden abandonment of the current structure of the economy and fiat currency. Although, in the case of, for example a major financial crisis, increased public distrust for the current economic systems may be triggered, which may then lead towards a direction that provides room for the adoption of alternative currencies, especially if the public begins to lose faith in national currencies.

It is clear that blockchain-technology behind cryptocurrency comes with certain fundamental benefits that at least will be incorporated into society on some level, and blockchain-based payment systems themselves may also come to find their place in society, as experiments with central bank digital currencies continue to progress and private companies contemplate the

issuing of their own cryptocurrencies. The public may become more aware of the benefits of blockchain-based payment systems if these are implemented incrementally over time, and adoptability will likely follow such a direction.

When considering the actual functionality of cryptocurrency as a currency, the obvious issue remains the instability and volatility of the currency. However as noted there is at least in theory a possibility that this level of instability will not continue to persist forever. Although, when examining the factors that influence the value of cryptocurrency, some concerning results have been demonstrated, especially regarding the speculative nature and potential for price manipulation. When examining emerging trends considering the Internet of Things, micropayments and an increasingly peer-to-peer based sharing and service-based economy, it appears that there may eventually be a greater demand for blockchain based payment systems, which could optimize these new developments. The push for the adoption of a virtual-currency based payment systems, may end up eventually emerging from the next stage of technological evolution.

While this research has aimed to cover the topic in an unbiased manner, there are certain limitations to be considered. Firstly, it is important to make the distinction that there are currently thousands of declared cryptocurrencies in existence, and most of the research concerning cryptocurrencies have been conducted on the most popular ones, specifically bitcoin. This research has therefore also largely focused on data concerning bitcoin, this can be justified to an extent as in the recent years other cryptocurrencies have largely mimicked the behavior of this dominant currency in the crypto market. However, the applicability of the research may not include all other forms of cryptocurrency as thoroughly, as there are certain technological distinctions between the different virtual currencies as well. These studies covered in this paper have also focused largely on the years and events surrounding the bitcoin-bubble phenomena, which may impact some of the findings concerning behavior and volatility. Furthermore, the topic being covered in this paper is highly present, meaning that new information concerning this issue is emerging consistently, as new information emerges it can lead to some prior research to be considered outdated.

One of the crucial factors that will be rather fundamental in establishing the future of cryptocurrency and its adoptability will be the eventual regulatory frameworks issued by varying states, the ambiguity of the status of virtual currency at this state, makes it difficult to predict the future developments. This is an area would should be monitored and examined closely for any individual who is interested in this topic.

To conclude, it is the author's opinion that there exists a great degree of potential within cryptocurrency as a payment system, however despite this, unless extraordinary circumstances emerge, it is not expected that cryptocurrency will come to be a serious competitor to replace fiat currency in the following few decades. This is due to a lack of a common framework to adopt virtual currencies as money in a large societal scale, and it is not yet known how efficiently monetary and regulatory policies could be implemented in the economy under such a system. Also, price stability will have to be present before the virtual currency can be a serious competitor. Although, there is a good possibility of the emergence of cryptocurrency-based payments as a type of parallel currency that may benefit certain transactions. The issuing of fiat-backed cryptocurrencies may also become a more prominent payment mechanism in the future, as it is probable that the incorporation of some of the technological benefits of cryptocurrency into the current economic system will be witnessed if experiments persist in this direction. The cryptocurrency phenomenon is certainly an interesting development in monetary history, and while the emergence of cryptocurrency has had an impact on society and will persist on have further implications, the full significance of this phenomena will remain to be uncovered at a future point in time.

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