CRYPTOASSETS AND THE NEW FINANCIAL PARADIGM: TRANSFORMATIONS AND CHALLENGES IN THE DIGITAL AGE

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Heitor Rocha Penna, Daiane Rodrigues dos Santos, Christiano Arrigoni and Josué Araujo Dutra Louviz de Azevedo.

ABSTRACT

The rise of crypto assets represented a significant transformation in the global financial paradigm. With the growing popularity of crypto assets, financial transactions are becoming simpler and extending beyond national boundaries, facilitating financial globalization. In parallel, the pandemic has intensified the search for alternatives to traditional monetary systems, further boosting this phenomenon. The global financial system, traditionally underpinned by a complex and interconnected banking network, has experienced changes due to the advent of Bitcoin and other crypto-assets, which operate independently and in parallel with the conventional banking system. This transformation is not only limited to the emergence of new assets, but also extends to the increasing adoption of the technology underlying these assets, blockchain. The technology in question, the basis of cryptocurrencies, has been gradually adopted by banks, companies and governments, bringing agility, connectivity and security to financial and commercial transactions. This article explores the advent of cryptoassets and its implications for the global financial system. It deals with the regulatory challenges faced by these new forms of financial asset in Brazil and the possible future directions for their regulation. By assessing the intersection between technological innovation and financial regulation, the present work sought to provide a synthesized understanding of the changes that are shaping the future of the global financial system.

Keywords: Financial institutions. Bitcoin. Cryptoassets.

INTRODUCTION

The rise of crypto assets represents a fundamental shift in the global financial paradigm. Financial transactions are becoming easier with the popularity of cryptocurrencies, which also extend beyond national boundaries, becoming a useful tool for financial globalization. The search for safe and stable alternatives to traditional monetary systems has increased during the pandemic, intensifying the phenomenon.

Society's relationship with means of payment is still linked to fiat currency. In today's domestic monetary systems, each country or region issues its own currency, technically, through the control exercised by central banks[1]. However, it is possible to observe that the global financial system has undergone some changes due to Bitcoin. The stability of the currency and the financial intermediation system is a necessary condition for good macroeconomic performance.

The issuance of fiat currencies and the regulation of the financial system imply, among other things, that most countries have a strong influence on the means of payment available to the public. For example, at present, private banks cannot issue official paper money, only central banks can. However, depository financial institutions can issue demand deposits, which are included in the main definitions of currency around the world. However, through banking regulation instruments, such as compulsory deposits, central banks are at least able to limit the power of traditional private financial institutions to create money. Therefore, although the issuance of paper money and bank reserves (the so-called monetary base) is controlled by central banks, the broader means of payment, which include demand deposits, are not perfectly controlled by central banks, but are strongly influenced by their policies.

At the same time, technological developments have driven a significant transformation in the global financial system. This system is supported by a complex and interconnected banking network. Technology, especially the advent of the internet, has brought a revolution in terms of agility, connectivity, and security. More and more financial solutions are using the Internet as a way to modernize the systems used around the world. Gradually, banks began to use the technology that is at the base of the Bitcoin crypto asset, the Blockchain. On the other hand, Bitcoin and other cryptocurrencies do not require a banking system to carry out transactions, as they use fully decentralized payment systems.

[1] From the second half of the twentieth century, there was a strong expansion in the creation of central banks around the world, so that nowadays almost all countries have a central bank as the government body responsible for issuing and controlling the supply of paper money and bank reserves of a country. See Pringle (1993).

Thus, operationally, cryptocurrencies and their technologies can be considered completely independent of the current global financial system, (ROMANO, 2020).

Over the years, given the increasing complexity of the global financial system, banking regulation has been developed to protect the system and reduce the risks associated with banking activities. The rules of the National Financial System apply to financial institutions in a segmented manner according to the size of their exposure to risk and the relevance of their international operations. Thus, institutions that are more exposed to risks or have relevant external activities are subject to more comprehensive and complex rules, while institutions with less risk and less important external activities are subject to simpler rules, without prejudice to prudence in both cases. Since 1988, international standards for banking regulation and supervision have been established by Basel, which is a set of recommendations for good banking regulation practices issued by the BIS (*Bank for International Settlements*), which is a supranational financial institution composed of the world's leading central banks. The Basel Committee on Banking Supervision created Basel I and II, (CENTRAL BANK, 2020).

It should be noted that financial regulation is not static. Laws, instruments, and procedures are developed based on modern financial practices as well as memories of the "last financial crisis." The pressure from financial institutions for total freedom of action leads to periodic processes of "deregulation" and the emergence of "financial innovations". The era of globalization has been generous in restoring full freedom for the international movement of capital at the domestic and international levels, (JUNG et.al, 2018). In the last 20 years, according to Pelucio-Grecco et al. (2020), the banking sector has not developed much technologically. While smartphones emerged in the last century and computers took on incredible forms, the banking sector has changed little for society. In the last two decades, only the magnetic card and the digital account have been responsible for most of the transformations in the banking sector. During this period, no other major transformations were carried out.

However, it is known that technological advances have provided an improvement in the financial system as a whole. Fraud detection, risk analysis, customer service, and product personalization are just a few of the areas where artificial intelligence (AI) and machine learning (ML) have been widely used. Financial institutions can learn a lot about risk management, investment behavior, and customer spending patterns thanks to access to a large volume of data and sophisticated data analysis techniques. Digital payments are also worth paying attention to: Fast and convenient payments have been made easier with the proliferation of mobile apps, e-wallets, and online payment technologies. (PELUCIO-

GRECCO et al., 2020). In Brazil, the role of the Central Bank of Brazil stands out with the introduction of the PIX system, starting in November 2020, which provided the necessary infrastructure to implement digital payments via mobile in the Brazilian financial system.

In recent years, technological innovations related to the digital revolution and the use of artificial intelligence in financial markets have allowed the creation of new instruments, in particular crypto-assets, among which private cryptocurrencies or digital currencies have become popular. Bitcoin can be considered the evolution of a decentralized financial system. Governments and central banks are giving way to computers and blocks of data. In the digitized financial world, cryptocurrencies are leading the way. A little over ten years ago, Bitcoin was created, which opened the cryptocurrency market (ROMANO, 2020). After almost ten years of existence, crypto assets are still questioned about their use. It is believed that crimes such as money laundering can be carried out through transactions with cryptocurrencies, such as Bitcoin. In addition, the lack of clear regulation in countries and price volatility create distrust about these digital assets. For the evolution of the topic and more adherence in the daily lives of economic agents, it is important that governments and financial institutions work together to establish a balance between innovation and security, ensuring that the potential of these digital currencies is fully realized in a safe and efficient way.

While technological advancements have fueled the unprecedented growth of cryptocurrency markets, the financial frenzy surrounding private currencies is nothing new. Throughout history, some private currencies have lasted longer than others, but some have not, not least because private agents lacked certain attributes that define a state, such as a territorial base and the ability to impose standards and regulations. Despite this historical experience, new business leaders, especially in high-tech sectors, have brought innovations to financial markets and tried to create their own currencies (ROMANO, 2020).

The purpose of this study is to examine the complexity of cryptocurrencies and understand how they are redefining the foundations of the financial system and generating significant changes in various areas. The present study proposes to discuss the stability of the currency and the financial intermediation system, which is a necessary condition for good macroeconomic performance. It is for this reason that the state monopoly on the issuance of money and the state regulation of various segments of the financial market have become part of generally accepted institutional opinion and practice. In recent years, technological innovations related to the digital revolution and the use of artificial intelligence in financial markets would allow the creation of new instruments, in particular crypto-assets,

among which private cryptocurrencies or digital currencies (such as Bitcoin) have become more popular.

Cryptocurrencies are increasingly present, but not limited to banking and commercial transactions, and are able to overcome cross-border barriers, promising greater security than traditional models. The pandemic has accelerated many existing trends, including the adoption of digital currencies by businesses, investors, and institutions. This is because the world is showing signs of distrust in the current financial system and government-backed fiat currencies that have been weakened and vulnerable to inflation. Ultimately, this has encouraged more public companies and institutional investors to diversify their holdings into this new asset class (MALAR, 2023). With this in mind, it is essential to understand how this innovation is changing the way we value, interact with, and use currency. Therefore, the present work highlights the elements that are part of this technology and the transformations in certain sectors that it will affect. It also provides a broad view of their limitations to determine how they can contribute to the development of the real economy while creating complementary relationships with existing monetary and banking systems.

In addition, the growth of crypto assets around the world has sparked significant discussions on issues of regulation, ethics, and cybersecurity. As more people adopt cryptocurrencies and the underlying technology continues to change, it is critical to assess the effects of these changes on global financial stability, cybersecurity, and the privacy of economic agents. Since there is no centralized authority that controls transactions, it is critical to understand how state-owned financial systems can adapt and control this rapidly changing environment. This work aimed to address the aforementioned issues, analyzing the effects and problems associated with the growing adoption of cryptoassets.

THEORETICAL FOUNDATION

The purpose – the reason for existence – of state-owned companies is simple. There are two objectives. The first is the most direct: they arose as a result of direct state intervention in the economy, either competitive intervention – a state-owned enterprise works together with and competes with non-state private enterprises – or monopolistic intervention – a state-owned enterprise exclusively carries out certain economic activities that can only be carried out by public authorities. (MARQUES NETO, 2006). The second objective, often observed in practice, is to eliminate the obstacles of formalism that affect bodies and subjects of the public administration, regardless of whether or not they have legal personality under public law. This goal aims to reduce bureaucracy, often aligning with the first goal. This is due to the fact that some state-owned companies do not operate as

business arms of the State, but as providers of public services, whose functional reality overlaps with the legal definition established by Decree-Law 200/1967. This decree, although criticized, defines public companies and mixed-capital companies, but does not explicitly mention the provision of public services as one of its functions (MARQUES NETO, 2006).

In his work "The Privatization of Money", Hayek proposed that the countries of the Common Market could assume, through an official agreement, the obligation not to create obstacles to the free exchange of the national currencies of the countries participating in the agreement in their territory (HAYEK, 2011). Bitcoin may, for example, represent this free trade in part because it is a currency created to overcome these barriers imposed by governments. The changes to the system are at the heart of Bitcoin's value, which lies in its effectiveness as a payment system, not in its previous use of the currency as a medium of exchange. (ULRICH, 2014). However, it should be noted that other problems are not solved with the adoption of Bitcoin, such as volatility, risk, purchasing power parity, and exchange policies, for example.

However, Ulrich (2014) argued that the most direct way for a government to do this would be to intervene in the conversion of Bitcoins into national currency. Furthermore, he believes that these efforts have only encouraged people to stay in the Bitcoin ecosystem. An article on the political economy of Bitcoins argues that a government's refusal to accept Bitcoins alone is not enough to stop Bitcoin transactions. For the elimination of transactions to be possible, the government would have to control a sufficient part of the economy.

The first Bitcoin regulations emerged in 2013 in the United States by the Financial Crimes Enforcement Network, which made *digital currency exchanges* and processors subject to the bank secrecy law, defining them as money services companies. (FOBE, 2016). Canada was the first country to install an ATM in Vancouver in October 2013, where Canadian dollars and Bitcoins could be exchanged. Despite the light regulation, this position may change with the arrival of a new liberal government. (FOBE, 2016). Japan pioneered Bitcoin-friendly legislation, sparking a digital gold rush in the country that sent its price skyrocketing around the world. It is already possible to use Bitcoins to pay bills in restaurants, electronics stores, and even pay gas bills. (EFE, 2017). At times, comments that China would shut down its virtual currency exchanges in the country affected Bitcoin investors in China, who left the Chinese cryptocurrency market with it, and caused the Japanese Bitcoin exchange market to once again be the largest holder of the market, with a share of more than 50%. (UMPIERES, 2017).

In Ecuador, then-President Rafael Correa banned Bitcoin transactions in the country and created a digital currency for the country. The digital currency created by the country has collapsed, leading to an increase in the use of Bitcoin. And in the neighboring territory, Bolivia, the use of any digital currency was banned, which was subjected to severe government repression. (MOURA, 2017). In Brazil, the Central Bank of Brazil took a position in Communiqué No. 31,379, of November 16, 2017, which states that virtual currencies are not guaranteed or issued by monetary authorities, so they do not have guarantees of conversion into sovereign currencies. Therefore, the risk lies with the owners of the cryptocurrency. But it concludes that the Central Bank supports financial innovations that make the financial system safer and more efficient. (DAMASO; GRAZIE, 2017; CABRAL, 2022).

BITCOIN

In 2021, digital assets moved out of the peripheries of the economy and began to enter the mainstream, leading to wider public adoption. Commercials for trading cryptocurrencies on platforms cover television networks in the United States, and the industry has become a focus of everyday conversation. In November 2021, with Bitcoin prices peaking around the $60,000 level, the total value of all cryptocurrencies surpassed $3 trillion, an increase from approximately $500 billion in December 2020. Today there are more than 16,000 individual cryptocurrencies in circulation, led by Bitcoin. Total daily trading volumes are now estimated to be over $275 billion across more than 400 platforms. (HAMMOND AND EHRET, 2022).

The year 2021 was transformative for digital assets and the stage is set for regulators to build a framework to target this massive new market. So far, the regulatory response is best described as ad hoc, rhetorical, or motivated by law enforcement in some cases. In such a new and disruptive area, it will likely take years to solve the challenge. Additionally, the ambiguous nature of digital assets and the absence of standardized definitions create issues of jurisdiction and overlap.

A brief definition of cryptocurrency is presented by Chu et al. (2017, p. 1) as "[...] a digital asset designed to function as a medium of exchange using cryptography to secure transactions and control the creation of additional units of currency." It should be noted that new currencies are the result of the "mining" of data from blocks of encrypted information, that is, a set of actions performed to confirm and process transactions in digital currency, in order to find the key that encrypts the blocks, called has, (CHU et al., 2017).

Bitcoin, the world's first decentralized digital currency, is a cryptocurrency: "Cryptocurrency in its purest form is a peer-to-peer version of electronic money. It allows online payments to be sent directly from one party to another without going through a financial institution." (PENA, 2017, p. 26). Bitcoin, the first and largest cryptocurrency, is capped at 21 million coins, which contributes to its deflationary effect. This characteristic makes it attractive to investors looking to preserve value in a context of rising inflation. In addition to Bitcoin, other cryptocurrencies such as Ethereum and Solana also have deflationary characteristics, contributing to their appreciation over time. However, it is important for investors to consider the associated risks, such as price volatility and the environmental impacts of the mining process, before including them in their portfolios. The growing popularity and growth potential of deflationary cryptocurrencies highlight the need to continuously monitor market trends and adjust investment strategies as needed (Pistunov & Nikolaenko, 2023).

Electronic currency, also known as cryptocurrency, is considered the currency of the internet. It does not have a system to regulate its transactions, its commercial exchanges, it does not have a regulatory body, unlike the currencies that exist and circulate around the world, cryptocurrencies are independent, they have their own system, an online system managed by their own users. The name bit does not refer to a byte, as many may think, but to a peer-to-peer (P2P) sharing network called BitTorrent, in which each user is anonymous and has equal value. This is what happens with virtual currency. Although Bitcoin is the most famous and widely recognized in the internet world, Bitcoin is not the only cryptocurrency in existence. The main points of competition belong to Litecoin and Mastercoin, but none of them is as representative as Bitcoin, the main virtual currency of the modern world. The origin of Bitcoin is attributed to Dorian Nakamoto, whose code name was used by Satoshi Nakamoto, although he always denies the alleged creation, which, at least officially, remains anonymous (PENA, 2017, p. 34).

For Bariviera (2017), one of the advantages of Bitcoin is the freedom of payments, we have the possibility to send and receive money anywhere in the world at any time. There's no need to worry about crossing borders, transferring associated holidays, or other restrictions that may arise when transferring money. With Bitcoin, control over your money is complete and there is no form of central authority on the Bitcoin network. He cites other benefits, such as security and control. It allows users to control their transactions, helping to keep Bitcoin safe for the network. Sellers cannot charge additional fees without prior notice and must notify the consumer before adding any type of fee. Bitcoin payments can be made and completed without linking personal information to the transaction, the fact that personal

information is hidden from prying eyes protects against identity theft, and a Bitcoin wallet can be encrypted and backed up to keep money safe.

The community of programmers of the Bitcoin protocol understands that the dissatisfaction with the existing global commerce over the Internet, the need for financial institutions as reliable third parties in transactions is one of the main reasons for the creation of the digital currency. This dissatisfaction is based on the high transaction fees charged by financial institutions, the lack of reliable information from monetary authorities on the global economic situation, and the cyclical global and regional economic crises that devalue and impoverish most of the world's countries and their populations (ULRICH, 2014).

Focusing on focusing on solving the computational double-spending problem that Bitcoin was created for, since a third party would be involved in the person responsible for securing a transaction, debiting or discounting funds from an email address or account and crediting them to another party, who would theoretically have a reliable database of all operations. The logic behind the creation of a digital currency by the developers of a decentralized system is similar to that of miners, who spend resources – computing and electricity – in exchange for gold (ULRICH, 2014).

According to Rose (2015), Bitcoin's success since its birth in 2008 has opened the door to hundreds of digital currencies (Ethereum, Cardano, Binance Coin, Stella, Litcoin, Monero, DogeCoin, among others) with the same basis of reasoning in their computer programming or Blockchains. Since the launch of Bitcoin in 2009, several hundred different "cryptocurrencies" have been developed and accepted for a wide variety of transactions in major commercial markets (CAMPBELL-VERDUYN, 2018).

Ulrich (2014) stated in his work that Bitcoin is a currency, and for this it provides the main elements of monetary theory. He emphasizes that Bitcoin is a form of currency, as well as comparing email changes with information about what Bitcoin can do with money. In the work, he uses the Austrian school of economics as a theoretical framework through the monetary theory developed by Ludwig von Mises to analyze what Ulrich describes as the "Bitcoin phenomenon". Providing monetary freedom and the future of currency as a backdrop.

The price of Bitcoin (BTC) hit a record high again in March 2024, surpassing $73,000. That particular spike in prices was caused by the approval of Bitcoin ETFs (Exchange Traded Funds) in the United States, while previous spikes in 2021 were caused by events with Tesla and Coinbase, respectively. The mass interest was fueled by Tesla's announcement in March 2021 that it had acquired $1.5 billion in digital currency, in addition

to the IPO of the largest U.S. cryptocurrency exchange. At the end of 2022, the market was very different. However, on July 28, 2024, Bitcoin prices reached around 68,255.87 after another crypto exchange, FTX, filed for bankruptcy.

It should be noted that Bitcoin's supply is finite, unlike fiat currencies such as the US dollar, as the Federal Reserve, the US central bank, may decide to print more banknotes. Bitcoin's maximum supply, which reached around 89% in April 2021, is built into its design. Despite the more powerful mining technology, it is believed that Bitcoin will be gone by 2040. This is because mining becomes much more difficult every four years, a feature of Bitcoin's original design. As a result, a Bitcoin mining transaction could in 2021 be equivalent to the energy consumption of a small nation.

BITCOIN'S FIT INTO THE ECONOMY

Bitcoin, like any other means of payment, has advantages and disadvantages in its use. Talking about the negative points, first of all, it should be mentioned about its low perception by society. This is due to the fact that few people know the crypto world, which is not very simple to understand.

Another problem with digital currency concerns its security. As Ulrich (2014, p. 30) points out, the lack of care for Bitcoin addresses and/or digital files can lead to losses. The author explains that "if a digital file is lost, money is lost, as well as cash". As for addresses, if they are not well protected, they can be stolen. This is not an individual risk, as Bitcoin exchanges also face this problem. The author gives several examples of cases where this has happened: Bitcoin exchanges have also faced security issues; in 2012, hackers stole 24,000 BTC (then valued at $250,000) from an exchange called Bitfloor in 201236, and in 2013, a series of DDoS (Distributed Denial of Service) attacks were carried out against the most popular exchange, Mt. Gox37, (ULRICH, 2014, p. 30).

In this sense, there is the fact that cryptocurrency is permissive and conducive to the practice of cybercrimes. Although cryptography and the Blockchain system guarantee the security of transactions, the lack of regulation of Bitcoins opens the door to the market for illegal products and services, as well as money laundering, terrorism, and human trafficking operations. According to (Ulrich, (2014), the same dangers also exist in the use of traditional money. However, this argument is not enough to convince critics, as Bitcoin is actually a much more discreet and anonymous means of moving value than a government currency.

Rotta and Paraná, (2022) also warn of the environmental problems caused by cryptocurrencies. According to the authors, the amount of energy consumed in the process

of extracting assets is equivalent to the costs of a country like Ireland. The competition of different computers during mining tends to increase the complexity of the algorithmic problems to be solved and therefore increase the cost of the energy spent on it. The problem of consumption depends to a large extent on the type of energy used and can be solved by using renewable and more sustainable energy sources.

In contrast to these unfavorable factors, certain advantages are observed in using Bitcoin over public currency. First of all, it should be noted that forced currency transfers require the payment of various fees, which add up to a significant amount. New companies and small businesses suffer the most, as they have to divert a significant portion of their resources to cover the costs associated with each sale. Financial transactions with Bitcoin, in turn, have lower costs and are more profitable for microentrepreneurs and small merchants.

Bitcoin is distinguished not only by its low costs but also by the flexibility of large transfers. An article by Rubinsteinn (2021) for the digital magazine Exame shows that an investor transferred almost forty-five thousand Bitcoins (about two billion reais at the time) in just one minute at the cost of four reais.

Boff and Ferreira (2016) also refer to the benefits of universal access to financial services. The authors explain that, according to estimates by the World Bank and published in a report by the WSJ Money Beat, about 2.5 billion adults in the world still do not have access to these services. This shows that society has not yet been able to create a financial system accessible to the entire population. (BOFF; FERREIRA, 2016). Using data from the same report, Boff and Ferreira (2016) show that "the number of people without access to financial services could be reduced by 90% with mobile payment technologies" and argue that the adoption of cryptocurrencies has low transaction costs relative to currencies issued by traditional banks and that this could solve some of the problems created by this financial inaccessibility.

The efficiency of international transfers is also an important differentiator of cryptocurrency. According to the article Panda et al. (2023), Bitcoin offers a viable alternative to traditional money transfer systems, which can be slow and expensive. Bitcoin allows for near-instantaneous transactions between parties in different countries, without the need for financial intermediaries, which can significantly reduce the time and cost involved. Additionally, the use of Bitcoin in diversified portfolios has proven advantageous in terms of risk-adjusted return, especially in cross-currency contexts, providing investors with an effective tool for portfolio diversification and mitigation of currency risks.

Finally, the limit on the amount of Bitcoins created and the fact that it is an autonomous financial system are factors that guarantee immunity against the phenomenon of inflation. Boff and Ferreira (2016) explain that in the case of Bitcoin, because it is a decentralized currency and has no central authority to control its monetary base, the risk of inflation is lower or zero because the increase in the value of the currency is constant up to a predetermined limit of 21 million monetary units. Furthermore, as discussed in the article "On Bitcoin's Investment Credentials: A Cross-Currency Perspective" published by Panda et al. (2023), Bitcoin not only benefits from a fixed emission limit but also from its decentralized nature, which contributes to its resistance to inflation. The Bitcoin system is designed to be autonomous and operate without the intervention of a central authority, which prevents manipulations in the money supply that could lead to inflation. This characteristic, according to the authors, makes Bitcoin an attractive option for investors seeking protection against the depreciation of the currency's value, especially in a global economic scenario where expansionary monetary policies are common. Bitcoin's ability to maintain its value in an environment of rising inflation reinforces its role as a store of value and an effective tool for portfolio diversification.

BITCOIN AS CURRENCY

According to Rotta and Paraná (2022), there are three groups of scholars who analyze the nature of Bitcoin. The first group seeks to analyze the sociological aspects of cryptocurrency, the second seeks to analyze its economic aspects, while the third group presents complementary contributions from both aspects. The fact is that, despite the different points of view used to understand and criticize cryptocurrencies, the consensus among the groups establishes that Bitcoin is not configured as a currency or currency of social recognition, but rather as an asset for speculative investment.

Monetary economics states that for an object to become money, it must fully fulfill the three functions of money, which are: intermediary of exchange, store of value, and unit of account, and meet certain requirements regarding its characteristics. Chartist theory, on the other hand, states that the main function to be performed is that of a unit of account, because in monetary history other functions came after it.

To function properly as a unit of account, Bitcoin must serve as a yardstick for measuring prices and debts to support established economic contracts. Keynesian and post-Keynesian theories establish that for this to happen there must be a stable purchasing power of society. It is also necessary to gain the trust of agents in fulfilling their obligations.

That doesn't really happen. It turns out that the strong swings in the price of Bitcoin make it difficult to use it in medium and long-term contracts.

According to Ulrich (2014), Bitcoin already works as a medium of exchange, but with less liquidity than a national currency. We can see that this function is only partially fulfilled by cryptocurrency, because to be considered as such, it must be widely accepted by society as a form of payment. In fact, the first monetary transaction in Bitcoin made sense. According to the Inset website (2021), the number of establishments that accept Bitcoin more than doubled between 2018 and 2021, reaching twenty-eight thousand stores in 2021, but the fact of low liquidity and high volatility still keeps the numbers unimpressive and hinders its use as a universally accepted means of payment. We can even see that the markets with the greatest focus on its use have been the information technology and cryptocurrency markets, while others still show some resistance to the movement.

In terms of value preservation, Bitcoin works from a speculative perspective, but not from a wealth preservation perspective. Large swings in an asset's price make it particularly interesting as an investment, as people can use its appreciation and depreciation to bet on future returns. However, these fluctuations completely destroy your potential to retain wealth. As he himself states (Ulrich, (2014, p. 29), "there is no point in managing the finances of the business or keeping savings in Bitcoins if the market price fluctuates in an uncontrolled and unpredictable way".

Thus, we can understand that Bitcoin does not fully fulfill any of the three main currency functions required for a monetary economy, and this is mainly due to the risks associated with its volatility and low liquidity.

BITCOIN AS AN ASSET

Although Bitcoin cannot be considered a currency, it has great potential as an investment asset. This is for two reasons: 1) the cryptocurrency has no regulator, stabilizer, and lender of last resort; 2) Digital currency has become quite speculative over the years.

Since its inception in 2008, Bitcoin's price has experienced singular changes. Several events have caused significant ups and downs in the price over these years after its advent. Bitcoin initially had negligible value. The first transactions with him were documented in 2010, when 10,000 BTC were used to buy two pizzas, with the value of each Bitcoin at less than a cent. Increased interest and media coverage boosted Bitcoin's price in 2013, when it crossed the $1,000 mark for the first time. However, the collapse of the Mt. Gox exchange in 2014, which resulted in the loss of approximately 850,000 BTC, caused a significant drop in price, taking it below $300. After being driven by speculation

and growing institutional interest, Bitcoin reached a new all-time high of nearly $20,000 in 2017. However, it dropped sharply to around $3,000 in 2018. Starting in 2020, Bitcoin started a new upward trajectory. While being driven by large companies and institutional investors, it reached a peak of around $64,000 in April 2021. However, events such as regulatory restrictions in China and comments from influential people like Elon Musk caused a lot of "noise" in the crypto market, which led to an abrupt drop. Bitcoin's price volatility in 2023 reflected the speculative nature of the asset and the market's sensitivity to global events and news. In February 2023, the price of Bitcoin experienced a significant drop following the interest rate hike by the United States Federal Reserve, which increased risk aversion among investors and reduced appetite for speculative assets. On the other hand, in July 2023, the price of Bitcoin surged rapidly following news that BlackRock, one of the largest Bitcoin asset managers, had applied for the creation of a Bitcoin exchange-traded fund (ETF), reporting growing institutional interest.

It turns out that cryptocurrencies (or cryptoassets, based on the aforementioned arguments) in general have not yet reached the point where they can generate more deposits than the assets to back them up. That is, cryptocurrencies, including Bitcoin, do not yet create money through credit in the same way that traditional banks do (According to monetary theory, commercial banks create money by granting loans, which increases bank deposits). It should be remembered that this process depends on citizens' trust in the institution that will protect their funds. Cryptocurrencies still lack public trust because, in addition to security and cybercrime concerns, they lack a central agent of last resort to regulate, stabilize, and lend in times of crisis. Therefore, Bitcoin, like other digital currencies, is much more an asset than a currency itself.

Regarding the second point, Rotta and Paraná (2022) explain that the effects of the 2008 global financial crisis, along with the monetary policy that was considered after the pandemic, were factors that allowed crypto assets to become highly speculative: Bitcoin has become a highly speculative digital asset in a world flooded by excess liquidity since the 2008 financial crisis, exacerbated by successive rounds of quantitative easing, negative interest rates, and 'loose' monetary policy following the Covid-19 pandemic, (ROTTA; PARANÁ, 2022, p. 13). Another point to be mentioned when we relate Bitcoin to investments is that the crypto asset has its own brokers, known as *exchanges*. These companies act as intermediaries in the process of buying and selling digital assets, aiming at greater convenience and security for individuals. In addition to brokering transactions, exchanges can lend virtual currencies and/or build a portfolio of assets for customers to manage virtually.

It is important to note that, as Brezolin (2021) explains, the dynamics of digital assets do not require intermediaries, but rather a certain trust between the parties involved, which is difficult in a world where cryptocurrencies are little understood and little used. Intermediation emerged as a response to this problem. Thus, we can understand that Bitcoin can be an investment option for those who are willing to take a lot of risk, as it has significant fluctuations that open doors to significant profits or losses.

NEED AND POSSIBILITY OF INVESTOR PROTECTION OF CRYPTOASSETS

In this study, it can be seen that virtual assets are speculative and can be used as a payment or exchange currency. And there is movement of wealth through these transactions. It is important to note that even with the increase in the movement of values through virtual assets, there is no regulation by the inspection and control bodies, even though there are rights and obligations in these operations, such as, for example, taxation of these values. Finally, this section will address who will be the provider of these virtual assets and why there is a need to regulate these providers through supervisory and regulatory bodies, as a way to ensure the safety of these investors.

Exchanges are responsible for buying and selling virtual assets such as tokens and cryptocurrencies (Bitcoin, Ethereum, Litecoin, among others.) through an online platform. The exchange of virtual assets for fiat currencies is allowed through applications on these platforms. An owner of virtual assets who wants to buy or sell through the exchanges must first register on the platform so that they can open only the valid and activated accounts they have. Registration with these brokers requires certain personal information from potential users. Personal information is under the control of this broker and the protection of your data belongs to him. (GRUPENMACHER, 2019).

Transferring virtual assets on an *exchange* can be tricky. All operations on the blockchain are carried out by the user and he needs to understand how the technology works and be aware that there is no central body to ratify, change or delete the operation carried out. After making this transfer to the financial institution's exchange account, all these funds are in the possession of the broker for legal purposes and are specifically made available or exempted from registration by BACEN or other competent bodies. Funds are somehow applied without supervision and regulation of such activities, (GRUPENMACHER, 2019). Some brokers charge a fee for providing these services. However, although it is not the only way to carry out the steps described, these platforms make it much easier to trade virtual assets and offer a higher level of security for users, which is why they demand these services a lot when investing in the market and for the planned investments (RODRIGUES,

2019). For legal purposes, it is a legal entity, part of a joint venture, and the following operations are carried out on behalf of an individual or legal entity.

For Steinberg (2019), regulation should affect these companies because they represent an efficient market that can be regulated by the Brazilian legal system. With this in mind, investors use *exchanges* both to trade their assets and to secure them. Thus, there is an opportunity to organize the circulation of these virtual goods. There is a difference between the activities carried out by banks, financial institutions authorized by the Central Bank of Brazil (BACEN) and *exchanges*. The main difference between them is that *exchanges* do not manage assets denominated in the national currency unit (the Real) in their portfolio. Thus, they need to turn to commercial banks to manage their assets and convert them into national fiat currency. A priori, its economic activity is focused on commercial virtual goods. He understands that there is no need to register the *exchange* in the National Financial System (SFN) and, after its regulation, transform it into a financial institution, since its activities do not yet pose a greater risk to financial stability.

In the foreground, in 2015, Bill No. 2,313/2015 was presented in the Chamber of Deputies, by Deputy Lucas Vergílio (SD-GO), which mentioned the meaning of criminalizing certain activities related to the inclusion of cryptocurrencies and air mileage payment programs supervised by the central bank. This attitude can be explained by the lack of information and knowledge on the subject at the time, as well as the link between the beginnings of Bitcoin and money laundering and drug trafficking. In this sense, (Barossi-Filho and Sztajn, (2015) highlight the need to protect these assets as follows: Because it circulates without the control of any monetary authority, because there is no guarantee of convertibility into another currency, because it has no backing, as in the case of currency or precious metals, this virtual currency market can lead to financial disasters. There is no way to guarantee creation limits for this type of coin and therefore clearly define its parity with any other asset. It lacks the liquidity typical of legal tender currencies. And despite these problems, the creation of this virtual currency, which is an expression of the exercise of private autonomy, does not violate the persuasive rule, it is not illegal, (BAROSSIFILHO, SZTAJN, 2015, pp. 1669-1670).

Also in 2019, PL No. 2,060/19 was presented in the Chamber of Deputies, whose objective was to provide a legal framework for virtual goods. In addition, in the same year, it received PL No. 3,825/2019, which proposes to regulate the national virtual asset market through concepts, instructions, definitions of the operations licensing system, supervision and internal inspection of central banks and securities commissions to combat money

laundering. The sanctions apply to other illegal activities and fraudulent or careless manipulation of the exchange of virtual assets.

Subsequently, Bill No. 4,401/2021, originating from PL No. 2,303/2015 in the Chamber of Deputies, aims to establish a comprehensive regulatory framework for virtual asset service providers in Brazil. This bill proposes significant changes to several legal frameworks, including Decree-Law No. 2,848, of December 7, 1940 (Penal Code), and Laws No. 7,492, of June 16, 1986, and No. 9,613, of March 3, 1998, to include virtual asset service providers in the list of institutions subject to its provisions. The purpose of the bill is to regulate the performance of these providers, defining clear guidelines for their operation, such as the need for prior authorization from a federal public administration body or entity, to be appointed by the Executive Branch. In addition, it establishes that the provision of virtual asset services must observe principles such as free enterprise, information security, consumer protection, and prevention of money laundering and terrorist financing. The bill also details the competencies of regulatory bodies, including operating authorization, supervision, and application of sanctions in case of non-compliance with the rules.

It is noteworthy that there is a large circulation of wealth through these assets, through operations. Therefore, it is necessary to regulate virtual assets by the Brazilian legal system so that there is no vulnerability on the part of the owners of these assets. In addition, the lack of specific legislation to regulate these asset providers can certainly be considered the biggest obstacle to the development of activities in this sector.

With the advent of virtual assets, a new form of personal wealth has emerged, different from the traditional assets conceptualized by the Brazilian legal system. Although there are several forms of virtual assets, cryptocurrencies (or cryptoassets) stand out as the main asset, generating a large movement of value in transactions on the platforms that store them, here called "*exchanges*", and even with this growing movement, it still remains on the margins of regulation.

In the first place, *exchanges* differ from banks and other financial institutions in that they cannot use deposited assets to increase the potential return on investment with external resources. These assets in custody are not owned by you, as they remain the property of the depositors. Thus, exchanges that store these virtual assets cannot use them to enhance their own business activity, they must limit themselves only to the performance of the activity for which they were effectively contracted. (STEINBER, 2019).

An important point to consider is that brokers are required to inform their investors about the risks involved and that their money should not be invested in buying or selling certain assets. Thus, what differs from *exchanges* is that the decision to buy or sell crypto

assets depends directly on investors. Therefore, these platforms provide information about the movement of assets. However, *exchanges* are not required to make available on their platforms the publication of any document that presents/promotes products or services (*whitepaper*). That is, they are only obliged to publish information about their functions, about the functionality of the platform, that is, about which assets they work with. Contrary to what occurs with brokerage firms, since, as determined by items I, II and III of article 11 of Resolution No. 1,655 of BACEN, they are responsible for the legitimacy of the securities delivered and for the authenticity of these securities. Thus, when exercising control over assets, no matter how indirect they may be, they consequently carry this responsibility, since the guardianship and ownership of these assets belong to the depositary, (GRUPENMACHER, 2019).

Table 1 - Need and Possibility of Protection in the Cryptoasset Market

Stage	Description	Need for Regulation	Possibility of Regulation
Creation	The process of mining or issuing new crypto assets, such as Bitcoin, through complex algorithms.	High, to ensure transparency and security in the creation process.	Regulation can include requirements for transparency, auditing, and compliance with security standards.
Negotiation (Buying and Selling)	Transaction of crypto assets on exchange platforms, where buyers and sellers meet.	High, to ensure the integrity of transactions and investor protection.	Regulation may require exchange registration, compliance with consumer protection regulations, and fraud prevention.
Settlement of the Transaction	Transaction finalization process, where crypto assets are transferred from the seller to the buyer.	High, to ensure that transactions are conclusive and secure.	Regulation may include security requirements on transfers and settlement guarantees.
Custody	Secure storage of cryptoassets in digital wallets, usually managed by exchanges or custodians.	High, to protect investors' assets from loss and theft.	Regulation may require cybersecurity standards, loss insurance, and periodic audits.

Source: Prepared by the authors.

Table 1 presents the main steps involved in the creation, trading, settlement, and custody of cryptoassets, highlighting the need and possibility of regulation at each step. Creation: This step includes mining or issuing new crypto assets, such as Bitcoin, using complex algorithms. It is very important to have regulation to ensure security and transparency in the creation process. The regulation may include obligations for transparency, auditing, and compliance with security standards to ensure that the process is secure and reliable. Trading (Buying and Selling): In this phase, buyers and sellers meet on crypto exchange platforms. To ensure the integrity of transactions and protect investors, there is a high need for regulation. The regulation may require the registration of trades,

ensuring a safe and transparent trading environment, and protecting consumers. Settlement of the Operation: In this stage, the crypto assets are transferred from the seller to the buyer, finalizing the transaction. Regulation is essential to ensure that transactions are secure and completed. In order to prevent disputes and fraud, legislation may include security requirements for transfers and settlement guarantees. Custody, in turn, refers to the secure storage of crypto assets in digital wallets, which are typically managed by *exchanges* or custodians. To protect investors' assets from theft or loss, there is a high need for regulation. Regulation may require cybersecurity standards, loss insurance, and regular audits to ensure that assets are maintained in a safe and reliable manner.

It is also noteworthy that since 2019, resident crypto asset exchanges and individuals are required by law to report to the Special Secretariat of the Federal Revenue of Brazil (RFB) commercial transactions of crypto assets. The requirements include acquisition and disposal of crypto assets, both CAWLM (crypto asset without a corresponding liability designed to act as a general medium of exchange) and non-CAWLM, between two resident counterparties (domestic market) and between resident and non-resident counterparts (international market).

In July 2023, the BCB was designated to supervise and regulate services related to crypto assets in Brazil (Law 14,478 of December 2022 and Decree 11,563 of June 2023). Currently, the BCB is preparing public consultations and, from there, it should publish the rules that will regulate the market in Brazil. According to Lemos et al. (2023), the structure of the CAWLM market for Brazil comprises: the purchase of CAWLMs by large residents, exchanges of crypto assets from non-residents, for distribution (sale) to resident customers, including individuals; and internal trade, between resident exchanges or between these exchanges and their customers, including individuals. CAWLM transactions between residents and non-residents are measured through foreign currency foreign exchange settlements (FX), which are the basis for the Register of International Transactions System (ITRS) of the Central Bank of Brazil (BCB).

Decree No. 11,563, of June 13, 2023, regulates Law No. 14,478, of 2022, which provides for guidelines for the provision of virtual asset services and the regulation of providers of these services in Brazil. This decree assigns to the Central Bank of Brazil the responsibility for supervising and supervising these activities, establishing a clear regulatory framework to ensure the integrity and security of the crypto asset market in the country. The decree establishes provisions for virtual investment service providers, including prior order, good governance practices, information security and consumer protection. In addition, in

line with international standards, the decree emphasizes the need to combat money laundering and terrorist financing.

CONCLUSIONS

As mentioned above, instruments considered currency fulfill three main functions: they are a unit of account, an exchange intermediary, and a store of value. In this sense, it is a "creation of the State" that establishes the unit of account and issues currency in the form of debt. These instruments require two conditions: zero elasticity of production (they are not privately issued without control) and zero substitution (the demand for money does not "flow" to other assets). The creation of money in the modern monetary system is carried out by central banks, which create physical money and electronic money used by banks (bank reserves) and commercial banks, which create endogenous demand deposits. A currency as a financial instrument is both in the equity of those who carry it and in the liabilities of those who issue it. These are credit-debit relationships, confession of debt and promise of conversion to another security and/or acceptance by the issuer in the future.

For an instrument to be recognized as a currency, it is essential that it is widely accepted for the settlement of payments, contracts, and debts. Currency issued by central banks reliably meets these requirements and is fully accepted and considered equivalent in nominal ("par") value. This occurs, firstly, because the central bank's currency is introduced into the banking system, which guarantees its circulation. Second, the Central Bank manages the payment system, ensuring that transactions are settled in the official currency of the state.

In recent years, technological innovations related to the digital revolution, the popularization of Blockchain and the use of artificial intelligence in financial markets have allowed the creation of new instruments, in particular cryptoassets, among which private cryptocurrencies or digital currencies have become popular. Cryptocurrencies are an evolution of the economy, mainly related to the computer and Internet technologies of this new century. Therefore, virtual currencies will be increasingly used around the world, which contributes to the new economic revolution that is beginning.

The emergence of private cryptocurrencies is in line with the libertarian debate of depriving the state of monopoly power over the issuance of currency. Proponents of this view generally expect a return to a Gold Standard-type international system, similar to the one in place from the late 19th century until the start of World War I, which limited the state's power to issue currency. At the heart of these narratives are worldviews that perceive the state as an entity that usurps the freedom of individuals and whose power, if it

cannot be eliminated, must be limited to the maximum, which of course includes its monetary monopoly. A new story began with the creation of Bitcoin in 2008, which ushered in a new type of economy: cryptocurrencies that came with innovative and revolutionary technologies. These cryptocurrencies aim to replace traditional currency, optimize transactions in general, and innovate the complex operation of the high-fee financial system.

It is noteworthy that while technological advancements have fueled the unprecedented growth of cryptocurrency markets, the financial frenzy surrounding private currencies is nothing new. Throughout history, some private currencies have lasted longer than others, but none have survived, not least because private actors lack certain attributes that define a state, such as a territorial base and the ability to impose standards and regulations. Despite this historical experience, new business leaders, especially in the high-tech sectors, brought innovations to the financial markets and tried to create their own currencies.

The regulatory framework and centralized banking system ensure the freedom and stability of traditional currencies and economic functionality. And in the current economic, technological, and social context, cryptocurrencies still face major problems to be widely accepted as currency, despite their innovative potential and technological advantages. Its common use as a unit of account, intermediary of exchange, and store of value is hampered by fluctuating prices, unstable regulations, and lack of a reliable central issuer. If societies decide that it is desirable for cryptocurrencies to be able to fully perform these functions, it will be necessary to create a regulatory system that balances innovation with the protection of economic agents and financial stability.

Cryptocurrencies (or cryptoassets) represent a significant evolution in the field of financial instruments, driven by the digital revolution, adherence to Blockchain, and the search for alternative monetary systems. However, its future as a replacement for traditional currencies will depend on its ability to overcome regulatory challenges and public acceptance, which requires a lot of time and significant changes in financial processes, legal spheres, and the very beliefs of economic agents, as mentioned above. The trajectory of cryptocurrencies will continue to be shaped by the interplay between technological innovation and government regulation, determining whether they will cement themselves as an integral part of the global financial system or remain speculative and niche assets.

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