



Are cryptocurrencies a new form of money?

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Abstract

Cryptocurrencies have become a central issue in digital economics. Many people view them as a new form of money. However, the economic essence of this new terminology is still debated, as the genesis of cryptocurrencies happened in the cryptography world and their application is intended for the economic world.

This paper aims to assess the aptness of using the term "currency" when discussing cryptocurrencies, focusing on their three properties: a medium of exchange, unit of account, and a store of value. We find that cryptocurrencies are not a good substitute to traditional currencies, and do not fulfil the aforementioned basic functions of money.

✓ Keyword : Cryptocurrency / Token / Bitcoin/ blockchain / Money / Fiat currency/

1. INTRODUCTION

In the new digital economics, cryptocurrency has become a central issue where different aspects are studied: regulation and institutional adoption of cryptocurrencies, monetary policy adoption, the future role in the global financial system not to mention a whole new body of literature about financial technologies (or

FINTECH), and the strictly technical side of innovation in this new domain. This subject captured the attention of investors, politicians, academics, and the general public alike since the democratisation of the internet.

Many people, including academic researchers, think of cryptocurrencies as a new form of money (Cirstoiu, Guarda et al. 2019), the next evolution of money (after the successive phases of barter, commodity money, representative money, and fiat currency). Using the “currency” in this new word is indicative of their intention and hope. Much published research has used this term without any concern for its appropriateness, the reason for that might be that the early research was carried out by non economists (computer scientists mainly).

The use of the latest developments in computer science and cryptography is appealing for investors and innovators. As a result, we observe a surge of an obscure terminology that is difficult to understand for the non-initiated, accepted at face value and reproduced by everybody else including economists.

Despite the growing popularity of the subject matter, the economic essence of this new terminology is still discussable, especially that the genesis of the cryptocurrencies happened in the cryptography world and yet the application is intended for the economic world, a discussion of this new subject beyond the terminology, but into the essence of the cryptocurrencies is important in our opinion. It is worth mentioning that a number of articles do describe them as assets, but most of the literature uses the term currencies, but are they really money? Do they share the intrinsic properties of money as established by the economic science?

The aim of this paper is to assess the pertinence of using the term currency attached to crypto when discussing this new type of assets.

Therefore the key question arises: are the cryptocurrencies a new form of money?

In this paper, we restrict ourselves to a discussion of the suitability and aptness of using the term currency in this context. Specifically, we consider that a currency has three different properties: a medium of exchange, a unit of account and a store of value.

The remainder of this paper is organized as follows. Section Two describes the emergence and development of cryptocurrencies starting by an overview of its early history and some definitions to explore the nature of cryptocurrencies. Section Three describes the basic functions of money, and discusses whether or not cryptocurrencies fulfil these basic functions. Section Four presents an assessment of cryptocurrencies. Section Five concludes.

The relevance of the research topic is determined by the growing popularity of cryptocurrencies and the ambiguous attitude towards them on the part of investors and the governments.

The theoretical basis and framework of this article is carried out based on theories about the nature of money and its functions.

2. An overview of cryptocurrencies : emergence and development of cryptocurrencies

2.1 Early history and emergence of cryptocurrencies

Cryptocurrency was first introduced in the early 1990s by David Chaum, an academic entrepreneur, in the form of eCash and DigiCash (Chaum, Fiat et al. 1990). The National Security Agency (a US based agency) released an analytic report of great significance on the same subject over the Internet in 1996, but few in the financial world paid much attention to the development of cryptocurrency until the global financial crisis in 2008 (Chuen 2015).

In November 2008, someone using the alias Satoshi Nakamoto announced on a cryptography forum the release of a new open-source online currency system, which they called Bitcoin (BTC). Satoshi Nakamoto emphasized that the currency is based on a peer-to-peer system, connecting currency holders directly, rather than through a third party¹ and will be "completely decentralized, with no servers or central authorities." (Nakamoto 2008).

To some enthusiasts, this is the next step in the evolution of money. That evolutionary narrative traces a path from more to less tangible: from barter to precious metals to coin to paper currency and checks to credit cards to purely digital value.

According to (Best 2023), there are nearly over 9,000 cryptocurrencies as of 2023, although there were many more digital coins in the early months of 2022, it still constitutes a severe increase from just a few digital coins in 2013. There are other estimates of roughly 20,000 cryptocurrencies being in existence, but most of these are either inactive or discontinued. However, a large portion of these cryptocurrencies might not be that significant. Due to how open the creation process of a cryptocurrency is, it is easy to an extent to make a new one. Indeed, it is believed that the top 20 cryptocurrencies make up almost 90 percent of the total market. Along with Bitcoin, Ether and Ripple are the most widely used.

¹ Banks, the trusted third party, lost the public's trust in the aftermath of the subprime crisis (2007 – 2008) so it is no coincidence that the Bitcoin saw the light in 2009 and has been embraced by some enthusiastic fans.

Satoshi Nakamoto's announcement was not in an academic paper but in what is called a white paper. According to the online Encyclopaedia Britannica, a white paper is "an authoritative report detailing an issue, position, problem, solution, or even a commercial product and service." (Costa). Ethereum was initially described in a white paper written by Vitalik Buterin, followed by a technical yellow paper written by Dr Gavin Wood. Since then, most ICO projects (initial coin offerings, a new form of fundraising) have included a whitepaper, though over time the white papers seem to have become less technical and have become a combination of a marketing document and investor prospectus that typically details mission statements, team biographies and the technical specifics of a project.

In a review of documents produced for 1,450 digital coin offerings, The Wall Street Journal (Jones 2018) has found 271 with red flags that include plagiarized investor documents, promises of guaranteed returns and missing or fake executive teams. By comparing white papers, the investigative journalists found that 111 repeated entire sections word-for-word from other white papers. The copied language included descriptions of marketing plans, security issues and even distinct technical features such as how other programmers can interact with their database. The journal found that for as little as 100 USD, a freelancer can write a white paper for any interested party.

This easy process constitutes a low barrier to entry, which contributes to the difficulty to keep track of the plethora of cryptocurrencies in the market at any time.

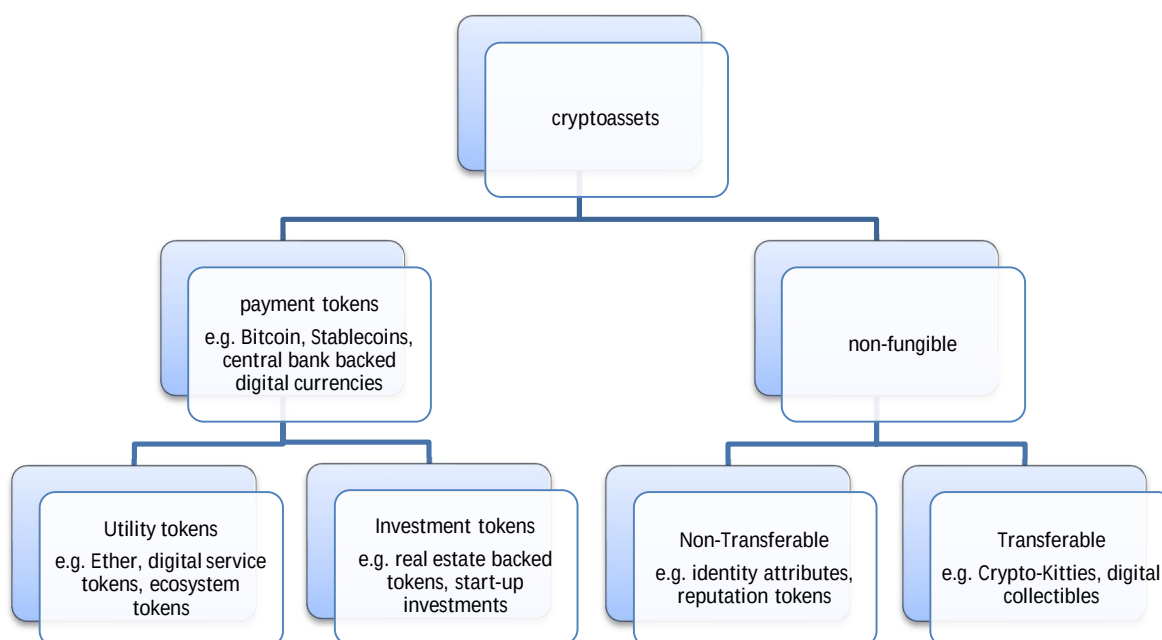
2.2 Some definitions

To define "cryptocurrencies," we need to acknowledge that there is no single or generally-recognised definition. Any definition that attempts to cover the meaning of cryptocurrencies will add more lingo to the mix. For instance, (Lewis 2021) defines them using their technological and design features. According to him, cryptocurrencies exist digitally, not physically. A particular cryptocurrency is a number of protocols : rules that define and characterise the cryptocurrency itself (how ownership is recorded, what validate a transaction, how to join a network of participants,...). These protocols are described in a computer code which can be compiled in a software that enacts these protocols (make them operate). Cryptocurrencies are created and destroyed according to the code that governs them. When the software is run, cryptocurrencies coins are generated, and can be sent from one account to another. These actions are recorded as transaction data. When bundled into blocks and linked together they form the cryptocurrency blockchain. Some blockchains are public (or permissionless): their list of transactions can be written by anyone. Others are private (or permissioned): there is a controlling party that allows participants to write and read them.

Even governing institutions and regulatory agencies are contributing to the inflation of terminology. Different reports from the Bank of International Settlements (BIS)² are adopting a wide variety of terms: cryptoassets, virtual assets, virtual currency, digital currency, digital token, central banks digital currencies...etc.

Cryptocurrencies and cryptoassets have been used interchangeably through the literature. When proposing a taxonomy for the term cryptoassets, (Arslanian and Fischer 2019) favoured a classification based on the intended usage and functionalities of the token. In this classification, a token is considered whether it is fungible or not, meaning if one unit is identical in its characteristics, usefulness and valuation to any other unit, or not. Within the category of fungible tokens, they define three high-level subcategories: tokens intended to be used to facilitate payments; tokens intended to serve as investments in financial assets/securities (investment tokens); and tokens intended to be redeemed for a consumable service (utility tokens). Within the category of non-fungible tokens, each of which may have a unique set of properties, they define two broad subcategories. Tradable tokens are 'alienable' and can be transferred to a new owner, and non-tradable tokens are inalienable and thus not transferable between owners. Figure 01 provides an overview of the proposed taxonomy.

Fig. 1. Taxonomy of cryptoassets



Source 1 (Arslanian and Fischer 2019)

² The BIS is considered to be the bank of central banks. The author of this article has reviewed several reports by the different committees of BIS and none of them offers a cohesive and single definition of cryptocurrencies.

The first part of term “cryptocurrency” clearly reflects the use of cryptography in their issuance, and in the validation of transactions, as well as the use of distributed ledger technology. The second part (currency) is the one posing problem to us. The need for clarity and accuracy is justified by the strict definition of money both in the economic literature and in many jurisdictions around the world.

3. Cryptocurrencies and the basic functions of money

According to the economic literature, money has three primary functions. It is a medium of exchange, a unit of account, and a store of value. (Mishkin 2004; Case, Fair et al. 2012)

3.1. The medium of exchange function

A medium of exchange means it is a payment mechanism: one can use it to pay others for something, to extinguish a debt or a financial obligation. The alternative to an economy based on money is barter, where people exchange goods and services directly for other goods and services instead of exchanging using the medium of money. To be a good medium of exchange however, money doesn't need to be universally accepted, (nothing is), but should be accepted in the particular context for which it is being used.

Are cryptocurrencies a good medium of exchange?

The digital nature of cryptocurrencies is highly suitable for the role of medium of exchange according to (Ammous 2018). In practice, some cryptocurrencies have been used to buy goods and services however prices are often set in fiat currency. In the few cases where they are written in a given cryptocurrency (usually Bitcoin), the price will be instantly converted to fiat currency, USD for example, and the transaction will be settled with the merchants in USD. So the fiat currency is the medium of exchange not the cryptocurrency.

Evidence of Bitcoin's footprint in daily commerce is mostly anecdotal, consisting of newspaper stories about people living only by spending Bitcoin or announcement from some businesses that are willing to accept a form or another of cryptocurrencies (which looks sometimes like marketing schemes rather than a real commitment). To date, very few established businesses of any size have begun to take cryptocurrencies as a means of payment. According to data available at numerous websites, the transaction count has peaked at important daily volumes. However, it is widely understood that most of these transactions involve transfers between speculative investors, and only a minority is used for purchases of goods and services (Chuen 2015).

Moreover, cryptocurrencies are not accepted to pay taxes, they are not legal tender in most jurisdictions around the world. Yet as of the time of writing, only two countries have adopted a cryptocurrency (Bitcoin specifically) as their currency: El Salvador, and Central African Republic. In the case of the first country, the measure does not seek to replace the US dollar as El Salvador's official currency. Furthermore, the law stipulates that the US dollar will continue to be used as a reference currency for accounting purposes and leaves the USD-to-BTC exchange rate to be freely determined by market forces (Gorjón 2021). It is argued that the Bitcoin in El Salvador is still not considered "cash" in the accounting sense because USD is still the reference currency under the law in El Salvador and Bitcoin cannot meet the criteria of being a unit of measurement (Huang, Deng et al. 2023) which leads us to the next subsection.

3.2. The unit of account function

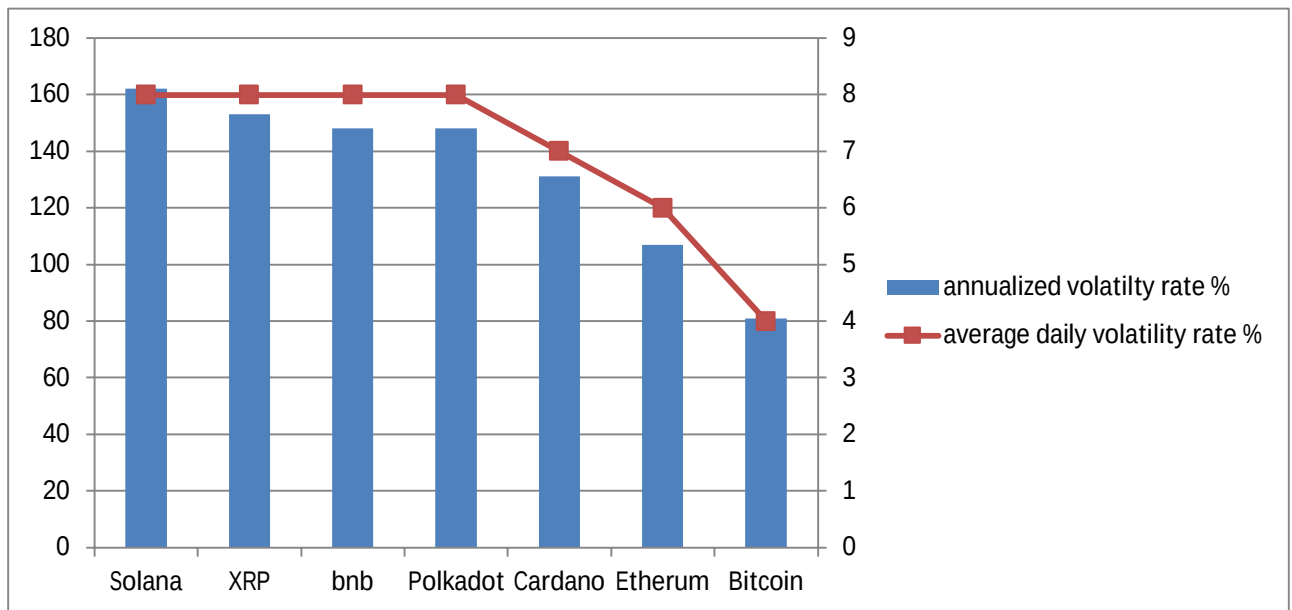
A unit of account means it can be used to compare the value of two items, or to evaluate the value of some assets. Money is a consistent way of quoting prices. All prices are quoted in monetary units nowadays. A computer can be quoted as costing DZD 60000, not 5 cell phones or 3 Tablets, and an apple can be quoted as costing DZD 100, not 1.4 oranges or 6 pages of a textbook. A standard unit of account is extremely useful when quoting prices. To be a good unit of account, money needs to have a well accepted or understood price against assets.

Are cryptocurrencies a good unit of account?

To answer this question, Lewis remarks facetiously that even the enthusiasts who made a good profit in trading cryptocurrencies don't quote their fortune in these cryptocurrencies but in dollars (USD), so the answer is no, or at least not yet (Lewis 2021).

There is an important price volatility against the USD, and every other fiat currency in the world. The prices of any commodity in cryptocurrencies can change anytime as the price of these cryptocurrencies fluctuates rapidly, which explains why there are very few merchants who are willing to price items in cryptocurrency. The crypto market is notoriously volatile (the prices of currency fluctuates rapidly in short periods). The volatility of the cryptocurrencies can be explained by the fact that they aren't tied to a single currency or economy, so their price reflects global demand rather than national inflation.

Figure 02 shows the annualized and average daily price volatility of selected cryptocurrencies in 2021.

Fig. 1. : The varying volatility of cryptocurrencies

Source: Statista Digital Economy Compass 2022 (Statista 2022)

We can observe that the largest cryptocurrency (Bitcoin) is the least volatile cryptocurrency in the list. Bitcoin's annualized volatility rate³ was 81 percent while investors can expect a 4 per cent change on a daily basis⁴. As figure 2 shows, these results are half of those of Solana which was revealed to be the most volatile of the currencies looked at in the report. Ethereum comes the closest to Bitcoin's performance, with 107 percent annualized and 6 percent average daily volatility rates.

Despite the apparent lead Bitcoin has on other cryptocurrencies, it has several more hurdles to overcome to become a unit of account. For instance, the relatively high cost of one Bitcoin compared to most ordinary products and services requires merchants to quote Bitcoin prices for most goods in four or more decimal places. For example, we would find a chocolate bar priced 0.00529 (or 5.29×10^{-3}) BTC, or a tea pack priced 0.05255 (or 5.255×10^{-2}) BTC on an online food retailer. (Chuen 2015) argues that many widely used accounting software products can only accommodate two decimal points in the price of a good. Moreover, the consumer would face computation difficulty in comparing the prices of goods. In the example above, the tea is about 10 times as expensive as the chocolate bar but this conclusion is not easily reached. This is bound to create friction when and if consumers choose to use Bitcoin for their daily shopping.

³ Annualized: Daily volatility of each coin scaled for a one-year period

⁴ Average Daily: Average difference between the price on a given day and the average price in 2021.

3.3. The store of value function

A store of value means that in the near future (to be determined) money will be worth the same as it is in the present time. There are many other stores of value besides money. Individuals could have decided to hold their “surplus” earnings by buying such things as antique paintings, watches, or jewellery, which they could sell later when they want to spend their earnings. Money has several advantages over these other stores of value. First, it comes in convenient denominations and is easy to carry. Second, since money is also a means of payment, it is easy to exchange for goods at all times. These two factors compose the liquidity property of money (Mishkin 2004). Money is easily spent; paintings and jewellery are not convenient and are not readily accepted as a means of payment. The biggest disadvantage of money as a store of value is that the value of money decreases when the prices of goods and services rise. Individuals quickly develop alternative ways to denominate value and undertake transactions, for example bartering or using more successful or stable currencies referred to as “hard currencies”.

Another disadvantage of traditional money is its security. The security problem arises whenever a currency is a store of value, where its holders have to worry about physical theft, or forgery. Commercial banks seem to be the answer to the first worry as for the second one, central banks have always tried to make note bills unfalsifiable; but no matter the technology, counterfeiters will know how to get equipped by advanced technologies (Ichbiah and Lefranc 2018).

Are cryptocurrencies a good store of value?

While many people hold cryptocurrencies, their large price fluctuation make it very risky as an asset for holding their investors' wealth. But for those holders who are not bothered by the high volatility, Bitcoin seems to be the only cryptocurrency to attract demand due to the credibility of its supply (written in its algorithm) and its resistance to manipulation up until now. As for the thousands of other cryptocurrencies, it is widely accepted that “you should only invest in what you are willing to lose”. Historically, some cryptocurrencies like Bitcoin have given impressive returns so far, but so did tulips in 17th century Netherlands. Cryptocurrencies are very much similar to a speculative or gambling contract that works like a Ponzi scheme⁵. In fact, it has been argued that the original scheme devised by Charles Ponzi in 1920 is better than cryptocurrencies from a social perspective (Sankar 2022).

⁵ A Ponzi scheme is a form of fraud that lures investors and pays profits to earlier investors with funds from more recent investors

4. Assesment of Cryptocurrencies as money

The comparison against the text book definition of money and its basic functions is useful to keep in mind before studying cryptocurrencies. The fans of the latter are adamant that the next evolution of money is going to be cryptocurrency.

4.1. Are cryptocurrencies a substitute to traditional currencies?

Before assessing the suitability of cryptocurrencies as new money, we can debate how good is nowadays money.

Let's analyse the Algerian Dinar (DZD) in regard to the previously stated three functions. The Dinar is generally accepted for payment in the Algerian territory at least so it is an appropriate medium of exchange. It is also an appropriate unit of account because it is legally implemented and goods and services sold inside the country are priced in the national currency. But how does it fare as a store of value? According to World Data, The purchasing power of a 100 DZD in 1970 corresponds to that of 7069.61 at the beginning of 2023. Conversely, in 1970 one could buy as much with 7.04 DZD as he can today with 100 DZD. The inflation rate for consumer prices in Algeria moved over the past 52 years between 0.3% and 31.7%. During the observation period from 1970 to 2021, the average inflation rate was 8.8% per year (WorldDataInfo, 2023)

This means that the Algerian Dinar is a poor store of value. However, on the short term, it does fulfil this function. This result is comparable to most modern day currencies including what is known as hard currencies (such as USD).

Moreover, the modern fiat money suffers from a poor reputation that stems from their history. Most of the early forms of currencies were neither very stable nor widely accepted by the public, as people did not believe the issuer (central banks) would honour the commitment to redeem the money. Governments were tempted to print more money to buy goods or raise wages, which fuelled inflation. Modern central banks seek to maintain price stability by regulating the supply of money on behalf of governments (Haksar 2018). The resurgence of the early distrust of fiat money is viewed by many as the main reason why Satoshi Nakamoto has created the Bitcoin in the midst of the international financial crisis and turmoil.

4.2. Assessment of the cryptocurrencies in the digital economy

In a paper that analyses the five cryptocurrencies with the highest market value of their tradable supply in august 2016 (Bitcoin, Ethereum, Litecoin, Ripple and Steem), Ammous compares the cryptocurrencies supply growth with the national currencies around the world⁶. The study finds that the Bitcoin seems the most stable

⁶ The data on broad money growth for 167 countries was provided by the World Bank for the period between 1960 and 2015.

because it has fixed supply cap and a decreasing growth rate written in its code and predetermined algorithm (Ammous 2018). But one cannot base the assessment of the whole field to one cryptocurrency no matter how well designed it is claimed to be. On a larger scale, we can argue that cryptocurrencies are not equivalent to a currency issued and backed by a Central Bank.

The Basel committee on banking supervision (BCBS) has declared that cryptocurrencies are unsafe to rely on as a medium of exchange or store of value. They have exhibited a high degree of volatility and are considered an immature asset class given the lack of standardisation and constant evolution. They present several risks to banks, including liquidity risk; credit risk; market risk; operational risk (including fraud and cyber risks); money laundering and terrorist financing risk; and legal and reputation risks (BCBS 2019).

The size of cryptocurrencies in some companies balance sheets is becoming substantial : As of 2021, companies worldwide had already held almost 8% of total Bitcoin supply on their balance sheets and the trend was still growing (Namcios 2021). However, it seems that accountants and regulators responses to this issue have been slow and inadequate (Huang, Deng et al. 2023). For instance, the International Accounting Standards Board (IASB), the body that develops and approves the International Financial Reporting Standards (IFRS), has yet to undertake any standard-setting on cryptocurrencies. Similarly, the Financial Accounting Standards Board (FASB), which governs the Generally Accepted Accounting Principles (GAAP) in the US, also rejected a specific accounting treatment for cryptocurrencies because they were not “widespread” enough.

The increased acceptance of cryptocurrencies would result in effective ‘dollarization’ of the economies around the world. This could be actual dollarization if Stable Coins⁷ linked to the US Dollar become widely used. The dollarization would undermine the ability of the different national authorities to control money supply or interest rates, as monetary policy would not have any impact on the non-national currencies or payment instruments. When that happens, countries lose not just their national currency, a defining feature of their sovereignty, but their policy control of the economy. With loss of traction for monetary policy, the ability to control inflation would be materially weakened (Sankar 2022).

On a practical note, cryptocurrency transfers can take hours to process. Their prices fluctuate wildly. In the absence of adequate controls and regulations,

⁷ Stable Coins have emerged to address the risks of un-backed cryptocurrencies with their value linked (or pegged) to one or more low-risk assets such as fiat currencies. Stable Coins profit from the credibility of the central bank’s unit of account. They are so-called because they aim to maintain a stable value relative to a specified asset or pool of assets. Whether they achieve this goal is to be determined, besides, their *raison-d’être* defeats the purpose of avoiding governmental reach in our opinion

cryptocurrencies are driving speculation by promising fast and high returns and exploiting regulatory loopholes that leave investors without protection. The limited understandings of risks, as well as the fear of missing-out seem to drive the speculation. Unlike with fiat money, the cost of producing many cryptocurrencies is high, reflecting the large amount of energy needed to power the computers that validate the cryptographic transactions.

The supposedly anonymous transactions leave an immutable trail that can be traced because holders can choose to be anonymous through encryption, but the blockchain is transparent in terms of what addresses hold which amounts of coins, and the related transaction flows. A vast majority of crypto holders rely on intermediaries, contrary to the accepted philosophy of decentralised finance. In El Salvador, for instance, payments are carried out via a conventional centrally managed wallet (Panetta 2022).

5. Conclusion

In conclusion, the main point of the text is to assess the aptness and pertinence of using the term "currency" when discussing cryptocurrencies. The text explores the emergence and development of cryptocurrencies, provides definitions, and discusses whether cryptocurrencies fully meet the criteria of being a currency.

Since their first appearance, and despite their constant presence in the news headlines, cryptocurrencies still don't fulfil the basic functions of money as a medium of exchange, a unit of account and a store of value. Because of their high volatility, they have little use so far as a unit of account or a store of value. Their limited acceptance for payment in practice restricts their use as a medium of exchange. Finally, decentralized issuance implies that there is no entity backing the cryptocurrency like it is with legal tender, so acceptance is based entirely on users' trust. Cryptocurrencies, by design, rely mainly on distributed ledger technology (blockchains) to bypass the need for a trusted third party. Only time will tell whether the public would follow this new way of issuing money or not. Up until now, the popularity of this new form of assets seems confined in a limited and restricted sphere of enthusiasts and online public with a keen interest in novelty.

In the meantime, governments and regulation agencies around the world have yet to give a proper attention to the risk facing the uninformed larger public who can mistake this new asset for a currency by virtue of its name. This article has established that the suitability of using the term "currency" to describe cryptocurrencies is questionable. It is imperative in our opinion to protect the large public and future users from this ambiguity either by wide release information

campaigns by central banks or a voluntary change of terminology both in the academic literature (specifically economic one) and in the large diffusion media.

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