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BITCOIN IN BRAZILIAN TAX POLICY

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Abstract

Bitcoin, created in 2008, is the first successful cryptocurrency. Bitcoin involves an industry, in which besides users, we have group of developers; miners; wallet providers; mixer providers; stock exchanges; and crypto banks. There are already countries whose tax policies accept bitcoins. It is that last aspect that this article is about. The article will initially seek to define Bitcoin and its industry, which are sources of much controversy. It will then discuss whether it is advantageous for taxpayers to honor their tax commitments with bitcoins, and under what circumstances it would be advantageous for public management to deal with bitcoins in their tax policy. In Brazil, the municipality of Rio de Janeiro plans to accept bitcoins in tax payments in 2023, and Brazil is preparing to improve its institutional framework for dealing with cryptocurrencies through Law 14,478/2022.

Keywords: Bitcoin, Cryptocurrency, Fiscal Policy, Financial Market.

JEL: E62, H20, G15.

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1. Introduction

Pecunia non olet is a Latin expression that today underpins tax law in many countries. Traditionally, the expression, which means “money has no smell”, was born when the Roman emperor Vespasian explained to his son Titus that it was okay to tax the fetid public toilets of the Empire, because the money collected in the collection did not carry the penalty of the smell of the toilets. The odor of the toilets, in modern tax law, has been transmuted into illicit or immoral business, meaning that the origin of the revenue does not prejudice or prevent the incidence of the tax.

For the tax authorities it does not matter if the taxable income had a legal or moral source. In the Brazilian Tax Code (Law 5.172, from October 25, 1996) we see this in article 118, about taxable event, which reads:

Art. 118. The legal definition of the taxable event is interpreted abstracting:

- I - the legal validity of the acts effectively practiced by the taxpayers, responsible parties, or third parties, as well as the nature of their object or effects;
- II - the effects of the facts that have actually occurred.

Here we deal with Bitcoin, a cryptocurrency, also called a digital asset. It is currently very relevant to discuss this cryptocurrency in terms of the Latin expression, from two aspects: 1) Is Bitcoin a currency? That is, is Bitcoin illicit or immoral?

Initially, we try to answer these two questions, because they are very primordial for the correct adoption of bitcoins in fiscal management. But the central objective of this article is to try to answer whether it is advantageous for Brazilian taxpayers to pay their fiscal commitments in bitcoins and in what financial circumstance it would be advantageous for public management in Brazil to deal with bitcoins among its assets.

Brazil is watching how countries have been behaving when it comes to accepting virtual currencies, and we already have a subnational entity, the City of Rio de Janeiro, which announced in March 2022 that it will accept Bitcoin and other cryptocurrencies as a form of payment for the Urban Territorial Tax (IPTU) in 2023. The city mayor even announced also that he intended to invest 1% of the municipality's treasury in bitcoins¹.

Internationally, little El Salvador, became in September 2021 the first country in the world to accept Bitcoin as the country's official currency. The country purchased more than 1,800 bitcoins. When El Salvador purchased its bitcoins, 1 bitcoin was equivalent to around US\$ 45,000 (around R\$ 235,000). El Salvador then invested around US\$ 82 million in bitcoins. It is estimated that this investment by El Salvador is equivalent to 15% of the country's annual investment budget.

¹ COINTELEGRAPH Brazil (2022a).

The measure had supporters, but also detractors, among the latter the International Monetary Fund. The main criticism that El Salvador received was that a country with a small, non-industrialized economy should not be subject to the price volatility that is common to Bitcoin. This issue of Bitcoin volatility will be central to the debate we will have here.

The Bitcoin price even reached US\$ 67,500 in November 2021, the cryptocurrency's all-time high price, making the 1,800 bitcoins purchased by El Salvador worth US\$ 121,5 million, an appreciation of nearly 50%. But after March 2022, the Bitcoin price began a sharp drop that to date (one year later, September 2022) has not recovered. In September 2021, the date of El Salvador's investment, the average price in the month was US\$ 45,586.11. But the average price a year later was around US\$ 20,000. The US\$ 82 million investment was only worth around US\$ 37 million in September 2022.

The government of El Salvador even offered \$30 to anyone who downloaded an application called "Chivo Wallet" that allowed bitcoin transactions. A good part of the population, around 60%, complied with the request. However, the use of bitcoins, after initial acceptance, plummeted. And by 2022, only a small proportion of the country's companies, around 14%, accept bitcoins. Moreover, the measure has not yet succeeded in attracting relevant technology companies to the country².

In January 2022, credit agency Moody's downgraded El Salvador's credit rating to CAA1, meaning that the country has a high credit risk. In February 2022, it was the turn of Fitch Ratings, which rated El Salvador with a CCC credit rating, indicating a high level of risk of moratorium.

For its part, in April 2022, the Central African Republic adopted Bitcoin as its official currency and legalized the use of cryptocurrencies. The country is the second least developed in the world, according to the UN. It has very low levels of human development and recurrently lives in civil war. But it is rich in gold, diamonds, and uranium. The government has stated that by adopting Bitcoin, it hopes to boost the country's economy.

The two countries have approximately the same number of inhabitants, around 6 million, but there are significant differences. El Salvador is one of the poorest countries in Latin America, with a GDP of around US\$ 25 billion. In El Salvador, the majority of the population does not have access to the banking system when Bitcoin adoption started, which shows that the population is far from knowing how a financial system works. On the other hand, internet access is widespread in the country. This is not the case in the Central African Republic, whose nominal GDP does not reach US\$ 3 billion. It is estimated that only 11% of the population has access to the Internet.

Why do such poor countries, with such weak institutions and incipient financial markets, seek to accept Bitcoin as currency and have it among their fiscal assets? We will not answer this question here, since we are dealing with Brazilian fiscal policy, but we should keep this question in mind when we evaluate what the Bitcoin Industry is and when we discuss a possible adoption of Bitcoin in Brazilian fiscal policy.

2 Kurmanaev and Avelar (2022).

In Brazil, within the National Congress we had Bill 2.303/2015 which became at the end of 2022 Law 14.478 of December 21, 2022. The Law establishes guidelines to be observed in the provision of virtual asset services and the regulation of virtual asset service providers. In the Law, a virtual asset is considered to be a digital representation of value that can be traded or transferred by electronic means and used to make payments or for investment purposes. Article 4 of the law establishes the guidelines that must be observed, among them are: free enterprise and free competition; protection and defense of consumers and users; and prevention of money laundering and terrorism financing and the proliferation of weapons of mass destruction, in alignment with international standards.

The author of the Bill (PL) that became law, Representative Aureo Ribeiro, stated in his justification that to a certain extent both the Central Bank and the Council for the Control of Financial Activities (Coaf) and consumer bodies already have the power to supervise and regulate virtual currencies, but that the legislations that confer such powers can be more transparent in relation to such powers, which would avoid unnecessary legal challenges.

2. The Bitcoin Industry

The crypto-market (crypto-market) is the market for cryptographic assets (crypto assets), which can be made available as a private token, investment, financial security, or cryptocurrency. The European Banking Authority (2019) defines a crypto active as a private asset registered in some kind of cryptographically protected distributed digital ledger (blockchain) that is neither issued nor guaranteed by a central bank or public authority and that can be used as a medium of exchange and for investment purposes or access to a good or service.

Clayton (2022) argued that the word “crypto” refers to a spectrum of products ranging from stocks and mutual funds to bank deposits that are under the supervision of different regulatory bodies. Many crypto activities, including Bitcoin, have followed an unprecedented development path. They have emerged globally and largely on a retail basis, that is, they have developed based on acceptance by the public, without institutional interference. Today there are thousands of crypto assets with capitalization exceeding \$1 trillion.

Cryptocurrencies are a type of crypto asset designed to perform the functions of currency (medium of exchange, store of value, and unit of account). Cryptocurrencies are neither issued nor guaranteed by a central bank. But this does not mean that the monetary authority does not affect cryptocurrency markets and prices. Auer and Claessens (2021) analyzed the impact of monetary authorities on cryptocurrency prices and concluded that the market responds strongly to news about the legal status of cryptocurrencies. It is routinely observed, for example, that news relating to anti-money laundering regulations or seeking to identify the user holding or provider of cryptocurrencies have adverse impacts on cryptocurrency prices.

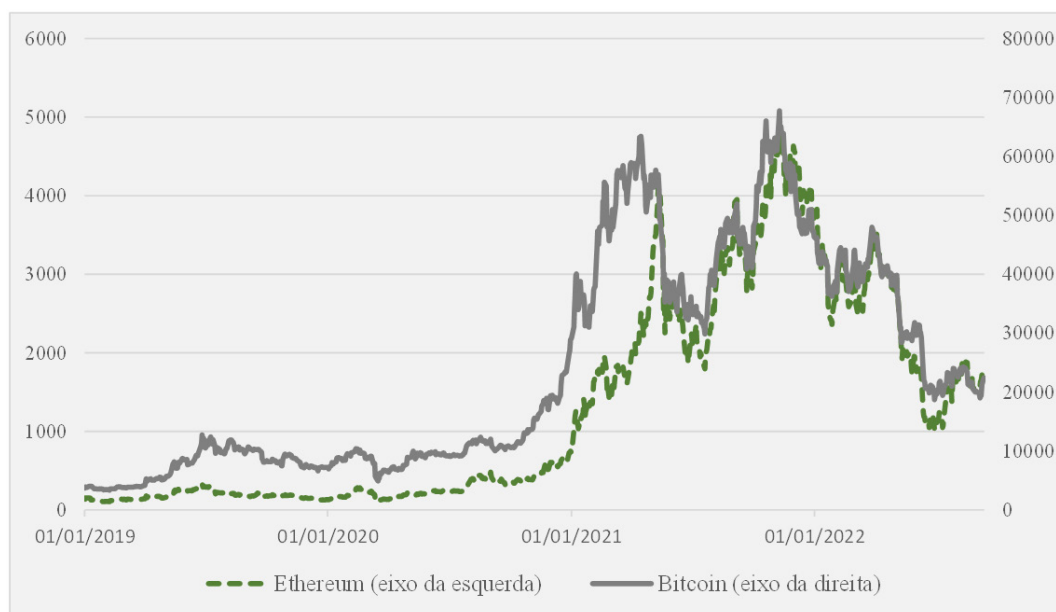
It was Bitcoin's success that started the cryptocurrency industry. Among cryptocurrencies, Bitcoin, despite not being a stablecoin (a digital currency tied or linked to the price of another asset or pool of assets), dominates the market. At times, it seems that the global adoption of Bitcoin is inevitable. Bitcoin was worth \$0.10 in 2010, but by October 2021, its price reached over \$60,000.

Nevertheless, there is nothing to guarantee that Bitcoin will not return to being worth \$0.10 at some point in the future, as Bitcoin has no underlying cash flows or real-world application. Other cryptocurrencies may outperform its technology and the Bitcoin industry may be considerably impacted by government regulations. Bloomberg (2017) argued that Bitcoin is only valuable because of its value as a medium of exchange for lawbreakers. This type of argument is well-founded, because what supports the price of Bitcoin is only the inflows, i.e., the use of the cryptocurrency. The business model of cryptocurrencies is prone to use in illegal transactions, such as money laundering, capital flight, and payment for illicit goods and services in various crimes. Jonathan (2022) argued that criminals made \$14 billion in cryptocurrencies in 2021, marking an all-time high and a 79% increase from the previous year.

Currently, we have many price quotes for different cryptocurrencies besides Bitcoin, such as Ethereum, Monero, Tether, and Dogecoin. But while Bitcoin was worth \$24,000 on average from January 2019 to September 2022, Ethereum, which is in second place, stood at around \$1,300. Some argue that this price difference is just a matter of level, as it is in traditional currencies. For example, a dollar is worth around 130 Japanese yen, while it is worth around 5 Brazilian reals. But this is not the case for digital currencies as they have the same market (global market, without legal, political, legal and social restrictions of a state) and perform basically the same functions.

The difference between these two cryptocurrencies remains close to stable. The price correlation is quite high (0.93) from January 2019 to September 2022, as shown in the chart below.

Chart 1: US\$ prices for Ethereum and Bitcoin
(from January 1, 2019 to September 12, 2022)



Source: Bloomberg Terminal, tickers: XETUSD Curncy (Ethereum) and XBTUSD Curncy (Bitcoin)

No one knows who created Bitcoin in November 2008, presented in an article entitled Bitcoin: A Peer-to-Peer Electronic Cash System, made available on the name.org domain. A person or persons behind the name Satoshi Nakamoto created it and described it in that article. This creator of Bitcoin, whoever he is, owns millions of bitcoins, owns a fortune of billions of dollars, with the appreciation of bitcoins.

Bitcoin was not the first digital cryptocurrency, previously it had been developed almost twenty years earlier, DigiCash, created by David Chaum. We also had experiments in digital currency that came very close to what was created for Bitcoin, such as Bit Gold, developed by Nicolas Szabo, who for some would be the creator behind the name Satoshi Nakamoto, but Szabo denied it.

Nakamoto defined Bitcoin simply as electronic money that would allow online payments directly without going through any financial institution. Bitcoin industry advocates add that Bitcoin solves the inefficiencies of traditional payment systems, which have expensive transaction fees, widespread fraud, and slow money transfers.

With no institutional oversight, Bitcoin relies on software and peer-to-peer encryption. A public registry was developed to archive all transactions performed in Bitcoin. This registry is located on servers around the world, known as a node. Each transaction is publicly transmitted and shared from node to node. Every ten minutes or so, these transactions are collected by so-called “miners” into a group of transactions called a block and added permanently to the Blockchain.

Blockchain is a distributed ledger technology (DLT) that has the following characteristics: immutability (the data stored in the database cannot be altered or deleted); decentralization (no single

point of control); anonymity (the identity of the senders and recipients of the data is unknown); and chronology (each transaction is time-stamped and can be tracked).

Blockchain provides universally verifiable proof of the existence or absence of a transaction in the distributed database by using hash functions (used to organize and bind data) and digital signatures (a cryptographic scheme that guarantees authenticity and non-repudiation). The block hash is a unique value that identifies the block and its contents. Each block has the hash of the previous block, which helps the “chain” part of the blockchain try to make it impossible for anyone to tamper with the blockchain data.

There needs to be some mechanism that establishes trust between the parties. Bitcoin uses Proof-of-Work (PoW), which is a complex cryptographic issue that so-called miners must solve.

So-called Bitcoin mining is essential to the industry. It has two functions: to put new bitcoins into circulation and to verify transactions. Miners are rewarded with the Bitcoin Block Reward. The Bitcoin block reward has two components: new bitcoins and transaction fees.

Regarding the first component, the Bitcoin protocols have established that every four years this reward of new bitcoins are halved, to ensure the determination of circulating bitcoins.

The process called bitcoin mining involves people or companies using powerful computers to solve sophisticated mathematical problems. After the miners verify a few thousand transactions, they group them into a block. Then the miners vie for the right to add this block to the Blockchain, trying to solve a sophisticated mathematical problem. The one who solves it gets a certain number of new bitcoins determined by the Network. In September 2022³, the Bitcoin block reward consisted of 6.25 newly generated bitcoins.

Regarding fees, the second component of Bitcoin Block Reward, they can fluctuate due to several factors. When someone makes a bitcoin transaction, everyone in the network is alerted and miners verify the transaction. Miners usually filter transactions according to the rate determined by the user. They prioritize transactions with higher fees. The user adds fees to encourage the miners to confirm the transaction. If the user does not include the fee in his transaction, it will take longer, perhaps hours, to confirm the transaction. Miners also charge different fees depending on the market price of Bitcoin, the higher the value of Bitcoin the fee tends to be lower. In September 2022, when the Bitcoin price was falling around \$20,000, the average fee per block came to 0.12 bitcoins, something around \$2,400 (around \$12,200). But the fee was 0.08 bitcoins in April 2022, when the Bitcoin price was around US\$40,000.

Bitcoin mining is under criticism because it requires a lot of electricity generation for computers to solve PoW. Some regions and China have banned or limited Bitcoin mining. Environmental groups often launch campaigns against PoW in favor of Proof-of-Stake (PoS). In the case of PoS, miners

3 For real-time Bitcoin prices and Blockchain statistics we have the website <https://bitbo.io/>

must provide digital currency participation to validate blocks. But PoW is at the heart of the Bitcoin industry.

Nakamoto has configured the Bitcoin Network to add a decreasing number of bitcoins over time, attempting to emulate precious metals. It is said that by the year 2140, a total of 21 million bitcoins will have been generated and the process of adding bitcoins will be stopped. By September 2022, there are 19 million bitcoins in circulation (over 90% issued). Then, by 2140, we have less than two million bitcoins remaining. Imagine this situation with fiat currency, with all the social and political pressures.

There are three legal ways for people to get Bitcoins: 1) Buying bitcoins using fiat currency; 2) A seller allows people to pay them with bitcoins; or 3) Mining.

When obtaining bitcoins, a person must store them in a so-called “wallet. Actually, there are no bitcoins or wallets. It is just an agreement in the Bitcoin Network about who controls these computer files called bitcoins. You don’t own bitcoins; you can only control them with the permission of this agreement.

A wallet is software that runs on a computer or other electronic devices. Whoever controls the wallet controls the bitcoins. Wallets represent the control of the “private key” (Private Key), which gives access to the bitcoins. The Private Key, which is a long alphanumeric code, is what allows someone to control bitcoins. This key is also tied to a “public address” on the Bitcoin Network. This “public address” is like an email. It allows you to receive bitcoins from other people. You must keep your private key secret, but anyone can see your public address.

There are different wallets: brain wallets, online wallets, hardware wallets, and paper wallets. They have different levels of security to prevent hacking and theft. It is argued that the most likely way for a person to lose their bitcoins is to trust the private keys to a third party, such as in an online wallet, or on cryptocurrency exchanges.

Finally, anyone can propose changes to the Bitcoin Network’s technical protocols. The proposals are said to be evaluated by a team of core developers who maintain the Bitcoin software. It is argued that Nakamoto withdrew from such a team in 2010. Today, in mid-2022, Wladimir van der Laan of MIT is the team leader. Before van der Laan, the leader was Gavin Andersen, who left the team in 2016 and was appointed by Nakamoto himself. Nobody knows much about these developers. They try to be very discreet about their personal preferences and investments. Some research organizations are also part of the team of developers.

By visiting the Massachusetts Institute of Technology’s Digital Currency Initiative website⁴ one can get some idea of the people who participate as developers. The CoinMarketCap website⁵ has disclosed the institutions that fund the maintenance and development of Bitcoin. There is a complex relationship between people and institutions that is not very clear to users.

4 Digital Currency Initiative (2022)

5 CoinMarketCap (2022)

In short, we have the following formal players in the Bitcoin Industry: developers of the Bitcoin protocols; users; crypto banks; exchanges for crypto assets; brokers; miners; wallet providers; mixer providers; and trading platforms.

3. Bitcoin's Central Problem: What is Bitcoin?

What is Bitcoin? Is it currency, payment system, speculative asset, commodity, tax haven, all together in a technological system controlled by “miners” or simply a computer code file? If a broker, or a crypto bank is asked this question, the answer depends on the portfolio of the broker, bank or investor. But technical answer free of financial interests will determine which government agency oversees the use of Bitcoin.

When money was a commodity like cattle or salt, that money was a social convention. With fiat money backed by no physical asset relying only on the ability of the monetary authorities to ensure the stability of the currency, the need for a social convention is even more evident.

Money is defined when people are willing to use it and it performs the following functions: unit of account (standard measure of values of goods and services); medium of exchange (accepted item for payment for goods, services and debts); and store of value (way of storing wealth to transfer purchasing power from present to future). People's willingness to use such currency and these three functions depend on the stability of the currency.

Considering the functions of money, one has difficulty showing that Bitcoin performs such functions. Regarding the medium of exchange function, Bitcoin has limited use and is inefficient for processing transactions. It can process about ten transactions per second, while credit cards can process tens of thousands⁶. In addition, there is enormous volatility in the price of Bitcoin, which significantly impairs the functions of unit of account and store of value.

Clayes and Demertzis (2021) pointed out that the potential of cryptocurrencies to credibly challenge fiat currencies cannot be based solely on the intelligence of their algorithms. Price stability is a public good that cannot be served by algorithms or private agents operating for profit, especially when people need it most, in times of crisis.

Volatility has been a feature of the Bitcoin price. Bitcoin will not become the dominant currency as long as it remains highly volatile. And for it to become less volatile it will probably need to become inflationary - that is, its price will fall over time. Thus, because of the volatility, for Bitcoin to be what Nakamoto has planned, it must have another development model.

Can we argue that Bitcoin acts financially in the same way as gold? Nakamoto tried to emulate gold when creating Bitcoin. Gold has the characteristic of being a global commodity. Like gold, Bitcoin is difficult to counterfeit. Like gold, Bitcoin cannot be manufactured. Like gold, there is a limited

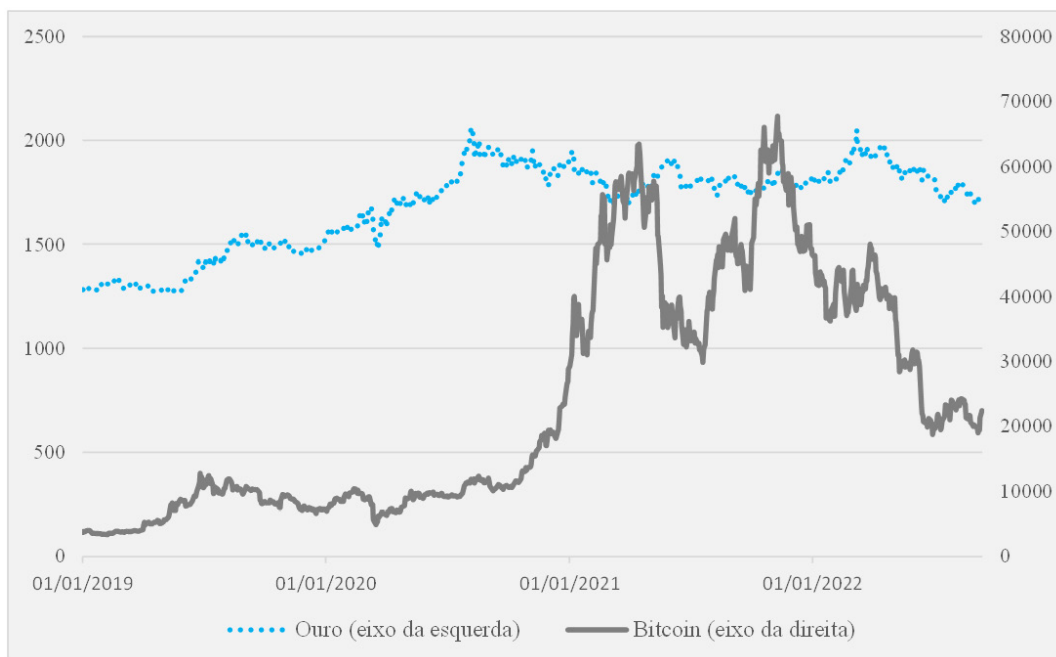
6 Phemex (2021).

number of Bitcoins. Just like gold, Bitcoin is an alternative to fiat currencies. Finally, like gold, Bitcoin is an alternative to investment when investors distrust assets, stocks, or governments.

On the other hand, gold is highly regulated by governments. You need registered dealers and brokers to be able to buy gold. Gold also has many more applications besides being an alternative to fiat currencies, as it is valuable as a material for consumer goods, such as jewelry, and has specialized applications in dentistry and electronics. Because of this, the demand for gold is much more diverse than that for Bitcoin. Gold depends on human investment to increase its stock, while Bitcoin's stock is predetermined by its cryptographic protocols. Bitcoin is recognized as a speculative investment. Gold is recommended for risk-averse investors who choose capital conservation over the potential for higher returns, while Bitcoin is for risk-loving investors who choose the opposite.

We can take advantage of the global recession caused by the Covid-19 pandemic and the Ukraine War, which brought economic sanctions with global effects, to observe whether gold and Bitcoin prices behaved similarly in periods of financial hardship. Below, we have Chart 2, with the prices of gold and Bitcoin.

Graph 2: US\$ prices for Gold and Bitcoin
(from January 1, 2019 to September 12, 2022)

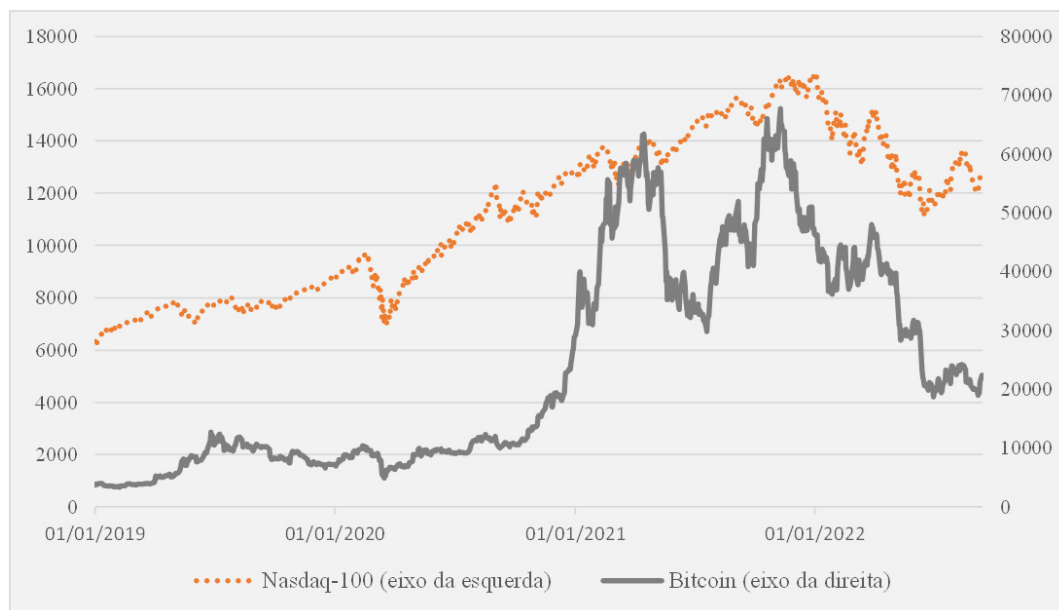


Source: Bloomberg Terminal, tickers: XAU Curncy (gold) and XBTUSD Curncy (Bitcoin).

We also have Chart 3 which shows Bitcoin against the Nasdaq-100 index. This index includes 100 of the largest domestic and international non-financial companies, with a focus on technologically innovative companies such as Apple, Google, and Tesla.

Chart 3: Nasdaq-100 Index and US\$ Prices for Bitcoin

(from January 1, 2019 to September 12, 2022)



Source: Bloomberg Terminal, tickers: NDX index (Nasdaq-100) and XBTUSD Curncy (Bitcoin)

The Covid-19 pandemic was determined on March 11, 2020, and the Ukraine War began on February 24, 2022. Gold reached its highest level on August 6, 2020; after that, it remained at a higher level. In contrast, Bitcoin reached its highest price only on November 9, 2021, more than a year after the record price in gold, and after high volatility in 2020. The correlation between Bitcoin and Gold over the period considered is only 0.57,

On the other hand, like Bitcoin, the highest point of the Nasdaq-100 index occurred in November 2021. The Nasdaq-100 index has a correlation of 0.89 with Bitcoin.

Regarding a security, can Bitcoin be considered a security? Howey's test points out the characteristics to determine whether an asset is a security. An asset is a security if it answers affirmatively to the following four questions: 1) Is it an investment? 2) Is there an expectation of profit? 3) Is there an investment in a joint venture?; 4) Are the profits coming from a promoter or a third party? Bitcoin could answer the first two questions positively, but it is not a joint venture, nor do its profits come from a promoter or a third party. Cryptocurrencies can be a bond, but that is not true for Bitcoin.

It seems more logical to determine that Bitcoin is a commodity. According to the US Commodity Futures Trading Commission (CFTC) (2022), in the United States, Bitcoin is a commodity, and commodity futures trading must occur on CFTC-regulated futures exchanges. But for both the CFTC and the Securities Exchange Commission (SEC)⁷, the European Securities Markets Authority

⁷ Same as

(ESMA)⁸ and the European Banking Authority (EBA)⁹, Bitcoin is not a commodity like gold, because it is a highly speculative investment.

The income tax return may also reveal how one might define Bitcoin. In Brazil, the IRS argues that crypto assets follow a similar pattern as real estate, cars, and Bank Certificates of Deposit (CDB). Only on the sale of this asset, the taxpayer must update the value and calculate the tax payable based on capital gains. In this way, Bitcoin is considered as a property¹⁰. The same position has the United States Internal Revenue Service (IRS)¹¹, regarding crypto asset assets such as Bitcoin.

In short, the best definition of Bitcoin seems to be either a speculative commodity or a simple computer code with records in a public book.

However, this debate over whether Bitcoin is a currency, security, or commodity is a debate on the surface of the issue. Bitcoin is a different speculative investment, primarily because it is a challenge to apply “Know Your Customer (KYC)” and “Anti-Money Laundering (AML)” regulations to Bitcoin transactions.

There are three main obstacles to applying KYC and AML on Bitcoin. First, Bitcoin is an anonymous or, at the very least, pseudonymous investment. It is called pseudonymous because while the identity of the user remains secret Bitcoin transactions are public. But Bitcoin can be and is often used completely anonymously because it is easy to use privacy/anonymity enhancing technology services, such as mixers and tumblers, that obfuscate the users linking data, either the sender or the recipient of a cryptocurrency.

In August 2022, the U.S. Treasury Department sanctioned the virtual currency mixer Tornado Cash, claiming that it has been used to launder more than \$7 billion in virtual currency since its inception in 2019. Other cryptocurrencies do not need these mixers, such as Monero, as they have already been defined at their formation as completely anonymous. But these other cryptocurrencies cannot fully compete with Bitcoin’s market power and acceptance.

Second, there is the inherently cross-border nature of digital currencies, which makes it too difficult for government authorities to supervise the use of the assets, even as there are governments and regions that facilitate tax evasion.

Third, unlike cash, cryptocurrencies allow digital transactions and electronic commerce. The so-called “deep web” uses specific communication protocols that provide greater anonymity and market places and often serve as the base of operation for cryptocurrency transactions in crimes.

Foley, Karlsen, and Putniņš (2018) estimated that almost half of Bitcoin transactions involve illegal activity. They argued that since 2016 the proportion of bitcoin activity associated with illegal

8 ESMA (2022)

9 EBA (2019)

10 Agência Brasil (2022a)

11 IRS (2022)

trade has declined, but the absolute amount has continued to increase. The authors explain this decline by two factors: the growth of general interest in Bitcoin and the emergence of alternative anonymous cryptocurrencies such as Monero and ZCash.

The Silk Road fraud case, in which the US government seized more than \$1 billion in bitcoins in 2013, is among the famous cases in which bitcoins support illegal activities. The case stands out because it has even been analyzed academically. Hout and Bingham (2013), for example, argued that drug users described Silk Road as “euphoric because of the wide variety of drugs available, because it is relatively easy to use once browsing Tor Browser (encryption software) and using ‘Bitcoins’ for transactions, and as safer than trading illicit drugs on the street.”

There are other known Bitcoin-related fraud cases, such as: SEC v. Trendon Shavers (2013)¹²; U.S. Department of Justice v. Faiella (2014)¹³; U.S. Department of Justice v. Hackers Group “The Community” (2019)¹⁴; the case against Binance (2021)¹⁵; U.S. Department of Justice v. Ilya Lichtenstein and Heather Morgan (2022)¹⁶; and the FTX - Alameda case (2022)¹⁷.

In Brazil, we are following the case of the “Pharaoh of Bitcoins”, concerning the businessman Gldison Acásio dos Santos, accused of defrauding bitcoins from investors, through the company Gas Consultoria. In September 2022, Judge Rosália Monteiro Figueira, from the 3rd Federal Criminal Court in Rio, ordered the businessman to deposit in court the amount of R\$ 19 billion to pay investors and creditors¹⁸.

In 2021, the Securities and Exchange Commission subpoenaed Atlas Quantum, one of the largest companies specializing in bitcoin trading in Brazil. The reason is a lawsuit for fraudulent operation in the market. According to the CVM, the company traded collective investment contracts without authorization¹⁹.

In 2022, the United States Department of Justice indicted Brazilian Luiz Capuci, founder of Mining Capital Coin. The Brazilian was accused of orchestrating a global investment fraud scheme responsible for a total loss of \$62 million to investors²⁰.

Turning to Bitcoin issues outside of Brazil, in July 2022 a crash was announced at the “cryptocurrency bank” Celsius Network LLC, which filed for bankruptcy protection. This type of

12 SEC (2013)

13 United States Department of Justice (2014)

14 United States Department of Justice (2019)

15 CNBC (2021)

16 United States Department of Justice (2022)

17 Durden (2022)

18 Otávio and Souza (2022)

19 CNN Brasil (2022) .

20 Cointelegraph Brazil (2022b)

bank offers bank accounts that pay much higher fees than traditional banks and promise guarantees to protect depositors from the idiosyncratic price swings common in cryptocurrencies like Bitcoin. Unlike conventional banks, deposits usually take the form of crypto. Crypto deposits, which typically yield interest rates far above what a traditional bank offers. The deposits are used to fund loans to other customers.

At the end of June 2022, the Presidency of the European Council and the European Parliament reached a tentative agreement on crypto asset markets (called MiCA)²¹. This agreement covers both unbacked cryptocurrencies, such as Bitcoin, and backed cryptocurrencies (stablecoins). The European Parliament is trying to protect investors against the risks associated with crypto investments and prevent fraudulent schemes, as well as preserve financial stability by enabling innovation and maintaining the attractiveness of crypto assets.

Regarding terrorist financing involving bitcoins, the European Union's Policy Department for Citizens' Rights and Constitutional Affairs (2018) argued that the borderless nature and anonymous relationship between pairs of these currencies offers the prospect of terrorist actors transferring funds outside the regulated sector and beyond the scope of anti-money laundering and countering terrorist financing.

3.1 The Bitcoin Ideology

If one follows the social media of Bitcoin adoption enthusiasts, one can easily see that these enthusiasts present a libertarian ideology that glorifies technology and understands government as a monolith (no consideration of the intrinsic institutional difficulties within a single government). Such an ideology despises social control and deplores human governance. One could say that the libertarian approach to economics has the same philosophical approach as the Bitcoin Industry. But there is a significant difference, Bitcoin ideologues have deep confidence in technology to solve social issues and provide welfare to society.

Faced with the problems related to fixed currency supply, Bitcoin enthusiasts tend to use libertarian ideology in favor of allowing time for market adjustment, relying on price signals. They would probably consciously or not use the so-called efficient market hypothesis, at least in its "weak form," which says that there would be no persistence of risk-adjusted outperformance by active financial managers beyond what would be randomly expected, since stock and bond prices reflect all publicly available information.

In other words, the financial market would adjust to all public information. The country would recover from financial and social problems with market adjustments. The social costs of the time needed for recovery should not be in the economic roles of investors, according to this ideology. The

21 European Council (2022)

experience with the gold standard and the European debt crises have shown, however, how difficult it is to rely on market adjustment without currency control.

Moreover, for Bitcoin enthusiasts, those who control the protocols and those who do the mining are dedicated only to the good of society and do not concentrate wealth in their hands. Even though mining today is concentrated in the two richest countries in the world: China and the United States, which account for about 60% of all mining in the world. Investing in Bitcoin mining is not cheap, far from it, nor is it risk-free. Bitcoin enthusiasts seem to see no evil inclination among controllers and miners.

These ideological considerations underlie the acceptance of Bitcoin by users, businesses, and government entities.

4. Adoption of Bitcoin in Brazilian Fiscal Policy

In Brazil, the city government of Rio de Janeiro stands out. It is the first Brazilian city to announce in March 2022 the acceptance of tax payments through cryptocurrencies starting in 2023. To make the operation feasible, the municipality will hire companies specialized in carrying out the conversion of crypto assets into reals. The City Hall would receive 100% of the value in local currency²². The mayor of Rio de Janeiro even announced that the city government intended to invest 1% of the city's treasury in Bitcoin²³. In early 2022, Rio de Janeiro's City Hall even talked about offering discounts on tax due if the taxpayer paid in Bitcoin²⁴.

We have not yet been informed how the conversion will be abated in due to taxes. As Bitcoin is quite volatile, the date of conversion is of significant importance. In addition, the municipality, by hiring a company to do the conversion into reals, will incur the cost of this hiring.

The Municipal Secretary of Finance, Pedro Paulo, said that the city hall intends to stimulate the circulation of cryptocurrencies, integrating them into the payment of taxes, as in the case of IPTU and, in the future, this may be extended to services such as cab rides. He added that crypto assets can stimulate the arts, culture, and tourism, through non-fungible tokens - NFTs (digital assets with a public record of authenticity and ownership made through blockchain technology) and create a solid and responsible governance policy to evaluate the realization of crypto investments.

It is interesting to mention that before Rio de Janeiro's City Hall announced that it intended to encourage the use of bitcoins for payment of municipal taxes, there was the presentation of Bill 5133/2021, which sought to inhibit fraud in the use of cryptocurrencies. The Bill was stimulated by the "Pharaoh of Bitcoins" fraud case, whose epicenter was precisely the State of Rio de Janeiro. According to the bill, established companies that offer cryptocurrency services are required to provide a report

22 Rio City Hall (2022) .

23 Exam (2022) .

24 Galvão (2022).

on their economic activities, to be sent annually to the Public Prosecutor's Office of the State of Rio de Janeiro.

It is still unclear how such a wide acceptance of an asset that seeks to replace legal tender would come about, nor why it is in the city's interest to stimulate this international asset that is not controlled by any state. It seems that the adoption of Bitcoin would be more important than the adoption of other currencies because Bitcoin would naturally bring investments in technology and innovation to the city of Rio de Janeiro, even considering that Bitcoin's nature is precisely that it has no borders.

To answer these questions, the city government announced the creation of the Municipal Committee for CryptoInvestments (CMCI), which will be responsible for developing and refining a methodology, structured in risk and profitability analysis, to enable the investment of resources in crypto activities, considering the rules and limitations of the public administration in the use of public money.

Decree 50,521, dated March 30, 2022²⁵, which creates the Municipal Committee for Cryptoinvestments (CMCI), with the purpose of proposing policies and strategies for investments in crypto asset assets, uses the following recitals, which reveal the city government's premises to encourage the use of bitcoins, such as:

- Considering the national and international technological and economic advances arising from blockchain technologies, means of payments, and the creation of digital assets and currencies;
- Considering that these activities and innovations represent economic segments that can boost the local economy and finances, especially in the traditional innovation and financial market environment existing in the city of Rio de Janeiro;
- Whereas the City announced, among other promotion measures, the possibility of investing one percent (1%) of municipal resources in digital assets and/or currencies;

It is important to mention that the Decree establishes that the CMCI must observe the average return and risk methodology and the regulations and guidelines of the Central Bank of Brazil and the Securities and Exchange Commission. Obviously, since the control of the money supply in the country is not up to the City Hall of Rio de Janeiro.

In May 2022, Rio de Janeiro's City Hall achieved an improvement in its Payment Capacity (Capag) score. Rio de Janeiro achieved a grade of B, after five years with a grade of C. With the new classification, the City Hall will find it easier to obtain guarantees from the Federal Government for financing contracts. According to the City Hall, the result was achieved due to the initiatives adopted throughout 2021, with the approval of changes in the tax and fiscal legislation and the transfer to the

25 Livecoins (2022).

private sector of sanitation services that were under the responsibility of the State Company of Water and Sewage of Rio de Janeiro (Cedae)²⁶.

Capag's analysis diagnoses the fiscal situation of Subnational Entities that want to contract new loans guaranteed by the Federal Government. The calculation methodology is given by MF Ordinance No. 501/2017, which establishes three indicators: Indebtedness, Current Savings and Liquidity, using the following formulas:

I. Indebtedness (DC):

$$DC = \frac{\text{Dívida Consolidada Bruta}}{\text{Receita Coreente Líquida}}$$

II. Current Savings (CP):

$$PC = \frac{\text{Obrigações Financeiras}}{\text{Disponibilidade de Caixa Bruta}}$$

III. Liquidity:

$$IL = \frac{\text{Disponibilidade de Caixa}}{\text{Obrigações Financeiras de Fontes Não Vinculadas}}$$

The Annex to the National Treasury Secretariat Ordinance No. 373/2020 defines the concepts and variables used and the procedures to be adopted in the Capag analysis. Each economic and financial indicator will be assigned a letter - A, B or C - that will represent the partial classification of the entity in that indicator, according to the classification presented in the value ranges of the following table.

Table 1 - Partial Capag Classification

Indicador	Sigla	Faixas de Valores	Classificação Parcial
Endividamento	DC	DC < 60%	A
		60% ≤ DC < 150%	B
		DC ≥ 150%	C
Poupança Corrente	PC	PC < 90%	A
		90% ≤ PC < 95%	B
		PC ≥ 95%	C
Liquidez	IL	IL < 1	A
		IL ≥ 1	C

Source: Imprensa Nacional, MF Ordinance 501, November 23, 2017

²⁶ Agência Brasil (2022b).

From the partial ranking, the final Capag ranking is established, in which it is possible for the subnational entity to get a grade of D. This final ranking is obtained according to the table below:

Table 2 - Capag's Final Classification

Classificação Parcial			Classificação Final da Capag
Endividamento	Poupança Corrente	Liquidez	
A	A	A	A
B	A	A	B
C	A	A	
A	B	A	
B	B	A	
C	B	A	
C	C	C	D
Demais combinações de classificação parcial			C

Source: Imprensa Nacional, MF Ordinance 501, November 23, 2017

In order for a subnational entity to obtain a final grade A, it must achieve a grade A in all three indicators. To get a final grade of B, it is necessary that the entity guarantees grade A in the Liquidity indicator and at least grade B for the Current Savings indicator. It doesn't matter which score on the Indebtedness indicator it has achieved. So, after getting grade A in Liquidity, among the three indicators, Current Savings stands out. It is very important for the subnational entity to keep its financial obligations below 90% of its gross availability. If the entity's Current Savings is rated C, it doesn't matter the Indebtedness, the final rating will be C. These are the cases of the municipalities of Fortaleza and Campo Grande, for example, which have an A rating in both Liquidity and Indebtedness, but have a final rating of C, because of the C rating in Current Savings.

If the subnational entity receives a grade of C in the evaluation of all three indicators, the final score will be D, which represents a very critical financial situation. All other combinations result in a final grade of C.

The final A or B grades are a necessary, but not sufficient, condition for the entity to receive federal guarantees for internal or external credit operations.

The Rio de Janeiro metropolitan region represents around 70% of the state GDP. It is important to recognize the relationship of the municipal administration with the state administration to know how the adoption of Bitcoin may affect government finances to a greater extent than the municipality. While the Capag of the municipality of Rio de Janeiro is a B, the Capag of the State of Rio de Janeiro is a D grade.

Currently, in September 2022, the indicators for the municipality of Rio de Janeiro and the State of Rio de Janeiro are²⁷:

Table 3 - Capag's Final Classification

Indicador	Prefeitura do Rio de Janeiro	Estado do Rio de Janeiro
Endividamento	61,36% (A)	324,42% (C)
Poupança Corrente	90,49% (B)	95,97% (C)
Liquidez	63,52% (A)	625,05% (C)

Source: Transparent Treasury (accessed September 30, 2022). Author's elaboration

Making a comparison among the Brazilian capitals (excluding Brasília, due to its particular financing characteristics), Rio de Janeiro, which has a final grade of B, is near the middle of the table, in 15th place, in relation to the Current Savings indicator, while it stands out negatively in relation to the other two indicators, Indebtedness and Liquidity. It is in second to last place in Indebtedness, with the municipality of São Paulo in last place. In Liquidity, the municipality of Rio de Janeiro is in 23rd place.

In the table below, with the comparison between Brazilian capitals, the final scores of each municipality are in parentheses, after the name.

Table 4 - Comparison between Municipalities across Indicators

Posição	Município	Endividamento	Município	Poupança Corrente	Município	Liquidez
1	Boa Vista (A)	12,20%	Rio Branco (A)	78,44%	Rio Branco (A)	0,29%
2	Macapá (A)	14,16%	Vitória (A)	78,55%	Vitória (A)	2,05%
3	Curitiba (B)	17,18%	Boa Vista (A)	80,10%	Curitiba (B)	2,90%
4	João Pessoa (A)	17,66%	Macapá (A)	82,24%	Salvador (B)	3,70%
5	Vitória (A)	18,02%	Palmas (A)	84,77%	Belém (A)	4,17%
6	Campo Grande (C)	19,10%	São Luís (A)	84,81%	Manaus (A)	6,87%
7	Teresina (B)	20,55%	Porto Alegre (A)	87,30%	Porto Velho (A)	7,84%
8	Rio Branco (A)	22,35%	Florianópolis (A)	87,34%	Porto Alegre (A)	12,32%
9	Palmas (A)	22,86%	João Pessoa (A)	87,73%	São Paulo (B)	13,03%
10	Maceió (A)	24,37%	Maceió (A)	88,27%	São Luís (A)	13,18%
11	Porto Alegre (A)	25,45%	Aracaju (A)	88,92%	Aracaju (A)	13,18%
12	Aracaju (A)	25,71%	Manaus (A)	89,15%	Belo Horizonte (B)	16,53%
13	São Luís (A)	28,12%	Porto Velho (A)	89,20%	Campo Grande (C)	16,73%
14	Goiânia (B)	29,17%	Belém (A)	89,40%	Fortaleza (C)	17,48%
15	Belém (A)	32,63%	Rio de Janeiro (B)	90,49%	João Pessoa (A)	17,49%
16	Belo Horizonte (B)	33,09%	Belo Horizonte (B)	90,68%	Maceió (A)	19,01%
17	Cuiabá (C)	34,39%	Goiânia (B)	91,22%	Goiânia (B)	19,44%
18	Natal (C)	35,04%	São Paulo (B)	91,41%	Palmas (A)	22,65%
19	Recife (B)	35,08%	Curitiba (B)	91,59%	Teresina (B)	29,14%
20	Porto Velho (A)	36,23%	Recife (B)	92,17%	Boa Vista (A)	41,34%

27 National Treasury (2022)

21	Salvador (B)	37,53%	Salvador (B)	93,23%	Recife (B)	52,49%
22	Fortaleza (C)	37,61%	Teresina (B)	94,99%	Macapá (A)	57,77%
23	Florianópolis (A)	48,41%	Cuiabá (C)	96,16%	Rio de Janeiro (B)	63,52%
24	Manaus (A)	58,70%	Fortaleza (C)	97,13%	Florianópolis (A)	93,30%
25	Rio de Janeiro (B)	61,36%	Campo Grande (C)	97,75%	Cuiabá (C)	170,67%
26	São Paulo (B)	62,67%	Natal (C)	100,63%	Natal (C)	234,46%

Source: Transparent Treasury (accessed September 30, 2022). Author's elaboration

Observing the financial conditions of the municipality of Rio de Janeiro, the municipality is in the process of improving its conditions, it recently achieved a B grade in the final classification in Capag, but it is far from being positioned with distinction among Brazilian municipalities, so that this allows innovations that bring risks to its fiscal policy until now unknown internationally.

But would A-rated municipalities, such as Rio Branco, Vitória, Porto Alegre, Belém and Florianópolis, or states or even Brazil be justified in adopting Bitcoin as a currency to meet tax obligations?

In federal terms, in addition to the actions of the institutions of the federal administration that have competence for the regulation and supervision of the financial market, and already act daily monitoring the investments and frauds related to cryptocurrencies, Law 14.478/2022 amends the Criminal Code to add fraud in virtual assets services, defined as “Organizing, managing, offering or distributing portfolios or intermediating operations involving virtual assets, securities or any financial assets in order to obtain illicit advantage, to the detriment of others, inducing or keeping someone in error, through artifice, ruse or any other fraudulent means.”

5. What is the Justification for Receiving and Paying Taxes with Bitcoins

We can see that the Bitcoin industry is a seminal success, its technological features, its business model, and its public ledger model are innovative and have influenced countless crypto assets. Noteworthy is the advent of blockchain that has application even outside the crypto asset market.

However, we find that Bitcoin fails to fulfill the functions of currency and that the best definition for Bitcoin is that of a speculative commodity or a computer code with public accounting records. Furthermore, it is clear that the Bitcoin Industry facilitates financial crimes because of its nature of anonymity and being an asset without sovereign borders.

In tax terms, both the US IRS and the Brazilian IRS treat bitcoin ownership as property.

In Brazil, in the Annual Income Tax return, crypto asset assets received their own codes in the “Assets and Rights” tab in 2019. They gained a specific section in the declaration called Non-Fungible Tokens (NFT), which includes bitcoins. In this way, bitcoins are recorded in a similar way to property, they are treated as if they were real estate.

Thus, Bitcoin which was designed to be a virtual currency that would compete with fiat currencies, similar to gold, is viewed in tax terms as if it were a commodity in a generic way by the tax authorities.

Considering it as a good or right is a really simple, safe, and generic way to designate an asset when you are not sure what it is. However, the volatility presented by cryptocurrencies, grounded in their dependence on inflows, puts these virtual currencies far apart from assets such as real estate, which have much greater price stability. In addition, real estate prices are dependent on completely different factors. Certainly, the Brazilian IRS, like the Central Bank and the Securities and Exchange Commission, is following the discussions about cryptocurrencies around the world to improve its regulations.

Considering the possibility of tax payments with bitcoins, would it be convenient for a taxpayer to perform such an action? The answer to this question depends on several factors.

The municipality of Rio de Janeiro has even announced an offer to reduce the amount of tax if the taxpayer pays with virtual currencies. Depending on the size of this discount and the trend in bitcoin prices, it may be advantageous for taxpayers to pay taxes with bitcoins. After all, disposing of bitcoins is not the same as disposing of real estate. It is a much simpler and faster process and has a much smaller impact on the life of the individual and his or her family.

On the government side, would it be appropriate to accept bitcoins as currency to honor fiscal commitments?

First, the management of these virtual assets would require great skill and speed on the part of the government manager, due to Bitcoin's marked volatility. Moreover, when receiving bitcoins in the fiscal sphere, one would have to convert them into local currency, either for accounting purposes or to honor commitments that cannot be paid with bitcoins. Volatility and conversion would have to be absorbed, in the healthy hypothesis, by the appreciation of bitcoins on the market. If virtual currency prices do not appreciate, the costs will have to be absorbed by other income or by cutting costs. At the very least, because of these conditions, the government should adopt a limited size in accepting bitcoins.

There may be interest in government acceptance, as it is felt that acceptance of bitcoins can attract investments in technology without inhibiting the use of local currency, as the municipality of Rio de Janeiro has suggested.

However, there are no international success stories to modulate yet. There are no examples that Bitcoin adoption has brought investment that would not otherwise come to the country or the region. The cross-border nature of bitcoins, the concentration of mining in the United States and China, and the centralized control in so-called "core developers" do not signal that these investments would occur.

In addition, environmental groups lobby internationally against bitcoin mining because of the high energy consumption to solve cryptographic issues. Whether or not the criticism from these groups is true, one must consider this issue and present the equation of the problem, even more so if the region wants to position itself as consuming energy in a sustainable way.

6. Conclusion

In the financial market, the various assets (government bonds, stocks, debentures, currencies, commodities, etc.) have different characteristics of return, risk, liquidity, and term, which cause them to be allocated differently in an investment basket and to be directed to different investors. Even though they have recognized characteristics in the market, the most vital characteristic of an asset may be its weakest aspect, depending on the analysis of the asset and the circumstance.

Nakamoto has tried to create a virtual currency whose endowment does not go through the control of government institutions and is controlled by cryptography so that the currency is always rare, trying to emulate gold. But can we trust a technological algorithm instead of monetary authorities to ensure financial stability? Doesn't that algorithm need social scrutiny? Can global currency management operate for profit instead of serving the common good?

Bitcoin cannot perform the functions of money. The price of Bitcoin has high volatility because Nakamoto has failed to create money. Instead, he (they) developed a speculative commodity. It is a computer code that concentrated wealth in "mining" countries.

In terms of ethics, Bitcoin is not the solution to the ethical problems encountered between monetary authorities and traditional banks. Instead, it brings more ethical issues because of its most vital characteristics of anonymity and cross-border nature. Bitcoin is prone to be used in illegal transactions such as money laundering, tax evasion, and terrorist financing.

The Bitcoin Industry has been founded on what is presented as a libertarian ideology with an emphasis on technology at the expense of human and social control. This ideological position is clear and underpins politics averse to government institutions.

We have seen that Brazil is still crawling in its studies for acceptance of cryptocurrencies in its fiscal policy. The municipality of Rio de Janeiro has taken the lead and already announced the acceptance of bitcoins by taxpayers to honor municipal taxes in 2023 and also announced the intention to invest 1% of municipal revenues in bitcoins.

The financial conditions of this municipality improved between 2021 and 2022, a period quite marked by the Covid-19 pandemic, in which there were many supportive public financial measures. But compared to the other capital cities, Rio de Janeiro's financial data still stands out negatively, especially in the Indebtedness indicator. Besides, the municipality has a strong presence in the state GDP and the state of Rio de Janeiro has an even more delicate situation than the municipality.

For the taxpayer, the use of bitcoins to pay taxes will depend on the discount offered by the government entity and the Bitcoin price outlook. Currently, the Bitcoin price is on a downward trend

due to various economic, political, and legal factors, especially the economic recession and inflation in developed countries. Given this situation, if the government entity offered a substantial tax discount it could be advantageous to pay taxes with bitcoins. But this would not mean that the acceptance of bitcoins by taxpayers would be an endogenous thing.

On the government side, the management of these virtual assets would require great skill and speed on the part of the government manager because of Bitcoin's marked volatility. And there would be the cost of conversion to local currency. If virtual currency prices do not appreciate, the costs would have to be absorbed by other revenue or cost cutting.

There are still no international success stories to even remotely ensure that the acceptance of bitcoins would attract technology investments that would not otherwise come to the country or the region. The cross-border nature of bitcoins, the concentration of mining in the United States and China, and the centralized control in the so-called "core developers" do not signal that these investments would occur.

One must also consider the criticism of Bitcoin's PoW model by environmental groups.

Bitcoin for a long time did not go past \$0.10, then it went up to over \$60,000, today, late 2022, it is around \$20,000. Nothing in its structure guarantees that Bitcoin will not cost \$0.10 again. Even disregarding the structure and characteristics of Bitcoin, the return to the derisory price may occur simply because of technological advancement or competition or the financial conditions or regulatory action of just two or three countries. Government entities need to be aware of this when formulating their measures to accept Bitcoin in their fiscal policies.

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