REVISTA *ARGUMENTUM*

TAXATION OF NEW TECHNOLOGIES: THE CASE OF CRYPTOCOINS

Liziane Angelotti Meira
Doctor and Master in Tax Law (PUC / SP). Master of Laws (Harvard Law School). Tax Auditor of the Iinternal Revenue and Customs Administration. Board Member of the Board of Tax Appeals. Lecturer Professor at the Brazilian Institute of Tax Studies. Professor of Tax Law at the Federal University of Rio Grande do Sul). Professor of Tax Law at the Instituto Brasiliense de Direito Público - IDP, Distrito Federal (Brasil).
E-mail: lizianemeira@gmail.com.
Lattes: http://lattes.cnpq.br/7247403201762735.

Hadassah Laís Santana
Professor of Tax Law and Researcher (Instituto Brasiliense de Direito Público - IDP). PhD in Education student (UCB). Master in Tax Law (UCB). Legislative Advisor in the Chamber of Deputies, Distrito Federal (Brasil).
E-mail: hadlais@gmail.com.
Lattes: http://lattes.cnpq.br/7817744309547446.

Fillipe Soares Dall'ora
Master in Law student (Instituto Brasiliense de Direito Público - IDP). Researcher in Tax Law (IDP). Editor of the Journal of Studies and Advanced Researches on Third Sector-Repats. Lawyer at José Menck & Mascarenhas Associated Lawyers, Distrito Federal (Brasil).
E-mail: fillipe.direito@hotmail.com.

Submissão: 30.08.2019.
Aprovação: 01.12.2019.

ABSTRACT

The present work aims to demonstrate the origin and formation of cryptocurrencies, by understanding the material nature of this technology in detail, it will be possible to categorize it into an appropriate tax incidence factor, since only by comprehending the object of taxation, in its essence, will be possible to classify it with lower risks of incurring in error, applying the most appropriate tax to the specific case.
Consequently, the cryptocurrency and its possible classifications in the juridical order will be presented, in order to understand it as a good or as a market asset, that is, a currency itself. This classification is fundamental so that it would be possible to determine how the tax incidence will be given on the virtual currency and, of course, to allow the application of the tax matrix rule to it. Furthermore, in this research it will be worked, in a first moment, the existential constitution of cryptocurrency, as well as it will be given a tributary explanation on the factors of incidence that can be applied to this technology, seeking to understand the essence both in the broad legal scope

and in taxation itself. In this way, it will be necessary to analyze the virtual currency in a similar way to other assets that have close operations, as well as verify the international understanding about the subject, since this technology is definitely an international asset.
KEYWORDS: *Bitcoin. Cryptocoin. Cryptocurrency. Taxation. Tax nature. Legal nature. Tax incidence.*

1. INTRODUCTION

The interpretation of technological innovations in relation to law is a motif of great relevance nowadays, in view of its rapid expansion and development.

Humanity develops its technological means with extreme agility. Remaining to the operators of the law to the arduous task of accompanying this speed of development and innovation in its diverse branches, among them, the tributary.

Taking into account these considerations as to its actuality, it remains to highlight one of the most recurrent, less understood and explored themes, namely, cryptocoins.

Few works try to point out its logical and factual constitution. Even less frequent are those aimed at demonstrating in the practical field the innumerable possibilities and consequences that such technological innovation will inevitably entail. This research, therefore, has the scope not only to clarify doubts as to the existence of such technology, but also to point out a horizon of possibilities that this innovation will bring.

That said, it is important to emphasize the juridical chasm that exists in the relationship of owner and related consumer between the people who hold the cryptocoins and the digital currencies themselves. Since only a short time ago the Brazilian National Treasury took some position on the interpretation of what should be in fact considered the virtual currency.

Nevertheless, the position adopted by the Treasury is controversial, since it goes against much of the position that Europe has on the same subject. This is what make this theme so relevant, because when dealing with a technology that has an origin and use in an international spectrum, extreme care must be taken, since isolating the matter exclusively to the Brazilian juristic framework without observing how the world deals with such subject can lead to unsustainable legal and economic consequences to Brazil.

Therefore, the correct understanding of the matter in line with the global positioning

would allow Brazil, with all its technological structure, to take a great step towards not only technological development, but also to take a great leap forward in the field of taxation, insofar as there will be an incidence factor never before considered by the Legislator.

Thus, it is inevitable that taxation on virtual currencies will be brought up and widely debated so that there will be no negative consequences of a misapplication of the understanding of this object, so in vogue nowadays.

2. FUNDAMENTAL CONCEPTS

2.1. The birth of the cryptocoins and their genesis: Bitcoin.

The problem that happens when you start using digital money is double spending. A banknote can only be used once, however, there is no guarantee that prevents the use of digital credit for more than one person.

In order to carry out any transaction using a debit card, a bank, card operators and several intermediaries are necessary to ensure that the account of those who transacts actually have balance and that the determined amount is being spent only in that store, with only the transacted product.

For this, a central authority is required to decide whether or not the financial transaction is valid, such as banks, governments, notaries, accountants and the like, who deduct the cost of such validation of the purchase. In this way, when a purchase is paid with a card, the cost of the transaction ends up being higher than the cost of the product, only to have this validation done by a mediator.

The need for a mediator was contested by Satoshi Nakamoto when he published an article in October 2008 describing the *blockchain* solution with the digital currency *bitcoin*.

Nakamoto has put together several ideas and formulated a system of networked programs that act as digital wallets, where these wallets store and encrypt every transaction that has been made in bitcoins with the date, the recipient and the values exchanged.

Bitcoin was the first cryptocurrency where the network itself validates transactions to ensure that no double spend occurs.

After developing *bitcoin*, Satoshi Nakamoto gradually passed the responsibility of

cryptocurrency to others and disappeared. To this day, it is not yet known who he is (or who they are) and for good reasons.

In August 2017, the 1 million bitcoins that were saved at the beginning of the project were worth over 4 billion dollars. Its value, as it were, is purely determined by the confidence people place in the currency.

Behind analog coins, there used to be a standard given by the government that determined how much they were worth. The US dollar, for example, was guaranteed by the gold that the national treasury possessed. Each dollar bill could be exchanged for the equivalent value in gold, which limited the money in circulation and eventually became a problem as the dollar began to be used internationally after World War II.

In 1971, President Richard Nixon broke the gold standard and turned the dollar into Fiat money, a currency that has no intrinsic value and depends only on the trust people place in it, even though the gold, wich was used as collateral, had a relatively imaginary value.

As useful as it is, gold has the value credited to it. Same goes for bitcoin, or any cryptocurrency. The value it has depends on how much people are willing to use it. During its first year, the value of each Bitcoin was virtually nil. In March 2010, a forum bitcoin user tried to sell 10,000 bitcoins for 50 dollars and no one accepted the proposal. Nathaniel Popper says in Digital Gold that, in the beginning, bitcoin's big appeal was much more ideological than really practical.

The notion of a currency that no central authority controls was enough to attract libertarians and the like in the beginning of the project. Bitcoin's first large-scale use wasn't lawful, as there are no intermediaries, just as no bank controls how much each has in its wallet and where the money goes.

One of the first big uses of bitcoin was as a currency in the illegal trade of SilkRoad, a site linked to DeepWeb. This movement made bitcoin start to be worth a few dozen dollars, only to see its value drop later by problems from MTGOx's (the largest bitcoin house until February 2014), when it was discovered that 650,000 customer bitcoins had been stolen. A price drop from which the currency took years to recover before skyrocketing to thousands of dollars.

This bitcoin appreciation often happens when people in a country facing currency issues buy bitcoins as a way to save money. As happened in Japan with the threat of conflict with North Korea in 2017. That's because bitcoin and other cryptocurrencies can do a lot that money can't.

Because only internet access is required to make transactions, bitcoin has the potential to serve the billions of people in the world without access to banking. This is because of the lack of economic interest of the banks or even the lack of security of these regions. As cryptocurrency is not centralized, there is no possibility of being confiscated as was the case with savings here in Brazil in 1990. What makes Bitcoin a way out in countries that control dollar inflows or force unfavorable foreign exchange like Argentina and Venezuela.

Bitcoin's so high appreciation makes people use it much more as savings than as money for financial transactions, the way it was designed. After all, the 10,000 bitcoins that were not bought for 50 dollars in 2010 would be worth 40 million dollars in August 2017. And to make matters worse, since transactions don't depend on one central agency controlling everything, they don't depend on the credibility of one agency either. This means that, at the same time, there is no agency that regulates and ensures that those who work with bitcoin do legitimate operations, which will be discussed later.

The number of transactions that can be made per second in bitcoins is limited by blockchain size and transaction validation commissions are high, which limits micro payments and many other possibilities that a digital currency would have. That is why other cryptocurrencies have been created since 2010, the “altcoins” that incorporate solutions to bitcoin failures, while serving for uses far beyond money. São plataformas de tomadas de decisões coletivas. Purchase and sale records, certificate issuance and many other important transactions.

2.2. The concept and application of *blockchain.*

The great innovation proposed by Satoshi Nakamoto, more than bitcoin itself, was how to control double spending, that is, how to ensure that only one bitcoin can be spent once, in a decentralized manner and without having to rely on just one or few participants, such as governments or economic blocs.

This requires encrypting all transactions on all computers connected to the network of the cryptocurrency, in this case, bitcoin. Thus, if a bitcoin from one wallet is sent to another one, two keys will be required to encrypt this transaction. The first, a public key, which identifies the sender's wallet and a private key, responsible for signing this transaction. One key without the other is completely useless, so there is no risk in publicizing the content of the public key.

With the public key you can identify the wallet, certify its existence and record all transactions that it has participated in. But bitcoin can only be taken from it if the user has the private key. This way, both keys are used to encrypt the transaction in a block of text, the *hash*, which records all trades ever made.

The blockchain, with all the data from that transaction, is transmitted to all the digital wallets of the network computers with what is called a "node". These nodes are responsible for generating mathematical calculations to ensure the validity of your transaction as well as certifying that that bitcoin has not been used more than once at the same time in more than one transaction.

As a result, at least 6 nodes need to verify and validate the transaction and if validated, the transaction is added to the blockchain and propagated across the network to be stored on all participating computers.

Therefore, the safety of the blockchain and its validated transfers is attested. So if someone wants to cheat on a trade or falsify a bitcoin they have to change all records in at least half of the network, and forge the accounts that would validate all blocks added after the transaction. For someone to forge a blockchain transaction, they will need to have more processing power than at least half of the other nodes, if they don't, the other nodes check the transaction, do not validate the fake transaction, and it is not incorporated on blockchains. In this way, the network itself guarantees the authenticity of the transaction without relying on more than one central authority for the transfer.

Thus, to ensure the incentive for people to devote their computers and electricity to keep their digital wallets, Satoshi has set up a commission for transactions, considering that the bitcoin blockchain is programmed to release coins to the computers that are doing the accounts called Miners. So, the more accounts a computer makes, the more likely it is to win the next draw.

Satoshi has programmed its blockchain to generate bitcoin blocks every ten minutes in decreasing quantities, starting with 50 bitcoins in 2009 and reaching 12.5 bitcoins in September 2017 until the total sum of created coins reaches 21 million generated bitcoins, when they will no longer be created.

This will generate a finite number of bitcoins, and no one can generate new currencies and inflate the market, as the government does with fiduciary currencies.

To guarantee that the block is mined every 10 minutes, the more computers are added to

the network, the more complicated the bills to generate each coin become. A home computer could generate 50 bitcoins in 10 minutes in 2009, until it began to use graphics cards to mine coins, which are far more efficient at fast accounts in parallel.

Consequently, each time the value of a bitcoin went up, the greater was the reward for devoting computing and processing to mining more, and with that even more computers were added to the network. To the point that specific processors were created to calculate the bitcoin hash.

The larger and more complex the network becomes, the longer and safer transactions become, as it becomes increasingly difficult for a single person to be able to fraud a transaction.

The applicability of blockchains is discussed far beyond the creation and transaction of virtual currencies themselves, but the important thing is to understand that with the blockchain verification system, information traffic will be increasingly secure.

2.3. Cryptocurrency, its evolution to ICOs (*initial coin offering)* and its relation to the stock market.

Cryptocurrencies are very much compared to stock market actions, especially regarding the possibility of astronomical gains or not, in a short period of time.

However the similarities end there. As already explained, cryptocurrencies in their conception were created as a transaction method where through a block chain validation system (blockchain), there is no need for an intermediary agency or entity that functions as a transaction moderator, much less a regulator for these transactions. Although this picture is changing, as we will see later in the present research, the conception of cryptocurrencies is much simpler.

In this way, virtual currencies, in a much broader and more complex sense than the reason for their creation, are increasingly being used as a source of alternative income or capital deposits, since despite their intense fluctuations, the currency is not subject to international markets, political decisions or state regulation. And while this is a potential advantage for cryptocurrencies, this is exactly where they differ from other assets, such as the stock market.

On the other hand, with the natural development of cryptocurrencies, ICOs (initial coin offers) are born, which appear as a kick-start for new cryptocurrencies and structure them more familiarly using the crowdfunding methodology.

This method works as follows: Interested parties deposited the renowned currencies, such as Bitcoin, and received in return an equivalent amount of the new virtual currency that was being created, ensuring an initial interest in the project so that the new cryptocurrency would stand out. Like everything in this new technology, this movement was organized by forums and specialized communities. This system was then matured by Ethereum, another powerful virtual currency, when it launched the first ICO model as a standardized mechanism for ICOs. With it, it's possible to acquire "digital assets" very similar to financial securities. These are called tokens, and having one of these tokens is proof that the bearer is the financier of a particular project, object of ICO.

As explained earlier, ICOs work in a similar way to "Crowdfundings", wich are nothing more than the movement to fund a project where funders receive some benefits for when the project comes to fruition. This is how the initial supply of coins works. There are several projects launched with the distribution of these tokens.

The value of each one of these is determined by the project creators themselves, who are also responsible for what each buyer is entitled to receive. Such as voting rights or future profit sharing, just like the stock market.

However, as already mentioned, so far ICOs cannot be compared to offers on the stock market, as they don't yet have regulatory agencies to guide their structure and ensure their operation with the minimum of confidence, as it occurs in the stock market. Still, such a scenario has strong possibilities to change, with intense meetings of several pioneer countries in this new technology, which aim not only to give a legal understanding to cryptocurrencies, but also to study possibilities for their regulation, as will be seen below.

3. THE WORLD'S PERSPECTIVE TOWARDS THE POSSIBILITIES OF TAXATION OF CRYPTOCURRENCIES.

The field of research and studies on cryptocurrencies and their possible taxation models is still unusual. Although there are several writings on the subject, it still remains abstract. Being pioneers, countries that already include this new form of income and monetization in their legal frameworks.

The fact is that the study of such a tool is still so archaic that it is not even possible to

categorize it for certain as to its legal nature in order to give proper guidance to its taxation.

In the United States, for example, the Internal Revenue Service (IRS) has stated that virtual currencies are treated as property, not qualifying as foreign currency for tax purposes. The opposite of what the European Court of Justice proclaims, which states that currency transactions must receive the same tax treatment as foreign currency exchanges, being recognized by the UK and Germany tax authorities as a form of private money in which their creators and users must be properly taxed.

The United States has further argued that the receipt of a virtual currency payment must be offered for taxation like any other payment made with goods, as well as the remuneration of currency-producing activity, mining, qualifies as autonomous labor income and should be taxed. It also states that if the taxpayer sells or exchanges virtual currencies there will be a taxable capital gain, such as the stock market.

In this sense, Brazil still takes its first steps on the treatment of virtual currencies, having an initial attempt to categorize virtual currencies into some type of financial asset through its own Federal Revenue that treats them within its income tax return as “Other Goods ”on the DIRPF Assets and Rights Card, and as in the United States, any capital gains will be taxed at progressive rates of 15 to 22.5% depending on the amount earned.

However, such a classification of cryptocurrency by the Brazilian legal system may be prematuresince there is no effective classification of it as an asset, or as currency, which makes all the difference for tax purposes.

If considered as currency, it will be subject to a private taxation regime, and it will be theoretically applicable to the incidence of IOF and ICMS. As an example there is a merchant who accepts such currency in a transaction, so would focus all tax modalities that affect a transaction with common currency. As explained above, the Brazilian IRS has defined that cryptocurrency should be understood as a financial asset, but in a recent statement on financial operations, it warns that “There is no specific provision on virtual currencies in the legal and regulatory framework related to the National Financial System. The Central Bank of Brazil, in particular, does not regulate or supervise virtual currency operations.”

On the other hand, if considered as a good, it will be subject to Income Tax, which is even Brazil's current position regarding cryptocurrencies. Thus, as explained above, these will be declared as financial assets for income tax purposes, and must be stated in the “other assets” sheet

at the amount that was acquired. When you purchase it, if it exceeds R $ 35,000.00, it will be subject to a rate ranging from 15% to 22.5%, depending on the amount, as with the shares for example.

This, as mentioned, is also the United States position, which by way of example, understands that if a cryptocurrency is used to purchase any commodity, it will be considered as property sale and will be subject to capital gains taxation.

In addition, Article 55, Section IV of the 1999 Income Tax Regulations, states that "income received in the form of goods or rights, valued in cash, at the amount they receive at the date of perception". Thus, bitcoin can be considered as an income received in law that is valued in cash and is therefore taxable. Which makes sense of a logical nature, however this position is not regular in the world.

Given the current position, both Brazilian and North American, it is worth bringing to light the important step in international economic policy on cryptocurrencies by the Bundesministerium der Finanzen of Germany, which issued a divergent directive from US positioning, on 01/03/2018, understanding cryptocurrency as a currency, not property. Also, under that directive, if a cryptocurrency is used to make a payment, it will not be subject to capital gains tax. However, it may be subject to financial transaction tax, using the value of the cryptocurrency at the time of the transaction, duly documented by the seller.

This directive was based on the ruling of the European Court of Justice which in 2015 ruled that the conversion of cryptocurrency into fiduciary currency would be subject to the levying of taxes, specifically those on services, thus revealing that the German Ministry of Finance understands that cryptocurrencies are of the legal nature of a currency.

With this positioning cryptocurrencies become equivalent to legal means of payment, as the so-called virtual currencies of those involved in transactions are accepted as an alternative means of contractual and immediate payment, as explained by the document issued by the German government.

Given this, according to the German document, a better definition is created about what can be taxed or not. For example, miners who receive rewards in digital currencies will not be taxed as their services are considered voluntary under the same document. By contrast, foreign exchange traders acting in their own name as intermediaries will receive a tax exemption, but in an Exchange (such intermediary) there will be no such exemption.

It may still be too early to say if this is undoubtedly the best alternative. However, the topic is being seriously discussed in the international community, and was the subject of discussion at the G20 meeting chaired in Buenos Aires, Argentina at the beginning of this year 2018.

Also in November 2018, a new G20 scheduled meeting has on its agenda, at the request of France and Germany, the theme of "cryptographic assets" such as bitcoins, which reveals the need to regulate such assets and perhaps where there will be an important step in the definitive classification of this new currency.

This position of world governments is so evident that in December 2017 the United Kingdom not only understood the importance of virtual currencies but raised the real possibility of creating a cryptocurrency protected by the English state. Possibly pegging its value to the British Pound to prevent its value from fluctuating like bitcoin itself.

But not all positions are positive, Egyptian Sheikh Shawki Allam has called for a ban on the sale, purchase or any other transaction of digital currencies on the grounds that "According to the Egyptian Grand Mufti, digital currencies are not sustained by a tangible asset such as gold standard, in addition to the characteristic anonymity of transactions, could lead to the financing of organized crime, tax evasion and money laundering, thus contrary to the laws of Islam."

Apart from the religious nature of the explanation, it is understood that the problem about the institution of cryptocurrencies is more focused on its use, as in the case of 2017 in Bulgaria where, after a crackdown by the Bulgarian police on an organized crime network, the state seized about 200,000 bitcoin units. No one knows so far what the Bulgarian government intends to do with all this digital fortune as it refuses to comment on it.

The truth is that new technology is inevitable, and with or without the consent of governments it will take on increasing strength and effectiveness. It is then up to the States to decide which side they will decide to take. And surely, as always, they will choose the most lucrative one, because the regulation of cryptocurrencies will not only give them greater credibility, but will create a whole new universe of revenue possibilities that simply did not exist a few years ago.

FINAL CONSIDERATIONS

The introduction of cryptocurrencies into the global scenario is still far from moving to the state of stability where their nature is fully understood. Of course, a great deal of study is still needed to determine not only how it works, but how the legal system will treat such a technological asset.

Thus, in order to evaluate how cryptocurrency should be treated within the legal aspect, in order to understand it and apply the most appropriate form of taxation, it was first necessary to delineate the origin, creation and purpose of cryptocurrency.

So, it was realized that its genesis came from the paper written by Satoshi Nakamoto, who utopically predicted the creation of a decentralized currency, based only on itself and on the confidence that its block chain verification system would guarantee.

Due to this concept, the currency was used for various payments on the deep web and consequently had an almost astronomical historical evolution in its value. This is when the whole world has turned to the infinite possibilities of bitcoin and cryptocurrencies.

As a result, numerous cryptocurrencies were born, which not only served to pay for products or services like a currency, but are already worth as parts of companies, in a system called crowdfunding, showing the enormous potential that cryptocurrencies have.

Such a potential mutation of the cryptocurrency function doesn't help to determine its legal nature, and two strands have been created around the globe, where one of them, adopted by the United States, understands cryptocurrency as a good, just as an action, responsible for adding capital to the owner of the virtual currency and must be declared by the Income Tax.

The divergent position comes from Europe, headed by Germany, where the understanding of cryptocurrency revolves around a currency itself, devendo incidir sobre esta Impostos comuns às transações financeiras, tal qual o IOF e o ICMS.

However, this research praises the verification of comparative law, which generates numerous questions about the possibilities that should be evaluated for the realization of tax collection on cryptocurrencies.

Consequently, by virtue of its global importance, it should be understood that cryptocurrency, being an asset that has no physical barrier, will inevitably cross all State borders and ultimately have the real ability to be anywhere in the world at the same time. For this reason,

it is of paramount importance that the overall alignment on the subject is unison, as it will be hard to calculate the consequences of using a currency that has a different treatment in every place in the world where it has any influence.

Thus, regardless of the position taken by the countries all over the world, the consequences will be noticeable, and perhaps for the first time the world will have to look at economic matters and work together to understand, apply and operationalize cryptocurrencies in a balanced and cohesive manner.

REFERÊNCIAS

BRASIL. Constituição (1988). **Constituição da República Federativa do Brasil.** Disponível em: <http://www.planalto.gov.br/ccivil_03/constituicao/constituicaocompilado.htm>. Acesso em: 1 maio. 2018.

IAMARINO, Átila. **Criptomoedas, blockchain e Altcoins | Nerdologia Tech.** 2017. Disponível em: https://www.youtube.com/watch?v=PQQ0NpwqMlg&t=192s. Acesso em: 17/09/2018.
IAMARINO, Átila. **Bitcoins | Nerdologia Tech.** 2017. Disponível em: <https://www.youtube.com/watch?v=h87O2xfUSv8>. Acesso em: 23/09/2018.

VIGNA, Paul; CASEY, Machael J.; **The age of cryptocurrency: How Bitcoin and digital money are challenging the global economic order (English edition);** ed. St. Martin's press; 2015

TAPSCOTT, Don; TAPSCOTT, Alex; **Blockchain Revolution;** ed. Senai, São Paulo; 2017.

NAKAMOTO, Satoshi. **Bitcoin: A peer-to-peer Electronic cash system.** Disponível em: https://bitcoin.org/bitcoin.pdf, Acesso em: 01/05/2018.

POPPER, Nathaniel. **Digital Gold:** Bitcoin and the Inside Story of the Misfits and Millionaires Trying to Reinvent Money. Harper Paperbacks; Edição Reprint, 2016.

ABITANTE, José Carlos B. **Elisão Fiscal, Evasão ou Sonegação do Bitcoin? Como agir dentro da lei.** 17 out. 2017. Disponível em <https://www.linkedin.com/pulse/elisão-fiscal-evasão-ou-sonegação-do-bitcoin-eis-uma-bueno-abitante/?published=t>. Acesso em 1 maio. 2018.

ANTONOPOULOS, Andreas M. **Mastering Bitcoin**. 2. Ed. 2017. Disponível em: <https://bitcoinvestimento.blogspot.com.br/2017/01/mastering-bitcoin-download-gratis-andreas.html>. Acesso em: 1 maio. 2018.

CHAU, David. **Bitcoin one step closer to being regulated in Australia under new anti-money**

laundering laws. 22 out. 2017. Disponível em: <http://mobile.abc.net.au/news/2017-10-23/bitcoin-one-step-closer-to-being-regulated-in-australia/9058582>. Acesso em 1 maio. 2018.

COLLUCI, Fernando; MIYAKE, Alina. **A Tributação dos bitcoins e outras moedas virtuais**. 23. jun. 2017. Disponível em: <https://www.machadomeyer.com.br/pt/inteligencia-juridica/publicacoes-ij/tributario-ij/a-tributacao-dos-bitcoins-e-outras-moedas-virtuais>. Acesso em: 1 maio. 2018.

BECKER, Alfredo Augusto. **Teoria geral do direito tributário.** 3. Ed. São Paulo: Lejus, 2002

MACHADO, Hugo de Brito; **Direitos Fundamentais do Contribuinte;** ed. Atlas, 2009;

QUINTELA, Guilherme Camargos; **Segurança Jurídica e Proteção da Confiança: A Justiça Prospectiva na Estabilização das Expectativas no Direito Tributário Brasileiro;** ed. Fórum; 2013;