Regulating Bitcoin – The Challenges Ahead

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Abstract: This article provides an overview of several challenges that involve Bitcoin and other cryptocurrencies. After briefly discussing the underlying technology, it discusses challenges related to cryptocurrencies that regulators face at this point in time. This includes issues regarding Initial Coin Offerings and cryptocurrencies in general, as well as cryptocurrencies as an investment instrument. It also includes an analysis of cryptocurrencies compared to the real economy. The article concludes that scholars are not unanimous regarding the regulation of Bitcoin and cryptocurrencies, and that cryptocurrencies, at least up till now, do no follow trends of the real economy.

Keywords: Cryptocurrency; Bitcoin; Initial Coin Offering; Financial Regulation; Financial Policy

JEL Classification: G18; F38

1. Introduction

The most famous cryptocurrency, Bitcoin, has been brought to life as an electronic payment system that is based on cryptographic proof instead of trust (Nakamoto, 2008). The reasoning behind this, is that because of this technology, in the case of electronic payments two willing parties can transact directly with each other without the need for a trusted third party. Instead of relying on financial institutions that were almost exclusively needed to process these payments, buyers and sellers can now make transactions without any other parties to be involved. These cryptocurrencies are distributed, worldwide, decentralized digital currencies, based on an open source cryptographic protocol, in which there are no institutions such as governments, companies, or banks in charge of issuing or managing these currencies (Filippi, 2014).

Bitcoin, and other cryptocurrencies, are created using a process that is called mining. It is a process that rewards users based on the amount of computing power they contribute to the network in the form of newly created currencies. The more computing power the user offers, the bigger the rewards. The computing power is

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used to resolve complex mathematical problems, also known as Proof of Work, which become more difficult the more the network increases in strength. Mining is used to ensure the integrity and security of the system by providing a means to verify transactions using a decentralized network of peers. These peers process transaction data simultaneously, often with fees involved. After this data is processed, the transaction is recorded into a public ledger, also known as a blockchain. This technology does not rely on a central bank or authority. Instead, it relies on cryptographic algorithms and peer-to-peer technologies, which can be used to securely transfer money without passing through a trusted third party. Unlike fiat-currencies, which have a value that is derived through regulation or law and underwritten by the state (J.P., 2011), cryptocurrencies have no intrinsic value. Ergo, the only real value is purely based on supply and demand.

Both within and outside the financial system, cryptocurrencies have generated a great deal of innovation and experimentation. Bitcoin, and other cryptocurrencies have seen a significant growing rate of acceptance, both by online and offline merchants. This could raise issues regarding for example cyber criminality and law enforcement. Contrary to popular belief, transactions that make use of Bitcoin or other cryptocurrencies, are not fully anonymous. Brito & Castillo (2013), for example, state that the Bitcoin protocol makes it possible to trace a transaction back to its pseudonymous Bitcoin address, which then can be linked to a particular identity. However, since it is quite difficult to track down the identity of anonymous users, as stated by Reid & Harrigan (2011), the cryptocurrencies are often used to blur the source of destination of a specific financial transaction. This is the case in for example online gambling practices, black market operations, fraud, or money laundering (Stokes, 2012).

In this paper, we will take a closer look at the challenges that the cryptocurrencies create for regulators. The structure of this paper is as follows. We discuss the existing literature in section 2. In section 3 and 4, we will present a comparative analysis of three large cryptocurrencies and the real economy measured in GDP, and in section 5 the conclusion will be discussed.

2. Literature Review

Bitcoin, and other cryptocurrencies create several challenges for regulators. Cryptocurrency has begun to be in the sphere of attention of states and their regulators later, in 2011-2013 (Y., 2018). The lack of regulations, both nationally and internationally, expose the cryptocurrency to operational, credit and liquidity risks, under the aegis which the security of systems can be compromised, as well as fraud (Cvetkova, 2018).

A Bitcoin system lacking adequate regulation leads to social instability and an economic downturn (Wang, 2018). Bitcoin regulation is treated by people in various ways (Filippi, 2014), which the most highlighted were those on regulatory denial due to pressures on the privacy and free trade of this type of product, and on the other hand, regulation is required for a better control of users behavior and reduce illegal or criminal activities.

Therefore, in Japan (Ishikawa, 2017) were questioned three issues regarding the nature and legal status of virtual currencies, the existence of regulations applicable to users and their protection.

In this chapter we will take a look at Initial Coin Offerings, cryptocurrencies itself, and cryptocurrencies as an investment tool.

2.1. Initial Coin Offerings (ICOs)

However, until now, unified and well-established approaches to legal regulation of this phenomenon have not only developed internationally but also in individual jurisdictions, fact evidenced by the fact of repeated changes in the policies of different governments (Utkin, 2018).

The first challenge that we will discuss regarding the regulation of Bitcoin and other cryptocurrencies are their Initial Coin Offerings (ICOs). techche et al. (2018) suggest that, based on their research, the ICO volume has passed the 25 billion USD mark. These ICOs are being used to attract financial support for new ideas, and the amount of ICOs grow with an accelerating rate. There are, however, flaws when it comes to ICOs. There are examples of ICOs being Ponzi schemes and outright scams, which is also stated by Chocan (2017). Due to governance concerns countries came with regulatory responses. For example, China (Chocan, 2017; Zetsche et al., 2018) and South Korea banned ICOs from happening in the first place, and warning notices have been issued by the European, US and other regulators. There have also been more supportive approaches, by for example countries as Singapore and Switzerland.

There are certain typical issues that arise related to ICOs. We will discuss the most significant ones. First of all, there is the issue with information asymmetry. Before an ICO, the issuing party writes a so called white paper for potential investors. The sample of Zetsche et al. (2018) shows that 17.96% of the white papers analyzed in their sample only provide technical information about the product. They find that in 31.04% of the white papers, there is no information provided regarding the initiators or backers, and that in 23.28% of the cases the papers do not provide the reader of information about the project's financial circumstances. This means that it remains unclear how the capital that is collected will be used. They also find that in 85.8% of the white papers there is no information whether the invested money by participants will be pooled or if it remains segregated. Several white papers that were analyzed were set up in a professional way, with the help of lawyers that were schooled in the

customs of security markets. However, most of the papers showed that the information they provided were inadequate, and mainly contained information about the technology only. Compared to Initial Public Offerings (IPOs), this is remarkably different.

A second issue that surfaces is capital misallocation. The research of Zetsche et al. (2018) finds that oversubscription is particularly common for the larger ICOs. It also shows that less than 10% of all tokens can be put to use by their investors. The remaining tokens are only available for trading, which shows that these are purely used as speculative instruments. And even trading remains a challenge in some situations. Transfer issues, for example, cause complicated legal issues in the ICO country, mostly overlooked by investors. In conclusion, this overall overexcitement appears to be an indicator of rather irrational market behavior, with bubble characteristics that has the potential of not only harming individuals who lose their money, but also potentially jeopardizes the benefits of this new technology due to the misallocation of capital. In a range of frauds and scams, it seems that ICOs show many signs of ways to channel funds to the recipients for personal use, rather than using it for something productive, which ICOs are initially intended for.

Thirdly, there is the problem regarding weak legal protections. The white papers only give information about the applicable law in 31% of the sample (Zetsche et al., 2018). In 48.11% of the cases, the papers do not give the name of the initiators, and there is no information available about their background, for example their address. There are also examples in which the name of the author or authors are different from the names of the ICO issuer or initiator. This is the case in 33.26% of the sample. Thanks to this lack of basic information, private law liability is limited when it comes to the law as a correcting factor. The law's arms are tied if there is no certainty about the parties involved in a transaction.

Lastly, we would like to discuss systemic risk. One may argue that the current market for ICOs is too small to justify regulatory actions, since the estimate of the ICO market capitalization ranges from several billions to several hundred billions at this point in time. However, potential concerns arise taking into consideration that the volume of cryptocurrencies is certainly hundreds of billions, with ICOs being a growing component of this market, and is growing fast. For example, the three largest players in the money market funds are Vanguard, Fidelty, and Schwab. These players were established in respectively 1975, 1946, and 1971. How let's take a look at Alibaba, a company that offered a fully online fund online in 2014. Within just nine months, this fund was the world's fourth largest money market mutual fund in the world (Zetsche et al., 2018) and nowadays, it became the largest money market fund with an estimate of 222 USD billion. ICOs have been used by desirable entrepreneurial companies to raise funds, while the role of venture capitalists remained rather unclear in this market. ICOs could therefore claim a significant part

of the market. What is happening now, is that venture capitalists are becoming more and more active in the pre-ICO stage, by buying rights to acquire tokens through contractual agreements, or by making certain equity deals. Zetsche et al. state that startups raised over 3.6 billion USD through ICOs in 2017, while 52.6 billion USD was raised overall by venture capitalists. Even though this gap seems large, the numbers are increasing. Mokhtarian & Lindgren (2017) reported that 110 crypto hedge funds have been active in the ICO market since 2011. A total of 84 of those hedge funds were established in 2017, and manage 2.2 billion USD of assets. The involvement can be seen as the market maturing, but also makes the link between the established banking sector stronger. This enhances systemic risk.

2.2. Cryptocurrencies

The Blockchain technology behind the Bitcoin system uses a type of accounting Log/Transaction log (distributed register) to approach that is not falsified to validate all the units produced and the operations performed and verified. Information is stored redundantly and distributed (Read, 2018).

"Virtual currencies are being used as an instrument to facilitate crime, particularly in regard to the laundering of illicit profits." This is a quote from Rob Wrainwright (as cited in Reuters, 2014), who is the head of the EU law enforcement agency for criminal intelligence, Europol. "Financial transactions for criminal activities are not reserved cryptographic payment forms", as stated by Ivo Opstelten (as cited by Coindesk, 2014), involving a case in which a US citizen sold a gun to a Dutch policeman through SilkRoad, which is an online black market known for drug trafficking and other illegal activities and on which cryptocurrencies were frequently traded. These are just two quotes of many, showing us that cryptocurrencies have the potential to be involved in transactions related to illegal activities.

Besides this, cryptocurrencies can also constitute a potential threat to national sovereignty, since they escape the scope of many governmental policies (Filippi, 2014). As stated by Kleiman (2013) and Twomey (2013), the decentralized and unregulated character of Bitcoin may jeopardize most of the economic and financial policies established by nation-states. Filippi (2014) argues that taxation is most likely to be the most relevant issue. Cryptocurrencies are independent from any financial intermediary. Therefore, it is virtually impossible to monitor or control how the currency is being used. Also adding the fact of anonymity, cryptocurrencies are the best candidate to qualify as a new tax haven (Gruber, 2013). Also, where state-regulated currency market capitalization is determined by a central bank, cryptocurrency market capitalization is determined in advance based on the underlying protocol. Because of this, central authorities can not intervene in the case of increases or decreases of the deflation rate. Besides these issues, there is no single entity in charge of the overall interest rate for Bitcoin or any other cryptocurrency. This means that, in the hypothetical case of a global adoption of cryptocurrencies,

states can potentially lose their ability to regulate their economy while making use of traditional monetary policies.

Another issues regarding Bitcoin and other cryptocurrencies is the legal status of these currencies. While Bitcoin-related regulation up till now have been largely focused on the application of "know your customer", anti-money-laundering rules, and customer protection licensing, the next major wave will likely be aimed at financial instruments, which include securities, derivatives, prediction markets and gambling (Brito, Shadab, & Castillo, 2014). They argue that financial regulators should consider to exempt or exclude certain financial transactions denominated in Bitcoin or other cryptocurrencies, using private securities offerings and forward contracts as examples. They also suggest that policymakers should consider to make efforts to encourage resilience and adaptations.

There are also cases that argue against regulation of Bitcoin, and thereby other cryptocurrencies. Kaplanov (2012), for example, states that both traditional Bitcoin users and miners fall outside of the regulatory provisions under federal banking, money transmission, and securities laws. The author claims that Bitcoin transactions should be treated as a community currency, meaning it should receive full contractual enforcement and being treated as a traditional currency in every other way. Kaplanov (2012) also states that, instead of prohibition, policymakers and judges should become familiar with the technology, and suggests that they should use existing investigatory tools to investigate and prosecute illegal activity. He concludes that trying to prohibit Bitcoin or other cryptocurrencies would only be problematic. Contrary, letting these currencies flourish could provide limitless possibilities in commerce around the globe.

To diversify portfolio risks, cryptocurrencies and the CRIX index (a crypto market benchmark) are a good option, according to Chuen, Guo, and Wang (2017). They find that correlations between cryptocurrencies and traditional currencies are consistently low, and the average daily return of most cryptocurrencies is higher than that of traditional investments. They state, however, that these currencies are still in an experimental stage, and that there are many other issues that should be addressed before these currencies will be seen as an asset class that institutions would be interested in. In the next chapter we will take a look at the growth rates of certain cryptocurrencies and compare them to two variables that indicate the real economy.

3. Data & Methodology

In our analysis, we will compare the growth rates of the three largest cryptocurrencies according to their market capitalization with the growth rates of the real economy. The three cryptocurrencies used in this analysis are Bitcoin, Ethereum, and Ripple. The data on these cryptocurrencies are extracted from Yahoo!

Finance. The indicators that we used to represent the real economy are the Gross Domestic Product (GDP) growth rate that covers 26 European countries, and the global GDP growth rate. The data is extracted from the OECD. We make use of quarterly data, covering a time period from Q4 of 2015 until Q4 of 2017. The descriptive statistics can be found in table 1, displayed below.

To compute the quarterly growth rates for both the cryptocurrencies, we make use of the following formula (1):

$$r = \frac{(\mathrm{Qx}-\mathrm{Qp})}{\mathrm{Qp}} \quad (1)$$

where r is the growth rate, Qx is the value of quarter x , and Qp is the value of the variable in the previous quarter.

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation	Median	Minimum	Maximum
Bitcoin Close	2668.63	3435.090	965.49	369.84	10226.86
Ethereum Close	193.40	360.196	11.86	2.20	1111.31
Ripple Close	0.18	0.369	0.007	0.006	1.14
GDP European Countries	0.005	0.003	0.005	0.001	0.008
GDP Global	0.006	0.002	0.006	0.003	0.008

Source: Author's calculations based on data provided by Yahoo! Finance and the OECD.

This graph shows the descriptive statistics of the variables used for the comparison.

4. Results

Table 2. Calculation of the quarterly growth rates

Time period	Bitcoin	Ethereum	Ripple	GDP EU	GDP Global
Q4 2015	18.83%	153.57%	22.27%	0.54%	0.29%
Q1 2016	21.28%	301.36%	11.81%	0.46%	0.42%
Q2 2016	38.65%	34.31%	-12.80%	0.50%	0.47%
Q3 2016	12.35%	-8.01%	32.98%	0.14%	0.42%
Q4 2016	38.19%	-1.83%	-19.66%	0.11%	0.72%
Q1 2017	40.02%	645.38%	714.04%	0.75%	0.56%
Q2 2017	113.27%	152.20%	215.83%	0.84%	0.76%
Q3 2017	123.75%	50.82%	19.84%	0.73%	0.72%
Q4 2017	58.53%	266.00%	477.22%	0.75%	0.65%

Source: Author's calculations based on data provided by Yahoo! Finance and the OECD.

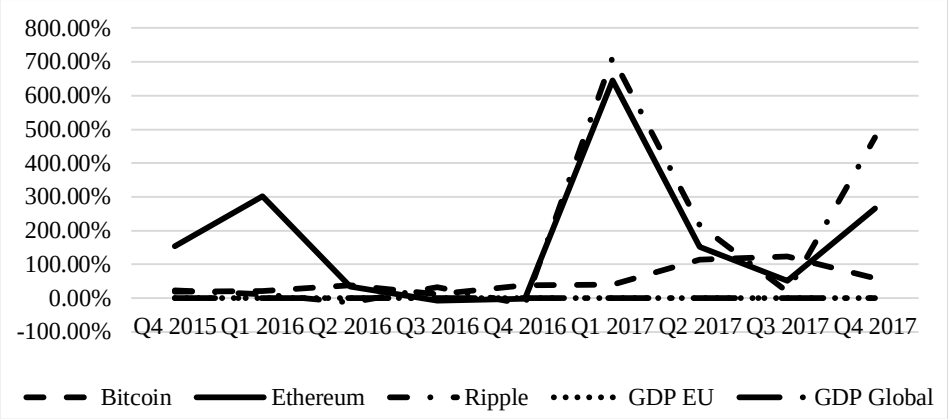
This table shows the calculations of the growth rates of the cryptocurrencies Bitcoin, Ethereum, and Ripple based on their closing price, and the GDP growth rates, covering 26 European countries and the global GDP over a period from Q4 of 2015

until Q4 of 2017. The 26 European countries include Austria, Belgium, The Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, The Netherlands, Norway, Poland, Portugal, The Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and The United Kingdom.

The results of our computations can be found in table 2. Graph 1 shows are visual representation of the results.

As we can see in table 2 displayed above, both the GDP for the European counties and the global GDP are moving at quite a similar rate. Bitcoin appears to follow a positive trend every quarter, while both Ethereum and Ripple seem to be more volatile. Q1 2017 knows the strongest increase, with Ethereum growing with 645.38% compared to the previous quarter, and Ripple with a growth of 714.04%.

Based on our results displayed in graph 1, we can see that none of the three cryptocurrencies follow the trends of the real economy. Bitcoin appears to be the most consistent in our sample, while both Ethereum and Ripple seem to closely follow each other. As discussed earlier, Q1 2017 shows us a big peak, and Q4 2017 knows a significant increase as well.



Graph 1. Growth rates of the three largest cryptocurrencies and the real economy

Source: Author's calculations based on data provided by Yahoo! Finance and the OECD

This graph shows the growth rates of Bitcoin, Ethereum, and Ripple in percentages, compared to the growth rates in percentages of the global GDP and the GDP that covers 26 European countries.

5. Conclusions

Bitcoin, and other cryptocurrencies, are digital currencies, based on an open source cryptographic protocol, and have a decentralized and unregulated character. They are created with a process called mining, which rewards that offer computing power to the network to solve complex mathematical problems. The technology generated a great deal of innovation and experimentation. However, there is also reason for concern. Initial Coin Offerings (ICOs), for example, seem to be increasing in numbers, but knows several flaws. The most significant flaws are information asymmetry, capital misallocation, weak legal protection for investors, and the potential of systemic risk.

The cryptocurrency markets still seem to be growing, but also here, there are some challenges that should be taken into consideration. While the technology was initially designed for two parties to make transactions without the involvement of a third party, there are cases in which the cryptocurrencies have been used for illegal activities, such as fraud, gambling, black market activities, and money laundering. Another challenge is the legal status of these currencies. While there are some scholars that expect the next wave of regulations will be aimed at financial instruments, there are others that argue that Bitcoin and other cryptocurrencies should not be regulated, since these currencies fall outside of the regulatory provisions under federal banking, money transmission, and securities laws. There are also cases that support cryptocurrencies as an instrument to diversify portfolio risk, but with the remark that these currencies are still in an experimental stage.

We analyzed the growth rates of the three largest cryptocurrencies (Bitcoin, Ethereum, and Ripple) and compared them to the growth rates of a cluster of 26 European countries and the global GDP, indicators for the real economy. While both the GDP indicators move very similarly, we find that none of the cryptocurrencies closely follow these trends. Bitcoin appears to be the closest to the GDP growth rates, while both Ethereum and Ripple show signs of a much higher volatility.

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