

THE VIRTUAL CURRENCY AND FINANCIAL BLOCKCHAIN TECHNOLOGY. CURRENT TRENDS IN DIGITAL FINANCE

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Abstract

We are currently witnessing a change in the financial system in the world, in the context of the emergence of over 850 virtual coins, coins that are not regulated at national and European level. Yet authorities like European Central Bank, International Monetary Fund, Bank for International Settlements, etc. have published several reports that have highlighted the risks of using such virtual currencies. Considering the context in which these virtual currencies have been issued, at the European level, there is the intention that virtual money to be regulated from the point of view of money laundering or terrorist financing by amending Directive (EU) 2015/849 of the European Parliament and of the Council on the prevention of the use of the financial system for the purpose of laundering money or terrorism financing. To this end, the European Central Bank (ECB) gave its opinion on the proposal for a directive of the European Parliament and of the Council amending Directive (EU) 2015/849 on prevention of the use of the financial system for the purpose of laundering Money or terrorism financing, and amending Directive 2009/101 / EC. The present paper aims at analysing the cryptocurrency issue in the context of current regulations.

Keywords: virtual currency, financial blockchain technology, sustainable development.

JEL Classifications: E00, E42, G00, G20

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1. Introduction

Starting from the "virtual currency" term, defined in EBA (2014)¹, European Central Bank makes some observations and recommendation concerning this definition. According to ECB opinion, the definition for virtual currencies should be improved by mentioning explicitly that they are not qualified as legal currencies or money from the European Union perspective and also, they should be viewed as means of exchange, rather than means of payment (ECB, 2016).

The press release, published by the National Bank of Romania on March 11, 2015, on the institution's website, revealed a series of risks regarding the use of virtual coins, which emphasized that their acceptance on payment is not legally binding. At the same time, the degree of anonymity regarding the holders of such coins has facilitated the use of such coins for the purpose of financing terrorist activities. Also, the use of virtual coins poses higher risks than traditional payment means, meaning that the virtual currency transferability relies exclusively on the internet and is limited by the capacity of the computer network and the related IT infrastructure of that virtual currency.

Due to this internet dependence, a considerable amount of money has been lost from the accounts of the owners as a result of computer attacks. The high volatility of these coins must be taken into account by potential users. At European and national level there are no official statistics on the issuing, trading and use of virtual currency, therefore the NBR has no information on companies who trades Bitcoin in Romania or other virtual currency.

The main aspects disclosed herein relate to:

- ✓ Developments at European and international level on regulation and supervision of transactions that are based on virtual currency (and following recent terrorist attacks);
- ✓ Developing the technology underpinning Bitcoin currency transactions and its potential impact on the financial system;
- ✓ The national context and the main players on the Romanian market of the Bitcoin currency transactions.

¹ *The virtual currency is defined as "a digital representation of value that is neither issued by a central bank or a public authority, nor necessarily attached to a fiat currency, but is accepted by natural or legal persons as a means of payment and can be transferred, stored or traded electronically." (EBA, 2014, pp. 5)*

2. Materials and Methods

Regarding the methodology of research on financial environment, complexity and diversity of the issues addressed have required the use of methods, techniques, tools, and procedures of scientific investigation and interpretation to which it's attached particular importance:

- ✓ Documentation, namely, accessing and studying general and specialized bibliography, domestic and foreign, state approach to knowledge issues investigated financial environment and scientific substantiation of the research.

- ✓ Rational method, used as an instrument of knowledge, reflection, analysis, organization, and ongoing scientific research approach.

- ✓ Integration of forms, methods, and logic operations research carried out through the use of analysis and synthesis, abstraction and concretization, comparison, generalization, and systematization.

- ✓ Statistical methods, through the use of descriptive statistics and statistical analysis.

- ✓ Observation method, carried out systematically and analytically.

- ✓ Discussions with experts from institutions and national and international institutions, but also the beneficiaries of financial products and services.

- ✓ Data analysis and interpretation, using graphs, tables, and figures to highlight various developments in financial environment.

Using the classic instruments of scientific research, based on analysis and synthesis, induction and deduction, general and particular, and adding modern methods, authors achieved substantial and pertinent analyses and studies on financial environment main ways, both internationally and especially national. Contributions of authors on investigated issue are highlighted during the research work and theoretical and applicative significance value resulting from the conclusions and proposals that they have formulated and promoted.

The research results are presented using formulas, tables, figures, and graphs. The theoretical information needed for the research was taken from literature and specialized works in the field

of financial environment investigated, from home and abroad. Statistical information and concrete data on how financial environment works were taken from reports and statistics of institutes involved in financial environment in the country and abroad as well as to public bodies and private specialist.

This method of analysis provides a more rigorous substantiation of the decision-making process and also maximum reduction in uncertainty.

3. Results and Discussions

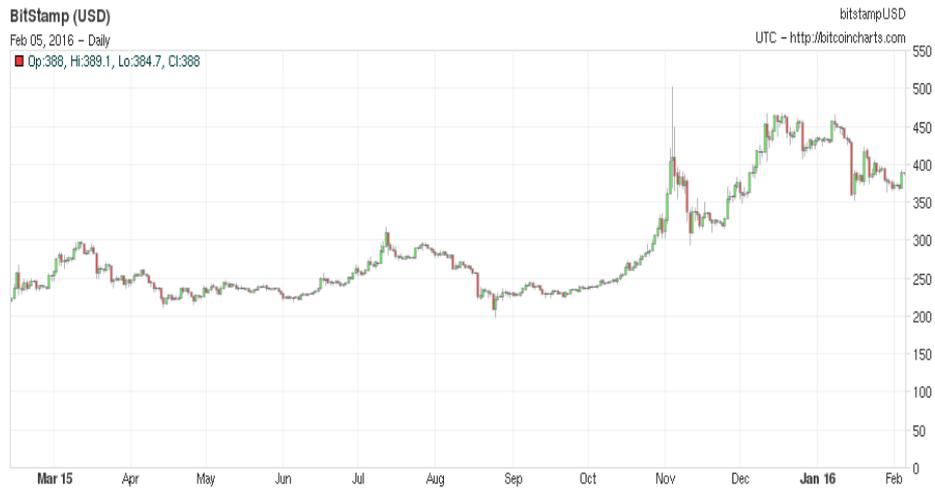
3.1. Recent developments in the field of virtual coins

At the end of 2015, in October, the European Court of Justice ruled Bitcoin virtual currency exemption from VAT, under Directive 2006/112/EC of the European Union of 28 November 2006 on the common system of value added tax. This decision came as a result of a request by the Swedish Tax Authority to the Swedish Supreme Administrative Court, whereby the first demanded that bitcoin purchases and sales transactions be excluded from the VAT exemption. The European Court of Justice has ruled that these purchase transactions represent exchanges of different means of payment (the bitcoin being therefore a means of payment), therefore these transactions should be exempt from VAT under the trade-related clause on coins, banknotes and coins used as legal tender of Directive 2006/112/EC.

Throughout 2015, the bitcoin quote against the US dollar recorded a slightly upward trend, as shown in Chart 1.

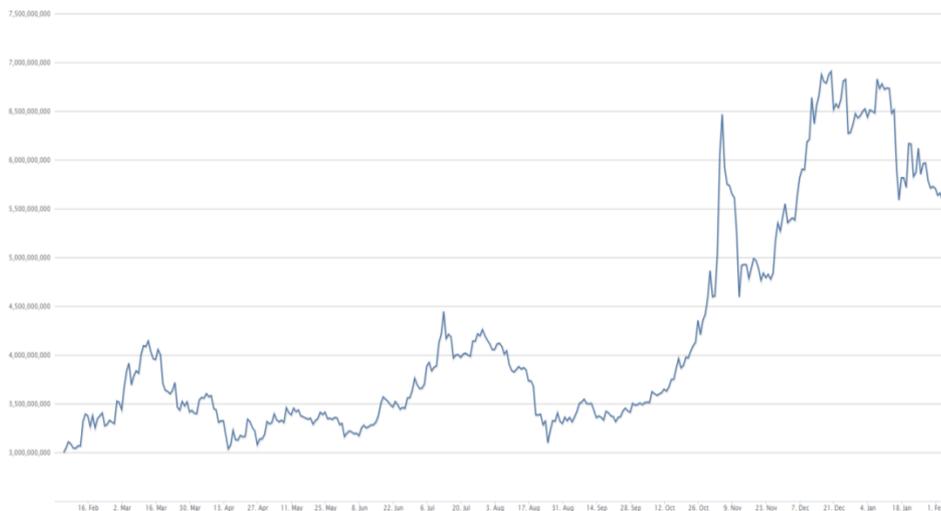
Also, market capitalization followed an upward trend as a result of the appreciation of the bitcoin value along with the issue of new currency (Chart 2).

Chart 1
Bitcoin (BTC) Evolution vs. US Dollar (USD) between March 2015 and February 2016 (BitStamp)



Source: <https://bitcoincharts.com/charts/>

Chart 2
Evolution of market capitalization of Bitcoin currency (BTC) worldwide in the period March 2015 - February 2016 (US dollars)



Source: <https://blockchain.info/charts>

At the international level, currently, the jurisdiction with the most advanced level of regulation of virtual coins is the one in the United States of America. These regulations apply to both trading venues where virtual currencies can be converted into currencies, as well as to administrators of these virtual currencies, or to the mode of charging virtual currency transactions. In September 2015, the United States Commodity Futures Trading Commission (CFTC) said that virtual coins are associated with commodities. Through this decision, the CFTC assumes the responsibility to monitor the futures and option contracts on virtual currencies. This is a very important step in the process of regulating virtual coins across the US, as the CFTC will be able to impose sanctions in line with its attributions. Magister Advisors, a UK company that advises on acquisitions and mergers in technology, organized a survey of the 30 most important companies in the field of virtual currency, especially Bitcoin. According to this survey, it is estimated that over the next 24 months, over \$ 1 billion will be used by global financial institutions for blockchain technology projects. This technology is becoming increasingly appreciated and has come to the forefront of the largest financial institutions such as Bank of America, Citi Bank, Deutsche Bank and Goldman Sachs, who have gathered as part of a project exploring the possibilities of using a blockchain transaction register within the traditional financial sector. Following the terrorist attacks, European ministers meeting in the Council of Justice and Home Affairs (JHA) agreed to extend controls the means of payment can be carried out anonymously and therefore could be used by terrorist organizations to fund attacks. These controls relate to non-bank payment methods such as electronic / anonymous payments, fund transfers, cash carriers, virtual currencies, the transfer of gold and precious metals and pre-paid cards, in line with the risks they present. The Digital currencies report of the Bank for International Settlements (BIS, 2015) states that virtual currency schemes still have a low usage and acceptance rate and that the challenges they face could limit their growth in the future. Therefore, their current influence on financial services and the economy as a whole can be considered negligible and it is likely that these virtual currency schemes will remain a product with limited use to the periphery of traditional financial services in the future. On the other hand, in recent years, the technology underlying virtual currency schemes attracted attention with a high degree of applicability of registers distributed value transfers bilateral absence of a trusted third

party. Therefore, certain aspects of the distributed registers technology could improve certain aspects of the efficiency of payment services and financial market infrastructures. In addition, the International Monetary Fund's report on virtual currency (IMF, 2016), presents an overview of the main aspects of virtual currencies and their associated risks, similar to those presented by the European Banking Authority in its Opinion on virtual currencies (EBA, 2014) and by the European Central Bank (ECB, 2015).

3.2. Distributed Transaction Log - Bitcoin's innovative technology

Bitcoin based blockchain technology is based on a public register, called the distributed ledger technology, which includes all transactions made with bitcoin currency. Each transaction is validated by multiple computers in this decentralized network, and then added to a validated transaction block. When these transaction blocks are complete, they are added to the registry in a linear, chronological order and cannot be modified or replaced later. Each block consists of the numeric code defining the previous block (code called hash), and so each block of transactions follows the previous block in chronological order within the register. Each computer that performs transaction validation automatically receives a copy of the public record, which includes all bitcoin currency transactions made since its inventory, so far, thus making the transactions traded transparent. However, a level of anonymity of the parties to the transaction remains, as they can only be identified through the code associated with the electronic wallet from which the transaction was made. Former Governor of the FED, Ben Bernanke, said in November 2015 that the bitcoin is "technologically interesting", but it has some serious problems, notably the high volatility of its value and the low acceptance as the currency of payment. This type of affirmation is becoming more and more common among financial specialists, making a distinction between virtual bitcoin and the innovative technology behind it. The innovative element in the decentralized virtual currency schemes is the Bitcoin block of transactions, especially for transactions with virtual currencies whose value is not related to any sovereign currency. The main innovation is the possibility of making peer-to-peer payments in a decentralized network when the level of trust between counterparties or a third party is low. Virtual coins and distributed transaction logs (blockchain) are

closely linked to most existing schemes, but this integration is not necessarily necessary. The presence of distributed ledger technology could pose a challenge to central banks by reducing their functions or, in an extreme case, even by eliminating the need for a central bank for certain functions (BIS, 2015). For example, it is possible that settlement cannot assume a central register if banks or other entities would agree to use a common register that does not require an entity to centralize transactions, thus allowing each bank to hold a copy of the register common transactions. The International Bank of Regimes analyses how central banks can respond to a potential increase in the use of a distributed transaction log to settle transactions. A situation is even the use of this technology by central banks and the issuance of their own digital coins, with central banks already presenting such opportunities, such as the Bank of England or the Bank of Canada. According to BIS (2015), the digital coins and the underlying technology could have an impact on financial intermediaries and financial markets. Their widespread use will test the role of intermediaries of current actors in the financial system, especially commercial banks. The possible disintermediation that could occur as a result of the spread of digital coins and transaction logs distributed within the financial system would have an impact on the mechanism for saving and accessing credit. This innovative transaction log technology can have major implications beyond payment, as this decentralized mechanism could compete with the current aggregation and clearing system on which most of the financial market infrastructures are based. In particular, it is assumed that distributed transaction logs could affect the system of collateral or the recording of transactions in shares, bonds, derivatives or other assets. Using this technology can induce changes in the trading, clearing and settlement due to deleveraging in the traditional service providers in the various markets and infrastructures. These changes can result in an impact on financial market infrastructures, not just in the retail payment systems, but also on high value payment systems, central depositories, securities settlement systems or trade repositories. Developing "smart" contracts based on the distributed transaction log may lead to individual margin payment variation payments, which could significantly affect how the system of margin setting and trade clearing works, at present Using net positions and guarantee funds. There are already many cases of using blockchain technology to address complex issues outside the sphere of virtual currency

schemes. For example, the Government of Honduras has collaborated with various companies in the technology sector and has used blockchain technology to create a secure and efficient registry for property titles. Estonia, the country with the lowest level of credit card fraud in the euro area, also uses a blockchain technology to protect banking infrastructure. At the same time, the Monetary Authority of Singapore is in the process of finalizing a decentralized registration system based on blockchain technology in order to prevent double billing in commercial transactions (ESMA, 2015). The Nasdaq OMX group also believes it will become the first major trading exchange to use the underlying Bitcoin technology and the distributed transaction log.

3.3. The national context

In Romania, the BTCXchange trading platform reopened as of August 2015, after being closed in December 2014 for security reasons. The platform offers the possibility of buying and selling bitcoin against the leu, and in November 2015 the trading volume was about 360,000 lei (according to this platform). Also, in June 2015, a new trading platform, called BitcoinXRomania, was launched, at that time being the only such platform in Romania before reopening BTCXchange. At this point, Netopia mobilPay is the largest bitcoin payment processor in Romania. Netopia has implemented the virtual currency payment option for more than 10 websites, including Vola.ro, PcGarage, ComputerGames.ro, F64, Fly-go.ro and Kartela.ro. In Romania, interested people can purchase bitcoin for cash through the ZebraPay and Qiwi terminals network. Together, the two networks have more than 2,500 terminals, making Romania at least at European level the country with the largest national terminal network that allows the purchase of bitcoin coins. Beyond expanding the bittorrent acceptance of merchants, Netopia also targets the exchange platform they will launch later on. In August 2015, Coinzone, one of Europe's largest bitcoin payment processors in Europe, a company with headquarters in Romania, the Netherlands and the United States of America, was acquired by Danish Coinify. Among Coinzone co-founders was Radu Georgescu, one of the important names in the Romanian financial and technological market. The Danish buyer company said that Coinzone's acquisition of Coinify will strengthen its leading position in virtual money platforms in Europe. Virtual coins and the underpinning technologies are of

increasing interest to financial institutions and regulators. At international level, the opportunities for implementing virtual coin-specific innovations within the traditional financial system as well as the potential regulation and supervision of virtual currency transactions are analysed, should their volume reach a relevant level. The Central Bank will continue to monitor the movements of virtual currencies and their influence on financial stability both from the perspective of the risks associated with the use and trading of virtual currencies and from the perspective of the innovations associated with the virtual currencies and the impact of these technologies on the financial system. Bitcoin is a too unstable currency and vulnerable to speculation to be accepted as an official payment instrument, warns Ewald Nowotny, governor of the Austrian central bank and member of the Governing Council of the European Central Bank (ECB). Governments in several countries around the world are considering ways to regulate and classify the virtual currency, whose value has recently climbed to a historic high of nearly \$ 3,000, Reuters notes. Japan has included the most popular cryptocurrency in the category of legally recognized payment means, part of the government's strategy to boost the economy, including through the use of financial technologies (fintech). But bitcoin is deficient in the chapter that defines a good currency - namely stability, says Nowotny. "Bitcoin is subject to speculation", the ECB official said in an interview with the daily *Kleine Zeitung*. Transactions with Bitcoin and the over 900 cryptocurrencies in circulation in the virtual space are not regulated by any central authority. Instead, transfers are checked and recorded by a network of thousands of computers worldwide, a protocol called blockchain. Investors and commercial banks have shown themselves increasingly interested in blockchain technology, attracted by the spectacular evolution of bitcoin and other virtual coins, including ethereum, which some analysts have said could compete with assets such as gold. According to a study by the British consultancy firm Magister Advisors, bitcoin could become, by 2030, the six most widely used currency in the world to set up foreign exchange reserves in central banks around the world, along with the euro, the dollar, Pound sterling, yen and Canadian dollar.

Peter Smith is the Co-Founder and Chief Executive Officer of Blockchain, a financial technology and data company that has empowered millions of users across the globe to store and transact digital value quickly and without costly intermediaries. Under his

leadership, Blockchain has become the market leader in digital currency and distributed ledger technology. By 2016, Blockchain's software has powered over 100M transactions around the world. Peter is a 2016 World Economic Forum Technology Pioneer and noted thought leader in the FinTech space, having been featured in the New York Times, Wall Street Journal, CNBC, Bloomberg, Fox Business, TechCrunch, and spoken at conferences around the world including TechCrunch Disrupt, Money 20/20, Web Summit, Collision, Wired Money, among many others. Prior to co-founding Blockchain, Peter lived, studied, and worked in the US, Europe, MENA, East Africa, and Asia. When he isn't basking in the glow of a laptop, you can find him either reading or out running, trekking, surfing, and climbing up or skiing down a mountain. If you are working on something hard and want to be in touch - please be in touch; but include a book recommendation. Exchanging value today is an antiquated, cumbersome and costly process. Digital assets can revolutionize the status quo. Benefits include the reduction of transactional frictions, the ability to transact across borders, the elimination of counterparty risk assessment, regulatory and monetary policy freedom, access to money for the "unbanked," user anonymity and ledger transparency. Given the long list of benefits as well as the fact that a digital infrastructure is available to most of the modern world, there is a present and growing need for a digital medium of exchange. The future of money is digital – and bitcoin is the first early success of that broad, world-changing vision. The digital revolutions, and the popularity of bitcoin, have made it clear that digital assets have become a noteworthy candidate for alternative asset investing.

This white paper uses bitcoin to illustrate the digital asset market across three dimensions: 1) fundamental market metrics, 2) through the lens of portfolio theory, and 3) an economic analysis of a digital asset's response to events that cause global financial market uncertainty.

First, over the past three years in particular, the bitcoin market has exhibited signs of market stabilization and other characteristics of more mature asset classes, including declining volatility (i.e., risk), increasing liquidity (i.e., the ability for a buyer to readily find a seller at a particular price, and vice versa), and informational efficiency (i.e., a standard feature of established markets, as indicated by independence of returns and its quick price reaction to new information). These favourable trends in fundamental market metrics

stem from bitcoin's increasing popularity and accessibility. Second, bitcoin is attractive under modern portfolio theory (MPT) because it offers significant diversification benefits and potentially high returns. The key driver of diversification is low correlation with other portfolio components. Bitcoin has exceptionally low correlation with other traditional asset classes. In addition, bitcoin has established itself historically as a high-risk and high-reward asset, so its inclusion in a portfolio can serve to increase the portfolio's potential returns (and its risk). In 2016, for example, the value of bitcoin increased 122%, from \$432 to \$960 per unit. By comparison, for 2016, the S&P 500 total return was approximately 12%. Indeed, an allocation of bitcoin in a diversified portfolio can significantly improve the portfolio's risk and-reward trade-off under MPT. Third, recent economic evidence shows bitcoin may hold the potential to act as a hedge or "safe-haven" in certain investment strategies, as its price movement is positively correlated with the likelihood of uncertainty-inducing outcomes, including the Brexit referendum and the 2016 U.S. Presidential election. Results show that bitcoin's price changed in near lock step with prediction market probability of outcomes that were expected to introduce great uncertainty to global financial markets – that is, a vote to leave the European Union and a Donald Trump presidency. The results suggest that, to some degree, bitcoin represents a hedge opportunity against global financial market uncertainty. Evaluating the still-nascent bitcoin currency from a financial market perspective provides a deeper understanding of the prominent digital asset and how market participants value and interact with it. This evaluation allows one to put a finer point on the definition of this digital asset that isn't quite like anything the world has ever seen. Only the future will tell of bitcoin's ultimate success, but its relationship with the digital revolution and unique and stabilizing financial market performance signal that digital assets - bitcoin or otherwise - area noteworthy alternative investment option with great potential. Furthermore, bitcoin's stability and other investment-worthy qualities prove, along with its increasing user base, that digital assets backed by central banks are not only possible but inevitable.

4. Conclusions

In the early years, the price of bitcoin experienced extreme volatility as indicated by large runs and corrections (or bubbles and

crashes). However, overall, bitcoin was a boon to early investors. Someone who bought at the first of the year in 2013 and held through today, for instance, would have enjoyed an increase in value of 70-fold (6,978%). By comparison, an investment in the S&P 500 increased approximately 1.6-fold (60%) over the same period. Beyond the very high historical returns, how might a potential investor evaluate bitcoin from an ex ante perspective? In other words, what defines a worthy investment, and how does bitcoin measure up? First order market metrics by which to evaluate a potential new investment include:

- ✓ Basis of value (does the asset have value? what forces determine its price? will such forces endure over time?);
- ✓ Stability (is volatility reasonably low and steady so that there is some predictability of how wide price swings could be, or does the asset show wild swings in value?);
- ✓ Liquidity (is the market large enough such that bids to buy are easily met with offers to sell, and vice-versa?);
- ✓ Informational Efficiency (does bitcoin resemble mature assets by responding to new information in a predictable way, or is it random?), and accessibility (can you invest and how? can it be purchased and traded? are products such as ETFs available that offer divisible investment through the standard channels such as a brokerage?).

As the following sections discuss, the bitcoin market shows favourable trends in these fundamental market metrics.

Basis of Value

The future of value is digital. Benefits of digital assets include the reduction of transactional frictions, the ability to transact across borders, the elimination of counterparty risk assessment, regulatory and monetary policy freedom, and access to money for the “unbanked,” user anonymity and ledger transparency. Given the long list of benefits as well as the fact that a digital infrastructure is available to most of the modern world, there is a present and growing need for a digital medium of exchange. Bitcoin is the most ubiquitous digital money option, with name recognition and a large network of market participants. What determines bitcoin’s price? the forces of supply and demand, as is true for all markets. Its price is driven not by its intrinsic value, but instead by the opinion of buyers and sellers and what they believe to be bitcoin’s value. Bitcoin’s market value is undeniably linked to the rise of the digital economy and the need for

digital money. As demand increases, so does price, all else being equal. Related from Nick O'Connor Publisher, *Exponential Investor* in end of July 2017, "over the coming months, 260,000 stores in Japan will start accepting bitcoin. Japan is embracing cryptocurrencies faster than any other nation. According to TechCrunch the rabid demand for cryptos in Japan and China has fuelled the recent record highs". In this reality the first and important question remain what will be the next steps in financial and banking sectors? "This is a truly global money revolution".

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