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THE BITCOIN: A BIG FRAUD OR A BIG OPPORTUNITY?

Florian Miti
University "Ismail Qemali"
ALBANIA

ABSTRACT

Virtual currencies are raising rapidly the interest of the public especially during the last year, thanks also to the striking performance of a particular virtual-currency such as the Bitcoin. Virtual currencies, known for their simplicity in transactions and holder's anonymity, are in meanwhile worrying the public authorities due to the absence of a distinct legal framework, absence of regulation and exclusion of central banks. The popularity of virtual currencies is evident not only in their varieties that are actually exchanged but also in the total volume of transactions. The concern is that the global economy and the financial markets are faced with a technological innovation, the block-chain, associated to the virtual currencies high risks. These risks are linked to its high price volatility, fraudulent schemes, money laundering or other use in criminal activities. Nevertheless, as the authorities in many countries are still reluctant in taking any measures, the "gold rush" for creating new Bitcoins seems unstoppable, leaving behind huge energy consumption and different development scenarios in the future. This discussion paper deals with the advent of the digital (virtual) currencies, focusing in more details on the Bitcoin as the pioneering instrument in the development of crypto-currencies, aiming to better understand a phenomenon accompanied by plenty of controversies.

Keywords: virtual currency, bubble, Bitcoin, mining

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INTRODUCTION

The use of electronic commerce and on-line trading has increased dramatically in the last decade giving rise to new payment methods in addition to traditional currencies. This discussion paper deals with the advent of the digital (virtual) currencies, focusing in more details on the Bitcoin as the pioneering instrument in the development of crypto-currencies. The phenomenon of digital currencies is actually a hot topic widely covered in the media but still neglected by the academic literature. Few papers like in Biere et al. (2013), and in Cheung et al. (2015), deal with the Bitcoin economic phenomenon. The European Central Bank defines virtual currency as "a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community" (ECB, 2012).

The difference between virtual currency and electronic money schemes used frequently by the banks basically is that there is not a physical counterpart with a legal tender status. In electronic money schemes, according to the Electronic Money Directive (2009/110/EC), the link between the electronic money and the traditional money format is preserved and has a legal foundation, as the stored funds are expressed in the same unit of account (e.g. in dollars, euro, etc.) while, in virtual currency schemes, the unit of account is changed into a virtual one (e.g. Bitcoins, Ethereum, Ripple, etc) leaving complete control of the virtual currency to its issuer, which is usually a non-financial company.

Table 1. Differences between electronic money and virtual currency.

	Electronic money schemes	**Virtual currency schemes**
Money format	Digital	Digital
Unit of account	Traditional currency (euro,$, £, etc.) with legal tender status.	Invented currency (Bitcoin, Litecoin, etc.) without legal tender status.
Acceptance	By undertakings other than the issuer	Within a specific virtual community.
Legal status	Regulated	Unregulated
Issuer	Legally established electronic money institution	Non-financial private company
Supply of money	Fixed	Depends on issuer's decisions
Possibility of redeeming funds	Guaranteed	Not guaranteed
Supervision	Yes	No
Risk types	Operational risks	Legal, credit, liquidity and operational
Source: ECB		

Among the virtual currencies there are in particular the *crypto currencies* which use cryptography in order to secure transactions, to control the creation of new currency units and to verify the transfer of assets (Andy Greenberg, 2011). Since not all virtual currencies use cryptography, not all virtual currencies are crypto-currencies.

In particular, the Bitcoin, was the first decentralized crypto-currency designed by its inventor, Satoshi Nakamoto[1] and released in 2009 as *open-source software* operating in a *peer-to-peer* network[2] and where transactions take place between users directly, similar to the systems used for downloading and sharing files between users[3]. Since then, thousands[4] other crypto-currencies have been created, frequently called altcoins, as an alternative coin to Bitcoin.

In the Bitcoin system, new broadcasted transactions are sent to all the users in the network to verify or validate the transaction by solving a cryptographic problem. All transactions are public and recorded on a large set of data called *block-chain,* where in order to avoid double-spending, a time-stamp solution is used to ensure that a series of data have existed in the previous transaction and have not been altered in order to get into the hash. Each time-stamp includes the previous time stamp in its hash, forming a reinforced chain of ownership and increasing the systems inviolability. The operators that validate the bitcoin transactions, the so called "*miners*", use extremely fast computers for performing complex calculations to verify the validity of new transactions. The mining activity is rewarded with 50[5] newly created Bitcoins every time their system finds a solution so this is the only way to create new Bitcoins.
The proofing system is rather easy at the beginning but becomes extremely hard as new Bitcoins are created. The difficulty is adjusted based on network's performance by creating a mechanism that aims keeping the average time between new block at 10 minutes per block (Nakamoto, 2008, p. 4).
Chart 1. Mining difficulty for a new block over time in a semilog scale.

[1] Has an unknown identity.
[2] A peer-to-peer (P2P) network in which interconnected nodes ("peers") share resources amongst each other without the use of a centralized administrative system.
[3] Similar to "Torrent" network used for sharing movies, music, books etc., between users.
[4] See LiveCoinWatch.com
[5] Reduced to 25 by the end of 2012 and further to 12.5 newly created bitcoins per block added to the blockchain since 9th of July 2016. This halving process is programmed to continue for 64 times before new coin creation ceases.

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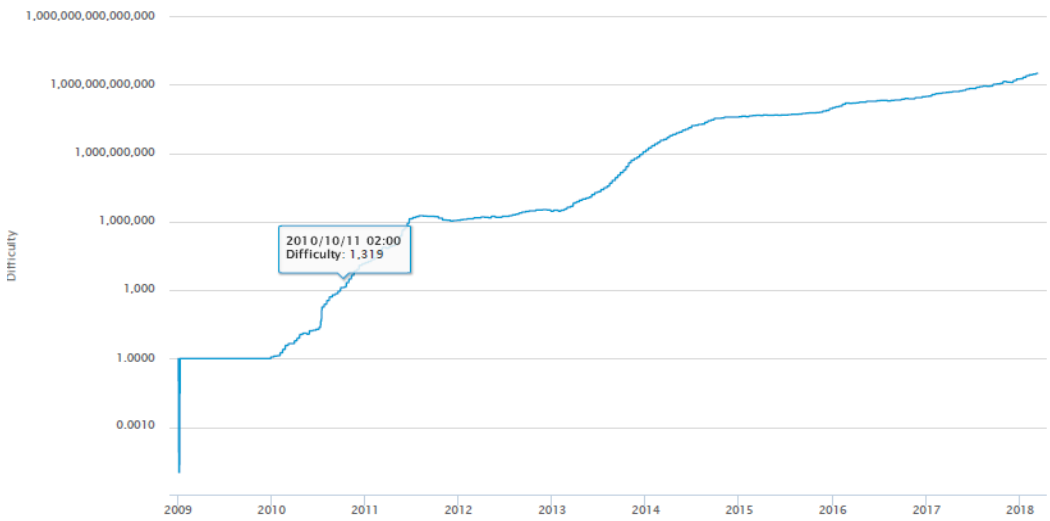

Source: Blockchain.info. The difficulty is adjusted periodically as a function of how much hashing power has been deployed by the network of miners.

As explained in the Bitcoin white paper, the number of Bitcoins generated per block is set to decrease geometrically, with a 50% reduction every four years[6]. The result is that the total number of Bitcoins in existence will reach 21 million in around 2040 with no more Bitcoins in reward for the last block (after 50 has been divided 64 times as it is set in the Bitcoin *halving code*). Afterwards, miners are expected to finance their service via transaction fees.

MONEY VS VIRTUAL CURRENCIES

Virtual currencies *as Bitcoin, Ethereum, Ripple etc,* are digital assets designed to work as virtual currencies. Actually, the total volume of virtual currencies commercialized on the financial markets reaches hundreds of billion dollars in transactions as represented in the table below.

Table 2. Top ten virtual currencies daily performance in $. May 2018.

[6] *"By convention, the first transaction in a block is a special transaction that starts a new coin owned by the creator of the block. This adds an incentive for nodes to support the network, and provides a way to initially distribute coins into circulation, since there is no central authority to issue them. The steady addition of a constant of amount of new coins is analogous to gold miners expending resources to add gold to circulation. In our case, it is CPU time and electricity that is expended"* (Nakamoto, 2008 p.4,).

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#	Coin	Market Cap	Price	Volume (24h)	Circulating	1hr	24hr	Weekly
1	Bitcoin BTC	$156,000,936,423	$9,164.67	$7,046,864,229	17,022,000	0.02%	-1.80%	
2	Ethereum ETH	$72,987,647,776	$734.96	$3,576,279,944	99,308,398	0.29%	1.96%	
3	Ripple XRP	$31,849,367,434	$0.8129	$485,321,150	39,178,259,468	0.62%	-0.63%	
4	Bitcoin Cash BCH	$27,155,781,754	$1,586.52	$1,025,889,607	17,116,575	0.24%	-1.52%	
5	EOS EOS	$15,308,278,304	$18.16	$1,591,847,565	842,868,651	0.96%	1.90%	
6	Litecoin LTC	$9,023,398,072	$159.86	$501,023,083	56,444,933	-0.04%	-0.82%	
7	Cardano ADA	$8,469,601,677	$0.3267	$135,705,046	25,927,070,538	0.38%	-0.16%	
8	Stellar XLM	$7,096,043,061	$0.3821	$44,994,427	18,572,441,579	0.71%	-1.01%	
9	IOTA MIOTA	$6,757,864,326	$2.43	$251,888,712	2,779,530,283	0.95%	13.61%	
10	TRON TRX	$5,347,814,018	$0.0813	$311,287,458	65,748,111,645	0.54%	0.84%	

Source: livecoinwatch.com

Nevertheless, the question if virtual currencies can be considered to serve as money is still disputed by the economists.

In principle, economists recognize as "money" anything that has three characteristics:

- *Medium of exchange*, accepted by its users to swap goods and services;
- *Store of value* and payment method, in order to preserve its value over and allowing its holder to pay off his debt.
- *Unit of account*, which is a common yardstick for measuring the economic value, for example, of commercial transactions.

According to "*The Economist"* magazine (2015), Bitcoins have three characteristics as they are "*hard to earn, limited in supply and easy to verify*", but it does not fit to all money's characteristics. Crypto-currencies like the Bitcoin do their best as a medium of exchange, having low transaction fees by avoiding banking intermediacy for each confirmed transaction and ensuring the buyer's anonymity but, they fail to be a stable store of value. Its volatility is induced by a highly sensitive demand which is based on the buyer's expectations and on the system's credibility.

Chart 2. Bitcoin monthly price.

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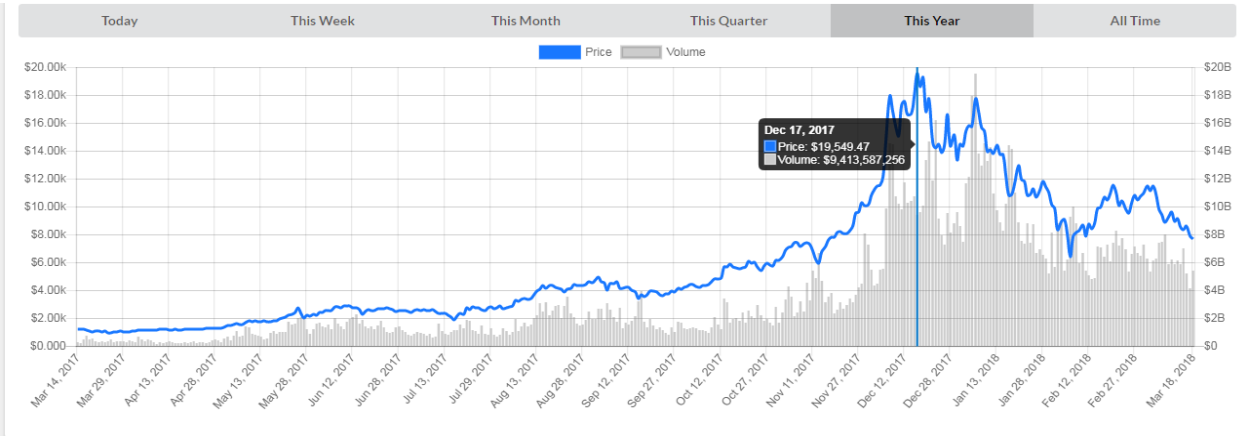

Source: Livecoinwatch.com

High volatility is also the reason why Bitcoin or other crypto-currencies fail to serve as a medium of account. Moreover as showed in Table 2, even when transactions occur in Bitcoin or in any digital currency, they are always associated to "real" currencies, especially to US dollars as accounting unit. This is why digital currencies, rather than currencies, are at most a medium of exchange within their user's community.

Literature Review should be given in this section. All the subheadings in this section should be in font size 12 Bold, Times New Roman, single spaced. The first letter of each word in subheading should be capital.

1. DISCUSSION

With more than 17[7] million Bitcoins in circulation and the rest of 4 million coins left to be mined in the coming years, the Bitcoin supply is almost complete. The Bitcoin creators support the Bitcoin's rigid supply since this system is supposed to avoid inflation and ensures monetary decentralization. It is clear that Bitcoin miners gain when the revenue generated through the mining activity exceeds the cost of running the implant, which in addition to electricity also includes the personnel costs, and other charges that come along with powering (and cooling) a high-intensity data center. China, with its low costs of labor and cheap energy, plays a central part for the Bitcoin mining and maintenance of the system. Despite huge profits, these data centers consume plenty amounts of energy: in total the extraction processes annually consume more than entire small states, such as Ireland or Denmark, worrying Chinese authorities that are going to reduce forcibly the bitcoin mining activity in

[7] May 2018, source Livecoinwatch.com.

their territory[8], contributing in this way to the dramatic price reduction of the Bitcoin after December 2017 (See chart 2).

Under these circumstances where mining Bitcoins has a significant energy impact for running the system to produce this currency, big doubts remain both in terms of its stability as a currency and in terms for a sustainable future. In fact, Vivek Wadhwa (2017), associates the Bitcoin to a maxi "*Ponzi" scheme*, since its price is not a reflection of its growing usage as currency but rather "*it reflects merely demand for the mirage of its speculative value, a mirage kept in artificial scarcity*", and many retail investors have bought crypto-currencies not out of rational calculations but for fear of missing out this sort of "digital gold" (Crypto-correction, *The Economist*, Feb 10th 2018). Furthermore, the empirical study conducted by Cheung, A., Roca, E., & Su, J. J. (2015), over the period 2010-2014, detected a number of short-lived bubbles, confirming claims of the existence and burst of bubbles in the Bitcoin market. These claims are more evident in the light of the sharp decrease of the virtual currencies price in the first trimester of 2018.

As for its low inflation target meant by its creator, this system might lead on the contrary to a deflationary spiral: "*if the number of Bitcoin users starts growing exponentially for any reason, and assuming that the velocity of money does not increase proportionally, a long-term appreciation of the currency can be expected or, in other words, a depreciation of the prices of the goods and services quoted in Bitcoins. People would have a great incentive to hold Bitcoins and delay their consumption, thereby exacerbating the deflationary spiral." ECB 2012, p. 25.*

The virtual currency schemes are also accused for their lack of transparency; asymmetric information between its users; used in criminal and in money laundering activities[9]; and with a lack of close oversight by any financial authority, leads inevitably to a high-risk situation for the public[10].

Nevertheless, some experts agree on the fact that the block-chain system which is used as the underpinning technology is the "true" value of the crypto-currencies is an innovation that can be used beyond virtual-currencies[11]. The banking system itself might adopt this technology as a quick and costless system to confirm transfers within banks; other ideas are considering its use in public databases of land registries, registration of notarial deeds, registers of the ownership of luxury goods, works of art and so on in many useful activities.

[8] "*Il Post*" Magazine, 10.Gen.2018

[9] Bitcoins are a suitable monetary alternative for drug dealing and money laundering, as a result of the high degree of anonymity. See FBI, Bitcoin Virtual Currency, 24 April 2012.

[10] The European Banking Authority (EBA)'s Opinion on "Virtual Currencies" (July, 2014), has identified approximately 70 risks connected to virtual currencies such as risks to users, risks to other market participants, risks to financial integrity, risks to payment systems in FCs, and risks to regulators.

[11] Consult "The trust machine - The promise of the blockchain" - The Economist, 31 Oct. 2015.

CONCLUSIONS

The difference between virtual currency and electronic money schemes used frequently by the banks is that basically there is not a physical counterpart with a legal tender status, which leads according to the European Banking Authority to a high-risk situation, due to the lack of close oversight by any authority.

The Bitcoin is the first decentralized digital currency, operating without a central bank or single administrator in a peer-to-peer network of users where transactions are verified by the network through the use of cryptography and recorded in a public *blockchain*.

Bitcoin and other virtual currencies do their best as a medium of exchange, having low transaction fees by avoiding banking intermediacy for each confirmed transaction and easy to use by ensuring so far the buyer's anonymity but, they fail to be a stable store of value.

The activity of running the system and mining Bitcoins, has a significant energy impact and yet big doubts about its future remain, both in terms of its stability as a currency and in terms of sustainability.

Nevertheless, the block-chain system that Bitcoin uses as the underpinning technology is an innovation that can be used beyond virtual-currencies, such as in banking, real estate, precious works of art etc. As a final consideration and in light of the above, instead of functioning as a currency, Bitcoin is rather a speculative digital asset.

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