

Global Service Nature of Contemporary Crypto-Currencies*

ELLANA MOLCHANOVA, YURIY SOLODKOVSKYY¹

ABSTRACT. The article deals with the problem caused by the crisis of the Jamaican currency system, namely, with the search for new forms of money that can replace dollars in international transactions. Alternative currency as the best global option has been searched both by national governments and international organisations, as well as the world's leading scientists. All current studies, and our research, are based on historical definition of the nature, forms and other aspects of money. The theoretical principles that have been studied helped confirm our hypotheses about the existence of absolutely new forms of money, including electronic. In this study, we proved that there are all necessary prerequisites for existence of electronic money as a new global currency. The key risks and possible directions of their neutralising were analysed. This allowed reviewing the hypothesis of introduction of fiduciary electronic money, studying historical facts of their existence and substantiating their implementation.

KEYWORDS. Money, contemporary money, electronic money, fiduciary money, fiat money, fixed and floating exchange rate, exchange regimes, digital currencies, crypto-currency, currency market.

Introduction

Rapid development of virtual currencies has become a priority at a global level in the recent years. Their economic component has been discussed at the meetings of the World Bank², European Central Bank³, US Treasury and FBI⁴. A group of electronic money

*This article was translated from its original in Ukrainian.

¹ **Ellana Molchanova**, PhD (Economics), Associate Professor of the International Economics Department at Kyiv National Economic University named after Vadym Hetman, Germany-based VNR Verlag für die Deutsche Wirtschaft AG freelance specialist dealing with the company's entry into the Ukrainian market. Since February 2013, she has been holding the position of the Deputy Dean of the International Economics and Management Department. Areas of research: globalisation, regionalisation, Ukraine's international economic activity, multinational corporations, a new economic order. E-mail: ellanam@ukr.net

Yuriy Solodkovskyy, PhD (Economics), Associate Professor of the International Trade Department at Kyiv National Economic University named after Vadym Hetman. Since 2013, he has been holding the position of the Dean of the International Economics and Management Department. Areas of research: international service trade. E-mail: dean.mem@kneu.kiev.ua

² *Siluk Sh.* World Bank forum weighs pros, cons of virtual currencies [E-resource]. Siluk – Access mode: <http://www.coindesk.com/world-bank-forum-weighs-pros-cons-of-virtual-currencies/>

³ Virtual currency schemes. European Central Bank, 2012 [E-resource]. – Access mode: <http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf>

⁴ Bitcoin Virtual Currency: Intelligence Unique Features Present Distinct Challenges for Detering Illicit Activity. Prepared by FBI Directorate of Intelligence Cyber Intelligence Section and Criminal Intelligence Section [E-resource]. – Access mode: http://www.wired.com/images_blogs/threatlevel/2012/05/Bitcoin-FBI.pdf

Department of the Treasury Financial Crimes Enforcement Network // http://www.fincen.gov/statutes_regs/guidance/pdf/FIN-2013-G001.pdf

researchers and crypto-economists has been formed among Western scientists. They include J. Matonis⁵, Bitcoin's Board Member, and the former Chief Economist of the IMF, Professor at the MIT Sloan School of Management S. Jones⁶. World research schools are developing very actively: the Austrian economics school (M. Rothbard), the Hungarian scientific school at the Cornell University (B. Steele)⁷ and the Lausanne business school (A. Brice A.)⁸. All of them are based on the theories of J. Keynes⁹, F. von Hayek¹⁰, B. Klein¹¹, etc.

However, their studies did not give a clear idea of the prospects of crypto-currencies as a global currency. Fragmented global development of electronic money demonstrates inadequacy of institutions and mechanisms, financial markets regulation. The monopoly of banking and financial institutions slows down the growth and development of promising innovations in global financial markets. Our study rests on these practical aspects and trends of the world economy. We should review the evolution of contemporary money before starting the main study.

Evolution of Money

The evolution of money as a social institution originates from barter, however, China is considered to be the historical birthplace of paper money. Paper money was first used in the 8th century. It was meant to substitute its metal equivalents: gold or silver. Both paper money and coins remained in circulation. Later, Sichuan faced a significant shortage of copper and the government decided to start mass production of paper money. Gold and silver were then banned

Shasky Calvery J. Before the United States Senate Committee on Banking, Housing, and Urban Affairs Subcommittee on National Security and International Trade and Finance Subcommittee on Economic Policy [E-resource]. /Shasky Calvery – Access mode: <http://www.fincen.gov/newsroom/testimony/html/20131119.html>

⁵ Matonis Jon. How Cryptocurrencies Could Upend Banks' Monetary Role [E-resource]. Matonis – Access mode: <http://www.americanbanker.com/bankthink/how-cryptocurrencies-could-upend-banks-monetary-role-1057597-1.html?zkPrintable=1&nopagination=1>

⁶ Simon Johnson, a renowned economist believes that governments will put pressure on Bitcoin crypto-currency. [E-resource]. – Access mode: <http://bitcoininfo.ru/news/izvestnyi-ekonomist-saimon-dzhonson-schitaet-cto-pravitelstva-budut-okazyvat-davlenie-na-kript> [In Russian].

⁷ Bill S. Incentives in Bitcoin and other online services could deteriorate as system grows [E-resource]/ Steele. – Access mode: <http://www.news.cornell.edu/stories/2012/03/bitcoin-currency-system-offers-negative-incentive>

⁸ Bitcoin rate beats \$100 for 1 BTC [E-resource]. – Access mode: <http://www.xakep.ru/post/60374/> [In Russian].

⁹ Násarano F. Money and Monetary Systems [E-resource]. – Access mode: http://books.google.com.ua/books?id=JEZYgAi4uTsC&pg=PA124&dq=Kevnes+%2B+%22fiduciary+money%22&hl=ru&ei=iWLITlaOGMaSOvLziPAI&sa=X&oi=book_result&ct=result&redir_esc=y#v=onepage&q=Keynes%20%2B%20%22fiduciary%20money%22&f=false

¹⁰ Hayek F. Denationalization of Money [E-resource]. – Access mode: <http://www.klex.ru/6q> [In Russian].

¹¹ Klein Á. The Competitive Supply of Money, Journal of Money, Credit and Banking. 1974. – No.6. – p. 423-453.

as means of payment and taxes were ordered to be paid with paper money.

In Europe, banknotes appeared much later than in China. Western Europe discovered paper money in Marco Polo's times. First, the majority of countries were sceptical about their introduction of paper money. However, the development of trade caused certain changes: gold and silver coins were replaced by paper banknotes. The first paper money was the paper 'coins' issued in the Netherlands in 1574. To create their currency locals used covers and pages of hymns books for making paper plates. The new 'money' was stamped with the same printing blocks that were previously used for minting coins.

The wide-scale introduction of paper money was directly associated with shortage of metal for making coins. Availability of gold and silver depended on the growth of a singly industry – mining (directly dependent on natural resources), while the demand for money is related to the development of an economy in general. Therefore, after the Industrial Revolution, that caused a rapid economic growth, replacement of metal coins with paper money was possible, and even inevitable. During the 18th century, paper money became common throughout Europe (in Russia – since 1769), and by the end of the 19th century was adopted worldwide.

The Industrial Revolution and economic growth of the leading countries resulted in the appearance and wide use of paper money. The current stage of the world economy development has the communication technology that allows millions of people using electronic money in their daily life.

However, we should explain what electronic money means for us. The first stage in the development of electronic money began in 1918 when the US Federal Reserve Bank first made a telegraph money transfer. This this method of settlements has not been popular until early 1970's. In 1972, the US Clearing House was officially formed for servicing e-payments which gave rise to wide use of electronic money. In the late 1960's – early 1970's, electronic money existed as account entries in computer databases of banks. All bank account entries were recorded from paper documents in electronic media. In the second half of the 1980's, money took a form of electronic impulses on plastic cards; and in the mid-90's the world saw the first digital cash and digital wallets. Technically, these were electronic impulses in specific devices. Unlike the previous stages of electronic money, a new form appeared that was similar to banknotes and could be freely used as cash, the function of a payment mean. In the early 21st century, such money becomes more functional due to the introduction and widespread use of digital currency.

Nowadays, national central banks do not issue digital currencies. Their exchange rates can be tied to national currencies or precious metals (E-gold, WebMoney, WMG), and be fixed or floating. These e-currencies include crypto-currencies. 'Crypto-currency' means a fiduciary digital currency with a fully flexible exchange rate set by supply and demand in currency markets without any control by central banks. The analysis of this definition is given below.

Fiduciary Digital Currencies

Fiduciary (fiat) money is money (means of payment) that has no intrinsic value: not backed with precious metals¹², therefore, their rates cannot be fixed. The basis for fiduciary money functioning as a means of payment is a state law, the order to accept such money at face value.¹³ However, in 1878 the United States adopted a resolution of a party meetings introducing the term 'fiat money'.¹⁴ At that time, the US did not yet have the central bank or gold standard, therefore, the US money then existed are considered to be fiduciary. Both fiduciary and fiat money have no intrinsic value or nominal value. However, the American English term 'fiat money' is more commonly used than 'fiduciary money'. In particular, in the 20th century the English scientist J. M. Keynes in his works used the term 'fiduciary money'¹⁵ while A. Ramsden used the word 'fiat' to describe paper money of the 10th century Song Dynasty of China. In English literature, fiduciary money mean the money which an issuer agrees to repay to bearer in commodities (such as gold) while fiat money is not backed by a physical commodity (usually backed by debt securities).¹⁶ Therefore, the value of fiat money depends on the level of confidence in the issuer. The lower this level is (especially in case of a central bank), the worse the real purchasing power of money.

Though in practice fiduciary money were, as a rule, only partially backed, the bearer could still have them repaid, which was not the case with fiat money. Until 1963, the US banknotes had an inscription 'payable to the bearer on demand'. Thus, the 1963 dollar notes initially were fiduciary and then turned into fiat money.

¹² Germany acknowledges Bitcoin [E-resource]. – Access mode: <http://www.vestifinance.ru/articles/31342> [In Russian].

¹³ Bitcoin rate beats \$100 for 1 BTC [E-resource]. – Access mode: <http://www.xakep.ru/post/60374/> [In Russian].

¹⁴ BitPay Processing Service is working at introducing micro-payments [E-resource] – Access mode: <https://cryptochan.org/news/76> [In Russian].

¹⁵ *Nāsarano F.* Money and Monetary Systems [E-resource]. – Access mode: http://books.google.com.ua/books?id=JEZYgAi4uTsC&pg=PA124&dq=Keynes+%2B+%22fiduciary+monev%22&hl=ru&ei=iWLITlaOGMaSOvLzjPAI&sa=X&oi=book_result&ct=result&redir_esc=y#v=onepage&q=Keynes%20%2B%20%22fiduciary%20monev%22&f=false

¹⁶ *Ramsden D.* A Very Short History of Chinese Paper Money [E-resource]. – Access mode: <http://www.financialsensearchive.com/fsu/editorials/ramsden/2004/0617.html>

The present fiduciary money, or fiduciary loan, means standard money payable on demand and used in commerce. Standard money are now issuing banks' banknotes recognised as a legal means of payment, as well as bank reserves on central bank accounts. Standard money does not contain a demand for anything else except itself. In other words, standard money is real cash and fiduciary money means bank deposits that can be used for payments by check or card.

Moreover, any legal entity can print and issue its own money. It is called private money. During the period from 1837 to 1866, the United States issued about 8,000 different types of money. The issuers were some states, municipalities, private banks, railways, shops, restaurants, churches and even individuals. The issuers of that time were called 'wildcat banks'.

Since 1991, the town of Ithaca, the United States, has been using its private currency known as Ithaca Hours. Its value is based on one hour's work. It is the oldest and largest local currency system that operates today in the United States. One Ithaca Hour equals to the value of one-hour work of one person. One Ithaca Hour is valued at 10 US dollars. However, the issuer assumes no obligation to exchange this money at any rate or form any backing reserve. The example of Ithaca Hour was used in the US to overcome the economic crisis in 2009; the alternative money systems were intensified, particularly in Madison (Wisconsin), Corvallis (Oregon)¹⁷ and other cities and municipalities that began to print their own currencies.¹⁸

In many countries, issue of fiduciary money is prohibited by law or strictly regulated. For instance, governments of Scotland and Northern Ireland licence private banks that issue their own paper money. In 1910, circulation of private money was banned by a special decree of Australian government. In the US, private money is formally permitted yet with significant restrictions; in particular, they must not look like dollars or have nominal value higher than that of dollars.^{fn} This limitation of nominal value is theoretically based on the Copernicus-Gresham law: "When a government overvalues one type of money and undervalues another, the undervalued money will leave the country or disappear from circulation into hoards, while the overvalued money will flood into circulation".¹⁹ The law published in 1526 in his treatise on money by the Polish astronomer, mathematician and economist Nicholas

¹⁷ Ithacahours official web-site – [E-resource]. – Access mode: <http://www.ithacahours.com/>

¹⁸ *Belo M.* US municipalities print their own currencies. [E-resource]. – Access mode: <http://inopressa.ru/article/07Apr2009/usatoday/valuta.html>

¹⁹ *Hayek F.* Chapter VI. The Confusion About Gresham's Law//Denationalization of Money. — Bacom. — P. 119 [In Russian].

Copernicus (1473-1543) and finally formulated in 1560 by the British financier Thomas Gresham (1519-1579)²⁰

Gresham's Law highlights "good" and "bad" money. The "good" money means the money with an "internal" value higher than either the nominal value or the "bad" money in circulation with an equal nominal value. Gresham's law is only true when "bad" and "good" money have equal values established under legislation. Let us bring this situation to today's reality: free market forms two separate currencies exchanged at a certain rate (e.g. assignation and silver roubles).

Gresham's limitation was noted by Ludwig von Mises in 1912 in his work "The Theory of Money and Credit",²¹ in 1962 by Murray Rothbard in his popular book "What Has Government Done to Our Money",²² and in 1975 by F. Hayek in his book "Denationalization of Money".²³

In his early scientific writings, Friedrich von Hayek also offered to denationalise money and limit state monopoly on its printing. The idea of possible denationalisation of money and removing the state from issuance and control of banking industry was also expressed by B. Klein in 1974.²⁴ The scientists offer a whole new plan to achieve monetary stability, the system based on competition of parallel private currencies. F. Hayek offers consider currency as usual commercial commodity. Just as there is competition between common goods, which improves their consumer properties and sort out low quality products, competition between private currencies will withdraw from circulation badly backed and poorly controlled currencies. Only the currencies best operating as money will remain.

These works were followed by many publications of other researchers of this subject. Studies have been conducted that confirmed the key ideas of Hayek's theory that existed before the era of central banks. Money systems in many countries were based on the principles of free competition and private money and were quite effective. For example, M. Friedman changed his negative assessment of the competitive private currencies and agreed with

²⁰ The History of Economic Studies /ed. V. D. Bazylevich. – 3rd ed. – Kyiv: Znannya Publishing House, 2007. – Vol. 1. – P. 267 [In Ukrainian].

²¹ *Mises L.* The Theory of Money and Credit [E-resource] – Access mode: <http://mises.org/books/tmc.pdf>

²² *Rothbard M.* What Has Government Done to Our Money? [E-resource]. – Access mode: <http://socioline.ru/book/myurrej-rotbard-gosudarstvo-i-dengi-kak-gosudarstvo-zavladelo-denezhnoj-sistemoj-obschestva> [In Russian].

²³ *Hayek F.* Denationalization of Money [E-resource]. – Access mode: <http://www.klex.ru/6q> [In Russian].

²⁴ *Klein Á.* The Competitive Supply of Money, Journal of Money, Credit and Banking. 1974. – No.6. – p. 444

Hayek by publishing in 1986 his article “Has Government Any Role in Money?”²⁵

So, historically and theoretically we confirm the idea of reasonably possible existence of fiduciary money. However, at the present stage of the world economy development some private institutions issue electronic, not paper money. The number of transactions made with such currencies reaches several billion dollars a year. It demonstrates the high demand for it and the new trends of today’s global financial system. This is also confirmed by the studies of the international institutions. In October 2012, the European Central Bank prepared a publication on the study of virtual payment systems stating that users perceive them as an alternative to the monopoly of central banks in the issue of money and the monopoly of commercial banks in transaction processing. Crypto-currencies are created not by central banks but users who perform complicated tasks calling them “mining”.²⁶

Exchange Rate and Exchange Regimes

Fixed and floating exchange rates definition is generally accepted. Fixed rate is based on mint par of exchange (weight content of gold in national currencies) (48 countries, IMF, 2001) or strict peg to exchange rate of certain reference currency with less than 1% deviation²⁷:

1.1) actually fixed (gold exchange standard),

1.2) contractually fixed:

- ordinary (pegged to special drawing rights (SDR), US dollar, French franc or other currencies),
- basket (pegged to artificially constructed combinations of currencies of major trading partners of Austria, Algeria),
- variable parity-based.

Floating rate is determined through a comparison of purchasing power parities of currencies, i.e. evaluation of national currencies for the same “basket” of goods:

2.1) independent floating (in foreign exchange policy-based markets),

2.2) managed (regulated) floating (central banks intervention),

²⁵ *Friedman M., Schwartz A.* Has Government Any Role in Money [E-resource]. – Access mode: <http://www.nber.org/chapters/c7507.pdf>

²⁶ *Podyachev S.* Bitcoin – gold 2.0 [E-resource]/S. Podyachev. – Access mode: <http://innovations.com.ua/ua/articles/op-manage/18531/bitcoin-zoloto-2-0> [In Ukrainian].

²⁷ *Molchanova E. Yu.* Topic 14. The Theory of Exchange Rates [E-resource]/Molchanova. – Access mode: http://meim.kneu.edu.ua/ua/depts6/k_mizhnarodnoi_ekonomiky/vikladachi_me/ Molchanova.E. Yu/ [In Ukrainian].

2.3) mixed floating towards a certain currency (US dollar) – used by four countries only: Bahrain, Saudi Arabia, Qatar, the United Arab Emirates),

2.4) joint floating (used by the EU’s monetary union member states).

However, the present exchange regimes are slightly modified²⁸:

A. Floating corner:

- 1) free floating,
- 2) managed floating.

B. Intermediate regimes:

- 1) band,
- 2) crawling peg,
- 3) basket peg,
- 4) adjustable peg.

C. Firm fixed corner:

- 1) currency board,
- 2) dollarisation or euroisation,
- 3) monetary union.

This classification indicates that crypto-currencies have not just floating but free floating exchange rate regime determined as a result of supply and demand in the foreign exchange market. Central bank interventions are virtually absent, so it can focus on maintaining price stability.

Therefore, we confirm the point that crypto-currency is a currency with exchange rate based upon free floating regime not controlled by central banks.

Contemporary Virtual Currency Market

Successfully functioning, today’s market of crypto-currencies, or virtual market, offers the dynamics of demand, supply and value of 86 crypto-currencies.²⁹ Bitcoin is now the most wide-spread crypto-currency. The European Central Bank’s analysts state that the theoretical basis for Bitcoin creation was the Austrian economic school which criticises the existing order of currency issue. Its representatives believe that the current issue of money causes inflation. The school’s another area of research is the development of forecasts and proposals as to how to avoid financial disasters.³⁰

²⁸ *Molchanova E. Yu.* Topic 14. The Theory of Exchange Rates [E-resource]/Molchanova. – Access mode: http://meim.kneu.edu.ua/ua/depts6/k_mizhnarodnoi_ekonomiky/vikladachi_me/Molchanova_E.Yu/ [In Ukrainian].

²⁹ Crypto-Currency Market Capitalizations [E-resource] – Access mode: [http:// coinmarketcap.com/](http://coinmarketcap.com/)

³⁰ *Podyachev S.* Bitcoin – gold 2.0 [E-resource]/S. Podyachev. – Access mode: [http:// innovations.com.ua/ua/articles/op-manage/18531/bitcoin-zoloto-2-0](http://innovations.com.ua/ua/articles/op-manage/18531/bitcoin-zoloto-2-0) [In Ukrainian].

Bitcoin is evaluated solely by the supply and demand balance on virtual exchanges such as MT.Gox³¹, BitStamp³², BTC-E³³, Mcxnow³⁴, Cryptsy³⁵ i Vircurex.³⁶ More recently, ICBit opened dollars/bitcoins futures trade.³⁷ Coinfloor, a London-based exchange, opened its platform for Bitcoin virtual currency trade. Supported by investors such as Passion Capital and Taavet Hinrikus, the exchange was opened for registration from October 30, 2013 and started transactions on November 4, 2013 on Coinfloor, which fully complies with ISO27001 standard and is registered in the Money Laundering Combat Programme³⁸. However, the website is closed to US users as US Treasury registration and licence are needed to accept payments from US residents.

The company's website is meant for users of virtual money, professional traders giving them "world-class strategic centres" and "sophisticated graphics packages". The developers offered users to play safe by using two-factor authentication and save Bitcoin offline in secure systems. However, 80% of transactions are conducted via MT.Gox where currency rates are compared. It turns out that MT.Gox is the trade centre for Bitcoin, which indicates a partial centralisation, and the exchange itself can actively influence Bitcoin rates. According to the world's financial foundations, the total Bitcoin exchange turnover is worth hundreds of millions of dollars. Currently, the total worldwide turnover stands at about \$15 mln a day. Such small volumes allow manipulate the rate easily. Since its creation, Bitcoin value has increased by 20,000 times: from 5 cents in 2009 to \$1,000 as of the end of 2013 (Fig. 1).

³¹ MT.Gox official website [E-resource] – Access mode: <http://mtgoxlive.com/orders>

³² Cryptocoin Mining Information [E-resource] – Access mode: <http://dustcoin.com/mining>

³³ BTC-E official website [E-resource] – Access mode: <https://btc-e.com/>

³⁴ Mcxnow official website [E-resource] – Access mode: <https://mcxnow.com/>

³⁵ Cryptsy official website [E-resource] – Access mode: <https://www.cryptsy.com/>

³⁶ Vircurex official website [E-resource] – Access mode: <https://vircorex.com/>

³⁷ Icbit official website [E-resource] – Access mode: <https://icbit.se/>

³⁸ The new reality: Cyber-currency Bitcoin exchange opened in London [E-resource] – Access mode: <http://news.finance.ua/ua/~1/0/all/2013/10/30/311883> [In Ukrainian].

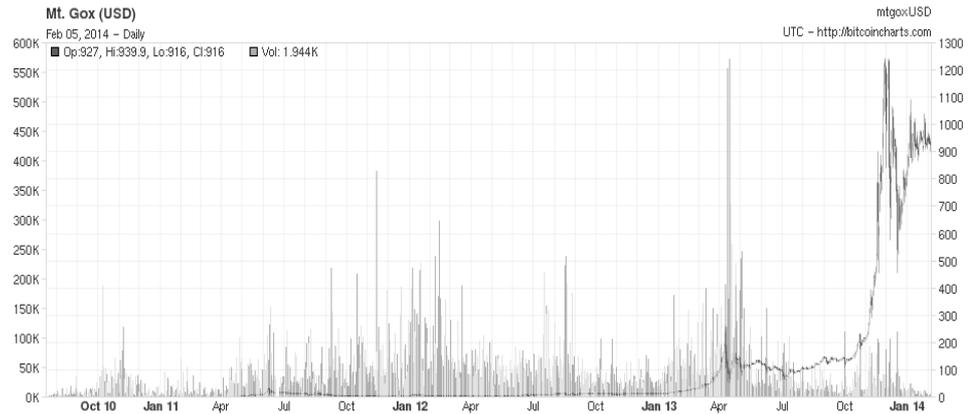


Fig. 1. Bitcoin value dynamics since creation³⁹.

Prior to 2011, when the world became aware of the new payment system and Bitcoin could be exchanged for real currency, the rate did not exceed \$10. In June, the market price first jumped to \$35 per Bitcoin. Personal computer users started to use the currency for online payments, which resulted in increase in demand. In late 2012, Bitcoin was sold for \$13. On April 1, 2013, the rate of the world's first crypto-currency reached \$100 for 1 Bitcoin. In April 2013, Bitcoin rate began to rise and reached \$238. (Fig. 2).



Fig. 2. Bitcoin dynamics from 2010 to 2013⁴⁰

³⁹ Bitcoincharts News Agency official website [E-resource] – Access mode: <http://bitcoincharts.com/charts/mtgoxUSD#tgSzm1g10zm2g25zv>

⁴⁰ Bitcoincharts News Agency official website [E-resource] – Access mode: <http://bitcoincharts.com/charts/mtgoxUSD#tgSzm1g10zm2g25zv>

Over its history, the value of the currency has increased dramatically and then fell several times (Fig. 3). For example, on October 2, 2013 FBI ordered the closure of an anonymous online marketplace that accepted Bitcoin. As a result, the value of the crypto-currency slightly dropped. On November 23, 2013, Bitcoin rate rose to \$600. Big investors responded to the sharp rise and began to buy up the currency, which resulted in its growth of up to \$1,000.

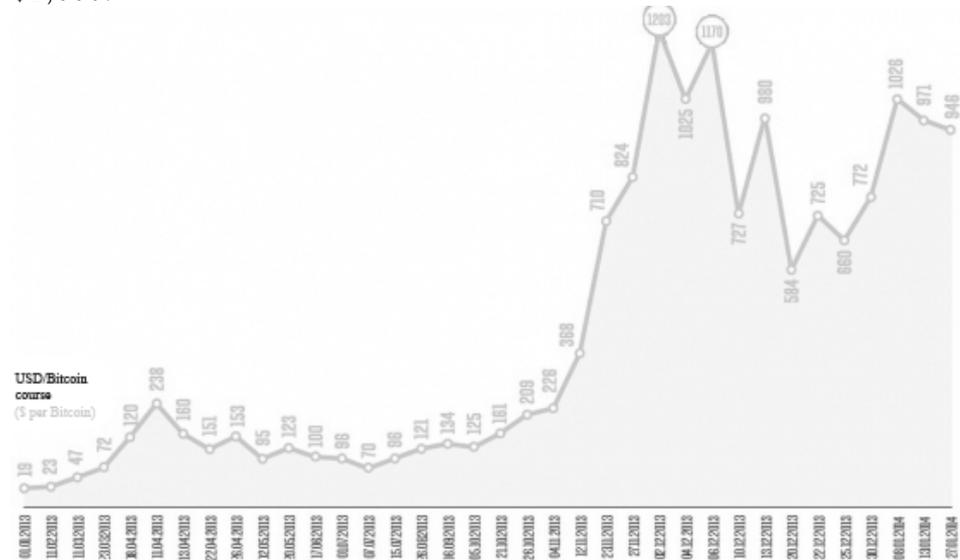


Fig. 3. Bitcoin dynamics in 2013-2014⁴¹

The next jump should be expected as a response of major players to the termination of cooperation of MtGox with Russian payment systems in February 2014. The exchange guarantees that all financial obligations will be fully met with methods available, without any additional fees, and encourages its customers to use Palpay (USD, EUR).

We have proved that crypto-currencies are fiduciary digital currencies with exchange rates set under a free floating regime as a result of supply and demand in the foreign exchange market without any control by central banks. However, it should be mentioned that Bitcoin is a virtual currency, a medium of exchange that works as a currency in certain areas but does not have all attributes of a real currency.

⁴¹ Bitcoincharts News Agency official website [E-resource] – Access mode: <http://bitcoincharts.com/charts/mtgoxUSD#tgSzm1gl0zm2g25zv>

E-Currency Converting Conditions

A virtual currency is considered to be “convertible” if it has or works as an equivalent in a real currency. An example supporting this point is the world’s first Bitcoin ATM exchanger installed in a coffee shop in downtown Vancouver. In a very short time, users made transactions worth more than 100,000 Canadian dollars. Currently, the ATM only accepts cash but the developers plan to expand its functions such as accepting payments from debit cards.⁴² A week after the installation of ATMs (in April 2013), the price per Bitcoin increased by \$126 (Fig. 2).

This service turn out to be interesting for both owners of the crypto-currency and manufacturers of ATMs. RoboCoin machines significantly simplified exchange of money for Bitcoin. Bitcoin users need to enter their “wallet” number and put money into the ATM. When buying/selling Bitcoin, users only pay the nominal value of transactions. However, when buying a debit or credit card users should find out: if there are any legal restrictions (debit and credit cards cannot be used for buying Bitcoin). Money transfer via PayPal is not credible as well because no Bitcoin transactions can be downloaded, and buying a crypto-currency for cash is associated with certain procedural obstacles.

So, in September 2013, RoboCoin began expanding its services and entered the US market in order to facilitate exchange services. However, having faced competition and dumping American businessmen began selling similar ATMs that were 4 times cheaper. Bitcoin-ATM creators hope to fill America with BTC ATMs. Online e-shop BitcoinStore, that was opened recently, lures customers offering them unprecedented prices, allegedly the lowest in the web. This Bitcoin experiment can attract other major retailers.

Since Bitcoin allows its owners to exchange virtual currencies for real money, users can now exchange them for goods and services. On April 30, 2013, the CEO of eBay, where PayPal is used, announced that the company is considering many options of integrating Bitcoin in the payment system. The Executive Vice-President of Western Union reported that if demand for Bitcoin grows, the company will find a way to incorporate Bitcoin into its payment system.

Companies are also beginning to accept crypto-currencies in payments for certain goods. Overstock.com, a retail network, started accepting Bitcoin (so far only for purchases sent to the US). Currently, there aren’t many retail platforms where crypto-currencies can be spent. During the first twenty-four hours after

⁴² The world’s first Bitcoin ATMs will appear in Canada [E-resource] – Access mode: <http://news.finance.ua/ua/~1/0/all/2013/09/14/308789> [In Ukrainian].

integrating Bitcoin, the company received 840 payments totalling to about 130K US dollars (at the current crypto-currency exchange rate). The list of companies that accept Bitcoin as payment for their goods and services is growing (WordPress.com, The Pirate Bay and Reddit, and tens of thousands of retail and service companies).

In Canada, crypto-currencies are accepted in taxis, and in the US you can buy a pizza, buy/sell a car by using crypto-currencies. In April 2013, a Texas family sold their car for 300 Bitcoins.⁴³ Electronics for Bitcoin store offers a wide range of products with the prices usually specified in several currencies, including a crypto-currency. You can also bet in BitVegas casino. The casino hotels also started to accept Bitcoin. It should be noted that these casinos and hotels are controlled by the same owner. The owner said that the crypto-currency had been introduced since many gambling customers became interested in such opportunity.

The UK-based Cambrian University and the University of Nicosia also started to accept Bitcoins. The founder of the Cambridge network of pubs Individual Pubs Limited decided to introduce Bitcoins in one of their pubs. Bitcoin is now accepted in all pubs of the network. In addition to casinos and universities, Bitcoin is accepted by sports organisations, at least Sacramento Kings, the basketball team, began to accept the crypto-currency for tickets to their games. Richard Branson's Virgin Galactic is ready to exchange the crypto-currency for a space flight. Bitcoin is accepted by CheapAir, the tour agency. Zynga, the computer game developer, announced that it is starting to test accepting Bitcoin 2 for FarmVille, CityVille, Hidden Shadows and other Zynga games. InternetArchive also offers its employees receive their wages in Bitcoin. Google is also interested in Bitcoin. In early January 2014, the company created a page with a survey asking users to describe what should be done with Bitcoin. The French government gave a permit to Bitcoin Central Bank to open deposits and transfer money both in euros and in Bitcoins.

It is worth noting that by now nearly all companies that deal with Bitcoin have introduced the inverse rate: the prices are specified in dollars, and customers can pay in Bitcoins if they wish to do so. More and more companies are willing to accept Bitcoin as a currency of payment for their services. This active use of the crypto-currency caused the formation of BitMonet, a system focused on a certain vertical – publishing, rather than on micropayments made on usual websites. The project allows publishers to set paywalls on the website charging fees for access to digital content in various ways.

⁴³ *Wile R.* Texas familv: We Sold This Porsche Last Night For 300 Bitcoins [E-resource] – Access mode: <http://www.businessinsider.com/texas-family-we-sold-this-porsche-last-night-for-300-bitcoins-2013-4#ixzz2syoe36Cj>

Processing services charge commission fees from micropayments. The companies specialised in credit cards take 2-3% commission fees from each payment along with the base rate of 20%. Bitcoin payments include a minor fee and require no registration. BitPay charges 0.99% per purchase, no base rate for processing of a transaction initiated via BitMonet.⁴⁴ BitMonet is 95% presented in Javascript and looks like a collection of files that can be uploaded by publishers to the page web server. There must be a script code used for integration in BitPay. The script helps publishers generate links for accessing paid content. Visitors see a window with three options of payment for access: page-oriented, hourly or daily. Depending on the option selected, a user is redirected to a Bitcoin window for making a payment in BitPay.

Merchants can save payments and send them from the payment system daily. However, Bitcoin transactions are in any case the way of the client's wallet to BitPay via a chain of blocks. To simplify work with electronic wallets Coin multicard was introduced late last year in the internet.

Today, Bitcoin services market is not totally systematised or presented with a full range of services. However, active users of this crypto-currency already can take advantage of the following services:⁴⁵

- CryptoPayment.ru – Bitcoin and Litecoin mobile phone recharge service. The commission fee is 5%. Mobile operators: Megafon, Beeline, MTS, Tele2, Smarts, Simtravel, Teletie,
- Unihost.com – professional hosting and domain registration services. Unihost.com provides everything required to create and maintain your online projects: from domain name registration and hosting to giving access to powerful servers and issue of SSL certificates. Unihost.com operates by the following principle: “Satisfied customers are critical for success.” Therefore, all company's efforts are focused on ensuring the highest quality and convenient service. Since 2014, Unihost.com's customers can pay via Bitcoin and Litecoin for any services,
- latilib.com.ua – a service for mobile phone recharge in Ukraine, Russia, Belarus, Kazakhstan, Moldova, Georgia, Armenia, Latvia, Poland, Romania, Cyprus, Turkey; for fixed phone services in Ukraine, Russia, Belarus, Kazakhstan; for services of internet providers and cable/satellite TV operators in Ukraine, Russia, Kazakhstan; as well as direct recharge at a price lower than the nominal value;

⁴⁴ BitPay Processing Service is working at introducing micro-payments [E-resource] – Access mode: <https://cryptochan.org/news/76> [In Russian].

⁴⁵ A Russian-speaking information resource about the network [E-resource] – Access mode: Bitcoin <http://btcsec.com>

- pilotline.net – an online store of rare electronics. The minimum order amount is 0.13 BTC. They accept any means of payment, including Bitcoin. No commission fees. Free delivery to any place in Russia. Goods are shipped within three working days of receiving the currency. Free trackmeter for tracking parcels;
- btcbelpay.com – a mobile phone recharge service accepting BTC only. It is offered for residents of Belarus as well as everyone who has a Belarusian mobile operator's SIM-card. Payments are made automatically. Money is transferred within 15 minutes after two Bitcoin confirmations. The rate is calculated based on maximum BTC buying rate on [mtgox](http://mtgox.com) and the average rate of USD in a country's exchange offices.

Given these trends of Bitcoin use, it can be expected that in the next decade crypto-currencies will be used in 10% of all global payments. In the countries with excessive or unjustified regulation of financial markets, the use of such currencies can become a must.

Conclusions

In our study, we were based upon the crypto-currency definition where we considered it in terms of its components such as: fiduciary nature, exchange rate and regime, supply and demand, institutional control. As a result, we were able to prove that Bitcoin is the currency activated by supply and demand as well as a set of services provided by electronic payment systems to trading companies.

References

1. A Russian-speaking information resource about the network [E-resource] – Access mode: Bitcoin <http://btcsec.com>
2. *Belo M.* US municipalities print their own currencies. [E-resource]. – Access mode: <http://inopressa.ru/article/07Apr2009/usatoday/valuta.html>
3. *Bill S.* Incentives in Bitcoin and other online services could deteriorate as system grows [E-resource] / Steele. – Access mode: <http://www.news.cornell.edu/stories/2012/03/bitcoin-currency-system-offers-negative-incentive>
4. Bitcoin rate beats \$100 for 1 BTC [E-resource]. – Access mode: <http://www.xakep.ru/post/60374/> [In Russian].
5. Bitcoin Virtual Currency: Intelligence Unique Features Present Distinct Challenges for Detering Illicit Activity. Prepared by FBI Directorate of Intelligence Cyber Intelligence Section and Criminal Intelligence Section [E-resource]. – Access mode: http://www.wired.com/images_blogs/threatlevel/2012/05/Bitcoin-FBI.pdf

6. Bitcoincharts News Agency official website [E-resource] – Access mode: <http://bitcoincharts.com/charts/mtgoxUSD#tgSzm1g10zm2g25zv>
7. BitPay Processing Service is working at introducing micro-payments [E-resource] – Access mode: <https://cryptochan.org/news/76> [In Russian].
8. *Brice A.* The issue of price [E-resource] – Access mode: <http://www.kommersant.ru/doc/2210178>
9. BTC-E official website [E-resource] – Access mode: <https://btc-e.com/>
10. *Buterin V.* BitPay Processes \$5 Million in March, Eclipses Silk Road [E-resource] – Access mode: <http://bitcoinmagazine.com/3910/bitpay-processes-5-million-in-march-eclipsessilk-road/>
11. Cryptocoin Mining Information [E-resource] – Access mode: <http://dustcoin.com/mining>
12. Crypto-Currency Market Capitalizations [E-resource] – Access mode: <http://coinmarketcap.com/>
13. Cryptsy official website [E-resource] – Access mode: <https://www.cryptsy.com/>
14. Department of the Treasury Financial Crimes Enforcement Network // http://www.fincen.gov/statutes_regs/guidance/pdf/FIN-2013-G001.pdf
15. *Friedman M., Schwartz A.* Has Government Any Role in Money [E-resource]. – Access mode: <http://www.nber.org/chapters/c7507.pdf>
16. Germany acknowledges Bitcoin [E-resource]. – Access mode: <http://www.vestifinance.ru/articles/31342> [In Russian].
17. *Halytskaya O., Polekhina O.* Pros and cons of virtual currency Bitcoin [E-resource]. – Access mode: <http://business.vesti.ua/35776-pljusy-i-minusy-virtual-noj-valjuty-bitcoin> [In Russian].
18. *Hayek F.* Chapter VI. The Confusion About Gresham's Law//Denationalization of Money. – Bacom. – ISBN 5900520-064 [In Russian].
19. *Hayek F.* Denationalization of Money [E-resource]. – Access mode: <http://www.klex.ru/6q> [In Russian]
20. Icbit official website [E-resource] – Access mode: <https://icbit.se/>
21. Ithacahours official web-site – [E-resource]. – Access mode: <http://www.ithacahours.com/>
22. *Klein B.* The Competitive Supply of Money, Journal of Money, Credit, and Banking. 1974. – №6. – P. 423-453.
23. *Matonis Jon.* How Cryptocurrencies Could Upend Banks' Monetary Role [E-resource]. Matonis – Access mode: <http://www.americanbanker.com/bankthink/how-cryptocurrencies-could-upend-banks-monetary-role-1057597-1.html?zkPrintable=1&nopagination=1>

24. Mxnow official website [E-resource] – Access mode: <https://mxcnow.com/>

25. *Mises L.* The Theory of Money and Credit [E-resource] – Access mode: <http://mises.org/books/tmc.pdf>

26. *Molchanova E. Yu* Topic 14. The Theory of Exchange Rates [E-resource]/Molchanova. – Access mode: http://meim.kneu.edu.ua/ua/depts6/k_mizhnarodnoi_ekonomiky/vikladachi_me/Molchanova.E.Yu/ [In Ukrainian].

27. MT.Gox official website [E-resource] – Access mode: <http://mtgoxlive.com/orders>

28. *Cesarano F.* Money and Monetary Systems [E-resource]. – Access mode: http://books.google.com.ua/books?id=JEZYgAj4uTsC&pg=PA124&dq=Keynes+%2B+%22fiduciary+money%22&hl=ru&ei=iWLITiaOGMaSOvLziPAI&sa=X&oi=book_result&ct=result&redir_esc=v#v=onepage&q=Keynes%20%2B%20%22fiduciary%20money%22&f=false

29. *Nikolaiev I.* Systems of local currencies - non-capitalistic economies in Western countries [E-resource] – Access mode: http://www.situation.ru/app/j_art_273.htm [In Russian].

30. *Podyachev S.* Bitcoin – gold 2.0 [E-resource]/S. Podyachev. – Access mode: <http://innovations.com.ua/ua/articles/op-manage/18531/bitcoin-zoloto-2-0> [In Ukrainian].

31. *Ramsden D.* A Very Short History of Chinese Paper Money [E-resource]. – Access mode: <http://www.financialsensearchive.com/fsu/editorials/ramsdn/2004/0617.html>

32. *Rothbard M.* What Has Government Done to Our Money? [E-resource]. – Access mode: <http://socioline.ru/book/myurrej-rotbard-gosudarstvo-i-dengi-kak-gosudarstvo-zavladelo-denezhnoj-sistemoj-obschestva> [In Russian].

33. *Shasky Calvery J.* Before the United States Senate Committee on Banking, Housing, and Urban Affairs Subcommittee on National Security and International Trade and Finance Subcommittee on Economic Policy [E-resource]. /Shasky Calvery – Access mode: http://www.fincen.gov/news_room/testimony/html/20131119.html

34. *Siluk Sh.* World Bank forum weighs pros, cons of virtual currencies [E-resource].Siluk – Access mode: <http://www.coindesk.com/world-bank-forum-weighs-pros-cons-of-virtual-currencies/>

35. Simon Johnson, a renowned economist believes that governments will put pressure on Bitcoin crypto-currency. [E-resource]. – Access mode: <http://bitcoininfo.ru/news/izvestnyy-ekonomist-saimon-dzhonson-schitaet-chto-pravitelstva-budut-okazyvat-davlenie-na-kript> [In Russian].

36. The History of Economic Studies /ed. V. D. Bazylevich. – 3rd ed. – Kyiv: Znannya Publishing House, 2007. – Vol. 1. – 582 p. – ISBN 966-346-149-7 [In Ukrainian].

37. The new reality: Cyber-currency Bitcoin exchange opened in London [E-resource] – Access mode: <http://news.finance.ua/ua/~1/0/all/2013/10/30/311883> [In Ukrainian].

38. The world's first Bitcoin ATMs will appear in Canada [E-resource] – Access mode: <http://news.finance.ua/ua/~1/0/all/2013/09/14/308789> [In Ukrainian].

39. Vircurex official website [E-resource] – Access mode: <https://vircurex.com/>

40. Virtual currency schemes. European Central Bank, 2012 [E-resource]. – Access mode: <http://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf>

41. *Wile R.* Texas family: We Sold This Porsche Last Night For 300 Bitcoins [E-resource] – Access mode: <http://www.businessinsider.com/texas-family-we-sold-this-porsche-last-night-for-300-bitcoins-2013-4#ixzz2syoe36Cj>

The article was received by the editorial board on 23.01.2014