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THE INFLUENCE OF CRYPTOCURRENCY ON THE FUTURE OF THE INTERNATIONAL FINANCIAL PAYMENT SYSTEM THROUGH THE EXAMPLE OF A BITCOIN

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The purpose of this article is to determine how the use of a bitcoin as an instrument of payment can affect the system of international financial payments and the banking system. The method of critical analysis of scientific and methodological literature is used and the materials of research executed by leading experts in the fields of international finance and IT in 2009-2017 are summarized. A bitcoin can become a serious competitor to banks, payment systems such as SWIFT in the implementation of major cross-border payments. It is even compared with gold because there is no risk for the counterparty in operations with it. We suggest that a bitcoin is an outstanding digital technology which can fundamentally change the world banking system, payment settlements and the global economy. The article proposes a classification of advantages, disadvantages and prospects of using a bitcoin as a means of payment between large financial institutions and banks. The perspective of increased competition between leading international payment systems in conducting large cross-border payments is substantiated. The prospects of further studies are determined. How do central banks need to reform the system of international financial payments in view of the inevitable introduction of cryptocurrency? How to implement new financial instruments based on blockchain technology and a bitcoin? What changes in legislation should be made to get the names of buyers and sellers of bitcoins, which will help to reduce financing of illegal activities?

Keywords: bitcoin, cryptocurrency, electronic funds transfers, international bank payments, bitcoin transactions, advantages and disadvantages of bitcoin.

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ВПЛИВ КРИПТОВАЛЮТИ НА МАЙБУТНЄ СИСТЕМИ МІЖНАРОДНИХ ФІНАНСОВИХ РОЗРАХУНКІВ НА ПРИКЛАДІ БІТКОЙНУ

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Мета цієї статті - визначити, як використання біткойну як інструменту платежу може вплинути на систему міжнародних фінансових розрахунків та банківську систему. Використовується метод критичного аналізу науково-методичної літератури, узагальнено матеріали досліджень, що виконані провідними фахівцями

у галузі міжнародних фінансів та інформаційних технологій у 2009-2017 роках. Біткойн може стати серйозним конкурентом для банків, платіжних систем, таких як SWIFT, при здійсненні основних міжнародних платежів. Він навіть порівнюється з золотом, оскільки операції з ним не мають ризику контрагента. Ми вважаємо, що біткойн - це видатна цифрова технологія, яка може кардинально змінити світову банківську систему, платіжні розрахунки, глобальну економіку. У статті запропоновано класифікацію переваг, недоліків та перспектив використання біткойна як засобу платежу між великими фінансовими установами та банками. Обґрунтовано перспективу загострення конкуренції між провідними міжнародними платіжними системами при проведенні великих транскордонних платежів. Визначено перспективи подальших досліджень: як центральним банкам треба реформувати систему міжнародних фінансових розрахунків з огляду на неминуче впровадження криптовалют? Як впроваджувати нові фінансові інструменти на базі блокчейн технології та біткойн? Які зміни в законодавстві слід внести, щоб отримати імена покупців і продавців біткойнів, що допоможе зменшити фінансування незаконної діяльності?

Ключові слова: біткойн, криптовалюта, електронні перекази коштів, міжнародні банківські платежі, трансакції з використанням біткойна, переваги та недоліки біткойна.

Relevance of the topic. With the development of information technology, appearance of cryptocurrencies and implementation of them into the system of mutual payments between organizations, institutions and banks many problematic issues arise. The main of which is how payments with a bitcoin, which is a decentralized currency, not controlled by any government, central bank or financial institution, will change the system of international payments.

The article highlights possible changes in international payment systems, advantages and disadvantages of a bitcoin as an instrument of payment, prospects of using bitcoin transactions in international payments.

Analysis of recent research and publications. Scientists Michael Casey, Paul Vigna, Nataniel Popper, Atis Elstsand, etc. researched the potential influence of a bitcoin on the system of international financial payments, but they did not find out how the use of a bitcoin as an instrument of payment can affect the system of international financial payments. That has caused us to continue researching this matter.

Purpose and objectives of the study. The purpose of this article is to determine how the use of a bitcoin as an instrument of payment can affect the system of international financial payments and the banking system.

Materials and methods of research. The method of critical analysis of scientific and methodological literature is used and the materials of research

executed by leading experts in the fields of international finance and IT in 2009-2017 are summarized.

The basic results of the article. Bitcoin, the world's most popular cryptocurrency has been making all the headlines in recent times as it reaches unimaginable heights in terms of value.

The purpose of Bitcoin according to its creator was simple. To create a new electronic cash system that will be fully decentralized with no central authority or central server.

Basically, bitcoin is simply a digital currency. You cannot see it physically or touch it like the normal bills and coins. The currency is also decentralized. This means that there is no government agency or financial institution like a bank that controls it. The owners of bitcoin are also anonymous. Instead of using Tax IDs and official names to connect people, Bitcoin uses encrypted keys [1].

Big banks have grown bigger and more entrenched. Privacy exists only until the next hack. Credit card fraud is a fact of life. Many of the "legacy systems" once designed to make our lives easier and our economy more efficient are no longer up to the task. Yet there is a way past all this — a new kind of operating system with the potential to revolutionize vastswath of our economy: the blockchain [2].

Since the Bitcoin creation in 2009, the price of this virtual currency remained quite stable until January 2013, reaching a maximum value of approximately 20 U.S. dollars. Afterwards a monthly price growth was observed until October 2013 when the price reached 198 U.S. dollars. This nearly tenfold increase in Bitcoin value proved to be insignificant in comparison to the price rally in November 2013, when the threshold of 1,100 U.S. dollars per coin was broken. After a period of downtrend which followed, Bitcoin price reached 1,349.19 U.S. dollars in April 2017. On the 11-th of December, 2017 the rate was 14 500 U.S. dollars for 1 BTC (see Figure 1) [12].

The number of bitcoins in circulation has grown month on month and reached just under 17 million in March 2018. The global value of Bitcoin amounted to approximately 10.1 trillion U.S. dollars as of January 2014 and was much higher than the value of other internet currencies such as Ripple, Litecoin or Peercoin [13].

As of April 2018, there were 2,668 Bitcoin ATMs worldwide. In the same time period, the countries with highest number of Bitcoin ATMs were United

States – 1 595, Canada - 420, Austria -136, United Kingdom - 116 and Spain – 40 (Figure 2) [13].

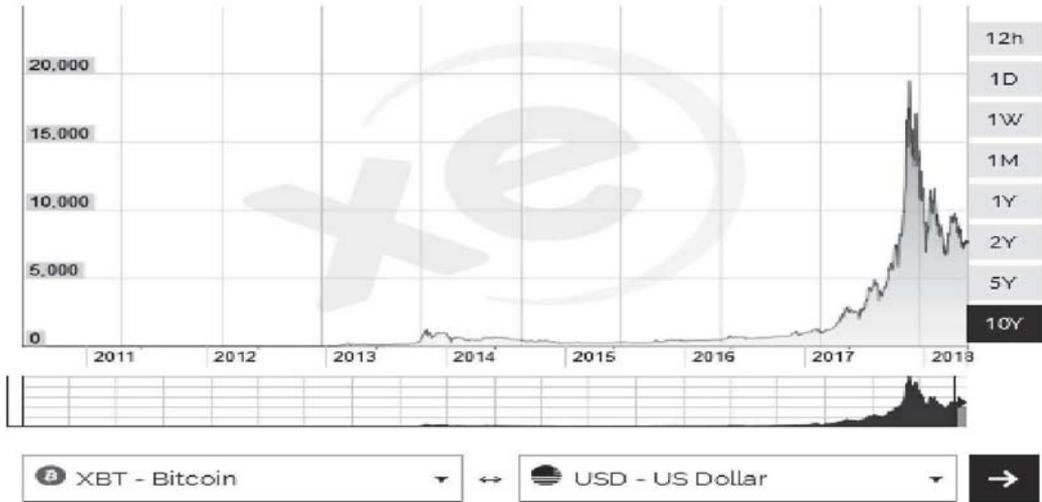


Figure 1. Bitcoin to US dollar chart 2010-2018
Source: [12]

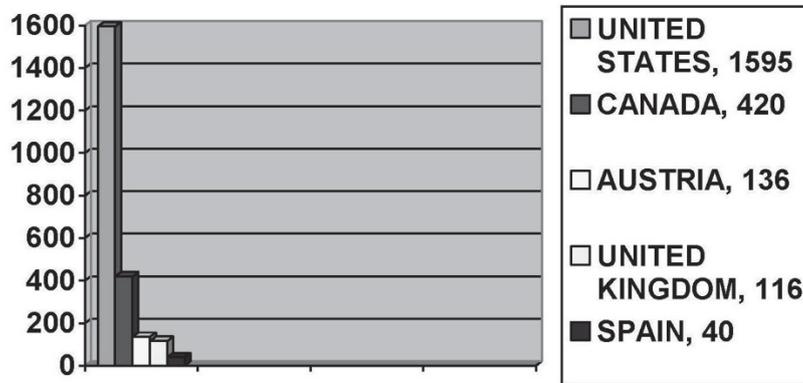


Figure 2. The countries with highest number of bitcoin ATMs
Source: [13]

According to the expert research published in “International business times” the lowest unit cost of "mining" a bitcoin is in: Venezuela (531 USD), Trinidad and Tobago (1190 USD), Uzbekistan (1788 USD), Ukraine (1190 USD) see Figure 3 [14].

Opinion of world’s central banks on bitcoin

The management of each central bank in different countries of the world has its own opinion on the need of the introduction of cryptocurrencies, in particular bitcoin, into the banking system of the country (see Figure 4).

USA:

Technical issues with the technology remain and “governance and risk management will be critical.” There are “meaningful” challenges to a central-bank cryptocurrency, that privacy issues could be a problem, and private-sector alternatives may do the job.

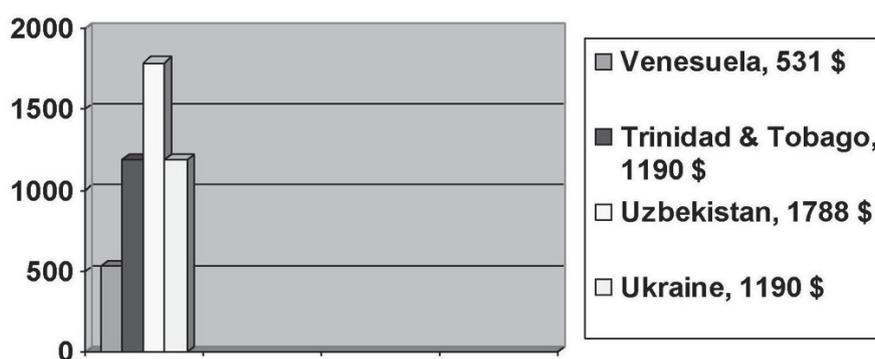


Figure 3. The lowest unit cost of “mining” a bitcoin
Source: [14]

Switzerland:

The Swiss National Bank it is not planning to issue a digital version of the franc and sees the potential for such a currency to have an ill effect on the financial system.

Euro Area:

The European Central Bank has repeatedly warned about the dangers of investing in digital currencies. The Blockchain technology was “quite promising” and the bank is “very interested” in it.

China:

China has made it clear: the central bank has full control over cryptocurrencies and electronic fund transfers. With a research team set up in 2014 to develop digital fiat money, the People’s Bank of China believes “conditions are ripe” for it to embrace the technology. But at the same time, the authorities are cracking down on bitcoin mining and cryptocurrency trading.

Japan:

The Bank of Japan is not considering issuing a digital currency as there is “no demand” for it, noting the rise of cashless transactions remains a work in progress in the country. The central bank also released a frequently asked Questions and Answers in raising awareness with the general public about risks of investing in cryptocurrency.

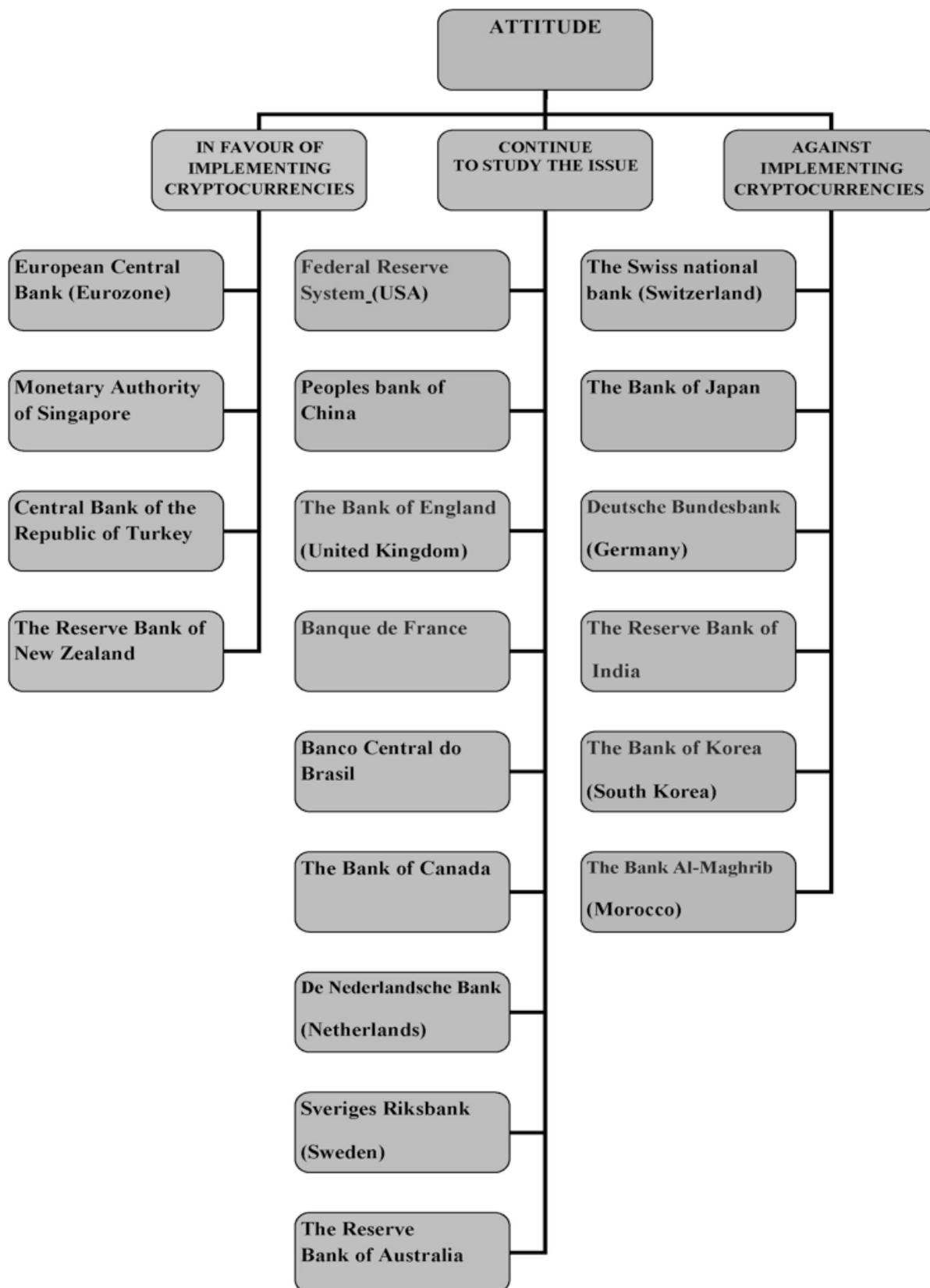


Figure 4. The attitude of the world's central banks to the introduction of a bitcoin into circulation within their own country

Source: [3]

Germany:

Germans for the first time made less than half their transactions using cash, a significant development for a country with a longstanding fondness for physical money changes to consumer behavior will be gradual. Deutsche Bundesbank does not consider the “Bitcoin hype” as competition for traditional cash or bank deposits for the foreseeable future.

United Kingdom:

The rapid evolution of crypto-assets may one day make them a threat to the financial system. Cryptocurrency is a part of a potential “revolution” in finance.

France:

Bitcoin was a “purely speculative asset” and the G-20 countries need to study the issue. Bitcoin is not a currency, or even a crypto-currency.

India:

The government does not consider cryptocurrencies as legal tender and will take all measures to eliminate their use in financing. India’s central bank is opposed to cryptocurrencies given that they can be a channel for money laundering and terrorist financing.

Singapore:

The authority will “never say never” on cryptocurrencies becoming money. Monetary Authority of Singapore has experimented with digital Singapore dollars on the Blockchain and is collaborating with the Bank of Canada on a cross-border solution using tokens issued by central banks.

Brazil:

Cryptocurrencies do not offer stability and while they aren’t a systematic risk they need to be monitored. The Banco Central do Brasil sees “no immediate risk for the Brazilian financial system” from cryptocurrencies, but remains alert to the developments in their usage.

Canada:

Countries need to come up with consistent definitions to avoid any cross-border regulatory arbitrage. Bank of Canada staff are also exploring the circumstances under which it might be appropriate for the bank to issue its own digital currency for retail transactions.

South Korea:

Authorities in South Korea have focused on protecting consumers and preventing cryptocurrencies from being used as a tool of crime. Cryptocurrencies are far from becoming legal tender, and as such regulations

to protect consumers and prevent illegal trading are necessary. A task force within the Bank of Korea has been conducting studies on cryptocurrencies.

Australia:

Australia's central bank chief criticized cryptocurrencies: the asset is more likely to appeal to criminals than consumers. The bank is not planning to issue its own digital currency as a case has not been made to do so.

Turkey:

Digital currencies may contribute to financial stability if designed well. But they do pose new risks to central banks, including to their control of money supply and price stability, and the transmission of monetary policy. Cryptocurrencies may be an important element for a cashless economy, and the technologies used can help speed up and make payment systems more efficient.

Netherlands:

The Dutch have been among the most daring when it comes to experimenting with digital currencies. In 2015 the central bank created its own cryptocurrency called DNBcoin for internal circulation only - to better understand how it works. The experiments confirmed the technology is "too slow" and underdeveloped currently to play a role in payment systems, but may have applications in the future.

Scandinavia:

Nordic authorities have been keen to explore the idea of digital cash. Sweden's Riksbank, the world's oldest central bank, is probing options including a digital register-based e-krona, with balances in central-database accounts. The bank says the introduction of an e-krona poses "no major obstacles" to monetary policy.

Riskbank authorities cautioning central banks offering digital currencies directly to consumers. One argument is that such direct access to central bank liquidity could lead commercial banks to crisis.

New Zealand:

Digital currencies, cryptocurrencies are real and serious proposition for the future. The central bank, once a pioneer on the global stage with its early introduction of inflation targeting, that it's considering future plans for currency issuance and how digital units may fit into those strategies.

Morocco:

Morocco has deemed that all transactions involving virtual currencies violate exchange regulations and are punishable by law. Cryptocurrencies

amount to a hidden payment system not backed by any institution and involve significant risks for their users [3].

Advantages of using bitcoin for international payments

For large, international transfers, sending Bitcoin can sometimes be cheaper than using fiat currency — if these sender and the recipient are both happy to hold Bitcoin. However, most cross-border transfers involve sending one fiat currency and receiving another [4].

Bitcoin's value proposition is not in making the small consumer purchases, but in making large and important payments, particularly across borders.

An interesting thought experiment is to imagine the shape of a global economic system built around settlement in Bitcoin. Bitcoin's current capacity is to verify around 350,000 transactions per day. This number of transactions can allow a global network of 850 banks to each have one daily transaction with every other bank on the network.

Bitcoin can support an international network of 850 central banks capable of performing daily final settlement with one another. Such a network would have two major advantages over the current network of central banks: First, the finality of settlement on bitcoin does not rely on any counter-party, and does not require any single bank to be the de facto arbiter, making it ideal for a network of global peers, rather than a global hegemonic centralized order. Second, the Bitcoin network is based on a form of money whose supply cannot be inflated by any single member bank, making it a more attractive store of value proposition than national currencies whose creation was precisely so their supply can be increased to finance governments [5].

Bitcoin transactions settle immediately. In this sense they are more like cash transactions than like credit card transactions. So in order to do apples-to-apples comparisons, we might want to examine other systems of final settlement. One such system is cash. Cash of course has some limitations, chief among them that it is not possible to send cash online without an intermediary [6].

The correspondent banking process can be made cheaper and faster using the type of peer-to-peer technology underlying bitcoin.

Bitcoin allows anyone to engage in their own cross-border banking by transferring funds to a seller that accepts bitcoin. This functionality is important because most international trade does not involve banks directly. Today, global suppliers typically provide their goods on credit and expect to be paid within 30 to 90 days.

It's safe to say that bitcoin and other decentralized ledger technologies will improve the efficiency of international bank payments. They will also enable companies and individuals to bypass the banking system altogether in making cross-border payments. In so doing, decentralized ledgers will likely improve cross-border payments and accelerate the already existing trend of buyers and sellers turning away from using banks in international trade [7].

- Financial assets face (in equilibrium) a tradeoff between expected return and volatility. In order for markets to be induced to hold a volatile asset, long-term expected returns must be higher. This means that over long time horizons, a relatively volatile asset (such as Bitcoin) may be a better store of value than assets deliberately designed to be non-volatile (such as fiat currency) [8].

The New York Stock Exchange, Intercontinental Exchange – and no doubt others - plan to offer exchange-traded funds based on bitcoin futures.

This creates the possibility that a few million dollars of actual bitcoin transactions, assembled in untested ways, will drive hundreds of millions of dollars of derivative settlement payments, which in turn could set the price for potentially tens of billions of dollars of ETFs.

According to the Bank for International Settlements, one option for central banks might be a currency available to the public, with only the central bank able to issue units that would be directly convertible with cash and reserves.

The Bank for International Settlements report highlighted that central banks could issue a digital-cash substitute that would allow transactions for goods and services to be anonymous, just as they are with traditional cash.

Disadvantages of using bitcoin for international settlements

As a decentralised network, Bitcoin is inherently less efficient than centralised networks. The peer-to-peer network requires computers around the world to simultaneously solve cryptographic calculations, requiring huge amounts of electricity. The electricity consumed per transaction is 244 KWh - enough to supply eight US households for a day. This is thousands of times the energy required to process transactions through traditional payment networks such as Visa.

Given that Bitcoin transactions are currently slow, expensive and cannot scale, the cryptocurrency can't possibly become a popular medium of exchange in its current form [9].

The future of the international financial settlements with bitcoin

The world's central banks can't sit back and ignore the growth in cryptocurrencies as it could pose a risk (replace) to the stability of the financial system, according to the Bank for International Settlements.

Institutions need to take into account of not only privacy issues and efficiency gains in payment systems, but also economic, financial and monetary policy repercussions [9].

Bitcoin has some extremely attractive qualities as a settlement medium – you can settle multi-million-dollar claims halfway around the world in minutes.

If Bitcoin has a future (still an “if”), that's where I see it most succeeding — as a global settlement mechanism. Banks in every country will be able to move value around the world at extremely low cost. There will be less need for correspondent banks. We will finally have a unified global financial system to which everyone will have access. Capital controls will become impossible, or nearly so [4].

Bitcoin can thus best be compared to settlement payments between central banks and large financial institutions, and it compares favorably to them, being infinitely cheaper and more verifiable. The only other form of money in history which is free of counter-party risk is gold, and moving that around is incomparably more expensive.

According to coindesk.com website, the cost of one bitcoin exceeded the cost of one ounce of gold. In January 2017 it happened for the first time. See Figure 5 [15].

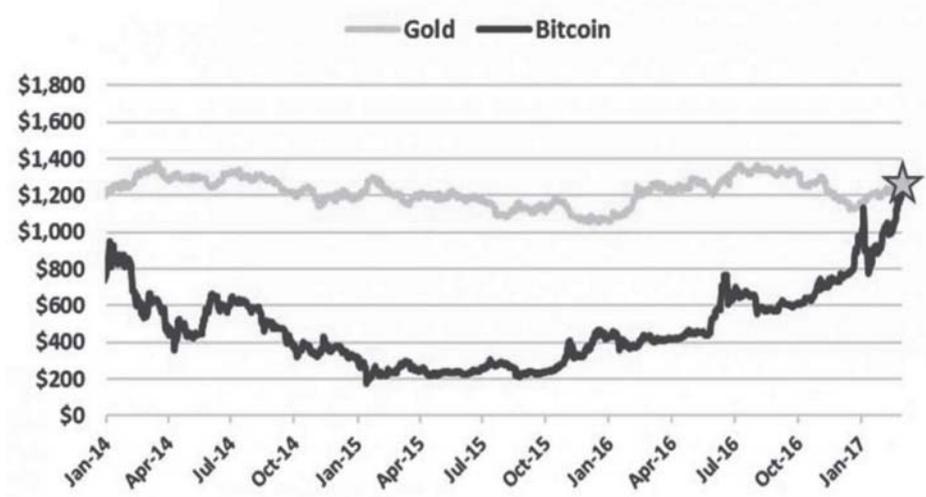


Figure 5. Historical price comparison

Source: [15]

In a world in which no government can create more bitcoin, these bitcoin central banks would compete freely with one another in offering physical and digital bitcoin-backed monetary instruments. Without a lender of last resort, fractional reserve banking becomes an extremely dangerous arrangement, and the only banks that will survive in the long-run would be sound money banks offering financial instruments 100% backed by bitcoin. They would settle payments between their own customers off of bitcoin's Blockchain, and then perform final daily settlement between each other over the Blockchain [5].

Monetary economics is highly contextual, and there are a lot of context-specific factors that continue to make bitcoin a compelling monetary idea, particularly as a medium of settlement

Bitcoin volatility is way down over the past several year. Why is this the case? To me it seems clear that the bitcoin ecosystem is growing over time. There are more and better bitcoin exchanges, wallets, and processors than there were in, say, 2011. The bitcoin derivatives market is still nascent, but it is more liquid than at any time in the past. As this financial infrastructure builds out, it is natural that bitcoin would become less volatile [8].

Bitcoin was supposed to be a faster, cheaper way to move money anywhere in the world — a superior alternative to stodgy payment providers like banks and PayPal.

Some Bitcoiners think that increasing demand to use the cryptocurrency for illegal transactions will support its price. I doubt it. The more that bitcoin is used to evade the law, the more aggressively that governments will respond. bitcoin isn't immune to regulation.

Governments are already starting to enforce know-your-customer regulations at bitcoin exchanges, the companies that allow people to swap cryptocurrency for widely-used currencies like the dollar, pound or euro. This means that the authorities can obtain the names of an exchange's customers and link them to specific bitcoin addresses.

If history is any guide, bitcoin will stagnate. In addition, bitcoin faces tough competition. Hundreds of rival cryptocurrencies have sprung into existence in recent years and many more are on their way. Any one of them could steal bitcoin's crown [5].

Bitcoin clearly fails in a couple of these areas (common and accessible, low cost of preservation, recognizability), but astoundingly exceeds in others (counterfeiting resistance, divisibility, transportability). Many of these failures at the moment will get much better over time. Technology always starts out

inaccessible and expensive to maintain and manage. Costs go down over time and the same will happen for bitcoin.

So, in summary bitcoin is very much a work in progress towards declaring itself a perfect money in modern economist's definition. It has a lot of potential to become more than simply a tool to break the law with, but it will take a lot of hard work both in technology and theory to demonstrate to the world that bitcoin is here to stay and able to take on traditional fiat money [6].

A new economical crisis, a new war or an environmental catastrophe with global impact are all realistic risks we need to consider. Using gold or other commodities is one way how to insure yourself against them. Using bitcoin and other cryptocurrencies is another, a more convenient and newer way. Historically, bitcoin has been uncorrelated with other asset classes, and should have extrademand in case of crisis [10].

Cryptocurrencies are currently gaining their fair share of the market, with Bitcoin still being the preferred currency. However, others, such as Ethereum, Ripple or Litecoin, are also finding their space in the market, each based on their own Blockchain version, with specific particularities.

We can expect that in the near future cryptocurrencies broaden their influence over a larger community, as they become a widely valid and accepted currency by both parts involved in any transaction. In any case, at this point it represents an opportunity not only for markets and consumers around the world, but also for developers.

Financial institutions are not yet fully prepared to integrate cryptocurrencies. Bitcoin saw the light of day less than ten years ago and it was not that long since it was recognized as a valid currency. It is understandable that the world of finance is trying to evolve and adapt as fast as possible.

We have solid reasons to believe that cryptocurrencies are here to stay and we have evidence that it's a mistake to overlook it. The journey just began, but currencies like bitcoin are already relevant and not just a mirage in a distant future [11].

Conclusions. According to the materials mentioned above, we can see that there are many countries which deal with the issue of a digital currency and conduct studies on it: United States of America, China, United Kingdom, Canada and Brazil. They suppose that cryptocurrency may be important for the future cashless economy, may help to increase the efficiency of payments between banks and large financial institutions.

Also, there are countries which have explored issuing their own digital money. The experiments were successful in Sweden, Norway and Netherlands. Central banks of these countries confirmed that the use of cryptocurrency “poses no major obstacles” to their monetary policy. Singapore and Canada have experimented with settling cross-border payments with digital Singapore dollars.

There are countries that are opposed to the idea of implementing cryptocurrency, but nonetheless, they continue to study the impact of cryptocurrency on the economy and the banking system.

After analyzing the above said, we conclude that the advantages of using a bitcoin for international payments are:

- large and important cross-border transactions can be cheaper with a bitcoin than through SWIFT and other popular payment systems;
- bitcoin transactions are settled immediately;
- a bitcoin has a capacity to verify 350 000 transactions a day like an international network of 850 banks;
- this decentralized technology will give an opportunity to bypass the banking system in making cross-border payments. The buyer and the seller can cooperate directly without an intermediary, which charges a significant fee for its service.

Among the disadvantages of a bitcoin as an instrument of international payments, it should be noted that transactions using this technology are very energy-intensive.

Taking into account the above-mentioned materials we conclude that a bitcoin can become a serious competitor to banks, payment systems such as SWIFT in the implementation of major cross-border payments. A bitcoin is even compared with gold because there is no risk for the counterparty in operations with it. But shipping gold to another country is a long and difficult transaction, while a bitcoin can be sent in a matter of minutes.

Today, on bitcoin exchanges and in companies where the cryptocurrency is traded, there are laws that allow the authorities of a given country to receive the names of buyers and sellers of bitcoins, which will help to reduce financing of illegal activities.

So, we conclude that a bitcoin is an outstanding digital technology which can fundamentally change the world banking system, payment settlements and the global economy. That’s why this issue is quite important and will remain relevant as it has a number of open questions for further research.

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