

T.C
ISTANBUL COMMERCE UNIVERSITY
GRADUATE SCHOOL OF FINANCE
INTERNATIONAL FINANCE PROGRAM

**THE EFFECT OF BITCOIN ON THE FINANCIAL
ECONOMY OF TURKEY**

MA Thesis

Tuğba BAHÇELİ
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Istanbul, 2018

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Advisor: Dr. Öğr. Üyesi Vahit Ferhan BENLİ

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Abstract

This study explores the Bitcoin's various effects on the financial market of Turkish economy. First of all, the thesis details the historical background of money, the financial and political atmosphere which led to the rise of crypto currencies. To do that, the study tells existence of barter system in the old days, and the rise of commodity monies. As the trade becomes complicated and cross-border, the barter system is displaced with bill of exchanges and lastly paper monies.

The study moves to tell the rise of bitcoin and its ledger system, known as the Blockchain. Detailing the Bitcoin system with its advantage and shortcomings, the study explores the possible effects of Bitcoin system on the financial system of Turkey.

It sums up the reality that the lower penetration of this particular cryptocurrency provides times to the country to make itself ready against such intrusion of these currencies.

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Abbreviations

BDDK	the Banking Regulation and Supervision Agency
CBRT	Central Bank of Turkish Republic
ECB	the European Central Bank
FED	the Federal Reserve
IMF	the International Monetary Fund
MHP	the Nationalist Movement Party
NSA	the National Security Agency
TUBITAK	the Scientific and Technological Research Council of Turkey
UK	the United Kingdom
USA	the United States of America
USD	the United States Dollar
VCS	Virtual Currencies Scheme

Introduction

Satoshi Nakamoto's short but effective paper in 2008 has a vision to revolutionize daily economic life from money to real estate management and financial transactions. Following the 2008 economic crisis, Nakamoto proposed an idea of money to be minted by people through computational power.

Users will update the public ledger so that they can record who has how many bitcoins in order to prevent double-spending. In the bitcoin network, the public ledger is known as the blockchain. Even though virtual currency was not novel, his design of blockchain and his solution to double-spending make the Bitcoin system unique. In the second half of 2017, as the value of bitcoin skyrocketed, bitcoins and block chain became a part of daily talks.

Even if Bitcoins do not constitute threat to the current financial structure right now, many experts point out that if more people began to use it for daily necessities, the Bitcoin has potential to disrupt the financial structure on how a person borrow money or settles a transactions. That's why governments rein in to take bitcoins under control while they stated their interests in the blockchain technology.

This paper carried out research into the possible implications of Bitcoin and Blockchain into Turkey's financial system. To do that, the paper firstly explored the invention of money and its historical background. Moving on, it explored how financial system has evolved and banks come into existence. Later, it detailed how Bitcoin was launch with historical background and its details including Blockchain and double-spending.

This paper also endeavored into different aspects of Bitcoin including operational, privacy and counterparty. After detailing local and international reactions, the paper explored what Bitcoin and blockchain may affect Turkey's financial structure.

FIRST SECTION: INVENTION OF MONEY

I. Invention Of Money

Money is one of mankind's earliest inventions. "Money, like other essential elements in civilization, is a far more institution than we were taught to believe."¹The close relation between money and invention is apparent since 'to coin' means 'to invent'. Also, it is related to humans as no other animals accept money as a medium exchange. So far, no one has seen any chimpanzee exchanging money with banana. Along with behaving as a medium of exchange, in economics, money acts as a store of value and as a unit of account.

Money can be divided to fractional amounts in contrast to physical objects; the money eased international trade and paved the way for institutions such as banking. For centuries, humans in different part of the world believed in different customs and gods and used different language to communicate; but regardless of their locations and beliefs, all of them believed in coins, gold and silver; that is money. States waged war with one another to take over the wealth of the other hand; or many killed one another to loot the other's money.

As it has been so central to human's daily life and states, philosophers have come up with theories on it and even prophets or religious leaders have sought to regulate it. One of the early philosophers, Aristotle, a Greek philosopher, pondered over the invention of money in his book, *Politics*. He claimed that money is invented to substitute the barter system in the face of complicated trade.

1.1 Functions of Money

As he wrote in *Politics*, "For the various necessities of life are not easily carried about, and hence men agreed to employ in their dealings with each other something which was

¹John Keynes, **A Treatise on Money**, Londra: Macmillan and Co. Limited, 1953, s.13.

intrinsically useful and easily applicable to the purposes of life, for example, iron, silver, and the like.

Of this the value was at first measured simply by size and weight, but in process of time they put a stamp upon it, to save the trouble of weighing and to mark the value.”²

According to Aristotle, it makes sense to narrate a story that if a farmer wants to buy a shoe in exchange of one kilogram of grain, that person should have convinced this shoemaker for such exchange. Although there had been some sort of common ground for these people to exchange these products with one another, it should have posed problems in time to exchange products with one another. If there were a third person involved in this trade, problems would pile up.

Without money, the barter economy had been in place, meaning that a person had to find a corresponding person who needs the former’s service to exchange the latter’s service. In the double coincidence of wants, the trade was obviously difficult to move forward. If a person thinks of cross-border trade or even global trade, she can imagine how troublesome it is to trade. In the early ages, gold, silver, even seashell are introduced to mitigate the problem of the barter economy.

As the money provides the easiness to make trade, in any economy, it has three functions: the medium of exchange, store of value, and the unit of account.

The Medium of Exchange: In any economy, people use money to buy and sell things. In the barter economy, you exchange your service. In economy with money, you value your service with a commodity money or fiat-money so that you can sell your service and buy other’s service. Since the society generally accepts this money as the medium of exchange, the society functions and the economy move forward. The time a person spends to exchange goods and services is lower with the money, and transaction costs are reduced, too.

The Store of Value: In the barter economy, a person may store chairs, stones or gold for future use, believing that when the time comes, she may use these values to get what she wants. Today, money performs this function.

² Aristotle, “Politics”, (Çevrimiçi) <http://classics.mit.edu/Aristotle/politics.1.one.html> (Erişim Tarihi, 28.05.2018).

When a doctor sells her service with money, she saves that money in her safe-deposit or bank account so that she can use that money to buy in the future. Money functions as the store of value. It is in a sense to bind the present with the future.

The Unit of Account: The money provides a standardized way to value goods and service while providing a solid foundation for states to receive tax and provide services to its citizens. Also, all values can be expressed in money. For example, in Turkey, the unit of account is Turkish lira.

In some cases, these functions do not perform as they are considered to be. For example, in the case of hyperinflation experienced in Venezuela or Germany following the World War I, money did not perform functions. Hyperinflation does not only mean that prices are getting out of control. People anticipate changes and act accordingly. It is a psychological change. In that scenario, money did not perform functions of the store of value and the unit of account although they remained the medium of exchange.

These people still accept their national currencies as the medium of exchange although these currencies do not perform the function of the store of value. This is because people do not store these currencies to buy goods and services in the future. Citizens may convert to another country's currency or gold in a bid not to lose the value of their labor. Also, citizens do not think in terms of their national currencies when it comes to value things in a standardized way. In this case, they may think in terms of another country's currency or commodity.

Apart from money, there are other values like stocks, land, houses, jewelry which provide better alternative in the case of the store of value. Still, people use the money as the medium of exchange, the store of value, and the unit of account. You can give it most people and they are willing to trade you valuable things for it.

Intrinsically, a paper lira is not worthier than its intrinsic value if we do not take into the consideration of the state's backing. In the old days at the United States of America, a person can see the explanation that one dollar is worthy of some silver. However, people can no longer see this explanation since governments do not print money with backing of valuable materials particularly after the World War II.

This relies on the fact that governments want to push the development, and gold sources were no longer there to back the development as much as states want. So, states dropped the gold standard; instead, the paper is valuable since a particular government backs it.

For example, John Keynes argued that money provides the perfect liquidity to people. They can use money with ease when they need goods and service. If they kept land, they have to sell the land first, probably with lower price in times of need, and then they can buy their needs. In the case of money, there are no transactions fee to buy and sell goods and service. Also, people store money in times of urgent needs. She or he may become sick and may need of money to meet his/her needs. Yet, in time of speculation or inflation, people may opt to hold valuable assets rather than money as the latter lose its value.

However, German philosopher Karl Marx understood the money from the social point of view, in line with his general understanding of economy. First of all, he perceived the money from the commodity backed money, not credit money. His conceptualization is developed as part of his critical analysis of capitalism, enshrined in the British society. Generally speaking, he envisioned a society without money as the money brought alienation with it.

This is because it provided a man with power to have goods and services which he cannot accomplish with his natural ability. “The extent of the power of money is the extent of my power. Money’s properties are my – the possessor’s – properties and essential powers,”³ Marx said.

As the money provided the exchange, the money relations developed; together with development on the exchange, the German philosopher argued that the exchange brought alienation to the producers, who manufacture the product in the first place. Besides, the money is neutral, according to him. It is a social tool, and it embodies and helps to have social relations.

Also, the money is not valuable because it is backed by government; instead, what makes the money valuable is the labor being spent on it.

³Karl Marx, “Economic and Philosophic Manuscripts of 1844,” (Çevrimiçi) <https://www.marxists.org/archive/marx/works/1844/manuscripts/power.htm> (Erişim Tarihi:28.05.2018)

1.2 Development of Money

1.2.1 Coin Money

Sumerians were first to attempt to tackle with the barter issue. Sumerians deployed a system of exchange in terms of barley. However, this system posed its problems.

How can one person carry so much barley to get a shoe if demand for a particular shoe rise up? Was everybody in favor of such system to carry out a trade relation?

Barley was one example of efforts to fix the barter problem with an introduction of medium of exchange. In addition to grains, people have used different things as money like seashells, wheat or even cigarette. Around BS 3000, shekel silvers were introduced to act as the medium of exchange. The Babylonian leader Hammurabi based his code on shekel silvers. Shekel is composed of two words: She, which means 'wheat,' and Kel, which was a measurement similar to a bushel. According to the Hammurabi code, the value of an eye of ordinary person was 20 shekel.

Hundred years later, in Anatolia, instead of gold or silver, Lydian issued coins to handle the exchange in an easier way. During the reign of King Alyattes, coins were minted in BS 640. Instead of being gold or silver, they were an alloy of the two called electrum. Lydian's coins have a determined weight and have mark on them to prove that they were issued by Lydian's leaders instead of being counterfeited. This coins could have been local in their being a medium of exchange; nevertheless during the Rome Empire, even Indians, thousands kilometers away from the empire's borders, were willingly to use this medium⁴. "If Romans were to use barley and wheat for tax collection or payment to their soldiers, think of how hard it would be to rule the Rome Empire,"⁵says Yuval Noah Harari in his book, "Sapiens."

For Ottoman sultans, money was more than a medium of exchange. It served as hallmark of being sultan. Whenever a new sultan ascends to the throne, he issued money with his special signature on it and made religious leaders to sermon on his behalf. II. Mehmed built a money printing house at Istanbul in 1467. After the collapse of the Ottoman Empire, the new republic began issuing money in 1924.

⁴ Yuval Noah Harari, **Sapiens: A Brief History of Humankind**, çev. Ertuğrul Genç, İstanbul: Kolektif, 2015 s: 188.

⁵ Harari, a.g.e, s:188.

1.2.2 Paper Money

Long before Ottomans or Europeans, the great civilization in the Far East made one of early innovations in money. A Chinese ruler introduced a paper money instead of being gold, silver or even seashells. Around 9th centuries, Chinese coiners were in need of bronze to produce coin and applied to the ruler to find solution. In response to this, Chinese senior leaders introduced paper money to overcome this problem. Chinese Song Dynasty issued the first generally accepted notes. This paper note pledged to exchange for some other object of value. The paper money had coexisted with coins. When the Chinese rulers understood the economic advantage of printing money, they began to produce their own money. Experts said that in the early 12th century, the amount of banknotes issued in a single year amounted to an annual rate of 26 million strings of cash coins.

Paper money was introduced to Europeans when Marco Polo, an Italian merchant and explorer, returned from his visit to China in 1295. He noted that Chinese people were using a paper money printed by the ruler. This paper money was signed and stamped with the royal seal to prevent counterfeits from being circulated. In his note, he said that: “All these pieces of paper are, issued with as much solemnity and authority as if they were of pure gold or silver . . . everybody takes them readily, for where so ever a person may go throughout the Great Kaan’s dominions he shall find these pieces of paper current, and shall be able to transact all sales and purchases of goods by means of them just as well as if they were coins of pure gold.”

What Europeans were not aware of that Chinese experienced inflation. Around 1020, Chinese authorities printed money to save off themselves from invaders from the north and to maintain their costly imports. “By about 1020 the total issue of notes had become so excessive, amounting in total to a nominal equivalent of 2,830,000 ounces of silver.”⁶

⁶ Glyn Davies, **A History of Money: From Ancient Times to the Present Day**, Cardiff: University of Wales Press, 2002, s:181.

Europeans began to mint paper money. “Bankers and goldsmiths (who needed a working supply of gold) began issuing paper promissory notes in exchange for deposits that were payable to anyone who had them in their possession.”⁷

What really changed the money system was the creation of the bill of exchange. They were letters telling a banker or an agent to make a payment in another country on the issuer’s behalf.

“Bank-Money in the shape of Bills of Exchange was not less useful and necessary in the ancient world than to-day for the purpose of settling transactions at a distance, owing to the cheapness of its cost of transmission as compared with the costs and risks of transporting Money-*Proper*.”⁸

For example, a person can go to France to buy shoes and pay this letter instead of carrying coins or paper money. This was risky as they could be stolen along the way and reduced the possibility of forgery since the paper money could be counterfeited.

In order to facilitate this exchange, a banker’s fee is incorporated into the exchange rate. “By arranging their affairs in this way, bankers were collectively acting as a central node between buyers and sellers and creating a mechanism for the creation and transmission of money.”⁹ Also, bankers created a system of trust. In different parts of the globe, a buyer and seller were not to need to know and trust each other to enter into transaction. They need to rely on only a bank to be able to sell and buy items.

This system also paved the way for an expansion of money supply and creation of loans. When Mrs. Ersoy deposits 1000 Turkish liras to a bank, this bank can loan this money to another people in need of some loans to expand their businesses. According to Niall Ferguson, in 2006, while the total amount of money in the world was 473 trillion dollars, the total value of coins and banknotes was less than 47 trillion dollars¹⁰. This shows the power of bank in expansion of money supply.

As this instance shows, a bank can lend money to another people so that these people can go out and make investments to earn money and create profit. For example,

⁷ David Orrell and Roman Chulpaty, **The Evolution of Money**, New York: Columbia University Press, 2016, s: 65.

⁸ Keynes, a.ge., s:15.

⁹ Orrell and Chulpaty, a.g.m. s: 65.

¹⁰ Niall Ferguson, **The Ascent of Money**, New York: The Penguin Press, 2008, s.4.

Christopher Columbus, an Italian navigator, completed his four voyages to the Atlantic Ocean to find a new route to India with loans. Despite his unawareness, he found a new continent, led the way for Europeans to colonize the American continent. Similarly, Johannes Gutenberg who invented the printing machine in Germany borrowed money from a local banker to finance his invention.

1.2.3 Banks

Above examples show that the real profit was on trading this special money rather than holding money and facilitating money exchange between buyers and sellers. All in all, banks turned into powerful organizations. However, it appeared that they have not been in direct competition to have power clout over political leaders. For example, Medici family in Italy founded the largest bank during the 15th century. Despite this, they remained as citizens rather than occupying a political seat until 16th century.

As private banks was holding the power over trade of this bills, the marriage between private and public came after the establishment of the Bank of England in 1694. This bank was created out of necessity to finance the rebuilding of the navy. British King William III needed £1.2 million to rule seas and oceans. The bank gave the government a permanent loan of gold in exchange of notes against this debt. The bank began to circulate papers, signed with the royal seal that in turned acted as money. As this successful marriage between the Royalty and the private sector was ongoing, the debate on whether there should or should not be a gold standard over the amount of paper money in circulation has begun. This debate was won by experts who believed in the gold standard as it would protect the currency from political interference and prevent inflation.

However, there were some believed in different standards like John Law. He advocated paper money to be linked to land as gold would not sustain the amount of money in circulation. He applied this system in America and began to take fruits out of this system. Despite that, some people advocated that paper money should be backed by states. People like Benjamin Franklin and Abraham Lincoln supported this idea.

These people perceived a direct link between money in circulation and economic growth. Thus, it was no surprise that President Lincoln signed into law the first Legal Tender Act, “which authorized United States notes as legal tender. These paper notes,

which soon became known as greenbacks, were not backed by gold or silver.”¹¹ This notion has been adopted by other countries. After the World War II, the U.S. dollar, instead of gold or silver, was set as a kind of reference currency.

With the collapse of gold standard for many economies around the world, they began issuing paper money, backed by the state itself rather than gold in reserves. Central banks were tasked with monitoring the supply of money in the economy to take possible inflation under the control. For example, in Turkey, the Central Bank is mandated with ensuring price stability and inflation, which goes hand-in-hand.

In recent years, with the invention of the internet, money, just like everything else, has become more and more virtual. In other words, they are numbers in one’s bank account. “Like words in the cloud, money exists as an abstract set of symbols that can be created or destroyed with the press of a keyboard button or the touch of a screen.”¹² According to Niall Ferguson, in 2006, while the total amount of money in the world was 473 trillion dollars, the total value of coins and banknotes was less than 47 trillion dollars¹³.

Money has become like oxygen that acts as a substance that surrounds us; despite being unseen, it is imperative for humans’ survival. Having said that, the shape and structure of finance, money, and wealth is being questioned like never before¹⁴. This trends seemed like accelerated particularly after the 2008 Financial Crisis, which was started in the USA after the mortgage crisis.

The crisis started as subprime mortgage bubble burst. Many considered this global crisis the worst since the Great Depression of the 1930s. After crisis in Russia and Asian countries, foreign capital began to flow in the United States that loosened the tight over loans with low interest rates.

This led banks and credit institutions to approve more and more mortgage loans to people with low incomes and questionable credit scores. However, this does not stop here.

¹¹Orrell and Chulpaty, a.g.e. s:130.

¹² Orrell and Chulpaty, a.g.e. s: 2.

¹³Ferguson, a.g.e. s:4.

¹⁴ Orrell and Chulpaty, a.g.e. s:5.

Some financial institutions began to bundle these mortgages and offered these as new financial instruments as mortgage-backed securities.

Together with that, the price of a typical American house has increased two folds between 1998 and 2006. Encouraged by this favorable climate, some people began to take a second mortgage on the top of their original mortgage as they see the climate. These mortgage-backed securities began to attract more and more demand from other institutions. In 2008, the price of a typical house fell by 20 percent, rendering people unable to pay their debts that led domino effects.

The effect of this development firstly felt in US bank institutions that crumbled under the pressure of this crisis. The Lehman Brother defaulted on 15 September 2008. Merrill Lynch was saved by the Bank of America. The United States government rushed to help the AIG with USD 182 million. Fannie Mae and Freddie Mac were taken under the government control.

Global effects of mortgage crisis felt worldwide. Three banks in Iceland collapsed, triggering nation-wide protests that also took down the government. The U.K started systematic injection into the economy to save it from collapse. Greece and Greek Cypriots faced economic hardship that saved by the European Union. Other states tightened their belts to save themselves from the economic turmoil.

SECOND SECTION: CRYPTOCURRENCY

II. Cryptocurrency Innovation

Bitcoin entered into this conflicting picture "exactly the right time."¹⁵ Economies around the world were crushing as a result of the mortgage crises in the USA in 2008 and the US government's behavior to rush into help companies, known as too big to fail, triggered social reactions, particularly the Occupy Movement.

The movement generally protested against social and economic inequalities and lack of real democracy. This crisis cools off many people from the financial system and raised question on even the concept of money itself. But, states want to guard its monopoly over money as it is so lucrative. It is convenient for states "to cover their budget deficits through the creation of new money."¹⁶ Against the state money, cyber currencies are considered as a right response to problems of the present economic structure.

Even before such attempts to introduce cyber money into the market, there were radically different approaches to the money, like issuing private monies. Some economists, such as Benjamin Klein and Nobellaureate Friedrich Hayek, presented this idea that monies are printed by private companies, rather than governments, as long as they are printed in free market.

"There is no justification in history for the existing position of a government monopoly of issuing money. It has never been proposed on the ground that government will give us better money than anybody else could,"¹⁷ Hayek said, advocating his privately issued monies' perception.

¹⁵ Orrell and Chulpaty, a.g.m. s:197.

¹⁶ Silas Barta and Robert P. Murphy, **Understanding Bitcoin**, (Çevrimiçi) <http://understandingbitcoin.us> (Erişim: 28.05.2018), s:6.

¹⁷ Hayek, F.A., **Good Money, Part II: Volume Six of the Collected Works of F.A. Hayek**, ed. Stephen Kresge, London: Routledge, 1999, s:236.

Nevertheless, his vision still was based on a single authority to rule all these transactions and relied on trust, simply removing a central authority with another one. Such organizations for whatever reasons can still violate some pledges of their own.

Cyber currencies are different from electronic money in a sense that the latter works like fiat monies in which transactions trigger a credit for one account and a corresponding debit to another. Above all, central banks still hold the power about the quantity of money in circulation.

However, cryptocurrency is a currency that has been based on cryptography to manage transactions and creation of new money units in a secure way. Unlike fiat currencies, this money is not backed by any central authorities, rather decentralized; it has not relied on trust, facilitated by third parties in today's world.

2.1 Prior to Bitcoin

While Bitcoin has been different in its attempt to address some fundamental problems like double spending and decentralization, it was not clearly the first effort to introduce virtual currency. There were at least 90 different attempts¹⁸ before Bitcoin to present consumers that they do not have to rely on cash or credit cards to carry out their transactions. Some of these attempts were on paper while some others were actual, running systems.

Some scholars have traced back this cryptographic idea to David Chaum in 1981. In fact, American computer scientist has presented the secure digital cash in his 1982 paper. Chaum said that the electronic payments system would have a huge impact on personal privacy. While this system allows other sides to access to wide-ranging information on a person's transactions, cash and coins lack security and control.

He proposed a new cryptography to prevent any third party to determine one's dealings while permitting a person to prove his/her payment. Also, this proposed system will be able to stop the usage of stolen media.

In his paper, he presented the idea of blind signature to increase personal privacy and show untraceable payment system. Chaum also introduced DigiCash, founded in 1989.

¹⁸Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, Steven Goldfeder, **Bitcoin and Cryptocurrency Technologies**, New Jersey: University of Princeton, 2016, s:3.

It was an early cash payment system, using the proposed blind signature. The company was unable to add more users into system, resulted in its bankruptcy in 1998.

Chaum blamed the lack of online commerce at that time, making it difficult to make people jump into e-cash wagon.

In 1998, Wei Dan laid the foundation for crypto money with his short essay¹⁹. His vision has been resonated in the Bitcoin's white paper, written by Satoshi Nakamoto. Dan proposed that every participant keeps separate database to see how much money each pseudonym has. Also, how much computational power you allocate for the system is directly related to how much money you receive.

Additionally, funds are exchanged by collective bookkeeping and authenticated with cryptographic hashes. These transactions are signed by private keys to initiate any transactions. These notions keep their central place in Bitcoin network.

2.2 Bitcoin

The collapse in economic system and ensuing loss of trust in financial institutions and the government with years-long effort to introduce virtual currency by civil activists paved the way for Bitcoin.

A week after the Lehman Brothers' default, Satoshi Nakamoto²⁰ sent email to his email groups to let every member that he created a cryptocurrency and named it as Bitcoin. The link directed people to a white paper that detailed his vision on cryptocurrency with methodology and terminology.

In 2009, he shared a post to detail his vision.

“The root problem with conventional currency is all the trust that's required to make it work. The central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust. Banks must be trusted to hold our money and

¹⁹ Wei Dai, **B-Money**, (Çevrimiçi) <http://www.weidai.com/bmoney.txt>, (Erişim Tarihi: 28.05.2018)

²⁰There have been various attempts to identify the real person behind this nickname. So far, it has been fruitless. Some claim there are more than one person using this nickname. But researches showed that it is one person. Gender of this personality is described as man since his nick name is a male name.

transfer it electronically, but they lend it out in waves of credit bubbles with barely a fraction in reserve.

We have to trust them with our privacy, trust them not to let identity thieves drain our accounts. Their massive overhead costs make micropayments impossible.”²¹

His paper, “Bitcoin: A peer-to-peer electronic cash system” presented the Bitcoin protocol, a peer-to-peer version of virtual cash that it not only takes the financial institutions from the picture all together but also brings the solution to the demise of current financial situation.

After the introduction of Bitcoin, it was started to use in 2009. Nakamoto was the first person to mine bitcoin, which is known as genesis block. In May 2010, developer Laszlo Hanyecz ordered two pizzas for 10,000 BTC²², which is recorded as the first transaction outside of the network.

Since its inception, it attracted great interest by tech enthusiasts and by some people, who were keen to hide their dealings at the online environment. Having said that, Bitcoin reached USD 1200 in December 2013 and steadily climbed to USD 20,000 in 2017. With the beginning of 2018, this rate fell down to around USD 8,000 but later bounced back.



FIGURE1 BITCOIN SYMBOLS AND LOGOS

(SOURCE: [HTTPS://EN.BITCOIN.IT/WIKI/PROMOTIONAL_GRAPHICS](https://en.bitcoin.it/wiki/Promotional_Graphics))

The symbol and logos of Bitcoin, which can be represented by the BTC abbreviation, are shown in Figure 3.1. Bitcoin can be divided up to 8 digits, so a bitcoin of

²¹ Satoshi Nakamoto, **Bitcoin open source implementation of P2P currency**, (Çevrimiçi) <http://p2pfoundation.ning.com/forum/topics/bitcoin-open-source> (Erişim Tarihi: 28.05.2018)

²² Stefan Kostarelis, “The first-ever Bitcoin transaction was used to buy two pizzas – today, it’s worth \$150 million”, (Çevrimiçi) <https://www.techly.com.au/2017/12/05/first-ever-bitcoin-transaction-used-buy-two-pizzas-today-worth-150-million> (Erişim Tarihi: 28.05.2018).

0,00000001 Bitcoin it is possible to process. The smallest one is called Satoshi. In other words, 100 million Satoshi is 1 BTC.

2.3 Terminology

In his paper, Nakamoto talked about miners, coins, and etc. in a bid to familiarize his audience with bitcoin network. However, it is useful to note that there are no actual miners that go out and dig a certain land, hoping that their efforts would yield some bitcoins. Similarly, there are no coins in the network. “When we encounter new technology, the language that we use to describe it often fails us.” (p4- Islamic finance).

In the network, miners are people that decided to allocate computational power to up-to-date the public ledger. Finding solutions to mathematical problem that was created by the network, these miners find a solution to the problem to pave the way for approval of transactions.

Anyone can become a miner as long as s/he wants to allocate computational power to the Bitcoin network. Bitcoins are released to the network once a miner finds solution. Bitcoins are data that kept at a person’s wallet in mobile phones or computers. There are no actual coins that any person can hold in his physical wallet.

In this framework, Nakamoto designed brand new currency to be minted by people.

“The root problem with conventional currency is all the trust that’s required to make it work,”²³ Satoshi said, adding that, “With e-currency based on cryptographic proof, without the need to trust a third party middleman, money can be secure and transactions effortless.”²⁴

Although Bitcoin does not depend on a novel idea, what this cryptocurrency did better from its predecessors is that the system required its participants to be online to receive rewards for their solutions while scaling back anonymity a little bit. “Bitcoin’s current success is due in large part to the vibrant supporting community who pushed the technology, got people using it, and got merchants to adopt it.”²⁵

²³ Nakamoto, a.g.m.

²⁴ Nakamoto, a.g.m.

²⁵ Narayanan, Bonneau, Felten, Miller, Goldfeder, a.g.e. s: 21.

2.4 Protocol

Bitcoin, in short, is a digital currency system and decentralized. Any person can download the software and create digital wallet to be a part of this system. The software creates an individual node for the user in the peer-to-peer network that can be logged in with standard internet connection. After these steps, the user can access the blockchain data structure in which s/he can see all transactions since first usage.

In the network, all users are equal. There is no hierarchy in which one user can dictate another user to act in a particular way. Users send bitcoins others with sharing transaction with the network. Thus, all users are informed about users' bitcoin balance with checking spent and unspent transactions of users.

In addition to this, peers have to approve transaction taking place on the network, which acts bulwark against the double-spending.

This system is designed by the founder to prevent any user from spending the same bitcoin more than once, which is, in short, the double spending problem.

If the network recognizes that a user tried to spend the same bitcoin in the second transaction, this attempt will not be approved by the peers since every transaction is worked out and approved by miners.

Through this approval process, miners that are in a race condition to find solutions in the network receive bitcoins as a result of solving the puzzle. In the first four years, miners are awarded with 50 Bitcoin when they find a solution. However, in every four years, this reward is halved. In 2017, the bitcoin reward for verifying transactions are halved to 12.5 new bitcoins and will continue to do so every four years.

Since 2009, the number of bitcoins mined has ballooned. That's the way the system was set up—easy to mine in the beginning, and harder as we approach that 21 millionth bitcoin. At the current rate of creation, the final bitcoin will be mined in the year 2140, leaving miners with no incentive other than claiming the transaction fee.

There will be no more than 21 million bitcoin in the circulation. In fact, since the protocol allows the blockchain to divide ownership down to eight decimal places, it is more proper to think that people will hold 2.1 quadrillion units of bitcoin currency.

Bitcoin has served approximately 62.5 million transactions between 109 million accounts. As of March 2015, the daily transaction volume was approximately 200,000 bitcoins—roughly \$50 million at market exchange rates—and the total market value of all bitcoins in circulation was \$3.5 billion²⁶.

The bitcoins that are presented cumulatively in Figure 3.2 can be seen.

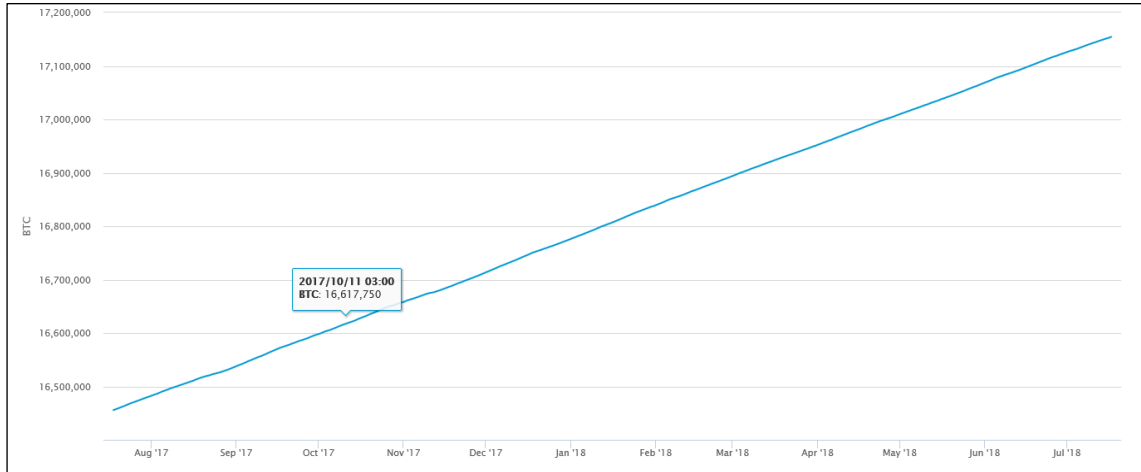


TABLE 1 BITCOINS IN CIRCULATION

(SOURCE: [HTTPS://WWW.BLOCKCHAIN.COM/TR/CHARTS/TOTAL-BITCOINS](https://www.blockchain.com/tr/charts/total-bitcoins))

Since its transaction fee is low, some researches claimed that this low fee cannot continue in the future. Because mining reward will decrease with time, miners need to get higher transaction fee in order to miners to operate.

Additionally, Bitcoin is open software and does not require users to register with their real names and even allows creating as many users as they like. Even the system itself would not know how much unique user has bitcoins in his/her pocket.

Moreover, if that user even does not want to be traced back in case of transactions with other users, s/he can use mixing pools to make it extremely difficult to trace these transactions back to that user.

²⁶Blockchaininfo. 2015. "Bitcoin Charts." (Çevrimiçi) <https://blockchain.info/charts/> (Erişim Tarihi: 20.02.2018).

2.5 Blockchain

Blockchain is the central innovation of Bitcoin system and the backbone of the whole system. Miners are rewarded with bitcoin to keep the blockchain up-to-date.

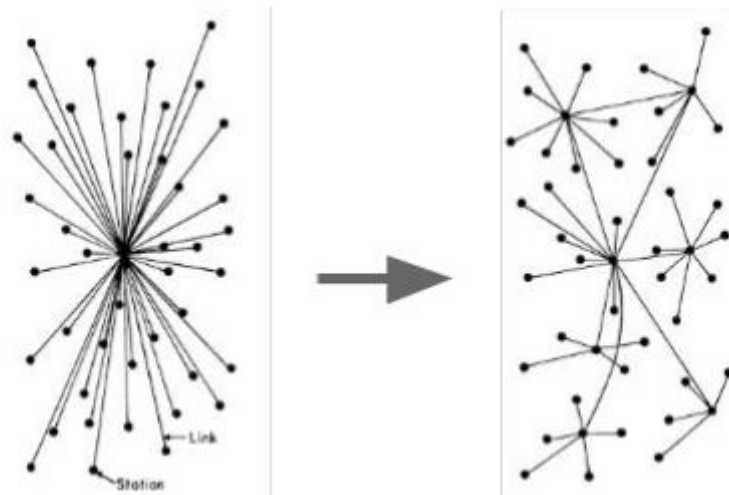


FIGURE 2: THE TRANSITION FROM CENTRALIZATION TO DECENTRALIZATION

(SOURCE: Paul BARAN, On Distributed Communication Networks-1964)

Satoshi's system is based on blockchain that acts as public ledger to keep all tracks of transactions.

Whenever a new user tries to install the software, the application downloads the entire transactions until the installation date. As of this writing, this data was around 153 GB. Every block is linked to each other with cryptographic algorithms, which is Elliptic Curve Cryptography.

These blocks cannot go reverse, meaning that once a block is approved, there is no way to change this block other than putting massive computational power to annul this particular block and ensuing blocks. Some claim that even the powerful computers in the hand of the National Security Agency (NSA) of the USA cannot reverse these blocks.

However, this operation carries a significant disadvantage. Once a user confirms a transaction, there is no way to reserve this. Let's assume that a user accidentally confirms a bitcoin to be delivered to another user. Following confirmation by the former user,

there is no way to get this bitcoin back if the latter user wholeheartedly returns this bitcoin.

Every block is unique in a sense that it is the result of blocks before it and contains a user's private keys along with public key, which validates any sort of transaction; thus the block is unique. Due to this reality, even critics of bitcoin, which roared particularly after bitcoin's surge, put a lot of importance on block chain innovation.

How does this block chain work? Let's suppose that Ahmet wants to buy a television from Elif with a bitcoin. First of all, two people should agree on this transaction.

Once they agree on this transaction - assuming that Ahmet has required bitcoins to complete this transaction - Ahmet make an announcement on the network that he will buy a television from Elif for two bitcoins.

Along with this announcement, Ahmet should sign this declaration with his private key to ensure that this declaration really comes from Ahmet. In Bitcoin network, Ahmet's wallet does not show that he has that much of bitcoin; rather it is filled with data proving that he has that much bitcoin that he claims to have.

Before processing Ahmet's message to the network, it has to be converted into a hash. If Ahmet makes an announcement to the system, "I will buy a television from Elif for two coins," the hash function of this message runs like this:

"613922472eddc6ce65415c6e4da3ebdbd1211d85321f99e76393e482a663ead". Any change to the original message completely changes this hash function.

Together with other transactions that took place within ten minutes right after the last confirmed block, these hashes are placed by the system into a block. That is to say, there are many transactions to verify. Let's assume that all these transactions are placed into boxes with a virtual padlock on them. Miners run software to find the key that will open that padlock. Once their computer finds it, the transactions are verified.

For finding that "needle in a haystack" key, the miner gets a reward of newly generated bitcoins. After the box is opened, miners began to verify transactions to earn the transaction fees. Once miners approve Ahmet's claim to have two bitcoins in order to purchase Elif's television, the transaction is completed.

When they find a solution, they broadcast this solution, including previous solutions. Another tour begins for user to find the key for another round of transactions. All blocks are added up like this. This process also ensures the total historical ordering on all blocks agreed by the entire network. A bitcoin transaction is not complete until it is added to the consensus.

In order for this consensus, other miners approve this solution as the right one. When this block is added to the consensus chain, this block is approved.

Sometimes, other miners come up with different answer, making it the previous attempt as invalid, practically voiding any reward claim. That's why Bitcoin transaction final only after six confirmations, to assure that it is truly recorded in a permanent part of the block chain.

The current number of attempts it takes to find the correct key is around 1,789,546,951.05, according to Blockchain.info—a top site for the latest real-time bitcoin transactions. Despite that many attempts, the 12,5-bitcoin reward is given out about every 10 minutes.

From the economic perspective, the blockchain allows greater efficiency in dealing with transactions between two persons without any mediators. The blockchain automatically records the transaction and provides easiness to audit any transactions and operations. For example, in the case of real estate, using this technology “reduces the cost, increases speed of settlement and improve security.”²⁷

²⁷Bob Remeika, Arisa Amano, and David Sacks, “**the Regulated Token Standard**,” (Çevrimiçi) <https://harbor.com/rtokenwhitepaper.pdf> (Erişim Tarihi: 28.05.2018)

THIRD SECTION: ASPECTS OF BITCOIN

III. Aspects of Bitcoin

Although the Bitcoin offers alternative approach to fiat money, inflation, economic crisis, it is needless to emphasize on the fact that the Bitcoin also presents alternative risks. There is market, counterparty, transaction-operational, privacy, investment and legal risks.

3.1 Market Aspect

Bitcoin is introduced in 2008. Following three years, it remained largely to be known among its enthusiast followers. Following mid-2013, the network's user base has increased which in turn affected the market price of bitcoin while increasing its fluctuation vis-à-vis fiat money. This reality has presented itself during the last half of 2017 as Bitcoin's market value has jumped to USD 20,000.

Although many ordinary people have come to know the existence of crypto currencies, this also caused financial-loss for some people because of the fluctuation. This interest presented market risk for Bitcoin as such fluctuations pointed poor market environment for the crypto currency.

Additionally, the fluctuations of Bitcoin present a serious challenge to the network's claim to replace the fiat money. Many people still perceive the Bitcoin as a way of investment rather than using it as alternative to the fiat money. Discussions among possible users led to an understanding most people invest in Bitcoin for short term gains and look for a way out once they believe that they made the enough profit. In other words, Bitcoin is increasingly turning into an investment option rather than a medium of exchange, store of value and unit of account.

Nevertheless, some critics acknowledge the fact that Bitcoin is not yet a fiat money as USD, Euro or Turkish lira. However, these experts also pointed out that Bitcoin does

not have an established market for itself like USD or Euro; thus, transition to Bitcoin will take time and will be gradual. When more and more people accept Bitcoin for wage and use the crypto currency to pay their monthly bill or give their kids this money to buy toys, Bitcoin will replace the fiat money.

As the value of Bitcoin skyrocketed in the second half of 2017, many newspapers published news about companies accepting Bitcoin for transactions and on countries letting companies to install ATMs so that people can buy and sell bitcoins. Nonetheless, as the value of Bitcoin fluctuated, some companies decided not to accept the crypto currency, which damaged the claims of the Bitcoin to replace monies.

Instabilities in the value of Bitcoin fueled negative attitude of some people against crypto currencies as these people perceive the Bitcoin as a Ponzi scheme. This understanding is also evident in senior Turkish approach to the Bitcoin. They cautioned people against buying Bitcoin. The Deputy Prime Minister in charge of economy, drew similarities between the tulip mania and Bitcoin. The Minister of Economy, said that Bitcoin is “highly global Ponzi scheme, and it is highly likely that small savers can suffer.”²⁸

Against such allegations, Bitcoin enthusiasts are resort to the idea that golds and monies create bubbles to attract investors or people to use it as a store of value. Yet, instabilities in the value of Bitcoin cannot be experienced in the value of gold unless there is economic crisis like 2008.

3.2 Counterparty Aspect

Bitcoin users can store their currencies in their digital wallets. Alternatively, they can leave their crypto currencies at the exchange, which let users to take immediate actions about their monies.

However, this fact presents a risk for users and exchange because these exchanges can close down their businesses without reimbursing their users and can be shut down by governments or can face cyber-attacks.

²⁸ Diken, **Bakana göre Bitcoin ‘global saadet zinciri’: Bir anlamının olmadığını düşünüyorum**, (Çevrimiçi) <http://www.diken.com.tr/bakana-gore-bitcoin-global-saadet-zinciri-bir-anlamının-olmadigini-dusunuyorum> (Erişim Tarihi: 28.05.2018)

According to one study²⁹, forty-five percent of the Bitcoin currency exchanges eventually terminated their operations while forty-six of these exchanges failed to pay back the money to their customers.

While high-volume exchanges are most likely to close down their operations due to security problems, low-volume exchanges are most likely to close down their dealings without any explanation at all.

Some exchanges became victims of cyber-attacks although the Bitcoin is claimed to facilitate secure way for payments. Yet, as in the other cases, people present weakest links in this secure environment since they can use weak passwords, fail victims to cyber-attacks, etc. In the early days of Bitcoin, Mt. Gox, a Japan-based exchange that handled over seventy percent of all bitcoin transactions worldwide, failed victim to such cyber-attacks.

As a result of this cyber-attack, Mt. Gox stopped transactions, closed down its website and exchange service. Later, it filed for bankruptcy protection from creditors in February 2014. Japanese company revealed that close to 850,000 bitcoins were missing and likely stolen, an amount valued at more than USD 450 million at the time.

A bigger theft is carried out at the beginning of 2018. Tokyo-based Coincheck announced that hackers stolen USD 523 million worth of a lesser-known cryptocurrency as bitcoins were not affected from this attack. Yet, it showed the vulnerabilities of the currency exchange. After the announcement, the company suspended deposits and withdrawals. The company and the Japanese government launched investigations into this attack. However, the Coincheck revealed it would compensate the loss although it failed to retrieve the stolen money.

Unlike Coincheck, a South-Korean company is closed down after it became victims to a second cyber-attack in a year. In April 2017, YouBit is hacked and lost 4,000 bitcoins, an amount valued at more than USD 73 million at the time. The South-Korean company

²⁹Moore, Tyler, and Nicolas Christin. 2013. "Beware the Middleman: Empirical Analysis of Bitcoin-Exchange Risk." In *Financial Cryptography and Data Security*, vol. 7859 of *Lecture Notes in Computer Science*, pp. 25-33. Springer

was hacked in December 2017 and lost seventeen percent of the assets on its platform. Eventually, it filed for bankruptcy and announced that it would shut down.

Despite these cases, Bitcoin supporters asserted that such currency exchanges are not integral part of the crypto currency system. They believe the system is aimed to prevent from ill-minded people to counterfeit the Bitcoin while it is up to people and users to protect their crypto currencies.

3.3 Transaction-Operational Aspect

Given the decentralized nature of the Bitcoin system, users are vulnerable to transactional risks. There is no central body in the network to correct wrong payments or to punish wrong-doers. It is between a payer and payee to handle any transactions while miners are there only to validate this transaction. If the one party fails to honor its promise, the network cannot step in to punish this wrong-doer. A payee and payer can correct any wrong transactions.

Additionally, the system is designed in a way to prevent double-spending, which means a user can spend the same bitcoin for the second time. Although it is the central innovation of the Bitcoin network to prevent this, some researchers showed that it is possible to spend the same coin twice before the miners step in to validate the transactions.

Besides, the Bitcoin founder, Satoshi Nakamoto, crafted a system relying on computational power. That is, validation process is based on this power as the founder believed good-mannered nodes would secure their upper-hand in the system, leaving aside ill-mannered nodes in the dark. However, it is possible for some people with enough computational powers to reverse the block chain in a way to invalidate transactions to that date. There is no way for such people with enough resource to follow such course.

On the side of operational risks, the system may face with the denial-of-service attacks.

Such attacks are carried out to slow down and to render any system unusable as a result of attacking any target with messages and requests. In a likely scenario, any mining pool can be attacked so that they would not solve the current puzzle in time to claim a reward, which in turn weakens the trust in this mining pool and eventually in the

Bitcoin system. As it becomes easier to facilitate such attacks for hackers to direct their powers to a single target, Bitcoin may fall easily to these attacks. These hackers may demand ransom to leave the target alone.

3.4 Privacy Aspect

According to the design, users remain anonymous in the Bitcoin systems. No one really knows how much a user has bitcoins. Even miners are left in the dark about this. On the top of that, users can use pseudo names to further protect themselves from attacks and ill-mannered users. Moreover, they can collect their currencies through mix pools to make even more difficult to follow the flow of the currency.

Nevertheless, as there has been weakness in almost every system, during transactions or in the currency exchanges, users have to reveal themselves who they really are. For example, a Turkish bitcoin exchange force users to upload their national identities under the pretext of protecting users while creating a possibility to know how much that user has in his/her pocket.

3.5 Investment Aspect

Some critics argue that there is no incentive for bitcoin owners to invest as it proved to be more lucrative to hold bitcoins as they are. In a world where bitcoin is the fiat money that is supposed to provide long term financial stability, it does not make sense to make investments. Additionally, as there would be no central authority to keep the economy engine going on, it may be difficult to convince bitcoin owners to put their monies in a particular project.

Let's suppose people need a park to spend some leisure times. Since the government would not issue money for such parks, it will be mainly money-holders to finance their projects. However, there would not be a reason for people to finance such projects since they would not gain at the end of this project.

Or, in a time of war, the government would find it increasingly difficult put an army before an enemy since, again, the owners would not see any profit in such wars giving the fact that there are more and more people that are against wars.

Nevertheless, some believe that economy will go on since bitcoin owners still can make profit out of such investments because once 21 million bitcoins are distributed and the currency gains its stability, it will become clearer that bitcoin-owners cannot enjoy benefits over fluctuations. Thus, they have to make investment to earn money.

According to these supporters of the Bitcoin system, it is not possible to make money out of money; thus, people have to make investments to earn additional money that will create stable economy in the long run.

3.6 Legal Aspect

Since the Bitcoin system is not owned by a particular group or organization, it is faced with legal problems and crack-downs by governments. Initially, some governments allowed people to buy and sell Bitcoins. But later as its value became unstable overtime, they step in to prevent fluctuations from harming people and their economies.

For example, the Indian government allowed the Bitcoin currency exchanges to operate; however, December 2017, the authority launched investigation into nine currency exchanges to oversee their dealings. Likewise, Israeli government has been preparing to preclude companies using bitcoins from joining the stock-exchange. Venezuela government even accused bitcoin-owners with terrorism. Similarly, social media giants like Facebook and Twitter ban new crypto currencies to make advertisements on their platforms to protect users.

Some government may entirely outlaw Bitcoin to block citizens to use these coins, believing that these monies allow people to make illegal trade like whitewashing criminal monies, selling and buying drugs without making themselves known to authorities.

There are also works by few governments to issue their own crypto-currencies. For example, Venezuela government issued El Petro, a crypto currency. Japanese has been preparing to issue J-coin for 2020 Tokyo Olympics.

FOURTH SECTION: REACTIONS TO BITCOIN

IV. Reactions to Bitcoin

4.1 International Reactions

The views of the major regulators like World Bank, International Monetary Fund or Federal Reserve are consistent on Bitcoin. All these institutions share the idea that Bitcoin is not in a position to affect the financial stability while the blockchain may open a new era for a financial transaction, thereby working on the chain technology to implement it.

4.1.1 The European Central Bank

The European Central Bank (ECB) acts as a central bank for the Euro and manages the monetary policy of the Eurozone, consisting 19 members of the European Union. As it is the case of other central banks, ECB's main task is to maintain price stability in the Eurozone. It sets and implements monetary policies. It also issues Euro banknotes.

ECB monitors virtual currencies schemes (VCS) that include Bitcoin. In 2012, the bank said in its report that VCS “does not pose a risk to price stability, provided that money creation continues to stay at a low level.”³⁰ Saying that VCS remains largely unpredictable, the bank emphasized that it cannot create risk to the financial stability.

Also, the bank said VCSs are not regulated. However, the ECB also cautioned governments that users of VCSs can represent challenge for public as these currencies can be used by criminals, fraudsters and money launderers. The bank also underlined that VCSs could have a negative impact on the central banks.

In 2014, the European Central Bank released another report on VCS. The bank reiterated its position, saying that “VCS can have positive aspects in terms of financial

³⁰ European Central Bank, **Virtual Currency Schemes – October 2012**, (Çevrimiçi) <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf> (Erişim Tarihi: 28.05.2018)

innovation and the provision of additional payment alternatives for consumers, it is clear that they also entail risks.”³¹

In February 2018, Mario Draghi, the President of ECB, said the bank will not take any step against Bitcoin as it is not their duty regulate Bitcoin. This revelation followed the head of the Bank for International Settlements Agustin Carstens’ statement on February 2018. He called on central banks to end the “Ponzi scheme” of cryptocurrencies, by restricting their access to banks and financial infrastructure.

4.1.2 The World Bank

A report, Ponzis: The Science and Mystique of a Class of Financial Frauds, written by a World Bank economist Kaushik Basu, drew similarities between a Ponzi scheme and Bitcoin. Although he underlined his position by saying that, “Contrary to a widely-held opinion, Bitcoin is not a deliberate Ponzi. And there is little to learn by treating it as such.”³²

However, he put emphasis on the reality that Bitcoin are open to the broad market speculations. “One can buy Bitcoin the way one can buy euros and trade freely with others having euros. Trouble started when people began speculating that the value of Bitcoin would rise, thereby raising the demand for Bitcoin and making the value-rise a self-fulfilling prophesy.”³³

In February 2018, World Bank Group President Jim Yong Kim labelled many cryptocurrencies as ‘Ponzi scheme.’ As recently as April, World Bank Group senior vice president Mahmoud Mohieldin cautioned banks against virtual currencies, adding that it is dangerous for the financial system.

4.1.3 International Monetary Fund

The International Monetary Fund released a staff discussion note on April 2014. Similar to the European Central Bank’s approach to VCS, the fund said these virtual currencies offer potential benefits but pose considerable risks. On the positive side, the report said that virtual currencies provide greater speed and efficiency in making payments and

³¹ European Central Bank, **Virtual currency schemes – a further analysis- February 2015**, (Çevrimiçi) <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemesen.pdf>, (Erişim Tarihi: 28.05.2018)

³²Kaushik Basu, **Ponzis The Science and Mystique of a Class of Financial Frauds**, World Bank Report, s:7.

³³Basu, s:7.

transfers; its innovation in distributed ledger offers “potential benefits that go far beyond VCs themselves.”³⁴

On the other hand, the note said that virtual currencies pose risks as opening ways for money laundering, terrorist financing, tax evasion and fraud. The note underlined that these currencies do not pose challenge to the financial system but may do as these currencies are widely accepted and used.

In her blog, Christine Lagarde, the head of IMF, called crypto-currencies as dangerous since they potentially provide vehicle for money laundering and the financing of terrorism. According to her, the financial stability is also under threat; thus, authorities and organizations need to develop framework to counter the challenge.

She also pointed out the positive side of these virtual currencies. They enable fast and inexpensive way of facilitation financial transactions while these currencies help developing economies to secure property rights, help increase market confidence and promote investment.

4.1.4 Federal Reserve

The Federal Reserve’s approach to bitcoin, in general VCS, is consistent with other regulatory bodies. Janet Yellen, the former US Federal Reserve chair, commented in December 2017 that Bitcoin remains highly speculative and it is not a stable source of value. Another senior people from the FED called on people not to invest in virtual currencies. Raphael Bostic, the head of the Atlanta branch of the Fed, said that virtual currencies are speculative, adding that people should not invest in these markets.

In 2016 dated report, which provides technical background and data analysis on Bitcoin, the FED said the transaction volume is low, putting it into dismissible position. Also, the report maintained that users do not use their bitcoins for to buy or sell goods and services. Additionally, the market does not have enough depth, and Bitcoin remains largely speculative asset as its value is volatile.

³⁴ IMF, Virtual Currencies and Beyond: Initial Considerations, Washington, 2016, s:5

4.2 Reactions In Turkey

4.2.1 Political Reactions

Amid bitcoin's meteoric rise in 2017, senior figures of the Turkish government including the finance minister took unwelcoming stance toward the cryptocurrency. Ministers said Bitcoin is like Ponzi scheme and warned citizens to stay away.

The deputy prime minister responsible in charge of economy, warned investors against putting money on bitcoin. "Bitcoin surpasses tulip mania, which was the biggest asset bubble in the history of finance," he said on Twitter, referring to the 17th-century Dutch craze for tulips. The deputy minister warned that Bitcoin's price can collapse. Tulip mania took hold of the Netherlands in the 1630s when prices of the flower bulbs rose sky high before collapsing in a spectacular fashion.

Similarly, the deputy chairman of the ruling AK Party, warned citizens against bitcoin. "People use fiat money with the state's backing. Without it, fiat money is a colored paper. We warned people against these. There is no a high authority if you run into problem," he said.

Besides, the ruling AK Party released a report on Bitcoin. According to press coverage, the report warned that virtual currencies open door for illegal activities, calling on the state to ban these virtual currencies. "When it is considered that the state is responsible for printing money and its supply, it goes against the idea of state that it cannot follow virtual currencies, taxation and its supply."

Turkey's top religious body also issued a statement on bitcoin. The Directorate of Religious Affairs released a fatwa, saying that Bitcoin is not under a central authority or under the guarantee of any state or financial institution.

"The purchase and selling of digital currencies is not appropriate according to religion at this point due to the fact that they are open to speculation in terms of value and they can easily be used mostly in illegal deeds such as money laundering," the body stated.

Unlike AK Party and the religious body, the opposition National Movement Party (MHP) took a positive approach towards bitcoin. The party's report, which was prepared by Deputy Chairman, called on the government to embrace virtual currencies.

It recommended the state to legalize the bitcoin and launch a bitcoin exchange in order to have a voice in this market.

Speaking to Al Monitor, the deputy chairman proposed an idea for national cryptocurrency. “We need to create the infrastructure for the blockchain database.”

Amid these reactions, Deputy Prime Minister told that Turkey formed a working group on blockchain. “Blockchain is a technology that will raise productivity and accelerate digitalization,” Deputy Prime Minister said. Turkey’s scientific council, TUBİTAK, said that it formed a lab on blockchain and cryptocurrency.

4.2.2 Banks’ Reactions

Murat Çetinkaya, the governor of Central Bank, welcomed virtual currencies. During a conference in Istanbul, he said that virtual currencies may contribute to the financial stability. “When they are designed well, they may contribute to the financial stability,”³⁵ he said. Later, he warned that there is no legal basis for virtual currencies.

“Since they are not electronic money, they are not subjected to Special Services and Electronic Money Law,”³⁶ he noted.

The emphasis on blockchain has been echoed by general manager of private banks³⁷. Hakan Binbaşgil, the CEO of Akbank, said that the bank has been working on blockchain technology, adding that smart contracts are an exciting development. However, he casted doubt on bitcoin, warning people that its value may drop to zero. Ümit Leblebici, General Manager of TEB Bank, said that the bank does not put emphasis on bitcoin; but the bank looks differently to blockchain technology, according to Leblebici.

³⁵ Sputnik, **Merkez Bankası Başkanı Çetinkaya: Dijital paralar istikrara katkı sağlayabilir**, 02.11.2017 (Çevrimiçi) <https://tr.sputniknews.com/ekonomi/201711021030854278-mb-cetinkaya-dijital-para-istikrar/>

³⁶ Sabah, **TCMB'den 'bitcoin' açıklaması**, 29.11.2017 (Çevrimiçi) <https://www.sabah.com.tr/ekonomi/2017/11/29/tcmbden-bitcoin-aciklamasi>

³⁷ Uzmancoin, **Türkiye'nin lider bankalarının CEO'ları Bitcoin hakkında ne düşünüyor?**, 2.12.2017, (Çevrimiçi) <https://uzmancoin.com/turkiye-bitcoin-banka/>

4.2.3 People's Reaction and Speculation via Bitcoin

As the price of Bitcoin rocketed particularly towards the end of 2017, bitcoin became a daily topic for ordinary people. A simple search on the internet can show that many people have asked how they could buy bitcoin. Moreover, some companies announced that they would accept Bitcoin for payments.

Because of wide coverage in the volatile of Bitcoin, some Turkish people were quick to utilize from this new trend. As the chart above shows that the price of Bitcoin increased to around USD20.000 around December 2017, a time in which even senior people were felt necessary to warn people against this new trend. Even the Religious Authority ruled a fatwa against Bitcoin. Nevertheless, some Turkish people did not hesitate to even withdraw from bank to invest into Bitcoin. During the first two quarters of 2018, the value of Bitcoin decreased substantially, leaving people in cold.

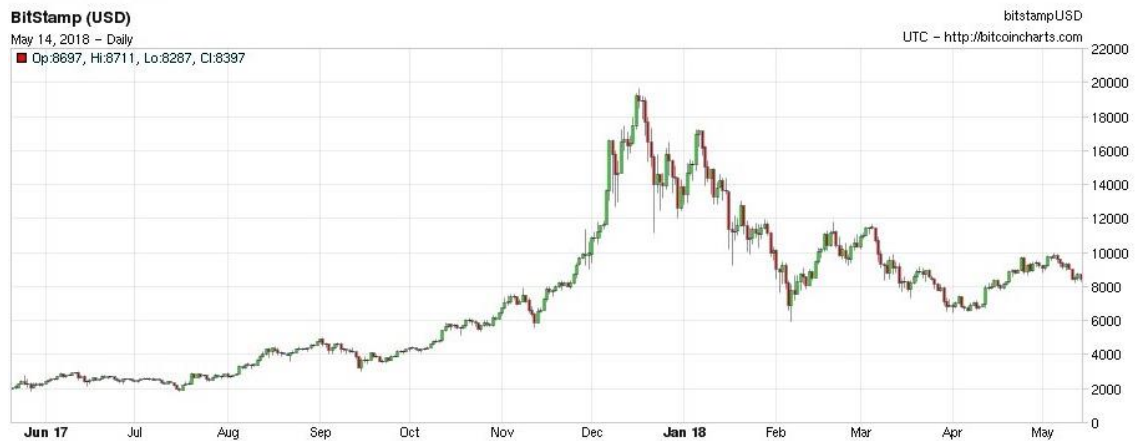


TABLE 2 BITCOIN SPECULATION

The number of Turkish businesses that accept bitcoin as a payment has increased 40 to 50. Ankara-based Miavita said they started accepting bitcoin in their sales. "We have not made sales yet, but there are interested parties. There is an interested consumer from Japan, and one from Turkey," Erdal Daldaban, the owner of the project management company, said. Daldaban said there is no risk in making sales with bitcoin, recalling that when he sold an apartment to a client in Australia, they had to wait three days to get the Australian dollar.

A local football team in Sakarya transferred a player and paid him with bitcoins. According to press reports, Harunustaspor paid 0.0524 bitcoins to Ömer Faruk Kırođlu to transfer him from Karasu Kùltürspor.

The ripple of bitcoin also felt in criminal sphere. Turkish police said that it detained five people that stole 450 Bitcoins (worthy of USD 2.83 million in November, 2017) from a business person in Istanbul.



FIFTH SECTION: THE IMPACT OF BLOCKCHAIN TECHNOLOGY

V. The Impact of Blockchain Technology on the Financial System

5.1 Financial Markets and Blockchain Technology

Blockchain is a technological breakthrough in the field of finance in the world and in Turkey in many areas. It has led to the start of the new venture. The chain allows you to use your money freely and safely without the need for a central approval authority. It offers advantages in the banking sector due to block chain, transparency, enhanceability, reduced infrastructure costs and increased transaction security. Thanks to the digital channels used in the finance and banking sectors, people can send money to their desired accounts or to other accounts in their own accounts or in other banks. By making use of our Digital Banking services, you can transfer money to international accounts via telephone, internet or branch. This process is costly. When the money is transferred abroad, this cost is increasing exponentially. However, in virtual money transfers, such money can be transferred quickly without expense.

Moreover, the use of virtual money is important when cash shortages are experienced. The most obvious example of this is Greece.

In the wake of the economic crisis in 2015, the use of virtual money called Bitcoin became widespread when cash was withdrawn in Greece, the cash in ATMs was exhausted, and the banks were closed. In Greece, PayPal, one of the top online payment systems, was also affected by the crisis, while Bitcoin, a financial instrument that exists only in the virtual environment, has been used with the increasing number of Bitcoin purchase orders from the country, without any official authority behind the people.³⁸

³⁸ Meltem KESKİN KÖYLÜ, Troya ÇAĞIL KÖYLÜ, "The Application Potential of the Block Chain Technology in Financial Markets", (The Journal of Academic Social Science Studies), 2017, s.368.

It is used in derivative works based on bitcoin. Derivative products are products that are determined according to the change of the underlying value over time, and the derivation is derived from the fact that another is brought about. Derivatives are used for investors who want to protect themselves from price increases in the markets or to generate profits from price changes that may occur.

The underlying assets of these products are foreign exchange (Turkish Lira, Euro, Dollar etc.), commodities (gold, silver, copper etc), stocks (BİST 30, 50, 100 indices, S & P 500 Index etc.) (TRY Libor, Euribor, etc.). In the course of financial global markets, it is being used as a derivative endowment as it moves towards becoming a competitor to the US dollar and the euro. The most common types of derivatives are; forward, future, swap and options. These operations are also performed based on Bitcoin.

In addition, LedgerX, a virtual money transaction operator, is also engaged in derivatives trading on Bitcoin. The opening of the Bitcoin stock market may also appear as a turn-around point in the history of Bitcoin development.

5.1.1 Blockchain Applications in the Banking Sector

The Great Polish Bank to Use Blockchain Technology: One of the largest banks operating in Poland is PKO Bank Polski, declared a public announcement in the past days that it was in a partnership agreement with Coinfirm, a blockchain company. The partnership between the two companies aims to develop a distributed notebook technology for storing and verifying banking files.

Established between two companies, each with a great reputation in their field, this agreement will earn Blockchain technology to the PKO banking system. Developed by Coinfirm, the platform Trudatum will allow users to access bank files securely. The said files include the arrangements made in the banking sector, the banking transactions, the various transaction fees and the information about the commissions, so that the safe environment provided by Trudatum is of great importance in the sector.³⁹

³⁹ Coin-Turk, Büyük Polonya Bankası Blockchain Teknolojisini Kullanacak, 31.03.2018, (Çevrimiçi) <https://coin-turk.com/buyuk-polonya-bankasi-blockchain-teknolojisini-kullanacak>

Costs can also be reduced by using a blockchain-based storage system for filing operations. Thanks to the Blockchain system, the need for costly physical files kept for about 9 million users is on the rise.

PKO Bank deputy general manager Adam Marciniak said the bank was beginning to test Trudatum last year. Following the successful test cycle, the two companies signed a partnership agreement and decided to continue working together on the project. The agreement is expected to lead the Polish banking sector on blockchain.

Blockchain Patent by Canadian Central Bank: Royal Bank of Canada (RBC), known as Canada's largest bank, received a patent on blockchain technology. The patent, which is registered by the US Patent and Trademark Office, includes a credit rating platform that works with blockchain technology.⁴⁰

According to the expressions in the patent document, traditional methods of calculating credit ratings have "non-transparent" qualities. According to these methods, customers are often not informed which data may affect their credit scores. In other words, there is no method or tool that allows customers to check their credit score.

With the distributed notebook technology defined in the patent, customers will be notified when "credit notes are checked by third parties or credit notes change in some way". For example, if an expired invoice affects customers' credit scores, users will receive a kind of credit note warrant.

The blockchain-based credit rating platform offered by the Canadian-based bank will bring convenience to both users and lenders. The platform makes all the data considered when identifying a user's credit rating easily accessible.

Bank of Thailand to Use Blockchain Technology: Thailand-based Ayudhya Bank (Krungsri), in partnership with technology giant IBM Cloud Garage, has launched a pilot application aimed at accelerating the blockchain technology-based contract management process.⁴¹

⁴⁰ Coin-Turk, Kanada Merkezli Bankadan Blockchain Patenti, 18.03.2018, (Çevrimiçi)
<https://coin-turk.com/kanada-merkezli-bankadan-blockchain-patenti>

⁴¹ Coin-Turk, Tayland Bankası Blockchain Teknolojisini Kullanacak, 08.11.2017, (Çevrimiçi)
<https://coin-turk.com/tayland-bankasi-blockchain-teknolojisini-kullanacak>

According to reports, pilot implementation, which plans to rationalize the bank's ability to execute related party transactions, has resulted in improved transparency and data security and accelerated transactions.

According to Voranuch Dejakaisaya, the information and operations officer of Ayudhya Bank (Krungsri), we can benefit from the potential benefits of blockchain technology in enhancing work efficiency and customer comfort.

BNP Paribas Builds Blockchain Based Fund Distribution Platform: A subsidiary of the world-famous French banking company BNP Paribas made a statement in the past days. According to the explanation, the company continues to make improvements on a blockchain-based fund distribution platform.

He works in partnership with AXA, investment manager of BNP Paribas Securities Services platform. The declared objective is to develop a more regular mechanism for fund sales in terms of introducing the platform to customers in full. Platforma Fund Link (Fon Linki) was given the name. Bank stated that they hoped to offer Fund Link to customers in a "near future".

The project is not the first blockchain work of BNP Paribas and its subsidiaries. A year ago, the subsidiary opened an innovation lab; one of the objectives of the laboratory was to test blockchain applications. BNP is also known to investigate the use of blockchain technology in areas such as international payments and bond issuance. The goal is to keep funding on a regular basis, to increase productivity and ultimately to reduce client costs.⁴²

5.1.2 Blockchain Technology Applications in Turkey

Blockchain technology is a treasure waiting to be discovered. Of course, they are not discovering this treasure; While Sony is using blockchain on the basis of its new education platform, Estonia is using blockchain technology to protect its health records.

While Microsoft developed a blockchain-based financial transaction infrastructure with Merrill Lynch, it began offering IBM blockchain as a direct commercial service. Spotify

⁴² Coin-Turk, BNP Paribas Blockchain Temelli Fon Dağıtım Platformu Kuruyor, 28.04.2017, (Çevrimiçi) <https://coin-turk.com/bnp-paribas-blockchain-temelli-fon-dagitim-platformu-kuruyor>

bought a blockchain-based Mediachain to solve license issues. In short, those who see it coming from the rain have already started to step in this area.

AkbankAkbank, one of the banks closely following innovations in financial technologies, announced in April 2017 that Ripple is included in the blockchain network and will use blockchain technology for international money transfer transactions. Akbank has taken the same steps with many foreign banks in this regard and has stated that its first works will be conducted through its subsidiary Akbank AG, which operates in Germany.⁴³

Akbank, one of Turkey's largest banks, is using blockchain due to its advantages. First, this technology is fast and flexible. It helps submit costs and exchange rates in advance, as well as reduces expenses of correspondent bank. The working schedule of 7/24 gives a great flexibility to the users. Tracking of payments is another strong point of the blockchain.

Interbank Card Center: The Interbank Card Center (BKM), established in 1990 with the cooperation of 13 public and private Turkish banks, closely monitors the innovations in financial services in our country. The institution that has taken the pioneering steps with Google Glass before in BKMLab has not passed the blockchain

BKM is experiencing blockchain technology with multiple venues and some technology partners. BKM, which makes blockchain-based experiments on digital identity, smart contracts and distributed ledgers, has also created a coded currency called 'partridge'. Experimental, this project has access to 200 special users and these users can transfer P2P partitions and get products from stores. The system is running closed circuit with Android and iOS applications.⁴⁴

Copyrobo: Copyrobo has been working on blockchain for about 3 years, producing evidence on the mobile environment and in many countries with the time stamps of electronic service providers.

⁴³ Webrazzi, Türkiye’de Blockchain Teknolojisi Üzerinde Çalışan Şirketler, 07.08.2017, (Çevrimiçi) <https://webrazzi.com/2017/08/07/turkiyede-blockchain-kullanan-sirketler/>

⁴⁴ Webrazzi, Türkiye’de Blockchain Teknolojisi Üzerinde Çalışan Şirketler, 07.08.2017, (Çevrimiçi) <https://webrazzi.com/2017/08/07/turkiyede-blockchain-kullanan-sirketler/>

Producing evidence using Bitcoin / Ethereum blockchain technology and Qualified Time Stamp, Copyrobo seeks to position itself as a 'global notary' based on the advantage of this technology. The Copyrobo team explains how they use Blockchain;

“We use the block chain to keep the secrecy of the works, especially in the field of copyright, for the deli. Thanks to Blockchain, we are able to prove the moment that the work was born and to whom it belongs, and also aim to sell, transfer and transfer the works through the block chain. We want to move the life cycle of all the works produced in the world to a single, accepted center, from this center to the birth, sale and division of the work.”⁴⁵

Global Miles: Offering an independent mileage program from banks and airline companies, Global Miles began using blockchain technology in November 2016, after completing the necessary integration efforts. The Global Miles team, which makes the virtual airline an entirely digital asset with an ethereal blockchain infrastructure, is also making the transfer transaction secure on this infrastructure.

The Global Miles team explains why they chose this method:

“The users' nation is managed by the central authority (airline companies, banks). When this central authority's servers or the company itself closes or sinks, the miller stands out as an asset. In other words, there is the authority of the author on the miller who is the acquired assets of the users, but there is no protection. Besides, the airlines' establishment, management and operation of these mileage programs are seriously expensive. For example; an international car rental company has to integrate with all its airlines, with their own systems, in order to make mileage agreements with dozens of airlines. This is a very expensive business in today's world. Globalmiles makes it possible for an operator, even a single point of sale, to integrate with this system thanks to the Globalmiles Blockchain infrastructure.”⁴⁶

T2 Software: Based in Ankara, T2 Software is a technology company that works in partnership with BKM. Two years before the project to develop Blockchain, the

⁴⁵ Webrazzi, Türkiye’de Blockchain Teknolojisi Üzerinde Çalışan Şirketler, 07.08.2017, (Çevrimiçi) <https://webrazzi.com/2017/08/07/turkiyede-blockchain-kullanan-sirketler/>

⁴⁶ Webrazzi, Türkiye’de Blockchain Teknolojisi Üzerinde Çalışan Şirketler, 07.08.2017, (Çevrimiçi) <https://webrazzi.com/2017/08/07/turkiyede-blockchain-kullanan-sirketler/>

company indirectly began to develop a P2P payment system that can work offline on mobile devices, sharing the same technological concepts as BlockChain. It is said that the actual blockchain technology, also called Private Ledger, was first used with BKM a year ago.

T2 Software CTO explains why they benefit from blockchain technology;

“A technology we prefer when there is no central authority and where stakeholder reconciliation is needed for the operations to be valid. In addition, many concepts in the blockchain can be preferred for log and data security without the need for concurrency.”⁴⁷

5.2 Implications of Bitcoin on Turkey’s Financial System

Bitcoin undoubtedly will impact Turkish financial system as it has been affecting daily lives of people and financial system of countries around the world. According to Statista, there are close to 1,500 Bitcoin ATMs around the world to facilitate buying and selling bitcoins. Even some countries ponder over the introduction of virtual currencies while countries like Venezuela already introduced a crypto-currency.

Fintech companies are looking way to help central banks and countries to introduce their own virtual currencies.

Above else, countries have keen interest in the block chain technologies to smooth transactions and enable developing and underdeveloped countries to include them into the financial system. However, the Bitcoin carries out less than USD 100 million worthy of transaction per day, “which is 1 percent or less of the (daily) USD16.5 billion and USD9.8 billion of transactions that were mediated by Visa and MasterCard respectively.”⁴⁸ In Turkey, penetrations of virtual currencies are even lower than the international level despite the recent interest.

However, the effect of cryptocurrency cannot be ignored in the middle and long run. If more and more people use this system, it will have effect on the financial system. The

⁴⁷ Webrazzi, Türkiye’de Blockchain Teknolojisi Üzerinde Çalışan Şirketler, 07.08.2017, (Çevrimiçi) <https://webrazzi.com/2017/08/07/turkiyede-blockchain-kullanan-sirketler/>

⁴⁸ Aaron Kumar ve Christie Smith, “Crypto-currencies – An introduction to not-so-funny moneys” **Reserve Bank of New Zealand Analytical Note Series**, 2017, (Çevrimiçi) <https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Analytical%20notes/2017/an2017-07.pdf>, s:21.

block chain technology even would have more effect on the financial system on countries including Turkey.

5.2.1 Central Bank of the Republic of Turkey

The Central Bank (CBRT) was founded in 1930 after the foundation of Turkish Republic with the contributions of Prof. Leon Morf from the University of Lausanne. This law assigned the bank with supporting the economic development of the new republic. Through time, the bank's duties and laws have been changed.

However, after the 2001 economic crisis, the Central Bank was tasked with the price stability.

When a person visits the Central Bank's webpage, that person will immediately perceive the line that the CBRT is responsible with the price stability. The Central Bank of Turkey also assumes the role of printing money.

Having such assignment, CBRT determines the monetary policy and the monetary policy instruments. In other words, CBRT is independent from the government's interference in these policies. Nevertheless, the law mandates CBRT to support growth and employment policies of the Government without sacrificing the objectives.

According to the 6493 numbered law on Payment and Securities Reconciliation Systems, Payment Services and Electronic Money Organizations, issued by the CBRT, any electronic money can be issued vis-à-vis fund and as an obligation to an issuer's liability. Because of this law, virtual currencies cannot be regarded as electronic money or money in Turkey.

The 6493 numbered law also brings the Banking Regulation and Supervision Agency into picture as it is mandated with electronic money institutions and payment services. On 25 November 2013, the agency made statement and warned people against such crypto currencies because of its shortcomings like instability in crypto currencies market, illegal activities.

Still, most experts acknowledge that Bitcoin is a possible threat to the central banks. The Bank for International Settlements noted that bitcoin has potential to interrupt the ability of central banks to exercise control on the economy while issuing money.

Agustin Carstens, the general manager of the Bank for International Settlements, warned central banks, saying that they must be ready to intervene in order to stem risks from these crypto currencies. He labeled Bitcoin as “combination of a bubble, a Ponzi scheme and an environmental disaster.”⁴⁹

In the Bitcoin system, users have ultimate responsibility to mint bitcoins. Bitcoins are produced primarily as a result of miners’ race to validate any transactions so that they would get the reward.

So, the bitcoin network itself issues bitcoins that are used as currency. Such reality of the system precludes any central bank from issuing money to use as an instrument to stabilize the economy and to support government’s policies to boost the economy.

“In order to stabilize economy, boost growth, control inflation, and maintain fiscal balances, the government agencies control money supply through several measures like liquidity, interest rate, and security deposits.”⁵⁰ The crypto currency has potential to make central banks redundant as central banks lose their privileges over money.

There is no central body in the Bitcoin network to replace central banks. In fact, it is the cornerstone of the network that does not have a central structure. Rather, it has decentralized system.

According to the Reserve Bank of Australia, if Bitcoin becomes more popular as a payment mechanism, it would affect central banks’ ability to influence economic activities, thereby impacting the macro stability. The bank emphasized on the fact that Bitcoin has a fixed supply scheme that cannot be adjusted to economic needs which would diminish the bank’s ability to deliver low and stable inflation. That means the bank cannot exercise control over price stability.

Reactions of the Central Bank of the Republic of Turkey remained largely silent over Bitcoins. Similar to the government’s reactions to the crypto currency, Murat Çetinkaya, the governor of the bank, warned people not to invest into these schemes as they lack legal framework.

⁴⁹ Market Watch, **BIS: Central banks must be ready to act on bitcoin**, (Çevrimiçi) <https://www.marketwatch.com/story/bis-central-banks-must-be-ready-to-act-on-bitcoin-2018-02-06-5485649>, (Erişim Tarihi: 28.05.2018).

⁵⁰ Barta and Murphy, a.g.e. s:262

Nevertheless, it is reported that a working group has been established among the Central Bank, the Banking Regulation and Supervision Agency, the Capital Market Board, and the Treasury to discuss the virtual currency schemes.

Around the world, many central banks are closely tracking virtual currency schemes, and some of these, like Canada and Ecuador, are looking into possibility to issue their own virtual currency units.

A possible explanation into silent stance in Turkey against Bitcoin would be that penetration of crypto currency remained low in the country. “One cannot see the investment level and researches made around the world on virtual currency units in Turkey.”⁵¹

5.2.2 Commercial Banks

Commercial banks came into being as a result of need for a trusted party due to the increase in the international trade. Also, they keep and update their ledgers so that ordinary people and business people can carry out their daily lives more easily and carry out their business with ease. However, throughout time, the financial system become more complex up to a point that audit and regulations are required to keep them under check.

The Bitcoin is considered to affect the banking system from bottom to top. This system acts as a central ledger and facilitates trust among parties to trade. It lends money to borrowers with a fee and interest while it transfers money from one location to another location with a fee. In fact, the financial system around the globe moves trillions of dollars a day and serves millions of people.

“But the system is rife with problems, adding cost through fees and delays, creating friction through redundant and onerous paperwork, and opening up opportunities for fraud and crime... It’s no small wonder that regulatory costs continue to climb and

⁵¹ Betül ÜZER, “Sanal para birimleri”, (Türkiye Cumhuriyet Merkez Bankası Ödeme Sistemleri Genel Müdürlüğü Uzman Yeterlilik Tezi), Ankara, 2017, s.135.

remain a top concern for bankers. This all adds cost, with consumers ultimately bearing the burden.”⁵²

In fact, Turkish customers mostly complained about banks.

Murat Şahin, the General Manager of the Customers Union, said in 2016 that they received complaints mostly about banks. “4.5 million complaints out of 5.5 million in 2014 and 2 million complaints out of 3 million in 2015... were about banks,”⁵³ Şahin said. He said customers mostly complained about commissions, interest rates or credit card fees and account maintenance fees.

It is no wonder why Turkish banks would resist the introduction of crypto currencies as they will be deprived of many fees that would help to continue their operations and would help to gain money out of money.

In Bitcoin system, the cross-border payments would become simpler and would be more widely adopted as there is no need for intermediaries. Virtual currency will make payments faster, easier and more secure. Through virtual currencies, transactions will be settled within minutes. “These ledgers do not balance instantly like the bitcoin network, which is clearing and settling every 10 minutes. The financial system does not work that way. It can take weeks to settle trades and transactions, creating a lot of counterparty risk.”⁵⁴

More importantly, the Bitcoin system would require no trust among parties to transact. First of all, there is a public ledger that let anybody to see how much currency the other party has and how this party has earned these currencies. Also, the computer node will handle the transaction.

Additionally, it is possible to issue smart contracts that one party can give command to transfer the money to the other party once the trade is settled and realized.

⁵²Alex Tapscott ve Don Tapscott, “How Blockchain Is Changing Finance”, **Harvard Business Review**, (Çevrimiçi) <https://hbr.org/2017/03/how-blockchain-is-changing-finance> (Erişim Tarihi: 28.05.2018)

⁵³ Memurlar.Net, **Tüketiciler en çok bankalardan şikâyetçi**, (Çevrimiçi) <https://www.memurlar.net/haber/582887/tuketiciler-en-cok-bankalardan-sikayetci.html> (Erişim Tarihi:28.05.2018)

⁵⁴ Charles G. Cascarilla, “Bitcoin, Blockchain, and the Future of the Financial Transactions”, 2015, Third Quarter, (Çevrimiçi) <https://www.cfapubs.org/doi/pdf/10.2469/cp.v32.n3.5,s.18>.

5.2.3 Real Estate

During the last decade, the real estate sector with big projects like airports, seaports and housing among others has become the growth engine for Turkey.

According to official data, the real estate sector is the reason for close to 8.4 percent of GDP in the last decade. Foreign direct investment stands at USD 10.8 billion, with real estate and construction garnering USD 4.2 billion (38.8 percent) of total FDI in 2017.

Just like other aspects of the financial world, the bitcoin and blockchain are expected to affect the real estate market as it would open ways for people in the developing and underdeveloped countries to secure loans, which in turn fuel growth.

“The technology holds great promise to revolutionize the industry of the good – from banks to stock exchange, insurance companies to accounting firms, brokerages, micro lenders, credit card networks, real estate agents, and everything in between.”⁵⁵

Thanks to the block chain technologies, settlement will take minutes rather than days, and everyone can see these settlements. The rights on good can be transacted even if they financial or hard assets. For example, there are attempts to create sidechains that can be differentiated whether they are digital or hard assets – a bond, a barrel of oil or gold.

The blockchain technology is considered to provide transparency, quality data and to make the real estate sector more efficient and quicker.

The technology will create radical transparency since the real estate sector lacks the clarity most of the time. The sector is not that transparent to provide the rate of commission, fees and other necessary information. Because of this vague environment, fees increase while costly disincentives are born.

Additionally, Blockchain/Bitcoin is thought to ensure quality data because some experts believe that the real estate sector only provides incomplete and incorrect data.

The quality data will pave the way for informed decisions in which sellers and buyers will not need a third party to overcome any mistrust between these people.

⁵⁵ Don Tapscott ve AlexTapscott, **Blockchain Revolution**, New York: Penguin Random House: 2016, s.19.

The technology will render the real estate sector more efficient. The transactions are time consuming since any transaction requires all data to be collected and valuations to be valid. If this technology can provide data integrity, there will no need to correct the data and the valuation to confirm any transaction.

Last but not least, the real estate sector will become much quicker if property titles can be transformed into blockchain. Following this transformation, public records and information will become easily and quickly reachable that will transform and speed up mortgage and title process. Implementation of blockchain technology will help to block any fraud attempt.

The implementation can also help buyers and sellers to settle any sale and transfer of fund one place to another easily. There will no need for third party to help the buyer and seller to create any guarantee between them. Undoubtedly, such innovation will decrease the property price.

In that sense, there are efforts to bring together real estate and block chain technology. Founded in 2013, the International Blockchain Real Estate Association (IBREA) is working to digitalize the real estate sector to facilitate above-mentioned benefits. Having more than four thousands verified members, the association has been seeking to get together a platform for property and title. This platform is aimed to be open, non-profit, and secure. This association is considered to provide a standard for real estate transaction using cryptocurrency.

The Swiss Real Coin aims to bring the real estate onto the block chain technology, which will provide permanent, non-corruptible and complete access to all information about the particular property. The system will have smart contracts to create market opportunities for the real estate industry.

There are also start-ups to implement the blockchain technology. For example, US-based Vista Abstract is a title company that accepts Bitcoin for real estate transaction. Ubitquity has been working to provide a secure recording and tracking property through the blockchain platform.

Even today, there are some cities that Bitcoin-owners can buy a house through their bitcoins. These are Miami, Dubai, New York, California, Bali and Ankara among

others. Sweden, for the first time, worked with a company to blockchain its title registry.

The Sweden National Land Survey agreed with Chromaway to transform its paper-based structure into blockchain. Sweden officials hoped to speed up sale of any property through the blockchain technology. In 2017, Sweden began to implement the blockchain technology in small scale.

Speaking to the Wall Street Journal, Jörgen Modin, chief solutions architect at ChromaWay, said that any transaction with blockchain can be settled “within hours”⁵⁶. Previously, such settlements can take months, according to the WSJ.

Similarly, Ukraine reached an agreement with Propy initiative in order to pave the way for buying real estate through the internet. Propy said that it would use the blockchain technology to follow any transaction. Through this system, Ukraine hoped to energize the real estate sector.

5.2.4 Islamic Banking

Commonly known as participation banks in Turkey, Islamic banking gained dynamism in recent years as public banks began to found Islamic banking in recent years. Public banks such as Ziraat and Halk have founded other sharia compliant banking providers. In fact, the law facilitating such financial houses to be opened was enacted in 1983. Initially, there were labelled as special finance house, but in 2005, they are called as participation banks. According to 2016 data, Turkey holds five percent of world market share of Islamic banking industry. In 2012, Turkey and Malaysia signed an agreement to boost the participation banks.

In the face of instability in the Bitcoin market, some people asked the opinion of the Directorate of Religious Affairs on whether trade of bitcoins is fine.

According to media reports, the religious authority ruled that the religious codes would not find it fine to trade bitcoins. However, some experts believe that bitcoins rather than fiat money are compatible with Islam and Islamic banking. These experts claim that one

⁵⁶ShefaliAnand, “A Pioneer in Real Estate Blockchain Emerges in Europe,” (Çevrimiçi)<https://www.wsj.com/articles/a-pioneer-in-real-estate-blockchain-emerges-in-europe-1520337601?mod=searchresults&page=1&pos=3> (Erişim Tarihi: 28.05.2018)

cannot earn bitcoins out of bitcoin that make the bitcoin network against interest system. Furthermore, in order to create bitcoins, one has to devote his/her time and money like buying new powerful computer.

Additionally, the whole idea behind bitcoin tries to find a way to earn money out of money that many believers find it unacceptable and think that the Prophet Mohammed banned.

“Fiat is born of riba and, by definition, not enough exists to repay the loans backing it; it necessarily must inflate without end. With Bitcoin, the quantity of XBT in circulation increases at a predictable and decelerating rate, and the ultimate cap on the quantity is hard-coded into the software at 21 million units.”⁵⁷

As both supporters of bitcoin and participation banks believe hard money is more valuable than fiat money, it may be seen that participation banks would lean towards to virtual currencies than fiat money.

5.2.5 Other Implications

Apart from the Bitcoin's effect on the overall banking system, there are other areas that Bitcoin can affect. Due to the anonymity nature of the Bitcoin system, it is easier to move illicit money around the world. In the first days of bitcoins, they are mostly used at the dark web to buy and sell drugs, weapons, hackers, etc. For instance, in 2013, US officials shut down Silk Road, a notorious dark web, in which users can exchange such illegal services through bitcoins.

Concerns over the use of bitcoins for illegal ends still remain an issue for today as there is no regulation over the Bitcoin network and bitcoins. Rouge states like North Korea resort to such crypto currencies to finance their economies under international transactions.

Likewise, as Turkey faced with multiple threats from terrorist organizations, these organizations can easily use these virtual monies to finance themselves.

⁵⁷Charles W. Evans, “Bitcoin in Islamic Banking and Finance,” **Journal of Islamic Banking and Finance**, Vol. 3, No. 1, (June 2015), s:8

Additionally, Turkey is considered as one of the illegal drug roads from Afghanistan to Europe. Illegal organizations may use virtual currencies to run their business without using traditional ways to exchange money in return for illegal drugs.

Bitcoin also affect taxation. State mostly finances their services through taxation. Without a clear understanding over taxing bitcoins, states may find themselves in difficult situations.

For example, if bitcoin holders refuse to back a possible war against an enemy, it will prove difficult to any country to manage this war. Before such catastrophic scenarios, it remains unclear for states to tax revenues out of bitcoin trade.

Obviously, especially during the second half of 2017, many people earned money due to volatile exchange. Despite this profit, it is not known whether states gained tax out of this wealthy. For example, the United States now bitcoin owners to register their losses and revenues with central organizations.

The crypto-currency can affect financial stability of Turkey if it is widely used. At this point, the volume of bitcoins cannot affect stability. Problems in currency exchanges like Mt.Gox and Coinbase did not pose threat to overall financial stability. Also, users do not use their bitcoins for daily use and store them at currency exchanges most of the time.

5.2.6 Bitcoin's Effect on Payment Systems

Because the payment system relies on years-old systems, which was established decades ago, that system is rife with inefficiencies. Each organization goes through its settlement and clearance system to check whether the payment is addressed to right person with the amount that the payee has. In cross-border systems, such payments are complicated even further due to the fact that every organization has to confirm the payment, delivers to another organization following having its own share.

In Bitcoin system, the cross-border payments would become simpler and would be more widely adopted as there is no need for intermediaries.

Virtual currency will make payments faster, easier and more secure. Through virtual currencies, transactions will be settled within minutes.

“These ledgers do not balance instantly like the bitcoin network, which is clearing and settling every 10 minutes. The financial system does not work that way. It can take weeks to settle trades and transactions, creating a lot of counterparty risk.”⁵⁸

Despite of this long settlement process and duration along with other risks rife in the financial system, the payment system is critically important for the stability of the financial structure. “Due to the critical role of payment systems in maintaining financial stability, the operation of payment systems, the oversight and regulation based on internationally recognized standards are among the fundamental duties of all central banks,”⁵⁹ said CBRT.

Smooth functioning of the payment system is vital as it has been taken into consideration that trillions of dollars travel daily in a system that is slow and loaded with many fees.

For example, according to Accenture’s report, which was released in 17 January 2017, blockchain technology system can reduce infrastructure costs for eight of the world’s ten largest investment banks by an average of 30 percent, “translating to \$8 billion to \$12 billion in annual cost savings for those banks.”⁶⁰

The Bitcoin’s effect on payment system will be observed in the following areas: speed, transparency, and savings. The system would require no trust among parties to transact that will speed any transactions.

In the Bitcoin system, once two sides agree on a particular system and announce this agreement on the system, it requires at most ten minutes to settle the transactions. Following this duration, it means that the settlement is carried out. While it has been carrying out, the system can share data with each organization involved in the transaction, which reduces or eliminates the need for reconciliation and confirmation of the transaction.

⁵⁸Charles G. Cascarilla, “Bitcoin, Blockchain, and the Future of the Financial Transactions”, 2015, Third Quarter, (Çevrimiçi) <https://www.cfapubs.org/doi/pdf/10.2469/cp.v32.n3.5,s.18>.

⁵⁹ CBRT, “Payment Systems,” (Çevrimiçi)

<http://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Core+Functions/Payment+Syst+ems> (Erişim tarihi: 28.05.2018)

⁶⁰ Accenture, “Blockchain Technology Could Reduce Investment Banks’ Infrastructure Costs by 30 Percent, According to Accenture Report,” (Çevrimiçi) <https://newsroom.accenture.com/news/blockchain-technology-could-reduce-investment-banks-infrastructure-costs-by-30-percent-according-to-accenture-report.htm> (Erişim tarihi: 28.05.2018)

The system is transparent as there is a public ledger that let anybody to see how much currency the other party has and how this party has earned these currencies. Also, the computer node will handle the transaction. The ledger is unforgeable since every entry is validated by the system, and once it is confirmed, the system cannot work backward. No computer can negate all chains to reserve any transaction. That's why it is not possible to delete a particular chain transaction to hide it.

Additionally, it is possible to issue smart contracts that one party can give command to transfer the money to the other party once the trade is settled and realized. These contracts are self-executing and stored on the blockchain. Because no one controls and is in charge of blockchain, anyone involved in the transaction can trust the validity of contracts, transactions, and amount. Thanks to the computer program, contracts are automatic and save a lot of money being spent on transaction to validate it.

Recently, Master Card announced that it will adopt the blockchain technology in an attempt to streamline payments, settlement, and clearance and provide lower fees to its customers.

5.2.7 Regulating Cryptocurrency in Turkey

As the cryptocurrency is a novel and recent phenomena in Turkey just as in the world, legal regulations about these currencies have not been established. Besides, there has not been clear understanding over these currencies; in other words, there has not been any clear approach whether a country will regard these currencies as money or Ponzi scheme or investment opportunity.

If Turkey is to regard these currencies as e-money, from the legal perspective, a value, which is stored or transferred, should be measured in terms of Turkey's currency or be indexed to the value of that currency in order to be considered e-money.

According to the Law No. 6493 on Payment and Securities Consolidation Systems, Payment Services and Electronic Money Organizations, published by the Central Bank, e-money can be exported through as a liability of an exporter and with respect to a fund. Because of this regulation, cryptocurrency cannot be regarded as e-money in Turkey.

However, generally speaking, cryptocurrency is likened money, particularly e-money, as these currencies provide easiness to make payments in a secure environment.

In Turkey, such electronic currencies fall under the responsibility of the Banking Regulation and Supervision Agency (BDDK), according to the aforementioned law.

In fact, the BDDK released in 2013, cautioning Turkish people against such currencies. The agency highlighted the fact that this system is decentralized and can be used for illegal purposes. Drawing attention to its volatility, the agency noted that digital wallets can be hacked and the payment is irreversible, meaning that there is no way to retrieve money once it has been spent.



CONCLUSION

Money transfer tool and digital payment system are defined in "Bitcoin 1.0". The creation of all financial and economic applications such as bonds, bills or loans in the near future is described as "Bitcoin 2.0". "Bitcoin 3.0" will be used in the future with Block-Chain in infrastructure such as health, culture, in all fields of science and art, creating applications that add value and facilitate life.

Even many financial institutions do not accept Bitcoin as a valid currency; in the future they will have to introduce Blockchain technology into their internal systems due to the range of advantages. With Bitcoin Version 2.0 and 3.0 and Block-Chain, applications will be more diverse, and digital data such as digital videos, copyrights, digital insurance, etc. will be transparently transmitted between the parties.

For now, in the Bitcoin system, Bitcoins can be bought, spent and stored. But in Bitcoin 2.0, interest can be borrowed or various rights in financial products can be purchased. In the field of electronic commerce, there is great potential for Block-Chain and Bitcoin. In the present case, many sensitive documents are given to the intermediary institutions to prove their identity, and the intermediary institutions keep these information on the central computers. In later versions of Bitcoin, it is thought that virtual ID cards can be created and the illegal use of sensitive information can be avoided.

Bitcoin technologies can also be used in regional or national democratic elections, referendums. The election or voting will be more transparent, and the identity will remain anonymous. The days when people will vote at home, at work or on mobile phones are not far away. In addition, such a reliable system can be used in title deed, notary public, stock exchange etc. Almost every process can be adapted to Block-Chain technology.

Bitcoin, which is the virtual crypto-money, is quite new to people and companies. The technologies it brings are quite promising and open to development. After Bitcoin, many subcodes have been developed, but at least for now, almost all of them are indexed to Bitcoin.

Banks, brokerage houses, authorities and governments may use Bitcoin in transaction costs. It will provide financial freedom for individuals. Despite of conventional means of payment like banknotes or digital money, Bitcoin is increasing day by day. The more common the system is, the more secure it will be.

Block-Chain technology, which is announced together with Bitcoin, is a technological solution that can be used as a reliable vehicle for all the services needed. Block-Chain is not indexed to Bitcoin's success.

Bitcoin and its technologies are increasingly used and widespread, while governments are in a positive state of affinity for Bitcoin.

Turkey, together with other countries, agrees that Bitcoin needs to be monitored. Taking into account all the risks of Bitcoin, a lot of new regulations need to be taken. Bitcoin Stock Exchange has to be established. This way Bitcoin will get more secure therefore popular in Turkey.

How is the block chain system widespread in Turkey? The system is getting more and more popular nowadays; however a lot of developments need to be carried out in order to integrate the technology into the internal systems. The most important start is to make legislative arrangements for this system. It is also vital to remember the fact that the block-chain technology does not have to coexist with bitcoin virtual money. Blockchain technology contains the capacity to make reforms in finance, as well as many other areas.

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