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AN OWERVIEW OF THE CRYPTOCURRENCIES; THE THEORY OF MONEY PERSPECTIVE

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Abstract

Before the invention of writing, which took place around 3200 B.C., commercial activities were carried out with small symbols named "Token", each representing different goods and services. It can be claim that the crypto tokens and crypto coins used today are digital and current versions of historical Tokens**.** As there is no regular transition from commodity money to fiat money, the transition from paper money to digital will not be outright just like a symmetrical line. Indeed, history is not a linear process. 2008 and 2009 were the years when both the global crisis happened where the trust in the traditional financial system was shaken and Bitcoin and its derivatives emerged as alternative de facto fiscal instruments. It is observed that crypto currencies still cannot fulfil the three basic functions of money. However, in the historical process, the definition and characteristics of money have changed and developed. Based on this thesis and the effect of smart contracts, the cryptocurrency community claims that cryptocurrencies are / will be more than money.

Key Words: Cryptocurrency, the theory of money, blockchain, bitcoin, money 4.0

PARA TEORİSİ IŞIĞINDA KRİPTO PARALARA DAİR GENEL BİR DEĞERLENDİRME

Özet

M.Ö. 3200 yıllarında gerçekleşen yazının icadından önce ticari faaliyetler; her biri farklı mal ve hizmeti temsil eden "Token" isimli küçük sembollerle yapılmaktaydı. Günümüzde kullanılan kripto tokenlerin ve kripto coinlerin aslında tarihi Token'lerin dijital ve güncel versiyonları olduğu söylenebilir. Tıpkı geçmişte mal-paradan itibari paraya düzenli bir geçişin görülmediği gibi, fiziki paradan dijitale geçiş de simetrik bir çizgi gibi doğrusal olmayacaktır. Nitekim tarih doğrusal bir süreç değildir. 2008 ve 2009 yılları; hem finansal kurumlara güvenin sarsıldığı bir küresel kriz dönemi hem de alternatif *de facto* mali araçlar olarak Bitcoin ve türevlerinin ortaya çıktığı bir zaman dilimidir. Kripto paraların günümüzde hala paranın üç temel işlevini tam olarak yerine getiremediği görülmektedir. Ancak paranın tanımı ve özellikleri tarih boyunca değişmiş ve gelişmiştir. Bu bağlamda ve akıllı sözleşmelerin de etkisiyle, kripto para topluluğunda sıklıkla "kripto paraların paradan fazlası olduğu / olacağı" iddiası dile getirilmektedir.

Anahtar Kelimeler: Kripto para, Para kuramı, Blokzincir, Bitcoin, Para 4.0

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Cilt/Volume:1, Sayı/Issue:2, Yıl/Year:2020, Sayfa/Page:147-165
ISSN: 2717-7890

Introduction

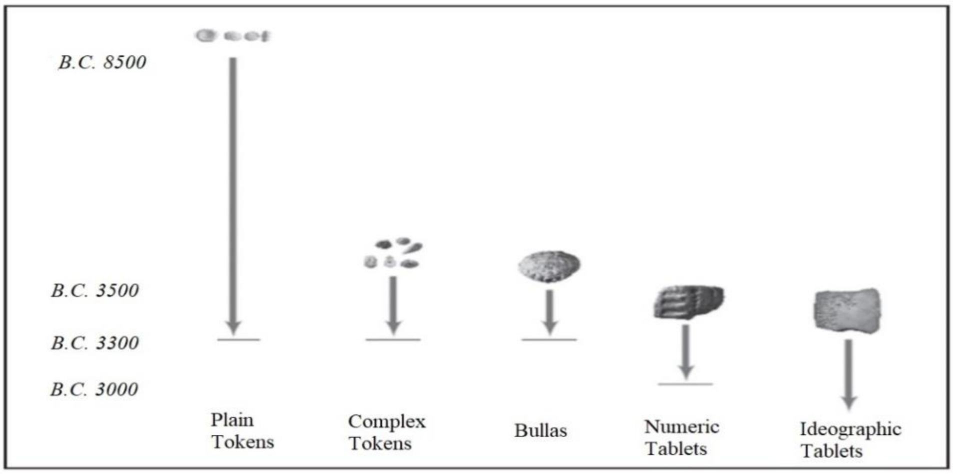
Money have existed and changed in different physical forms such as seashells, stones, leather, gold, silver, paper throughout history. The use of precious metals as money has decreased over time. Before the slips that replace gold and are kept in the jeweller, and then paper-like banknotes that can be converted into precious metals began to function as money (Ali, 2014). The gold standard system, which was known to be limited to the reserves of the government by connecting money to commodities such as gold and silver, and which was accepted by most governments after 1821, had a gradual collapse until 1970s. Although one of the causes of the collapse is the heavy cost of the 1st and 2nd World Wars, the main reason is that gold reserves around the world cannot keep up with global economic growth (Yermack, 2013). In 1944, with the Bretton Woods system, the price of 1 ounce of gold was set at $ 35, and it was accepted as the only currency that could turn into gold worldwide. After Bretton Woods, world economies mostly switched to paper money. The main factors in the process of change of money are the increase in production and technological developments. In the light of the Gresham's Law[2], the exchange of valuable assets such as gold and silver; We can say that it is towards more worthless assets as raw materials such as paper, credit cards or digital records.

[2] Gresham's Law: If there are two coins with the same market value but different quality; bad coin chases good coin. The irregularities experienced when different quality coins are put into circulation have been seen since ancient times. For example, during the first period of the gold coins, it is known that these coins disappeared as soon as they were put into circulation by those who received them in Iran. In the comedy named Frogs, Greek theatre writer Aristophanes wrote that the newly released (presumably low setting) silver coins removed the old ones from circulation. Copernic and Oresme wrote in their works that coins that are full of tuning and weight are used by the public to replace those with low quality. However, changes that occur with the introduction of payment instruments of the same value but different quality, registered in the name of Thomas Gresham at the economics science.

1. Change of Monetary Paradigms

While there is no need for money in the period experienced in hunter gatherer groups, it is argued that there are gift-exchanged exchanges in the following periods when communication between groups has increased. However, gift exchanges between countries have been viewed with suspicion since the Trojans accepted a tree-made horse as a gift and captured the Greeks (List, Matile, Richelot, & Colwell, 1856: 225). On the other hand, doubt is the only truth in science. As in all human relations, doubt is an essential phenomenon in economic life. Although honesty is often mentioned in commercial activities, it is often seen that one of the partners tends to deceive. This contrasting situation, known as "reflection", in psychology, is a humanitarian behaviour derivative observed even in international political and economic relations (Alpagu, 2018). Transaction by network stakeholders without obligation to trust each other is frequently mentioned as an added value of blockchain-based cryptocurrencies. According to Werbach (2019: 16), cryptocurrencies does not completely eliminate the need for trust in commercial activities, it reveals it in a new way.

Figure 1: Evolution of Historical Tokens



Source: Englund, 2011:35

Tokens have been the most effective impetus power in the invention of the writing from the 8000s BC to 3000s BC. It is known that commercial activities were carried out with Tokens during this period. It can be said that historical Tokens with a size of 1-2 square centimetres (Figure 1) and each representing different types of goods and services; They are the old versions of the crypto tokens and crypto coins we use today. As a matter of fact, cryptocurrencies which are over 5000 today, are eco-digital assets that represent different goods and services, just like their ancestors historical Tokens.

The common view is that the beginning of economic history is based on the ideas of Ancient Greece and Aristotle. But history is a research that lacks beginnings and whose content varies according to what it interprets. In this context, the idea that economic thought arises with humanity may be a reasonable assumption. Also, a long time before Ancient Greek it is known that there were enormous civilizations in Babylon, Egypt, and Ancient India in 3000 years. Thus, it is accepted that Babylon has an advanced legal and financial system, Egypt has a systematic economic model, and China has successful currency control and monetary systems by most historians.

It has been observed that the barter system has been insufficient in four aspects over time. Firstly, partners to change have difficulties in finding each other. Secondly, it is not possible to accumulate wealth. In addition, each good is heterogeneous and very priced. These and similar problems accelerated the search for payment systems (Çalışır & Şanver, 2018).

According to the inferences based on archaeological findings, it was first seen in Mesopotamia to use certain symbols to overcome the limitations of barter. In this system called "Shekel"; a list of gold, silver and grain was used as an option to barter. The fact that money became a material means of payment in the economy starts with the gold coins issued by the

Lydians in the 7th century BC. The Roman emperor Julius Caesar printed a picture of himself on the Roman coin and a political value was imposed on the money in 100 BC. Money gained a new meaning as a symbol of sovereignty after this action.

In medieval age, constant wars, insecurity of roads, towns of cities behind fortress walls, political instability slowed economic activity as to use of money has accelerated economic relations and trade has become easier. On the other hand, inflation, convertibility and trust problems have also emerged as money is itself a value tool in the economy. It can be claim that in Mercantilism, which was a common economic approach from the post-medieval period to the beginning of the industrial revolution, new ideas about money were put forward and the feature of being the store of value of money was dominant.

While Marx's socialist system emphasized labour rather than money, Say drew attention to the function of money as a medium of exchange. In the period when the classical economic trend which was pioneered by Adam Smith; it is seen that money is given priority when determining economic policies. In the classical approach, since fiscal instruments are essentially monetary policy instruments, monetary policies should be preferred before fiscal policies in case of economic instability.

In the gold standard period applied between 1890-1914; a fixed exchange rate system is observed, in which many countries stay their official currency under general acceptance. The rate of change in the values of official currencies is expected to occur at the same level as they depend on gold in the gold standard system.

After the I. World War, the macroeconomic approach based on Keynes' views was thought that the balance in the economy would shift in the desired direction by changing the total demand with monetary and fiscal

Cilt/Volume:1, Sayı/Issue:2, Yıl/Year:2020, Sayfa/Page:147-165
ISSN: 2717-7890

policies (Keynes, 1935:135-147). It can be said that fiscal policies were brought to the forefront more than most monetary policies under the influence of the Keynesian economics. Bretton Woods, the financial order in which fiat currencies were fixed to the dollar and the dollar to gold, was adopted with the agreements made after the II. World War. (Carney, 2009:16).

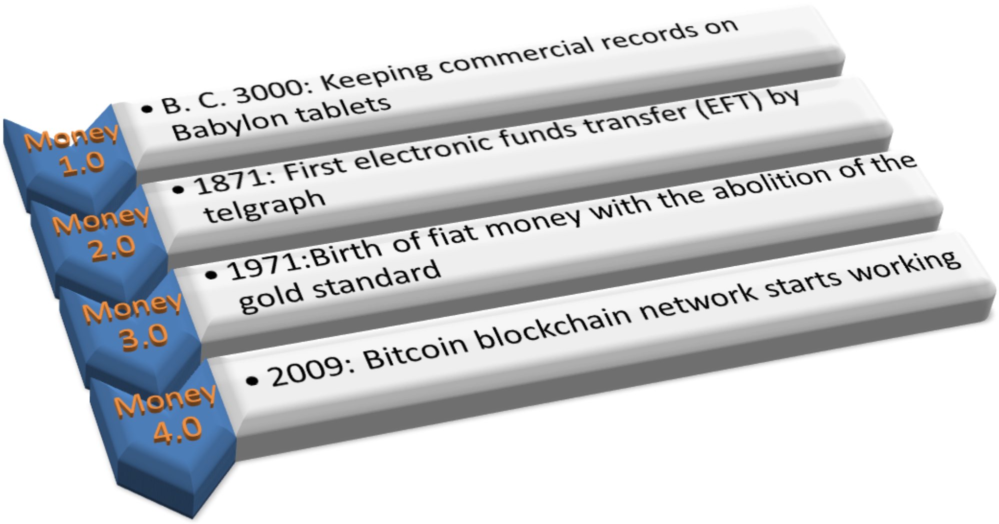
In the Monetarist doctrine, which is the popular economic trend after 1980; money is argued to be the most effective tool in a financial order. In the approach, almost every macroeconomic problem is a monetary phenomenon such as inflation.

Monetary standards can be classified as commodity money system[3], representative money system[4], paper money system[5], and bank money system[6] considering the historical development of money.

Nowadays, money is put on the market by central banks with issuing privilege. While the records belonging and movements were previously kept in a physical book, they are now kept digitally in bank accounts. The main reason is the financial markets are in a constant change and development with the effect of the advancement in information technologies. In today's economic system, since money is available in a digital form rather than cash or physical, it is referred to as bank money[7], and it is more demanded in this way. Unlike cryptocurrencies, which have not reached a legal status today, there are also some digital coins recognized by central authorities.

[3] Commodity money system: The commodity used as money also constitutes a value as a commodity. Gold and silver are the most popular coins in this system.
[4] Representative money system: It is the system where payment instruments, which can be converted into gold or silver, are used as money when requested.
[5] Paper money system: It is a monopolistic production system where money cannot turn into gold. Accordingly, the raw material of money is insignificant, the market value of money is important.
[6] Bank money system: While circulating money can only be produced by central banks, commercial banks are authorized to produce bank money.
[7] Bank money: Money produced by commercial banks that does not physically exist.

Figure 2: Some Milestones in Monetary History



Source: Authorial

It can be claim that along with the milestones in the 5000-year monetary history, 4 different periods are mentioned in which the paradigm changes (Figure 2). From the emergence of money in the "Money 1.0" period to the time until 1871; seeds, stones, metals, etc. it is seen that it is used as money. The first electronic fund transfer (EFT) was realized by the Western Union company in 1871 with the telegraph network. In 1971, when the US removed the gold equivalent of the dollar, the "Money 3.0" period was started, in which the fiat money emerged. Recently, in the literature, the idea of the beginning of the "Money 4.0" period has been expressed with the start of the transfer in the blockchain network of Bitcoin in 2009 (Birch, 2017).

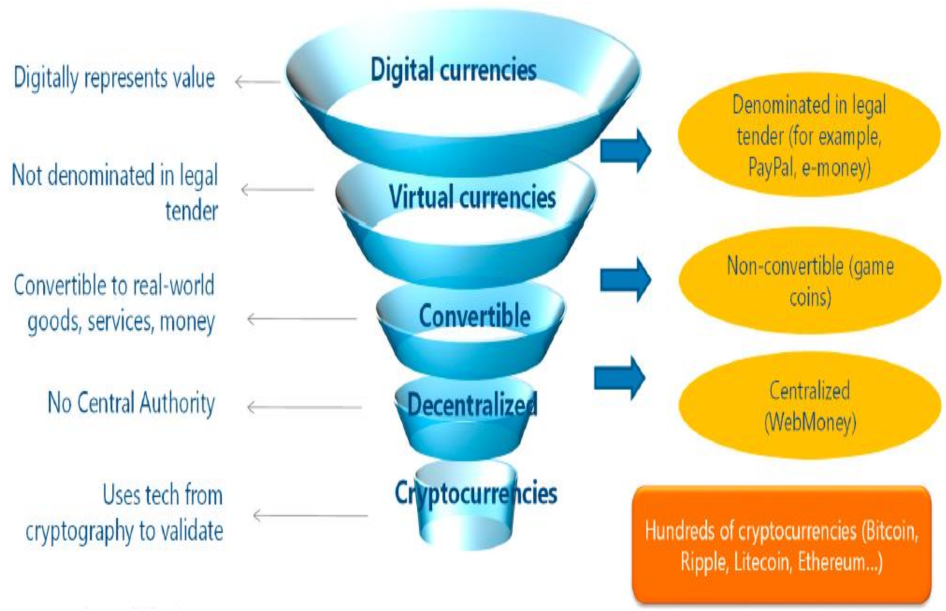
Humanity transforms money in the light of its own scientific, economic and cognitive development. We witness that this transformation is based on digitalization by abstraction, as in virtual, electronic and digital money samples recently. The values called crypto money today point to the last point where the concept of money evolves. (Çalışır & Şanver, 2018). We observe financial innovations that are developing at an increasing rate are becoming more and more widespread especially in the fields where technology such as banking or insurance is used with finance. These developments were effective in the emergence of electronic currencies or digital currencies used based on fiat money. In time, we see that consumers' habits of purchasing goods and services have changed. The change has increased the number of financial institutions that undertake e-money use and brokerage activities. Brokerage transactions have reached a serious volume until recently and increased the return of financial institutions. This is effective in the recognition of blockchain-based cryptocurrencies, which work independently of the central authority and allow exchange to be made at a lower cost without the need for validation of shopping by third party brokers. The main difference that distinguishes crypto money from electronic money; It is the feature of working independently from the intermediary or the inspector and not having a physical edition. The most common use of crypto coins; As of now, Bitcoin is dominant in more than half of the market volume.

2. Digital Currencies

For the security of transporters and fuel stations that buy fuel late at night in Europe after the 80s, loading and refuelling with smart cards are the primary examples of digital payments in the free market. At that time, some companies were demanding banks to make direct payments from their accounts. As a result of these demands, the use of POS (Point of Sale) devices, which are widely used today, has started to be used. The fact that banks and digital payment options offer 7/24 online participation causes physical money to be replaced by digital currencies. Bartering, shekel system, commodity money, gold-based paper money, fiat money, and ultimately digital money are the transitions made possible by technology. The abstraction of money is a historical and scientific process It is observed that the commercial activity realized with physical money has been decreasing recently and the fiat money has progressed towards digitalization (Griffith, 2014).

In the IMF report of 2016, assets that are digital and have a counterpart are expressed as "digital currency". This definition is general and inclusive. As a matter of fact, electronic coins with a legal basis (PayPal, Digicash, First Visual, Cybercash, Visacash), virtual coins without a legal basis, Linden dollars, virtual game tokens, airline miles, mobile and internet coupons, crypto coins, etc. all examples are covered in digital currency.

Figure 3: Taxonomy of Digital and Virtual Currencies



Source: IMF, 2016: 8

In the light of Figure 3, it is seen that cryptocurrencies are the most specialized structure compared to other digital assets. “Virtual currencies” and “digital currencies” definitions cover the cryptocurrencies, but these definitions cannot be said to be equivalent to cryptocurrency. In conclusion, digital assets that are decentralized and use cryptography are called cryptocurrencies.

2.1. Virtual Currencies

Goods or services procured from the internet have expanded digital payments. The traditional money transformed into digital payments in this process. The classification published by the IMF in the 2016 report is shown in Figure 3. In the light of this report, digital currencies; It is in digital form and defined as digital assets corresponding to a value. PayPal and e-money are examples of digital currencies in exchange for fiat money. Those who have no exchange in terms of fiat money are called virtual currencies. There are non-convertible variants such as virtual game coins within the virtual currencies, as well as currencies that can be converted to other forms. Convertible currencies are divided into two parts, centralized and decentralized. Decentralized ones are known as cryptocurrencies that are produced using crypto science.

Virtual currencies are digital representation of values released by private developers and expressed in their own account forms. Bitcoin, Ethereum, internet or mobile coupons, airline miles, virtual game tokens are examples of virtual currencies. However virtual currencies differ from digital currencies defined by law, such as e-money. Namely, electronic money has a digital payment mechanism in terms of fiat money. On the other hand, virtual currencies have no official fiat money and have their own account forms (IMF, 2016).

Virtual currencies are digital currencies, but today they have no counterpart by central banks. They are separated from the e-money in the point that they do not meet the fiat money put on the market by the central banks. As a matter of fact, e-moneys are digital moneys that are accepted by law and have a nominal value of money.

In the 2012 report of the European Central Bank, crypto money was originally associated with the Austrian School of Economics[8]. According to the report virtual currencies are unregulated digital currencies that are accepted and used by limited virtual group members, mostly controlled by supply developers (ECB, 2012: 13). This definition was updated as follows in the report of February 2015; virtual currency is a representative digital value that can sometimes be used like money, although it is not issued by a credit institution, electronic money institution, or central bank (ECB, 2015: 11).

Virtual currencies and related technologies are developing rapidly, and the future situation is not easy to predict. Virtual currencies encourage financial participation by offering more speed and efficiency in payment and transfer. The emergence of virtual currencies in the recent financial transformation process is an important development. Virtual currencies are in principle questioning the paradigm of state-supported fiat currencies and the dominant role of central banks or traditional financial institutions on the financial system. Virtual currencies are produced without the participation or support of a state. Virtual currencies and their underlying technologies can benefit the financial order. Indeed, virtual currencies and blockchain technologies can increase financial efficiency by facilitating peer-to-peer shopping, reducing transaction times and costs. In the long run, these technologies have the potential to enrich financial participation by offering safe and low-cost payment options. To realize these possible benefits, technological and regulatory developments are needed over time. However, there is a risk in these technologies. Virtual currencies can be used as a tool for money laundering, financing terrorism, tax evasion or other illegal forms of activity (IMF, 2016).

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[8] Austrian School: Austrian School: It is a school that is accepted to be born with Carl Menger's "Principles of Economics" dated 1871 and is shaped by the contributions of names such as Friedrich A. Hayek and Ludvig von Mises.

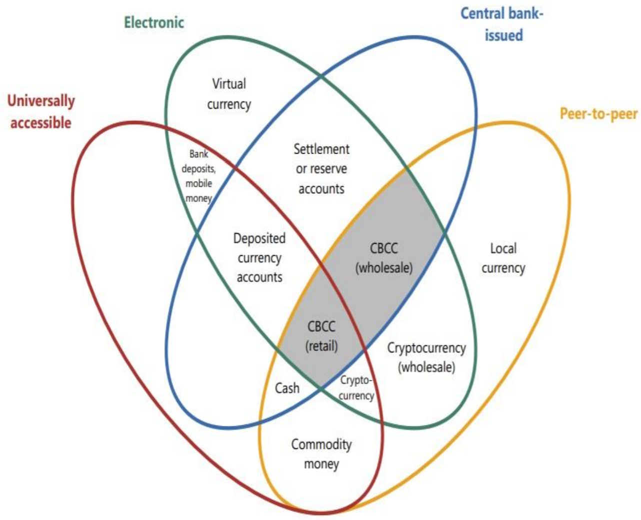
2.2. Cryptocurrencies

Cryptography derived from the Greek word "cryptos"; It aims to ensure the safe transmission of data even under unsafe conditions (Coron, 2006: 70). Cryptocurrencies are eco-digital assets developed with an encrypted algorithm and can be used in different types of electronic commercial activities.

Cryptocurrencies are the most current type of digital currencies. They enable encrypted, secure transactions without intermediaries. Cryptocurrencies are alternative currency, they are digital, virtual, decentralized and encrypted. Bitcoin is the first example of crypto money. The principle of operation is based on the encryption method.

Cryptocurrencies and some digital and virtual currencies are often confused. For example, e-money or bank money are based on the local currency they represent and are not independent currencies. They are under the control of the central banks. However, Bitcoin and similar cryptocurrencies are self-values, and today they cannot be regulated and audited by any official institution.

Figure 4: Money Flower



Source: Bech & Garratt (2017)

Bech & Garratt (2017) compares cryptocurrencies with some other coins with the help of the Venn Diagram like Figure 4. According to the classification, the only common feature of virtual and crypto currencies is that they are in electronic form. Bank deposits and mobile money are available to everyone and in electronic form. It is seen that Central Bank Digital Currencies (CBCC) and Crypto currencies are separated at the point of centralization. It is seen that the Money Flower diagram of Bech and Gratt (2017) is used in annual and quarterly reports of international organizations such as BIS (2018) and CPMI (2018), adapted to possible central bank digital money and digital money applications.

Authorities supply money through central banks in traditional economic system. However, cryptocurrencies are produced transparently and at the initially determined rates in an infrastructure where the responsibility is distributed. Information about the amount of crypto money to be placed on the market and the form and timing of its supply is planned and specified during the establishment phase. In the traditional system, a third intermediary such as a bank is required for financial transactions. If one of the partners is going to pay the bank, the bank comes into play. In other words, the bank is directly responsible for the transfer. In crypto systems, there are no intermediaries and trust is unnecessary. Theoretically, the disappearance of the intermediary brings about a decrease in costs such as transfer fees and seignories. However, this is not always the case in practice. Banknotes in circulation are fiat and their power is based on the authority that supplied them. However, trust in crypto assets today is for the crypto money circulation and issuance system; that is, it is based on miners and cryptocurrency exchanges. To avoid inflation in the circulating cryptocurrencies, crypto money production is reduced over time.

Another important point is that every cryptocurrency can be called a virtual currency, but not every virtual currency is a cryptocurrency. As a matter of fact, those that are decentralized and produced with crypto science are called cryptocurrency. Cryptocurrencies are alternative, digital and at the same time virtual money. Cryptocurrencies are digital assets that are independent of the intermediary institution and central authority and are used mostly through the internet.

3. Fiscal Intermediaries and Transaction Costs

Those who need funds can obtain funds by selling securities directly. In this process, indirect financing provided by banks is more useful than direct financing. The savings owner transfers his deposit to the intermediary with a certain profit rate, and the intermediary to the need of fund with a certain profit rate indirectly. It is seen that the meeting is not face-to-face, that the transfer of funds takes place as an indirect process with an intermediary foundation such as a bank. With the absence of intermediary foundation, it can be concluded that monetary relationship cannot be established, and economic activities will be limited to barter.

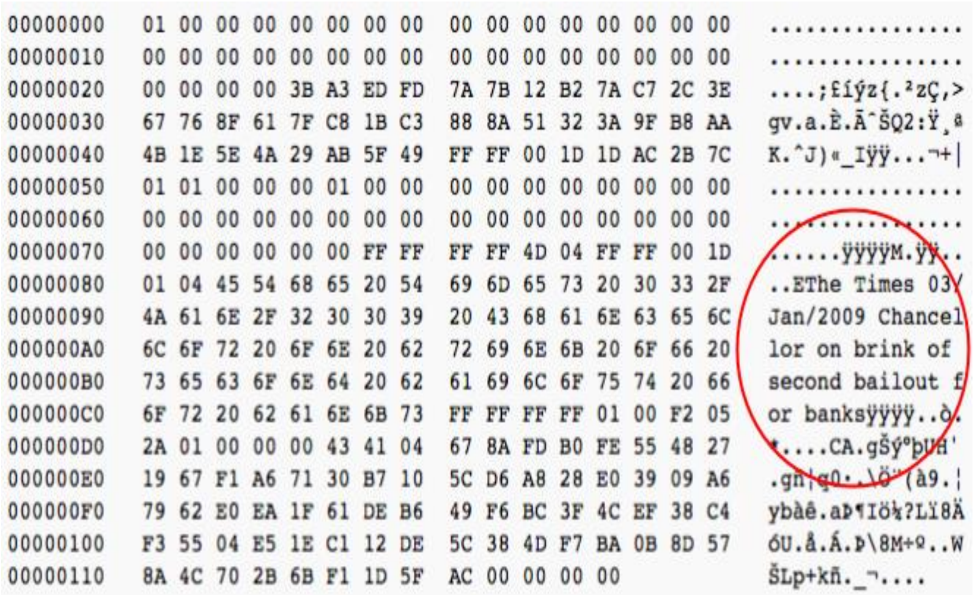
The increase in the need for money has changed the quality of the institutions that meet this need and these institutions have been transferred to the bank. Expressed in the same way with minor changes in world languages, the bank comes from the Italian word "banco". As a matter of fact, Lombardy Jews, who carried out banking transactions on a table (banco) they put on the markets, were considered as the first bankers. It can be said that the prohibition of interest and credit with severe penalties had a negative effect on the development of banking in the following periods. It is seen that there is a close relationship in the historical development of the bank and money. In other words, bank and money have become todays with two-way interaction.

Banks, which are critical importance in terms of economy, are institutions regulated by law and have a monopoly in lending. However, with the advancement in financial technology, the financial ecosystem has begun to differentiate. After the economic crisis that started with banks in 2008 and spread all over the world, consumer confidence in banks was shaken. (Dietz, Khanna, Olanrewaju & Rajgopal, 2016).

Fiscal intermediaries are one of the building blocks of the financial order today. The starting point of most financial markets' approaches; It is based on an Efficient Market Hypothesis. Based on this hypothesis, it is common to see that financial intermediaries increase their transaction costs, on the one hand, and increase their market volume, and act as catalysts as market makers. For example Boyd & Prescott (1986) states that even if every investor has access to information at the same time, markets can never be fully efficient and financial intermediaries; asserting that it strengthens the market by increasing investors' participation in the market, they expressed financial intermediaries as knowledge producers.

Another situation that was effective in questioning the existence of financial intermediaries in the 2000s; It is the observation of an increase in contrast to the expected decrease in transaction costs Despite the increase in volume and the use of financial intermediaries, transaction costs continued to increase, and the literature focused on transaction costs again. Even though the share of financial intermediaries was overlooked during the Dotcom crisis, the Mortgage crisis observed in 2007-2009 turned attention back to financial intermediaries. Adrian & Shin (2010) argued that financial intermediaries' aggressive profit policies have unpredictable results in their studies dealing with the mortgage crisis and that these attitudes and policies of financial intermediaries lie at the centre of the financial crisis. in this period, the concept of crypto money entered the financial world with the invention of the programmer / group known as Satoshi Nakamoto.

Figure 5: Genesis Block



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Source: Nakamoto (2008)

With the introduction of Bitcoin, which was launched at the end of 2008 and started to be mined and transferred with the production of the first block Genesis in 2009, it can be transferred by direct communication between spouses without the need for a third agent / institution (Nakamoto, 2008: 1). In the message encoded by Nakamoto to Genesis (figure 5); Reference was made to the headline of The Times newspaper dated 03.01.2009. The citation includes the phrase "The Times 03 / Jan / 2009, Chancellor on brink of second bailout for banks". As a matter of fact, it is known that the British Treasury Department and the British government were preparing to connect 500 billion pounds of transfer to the banks.

Conclusions and Recommendations

- It can be said that the crypto tokens and crypto coins used today are digital and current versions of historical Tokens**.**

● Cryptocurrencies are still far from fulfilling the three main functions of money (IMF, 2018: 52). Today, they have no legal status and are highly volatile de facto financial instruments that are not accepted by central banks. However, the definition and characteristics of money have changed and developed in the historical process. Based on this thesis, the crypto money community; claims that cryptocurrencies are / will be more than money. The transformation of cryptocurrencies from the cryptosphere into an internalized universal value is a process that will start with the fulfilment of the basic functions of money.

● Nobel prize economist Mundell (2003) stated that if the reserve money used worldwide only serves the interests of a certain community, it would remain ineffective in the long run and instead a Eurozone-like practice would be more successful.

● According to Keynes, solid money will be in a solid economy. Hyper volatility is one of the main obstacles to “cryptocurrencies” independent from local economies.

● According to Eichengreen (2019), there is no regular transition from commodity money to fiat money, and the transition from paper money to digital will not be straight like a symmetrical line. Indeed, history is not a linear process.

● Cryptocurrencies, which are positively welcomed by libertarian circles, do not seem to be taken too well by players in the payment system.

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