THE EVOLUTION OF MONEY

From Commodity Money to E-Money

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Abstract

By exploring the history of money, this paper describes the transition from former commodity money to today’s electronic money. After introducing the properties of money the development of payment systems is outlined. Additionally, it is indicated why innovations of current payment technologies are tremendously important with respect to economic aspects such as electronic commerce.

Key words

- E-money
- Money
- Payment systems
1. Introduction

In our world today, money is high-tech. People not only use coins and dollar bills issued by the government as money, but also increasingly cheques and credit cards. Banks are able to move millions of dollars by touching only one button on their computers.

Money has always been important to people and to the economy. Many economists, like Keynes (Skidelsky, 2000, pp.110,112), have dealt with the question of money already. The forms money has taken on over centuries have always been closely connected with the technological developments in the economy. As simple economies evolved into more complicated economies, money has always adapted to the different economic circumstances. With respect to the latest innovations in the computer industry a new form of money has evolved: e-money.

This paper describes the transition from traditional government money to privately issued electronic money. It examines the current innovations in the payment technologies by exploring how today's forms of money have evolved over time. It also reflects the reasons for inventing electronic money schemes.

2. The Meaning of “Money“

To understand how modern money developed, one has to comprehend exactly what money is and what its functions are.
The word "money" can mean many things. It is used with different connotations in our everyday speech. On the one hand, if people say that a person has a lot of money, they usually mean that the person is wealthy. On the other hand, to economists money has a very specific meaning. They define money as “anything that is generally accepted in payment for goods and services or in the repayment for debts.” (Mishkin, 1992, p.G-7)

It should be mentioned at this point that currency, e.g. the euro (€), is one type of money. However, to define money merely as currency would be too narrow for economists.

3. Functions of money

No matter whether money is gold or paper or beads or knives, in any economy it has three functions. It is a medium of exchange, a unit of account and a store of value. (Mankiw, 1999, pp.155-156) These three different functions can be distinguished in the following ways:

3.1. Medium of exchange

Money in the form of currency or cheques is a medium of exchange, since in our economy people use it to buy goods and services. Without a medium of exchange we would live in a barter economy where goods and services were exchanged directly for other goods and services. When relying on barter, people have to satisfy
the “double coincidence of wants”. (Mankiw, 1999, p.156) In order to trade, people have to find someone who has a good or service they want and who also wants the good or service they offer. In a society with millions of people and with millions of different goods and services, the system of the barter economy becomes too complicated to be realised.

Money as a medium of exchange greatly simplifies the transactions which take place in an economy. The time spent trying to exchange goods or services is lowered and consequently transaction costs are reduced as well. The resulting ease and speed with which money is converted into other things – goods or services – is called “liquidity of money”. As Keynes stated, money is the most liquid asset. (Hicks, 1989, p.42)

3.2. Unit of Account

A second function of money is its serving as a unit of account. Unit of account means that money provides standardised terms in which prices are quoted and debts are recorded. It is also called the standard of value with which economic transactions are measured.

With money, all prices, i.e. the values of goods and services, can be expressed in the same way, in terms of units of money. In the USA, for example, the unit of account is the U.S. Dollar.

3.3 Store of value
Finally, money also functions as a store of value. This means that purchasing power is transferred from the present to the future. A person might decide to keep a fraction of the money that she or he received by exchanging his or her labour in order to spend it later. Then this saved money serves as a store of value.

John Maynard Keynes placed great emphasis on money as a store of value. This observation was made by Lord Skidelsky:

“The emphasis Keynes placed on money as a store of value, as an escape from commitment to activity, was one of his original contributions to economics.”

(Skidelsky, 2000, p.112)

Keynes argued that money was “… the perfect store of value, that it is the only asset which possesses perfect liquidity…” (Hicks, 1989, p.42)

In times of inflation however, when an increase in the overall level of prices can be observed, money does not serve very well as a store of value. Thus Keynes’ argumentation was much more true for the time when inflation did not exist or for times with very low inflation.

There are other assets which serve much better as a store of value, e.g. stocks, bonds, land, houses, art, or jewellery, since many of these have advantages over money as a store of value. Among those are the facts that they pay the owner higher interest rates than money, or that they experience price appreciation.

If other assets exist which are a better means of storing wealth than money, then it is natural to raise the question: Why do people hold money at all?
The same question was also asked in Keynes’ theory of the demand for money, the “Liquidity Preference Theory”. Keynes put much emphasis on what influences people to hold money as it was observed by Skidelsky:

“The psychological propensity to “hoard” is not just a quasi-rational response to uncertainty but expresses a perverted human longing: a “love of money” for its own sake. Depressions, then, are the fruits of sin as the classical economists taught – not of the sin of extravagance, however, but for usury, a medieval concept Keynes took to be identical with his own “liquidity preference” theory of the rate of interest.” (Skidelsky, 2000, p.112)

Keynes postulated that there are three motives describing what induces people to hold money (Mishkin, 1992, pp.530-533):

(1) The transactions motive:
People hold money because it is a medium of exchange that can be used to carry out everyday transactions. Contrary to other assets, e.g. land, there are no transaction costs involved. For example, if a piece of land has to be sold in order to get cash quickly, one might have to settle for a lower price.

(2) The precautionary motive:
People also hold an additional amount of money as a precaution against an unexpected need, e.g. a person might need some medicine immediately, because she or he suddenly feels ill.

(3) The speculative motive:
Keynes believed that interest rates also play an important role. As interest rates rise, the demand for money falls. This means with rising interest rates people want to hold bonds rather than money. People are more likely to expect a higher return from holding a bond than from holding money.

4. The Evolution of payment systems

To understand the functions of money better and to obtain an idea over the forms money has taken over time, we now take a look at the evolution of the payment system, the method of conducting transactions in the economy.

The payment system has been changing and evolving over centuries, together with the form of money.

A long time ago, gold served as the main form of money. Later, paper assets, such as cheques and currency were used as money. The coins and notes which are used in most economies today are called fiat money. (It is money that has no intrinsic value and declared to be legal tender.) It is worth exploring the evolution of the payment system, since the direction the payment system has been heading to has an important influence on how money will be defined in the future. (Mishkin, 1992, p.25)

4.1 How fiat money has evolved
In the past, most societies used a commodity with some intrinsic value for money. In order to function as money, the commodity had to be widely acceptable, which means that everyone had to be willing to accept it as a payment for goods or services. Early forms of commodity money were, for example, animal skins in Alaska, salt in Nigeria, cattle in East Africa, tobacco in America, or shells in Thailand. (Rabley, p.3) Objects like these were not only used to buy goods, but also to pay for marriages, fines, and debts.

Although everyday objects were extremely practical forms of money, they nevertheless had disadvantages as well. Firstly, it was a problem to store some of them for a long time. Secondly, the accurate measurement of their value was not easy. Difficulties arose when using these objects to plan financial activities for the future or when splitting commodities into smaller amounts or units.

For the above reasons, some societies started to use precious metal, such as gold and silver. They have been popular commodity monies because they could be used for various purposes – jewellery, dental fillings etc. - as well as for transactions. People in Mesopotamia e.g., began using such metals about 4,500 years ago. Later, these metals were also used in Ancient Egypt, China and elsewhere. At this time they were not exactly coins yet, because they had no fixed shape. Around 2,700 years ago the first coins were produced in the ancient kingdom of Lydia. They were made of a mixture of silver and gold. (Rabley, pp.3-4)

Until several hundred years ago, these metals functioned as a medium of exchange in most societies, except for the most primitive ones. This new metal money was an important advance, since it was easier to carry and lasted for a long time. This
money could be divided into different values, and it made planning for the future easier.

When people only used gold as money, the economy was said to be on a Gold Standard. The Gold Standard was common throughout the world during the late nineteenth century. (Mankiw, 1999, pp.156-157)

Despite the advantages of metal money, these metals were still quite heavy and it was hard to transport bigger sums, e.g. for large purchases, such as land or houses. It was also easy to steal them. Furthermore, some countries only had limited amounts of precious metals. They could not use all their resources to make coins, for instance.

Other problems with gold and silver have occurred when governments debased them. In ancient Rome, for example, the commodity money was based on gold and silver. Emperors in the second and third centuries often reduced the amount of gold and silver in their coins if they needed more funds. Consequently, at the end of the third century, these coins did not contain any precious metal at all and the Roman Empire had serious inflation as only worthless coins were produced. (Schenk, 1997-8, http://wueconb.wustl.edu/E1043S00/schenk/Money/Commodities.html)

Due to the above mentioned disadvantages of gold and silver, banks evolved in 16th and 17th century in England. Merchants used to store their gold there and in return received a statement indicating how much they had deposited. This statement could be signed over to other persons when the merchants wanted to buy something. As a result, paper currency, which are pieces of paper that function as a medium of exchange, developed. (Schenk, 1997-8, http://wueconb.wustl.edu/
Initially, paper money was guaranteed to be convertible into an adequate quantity of precious metal or coins. In most countries this system has evolved into paper currency that is issued by the government’s decree (“fiat”). This means that this currency has to be accepted as legal tender. It is called fiat money which is not convertible into precious metal anymore and has no intrinsic value. For instance, today’s coins only have a token value, that means the face value exceeds the value of the metal. The value of fiat money derives from the perceived authority and creditworthiness of the issuer. Fiat money is the norm in most societies today. National currencies are issued and managed by the central bank’s fiat. (Central Banks are institutions which control the money supply of the country.) If the monetary authorities are both competent and honest, fiat currencies are stable, reliable and efficient.

4.2 Development of new payment technologies

Paper currency and coins can easily be stolen and can be expensive to transport because of their size. As a consequence, with the development of modern banking, cheques were invented. Cheques are a type of IOU payable on demand that allows transactions without the use of currency. No money needs to be moved when using cheques, because payments balance out such that both cheques are cancelled. They can also be written for any amount up to the balance in the account. This simplifies the transactions for large amounts of balances a lot. As a result, it reduces
transportation costs and therefore, improves economic efficiency. (Mishkin, 1992, p.27)

Despite the advantages, it is very time consuming to trade a cheque for currency. This may result in difficulties if something has to be paid quickly. Furthermore, it takes a few days until the bank will credit the account with a cheque that a person has deposited. To process cheques is very costly. For example, it has been estimated that it costs over 5 billion U.S. Dollars per year to process cheques written within the USA. (Mishkin, 1992, p.27)

Due to the development of the computer and advanced telecommunication technologies, new advances in the payment system were made, like the invention of the electronic funds transfer system (EFTS). This technology introduced individual access to the payment system by means of a debit card reader or a personal computer. Deposits are simply transferred from payer to payee using electronic devices. Nowadays, for example, central banks, commercial banks, or corporations can transfer funds to other institutions by using EFTS. The whole paperwork can actually be eliminated by converting it to the EFTS. It is much more efficient than payment systems based on paper, because it reduces the cost of transferring money and, therefore, decreases the frequency of using cheques and paper money. During the last years, people have begun to use EFTS more and more in daily life.

In connection with EFTS the evolution of plastic cards, e.g. debit and credit cards (American Express, Visa, etc.), should be mentioned. These cards allow people to make purchases which are paid for by booking the amount from the person’s bank account either immediately or at the end of a month. (Goede, 2000, pp.309,342)
The main difference between credit and debit cards is that credit cardholders can extend their credit up to a given limit. Today, credit cards are the most widely used method of payment. (Besson, 1999, p.58)

EFTS, debit and credit cards are basically the beginning of electronic payment systems. Innovations of these electronic payment systems helped to reduce transaction costs a lot and initiated the creation of digital money.

5. Digital money

Currently, there are various approaches to set up and implement electronic payment systems. To understand the evolution of electronic money one has to take a look at the historical improvements in computer technologies.

5.1 Electronic commerce

For a few years, now computers and networks have been widely used.

In 1993 the aggressive expansion of the internet started. (Besson, 1999, p.14)

Electronic commerce was heavily enforced by this development. This expression refers to ‘on-line selling’, what means doing business through web stores. (Besson, 1999, p.15) This will and partially has already changed the way business is carried out. Every company will be affected by electronic commerce, even companies that do not think of themselves as being involved in the on-line business.

Electronic commerce directly leads to the reasons why electronic money has developed.
If somebody wants to operate fully in the digital market place, commonly accepted payment methods may not always be appropriate or efficient.

Since different kinds of transactions take place within electronic commerce, e.g. the purchase of an expensive house or of something very inexpensive, the idea of electronic money (equivalently, e-money or digital money) arose.

5.2 Why electronic money is required

As mentioned before, the most widely used ‘digital payment methods’ are credit cards. Cardholders used to send their cardnumber via e-mail without any encryption in order to pay for purchases. Thanks to improvements in technology, credit card encryption has become more and more usual. This reduces the risk of misuse a lot and increases the number of people who are willing to pay by credit cards in the internet.

However, when making micropayments (or minipayments), e.g. buying a good for 28 Cents, it is neither efficient to pay by credit card nor by cheque or bill, since transaction costs would be much higher than the price charged. So other forms of electronic payments for low-price goods which are more efficient, such as e-money, have to be implemented.

5.3 What is e-money?
There are many different names which are currently used to specify electronic money: Digital Cash, Digital money, Cyber-coins, E-cash, Digital Token, etc. Electronic money is a digital payment message which serves as a medium of exchange or store of value. (Besson, 1999, p.21) According to Lawrence H. White a more precise definition of digital money can be obtained:

“The currency balance information, an encoded string of digits, can be carried on a “smart” plastic card with an implanted microchip, or kept on a computer hard drive. Like a traveller’s check, a digital currency balance is a floating claim on a bank or other financial institution that is not linked to any particular account. One cardholder can make a payment to another without bank involvement, by placing both cards in a “digital wallet” that writes down the card balance on one card and writes up the balance on the other by the same amount.” (White, 1996, http://cato.org/moneyconf/14mc-7.html)

The greatest differences to earlier forms of money are, that e-money is impersonal and virtual. Contrary to credit or debit cards, it is always pre-paid. The private issuer of any form of e-money allocates value to a coded digital message which is stored on a computer system or a smart card chip. The issuer guarantees a fixed reimbursement value.(Besson, 1999, p.22)

5.4 Types of e-money
There are various e-money systems which are technically different, for example electronic coins, credit card chips, digital cheques, etc. Most of these types of digital money still use national currency as a denomination of the value they store and transfer.

In addition to credit cards, which are the most widely spread payments, electronic cheques are used. They are well suited for minipayments and may be sent through e-mail. One example for electronic cheques is the NetCheque™. (Besson, 1999, p.62) For secure transactions people prefer smart cards (also called digital wallets), e.g. for paying underground fares. Here, a small computer chip is attached to these cards which allows one to store cash electronically. For example, MONDEX™ is a plastic card which can store up to five currencies. (Besson, 1999, p.64)

5.5 Properties of e-money

Digital money can be absolutely anonymous. This means that the customers have the freedom of usage, and the bank is not able to identify their clients via their payments.

In order to replace cash or traditional money as a standard medium of exchange, e-money has to have equivalent characteristics of traditional money. For example, it must have a monetary value (backed by cash), furthermore, it must have a global acceptance.

5.6 What makes e-money business attractive?
Contrary to traditional currency, the banks pay no interest for digital currency balances. Therefore, banks receive an interest-free loan from customers.

On the other hand, although, hard (i.e. stable) currency has been a successful payment instrument over centuries, the production cost of paper money is becoming higher due to security requirements. As a result, paper currency will become more expensive. If e-money schemes are able to eliminate transactions or handling costs, and can offer high security standards, it is rather likely that digital money reduces or even replaces the use of money issued by the central bank.

From the central bank’s point of view, digital currency is a substitute for traditional money issued by governments.

6. Monetary freedom vs. government regulation

Monetary freedom is essential for a free-market economy. This implies that in order to ensure the independence of money and its value, the latter one needs to be determined by open-market operations, as with the price for any other good.

Following this reasoning, e-money and thus electronic commerce must also be supported by market competition freely since it relies on a flexible monetary system.

As various organisations are allowed to issue their private currency in a freely competing market some risks also become obvious.

For example, only a single private currency issuer might be able to gain control over the whole economy or at least major parts of it. This applies particularly to large companies that already participate in e-business. Therefore, money manipulation and
the complete control over the supply of e-money of one economy (as central banks

do in almost all countries) might become a threatening issue for governments.

(Besson, 1999, p.77)

Further, it must be ensured that digital money schemes are strong and stable enough

in terms of risk management.

As a result, to avoid one free-market clearinghouse becoming established and acting

as a central bank, government regulation is necessary.

This observation, that market capitalism should never be left alone, but rather be

regulated by governments to stabilise the economy, has been already made by

Keynes. According to Skidelsky, he observed the following:

“Governments, that is, retain their role as an uncertainty-reducing resource... .”

(Skidelsky, 2000, p.112)

7. Conclusion

To sum up, money has taken different forms over time. As discussed in the paper,

today’s money has evolved over centuries. Due to many innovations and

technological advances in the computer industry, money has become finally what it is
today: high-tech. It acts like a symbol of the commercial structure we operate in. By

examining the history of money, it becomes obvious that a higher number of societies

with sophisticated economies has resulted in money adapting to the technological

advances in the economies. The more sophisticated the society the more the use of

traditional money has declined. All the transition steps from a barter economy to

today’s high-tech world have always been followed by the evolutionary steps of
money. From commodity money over fiat money, it has evolved into digitised money. Digital money makes it possible to undertake cash transactions over the internet. “By doing so, it will be the basis for a new generation of digitised business.” (Besson, 1999, p.79) It can be safely assumed that e-money will diminish the use of government issued money.

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