

## EFFECTS OF WIDESPREAD E-MONEY USE ON CURRENCY DEMAND AND OUTLINING HOUSEHOLD E-MONEY USE IN U.S. AND TURKEY

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### Abstract

Although money has been used as the principal medium of exchange in trade since the ancient times, in recent years, e-money use has become widespread due to technological developments and digital systems in many countries from all over the world, especially in the United States, Japan and Hong Kong. In addition to these countries, some developing ones such as Turkey use e-money together with cash for the sake of simplicity and convenience it provides. However, using e-money brings along some suspicions that needs to be done away with. Therefore, the aim of this paper is to define the term “e-money”, its types and potential effects on lives of individuals, its importance to the United States and Turkey considering its prevalence, its areas of utilization and individual point of view toward usage of e-money in these countries as well as its security issue. However, it is understood from this study that it is still required to do more comprehensive research on this subject in order to understand the nature of payment systems and produce new ideas of them.

**Key words:** Electronic Money, E-money, Turkey, USA,

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### 1. INTRODUCTION

Money, the principal medium of trade, certainly had countless developments in the history and came in different forms. However, following the developments in technology and digital systems that occurred at an incredible speed through the last two decades, the concept of money may be on the threshold of an evolution. The new form is digital rather than physical such as banknotes or coins; therefore most usually referred as electronic money (e-money). Its other names such as digital cash, virtual cash, plastic money, e-purse are more specifically express different aspects of e-money.

As a recent yet fast-growing payment medium, e-money draws the attention of people familiar with technology and digital world. Currently, its main uses are both online and traditional shopping, commuter fare payments and loyalty programs offered by companies. The applicability and adaptability of e-money promise usability in almost everywhere in the future are evoking one of the most unusual thoughts -a cashless societies. The rapid developments in security and simplicity of online transactions underline the probability of this new era despite that the thought might seem inconceivable itself. However there are still many issues to resolve chiefly about security of e-money and the future of fiscal administrations before e-money replaces the currency.

Even though e-money continues to be as controversial as it is innovative, it is already a must in many peoples' lives in several countries; the most noticeable ones include Japan, Hong Kong and the United States. Equally, some people in developing countries like Turkey embrace the freedom of holding cash and the simplicity e-money offers while others approach it with suspicion in contrast to cash which is tangible therefore feels safer than electronic records.

## 2. E-MONEY

### 2.1. What is E-Money?

Electronic money or electronic cash is a monetary value represented by claims of the owner against issuer and stored on an Integrated Circuit (IC) card or on a network server (Godschalk, H., & Krueger, M., 2000). The value of e-money reduces by every payment or similar transaction and increases by every deposit. This depositing and payment requires appropriate technology, which may refer to an IC card, depositing stations and vendors equipped with point of sale (POS) devices; or to an online server and an end-user computer with internet connection.

The purpose of e-money has been relatively simple: to provide a medium of money that enables secure online payments (Kinoshita, H., Kudo, M., Morizumi, T. & Suzuki, K., 2010). While this notion still constitutes the basis for most of the e-money use, a wider range of commercial transactions can be done with e-money in a faster fashion than those with currency. In addition to the speed factor, the superiority of e-money in remote transactions and cleanness against traditional cash is behind the appeal of this new payment medium.

### 2.2. Types of E-Money

Due to intense complexity and diversity of current technological developments concerning electronic payments, there are many different types of e-money available. However, electronic money is conventionally classified according to where it is stored and its level of anonymity.

#### *Storage of the e-money*

In terms of storing environment, e-money can be classified into three (Fujiki, H., & Migiwa, T., 2010). As mentioned before, the monetary value may be stored electronically on an IC card or on a network and more rarely on both of them.

Firstly, electronic money stored in IC cards represents the value transferred on a card with a chip or any other storage of information (i.e. a magnetic stripe). Prepaid debit cards and commuter cards are the most commonly encountered uses thus, generally this type of e-money considered a real monetary value paid beforehand by owner of the card (Zika, J., 2005). However, this is not necessarily the case. There are applications of e-money not so rare that the monetary value on the card is defined by issuer firm as a bonus depending to the owner's previous shopping or frequency of transactions. The safety of electronic money relies on the card's durability as the information relating to the amount of e-money is stored on the card. IC cards usually come with total anonymity because there is no need for authorization of a third party on the payment instance while certain exceptions exist.

Secondly, electronic money stored on a network is most commonly requires an encrypted access system to provide the security of e-money. The issuer checks the authenticity of the owner before certifying the transaction orders, which implies to prevention of anonymity. The main uses of network e-money include Electronic Funds Transfer (EFT), internet banking and online shopping. A large portion of online shopping are paid through a trusted third party (i.e. PayPal, 3D Secure) that conducts transaction on a secure platform in order to avoid fraud (Çam, A. R., 2010).

Thirdly, the hybrid systems store e-money both on network and card hence utilize the advantages of the two technologies. The security of e-money stored is higher than one of the other two alternatives alone and the transactions are still fast. However, anonymity cannot be provided even though an authorization is not needed (Fujiki, H., & Migiwa, T., 2010).

#### *Anonymity level of e-money*

In sense of anonymity, identified e-money falls behind the traditional cash while anonymous e-money offers nothing less than it does. This difference certainly has a lot to do with the e-money technology adopted by issuer; the time of settlement is the key. According to Fujiki and Migiwa (2010), if the settlement between the issuer and the owner is done after the payment, as it is in the case of credit cards, the anonymity is restricted due to the need for traceability. If the settlement is done before the payment (prepaid) or immediately at the payment, it is possible to preserve anonymity.

Identified e-money is the type of e-money that is traceable by banks or auditing institutions. On the instance of payment, the identity of owner is revealed as the issuer needs to track the balance of the issuer's card. When the payment provision is completed and the time for exchange of e-money to currency to be paid to the payee, then payee's identity is also revealed (Çam, A. R., 2010).

Anonymous e-money provides anonymity like the case of traditional cash. The e-money is untraceable because the issuer does not store it on a server. So, it means when the currency is out of circulation and exchanged to e-money, it is in the 'pocket' of somebody. This way, the e-money may be spent or transferred between peers as traditional cash would be.

### **2.3. Potential Effects of Widespread E-Money Use**

The reflection of e-money in our daily life is still somewhat restricted to an extent because has not been recognized by everybody as an alternative medium of transactions. However, its popularity is increasing along with expansion of e-trade and now maybe the most important acknowledgement about e-money has been settled: it will be there in the future. People do not approach e-money with hesitation thinking that e-money is destined for a short lifetime, unlike during the infant stage of e-money plus some 10 years more. Now, people remain anonymous thanks to e-money and feel safer when shopping online.

The impression that e-money can totally replace the currency in payments is more commonly shared by the interested than ever. However, this is not necessarily believed to be the immediate impact of the potentiality of e-money. For instance, Sardoni and Verde (2002) do not overlook the fact that the currency is required initially for both network type and IC card type e-money. The suggestion is not obscure at all: currency is used to buy e-money from the issuer just to be spent electronically later. Electronic money is a store of value that cannot perform the perfectly liquid asset function of currency thus cannot be substituted for it wholly.

Goodhart and Krueger (2001) agree with Sardoni and Verde that the prospect of e-money replacing currency completely is remote. In contrast, the currency may benefit from the developments triggered by information technologies (IT) the same way as many other financial products. Rose (2001) backs Goodhart and Krueger's negative answer to the question of whether e-money can be substituted for currency or not. The supporting evidence of previous e-money schemes' short

lifetimes and declining attention to e-purse is sufficient. From another perspective, Greenwood-Nimmo (2009) states that total replacement of currency with e-money by non-bank public is bearable.

On the other hand, the immediate impact of e-money that gives the researchers a headache would be the possible end of the functionality of monetary policies constructed for currency by central banks (Ucal, 2004). The recent statistics shows that as more traditional cash is left out of payments and transactions (see Michna et al (2016)), less effective the monetary policies will become. Certainly this impact is the result of a widespread use of e-money that means more traditional cash is stored as e-money instead of being in circulation.

Pan (2005) states that the independence of the will be challenged by the probable increase in e-money use. The global nature of e-money transactions will eventually take effect and customers will use e-money issued by foreign institutions in payments or e-money of domestic origin to buy foreign products. Consequently, the monetary policy of a country will be disrupted by the influence of another's monetary policy. Another serious threat to the effectiveness of the monetary policies could occur with the decrease in central banks' funds that are crucial for their independence. The major source of a central bank's funds is seigniorage revenue that relies on the status of sole currency issuer.

Max and Klein (2012) share the concerns on the effectiveness of the monetary policies with existing tools. It is not clear how the money supply will be affected under the condition of widespread e-money use and whether the central bank can control the monetary without the instrument of issuing new money. The European Central Bank's report on e-money (1998) proposes the risk of price instability caused by lower interest rates as a consequence of lower marginal cost of issuing e-money.

While there is abundant research investigating the possible effects of widespread e-money use on monetary policies; likes of Rose (2001) point out less obvious but probably more serious questions on e-money use. Rose's questions focus on the risk of fraud and the increasing costs of intense encryption to prevent counterfeiting, the former relating to the declining popularity according to the author and the latter causes a competitive disadvantage on e-money's behalf. McAndrews (1999) also expresses concerns of fraud risk and operational risk of e-money. Furthermore, the author brings to front legal and payment risks of e-money transactions that coincide the concerns of The European Central Bank (1998). In addition to those mentioned, Max and Klein (2012) question the case about the possible high speed of circulation especially with the use of mobile phones in payments.

Kern (2001) argues that e-money provides a not only effective but also cheap and fast way of payments especially for small amounts. Thus, it is suitable for widespread use. Singh (1996) states that people with low income and literacy level are unable to perform e-money transactions. Ishii, Higuchi and Takeyasu (2012) defended that consumers mainly hold traffic cards rather than IC cards. E-money is preferred because of its applicability and convenience, but the customers expect improvements in security. Also, e-money is not preferred because it looks intimidating to who do not use it.

#### 2.4. The Importance of E-Money to the USA and to Turkey

Allen, McAndrews and Strahan (2002) defend that the electronic payment systems have been efficient in interbank transactions in the United States but this was not the case with the consumers for a long time. Later on, Automatic Teller Machines (ATM) was distributed all over the United States in 20 years that brought convenience to the banks but could not substitute for branches for the costumers. According to the authors, the developments in communication technology are complementary to the banks' activities but could not be embraced as the new medium until 2001. The reasons why the appreciation of electronic payment systems by consumers in the USA was rather lower than other developed countries might be the cost of adopting the technology or the belief that technology was insufficient in peoples' opinion.

However, things have changed in the United States over the last decade: the use of e-money has substantially grown, especially in means of network money. The largest online shopping sites are based in the US, including eBay and Amazon. One of the most preferred secure online transaction platforms, PayPal, have emerged in this period. IC cards have been issued by various institutions of public transport, bookstores (The Bank for International Settlements, 2004; U.S. Department of the Treasury, 1996). This rapid increase in use of e-money should indicate a shift in the public perception of e-money. It is intriguing to examine if it is a similar case for Turkey due to the similarities of public approach to e-money phenomenon.

Turkey is often described as a fast-growing economy and in accordance with that, the use of technology at home increases fast. As stated in the survey of The Bank for International Settlements (2004), Internet banking in Turkey is really embraced by users so that all of the top-10 Turkish banks have an online branch on which customers execute almost all the transactions made at a traditional branch. As of 2012, the top-10 banks have 'mobile branches' that are applications for smart mobile phones with full features of internet banking. Most of the online transactions such as paying bills and EFT are offered free.

E-money use on IC cards is also quite common in Turkey, the number of credit cards is almost two-thirds (51,360,809/74,724,269) to population as of 2011 and number of debit cards exceeds 81 million ([www.turkstat.gov.tr](http://www.turkstat.gov.tr)). Additionally, there are forms of credit cards with sole purpose of online shopping. In most populated 20 cities of Turkey, covering more than half of Turkey's population, public transportation commuter programs are applied with prepaid IC cards. In some cities including the capital city Ankara, even the natural gas and water supply to houses are associated with prepaid systems with IC cards.

Clubs, theme parks, car parking areas, shuttle companies etc. employ prepaid close-circuit IC cards of which the deposited amount reduced every time the customer uses the services offered at the convenient place. Almost every shopping mall, supermarket chain and intercity bus transportation company offers a loyalty program that consists of accumulating e-money, available to spend like currency, on an IC card with every purchase.

Therefore Turkey has an important potential of e-money but there is no decent quantitative information on where this e-money use in Turkey leads. Sato (1997) states that e-money experience may vary from a country to another hence the

expectations on the benefit of e-money have to be determined first in order to measure the performance and utility of e-money.

Ucal and Mungo (2012) investigated the effect of electronic money (money) on the definition of money according to the analysis of Turkish monetary data. They mentioned that since the central currency of the electronic money will be replaced by the currency, the entire stock of central bank money could be affected and the biggest impact is expected to be on the central bank currency, which is called the M1, contains the circulating and demand deposits. They also calculated of central bank money components and including the Reserve Ratio on Electronic Currency – Money. However, they found that the reserve ratio on electronic currency smaller than the reserve ratio on deposit because of the low levels of e-currency. On the other hand, they estimated the SVAR (a structural vector autoregressive) model and realized that a shock in the amount of M1 (Thousand Turkish Lira) drives up PI (potential increase in M1 with conversion to electronic money (Ratio)) and this effect appears to be significant for about eight years (sample size is from 1986 to 2009 and annually). They deduced that the effect of a PI shock on M1 is only marginally positive in the short-run or long-run. Given the results obtained from this study, it is clear that electronic money will affect the measure of the supply of money as a monetary policy indicator and the effectiveness of monetary policy instruments.

### 3. DISCUSSIONS

Taking into account the current developments and payment system in finance, it is necessary to emphasize the need for further research on payment systems. In this sense, this paper has made a brief review of the analysis of the distinctive features of electronic money. There is a need both theoretically and practically for the work of developing new ideas that reflect the broad monetary, banking and infrastructure aspects of payment systems. Payment systems are critical to the functioning of a modern monetary economy.

According to estimates of e-money developments in the future, it is expected that e-money and cash assets will coexist and e-money developments will be controlled by the central bank in the countries. This means the potential of the paper currency / e-money or representative money and coins will be controlled by the monetary authority. In this way, it will be the strongest, rationalist and providently policy that can be created and the most appropriate application that can be done to prevent misuse. Regulations are needed for misuse or new developments in the monetary system, for example ECB (European Central Bank) has been included e-money in monetary balance sheet, according to EU regulation EC/25/2009 of the ECB. When considered according to this pioneering attitude, central banks should try to introduce new regulations, or adjust those already existing, to face the new situation in terms of usage of electronic money.

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