The Impact of E-money on the Economy

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Abstract

From 1990's, e-money has developed very quickly. Many economists proposed their view by theory. They think that e-money, designed to substitute central bank currency, could take impact on money supply, especially on the narrowly defined stock of money, M1.In modern economy, money has played a very important role, so e-money has a big potential to affect GDP.

The paper discusses how e-money has impact on M1 and GDP based on the data from 1990's to now.

In the analysis, we can get following conclusions: (1) as a payment media, the development of e-money has increased rapidly, we can see e-money has very strong potential in economy. (2) Now, the volume of e-money is still very little. And e-money has little impact on M1 and GDP. (3) In a short time, e-money can hardly replace currency in circulation, and they will exist simultaneously for a long time.(4) Now it is unnecessary to carry out any policy to restrict the development of e-money. Such as e-money issue mechanism, but it is necessary to build an e-money balance report mechanism.

1. Introduction

E-money emerged in 1990's and from then has developed very quickly and attracted many people's attention.

Many economists proposed their view in theory analysis. In 1994, Working Group on EU Payment Systems released their first report on e-money that was also the first report by official on e-money[1]. In the report, it discussed the issue aroused from e-money.

After that, Benjamin Friedman (1999), Mervyn King (1999), Charles Goodhart (2000), Charles Freedman (2000), Michael woodford(2000) and other economists have published many papers discussing e-money.

They proposed that e-money which designed to substitute central bank currency, could in principal replace the entire stock of central bank currency. Central bank currency is a component in all monetary aggregates; therefore, a change in the demand for central bank currency could affect these aggregates. The largest impact would be on the narrowly defined stock of money, M1, and other monetary aggregates, such as M2 or M3, could also be affected. In most countries M1 consists of central bank currency in circulation, traveler checks in the hands of the public, and demand deposits, however, central bank currency has less weight in M2, M3, and they would be less affected

In modern economy, money has played a very important role. Because the development of e-money is very quick, it has a great possibility to replace currency. With the development of e-money, it is worth studying on how it takes impact on M1, and on GDP.

The paper discusses how e-money has impact on M1 and GDP based on the data from 1990s.

From the analysis, we can get follow conclusion:

(1) As a payment media, the development is rapid, especially in small value business, and the volume of payment larger and larger. We can say e-money has very large chance in economy.

(2) Now, the volume of e-money is still very small, and its impact on M1 and GDP little.

(3) In a short time, it is hard for e-money to replace currency in circulation, and both two will co-exist for a long time.

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[1] Working Group on EU Payment Systems "Prepaid Cards", Report to the Council of the European Monetary Institute May 1994

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(4) From above results, we can argue that, currently it is unnecessary to carry out any policy to restrict the development of e-money. For e-money issue institution, it is unnecessary to restrict on the credit institution. It can be issued by High Tech Corporations. While supervisors can build a balance report mechanism. All the institutions must report their balance of e-money regularly; its report can be monthly or quarterly.

2. E-money has impact on the development of economy

2.1. E-money VS currency

In modern economy, money plays a very important part. In most countries, M1 is a very important index of money supply. As the main part of M1, currency is signified. As a payment media, e-money will replace currency in circulation; here first we compare e-money with currency on the payment volume in circulation. See table 1.

From table 1, we can see, by statistics, comparing with currency, although recently years more and more people use e-money as payment tool, the volume of e-money is still very little. E-money has little impact on GDP. However as a payment media, the development of e-money has become very rapid. See chart 1. In business and commerce, the volume of payment with e-money has change greatly; we can say e-money has very great opportunity in economy. In small value business, the role of e-money is increasingly important. But it will be a long run to replace currency completely. In a long time, e-money and currency will co-exist.
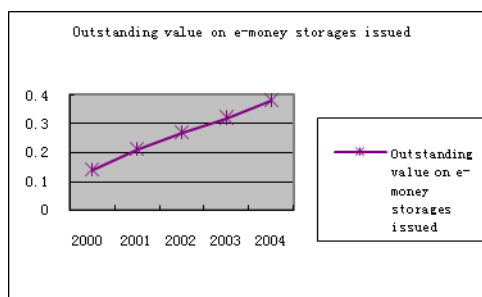

Chart 1 Outstanding value on e-money storages issued

2.2. The relationship with M1

Money supply is divided into different categories, such as M1, M2, and M3 in different country. By IMF, M1 (Narrow money supply) equals to cash in circulation and transferable deposits held by non-banks including non-residents, unless otherwise indicated.

E-money storages instruments for storing e-money funds conclude card-based, software-based and mobile-based.

Card-based e-money products mean cards with an e-money function; Software-based e-money products, which employ specialized software on a personal computer or servers, can typically be used to transfer electronic value via telecommunications networks such as the Internet; mobile-based e-money products mean e-money balance stored locally on a mobile phone

E-money is issued to replace currency in circulation, and then it has impact on money supply, in order to be effect on the practice of money policy. European Union is the most developed area in E-money field recent years. Here we select payment data of European Union to analysis. See Table 2.

From the data, we can conclude that the currency in circulation has a very significant role in M1; the currency in circulation has a great weigh in M1. However, e-money has little impact on M1. But we must notice that the developing speed of e-money is very quickly. E-money has a great potential.

2.3 Correlation analysis with e-money, M1 and GDP

Suppose GDP is affected by money supply, currency in circulation and e-money.

M1 denotes money supply; C denotes currency in circulation; and Me denotes e-money.

So, $GDP = L_{M1}M1 + L_c C + L_{Me}Me$

Because e-money developed from middle 90's in last century. So we select data of payment report of CPSS from 1996 to 2008.The data we select include country, GDP, the volume of currency in circulation, the volume of M1 and the volume of emoney

So we get correlation matrix, shown as table 4.
From the matrix, we can get follow results.

With GDP and the currency in the circulation, correlation coefficient is 0.980, and significance level Sig=0.000, presents the closely correlated tendency.

With GDP and M1, correlation coefficient is 0.946, and significance level Sig=0.000, presents the closely correlated tendency.

With GDP and e-money, correlation coefficient is 0.157, and significance level Sig=0.135, presents non-correlated.

With the currency in the circulation and e-money, correlation coefficient is 0.068，and significance level Sig is 0.519, presents non-correlated.

With M1 and e-money, correlation coefficient is 0.021，and significance level Sig is 0.843 presents non-correlated.

So we can get follow results:

(1) GDP = 0.946M1 + 0.980 C + 0.157Me

(2) Currently, the development of e-money has little impact on money supply M1 and GDP.

3. Conclusion

From the analysis, we can get following conclusions:

(1) As a payment media, the development of e-money is rapid, especially in small value business, people of using e-money as payment tool are increasing, and the volume of payment with e-money has become very large. In small value business, the role of e-money has more and more important. E-money has gradually become one of the main small value payment tools. In the meantime, more and more store and consumers have accepted it. Therefore we can say e-money has very great opportunity in economy.

(2) Now, since the emerging of e-money, it has developed very quickly, and it gradually becomes one of the main payment tools. However, on the other hand, now the balance of e-money is still very little, the volume of e-money is still very small. The currency in circulation has a great weigh in M1, and the currency in circulation has a very significant role in M1; e-money has little impact on M1 and money supply. From the correlation analysis, we can see that Currently GDP presents the closely correlated tendency with M1 and currency, but has non-correlated tendency with e-money. Therefore e-money has little impact on development of economy.

(3) In a short time, e-money can hardly replace currency in circulation, and they will exist commonly for a long time.

(4) From above results, we can argue that, it is hard for e-money to replace currency in circulation completely, and it has little impact on money supply. Therefore it has little impact on money policy therefore, now it is unnecessary to carry out any policy to restrict the development of e-money. For e-money issue institution, it is unnecessary to restrict on the credit institution, and its issue can be taken by High Tech Corporations. However, for supervisor, it can build a balance report mechanism. All the institutions must report their balance of e-money regularly; the reporting can be monthly or quarterly.

4. References

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5. Appendix:

Table 1 currency and e-money in circulation as payment in GDP[2]

	currency in circulation as a payment as a percentage of GDP(%)					*e-money in circulation as a payment as a percentage of GDP(%)*				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Belgium	nav	nav	nav	nav	nav	0.08	0.1	0.25	0.2	0.18
Canada	3.7	3.7	3.9	4.1	4.1	nav	nav	nav	nav	nav
France	nav	nav	nav	nav	nav	0	0	0	0	0
Germany	nav	nav	nav	nav	nav	0	0	0	0	0
hongkong	8.0	8.7	9.7	11.4	11.9	nav	nav	nav	nav	nav
Italy	nav	nav	nav	nav	nav	nav	nav	0	0.01	0.07
Japan	12.7	13.6	17.1	18.0	17.3	nav	nav	nav	nav	nav
Netherlands	nav	nav	nav	nav	nav	0.02	0.02	0.05	0.06	0.07
Singapore	8.1	8.4	8.9	9.1	8.6	0.11	0.14	0.42	0.77	0.74
Sweden	4.3	4.6	5.1	5.0	4.7	0.01	0	0	0	nav
Switzerland	9.4	10.0	10.5	10.5	10.3	0.02	0.02	0.02	0.02	0.02
U.K.	3.2	3.3	3.6	3.7	3.6	nav	nav	nav	nav	nav
United States	6.0	6.4	6.6	6.6	6.4	nav	nav	nav	nav	nav

Table 2 Payment data in European Union

Payment data in European Union					
	2000	2001	2002	2003	2004
GDP (EUR billions)	6,561.10	6,967.70	7,208.20	7,405.90	7,700.10
CPI (%)	2.1	2.34	2.25	2.07	2.14
Currenve in circulation	nav	nav	392.95	450.52	517.28
(M1)	nav	nav	2,499.43	2,727.09	2,948.88
e-money	0.14	0.21	0.27	0.32	0.38
Card-based	0.14	0.21	0.27	0.31	0.37
Software-based	0	0	0	0	0

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[2] data sources: Committee on Payment and Settlement Systems Statistics on payment
and settlement systems in selected countries Prepared by the Committee on Payment and Settlement
Systems of the Group of Ten Countries Figures for 2004 March 2008 Preliminary release

Table 3 correlation matrix

Correlations		GDP	currency in circulation	M1	e-money
GDP	Pearson Correlation	1	.980(**)	.946 (**)	.157
	Sig. (2-tailed)		.000	.000	.135
	N	92	92	92	92
currency in circulation	Pearson Correlation	.980(**)	1	.991 (**)	.068
	Sig. (2-tailed)	.000		.000	.519
	N	92	92	92	92
M1	Pearson Correlation	.946(**)	.991(**)	1	.021
	Sig. (2-tailed)	.000	.000		.843
	N	92	92	92	92
e-money	Pearson Correlation	.157	.068	.021	1
	Sig. (2-tailed)	.135	.519	.843	
	N	92	92	92	92

** Correlation is significant at the 0.01 level (2-tailed).