

The Analysis on Inflation Transmission Mechanism from Virtual World to Real World

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Abstract—Virtual currency has become a new means of e-commerce payment. The volume of virtual currency is expanding at a stunning rate annually. Academics and financial regulatory agencies begin to pay more attention to virtual world inflation. This paper attempts to study whether or not virtual currency will affect the entity's financial order and even lead to inflation.

Keywords—virtual currency(VC); virtual world; inflation; real world; monetary approach to balance of payment

I. INTRODUCTION

With the rapid development of information technology, the rise of the Internet economy, the rapid development of electronic commerce, virtual currency has become a new means of e-commerce payment. Data shows that virtual currency market has more than billions of Yuan in china, and this market is exploring at an annual rate of over 20%. [1].

The literatures of virtual currency are not common. Some mixed virtual currency with electronic money; some took it for granted that the rapid expansion of virtual currency will impact the real financial order and bring the real world inflation, other views even conflicted with each other. This paper tries to study the virtual currency transaction patterns and to analyze whether the virtual world inflation will lead to real-world inflation.

II. VIRTUAL CURRENCY

A. Definition

We define network virtual currency as a kind of payment with purchase of legal tender, it can pay for virtual goods and a variety of Internet payment services. It is a kind of virtual credit money for the storage, exchange and payment in the form of electronic information through network system.

B. Virtual Currency in China

Virtual currency generated on the Internet. June 17, 2011, China Internet Network Information Center (CNNIC) released "2010 China's online game user research report". The report showed that the number of China's active online game users increased at the rate of 58.7% to 110 million people at the end of 2010, more 40.69 million than 2009. Many network operators have started to issue their own virtual currency to users to purchase a variety of services and virtual goods offered by companies. These virtual currencies include Q Coins by Tencent, POPO money by Netease, U coins by Sina, Baidu

Coins by Baidu, Point coupons by Shanda, etc. Not only can the virtual currency pay online service, but some can pay SMS fees, even used in the online purchase of physical goods. Many types, huge scale of use, convenience prepayment, high degree of recognition, make virtual currency of more and more concern.

III. INFLATION IN THE VIRTUAL WORLD

A. Virtual World Inflation

Virtual world Inflation reflects as followings. First, Inflation is reflected in the virtual world inside. Terdiman (2005) pointed out that due to lack of money supply control system, more and more games money were issued into the market, What could buy a castle today, perhaps were only enough to buy an ax tomorrow.[2] Second, Inflation is manifested in the exchange between VC and RMB. For example, World of Warcraft players can use 2000 Yuan to buy a 1800 virtual Gold in 2005, but these virtual Gold devaluated more than 98% after less than three years. World of Warcraft Gold and the RMB exchange rate is 0.9:1. With the inflation in the virtual world, purchasing power parity laws lead to the rapid depreciation of virtual currency against the RMB.

B. Causes of Virtual World Inflation

Virtual currency inflation is originated from its release mechanism. If the virtual currency can be purchased only through the RMB, and the exchange rate is fixed, the issuance of virtual currency will not lead to severe inflation in the virtual world.

While, in fact virtual currency cannot be bounded with RMB. Plays can get virtual currency as free gifts from VC issuers or other players, and they can also attain VC through playing games. In other words, Both VC original issuers and players lead to issuances of VC in the virtual world to get more profits. [3]In the virtual world, there is no regulation over this kind of speculation. So, it took only a few years from scratch to vicious inflation in the virtual world.[4]

C. Academic Overview

At first, views of scholars are not uniform on whether or not virtual currency will affect the entire financial order. Most scholars view that the virtual world will have an impact on RMB, and even cause inflation. Opponents believe that a limited amount of virtual currency transaction, which is free

Supported by "the Fundamental Research Funds for the Central Universities" (Code: 2009RC1012).)

exchange to RMB, will not impact on real financial order. However, the rapid development of E-commerce makes their hypothesis overthrown and poses a challenge for above mentioned views. There are more and more exchange platforms of virtual currency and RMB, transaction volume is also growing fast and becoming huge. Academic generally unified view is that the virtual world inflation will impact the real world financial order, and even lead to inflation in the real world. [5][6] Is that true? Let's begin with the study of virtual currency transaction patterns, and then analysis operation mechanism and impact of virtual inflation based on "Monetary approach to balance of payment" of Harry G. Johnson. [7]

IV. THE IMPACT OF VIRTUAL WORLD INFLATION ON THE REAL WORLD

This part we will analyze the impact on the real world under each Transaction pattern according to the purchase of virtual currency.

A. Hypothesis : virtual currency can not buy real goods.

If the virtual money cannot buy real goods, the transaction pattern is the same as prepaid system, the virtual goods is just another kind of commodity. No matter how the exchange rate of virtual currency varies, it's just a new commodity price fluctuation.

1) Transaction pattern 1 : purchase virtual currency from the issuer

When People purchase virtual currency from the virtual currency issuer, they usually directly use their bank deposit. The purchaser's bank deposits turn into the issuer's deposits, this transformation has not changed the total amount of bank deposits, the corresponding deposit reserve ratio and the excess reserve ratio has not changed, and the deposit multiplier will not change either. If they use cash to purchase virtual currency, the cash is raised from bank deposit, so there's no difference between the two patterns.

The result of the transaction is that new base virtual currency is issued in virtual world, but in the real world deposits are only transferred in the banking system and the amount of money does not change at all, as shown in Figure 1.

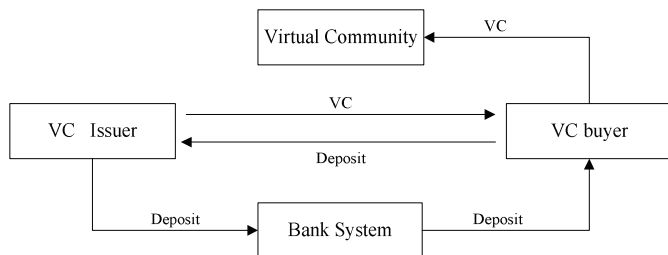


Figure 1. Transaction pattern between VC issuer and buyer

2) Transaction pattern 2: purchase virtual currency through a third party platform

In this transaction pattern, first of all, the virtual currency buyer draws bank deposits from his account and transfers to a third party's account, the third party will notice the currency seller, the seller will transfer the virtual currency to the buyer's

virtual account after receiving the notice. Then the buyer will check if the amount of virtual currency is correct and then notice the third party to transfer deposits to the seller. After deducting some fee the third-party will transfer the deposits to the seller, as shown in Figure 2.

The result of the transaction is that in the virtual world the amount of the virtual currency shows no change, in the real world the virtual currency buyer's bank deposits transfer to the third-party's deposits and the seller's deposits. So the amount of money does not change in the real world regardless of the change of the exchange rate between VC and RMB.

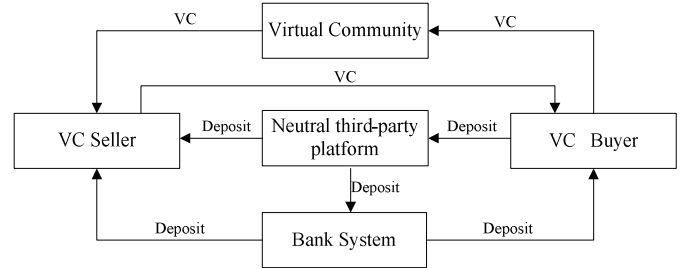


Figure 2. Transaction pattern based on third-party platform

B. Hypothesis : virtual currency can buy real goods.

We assume that virtual currency can purchase real goods. According to the virtual currency credit rating, there are two transaction patterns.

1) Transaction pattern 3: virtual currency is used as a one-time media

In the transaction, the virtual currency possessor will buy the real goods, then he gets the real goods, and manufacturers get virtual currency. The fact is that manufacturers do not prefer to be always holding virtual currency, because the virtual currency does not flow in a large area of the real world, so manufacturers will sell the virtual currency as soon as possible. In reality, they often transact with co-operators of virtual currency repurchase or issuer (according to their agreement), then the manufacturers get the RMB deposits, the virtual currency buyers get virtual currency, as shown in Figure 3.

The result is that in the real world the deposits transfer from the virtual currency buyers' account to manufactures' account and the virtual currency turns around in the real world then goes back to the virtual world just as a one-time media. All in all the amount of currency doesn't change either in the real world or in the virtual world.

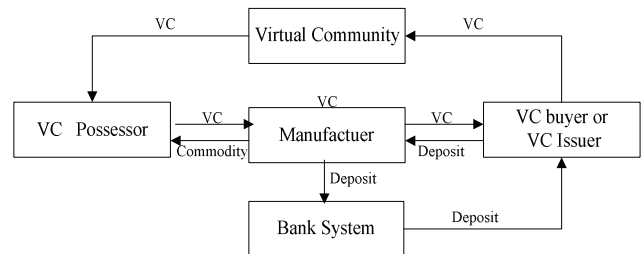


Figure 3. Transaction pattern between VC processor and manufacturer

2) *Transaction pattern 4: virtual currency has all the functions of RMB*

Assume virtual currency has enough credit to be accepted and widely circulate in the real world, and it can act as a real-world measure of value and means of circulation.

We will use Harry Johnson's Monetary Approach to Balance of Payment to analyze. Assume that the real world and virtual world are two countries which trade freely and real money can buy both real goods and virtual goods, virtual currency can buy both virtual products and real goods. Real goods and virtual goods can have a free exchange because they both contain undifferentiated human labor.

a) *Modeling*

Johnson' approach can be illustrated as following. We assume there are two currency system, real world and virtual world. Under open economy, base currency of real world consists of two parts, D is the part of the domestic credit creation. R is the part from abroad, i.e. increased international reserves caused by balance of payments surplus and. M_s is the total money supply, and h is money multiplier. Then,

$$M_s = h(D + R) \quad (1)$$

We assume the exchange rate is fixed. According to Cambridge Equation, money demand M_D is a stability function of price h and income Y function, namely,

$$M_D = kpPY \quad (2)$$

When there is equilibrium in the money market, (3) is established.

$$M_s = M_D \quad (3)$$

Then, we can get (4) from (1),(2)and(3).

$$kPY = h(D + R) \quad (4)$$

According to *Law of One Price*, we know

$$P = EP^* \quad (5)$$

E is the exchange rate, and P^* is the price in the virtual world.

Put (5) into (4),we get (6)

$$kEP^*Y = h(D + R) \quad (6)$$

On the logarithmic and then derivative of formula, we get (7).

$$e + p^* + y = r + d \quad (7)$$

If exchange rate is fixed, we know $e = 0$, $p = p^*$, then

$$r = p + y - d \quad (8)$$

Or,

$$r = m - d \quad (8)$$

In (7) and (8), we assume $m = \Delta M / M$.

Rewrite the above equation, we get (9)

$$p = r + d - y \quad (9)$$

Let's put (8) into (9),we get (10)

$$p = m - y \quad (10)$$

b) *Analysis*

First, it is under a fixed exchange rate in the free trade situation. Because of "law of one price" role, national inflation rate has convergence tendency, the international price transmission is particularly evident, if one country want to maintain the pegged exchange rate with other countries, its domestic prices levels will have to change with other countries. This means that inflation can pass from the virtual world to the real world.

Second, it is under the floating exchange rate. Floating exchange rate system can prevent the disturbance of virtual currency. Under floating exchange rate the RMB will appreciate. Appreciation of the RMB will reduce the exports to the virtual world and increase imports from the virtual world. Through the automatic adjustment of the balance of payments, inflation will be blocked.

Subjectively, it's impossible for the network operators to maintain the exchange rate of the virtual currency because the individual can use the black market for arbitrage activity under fixed exchange rate. That is, the cost of control for virtual currency will be enormous. Of course the real-world central bank will not afford to maintain the virtual currency exchange rate by changing the supply of RMB.

So From an objective point of view, there will be only floating exchange rate between the virtual currency and RMB. Floating exchange rate would be more effective and safe over the long term, the virtual world inflation will be blocked automatically.

V. CONCLUSIONS AND SUGGESTIONS

June 2009, the Ministry of Culture and the Ministry of Commerce issued "the notice to strengthen the management of online game virtual currency ", according to the latest regulations, online game virtual currency cannot be used to purchase real goods. This requirement is consistent with our first assumption, and will not impact on the financial order, or bring inflation to the real world.

In fact, this assumption is too strict. According to the analysis, in the current credit status, even if virtual currency could buy real items, it would only be as a one-time exchange medium, and will ultimately go back to the virtual world, and would not in general circulate in the real world, and virtual world inflation will not be transmitted to the real world.

Even in the extreme assumption that the virtual currency has such excellent credit status that it gets the functions of RMB in the real world, and even could somewhat substitute the RMB in circulation, inflation of virtual currency could not be transmitted to the real world in a long run. By the way the intense inflation of virtual world will hit the credit of the virtual currency and this extreme assumption will be very difficult to occur.

Despite this, the virtual currency inflation will hit the virtual world order and destroy the basis of the credit of virtual

currency. That is not conducive to the development of a new industry, so supervision of the inflation in the virtual world is still necessary, and regulators do not have to worry too much about the real world at the same time.

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