INTERNET CONSUMER'S BEHAVIOR UNDER THE CYBER 'LEMON': THE CASE FROM THE INTERNET MARKETS IN CHINA

Yong Pan

School of Information
Henan University of Finance and Economics
Zhengzhou, 45002, China
Email:pannyong0903@yahoo.com.cn

ABSTRACT

The 'lemon' problem means the informational asymmetries resulted from the products quality uncertainty. It was suggested by the American economist George Akerlof (1970), who is one of Nobel Economics Prize laureates in 2001. The purpose of this paper is to analyze Internet consumer's behaviors under the cyber 'lemon'. With the view from CAS (complex adaptive system) theory, the paper builds up e-consumer's behaviours model that based on Akerlof's 'lemon' model and analyzes the issue stemming from the Internet markets in China. The thesis considers that the cyber 'lemons' in China is more serious than other developed countries, because there are many special influencing factors. This paper put forward the ideas eliminating or avoid the cyber market. Compared to the physical market, we need some particular approaches to eliminate the cyber 'lemons' such as renting reputation, uniting brand and quality-intermediates. Some non-economic approaches such as law, ethics and trust in Internet market are need also.

Keywords: Lemons Problem, Informational Asymmetries, Adverse Selection

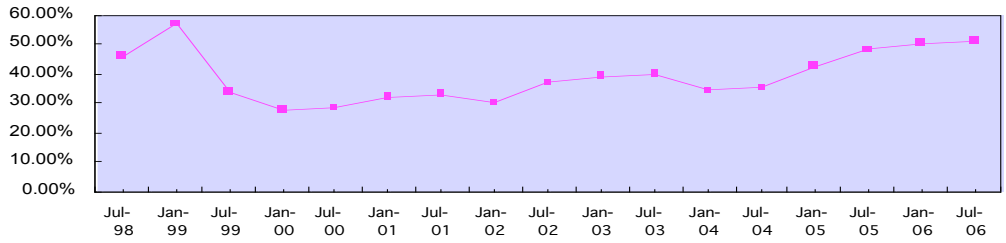
CYBER 'LEMON' PROBLEM IN CHINESE INTERNET MARKETS

Compared with the traditional market, the advantage of e-commerce markets lies in its lower enter-obstacle, lower transaction cost and easily acquirement for the market information. But it not implies that there should be high marketing efficiency. In fact, in the e-commerce market the 'lemon' problems resulting from asymmetry of quality information exist more seriously than in the traditional market. The reasons as below: (1) E-Commerce changes the nature of transactions. In e-commerce the e-buyers and e-sellers are geographically separated, they do not interact face-to-face. So it is hard to physically inspect the quality of the good prior to buying it. There is temporal separation between exchange of merchandise and cash. (2) Unclear identity for online producers. In the Internet the cyber-store can be built in one day, and disappear simultaneously too. For this type of uncertainty, the marketing efficiency in e-commerce will be extremely low. Unclear identity for online producers makes us not know well the products quality. (3) The subjectivity of evaluation about quality online. There is no doubt that the personalized service in the Internet enables customers more frequently and more convenient. However, the personalized services make it difficult to diffuse the reputation built in a customer to other customers, which strengthen the informational asymmetries about product quality. (4) Alternating personality of producers in network. Unlike the tangible products, the online goods are produced and sold by the virtual persons, who exist in short time or numerously.

All the users are the potential producers or vendor by the individual homepage or web server. Hence in the e-commerce market the lemons problem will be serious. (5) The influence of 'information paradox'. Because the digital products mostly are experience goods, their quality is known clearly only after being used. However, once consumers acquaint oneself with its quality they unwillingly buy it – this is an insuperable barrier in producing the digital commodities. This attribute makes the manufacturers find no good methods to guarantee their products quality to customers.

E-consumers in China have stronger 'lemon's sensitivity' than other developed countries. According to the 'China Statistical Survey Report on Popular Internet Issues' published by China Internet Network Information Center, in China e-commerce market, the quality of online goods is the problem that e-consumers concerns most. Recent 18 times report shows that the proportion of 'thinks the biggest problem in e-commerce market is good quality' is very high (table 1).

Table 1 Proportion Concerned By E-Consumer For Online-Quality



According to the '2006 China C2C online shopping Report' published by China Internet Network Information Center also shows that the 'Thing that the e-consumer cares for most' is quality of online product in the top 3 city of China (Beijing, Shanghai and Guangzhou) (table 2).

Table 2 Proportion Concerned By E-Consumer (Three Cities)

	Beijing	Shanghai	Guangzhou	Add up
Quality of online product	66.5%	63.1%	62.6%	64.1%
Veracity of online seller	34.2%	34.2%	33.6%	34.0%
Payment for goods	13.5%	12.7%	18.7%	14.9%
Deliver of goods	9.6%	5.8%	10.2%	8.5%
Dissension of trade	3.2%	3.5%	5.2%	4.0%
After service of web	9.0%	8.3%	10.3%	9.2%
Else	6.3%	9.5%	10.0%	8.6%

CYBER 'LEMON' MODEL IN THE INTERNET MARKETS

Now we can illustrate this by the cyber 'lemon' model in the internet markets. With the view of CAS (complex adaptive system) theory and based on the virtual reality in e-markets, the model is considers the qualitative-preference difference between the e-buyers and e-sellers in China. We hypothesize that there are many potential e-buyer

and e-seller, who are risk neuters and hypothesize that $q \in \_q^0 \_ q^1 \_$ is the quality of online products, and the distributing function is f(q).

The objects concerned:

- **E-Sellers**

E-Sellers are the object traded in the market. For the e-seller in the e-commerce markets, their utility function is:

$$U_s = U_s(c, n \mid m, q) = c + mqn$$

Here c is e-seller' consumption for other goods. n is discrete binary variable that indicates if seller sale their products, n = 1 show that seller sale nothing, n = 0 show that seller have sold some product. m is a type of utility index, which show seller' appraisement for the quality of online product. Because the relative price (not absolute price) influence decision making, we can denotes price with p and define the price of other products as 1.

Under the restriction of income budget, vender is faced with following issue:

$$\max_{c,n} U_s = c + mqn$$

We hypothesize that vender's restriction of income budget is_

$$Y_s = c + pn$$

Here Y_S is e-seller' income. When we put the restriction of income budget into the utility function, we can get following result_

$$U_s = Y_s + (mq - p)n$$

If e-seller want to get maximal utility when they sale their product(n = 0)_following condition must be meet:

$$mq - p < o, mq < p \text{ or } q < \frac{p}{m} \qquad (1)$$

So, under any price, the product proportion that meets $q < \frac{p}{m}$ is_

$$S(p) = prob(q < \frac{p}{m}) = \begin{cases} \int_{q^0}^{p/m} f(q)dq \cdots\cdots\cdots (p > mq^0) \\ 0 \cdots\cdots\cdots\cdots (others) \end{cases} \qquad (2)$$

- **E-Buyers**

E-Buyers are the other object traded in the market. For the e-buyer in the e-commerce markets, their utility function is:

$$U_B = U_B(c, r \mid t, q) = c + tqr$$

Here c is e-seller' consumption for other goods. r is discrete binary variable that indicates if e-seller sale their products, r = 1 show that e-buyer have bought some product, n = 0 show not purchase. t show relative appraisement index of online products, which compare with other goods[1].In order to guarantee successful trade, should $t \geq$ m. We can also denote price with p and define the price of other products as 1.

Under the restriction of income budget, vendee is faced with following issue:

$$\max_{c,r} U_B = c + tqr$$

We hypothesize that vendee's restriction of budget is_

$$Y_B = c + pr$$

[1] In Akerlof's model_t=3/2_

Here Y_B is e-buyer' income.

Under the precondition of quality uncertainty, vendee's decision whether to buy goods depends on the following expectation utility:

$$E(U_B) = c + t\,E(q)n = c + t\_r$$

Here $E(q)$ show expectation quality of online products, i.e. its' average quality lever, so $\mu = E(q)$

If we take the restriction function of income budget into the expectation utility formula, we can get:

$$E(U_B) = Y_B + (t\mu - p)r$$

If e-buyers raise their utility when they buy products ($r = 1$), should have:

$$t\mu - p > 0,\ t\mu > p \text{ or } \mu > p/t \qquad (3)$$

In fact _(3) indicate the decision boundary of demand .

- **Equilibrium in E-Market**

Similar to the Akerlof model _1970_,we can build Supply and demand function, which is based on the relation between the average quality and price . According the Wilson model _1979_1980_,the relation between price and average quality is :

$$\_ = E(p\_mq<p)$$

$$= \int_{q^0}^{p/m} qf(q)dq \Big/ S(p)$$

$$= \int_{q^0}^{p/m} qf(q)dq \Big/ \int_{q^0}^{p/m} f(q)dq \quad (q^0 < p < q^1) \qquad (4)$$

Because it synchronously satisfy the condition of formula (1), so formula (4) actually indicate average quality level of product traded. More important_it shows decision boundary of supply . Combing (4) and (3), we can analyze the equilibrium condition, i.e. Walrasian equilibrium region.

In order to illustrate issue, we endue the product quality with stated probability distribution. We assume that q is uniformly distributed_so its' density function is_

$$f(q) = 1/(q^1 - q^0).$$

Now we discuss the equilibrium of trade and price according to the scale of m. We can consider two kinds of situation_$m = 1$ and $m \neq 1$.

Examples

- **Example 1**

If $m = 1$__4_become following formula _

$$\mu = \int_{q^0}^{p} \frac{q}{q^1 - q^0} dq \Big/ \int_{q^0}^{p} \frac{1}{q^1 - q^0} dq = \frac{p + q^0}{2} \qquad (5)$$

The possible equilibrium of both parties of supply and demand shows Fig.1.

In Fig.1,(4) shows radial **S**($q^0 > 0$) and radial **S**($q^0 = 0$)_which reflects decision desire and gist of supply .(3) shows lower right of radial **D**($t \geq 1$),which is decision boundary of demand .

As what we have discussed above in order to guarantee trade successfully, we need $t \geq 1$.So, radial **D** ($t = 1$) is lowest boundary of demand cluster **D**($t \geq 1$). Obviously, the intersection between supply district and demand districts is Walrasian equilibrium, which is intersection between lower right area of line **D** and radial **S**.

If the lowest quality of online products is 0_$q^0 = 0$__intersection between **S**($q^0 = 0$) and lower right area of **D**($t \geq 1$) is origin_0_0_. It already has no actual meaning,

we needn't consider this case.

If the lowest quality of online products isn't equal to 0_q^0 >0_. From Fig.1 we can know, if online consumers make up the shortage of the quality judgment by lowering their preference for quality that resulting from network virtuality (t tend near 1),the boundary of equilibrium will shrink, i.e. equilibrium price will fall(in Fig.1 p^1 tend to p^0). So we can get conclusion that the virtuality from network comes into being lower-price equilibrium.

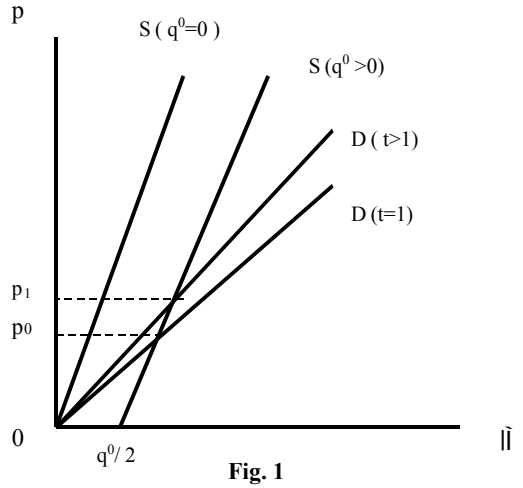


Fig. 1

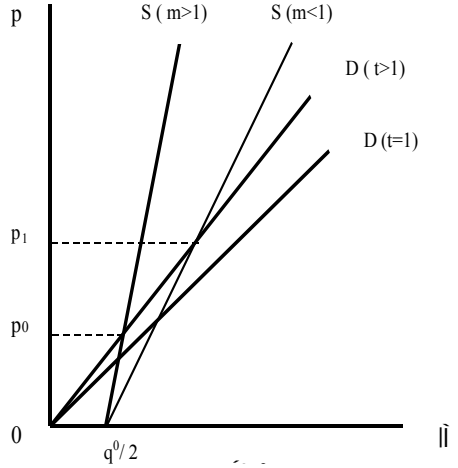


Fig. 2

- **Example 2**

If $m \neq 1$ (4) become following formula:

$$\mu = \int_{q^0}^{p/m} \frac{q}{q^1 - q^0} dq \Big/ \int_{q^0}^{p/m} \frac{1}{q^1 - q^0} dq = \frac{1}{2}(\tfrac{p}{m} + q^0) \qquad (6)$$

We assume that e-seller' preference for quality of online product $m \neq 1$.If combining (6) and (3)_the possible equilibrium of both parties of supply and demand shows Fig.2. From the Fig.2. we can see, if e-seller' preference for quality of online product is increasing , increment of m, supply area, i.e. intersection between **S** and lower right area of **D** will shrink, so equilibrium price will fall (in Fig.2 p^1 tend to p^0).

CONCLUSIONS

The conclusion can be got from the model analysis above: (1) Qualitative-preference between the e-sellers and e-buyers in China will bring contraction of Walrasian equilibrium region and lower Walrasian equilibrium price. This phenomenon comes from virtuality of the network in China: the e-consumer not only needs to learn the quality distribution of the product but also try to understand the e-seller's motive. So the virtual network increases the consumer's information inferiority, which induce more serious lemon problem than other area. The e-consumer 'lemon-sensitivity' will be even stronger than the tangible markets. (2) From economics opinion, if the market equilibrium is based on the low-price level, this possibly means market's coordination function doesn't work because it indicates that the welfare level is decreasing in transaction. Compared with traditional market, the network market even requires the occurrence of the coordinator of market, such as the quality intermediary, the law

enforcement, the moral criterion and so on. (3) The model also tells us that network product's quality distribution can influence the equilibrium result. The extreme situation is, if the lowest quality is assumed as zero, then the whole transaction possibly can break up. The market equilibrium has the significance only when the worst product quality is above zero. It also explains that if there are too many inferior products ('lemons') in network market, the market is even easier to break up.

From the conclusions above, we can adopt following strategies to eliminate or avoid the cyber market in Internet markets: (1)As a trusted third-part, the quality-intermediary in the e-commerce market can establish the trust for market participants to eliminate cyber lemons. A trusted mechanic may examine the online product to determine whether it is a lemon. The common criterion is that third parties need to be neutral, trustworthy, and equipped with a necessary expertise to evaluate products (yong pan, 2006). (2) As a non-economical methods_it is important to supply the law support for eliminating the lemons problem in the e-market, for example punishing the violators. (3) Combine the traditional channel and the cyber channel. The on-line enterprises can use their reputation and brand based in tangible market to knock the door of the E-commerce. (4) Sufficiently pay attention to the situation of China and designing suitable network model that suits Chinese situation and characteristic.

FURTHER DISCUSSION

The efficiency of a market critically depends on the amount and the nature of information—about products and consumer tastes—available to sellers and buyers. When market agents are not endowed with proper information, the market may be inefficient or even fail to function. Grossman and Stiglitz (1980) have proved and put forward the 'Grossman - Stiglitz paradox'. This paradox consists of two contradictory conclusions: (1) If the information in the market is transferred adequately, the market equilibrium is inexistent. (2) If achieving information need paying out cost, there is no the equilibrium in the original significance. This 'equilibrium' paradox drastically negates the connotative presupposition that the information is complete. It illustrates that complete information can not availably enhance market efficiency, contrarily, it possibly obstructs exert of market efficiency. Extreme high or low information efficiency all hinders the improvement of market efficiency. Hence asymmetric or incomplete information is realistic, inevitable and necessary. What need to do is that we should sufficiently recognize the influence of the cyber 'lemons' on the e-commerce, which is precondition when we observe the Internet markets.

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