Research on Pareto Optimal Effect of Internet Finance *

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Abstract - Internet finance is the financial innovation in the field of financial under the Internet background, which also is the product of thinking in the Internet. This article takes study on the effect on Internet financial based on Pareto. Firstly, the paper combed the knowledge of Internet Finance, expounded the phenomenon of the Internet financial compared with traditional financial markets to reduce the dependence on the financial intermediation and reduced the transaction cost. Then, it explained the concept of Pareto optimality, and gave out the agreed conditions. After analyzing, it is can be achieved the Pareto optimality of the Internet financial effect. At the end of the article, Internet financial development several opinions are given.

Index Terms - Internet Finance；Pareto optimal；Internet thinking

1. The Internet Finance under the Thought of the Internet

High-efficient sharing, equality and freedom, trust and respect are the sharing of point to point and gridding interconnection, thus forming information interaction, resource sharing, complementary advantages and disadvantages, and we can excavate from these data to find information value. So Xie Ping(2012) was first put forward the concept of the Internet financial and corrected to point out that: the Internet finance is different from commercial banks and the "third" financing method of capital market.

Thus the modern information technologies, represented by the Internet (including online payment, cloud computing, social networking, search engines, etc.) as the backing, to achieve financing, payment and information intermediary business such as an emerging financial, which is different from the elite temperament. It pay attention to professional qualifications and the barriers to entry, not anyone can enter, nor anyone can enjoy the traditional financial services. Internet financial will open, shared, decentralization, equality, freedom of choice, inclusive financial, democratic spirit of the Internet to carry out the financial division and weakening the specialties, financial products are simplification, financial disintermediation, disintermediation, financial democratization, inclusive financial, and the innovation of financial products link the basic necessities of life line with social contact.

Domestic research of Internet finance are based on different theories. Not only based on the characteristics of the Internet financial under the perspective of complex adaptive system and operation mechanism (Yu-Ming Chang, 2014), but also based on the view of financial function of the Internet financial compared with commercial Banks (Hong-Mei Li, 2014), as well as Internet financial ecological construction based on system theory (Xia Zheng, 2015) and so on. This article attempted to study of this problem from the classical theory of economics, Pareto optimality. That is because: (1) Internet financial is a revolution about a new kind of resource allocation, Pareto optimality is an important concept in economics, also is a method to study the allocation of resources, thus the Pareto optimality of the Internet financial is also important research direction. (2) Pareto optimality of Internet financial effect can make resources get reasonable configuration, the traditional financial intermediary and financial market will give way to the Internet technologies, can reduce transaction cost, which is one reason that Internet financial with a rapider development than traditional financial.

2. The Financial Analysis of the Pareto Optimal Effect

Pareto optimality, also called Pareto efficiency, was first posed by Vilfredo Pareto, an Italian economist. It means some individuals have reached the Pareto optimal state and can't increase their welfare anymore under an economic environment and without affecting other individual interests.

How does Pareto optimality apply on the Internet Finance? The followings are the conditions the paper have thought about that Pareto optimality needs in the economical application.

A. Having Sufficient Market

Be similar to other resources, Internet financial also needs enough market space to achieve the Pareto optimality. The nature of the Internet financial is Internet thinking, and equality, democracy, inclusive of Internet thinking let us access to the Internet financial directly. It fully deployed capital of every individuality across the society by reducing the barriers to entry. Together with reasonable, fair, standardized supervision, a sufficient market will be formed inevitably.

B. Producers and Consumers are in the State of Competition

It can know from the conditions of Pareto optimality that all producers and consumers are in a state of competition. So when the Internet financial becomes the resource of perfect competition, everything about the reallocation of the Internet financial will lead to the decrease of the production level and Pareto improvement can't be improve anymore, it is called Pareto optimality.

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C. Market Equilibrium

The balance of the market supply and the market demand is market equilibrium. It can reach to the best state of Pareto optimality when it is under Perfect Competitive condition. In theory, it should meet the above three conditions if wanting to apply Pareto optimality In the aspect of Internet Financial development. Fortunately, The Internet Finance is exactly similar to the Perfect Competitive market, and when it meets these three conditions, it will reach to the best state of Pareto optimality.

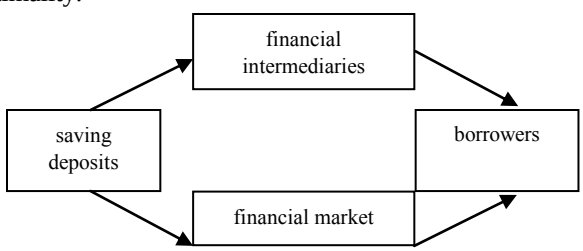

Fig. 1 Traditional financial intermediation and market

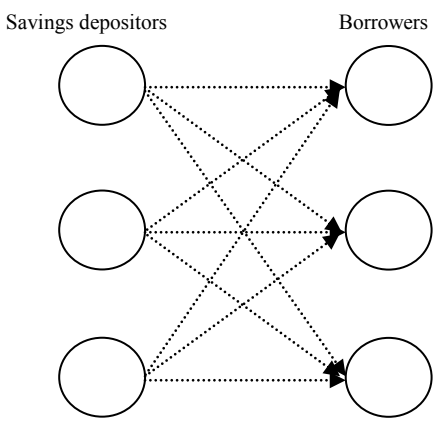

Fig. 2 No financial intermediation and market sentiment

Precisely, it may then assume there were m Internet financing models, each model have established preference, as utility function is known. Now there exist two kinds of resources M, H, we know the total of them were Mo, Ho, from the Pareto improvement obtain the conditions of resource allocation:

Sets the general form of the utility function to be represent the M, H the distribution of the elastic coefficient：

$U_i = M_i^{a_{i1}} H_i^{a_{i2}} (i = 1...m, a_{i1} > 0, a_{i2} > 0)$, a_{i1} a_{i2}

The total amount of two kinds of resources M_o 、 H_0

$M_1 + ... + M_m = M_0$ 、 $H_1 + ... + H_m = H_0$

The utility demand of consumer of 2 to M can be obtained by $\overline{U}(i = 2...m)$

Lagrange function is expressed as:

$$L = U_1(M_1, H_1) + \sum_{i=2}^{m} \lambda_i \left[U_i(M_i, H_i) - \overline{U}_i \right] + \lambda_0 (M_1 + \bullet\bullet\bullet + M_m - M_0)$$

$$+ \lambda_1 (H_1 + \bullet\bullet\bullet + H_m - H_0)$$

Strives for the partial derivatives

$$\frac{\partial L}{\partial M_1} = \frac{\partial U_1}{\partial M_1} + \lambda_0 = 0$$

$$\frac{\partial L}{\partial M_2} = \lambda_2 \frac{\partial U_2}{\partial M_2} + \lambda_0 = 0$$

…

$$\frac{\partial L}{\partial M_m} = \lambda_m \frac{\partial U_m}{M_m} + \lambda_0 = 0$$

Getting derivative with respect to L of H1……Hm, as follows:

$$\frac{\partial L}{\partial H_1} = \frac{\partial U_1}{\partial H_1} + \lambda_1 = 0$$

$$\frac{\partial L}{\partial H_2} = \lambda_2 \frac{\partial U_2}{\partial H_2} + \lambda_1 = 0$$

…

$$\frac{\partial L}{\partial H_m} = \lambda_m \frac{\partial U_m}{\partial H_m} + \lambda_1 = 0$$

Thus

$$\frac{\partial U_1 / \partial M_1}{\partial U_1 / \partial H_1} = \frac{\partial U_2 / \partial M_2}{\partial U_2 / \partial H_2} = ... = \frac{\partial U_m / \partial m}{\partial U_m / \partial H_m}$$

Thus

$$MRS_{MH}^{1} = MRS_{MH}^{2} = ... = MRS_{MH}^{m}$$

These are a multiple Internet financial financing model and two kinds of resources of Pareto optimality conditions, In other words, When each Internet financial financing mode of the marginal rate of substitution is equal, it can be achieved the Pareto optimality.

3. Case Analysing: P2P Lending

P2P (Peer - to - Peer) lending is a form of Internet financial, refers to the use of internet platform to carry out the lending business form of microfinance. P2P lending of China developing rapidly since China established the first P2P lending platform “PaiPaiDai” in 2007. According to the P2P lending organization statistics, by 2013 the P2P lending industry has more than 800 internet platforms and the total volume of 501.8 billion yuan. Generalize the P2P platform operation mode found online lending process is divided into three steps:

1) Borrowers in the lending platform release their personal information, including the loan amount, purpose, term and interest rate, etc.

2) After understanding the personal information of the borrowers, lenders choose whether to lend, also the amount and interest rates.

3) The borrowers and lenders reach an agreement then the contract established, according to the contract requirement borrowers pay the interest monthly.

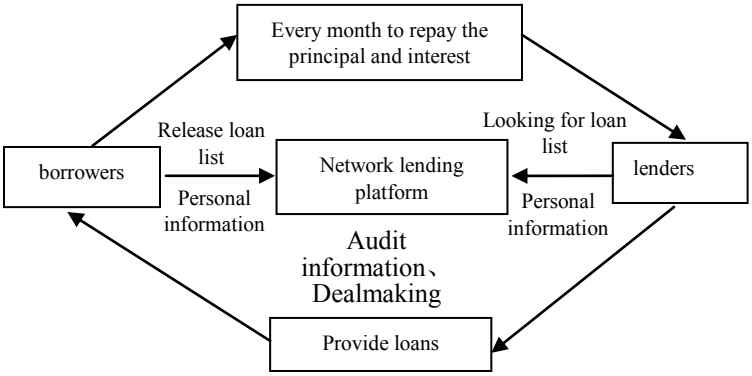

Fig. 3 Flow chart of P2P lending

P2P lending is a typical embodiment of Internet financial, it does not have a traditional financial intermediaries, but use the Internet technology enables funds flow between lenders and borrowers. Because of the Internet technology it can make all people become lenders and borrowers after they reach a certain standards, compared with the traditional financial， P2P reduces the threshold, it make the Internet financial market more fully. At the same time, because of the internet's efficient sharing and equal freedom, both lenders and borrowers in the loan of P2P network are in competition condition, to achieve market equilibrium state at the end.P2P lending completely meet the three conditions of pareto optimality, therefore it can be in a state of pareto optimality.

4. The development of the Internet financial advice

1) Start from consumer's needs, use the support of the Internet, supplier's cost will be reduction. Who know consumer's need Who can have the market. In the mean time supply and demand will get balance. Finally approach Pareto optimality.

2) The government should support Internet financial development. The traditional financial had been developing for years. The transitional financial and Internet financial supplement each other. The government's support on Internet financial let Internet financial approach Pareto optimality.

3) Relevant department should strengthen supervision and movement. Financial industry default is high-risk and has a great influence in society. The government should support Internet and pay attention on strengthening supervision and movement. Only when government paid attention on that, it can approach Pareto optimality.

4) The Internet financial enterprises should strengthen the propaganda on the Internet Financial, broaden business, which can let the company get high benefit, let it develop faster, finally approach Pareto optimality.

5. Conclusion

Internet finance is the financial innovation in the field of financial under the Internet background, which also is the product of thinking in the Internet. This article takes study on the effect on Internet financial based on Pareto. Firstly, the paper combed the knowledge of Internet Finance, expounded the phenomenon of the Internet financial compared with traditional financial markets to reduce the dependence on the financial intermediation and reduced the transaction cost. Then, it explained the concept of Pareto optimality, and gave out the agreed conditions. After analyzing, it is can be achieved the Pareto optimality of the Internet financial effect. At the end of the article, Internet financial development several opinions are given.

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