



Game Analysis of the Influences of Converse Selection on Enterprise Financing

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Abstract

Converse selection is the phenomenon commonly existing in the market, and its connotation is the asymmetry of information. Converse selection influences the trading between two or among above two different individuals or enterprises. Enterprise financing comes down to the trading between at least two different enterprises such as the financing party and the loan party, i.e. the behavior of converse selection influences the enterprise financing, and under different financing modes, these influences are different, which can be better opened out by the game analysis. And the theory of signal can be used to reduce or eliminate the bad influences on the enterprise financing brought by the behavior of converse selection.

Keywords: Converse selection, Enterprise financing, Game, Signal

1. Converse selection and information asymmetry

The economic explanation of information asymmetry is that one party of the trading knows insufficiently about the other party, and both parties are in the unequal state. Generally speaking, seller possesses more information about the trading goods, for example, for the business of second-hand cars, seller more know the car, but the contrary situation may also exist, for example, for the medical insurance, the buyer generally possesses more information. According to the time sequence of asymmetric information, and information asymmetry is represented by converse selection and moral risk.

The converse selection is the information asymmetry beforehand, and it means that the products with bad quality produced because of information asymmetry and descending market price drive out the products with good quality, and accordingly the phenomena that the average quality of products in the market falls occur. In the financial market, the converse selection means that the financing parties with the most possible disadvantageous (converse) result (i.e. the risk of breach faith) always are those people who seek the capitals most actively and acquire the capitals most possibly.

2. Modes of enterprise financing

The modes of enterprise financing can be divided into two sorts, i.e. the interior financing and the exterior financing.

The interior financing means that the economic subject (the enterprise) finances by certain mode in the enterprise itself, for example, the enterprise finances by its own profit retention and depreciation. Generally, the interior financing is the

main financial mode when the enterprise starts in the initial stages. As viewed from the financial theory, because reducing the exterior financing charge of the enterprise, the interior financing needs not to pay interests and dividends, so the cash outflow of the enterprise will not be influenced, which will reduce the pressure of cash flow of the enterprise. But the most of interior financing has its deficiencies, and the most key limited factor is the limited quantity, and its upper limit is the management profit of the enterprise.

The exterior financing of the enterprise includes the direct financing and the indirect financing. The so-called direct financing means the financing behavior that the enterprise directly loans or issues stocks and bonds from the asset suppliers not from the financial institutions such as bank. In the direct financing, the supplier and demander of capitals could directly transfer the capitals by the financing measure, not via financial institutions such as bank. The direct financing can most possibly absorb the social idle funds which can be directly invested in the production and management of the enterprise to supplement the deficiency of the exterior financing. It includes three modes, i.e. the financing in the stock market and the bonds issuance, the financial lease which means that when the enterprise needs to finance and acquire equipments, it doesn't invest by direct purchase, but borrow equipments from the lease company by paying the rents, other financing channels which includes the lease market, the pledge market and the civil loans. The main mode of exterior financing is to acquire loans from the financial institutions.

3. Game analysis of the influences of converse selection on enterprise financing

Three modes of enterprise financing are the interior financing, the direct financing and the indirect financing. Because the interior financing can be regarded as the interior business of the enterprise, and it doesn't relate to the relationships of the enterprise with other parties, so the relationship between converse selection and interior financing is not discussed in the article, but the influences of converse selection on direct financing and indirect financing.

3.1 Influence of converse selection on the direct financing of enterprise

The direct financing of enterprise is a kind of financing mechanism which mainly uses stock and bond. The location that the suppliers and demanders of capitals can direct finance capitals by the financial tools such as stock and bond is the direct financing market, i.e. the securities market.

Suppose that the market income that good enterprise issues stock or bond is R_g , and the issuance price is P_g , and the issuance cost is C_g , and the yield is Y_g , so the investors' incomes investing in good enterprise is V_g . Relatively speaking, suppose that the market income that bad enterprise issues stock or bond is R_b , and the issuance price is P_b , and the issuance cost is C_b , and the yield is Y_b , so the investors' incomes investing in good enterprise is V_b . Generally speaking, the income of good enterprise exceeds the income of bad enterprise, and the stock issuance cost of good enterprise is less than bad enterprise, and the investment income of good enterprise is better than bad enterprise, i.e. $R_g > R_b$, $C_g < C_b$ and $V_g > V_b$.

Because of the influence of converse selection, the probability that good enterprise is regarded as bad enterprise is P_1 , and the probability that bad enterprise is regarded as good enterprise is P_2 , which will influence the costs that enterprise issues stock or bond, but will not influence the income of enterprise, because the character of the enterprise doesn't been changed. So the anticipated income of good enterprise E_g can be denoted as

$$E_g = (1 - P_1)(R_g Y_g - C_g) + P_1(R_b Y_g - C_b) = (R_g Y_g - C_g) + P_1(C_g - C_b)$$

If the market is in the condition of complete information, the anticipated income of good enterprise will be $E = R_g Y_g - C_g$.

Because $C_g < C_b$, so $E_g < E$, i.e. in the influence of converse selection, the anticipated income of good enterprise will be reduced, which will impact the enthusiasm that good enterprise directly seeks financing in the securities market.

The anticipated income of bad enterprise E_b can be denoted as

$$E_b = (1 - P_2)(R_b Y_b - C_b) + P_2(R_b Y_b - C_g) = (R_b Y_b - C_b) + P_2(C_b - C_g)$$

Here, $E_b > E$, i.e. the anticipated income of bad enterprise increases, which will encourage bad enterprise to implement the direct financing activities in the capital market, and for long, the similar phenomenon that "bad money drive out good money" will be formed in the capital market, which will largely impact the development of the capital market.

3.2 Influence of converse selection on the indirect financing of enterprise

In fact, the influence mechanism of converse selection on the indirect financing of enterprise is similar with the direct financing, and the difference is that the investors turn into financial institutions such as bank, which is different with the characters of the direct financing. In China, the enterprise financing sequence is issuing stock and financing in the stock market, loan and financing from banks, and interior financing. The indirect financing is one important mode of the sources of enterprise sources, because enterprises have the demand to loan from banks. So the influence of converse selection on the indirect financing of enterprise is mainly embodied in how financial agencies such as banks provide loans for enterprises.

By virtue of the mathematical symbols in the analysis of the influence of direct financing, the anticipated income E_{g2} that banks loan good enterprise can be denoted as

$$E_{g2} = (1 - P_1)(V_g - P_g) + P_2(V_b - P_g) = (V_g - P_g) + (P_1 - P_2)P_g + P_2V_b - P_1V_g$$

And the anticipated income E_{b2} that banks loan bad enterprise can be denoted as

$$E_{b2} = (1 - P_2)(V_b - P_b) + P_1(V_g - P_b) = (V_b - P_b) + (P_2 - P_1)P_b - P_2V_b + P_1V_g$$

P_1 and P_2 respectively denote the probabilities that enterprises are falsely judged (good enterprise is falsely judged as bad enterprise, and bad enterprise is falsely judged as good enterprise), and when financial institutions such as banks are the judged subjects, these probabilities are very small, so for the convenience, they are supposed as equal, i.e.

$$P_1 = P_2.$$

So,

$$E_{g2} = (V_g - P_g) + P_1(V_b - V_g)$$

$$E_{b2} = (V_b - P_b) + P_1(V_g - V_b)$$

And, generally the income of investing in good enterprise is better than the income of investing in bad enterprise, i.e. $V_g > V_b$.

So, $E_{g2} < (V_g - P_g)$ and $E_{b2} > (V_b - P_b)$, and the rights of the formula respectively denote the incomes of good enterprise and bad enterprise without the influence of the behavior of converse selection. These two formulas indicate that when converse selection exists, the income that banks loan good enterprise will decrease, but the income that banks loan good enterprise will increase, which will encourage banks to loan more capitals to bad enterprises. That will make against not only the long-term development of banks, but also the development of the country and the society.

4. Countermeasures for the behavior of converse selection in enterprise financing

By above analysis, it is obvious that the largest influence of converse selection on enterprise financing is investors' false judgment of enterprise, i.e. because of incomplete information, investors falsely regard good enterprise as bad enterprise, or regard bad enterprise as good enterprise, so their decisions are impacted to bring losses for their investments. If investors could know sufficient information about the enterprise beforehand, the probability misjudging the enterprise will be very small, which needs the enterprise to actively make information and let investors more comprehensively know it. But another problem occurs, i.e. enterprises will hide the disadvantageous information as much as possible in order to attract more investors, so relative systems are needed to restrain them.

4.1 As viewed from enterprise: strengthening the signal revealing mechanism

The signal theory begun in A. Michael Spence's research, and he thought that to reduce the influence of asymmetric information to the final trading in asymmetric information, the party with predominant information should transfer signals to the party in the inferior position of information, and the latter needs to discriminate the information from the party with predominant information to change the bad result induced by the information asymmetry.

4.1.1 Listed enterprises should have stable dividend policies

The dividend policies of Chinese listed companies are not stable, so quite proportional profit can not be distributed every year, which will seriously harm investors' benefits, even induce that investment refuse investing, so the financing of capitals will be influenced. Therefore, various listed companies should establish a long-term dividend distribution policy and keep the stability of the cash dividend policy according to their actual situation, their industry and their development stage, which can make investors to have a basic anticipation for the dividend in future and accordingly attract them to invest. And from the conclusion of the game model of dividend signal transfer (Zhao, 2007), only the signal that the listed company promise dividends after the income of item is realized is effective. In the actual economic activity, unreasonable dividend distribution will influence the long-term development of the company, and accordingly influence investors' long-term benefits, and change their investment decisions.

4.1.2 Enterprises should establish the credit rating system

The credit means a kind of promise and guarantee made by the party grasping information to the party in the inferior position of information. Enterprise is the carrier of credit, and the value of enterprise consists in credit, so to exert the function of signal display normally, the enterprise credit rating system is needed. Under the premise that the society provides the guarantee of encourage to enterprises, the enterprise with good credit could obtain excessive profits, i.e. the "credit income", and it can be understood by that the enterprises enjoy the return of good credit, for example, the enterprise with good credit can more easily obtain the loans from financial institutions such as bank. If the credit of the enterprise is harmed, its benefit will be damaged certainly, and in this way, credit will become into a real signal. Therefore, enterprises should establish a right credit mechanism to reduce the influence of information asymmetry on the market trading and the occurrences of converse selection.

After enterprises establish the credit rating system, they should periodically issue the credit rating reports for investors to know their credit records. According to the signal display theory, the enterprises with low class will continually enhance their quality, actively create conditions, and join the group with high class, and they will not simulate signals only. In this way, investors can make investment decisions according to the signals from enterprises.

4.2 As viewed from government: standardizing relative legal systems

To seed out "good" signals, enterprises have the motivations to make fake information in the process of information proclamation. To restrain that, the governmental department should adopt active and corresponding measures.

4.2.1 Exerting and strengthening the supervision and management function of the enterprise

The master of game theory who won the Noble Prize of economics, Doctor R. Reinhard Selten analyzed a game model about thief and guard, and the result showed that whether in the long term or in the short term, the most effective measure to restrain the happening of theft was to increase the punishments for the guards with breach of duty. Therefore, the behaviors of weak supervision of relative departments should be largely punished, and the encouragement mechanism should be introduced to encourage the implementation of their duties, which can effectively exert the function of supervision.

4.2.2 Perfecting the legal policy environment

The establishment of the credit system needs a relatively stable policy environment, and when the policy environment is more instable, investors will more pursue short-term benefits. The illegibility and opacity of policies, and the random of constituting policies all will influence the stability of the policy environment. At the same time, a reliable and feasible legal system is needed to make enterprises to observe the relevant code of conduct and the law, and let those enterprises which can not keep faith to pay higher costs exceeding the costs obtained from losing credit. Therefore, the present measure is to perfect various regulations and laws, and enhance the punishment degree for disobeying regulations and laws.

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Table 1. Investment game under the influences of converse selection behavior

Enterprises	Investors	
	Investing	No investing
Good enterprise	$(R_g Y_g - C_g, V_g - P_g)$	$(-C_g, 0)$
Bad enterprise	$(R_b Y_b - C_b, V_b - P_b)$	$(-C_b, 0)$