



CREDIT INFORMATION SHARING AND FINANCIAL DEVELOPMENT BASED ON THE RESEARCH OF INFORMATION CHOICE MODEL

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ABSTRACT

By examining the existing credit management system and financial institutions credit behavior, using "Information choice " model to analyze the bank's credit information collection and sharing of logic reveals the inter-bank credit information sharing barriers, sharing the effect it brings, produce inter-bank credit information sharing model which constrained the full effect of incentive.

Keywords: *Credit, Sharing of Information, Finance*

1. INTRODUCTION

Finance theory suggests that borrowers applying for loans have information advantages relative to the bank, which leads to moral hazard and adverse selection problems. In fact, demand for funds from the enterprise's reach to the bank credit, loans, loan quality as well as arrive down into non-performing loans, the real support behind these acts is the information flow. Information flow including corporate to bank, bank to bank and bank to the enterprise, more than one direction, the transfer of signaling effects on the quality of the credit behavior of credit has a decisive influence on the result, often ineffective information transfer result in credit relationships. The lock will eventually seriously affect the development of the credit. As economic globalization becoming reality, the distance between borrowers and lenders may be farther and father ,the analysis of credit has also become increasingly difficult, the ex ante protective function of credit analysis has also been increasingly obvious limitations, and further highlights the need to reduce information asymmetry. Currently, both domestic and foreign borrowing for the study of asymmetric information, asymmetric information, and most will have information superiority attributed the party's role. In fact, the information asymmetry can not be completely attributed to the information superiority; banks can also design to some system to increase the characteristics of the borrower or behavior understanding.

The current institutional arrangements reduce information asymmetry, there are three, namely, security system, and the loan review system, directly and credit information sharing system. Compete in the same market share of bank loans business credit information, has become a very popular form between banks in many countries, Economic literature has been the existence of such behavior provides a powerful experience shows. Compared with the previous two systems, credit information sharing will enable lenders understand that all the liabilities of the borrower, reduce the risk of excessive borrowing and the potential invalid loans. By examining the existing credit management system and financial institutions credit behavior, using "Information choice " model to analyze the bank's credit information collection and sharing of logic reveals the inter-bank credit information sharing barriers, sharing the effect it brings, produce inter-bank credit information sharing model which constrained the full effect of incentive.

2. INFORMATION COLLECTION AND SCREENING: BANK CREDIT BEHAVIORAL CHOICES UNDER THE PREMISE OF NO SHARE

Bank lending through examination, the loan after management information collection behavior get enterprise credit information, judged whether the enterprise the solvency, guard against



operational risks, industry risk, legal risk etc. For Banks, credit information is the one of the core elements of business. Bank first make enterprise of qualifications of the overall status of evaluation, forming a priori estimate, Then discriminate enterprise credit information which need further investigation. Information-discriminating certainly is closer to reality as possible. But to get closer to the real information, bank must pay higher economic costs. So Banks face a survey degree of dilemma.

2.1 From a Priori Estimate to Information-Discriminating: The Core of Bank Credit Behavior

Assuming enterprise applying for credit θ can be classified into two types :With high level management ability of enterprise H and has low level management ability of enterprise L , θ belong to H probability for q , θ belong to L probability for I-q . Assume every kind of enterprise's investment project which requires I unit of original investment (both are bank loan), produce X cash flow, so:

$$X = \begin{cases} R & P_\theta \\ 0 & I - P_\theta \end{cases} \quad \theta \in (H, L) \quad (1)$$

The average project investment success probability should equal $qPH + (I - q)PL$ Assuming $PH > PL$, $PHR > \bar{p}R > PLR$ and $\bar{p}R > I$, In other words, assuming that H enterprise probability of success than L enterprise high, project investment success average revenue R between two class enterprise may earnings, and high with primitive between investment (bank loans).

To meet the assumption, enterprises in the loan application, the bank will have intention to a borrower qualification information are screened. Information transfer process will appear in various forms, size of interference (noise), it corrodes reliability of the information .Therefore, the bank's screening results may be inconsistent with the facts, screened results and a priori estimate, compared to discern results and fact closer, the information is bigger, the greater is smaller ,If still is inferior to a priori estimate, the information is negative .Because information is consistent with or not problems, negative information will lead to worse probability discrimination, meanwhile results. Information from screening results, need facts inspection, the bank mainly according to its

by signal to discern the results, the quality of result of discernment because of information quality and change, the screened resulting value does not necessarily than a priori estimate is closer to the facts.

2.2 Comparing Benefits and Costs: Based on Information Gathering Behavior of Bank Credit

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In theory that banks prior information through surveys of borrower information Q , Mainly depends on the bank in information-discriminating in the amount of costs $C(e)$ (Where e are willing to pay for the bank's efforts to obtain the degree of information, so $e > 0$) and to get the credit information processing and processing capacity of I, such as credit scoring, internal credit rating technology, mainly used for reducing Banks and borrowers the information asymmetry between the degree.

$$C' > 0, c'' > 0, \text{ and } C'(0) = 0, C''(I) = \infty \quad (2)$$

Bank through information-discriminating results judgment, the borrower type S prior probability for:

$$\Pr(S = H' \theta = H) = Q = \Pr(S = L' \theta = L) \quad (3)$$

$$\Pr(S = H' \theta = L) = I - Q = \Pr(S = L' \theta = H) \quad (4)$$

$$\text{and } Q = \frac{(I + Ie)}{2}, I \in (0, I), e \in (0, I) \quad (5)$$

If banks should carry on the credit behavior decision-making, they must according to the application of a enterprise behavior to modify his about enterprise type of "prior probability", Namely, calculate the applicant of low risk, the probability of risky companies, then make a decision. You can use Bayes rule to calculate posterior probabilities,

From the above argument can be obtained , In the market, only the presence of a bank, the bank in information collection of game strategies include two aspects, Investigation application



borrower type spent costs and willing to provide loans, Lending rates decision mainly information-discriminating results as the foundation. It is assumed that credit markets have A , B two competing commercial banks, B bank and client enterprises with traditional business connections with private information, through lower cost information collection and discriminate, namely can make accord with the interests of the bank decision. The B bank because of no private information, and unable to get A bank information-discriminating results, for A banks, regardless of its provide loan interest rate r is how much, the expected utility

$$\text{are } 0 \cdot \pi_B(r) = 0, \pi_B(r) = r\bar{p} - I, r = \frac{1}{\bar{p}}.$$

$$\begin{cases} \Pr\left(\theta = \frac{H}{S} = H\right) = \frac{Qq}{Qq + (1-Q)(1-q)} \\ \Pr\left(\theta = \frac{L}{S} = L\right) = \frac{Q(1-q)}{Q(1-q) + (1-Q)q} \end{cases} \quad (6)$$

Under normal circumstances, A bank will an information-discriminating to determine loan behavior, When judging borrowers with low level management ability, refused to corporate lending, obtain utility $A(L)$ to 0 : When judging borrowers with high level management ability, obtain the utility of

$$A(H) = rp(H) - I = (I) * P(H) - I \quad (7)$$

In no credit information sharing, under the situation of bank from the credit behavior hopes to get equilibrium expectation utility function is:

$$U[\pi_i(S)] = E[\pi_i(S)] - C(e) \quad (8)$$

$$\begin{aligned} & E[\pi_i(S)] \\ &= \Pr(S = H)\pi_i(S) + (1 - \Pr(S = H))\pi_i(L) \end{aligned} \quad (9)$$

$$\begin{aligned} & U[\pi_i(S)] \\ &= \Pr(S = H)\pi_i(S) + (1 - \Pr(S = H))\pi_i(L) - C(e) \\ &= (I\bar{p})(PH - PL)q(1-q)(2Q - I) - (e) \end{aligned} \quad (10)$$

Borrower and the information asymmetry between banks has led to moral hazard and adverse selection problems, Sometimes people will find, cooperation, also can give rivals bring greater benefits.

So, in the competitive position of the A , B alone, the two banks of information gathering, or some degree of credit information sharing? It depends on two types of behavior expected benefits and costs.

If you choose to share information, it will have access to information through the credit system to strengthen inter-bank communication needs.

3. CREDIT MARKET STRUCTURE AND INFORMATION SHARING : BASED ON THE EFFICIENCY OF THE BANK BEHAVIOR CHOICE

3.1 Bank of the Economic Efficiency of Information Sharing

When a bank fully understand the borrower, and realize themselves in information monopoly position, the bank more willing to hide fine certain customer important information not report, in order to reduce competitors to customer resources for, In the meantime, under the temptation of excess profit, it might be in charge interest only than information when inadequate charge competitors slightly low, and higher than the price of information fully sharing, which contain information rents. Assuming enterprise on credit intend unchanged, at the same rate, conceal its credit bank records can lead to other bank is willing to provide relevant information have paid the required large cost, in the monopolistic market structure, the information shared by all participating banks can not receive the same benefits, so that the banks willingness to share information difference.

If no one is willing to share the cost, bank naturally reluctant to share your hard earned credit information. In addition, the bank found enterprise appear debt-repaying crisis, its first reflection may be as soon as possible to implement its own assets preservation behavior, not will update information sharing.

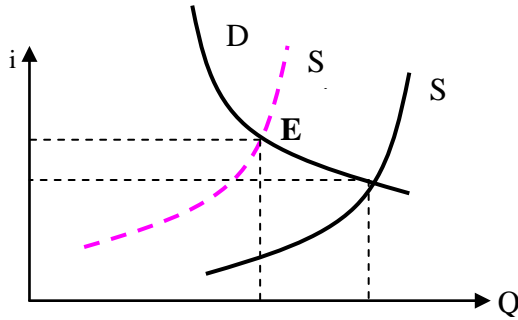


Figure 1. The Bank Information Monopoly To Social Welfare Effects

Information sharing can reduce the bank may be extracted from their customers, "information rent." It through promoting each bank loans to more competitive price, then reducing implied rent, lower rates increased the borrower's net income. At the same time, along with the gradual expansion of information sharing, enterprise can use credit information sharing mechanism to help them build "honorary collateral," get loan opportunities which in the original circumstances cannot get to gain benefits.

Information sharing increased overall utility of the banking industry. It strengthens the constraints on the borrower, decreases the probability of default.

On the one hand, the pursuit of monopoly information excess profit. Dominant banks worry their market share affected, In order to protect themselves in the driving position in the competition, borrower information will be shared with other banks in the process is difficult to truly proactive, but is often inhibit the sharing of information intend to dominant, are trying to render

rival master as little information. On the other hand, information sharing, cost-benefit asymmetry. Enterprise information belongs to bank business secret, as mentioned previously, banks access to borrower, reduces the moral hazard and adverse selection, the bank group is able to lend more to earn more profits. Reasonable sharing of information resources is a mutually beneficial act, directly contributed to the optimal allocation of credit resources, expanding the total resources available for consumer information, for the purposes of the original equilibrium is a Pareto improvement.

3.2 Under the Existing Credit Information Sharing Market Structure Reality Constraints

Pagano and Padilla (1993) found that some of the credit market structure influencing credit sharing, In the competitive credit market, if the lender has the information advantage relative to other lenders, the lenders will not voluntarily share information, because it will reduce its impact on the market and profits. Currently, our country's credit markets, the state-owned commercial Banks in the credit markets though the share has dropped, but it's still loan supply main body. In shaanxi province as an example, By the end of 2009 state-owned commercial bank's share of new loans comparative end of 2007 rose 2.22 a percentage point (see table 1). In this credit market structure, due to commercial Banks master borrowers credit information number and quality difference, As with information superiority of state-owned commercial Banks, is very difficult to take the initiative to their information shared with the small and medium sized commercial banks, This is also the credit information providers profit maximization of optimal game selection strategy.

Table 1: The Changes Of The Credit Market Structure In Shaanxi Province

Time	2009Xxx meaning		2008		2007	
	Balance of proportion	New of proportion	Balance of proportion	New of proportion	Balance of proportion	New of proportion
State-owned commercial Banks	37.92	36.85	38.56	37.92	36.85	38.56
Joint-stock commercial bank	21.15	25.18	19.81	21.15	25.18	19.81
Policy commercial Banks	17.21	16.65	17.53	17.21	16.65	17.53

3.3 Information Sharing Mechanism on Bank Behavior

The preceding analysis that in the competitive position of the A, B two banks, will face whether credit information sharing the dilemma of choice.

In information sharing, information of externality makes bank in obtaining the borrower's credit information, even don't need through their information investigation or information resource investment, shouldn't take any cost can obtain the



borrower's credit status. Assumption t for the extent of information sharing, theoretically, for A bank, information sharing surface is larger, it will gradually lose information competitive advantage, from information-discriminating gain returns will also be reduced gradually, in information sharing premise, (5) type can transform into:

$$Q = \frac{\left(I + \frac{Ie}{t}\right)}{2} \quad (11)$$

Type (10) into (11):

$$Yl\pi_i \left(\sum J\right) = (I\bar{p})(\Pi H - \Pi L)\theta(1-\theta) \frac{I\varepsilon}{\tau - X(\varepsilon)} \quad (12)$$

Knowable, sharing the borrower of the credit information enthusiasm and the borrower types of heterogeneity, the borrower's liquidity, credit market scale, and the progress of information technology positively correlated; instead, hindering the borrower sharing the credit information factor is the credit market structure and worrying about new market participants from the competition. In fact, the bank has Shared the borrower information motives, also hope to use the information to avoid new distributors to monopolistic competition.

Borrower's liquidity and diversity make it increasingly difficult to closely rely on banks to manage the monopoly of information, therefore, increased borrower with other banks to share information on demand. In addition, the number of banks involved in the greater sharing of information, the bank's customers to the appropriate size and difference greater, the greater benefits from share information.

To model for further extensions, by maximizing theorem to one order optimality conditions, Pray for (12) type about e first order derivative and make the results of 0, available:

$$U'[\pi_i(S)] = \frac{\left(\frac{1}{\bar{p}}\right)(PH - PL)q(1-q)I}{t} - C'(e) = 0 \quad (13)$$

$$\text{Make } F(e^*, t) = \frac{\left(\frac{1}{\bar{p}}\right)(PH - PL)q(I-q)I}{t} - C'(e) \quad (14)$$

Using implicit function method, find the equation of the derivative on t. Because:

$$\frac{\partial F(e^*, t)}{\partial t} = \left(\frac{1}{\bar{p}}\right)(PH - PL)q(I-q)L \quad (15)$$

$$= - \frac{\left(\frac{1}{\bar{p}}\right)(PH - PL)q(I-q)L}{2t}$$

$$\frac{\partial F(e^*, t)}{\partial e} = C''(e) \quad (16)$$

$$\frac{\partial e^*}{\partial t} = \frac{\frac{\partial F(e^*, t)}{\partial t}}{\frac{\partial F(e^*, t)}{\partial e}}$$

$$= \frac{\frac{1}{\bar{p}}(P_H - P_L)q(1-q)\frac{1}{t^2}}{C''(e)} < 0 \quad (17)$$

4. CONCLUSION

Available, credit information providers as rational lender, there are different cost function and utility functions, they only exist the optimal solution in the information sharing. Full description of the inter-bank competition, interest rates can not be an effective means of bank competition situation, for individual banks, it exits moderate range between the bank credit information sharing, its reasonable limits as from the information sharing profits at least equal to that of commits any share information for all costs, including the cost of information collection and sharing of potential damage to the bank itself.

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