



INFORMATION SYSTEM IN THE COLLUSION OF THE REAL ESTATE FINANCIAL INNOVATION

¹ DAN LU, ² CHUXIAN FANG

¹ School of Economics, Wuhan University of Technology, Wuhan 430070, Hubei, China

² Guotai Junan Securities Co., Ltd., Changsha 410000, Hunan, China

ABSTRACT

As the core content of the financial market, information plays an important role in the process of the real estate financial innovation. This article builds a game model with four participants (real estate company, financial institution, investor and regulator). Based on interest structures of real estate company, financial institution and investor, we give the dynamic game analysis of different participants' micro-income structure. By using the Principal-agent theory we try to design the incentive mechanism to stimulate real estate companies and financial institutions to work hard and transfer true information effectively. Finally, in order to improve the efficiency of the financial market indirectly, we try to find out the institutional arrangements for the regulation of financial transactions and avoiding the risk of investor's funds.

Keywords: *Information System, Incomplete Information, Collusion, Game Theory, Incentive Mechanism, Financial Regulation*

1. INTRODUCTION

In recent years, with the gradual implementation of the macroeconomic regulation measures in the real estate market, in China real estate enterprises are facing difficulties in financing. In the context of bank loans was tighten, various types of financial innovation became the important financing channels for real estate enterprises, including real estate investment trusts, real estate investment fund of private equity funds, real estate securitization and so on. The trust companies issued 1003 real estate investment trust products in 2011, added to 286.41 billion Yuan. This size of issue grew by 66.33% compared with 2010[1]. We should see that the financial innovation products meeting the demand of financial investors, at the same time, in the future its own problems in the design of the property rights system is possible not only damage to the financial interests of investors, but also become the financial market risks.

At present, most of the real estate financial innovation is reinvestment operations of financial institutions by using variety channels of information and marketing tool to centralized financial capital together from investors under the constraints of a certain financial contracts. The process itself can be seen as a process of investors entrusting with the financial institutions to supervise the investment and capital operation. And

the relationship between investors and financial institutions, in essence, is a principal-agent relationship. So, the relationship between financial institutions and the real estate business should be seen as a proxy supervisory relationship that financial institutions on behalf of the investors in supervision and monitoring. This bidirectional agency relationship must have the appropriate institutional arrangements and regulation. Otherwise, when there is a serious asymmetric information problem in the financial market, it bound to cause a lot of financial problems and high costs of financial transactions. Especially in the case of small and medium-sized financial investors are relatively weak in China, how to avoid the risk of investment trade and protect the property rights of small investors are important parts of our financial system reform. Therefore, this article focuses on issue that the collusion of the financial institutions and real estate companies may exist in financial innovation. Though dynamic game analysis on the agency relationship between investors, financial institutions and real estate companies, we try to find out the institutional arrangements to regulate and restrain the similar behavior of financial transactions to avoid the risk of investors' funds and improve the operating efficiency of the capital market indirectly.

2. LITERATURE REVIEW

The concept of collusion first came from the study of human relations in the political science and



sociology. The existence of collusion is because of the certain common interests between the two people in the process of their policy-making in the future.

Western economists research collusion in two aspects. On the one hand is collusion behavior analysis exists in the price competition of industrial organization. Such as Stigler researched on the oligopolistic market price and yield of conspiracy[2]. And in the article of Green and Porter studied on the price war under the condition of incomplete information[3], and Compte and Verboven discussed the manufacturers resolve asymmetric information in the failure of conspiracy through communication and information exchange mechanisms[4][5]. On the other hand, from the motivation of behavior to prevent agent's collusion, such as Tirole. His analysis of the client may observe agent types of information model and put forward the basic principle of preventing collusion [6]. Roland Strausz emphasized the signal mechanisms is an important role in the prevention of collusion [7]. Roberta Dess proposed three ways of against collusion in financial capital market [8].

In China the research on collusion paid more attention to the practice application, especially about the collusion and incentive mechanism in some industries. For example: Zheng Junjun studied on venture capital industry [9], Yin Zhendong researched on the Chinese administrative system [10], and Fu Yong and Tan Songtao analysis the institutional investors in the shareholding reforms and Jiang Shenzhou discuss the governance of the State-owned company [11][12]. Of course, there are some scholars make pure theoretical analysis and research on the relationship of information and collusion. Such as Chen ZhiJun and Qiu JingYuan [13], WangZheng and Wu QiuJing reviewed on collusion test economics, and so on [14][15]. All of the Collusion literature, little mention of possible conspiracy in the process of current real estate financial innovation. Besides the research of collusion, there also are many literature about financial insitution. For example, Wei Li give a research on logistics financial credit evaluation with uncertain information, and Bing Tian, Qi Chen, etc, did empirical study of the performative part of organizational [16][17].

Today, regulation of real estate finance innovation is also important content of the regulator's work; it is not only related to the healthy development of our financial capital market, but also sustainability of real estate industry. Therefore, this article takes the real estate financial business

innovation behavior as a focus and gradually expands the following analysis.

3. GAME MODEL OF COLLUSION

In view of the complexity of the real estate financial innovation and diversity of innovation activities subject, this article will use a game model of four participants to start our research of the importance of information system in the collusion of financial institutions and real estate companies from the interest-structures of the real estate enterprises to financial institutions and investors step by step.

3.1 The basic Assumptions

The information in our real estate financial innovation model is incomplete. The model should be consistent with the following assumptions:

Assumption 1: The model has four participants: real estate companies, financial institutions, investors and regulator with bounded rationality. All participants did not know each other's choice before they decided, so the information is incomplete.

Assumption 2: The Real estate companies and financial institutions signed the financing contract. In the actual course of business, the real estate companies have two options: breach of contract in effort of D_1 and fulfill contracts at effort degree of D_2 . We also assumed that the probability of default and the performance of the contract were α and $1-\alpha$ respectively, and $\alpha \in [0,1]$. Corresponding to the two operational behaviors of real estate company's efforts cost are $C(D_1)$ and $C(D_2)$ and distributable profits are R_1 and R_2 , we know that $C(D_1) < C(D_2)$, $R_2 < R_1$. Therefore, the real estate companies have motive of default. However, in order to cover up the truth, they may conduct conspiracy with financial institutions through "bribers" B and the "bribes" come from the income distribution to investors.

Assumption 3: Financial institutions have to transmit information to investors, they also have two options: truthfully reflect with the probability " β " or a false report with the probability " $1-\beta$ ", which $\beta \in [0,1]$. On the premise of two options for the given real estate enterprises choice, the information conveyed by financial institutions exists three possibilities: the false report of the real



estate companies who breach the contract, truthfully reflect real estate enterprises in violation and truthfully reflect the proper performance of the real estate enterprises. In this process of information transmission, financial institutions have no interest incentives distort the proper performance of the real estate enterprises.

Assumption 4: The investors share operating earnings with real estate enterprises, at the ratio “ θ ” according to the terms of their financial contract, and $\theta \in [0,1]$. Based on feedback information from financial institutions about enterprises business condition, financial institutions get their commission. When the real estate company violated the terms of the contract, the investor give the payment at T_1 and investors get income M as compensation; when the financial institutions feedback the information of the real estate company fulfill the contract, they will get the payment “ T_2 ”.

Assumption 5: We suppose there is a market regulator on behalf of investors to supervise financial innovation activities and use technical means to check the collusion between financial institutions and real estate companies. There are two possibilities of the regulatory effect: detected collusion with the probability “ γ ” and not detected conspiracy with probability “ $1-\gamma$ ”, $\gamma \in [0,1]$. When conspiracy of financial institutions and real estate companies is found, the two sides will be punished at F , more than this; the illegal gains of financial institutions also will be forfeited.

Assumption 6: Due to the presence of the regulator, there are some obstacles in the process of the real estate companies “bribe” financial institutions, while financial institutions can only get δB , $\delta \in (0,1)$. This δ relate to the strength of regulation. The greater the intensity of regulation is, the smaller δ is, the fewer benefits can financial institutions obtain.

Assumption 7: Assuming that the interests of the regulator and investors are aligned, we will no longer provide income function of regulator. And

regulatory work is efficient, so rent-seeking behavior does not exist.

3.2 Construction of model

Based on the above assumptions, we can see that it is a classic principal-agent relationship between investors and financial institutions. In the real estate financial innovation, the principal-agent relationship exists not only between investors and financial institutions but also between financial institutions and real estate enterprises. Its process is a financial institution raise financial capital from investors in term of an appropriate portfolio to invest directly or indirectly in real estate enterprises, and try to supervise the business of real estate enterprises to achieve investors’ capital gains. At the same time, they access to appropriate services fee. However, the relationship between financial institutions and real estate enterprises are not just simple principal-agent, their interests are not always conflicting. When market condition changes, there may be some interests in common between them, especially when they have common client’s premise, which may occur the behavior of collusion. This also becomes important policies which will affect their common client-investor’s interests.

The entire game process is essentially a process of detection and transmission of information; the financial institutions are major producers and sellers of information. Information obstacles caused by difficulty of access to information put investors at a relatively weak condition. This needs a regulator on behalf of investors be responsible for supervision on all kinds of financial transactions. However, the regulator is not-for-profit institution, so he doesn’t pursue the maximization of interest. Therefore, there dose not exist problem of rent-seeking and principal-agent regulators between regulator and investors. Based on the above analysis, information of funds and exchange between the four participants is shown in the following figure:

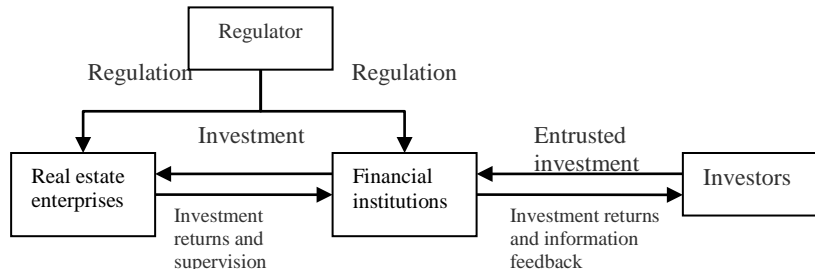


Figure 1: Funds and Information Exchange

4. GAME ANALYSIS OF COLLUSION MODEL

In the game model of collusion, the financial supervision is the key to equilibrium analysis; there are two choices of financial institutions subject to collusion or no conspiracy. In order to facilitate comparative analysis of the system about preventing conspiracy, we will first discuss the financial institutions is not conspiring with real estate enterprises to understand the existence condition of conspiracy, then analyze interests structure of all participants.

4.1 Financial Institutions Do Not Conspire With The Real Estate Companies

We use U_i , U_f and U_c on behalf of individual utility function of investors, financial institutions and real estate enterprises respectively. According to the above assumptions, when there is no conspiracy premise, the returns to investors will be strictly dependent on the compliance of the real estate companies: (1) When the real estate enterprises violate the contract of management, financial institutions feedback the true information to investors, the real estate enterprises have been punished and investors receive the compensation. In this case, the investor's utility function is $U_i^1 = (1-\theta)R_1 + M - T_1$, the utility function of financial institutions is $U_f^1 = T_1$, utility function of real estate enterprises expressed with $U_c^1 = \theta R_1 - M - C(D_1)$. The probability of this situation is $\alpha(1-\beta)$. (2) When the real estate enterprises choose to completely fulfill the contract and financial institutions also report truthfully to investors and receive the corresponding commission. At this point, investors' return function is $U_i^2 = (1-\theta)R_2 - T_2$, the utility function of

financial institutions is $U_f^2 = T_2$, the real estate enterprises' utility function is $U_c^2 = \theta R_2 - C(D_2)$. This happens with a probability of $1-\alpha$.

Therefore, in no collusion cases, all game participants expected utility function is as follows: Investors expected earnings is

$$EU_i^n = \alpha(1-\beta)U_i^1 + (1-\alpha)U_i^2 = \alpha(1-\beta)[(1-\theta)R_1 + M - T_1] + (1-\alpha)[(1-\theta)R_2 - T_2] \tag{1}$$

Financial institutions expected return is

$$EU_f^n = \alpha(1-\beta)U_f^1 + (1-\alpha)U_f^2 = \alpha(1-\beta)T_1 + (1-\alpha)T_2 \tag{2}$$

The expected return of the real estate companies is

$$EU_c^n = \alpha(1-\beta)U_c^1 + (1-\alpha)U_c^2 = \alpha(1-\beta)[\theta R_1 - C(D_1) - M] + (1-\alpha)[\theta R_2 - C(D_2)] \tag{3}$$

4.2 Financial Institutions Conspire With The Real Estate Companies

Although devoting to their duties should be the logical choice for financial institutions, but in reality there are still many uncertainties that affect the choice of financial market players. For example, when the real estate enterprises are unable to fulfill the contract originally, in order to avoid possible default penalties, the real estate enterprises choose to bribe the financial institutions to cover up their own mistakes. In the result, partial loss of breach will be borne by the investors, which "simulate" real estate companies to speculation. By bribing financial institutions, the real estate companies transferred their own losses to investors. However, financial institutions in the temptation of interests will think twice and weigh whether to conspiracy with real estate enterprises. Therefore, the earnings



of the parties in the game have two possibilities as follows. (1) When the real estate enterprises choose to violate the contract and the collusion of them is detected by the regulator, at this time, investors utility function is expressed in $U_i^3 = (1-\theta)R_1 + M - T_1$, the income function of financial institutions is $U_f^3 = T_1 - F$, the real estate enterprise's utility function is $U_c^3 = \theta(R_1 - B) - C(D_1) - M - F$. The probability of this happening is $\alpha\beta\gamma$. (2) When the conspiracy of real estate enterprises and financial institutions had not been detected by the regulator, then the investors utility function becomes to be $U_i^4 = (1-\theta)(R_1 - B) - T_2$, the income function of financial institutions is $U_f^4 = T_2 + \delta B$, the real estate enterprises' utility function is $U_c^4 = \theta(R_1 - B) - C(D_1)$, this happens with a probability of $\alpha\beta(1-\gamma)$.

Thus, under the condition of conspiracy, each participant's expected utility function are as follows:

Investors expected earnings is

$$\begin{aligned}
 EU_i^* &= \alpha\beta\gamma U_i^3 + \alpha\beta(1-\gamma)U_i^4 \\
 &= \alpha\beta\gamma[(1-\theta)R_1 + M - T_1] \\
 &\quad + \alpha\beta(1-\gamma)[(1-\theta)(R_1 - B) - T_2]
 \end{aligned}
 \tag{4}$$

Financial institutions expected return is

$$\begin{aligned}
 EU_f^* &= \alpha\beta\gamma U_f^3 + \alpha\beta(1-\gamma)U_f^4 \\
 &= \alpha\beta\gamma(T_1 - F) \\
 &\quad + \alpha\beta(1-\gamma)(T_2 + \delta B)
 \end{aligned}
 \tag{5}$$

The expected return of the real estate companies is

$$\begin{aligned}
 EU_c^* &= \alpha\beta\gamma U_c^3 + \alpha\beta(1-\gamma)U_c^4 \\
 &= \alpha\beta\gamma[\theta(R_1 - B) - C(D_1) - M - F] \\
 &\quad + \alpha\beta(1-\gamma)[\theta(R_1 - B) - C(D_1)]
 \end{aligned}
 \tag{6}$$

In order to more clearly show the payoff matrix of the various participants in different behavioral strategies, we use more intuitive and simple form to describe the revenue expression in the different situations. The $\{U_i, U_f, U_c\}$ represents the set of instant context for individual utility function of investors, financial institutions and real estate enterprises in Table 1.

Table 1: Definition Of Utility Function Sets

Expression	Real estate company		Financial institution		Regulator	
	Fulfill the contract	Violate contract	Dedication	Collusion	Detect the Violation	Not detect the Violation
U_c^1, U_f^1, U_i^1		✓	✓			
U_c^2, U_f^2, U_i^2	✓		✓			
U_c^3, U_f^3, U_i^3		✓		✓	✓	
U_c^4, U_f^4, U_i^4		✓		✓		✓

Based on the above discussion, real estate companies, financial institutions and the regulator

play the game in a certain time series. The game as a whole is shown in Figure 2.

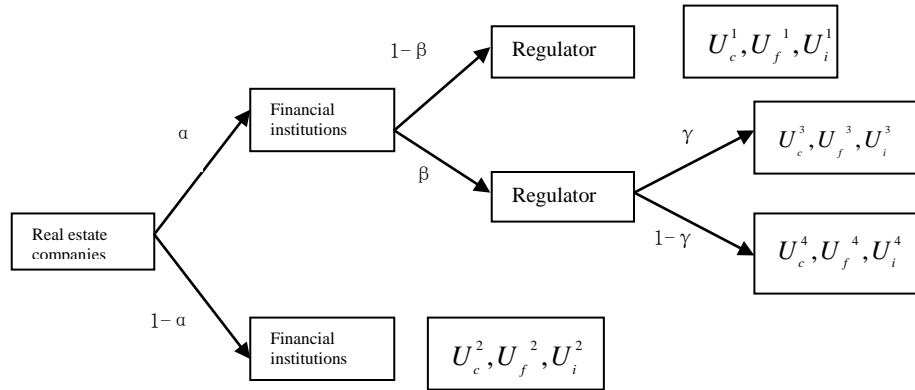


Figure 2: Real Estate Financial Innovation Dynamic Game

Here, each of the above utility functions is listed in following Table 2:

Table 2: Description Of The Context Value

Expression	Description
U_c^1	$U_c^1 = \theta R_1 - M - C(D_1)$
U_i^1	$U_i^1 = (1-\theta)R_1 + M - T_1$
U_f^1	$U_f^1 = T_1$
U_c^2	$U_c^2 = \theta R_2 - C(D_2)$
U_f^2	$U_f^2 = T_2$
U_i^2	$U_i^2 = (1-\theta)R_2 - T_2$
U_c^3	$U_c^3 = \theta(R_1 - B) - C(D_1) - M - F$
U_f^3	$U_f^3 = T_1 - F$
U_i^3	$U_i^3 = (1-\theta)R_1 + M - T_1$
U_c^4	$U_c^4 = \theta(R_1 - B) - C(D_1)$
U_f^4	$U_f^4 = T_2 + \delta B$
U_i^4	$U_i^4 = (1-\theta)(R_1 - B) - T_2$

5. DESIGN OF MECHANISMS TO PREVENT COLLUSION

5.1 Information System For Financial Regulation

In this dynamic game model of real estate financial innovation, choice of financial institutions is the focus of our analysis. This is not only because of their subject status in the market, more importantly, the financial institutions as intermediary organizations have the responsible for information creating function. The incomplete and imperfect information are fundamental problems in the financial market as a whole. Thus, for the

supervision on financial institutions is also the core issue of market regulation.

From the objective of financial supervision, compliance management for financial institutions is the ideal state of the market. Therefore, if we able to increase the cost of financial institution breach to prevent conspiracy of financial institutions and real estate companies by some tools, this will achieve the common aspiration of regulator and investors.

As long as the collusion bring the benefit to the financial institutions is less than the proceeds of legitimate compliance management, just as $EU_f^n > EU_f^*$, Financial institutions have not the impulse of collusion with the real estate enterprises. Therefore, the participation constraint for the financial institutions in choosing compliance management is $EU_f^n - EU_f^* > 0$.

Let

$$\pi_f = EU_f^n - EU_f^* = \alpha\beta(1-\gamma)\delta B + \alpha\beta\gamma F - \frac{T_2}{\alpha} - \alpha(T_1 - T_2)(1-\beta-\beta\gamma) \quad (7)$$

$$s.t. \quad T_1 < T_2, \quad B > 0, \quad \alpha, \beta, \gamma, \delta \in [0,1].$$

$$\text{We get } \frac{\partial \pi_f}{\partial \gamma} > 0, \quad \frac{\partial \pi_f}{\partial \delta} < 0, \quad \frac{\partial \pi_f}{\partial F} > 0.$$

To meet this inequality, it is necessary to adjust the variables in the utility function to increase the legitimate income or reduce conspiracy interests, and then it will be able to prevent the occurrence of conspiracy in the micro-interest of the financial institutions.

The “F” and “γ” are controllable variables for regulator. When “F” and “γ” reach a certain level, it can satisfy the constraint conditions of preventing



collusion. In addition, the regulator can also embed a signal mechanism into the game model to change the interest of financial institutions in weighing compliance and violations. We add a signal variable as “ $\sum_{t=1}^n \varepsilon^{t-1} P$ ” into the income function of identified financial institutions who conduct conspiracy and $P > 0$. The variable express a feature tag of “bad faith”, this kind of signal has a negative impact on development of financial institutions in their future activity. ε is a discount factor, “P” express the negative impact of economic losses in the future. These are the considerations of financial institutions in the current game. Thus expected yield function of financial institutions in collusion game becomes to be:

$$\begin{aligned} EU_j^* &= \alpha\beta\gamma U_j^3 + \alpha\beta(1-\gamma)U_j^4 \\ &= \alpha\beta\gamma[T_1 + \phi(1-\theta)(R_1 - B) - F - \sum_{t=1}^n \varepsilon^{t-1} P] \quad (8) \\ &\quad + \alpha\beta(1-\gamma)[T_2 + \phi(1-\theta)(R_1 - B) + \delta B] \end{aligned}$$

In the equation which there is a signal variable $\sum_{t=1}^n \varepsilon^{t-1} P$, as financial institutions continue to operate longer, the negative effect of reputation is larger, the financial institutions expected return of conspiracy is smaller, the incentive of conspiracy is smaller.

5.2 Prevent Collusion Mechanism For Real Estate Enterprise

As a special participant of real estate financial innovation, real estate enterprises’ management is a key to success of financial innovation and also a prerequisite for conspiracy. If we can avoid real estate enterprises at the motives of conspiracy, we can also achieve the purpose of the financial regulation. Because operation result is influenced by many subjective and objective factors, beside their hard work, there are also external uncontrollable factors play a role in this process. And regulators’ goal is not to eliminate possibility of business failure, but to reduce the presence of irregularities and illegal acts in financial market under controlled conditions. So, incentive constraints of preventing collusion should be included in our analysis. As long as legitimate income of real estate enterprises’ is greater than the illegal proceeds, Just as $EU_c^n > EU_c^*$. Real estate companies would have no incentive to illegal business activities. Take each variable into the

inequality, real estate companies face the potential profit of the hard work is

$$\begin{aligned} \pi_c &= EU_c^n - EU_c^* \\ &= \alpha(1-2\beta)[\theta R_1 - C(D_1)] \\ &\quad + (1-\alpha)[\theta R_2 - C(D_2)] \\ &\quad - \alpha[(1-\beta)M - \beta\theta B - \beta\gamma F] \end{aligned} \quad (9)$$

Let π_c seek partial derivatives to F, we get $\frac{\partial \pi_c}{\partial F} > 0$. That means raising fines “F” for illegal real estate enterprises can effectively reduce the motives of their conspiracy. However, let π_c seeks partial derivatives to M, there exists two different impacts on the real estate company when the regulator raise compensate “M” to investors for the loss. When $\lambda > \frac{1}{\beta} - 1$, we get $\frac{\partial \pi_c}{\partial M} > 0$, the rate of detected conspiracy behavior reaches a certain level, improving investor compensation can prevent conspiracy. When $\gamma < \frac{1}{\beta} - 1$, $\frac{\partial \pi_c}{\partial M} < 0$. This happens in the case of loosen regulation system, so rate of founded financial irregularities is too low and result in high compensation for investors stimulates real estate enterprises’ collusion.

5.3 Maximizing The Financial Interests Of Investors

The economic interests of financial investors in the financial markets can only be protected by the financial regulatory activities. For regulator, the expected incentive contract is maximizing interest of financial investors by adjusting to the relevant variables in the collusion model, just as

$$\begin{aligned} \text{Max}_{\gamma, M, B} EU_i &= EU_i^n + EU_i^* \quad , \quad \text{that is} \\ \text{Max}_{\gamma, M, B} EU_i &= U_i^n + U_i^* \\ &= (1-\theta)[\alpha R_1 + (1-\alpha)R_2] - T_2 - \\ &\quad [\alpha(1-\beta-\beta\gamma)][T_1 - T_2] + \alpha(1-\beta-\beta\gamma)M \\ &\quad - \alpha\beta(1-\gamma)(1-\theta)B \end{aligned} \quad (10)$$

$$s.t. \quad T_1 < T_2, \quad M > 0, \quad B > 0,$$

$$\alpha, \beta, \gamma, \theta \in [0,1].$$

Solving the above equation, we get $\frac{\partial EU_i}{\partial \gamma} > 0$,

$$\frac{\partial EU_i}{\partial M} > 0, \quad \frac{\partial EU_i}{\partial B} < 0.$$



This shows that the expected return of the investors increases with the probability of detected conspiracy and the compensation amount, and decrease with the bribe for the financial institutions in the process of conspiracy. These three aspects give the direction for the work of the regulators.

6. CONCLUSION

Constructing a perfect information system of signal mechanism is so important for our regulator. Chinese financial capital market is an emerging market, its maturity and information transparency is not ideal, even experienced more than 10 years reform of financial system, there is still the problem of information asymmetry. Of course, the problem also exists in the current real estate financial innovation.

Due to the owner of the information possible hides information content or release false information in order to seek his own interests, this kind of behavior will directly or indirectly harm to the interests of information demanders. Thus, the regulator as a mechanism designer have the responsibility to achieve transparent and smooth transferring of information through design and arrangement of regulation system, and strive to improve the effectiveness and stability of financial markets. As producer of information, the signal information released by the financial institutions will directly affect the vital interests of investors, more than this, the authenticity and accuracy of the information also reflected the quality of the products in the financial market. If the regulator is also able to establish a perfect signal mechanism or system for financial institutions or other intermediaries, at the same time increasing disclosure and publicity of information on the integrity of the financial institutions can fundamentally changed their expected return in the course of financial innovation. The reputation of financial institution as a substitute for dominant incentive contract can play the same role with the economic interests in encouraging financial institutions to be loyal to their duties. Besides, in the future regulatory activities, the regulator should continue to enhance influence of the integrity to the financial organ management. This is also in line with the discussion of the effect of motivation in the model of reputation and incentive in their agent market in Holmstrom [18].

REFERENCES:

- [1] Data source: 2011 real estate trust development report. Use trust Studio, vol 3, no 2, 2012.
- [2] Stigler, G, "A theory of Oligopoly", *Journal of Political Economy*, Vol.72 No. 1, 1964, pp. 44-61.
- [3] Green, E.R. Porter, "Non-Cooperative Collusion Under Imperfect Price Information", *Econometrica*, Vol.52, No. 1, 1984, pp. 87-100.
- [4] Compte, O, "Communication in repeated Games with Imperfect Private Monitoring", *Econometrica*, Vol.66, No. 3, 1998, pp. 597-626.
- [5] Verboven, F, "Localized Competition, Multimarket Operation, and Collusive Behavior", *International Economic Review*, Vol.39, No. 2, 1998, pp.371-398.
- [6] Tirole, J, "Hierarchies and Bureaucracies: on the Rule of Collusion in Organizations", *Journal of Law, Economic and Organization*, Vol.2, No. 2, 1986, pp. 181-214.
- [7] Roland, Strausz. "Collusion and Renegotiation in a Principal-Supervisor-Agent Relationship", *Journal of Economics*, Vol.99, No. 4, 1997, pp. 497-518.
- [8] Roberta, D, "Start-up Finance, Monitoring, and Collusion", *Journal of Economics*, Vol.36, No. 2, 2005, pp. 255-274.
- [9] Zheng Junjun, Xu Ming, "Study on the Incentive Model to Prevent and Control Collusion Based on Venture Capital", *Journal of the Wuhan University (philosophy and Social Science Edition)*, Vol.63, No. 1, 2010, pp. 125-128.
- [10] Yin Zhendong, "The Vertical Management and the Jurisdictional Management: the Choice of Administrative Management System in China", *Economic Research Journal*, No. 4, 2011, pp. 41-54.
- [11] Fu Yong, Tan Songtao, "On the Strategic Alignment and Insider Trading in Non-tradable Share Market", *Journal of Financial Research*, Vol.333, No. 3, 2008, pp. 88-102.
- [12] Jiang Shenzhou, "Mechanism Design of Collusion Proof in State-controlling Corporate Governance", *Economic Review*, No. 1, 2011, pp. 116-126.
- [13] Chen Zhijun, Qiu Jingyuan, "Divide to Conquer: Asymmetric Mechanisms with Discrimination to Prevent Collusion", *China Economic Quarterly*, Vol.3, No. 1, 2003, pp. 195-216.



- [14] Wang Zheng, Wu Qiuqing, “conspiracy to experimental economics research”, *Economic Perspectives*, No. 2, 2009, pp.116-1200.
- [15] ZhaoPo, Yue Zhonggang, “Review of Collusion among Firms”, *Finance and Trade Research*, No. 4, 2008, pp. 10-15.
- [16] WeiLi, “Research on Logistics Financial Credit Evaluation of Third-Part Logistics Enterprises with Uncertain Information”, *Advances in Information Sciences and Service Sciences*, Vol. 14, No. 8, 2012, pp. 171-177.
- [17] Bing Tian, Qi Chen, Heng Xu, “An Empirical Study of the Performative Part of Organizational Routines Based on Grey Superior Analysis”, *Advances in Information Sciences and Service Sciences*, Vol. 4, No. 16, 2012, pp. 444-451.
- [18] Bengt.Holmstrom, “Moral Hazard in Teams ” , *Journal of Economics*, Vol. 13, No. 2, 1982, pp. 324-340.