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Study on the real estate credit risk based on system dynamics

Jingjing Yin[1], zhenzhen Xie[1], Jingjuan Guo[1]
[1] Beijing Jiaotong University, Beijing, China
yinjingjing07020901@126.com
2.11120728@bjtu.edu.cn
guojingjuan@sina.com

Abstract: Since, the real estate industry and financial industry rely on each other. On one hand, the bank credit capital is the real estate industry primary source of capital, at the same time; the real estate credit is an important component of bank capital. Consequently, with meeting the capital needs of real estate credit, commercial banks bear much credit risk of the real estate industry. It is very necessary for commercial banks and property developers achieving a win-win to understand the risk profoundly, and find the appropriate measures to prevent or control measures. Basing on the understanding of the real estate credit risk, the article builds a real estate credit risk causal feedback which relies on the system dynamics theory and method. Next the paper identifies the factors and the outcomes, which affect the real estate credit risk. Finally, some suggestion is made to strengthen the real estate credit risk control and management.

Keywords: Real Estate Credit, System Dynamics, Risk, Cause and Effect, Real Estate Credit Risk, Feedback

1. Introduction

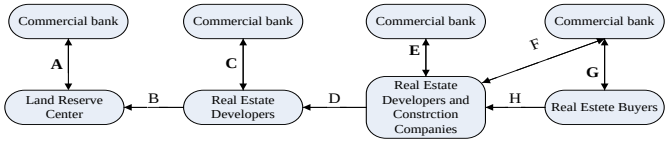
With the rapid development of the real estate, the real estate credit has got a big rise. Therefore, the real estate credit becomes a very important competition field among commercial banks. However, the Chinese real estate market mechanism is not so perfect that commercial banks meet the capital needs of real estate credit and bear much risk because of many factors such as national policies, real estate prices, and people on the real estate supply chain. As we know, the real estate risk can accumulate and amplify through specific mechanism, eventually

leading to financial crisis. How to manage credit risk becomes an important question which is worth thinking. At present, the domestic research focuses on the early warning mechanism (Zeng, 2010; Hu, 2005), and builds a VAR model to measure risk (Ma, 2010). The paper agrees that we can control risk and reduce the impact of the credit risk, basing on the transmission mechanism of the real estate credit risk. Because we can predict the unknown real estate credit risk and cut down the transmission channels.

2. Real estate credit risk characteristic

For commercial banks, the real estate credit risk refers to a possibility of losses which is caused by the difference of the actual earnings and expected benefits in the process of real estate credit business. And the difference is the outcome of many unknown factors.

In general, the risk has common characteristics of the uncertain, universal, developmental and so on, while the real estate credit risk also has its particularity. First, real estate credit risk is inevitable. The development of real estate needs ample funds and has a long life cycle, so that the real estate credit funds exist in the form of quite complexity. As shown in Fig.1



A:Loans for land reserves B:Land transfer payments C:Land Transfer and development loans D:Business contracting and subcontracting funds E:Real estate development and construction loans F, G:Mortgage loans H:Deposit, advance payment

Fig.1. Real estate credit capital flows

The figure shows that the bank credit funds involve in the real estate in the form of Loans for land reserves, Land transfer payments, Land Transfer and development loan, Mortgage loans and so on. Therefore, the phenomenon that the real estate credit funding sources are highly concentrated in commercial banks, will inevitably lead to the necessity of the real estate credit risk. Second, the real estate credit risk is linked. “Real estate credit funds” is recovered and value-added in a constant circular flow. In the three stages of the cycle, any small barrier may lead the risk of credit funds to the loss. Third, the real estate credit risk exists everywhere. We can be affected in any stage of the credit business, from the application of the real estate credit business, investigation, review, approval; delivery to post-loan management, real estate credit risk is everywhere.

3. Real estate credit risk system dynamics analysis

3.1 The introduction of system dynamics

System Dynamics was put forward by a professor named Forrester in the 1950s. The subject, which is mainly used to study the structure and function of large and complex social systems and the dynamic behavior of the intrinsic relationship, is a kind of systems analysis tools and computer simulation technology. System dynamics agrees that behavior patterns and characteristics of the system depend primarily on its internal structure. Feedback refers to Y affected by X, in turn; X can be affected by Y through a series of causal chain. And we can not only analyze the connection between X and Y to explain the behavior of the system, but draw the right conclusion through the whole system seen as a feedback system (Zhong et al., 2009).

3.2 Real estate credit risk system dynamics feedback

We can understand profoundly the nature of real estate credit risk from the perspective of system dynamics. Real estate credit risk, which is a feedback and complex dynamic system, consists of four subsystem, namely risk element system, risk system, risk perception system, risk management system. The four systems interact and develop a loop feedback (Han et al., 2010). As shown in Figure 2.

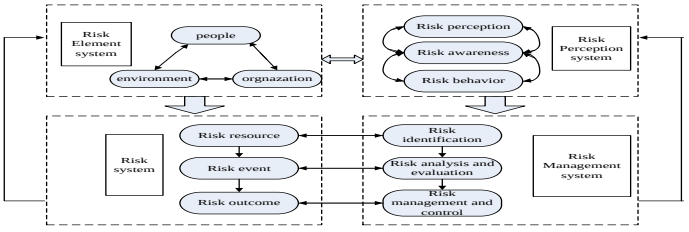


Fig.2. Real estate credit risk system dynamics feedback

Therefore, we can see the real estate credit risk as a large system, whose subsystems are interrelated and interacted and reflect the characteristics of system dynamics theory. Overall, the method can be used to analyze study and evaluate the real estate credit risk.

3.3 Dynamics Analysis of the real estate credit risk conduction

From the view of system dynamics, we think the conduction of real estate credit risk rely on the interaction between the internal environment and the external environment of the system centered on commercial banks, inducing the

acceleration of conduction in the emergence of non-equilibrium state. The reason why the credit risk has been able to continue under the action of the various risk factors is that the various risk factors can reach the dynamic coordination and coupling (Xia & Deng, 2007). When the objective of the various risk factors is identical and couples in high integration, risk threshold varies suddenly and risk outbreak. On the contrary, when the objective is different and various risks are low integration, the risk is in a partial, static state and the effect is smaller to the real estate credit.

4. Real estate credit risk system dynamics model

4.1 Real estate credit risk system dynamics model boundaries and variables

In the process of real estate credit, we should not consider all the credit risk factors into the system dynamics model. It is partly due to the simplification of the model design, and partly as a result of uncontrollable factors (Cai, 2008).

In the system dynamics model of the real estate credit risk, the various risks are classified into two categories - systematic risk and the non-systematic risk as the major factors variables of the model. As shown in Figure 3.

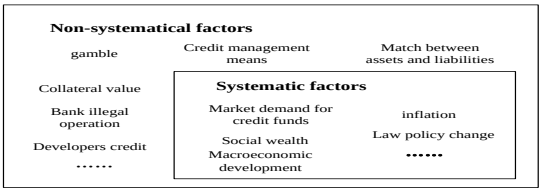


Fig.3. Real estate credit risk variables

4.2 Real estate credit risk system dynamics causal loop

In the process of formation and conduction, the real estate credit risk depends primarily on the financial policies, macroeconomic, real estate price, the participators and so on. Financial policy mainly refers to monetary policy, including interest rate adjustment and the size control of credit control. And macroeconomic economic reflects economic development, per capita income change. The participators' operation involves the credit means and credit officers risk awareness. By the corresponding path, each factor ultimately makes the real estate credit risk events occur, triggering a series of results.

According to the formation process of the real estate credit risk and the principle of system dynamics, how to draw causal loop diagrams, we build the

real estate credit risk identification feedback diagram in the help of system dynamics software Vensim. As shown in Figure 4.

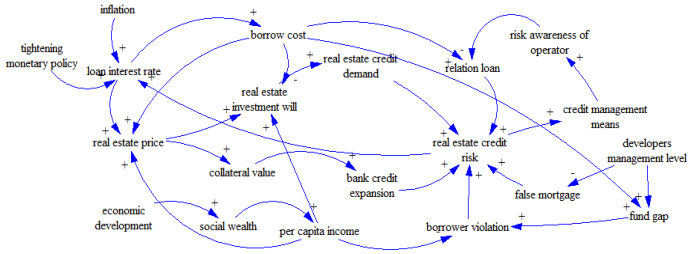


Fig.4. Real estate credit risk system dynamics causal loop

Positive feedback loop can lead to own growth behavior, increasing the unwanted addition and decreasing the unwanted reduction. Positive feedback will lead to risks accumulating and increasing, eventually causing the entire system a larger risk and resulting in large losses. Negative feedback loop is balanced, which can produce the behavior to seek specific targets, and then you can limit the addition and reduction. Through the real estate credit risk feedback loop, we can get a total of eight loops. The seven positive feedback loops explain the real estate credit risk self-reinforcing, and the one negative feedback explains the self-regulation of the real estate credit risk. Based on this, much attention should be paid to the positive feedback loop, which can amplify the real estate credit risk.

5. Preventive measures of the real estate credit risk

As what we have known from the feedback loop of the real estate credit risk system dynamics model, a huge financial risk may occur, once the majority of factors are out of control and focus on the outbreak. Therefore, all relevant stakeholders should take effective measures as early as possible and put them into implementation to ensure him real estate credit business to develop healthily and keep sustainable. First, the country conducts should target regulation and the bank should maintain a keen sense of smell. Then, commercial banks should strengthen the construction of credit system, and strictly implement the system of loans by improving and adding the target, scope of the inspection system to compensate for the lack of credit management and improve the credit system. Next, real estate credit risk causal loop show us that the real estate credit risk is not the result of individual factors, but the combination of various factors. Therefore, we must set different risk weight to

various risk factors and establish a steady index system of the real estate credit to measure accurately the extent of the real estate credit risk.

6. Conclusions

System Dynamics has become a mature modeling with a long history. In the article, we build a real estate credit risk system dynamics modeling and analyze the system deeply, to understand the internal structure of the system further. In the process of modeling on real estate credit risk, we identify the various factors involved in real estate credit risk and build system feedback loop to clear the causal relationship between the various factors. On the base of the system dynamics feedback loop, we are clear that which factors motivate the risk and which reduce the risk.

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