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# Financial Structure, Household Preference, and Enterprise Risk The Micro-Foundation Study of Monetary Policy Effect in China

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## Abstract

The household's preference about investment and consumption influences the effect of monetary policy. Using the research methodology of DSGE (Dynamic Stochastic General Equilibrium) model, this article focuses on the analysis about how the change of household preference and enterprise risk does impact on the effect of monetary policy, in the background of Chinese current financial structure. In conclusion, firstly, the household preferences of consumption and leisure impacts economics in different directions, while the consumption preference does have more direct and powerful influence than the latter. Secondly, the amount of informal financing has more capacity to influence Chinese economy aggregate, with a multiplier effect of approximately 3.3. Lastly, in the time of economic crisis, the effect of monetary policy on financial market is limited and might be in vain.

**Keywords:** DSGE Model, Dual Financial Structure, Household Preference, Micro-Foundation of Monetary Policy

## 1. Research Questions

The effect of monetary policy has always been one of the heat topics in both academics and industry. The relevant researches of monetary policy are usually conducted in the aggregate, which simplifies the analysis and highlights the emphases. However, in the practical, the effect of monetary policy is influenced by many economic ingredients. Without taking the micro-foundation into consideration, the transmission channels of monetary policy could not be understood. In the same sense, predicating the reaction of economic ingredients to monetary policy provides important reference to the policy maker.Two current systematic changes in China highlights the micro-foundation study of monetary policy effect: the change of household preference and the formation of dual financial structure. On one hand, the high-speed economy development since the Reform and Open in 1990s causes not only the accumulation of wealth, but also the change of household preference. On the other hand, the financial structure presents the tendency of dualism: the informal financial sector has been established, and the market is under regulation. In the beginning of Reform and Open, the informal financial sector was impeded and banished because of the majority of public ownership enterprises and the contemporary financial patterns. The increasing implementation of the policy of Reform and Open facilitates the development of SMEs and also activates their demand of informal financing. Correspondingly, the policy has shifted from banning and limiting to guiding and regulating. In this background, this article has introduced dual financial structure, household preference change, and enterprise risk factor into the DSGE model to discuss the following questions about the micro-foundation of monetary policy. (1). How do the change of citizens' consumption preference and leisure preference transmit in economy system? The current change of household preference will increase the national economy or not?

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(2). Who decides the two separate interests of formal and informal financial sectors, household, enterprise, or central bank? Do these entities influence each other? Could the monetary policy be modulated and controlled? (3). Does the change of enterprise risk influence the financial structure and the modulation ability of monetary policy?

## 2. Literature Review

This article studies the influence of the change of household preference and enterprise risk factor on the effect of monetary policy, in the background of dual financial structure in China. The research study involves with three parts: dual financial structure, the effect of monetary policy, and the micro-foundation of monetary policy. No literature that introduces all these three parts into one model has been found. Thus, the literature review will introduce these three fields respectively. The dual financial structure means that the coexistence of formal and informal financial sectors in financing market. The World Bank defines the informal financing the financing activities unregulated by authorities. A great amount of articles discuss about dual financial structure. Some researchers believe that financial repression results in dual financial structure. The opinion implies that once the financial repression extincts, so does informal finance sector. The other researches in this field are on the basis of the existent dual financial structure in developed countries and regions of financing liberalization. Micro-foundation study of monetary policy has randomly presented in the publications of many researchers. In China, Chen Xuebin is one of the researchers who has put forward the micro-foundation concept in early days. Chen studies the influence of residents' income and income uncertainty on their behavior of consumption and savings. The research result shows that the permanent income of residents have more salient influence on consumption, while the increase of risk awareness causes the increase of savings behavior. In another article of Chen's, he refers to the life cycle model built by Campbell, and studies the consumption and investing behavior characters of individuals in their whole life cycle, and the influence of residents' preferences on their investing behavior. In addition, Li Cheng uses DSGE model to study the learning effect of residents and the influence of the inflation target change on economy. He indicates that the central bank shouldincrease the transparency of monetary policy and build an anchor telling the public the process of determining inflation index. Based on the core idea of information asymmetry, this article introduces the enterprises' cheating behavior, banks' judging behavior, and households' choosing behavior, to DSGE model, to study the influence of micro-foundation change on monetary policy.

## 3. Research Methodology and Model Setting

This research follows with the standard of DSGE research methodology: setting model, calibrating parameters, and analyzing results. DSGE has been one of the important methods used by central bank in studies of economic aggregate and monetary policy, and provides new view for setting economy models. It comparatively avoids issues such as Lucas Criticism, so that the reliability of model's prediction and evaluation increases. Moreover, DSGE has been used commonly by developed countries and regions for analyzing economy and making monetary policy. From this article's research philosophy, a small-scaled DSGE model serves better to express the main idea and simplifies the analysis. Therefore, certain common DSGE elements, like the adjusting cost of capital, and the mechanics of household and enterprise price adjusting have been canceled. The model used in this article refers to and adjusts the research model by Harold and Nicola5 to set the model matching with specific circumstances in China. The model is designed according to general equilibrium idea and chooses four sectors: household, enterprise, financial organization, and monetary policy maker, to form the basic cycle of model. All these fours sectors will perform according to behavior equation to achieve maximum income. Thus all the important variables, such as the consumption and savings of consumers, the production and sales of enterprise, the number and interest change of formal and informal financial sector are endogenetic. This also coordinates with the rule of economy in the real life. The household gains income by labor and makes freely consumption and savings choices. In credit market, household is the provider of credit capital. The choice of household determines the financing amount of two financial sectors. Enterprise uses labor units and capital to produce undifferentiated goods, and pays the labourers. Two types of enterprises with high and low risk exist in economy system. The level of risk is evaluated by the success rate of investment transmitting to capital.

The enterprises choose their financing pattern according to their risk level and intend to cheat. The financial agencies serve to distinguish risk and provide credit service. The monetary policy maker set the basic interest of economy entity by Taylor's Rule. Formal financial sector decides the credit interest according to the basic interest, while the interest of informal financial sector is determined by the supply and demand of market. Notice: for details of the model, please contact the author.

## 4. Calibration and Research Results

After setting the model, all the parameters, like the subjective discount factor and enterprise risk factor, should be calibrated, to make the output of model to suit better the research target country. According to existent references, the calibration of parameters shows as follow in Table 1.

In the first part, the influence of household consumption preference and leisure preference on economy will be discussed; in the second part, the influence of the enterprise risk change on the effect of monetary policy is studied.

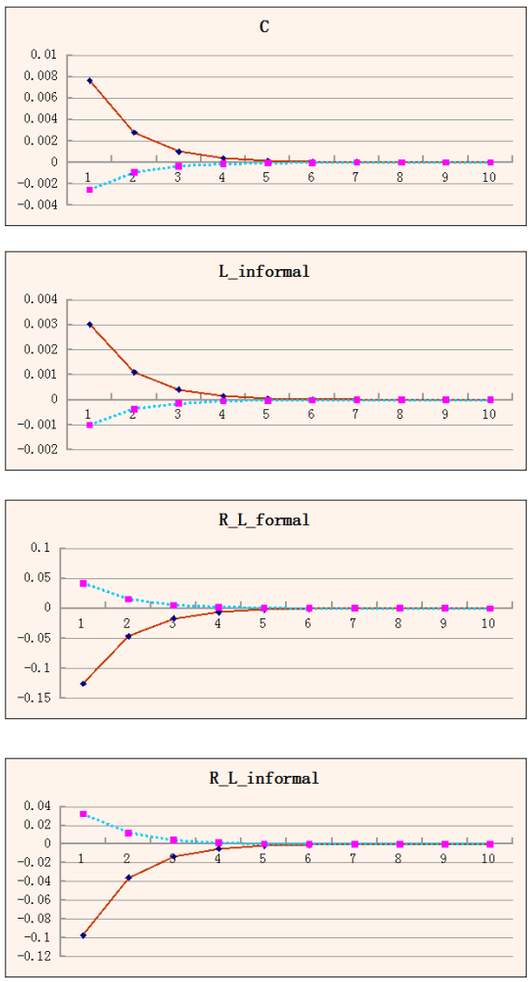
### 4.1 Consumption Preference and Leisure Preference

The household provides labor and gains income, consumes and invests in financial market. Thus, it locates in the core position of the whole economy system. As above, one temporary and positive consumption preference and leisure preference will cause the increase and decrease of GDP. The increase of consumption preference means that the consumption effect to household is positive and thus promotes the consumption, and the consumption amount of economy entity will reach the maximum during impact. From the statistics, this preference has increase effect about 0.8% to total consumption amount of economy entity.

| Parameter | Calibration | The meaning of parameter |
|---|---|---|
| $a$ | 0.4 | Output elasticity of capital |
| $\beta$ | 0.985 | Consumer subjective discount factor |
| $\Phi$ | 2 | Leisure parameter |
| $\Psi$ | 1 | Consumption parameter |
| $\Gamma$ | 1 | Weight of real money balances in utility function |
| $q$ | 0.80 | Probability of loan repayment |
| $\varphi$ | 0.8 | Lagrangian multiplier |
| $\rho$ | 0.25 | Proportion of high risk borrowers |
| $\vartheta_h$ | 0.85 | Risk factor for high risk borrowers |
| $\vartheta_l$ | 0.95 | Risk factor for low risk borrowers |
| $\delta$ | 0.1 | Mark-up over the bank rate to obtain base lending rate |
| $\chi_1$ | 0.78 | Weight of real interest in the Taylor's Rule |
| $\chi_2$ | 0.28 | Weight of expected change in output in the Taylor's Rule |
| $\theta$ | 0.7 | Lagrangian multiplier |

**Table 1**. F-1 Parameter calibration

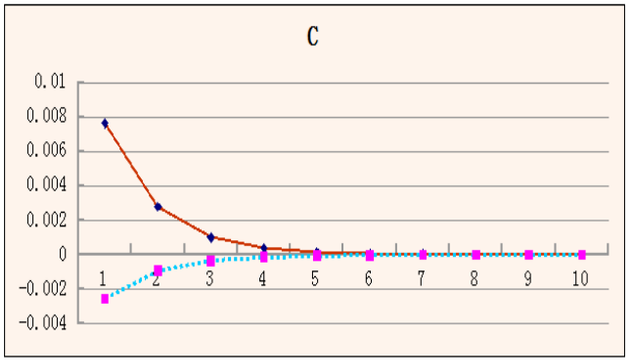
**Figure 1.** The impact of consumption preference (full line) and leisure preference(dotted line) on economic aggregate.




The GDP and consumption are strongly positively related. Although in the first stage of impact GDP stays the same, the increase rate of GDP overpasses that of consumption and reaches as much as 1%. From the employment market, the impact of leisure preference causes the decrease of contemporary employment rate. The failure of labor supply market providing equilibrium labor number causes the temporary increase of wage rate. The increase of consumption impulses people to work hard, thus, their working time increases. But because the supply overpasses the demand in labor market, the wage will decrease temporarily. As the Figure 1 indicates, the increase of economy will turn this tendency: in the second stage, the wage rate is larger than that before the change of preference. The Figure 2 indicates the influence of preference change on dual financial system. The change of household preference has small influence on the financing amount of formal financial market, with the maximum of 0.02%, which could be ignored. To informal financial market, the influence has reached maximum of 0.3%, which is high comparing to 1% GDP and 0.8% consumption. In the meanwhile, this result presents that informal financial sector has multiplier effect of approximately 3.3 on GDP. This conclusion supports the policy of encouraging the development of SEMs and informal financial sector in China.

## 4.2 Enterprise Risk and Monetary Policy

This article defines risk factor to evaluate the operation risk of enterprises. This factor is presented as the transmission rate between enterprise financing amount and production capital. The level of enterprise risk indicates the change of use-cost of enterprise capital. However, the question whether enterprise risk factor will influence the financing structure of society as a whole is open to further study. In this part, the financing risk of three types of enterprises are compared. The dotted line represents the high risk enterprises (the financing transmission rate of high risk and low risk enterprises are 0.3 and 0.2 respectively); Full line represents the normal risk enterprises (the financing transmission rate of high risk and low risk enterprises are 0.95 and 0.8); The solid-cum-broken line serves as control group, whose financing transmission rate is 0.95 when low risk enterprises stay in their risk level, and 0.2 when the risk level of high risk enterprises increases. Thus, the influence of monetary policy on financing amount could be divided into two parts: high risk effect and low risk effect. The difference between dotted line and solid-cum-broken line is low risk effect, while the difference between full line and solid-cum-broken line is high risk effect. According to the analysis above, the credit sector is antecedent variable of economic aggregate, and the main transmission channel of monetary policy. The change of credit sector's index shows as bellow.



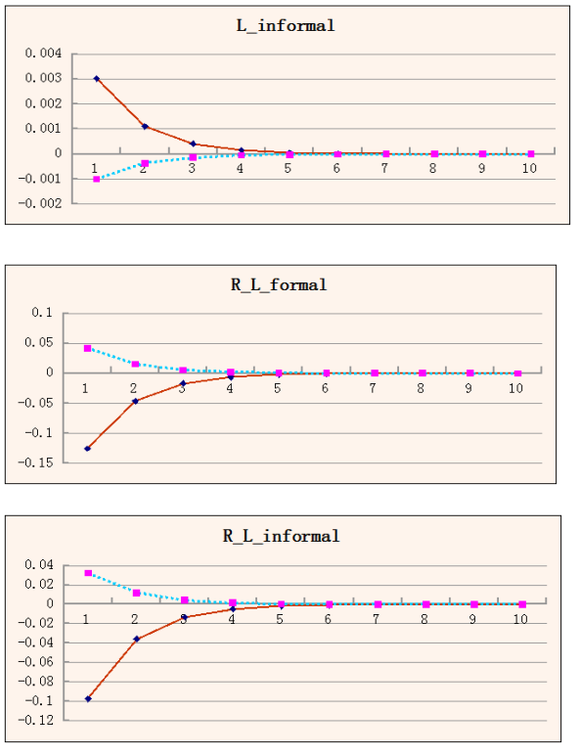
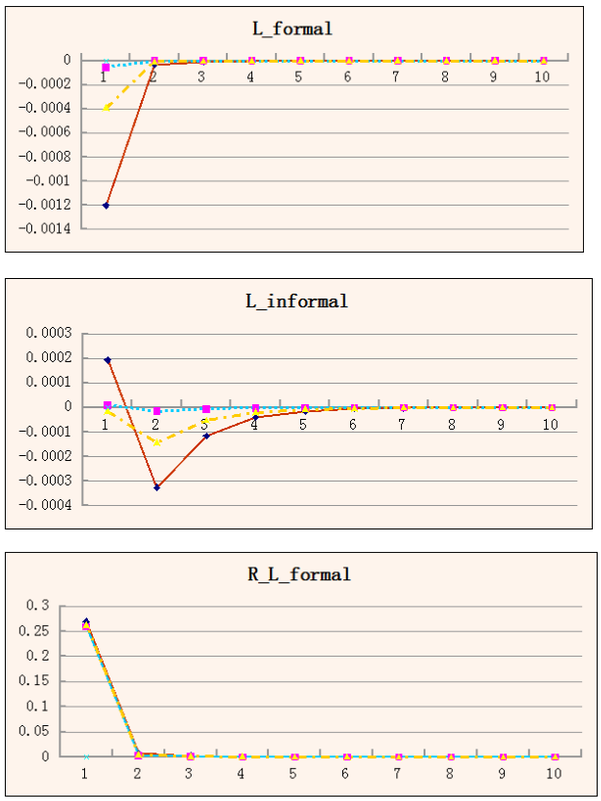



**Figure 2.** The impact of consumption preference (full line) and leisure preference (dotted line) on financial system.



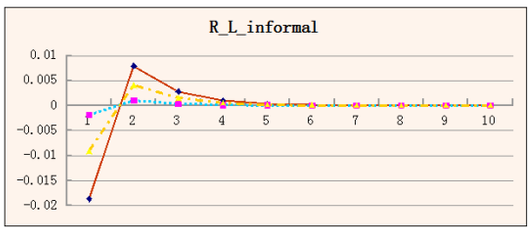




**Figure 3.** The influence of monetary policy on financing market under the risk change.(full line represents normal level; dotted line represents high risk; solid-cum-broken line represents control group).

In Figure 3, the change of enterprise risk factor has no influence on the interest of formal financial sector. Under all three circumstances, the influence of the increase of basic interest determined by monetary policy on formal financial sector is 25%. Comparatively, enterprise risk factor has a bigger influence on the interest of informal financial sector. According to the positions of three lines, when the risk factor is minimum, the fluctuation of informal credit interest is the largest. The Figure 4 also tells that in normal situation, the impact of enterprise risk level on the financing amount of two types of financial sectors. When the risk level decreases, the demand of formal financing increases to 0.15% and returns to steady state rapidly; the demand of informal financing firstly changes to -0.08%, in the second stage surpasses the steady state and reaches as much as 0.07%, and in the following third stage returns to steady state slowly. Therefore, when the risk condition changes, the lower the risk level, the higher the demand of informal financing, and the larger the fluctuation. When the risk level is high, the demand of formal and informal financing will be depressed, and the modulation ability of monetary policy is small (indicates as dotted line).Further, it concludes that in the economic crisis period when risk level increases, the influence power of monetary policy to social financing decreases. At this time, it is highly possible that using monetary policy to revive economy is ineffective.

## 5. Conclusion

This article studies the influence of the change of household preference and enterprise risk factor on the effect of monetary policy in China by building DSGE model involving with four sectors: household, enterprise, financial market, and monetary policy maker. From the impulse response figure (after calibration), it shows that the household preference impact and leisure preference impact both influence

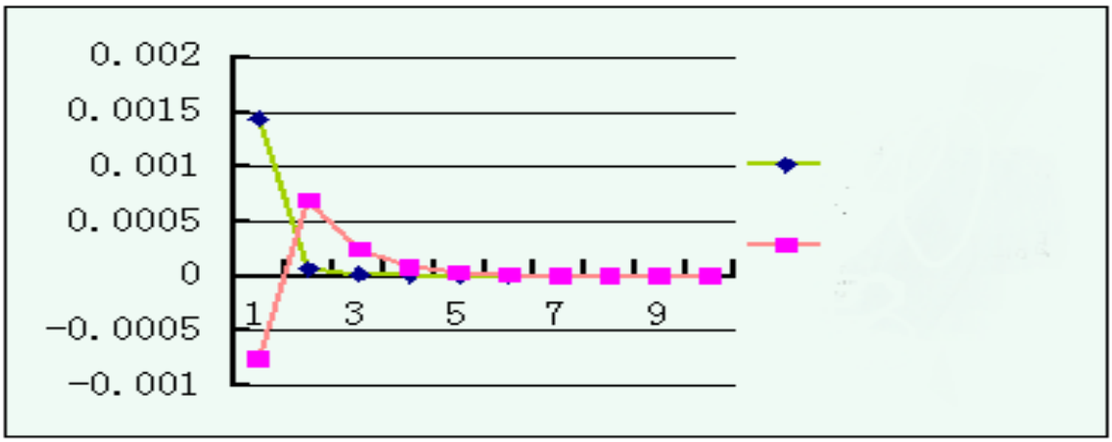



**Figure 4.** The impact of risk factor on financial market.

Notice: the blue line indicates the formal financing scale; the pink line indicates the informal financing scale.

directions of these two impacts are contrary: the consumption preference promotes economy development and leisure preference impedes economy development. From the view of absolute value, under standard unit of impact, the influence of consumption preference is larger than that of leisure preference on economy development.

The article also studies the influence of the micro-foundation change on monetary policy. The increase of household consumption preference magnifies the fluctuation of economy entity. In the condition of monetary policy impact, the change of household utility does not influence the interests of formal and informal financial market, but does influence the financing scale. Additionally, the change of informal financing scale influences greatly the economic statistics in China. And the informal financial sector has multiplier effect of approximately 3.3 on GDP. When discussing the change of enterprise risk, this article divides the influence of risk level on monetary policy as high risk effect and low risk effect. The enterprise risk factor will only influence the interest of informal financial sector, not that of formal financial sector. And the influence power of high risk effect is larger than that of low risk effect. Moreover, when the social risk level increases to certain degree, the demand of formal and informal finance will be depressed and the modulation effect of monetary policy to economy will greatly diminish. Therefore, in the economy depression period, using monetary policy to revive economy might be in vain. The research results are inspiring in three aspects for understanding the micro-foundation of monetary policy and macro-economic policy in China. Firstly, although the influence of household consumption preference and leisure preference on economy is contrary, the former is larger than the latter. Thus it is viable to activate economy increase by the method of "Golden Week". There has been discrepancy among researchers about whether to maintain "Golden Week" in China. Some researchers think that long-term vacation can activate consumption and then the economy increase, while others believe that vacation increases peoples' rest time and thus causes potential lose of GDP. The research results indicate that when the consumption and leisure of household are increasing in the equal rate, the promotion effect of consumption to economy is larger than the impeding effect of leisure to economy. Secondly, monetary policy is not panacea. During the economy crisis period when the enterprise risk level increases, the influence of monetary policy to the financing scale of financial sector is limited, so that the modulation effect of monetary policy to economy is unobvious. Thus, in economy crisis period, the government should not rely on monetary policy to solve the depression. Additionally, relevant polity will influence greatly the SEMs with higher risk factor. And the economy fluctuation caused by Long-tail Effect should not be ignored when making policies. Thirdly, the informal financing should be paid more attention. The government should guide and regulate the development of informal financing, because it complements the deficiency of "hard information" in SEMs, which is very important for the firm growth. According to the research results, the informal financial sector has multiplier effect of approximately 3.3 on GDP.

Consequently, the healthful development of informal financing is meaningful for both the sustainable development of economy and employment in China. In general, the research could be improved in three aspects: introducing sticky information in the model; analyzing more comprehensively the capital use of enterprise; and considering the influence of household expectation on monetary policy. The author will conduct further researches about these three aspects.

## 6. References


1. Calvo GA. Staggered price in a utility-maximizing framework. J Monetary Econ. 1983; (12):383–98.
2. Carlstrom CT, Fuerst TS. Investment and interest rate policy: A discrete time analysis. Federal Reserve Bank of Cleveland Working Paper, WP/03/20. 2003.
3. Chen X, Fu D, Ge C. The dynamic optimization simulation of consumption and investment decision making during the period of resident's life cycle. Finance Research. 2006 ; (2):21–35. (In Chinese).
4. Christiano L, Ilut C, Motto R, Rostagno M. Monetary policy and stock market boom-bust cycles. European Central Bank Working Paper, No.955. 2010.
5. Harold PE, Ngalawa, Viegi N. Interaction of formal and informal financial markets in Quasi-emerging market economies. ERSA Working Paper, No.326. 2013.
6. Stein JC. Information production and capital allocation: Decentralized vs. hierarchical firms. NBER Working Paper, No.7705. 2000.
7. Bin L. The application of DSGE model in the analysis of monetary policy. Finance Research. 2008; (10):1–20. (In Chinese).
8. Cheng L, Wentao M, Bin W. Learning effect, change of inflation target and the formation of inflation expectation. Economic Research. 2011; (10):39–53. (In Chinese)
9. Linnemann L. The effect of government spending on private consumption: A puzzle?. J Money Credit Bank. 2006; 38:1715–36.
10. Lin Y, Sun X. Information, informal finance and SMEs financing. Economic research. 2005; (7):35–44. (In Chinese).
11. Li S. Study on the transmission mechanism of China's monetary Policy with DSGE models. Wuhan, China: Huazhong University of Science and Technology; 2010. (In Chinese).
12. Ma W. Comparison between quantity instrument and price instrument in the performance of macroeconomic control. Quantitative & technical economics. 2011; (10):92–111. (In Chinese).
13. Sheng S, Wu P. The binary transmission mechanism of China's monetary policy -- A research on the two intermediaries, two targets model. Economic research. 2008; (10):37–51. (In Chinese).