

Housing Market Makes Spurious Prosperity in China's Economy

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Abstract

Unaffordable Housing price problem in China's metropolises could be attributable to excessive investment in real estate market. However, the real estate market's establishment here is not determined by market itself but largely supervised by Government, this is what we say one of the representative cases of "big government and relatively small market". Although real estate market in China is more developed than other markets in China, government's constant intervention behaviour, which initially is in order to achieve goal of economic growth, indeed has deviated the real estate market from sustainable development path. It is specifically manifested in superfluous private investment and public investment flowing into real estate market. And the high investment level always corresponds to the high price level, which causes the "housing price unaffordability" in cites. Moreover, it gradually became the fact that real income growth of Chinese residents in fact cannot catch up with housing price growth, and even to the extent that high expense in housing makes Chinese residents "poor". And at the same time capital over-accumulated in real estate industry makes other industries "weak" and then has adverse impact on national output in long-run.

Introduction

In my paper, I want to study the effect of past housing market reform on current housing market formation in China, related China's monetary policy's effect on real estate market investment, and long-run effect of real estate investment on national output. In addition, I will try to use simulation analysis to explain why housing price in China become so unaffordable. The current housing market problem in fact can be seen as a specific epitome of China's institutional problem. In this sense, I will analyse the potential causality between China's institutional problem and housing market problem in China. The primary opinion of my dissertation is that over-hot housing market investment in China will absorb much of public capital from other

sectors then further has adverse effect on national output in long-run. And I insist that the housing problem is intensifying inequality of social wealth distribution, which will probably make China into middle-income trap in turn.

Highly unaffordable housing prices especially in metropolises has strangled local citizens and people coming from remote areas for a long time; on the other sides, the wealthiest people was still earning the biggest pie of treasure from housing market. Among nationwide China has been stirring up an intense discussion of future housing market, be sustainable or unsustainable, the price being up or stationary. Obviously, housing price problem has been put at the one of the most popular issue in the national party convention. At the same time, our government is in the dilemma situation whether should “punish” the overinvesting condition in housing market; while at the same time government has close benefit connection with real estate market. In fact, the macro economy control for housing market towards to China’s central government was never easy, since the evolution of housing market involved much complicated benefit linkages with other sectors, like the biggest four state-owned commercial bank and even local governments. In this paper, one of the most important job is to figure out how other social sector links with the housing market sector. Also we will unveil the history of evolution of housing market in China, and we will combine the housing market analysis of other countries which also had been shocked by housing market. Basing on review of related literature and simulation analysis from practise, the sequential description of this dissertation will follow by five sections mainly, the first section covering the related literature review; the second section introducing the history of housing market evolution in China; the third section mainly employing econometric model, like we will establish VAR model to predict the impact of related monetary policy on real estate investment and retail consumption, and we will also set up a VECM model to find out the long-run relationship of housing market investment with total output; the fourth section aiming at explaining why housing price keep trending up by establishing three aspects simulation analysis, say the individual-individual aspect, the individual-capital market aspect and the government-financial system aspects; the last section will be the conclusion of this paper.

Keywords: Housing Market, Real Estate Investment, Housing Unaffordability, Government

First Section: Literature Review

1. Study of Monetary Policy and Housing Market

In mainstream, economists usually use DSGE model (Dynamic Stochastic General Equilibrium Model) to analyze housing market, from which it primarily studies the effect of housing market and monetary policy toward to other major macro-variables under the framework of DSGE model. Basic on the methodology of studying the relationship between monetary policy and housing market, it can be classified into two different kinds of methodologies. The first kind of methodology prevailingly focuses on empirical induction, like how monetary policy has impact on housing market price and real estate market investment. The second kind of methodology mainly pays attention on DSGE model. Besides, we refer to some related studies from China.

(1) The First Kind of Methodology—Empirical induction

The major representative for this empirical deduction may be Ben Bernanke and Mark Gertler (1995), Willian Lastrapes (2002). Bernanke and Gertler inspected the fluctuation of real estate market investment brought by interest rate change. They found that short-run interest rate shock will generate intense and durable effect of impulse response; while the long-run interest rate's impact on real estate market investment is non-significant. Lastrapes used time series data from 1963 to 1999 of America to investigate the narrow money supply (M1)'s influence on housing sales. He found that one positive standard deviation of M1 will promote housing sales in short-term. For better explaining the internal causality, the author also established a DSGE model which included housing market variables. Matto and Raoul (2003) study how housing market price fluctuation influenced by degree of financial market freedom and shock of monetary policy. Matto and Raoul recognized that under higher degree of financial market freedom condition, interest rate shock can generate more durable and intensive fluctuation in housing asset value.

(2) The Second Kind of Methodology—DSGE Model

Matteo Iacoviello (2005) established a DSGE model under borrowing constraints, which includes a Representative Household, Entrepreneurs, Retailor and Rule Maker of monetary policy. The result of Iacoviello's study demonstrates that housing asset value will give positive

response to one positive housing demand shock; on the other side, debt constraints, which can mitigate impulse response of housing supply shock, given under interest rate control, could serve as a role to stabilize housing market. In addition, based on DSGE model constructed by Iacoviello, Iacoviello and Neri did research on sources and consequences of housing market fluctuation. The research found that slow technology innovation in production department of housing market could explain why housing price keeps rising in America in recently 40 years. Moreover, it also revealed that a shock of housing demand or housing construction technology could respectively contribute 25% fluctuation of housing market investment and housing price, while relatively causality of monetary factor could only contribute to the two above no more than 20%. But in the new century, monetary policy is playing significant role on affecting real estate market fluctuation. In addition, the author insisted that the effect of “Spillovers” in housing market can not be negligible, since this effect mainly reflects on consumption rather than investment. Brukak et al (2007) studied the relationship between financial friction and monetary policy by adding housing department into DSGE model. The author’s result shows that the financial friction originated from housing market to some extent mitigate and reduce monetary policy shock toward economy. And Lombardo and McAdam (2008) confirms the importance of financial friction of real estate market with respect to monetary policy delivery mechanism. Kannan, Rabanal and Scott mainly discuss the prudential policy’s impact on economic risk under the background of housing price ceaselessly rising. The authors consider that rising price in real estate market property amplifies financial risk, while prudential policy by government helps to stabilize fluctuation of credit market. At the same time, the authors also constructed a DSGE model including housing market, the simulation result of the model shows that intensive response of monetary policy to the financial accelerator boosts credit increasing and asset value rising, then further promotes stability of economy. Employing prudential policy helps to relieve fluctuation in credit market, but the over rigid and invariable policy will increase biased risk in economy from which reduce the stability of economy.

(3) Relative study in China

The study of relationship between monetary policy and housing market in China always chooses to use empirical induction method by constructing econometric model. The models always

include monetary policy variables, like the interest rate policy, the money supply policy and the loan-and-credit policy.

Davis and Zhu (2004) employed model to discuss the relationship between bank lending and housing price. They found that in long-run, housing price has positive relationship with bank lending, where housing price growth has significant effect on increasing bank lending; while increasing bank lending do not have significant effect on housing price growth. Gerlach and Peng (2005) mainly try to detect the relationship among the housing price, bank lending and macro economy. According to their VAR model (Vector Autoregressive Regression Model), they found that there exists a long-term equilibrium relationship among housing price level, bank lending and real GDP with respect to the data of Hong Kong from 1982 the 1st quarter to 2001 the 4th quarter. Jingkui Zhou (2005) established VEC model (Vector Error Correcting Model) to analyze the housing price in Beijing, Shanghai, Tianjin and Chongqing and the monetary policy. The result shows that the housing market price of the four cities, the real estate investment, the real estate sales and the last period housing market price level exist the Cointegration relationship. Furthermore, the authors insist that housing price rising connected closely with China's easy monetary policy. And the VEC model also reveals that the four cities above have deviated severely from their equilibrium housing price level and the housing market encounters "Irrational Exuberance". At the end, the author suggested that behaviour of banking system, real estate market and housing buyer together give rise to real estate market bubble. Yu Kong (2009) used panel data of Provinces in China to study the relationship among housing price fluctuation, bank lending and economic growth rate. The study shows that the three above are closed related to each other. Besides, the author also added regional heterogeneity into consideration. The result indicates that regional housing price rising is related to financial support. The excessive financial support has sheered the housing market price in the Central Region and the Eastern Region of China from economic fundamentality—housing price overestimated. The author also found that relatively speaking to the Eastern Region of China, housing price rising has significant effect on bank lending expansion in the Central Region and the Western Region of China; and housing market price rising and bank lending expansion both contribute to regional economic growth rate. Wei Wei (2011) mainly concerned for the regional heterogeneity in China's housing market. The author demonstrated that monetary policy has regional heterogeneity effect on different of China.

Moreover, the author concludes that monetary policy's regional heterogeneity effect on housing market fluctuation can be explained by regional industrial structural characteristic, industrial structural transformation, residents' consumption behaviour and development of financial system, from which the author suggested that China could adopt differentiated monetary policy to coordinate regional housing market development. Weiguo Xiao, Kaiyuan Zheng and Wei Yuan established a DSGE model which includes household consumption decisions, enterprise production decisions and monetary policy decisions. On this basis, the authors adopted Ireland's RBC-VAR (Real Business Circle-VAR) model to detect the relationship among housing price, consumption and monetary policy. The result shows that more families hold expectation of housing price rising, greater the effect of real estate fluctuation on consumption; the monetary policy targeting on real estate price do not help a lot, since reducing output fluctuation will simultaneously increase chance of inflation. Therefore, the authors suggest that Central Bank of China should restraint over-deviation of housing price from equilibrium level and try to change the expectation of the public for housing price rising in future, but it is unreasonable for monetary policy to target at real estate property price. Huaben Xiao (2007) studied the Granger Causality relationship between aggregate bank lending and housing price. The result shows that overexpansion of bank lending could bring large capital inflow into real estate market then maintain housing price rising; however, the reason for bank lending overexpansion can be traced to high growth rate of money supply, low real interest rate level and high interest spread between deposits and loans.

Comprehend all the related literature above, we can see that housing market price indeed closely relates to monetary policy, and we could infer that economic activity in housing market can influence consumption and total output. But the literatures lack of study of relationship between monetary policy and housing market activity like real estate investment. In this sense, one of the tasks of my paper will unveil the relationship between the two. Also, though we have known that real estate investment has relationship with total output, we still need to analyze respectively the short-run and long-run effect of real estate investment on total output.

2. Study of Real Estate Price

(1) Foreign Study of Real Estate Price

For studying housing market equilibrium of supply and demand, Knight and Sirmans (1994) studied the price signal's effect on housing market supply, in which price primarily reflects signal of housing seller; however, the signal of buyer always lags behind the seller's. In the Dipasquale -Wheaton model by Dipasquale and Wheaton (2002), it supposed that there are two sub-market—dwelling stock market and dwelling increment market under neoclassicism theory. In this model, dwelling increment market determines the level of incremental dwelling construction; on the other side, the supply and demand equilibrium in dwelling stock market determines housing price level.

As a kind of special asset, we can choose asset pricing method to study real estate price, like comparing the future return of housing with other investment approach, or comparing the cost and benefit between housing renting and housing buying then determine housing price level. Johan and Campbell (2006), in virtue of Gordon Model, classified three determinants—the expected future growth rate of housing rental, the expected future real interest rate and the expected risk premium--of the reasonable housing price-to-rent ratio. Among the three determinants, the author predicted that housing price-to-rent ratio can be to a large extent explained by the expected future real interest rate and expected risk premium. In other words, changes of expected future housing price causes change of price-to-rent ratio instead of the contrary.

With respect to real estate market price fluctuation, Poterba (1991) provided three aspects to explain it: Construction Cost View considers that housing construction cost increase will correspondingly raise housing price; User Cost View believes that unpredictable inflation and change of tax system will together bring out with shock to demand of housing market; Population View thinks the population between age 22—34 will potentially has impact on housing market price. After analyzing the data of 39 cities from 1980—1990, the author concludes that income increase and construction cost increase are able to explain housing price rising well, while the impact of population on housing price rising is not at the significant level. And in addition, French and Poterba hold the opinion that change of expected future economic growth rate is one of the reason that could cause housing price fluctuation in short-run; while considering for the supply inelasticity, increasing personal income level will admittedly raise

housing price level, given unchanged housing quality. Atash (1990) studied the housing price fluctuation with the aspect of cost-and-benefit analysis. In author's induction, it is housing's nature as a kind of investment property that generates fluctuation for itself, where housing demand is very sensitive to variation of interest rate and they are in negative relationship. At the same time, Atash found that the macroeconomic fundamentality can predict well of housing market trend in long-run, but it is impossible to predict it in short-run.

A lot of studies insist that financial support is the precondition for housing market development, but financial sector's over-investing even speculating will probably create real estate property bubble. Bertrand (1995) considered that under the background of financial liberalization and deregulation, easy bank lending policy of financial institution will intensify real estate market fluctuation and then cause bubble-and-burst. Mishkin (1997) recognized that the reason for financial asset bubble burst could be asymmetric information between financial institution and borrowers. Krugman (1999) held the opinion that almost all the real estate market bubble burst is created by bank financing. Allen and Gale (2000) considered that if investors use their own money to make investment, the equilibrium of demand and supply can effectively reflect fundamental value of assets; but if investors use borrowing money for speculation and only undertake limited liability, they will prefer to invest into those riskier assets, in which asset price deviates from normal asset value then generates bubbles. In this sense, Allen and Gale established an asset price bubbles model to analyze the effect between financial institution and production department under the case of lending over-expansion, and then concluded that mostly the property bubble is generated by agency problem of financial institution. Collins and Senhadji (2001), after analyzing the real estate market of Thailand, Korea, Singapore and Hong Kong, found out a common characteristic that there is synchronization effect between bank lending increasing and housing price rising.

(2) China Study of Real Estate Price

Xiaohui Gao (2001) studied the relationship between land price and housing price in China. The author thought that land price and housing price will be affected by each other: housing property must be cling to land property, land price is a fundamental component of housing price; housing price is the reflection of land price, so different location with different price is the manifestation

of land price differential. Fan Yang, Hongjin Li and Yong Li (2005) believed that the nature of land price is finance and a kind of land rent capitalization, it is equal to land rent divided by interest rate. Government employs differential land rent in the form of added-value tax of land to invest into urban infrastructure, then further amplify differential land rent and absolute land rent. Besides, the differential land rent, the absolute land rent and the monopoly land rent become the source of supernormal profit of housing market and are distributed among local governments and real estate developers. This kind of rent distribution mechanism serves as a powerful engine for economy development as well as becomes causality of bubble generation. Lin Liu and Hongyu Liu (2003) applied four-quadrant model to analyze the causal relationship between housing price and land price. They thought that in demand sides housing price increase will cause land price increase; and in supply sides land price increase will stimulate housing price increase in turn. Therefore, housing price has closely positive relationship with land price. Bo Song and Bo Gao use Granger Causality Test to make empirical analysis between housing price and land price. The authors found that land price is the Granger Causality of housing price in the short-run, but housing price is not the Granger Causality of land price; however, housing price and land price exist reciprocal Granger Causality relationship between each other in long-run. Chongming Qiu and Huiwen Li recognized that it will become normality that inelastic demand for housing, land supply constraint and heterogeneity in housing market altogether sheer housing price from fundamental value.

Some scholars mainly study how government behaviour affects real estate market price. Chenyao Zhang (2005) considered that local governments in China could reach the goal of high GDP growth rate and high fiscal revenue, by promoting the real estate market development and by motivating more social resources into real estate market. The incentive for local government to support real estate market can be attributable to the national tax distribution system which gives more management authority rather than fiscal authority to local government. Tao Zhang and Xuebing Wang and Lei Chen pointed out that government's investment in public infrastructure can advance welfare of local residents and will simultaneously push up housing price and land price, in which it provides more opportunities to maximize government fiscal revenue from land auction. This motivation of government making profit helps to generate property bubble in housing market.

In review of the literature, we can study housing price following asset pricing model. But under the circumstance of China—an incomplete market economy different from the western developed countries, we should try to add more weight of government into analysis. In fact, large financial institution is under control directly by government, this largely strengthens the effect of government behaviour on housing market. In my analysis, I will combine the aspects of government and financial department to explain why housing market price had better trend up rather than trend down.

3. Housing Market and Financial System Stability

Allen and Gale (2000) studied from the aspect of financial department's expectation on housing market prosperity in future. Commercial bank will have desirable expectation on housing market, because housing market's sticky supply and rigid demand will together shift housing price up in long-run. Based on this cognition, banking system will expect to maximize profit by increasing investment or bank lending into real estate market. Market system risk will expose when housing market excessively accumulated capital of banking system. If housing market evolves from prosperity to decline, banking system will automatically reduce lending scale in order to reduce exposure risk in housing market, and then the shortage of bank lending will in turn lower housing market price.

Bernanke and Gertler (2000) considered that the extent of housing market's influence on economy is majorly dependent on original financial environment, say, asset-liability ratio of household, company and bank. If economic agents' liability ratio is lowered and free cash flow is sufficient in economy entity, an asset price plummet will not trap households and enterprises into financial distress and will not create instability on banking system. So on the contrary, economic activities with high asset-liability ratio will generate instability of financial system. Goetzvon (2004) considered that the asset-liability ratio of enterprises and bank has large effect on financial system stability. If economy operates with high asset-liability ratio and the central bank adopts tight monetary policy, asset price fallen will transform into bank lending loss and then exaggerate financial system instability.

Kangping Wu, Shun Pi and Guihua Lu (2004) concerned with personal interest of commercial bank executives and incomplete incentive mechanism in procedure of bank operating. The author established general equilibrium model of housing market and bank lending market. Through comparative analysis, the study reveals the internal mechanism between housing market and lending market, under the current supervision system of commercial bank, it exists the situation that bank executives without complete incentive mechanism have excessive preference to offer bank lending to real estate market. Then over-accumulated capital stock in real estate market directly cause housing price overestimation. The result also shows that the positive feedback mechanism between housing price and bank lending increases real estate mortgage risk, where rising housing price attracts bank lending and in turn bank lending accelerates housing price rising.

Zhengxun Tan and Cong Wang mainly studies the potential factors causing banking system instability in China. The dominant factors include the housing price fluctuation, the bank lending fluctuation and the combined fluctuation of housing price and bank lending; the tight bank lending policy; the fluctuation in macro-economy. In order to maintain banking system reliability in China, regulation of high housing price can only resort to the mild approach that prevents sudden collapse in housing market.

4. Other related review

Modigliani (1971), in the Life Cycle Hypothesis (LCH), pointed out that personal consumption behaviour is determined by over-life income. Based on this hypothesis, monetary policy could stimulate consumption by increasing consumer's asset value, like stock and real estate property, and then further facilitate real economy. With respect to Tobin's Q Ratio Theory (1969), increase money supply will elevate asset price, then provide more incentive for social investment, and at the end stimulate real economy. Federic Mishkin (1976) created the Household Balance Sheet Theory to confirm that household balance sheet condition has large impact on preference of consumption. The author suggests that housing price rising make help improve household balance sheet by adding net value on household assets, which will indirectly increase social investment and consumption then stimulate real economy. Furthermore, Mishkin (2001) also proved that real estate market plays important role in monetary policy delivery mechanism.

Monetary policy's impact on housing market price will indirectly influence real economy through housing price's impact on household housing expenditure, real estate asset value and balance sheet condition of banking system. In addition, Peter Ireland (2005) mentioned that monetary policy can influence real output and employment rate through channel of housing market. Bernanke, Gertler and Gilchrist (1996) provided the Financial Accelerator Theory, describing that financial market could effectively amplify small shock then trigger profound impact on whole economy. The theory proves the core mechanism of reverse relationship existing between External Financial Premium and net asset value of borrower. Here the External Financial Premium means the differential of enterprise financing from external and internal. As result of the asymmetric information between lending and borrowing parties, there is agency cost in External Financial Premium. In this sense, net asset value will have impact on enterprise cost of financing from external, and higher net asset value of enterprise helps to relieve asymmetric information embarrassment then enterprise could access to lower cost bank lending; inversely, lower net asset value value is bound to be with higher cost of external financing.

Second Section: Housing Market Evolution in China

Current high housing price in China can be regarded as a short-term equilibrium of housing supply and demand. Moreover, to a larger extent, “over-prosperous” housing market nowadays could be traced back to the past housing market policy reform. It was the reform that helped market for housing build up. In past, the original planned economy dominated all aspects of living in China, like a kind of welfare economy without any markets participation, housing distribution behaviour is completely dependent on the “central planner”. The first essential reform in housing system happened in 1998, the new policy started to cancel the welfare housing distribution system. The housing reform gradually achieved housing privatization, and simultaneously encouraged development of financial market to housing market. Liberalized market gave rise to large demand for housing self-buying, which helped the China’s housing market go through ten-year prosperity periods. This section tries to introduce the background of China’s housing market evolution, from empty-market to market establishment then to market prosperity. At the same time, we will unveil the great contribution of housing market to China’s whole economy in the past.

1. Beginning of Housing Privatization

Before 1998, China implemented the welfare housing distribution all the time, which means nation would take charge of housing allocation to families according to practical needs. However, in 1998, the State Council of China published a policy¹ to stop the welfare housing distribution in all cities and towns across the country and to start proceeding comprehensive housing reform. At the meanwhile, national policies were inclined to boost housing finance business then to cultivate and regulate housing market. After that the private housing purchasing system replaced the welfare housing distribution system and it represented the establishment of private housing market in China.

2. New Way of Buying Housing—Bank Mortgage

¹*The State Council on further Deepening the Reform of Urban Housing System to Speed up the Construction of Housing (1998 NO.23)*

The word “bank mortgage” may be familiar with residents in western countries, but buying housing relying on bank mortgage is completely a strange way for citizens in China. In fact, until now there still exist substantial proportion of families purchasing housings by their own savings rather than requiring bank mortgage or other financial support, since the consumption concept of Chinese is different from western, where Chinese families more prefer “conserved consumption” to maintain high saving level then to prevent future unexpected risk. But in 1999, the central bank of China published a policy² to expand personal consumption credit business, from which the conception of “borrow to buy housing“ and “bank mortgage” started to emerge around the public. Here I believe that financial support policy helped to cultivate housing market, especially commercial bank provided necessary funds for those people who were lacking of financial support to buy a housing at the materials underdeveloped period; but in reverse, housing market accelerated development of commercial banks, since it provided housing or land as underlying asset for bank, through which commercial bank could guarantee its asset value and further enhance social financing capacity. We could say, housing market liberalization provided great opportunity for commercial banking system to step into the “leveraging age”. During this period, asset leveraging helped banking system promote efficiency in financial transaction and operation, simultaneously housing asset start to become the primary asset kept by commercial banks.

3. Land Auction System

China’s land auction system was mainly aiming at eliminate the probability of corruption existing in land transfer from local government to private sector. Comparing to the past Grant by Agreement System according to which local government possessed absolute authority to set price of land transfer or make decision to transfer land to whom, the newly Land Auction System³ is more beneficial to enhance market efficiency in public land resource distribution and reduce the chance of government official’s rent-seeking behaviour occurred in public land transaction procedure. This reform effectually provided more robustness to housing market and

² *Guidance about to Carry out the Personal Consumption credit (1999, NO.73)*

³ The Land Auction System required that all land transfer must go through invitation for bids, competitive auction and information disclosure of land usage. This reform is announced by China’s Ministry of Lands and Resources in 2004 July. It should be noticed that land transfer from government to real estate means developer only has right for land usage rather than land ownership.

lay the foundation for housing marketization. But in review of the adverse effect, land transfer reform directly pushed up land price and then indirectly pushed up housing price.

4. Construction for Affordable Housing and Low-rent Housing in Urban

In the early stage when the suggestion of stopping welfare housing system was advocated, the State Council of China had plans to establish affordable housing and low-rent housing system to supplement the disadvantage of housing marketization. In 2007, the State Council of China published a policy⁴ to promote current housing system. The policy required local government to increase low-rent housing construction and improve affordable housing system regulation, through which government tried to solve the problem of poor families' "housing difficulty". In addition, the central government has adopted the evaluation--urban low-rent housing and affordable housing construction, into the system that evaluates the performance of local government. This conversion differential to the past evaluation system that local government only focus on pure economic growth in sense of superficial number, indicating China's government function's transformation toward solving real livelihood issues of people. On the other sides, the central government's stress on improving social indemnificatory housing construction also unveiled that "housing difficulty" problem had and would become one of the most severe problem in society. In practise, until now the low-rent housing system and the affordable housing system construction is still at the preliminary stage, since the two systems can only cover a minority of low-income household in cities let alone those people migrating into cities from outside.

5. Macroeconomic Regulation and Control in Housing Market

After housing market releasing by government, housing market price kept remarkable rising tendency. In 2003, housing market transaction was in the rapid development lane , "the national housing sales price index in the quarter year-on-year was higher than 104; real estate market exploitation and development year-on-year growth increased 30.6 % ; area of commercial commercial housing completion reached 395 million m²; and area of hosing sales reached 322

⁴ *The State Council about Solving the Housing Difficulties of Low-income Families in Urban Several Opinions (NO.24)*

million m²,⁵. With respect to real estate market over-prosperity and the potential social contradictions incurred by government's land finance, the central government published a series of policy papers to further regulate housing market in China, among which it includes the public land transfer system reform that we have introduced before. At the same time, large social investment wave of housing market starting in 2003, which could be regard as the turning point of housing market investment to housing market speculation. In sense of social investment booming in housing market, the Central Bank of China decided to restrict bank lending to real estate developer by enhancing lending requirement, like prohibiting commercial bank to lend credit to those developers without sufficient official documents and capital capacity but trying to earn profit using bank leverage. Such measure directly brought up with large financing burden on real estate enterprises which was used to relying on bank lending for operation. On the other side, the State Council of China admitted⁶ that real estate market had become the mainstay industry of China, which implicitly released a signal to market that government would provide more advantageous and supportive policy for nationwide real estate market development. The combined result of "macro regulation" above firstly squeezed out those enterprises without healthy finance condition but supported those enterprises which had economic scale and some of those which possessed strong government background; and secondly the relative low system risk environment in housing market that shaped by the central government indeed provided confidence of public investment to spur up housing price and after 2003 housing market has at least gone through ten-year prosperous epoch.

In 2005, housing price rising problem caused concerns among public and housing price has gradually become severe living burden on families in cities but the extent of affordability is not so much. Under this circumstance, government launched a new round of macro economic regulation and control⁷ to inhibit the over-fast growth rate of housing price, it mainly contemplated to control the demand of housing from escalating standard for personal housing

⁵ The statistic is from Huang Jing's *Research on Generalized Wealth Effects of Real Estate Price Rising in China* (Antai College of Economics and Management Shanghai Jiao Tong University, 2010 April), which is supported by National Natural Science Fund (NO.70741018).

⁶ NO.18 Document of State Council of China in 2003

⁷ The representative policy announced by State Council of China, *the Notice about Strengthening the Management of Real Estate Tax* (2005 March).

loan and from increasing investment cost of real estate field in virtue of tax instruments. Moreover, the policy of nation began to emphasize on suppressing private sector's over-investment or even speculation behaviour in housing market. Therefore, we can see that the extensive range of private sector's preference in speculating in housing market was shaped in 2005 and it also had spawned a large number of rich people who accumulated their wealth professionally relying on speculating in housing market. The famous group of housing market speculator is "Wenzhou Real Mission"⁸ whose appearance revealed the potential opportunities in earning lucrative profit by housing speculation; and also indicated that investing in real property has become a normal economic behaviour among Chinese families with their disposable funds.

In 2006, Prime Minister of China Jiabao Wen in government report meeting provided opinion of how to achieve sustainable development in housing market--the "State Six"⁹. Comparing with policy guidance in 2005, macro economic regulation and control in 2006 more prefers to utilize market instrument rather than normal administrative regulations; at the same time, it adopt relatively intensive monetary policy to regulate the demand-and-supply in housing market. For instance, from 2006 July to 2007 May, the Central Bank of China continuously raised the reserve ratio of bank deposits seven times in no more than one year, the ratio from 7.5% to 11%. But in reality, housing price level of nationwide did not fall but inversely still kept rising, like "from May to August in 2007, 70 cities' housing sales price year-on-year growth rate was respectively

⁸ Wenzhou Real Mission mainly refers to people originally living in Wenzhou city in Zhejiang Province accumulated their own wealth primarily through housing speculation behaviours among nationwide range. One official once reported that "the scale of real estate exploitation and investment in Wenzhou area can be comparable to Jiangxi Province, but the population in Wenzhou was only around one million". In fact, Wenzhou Real Mission's large volume of capital inflow into housing market indeed push up specific areas and cities' housing price and also gave rise to housing investment boom around China. In late stage, Wenzhou Real Mission excessively used private lending for investment and housing price fall in 2012 gave a bad shock on them.

⁹ State Six was announced by State Council of China in 2006, it mainly included six policy directions on regulating housing market, like constructing low-price and small-size housing, controlling old housing demolition scale and alleviating passive demand of housing, strengthening land supervision and inhibiting of hoarding land by developers, promoting real estate market information revelation system, etc.

6.4%, 7.1%, 7.5%, 8.2%; and indexes of housing sales price and land transaction price both reach peak level in 2007”¹⁰.

In 2008, there occurred turning point in housing market, housing price firstly occasioned to falling tendency which could be largely due to the achievement of central government’s work in 2006 and 2007. However, under the environment of worldwide economy, 2008 was a special year—the American subprime mortgage crisis broke out. China’s economy doubtlessly might be more and less affected by this crisis. Concerned for stabilizing national economy, the central government had to choose corresponding bailout plan. And the easiest and most straightforward measure that could be adopted was relaxing credit-and-loan policy which directly reduced the housing purchase cost of citizens and then stimulated more intense demand for housing. At the meanwhile, the original tight monetary policy loosened helped more new money supply inflow into real estate market. Moreover, the central government’s guidance also helped to bring more private sector’s capital into real estate investment. The decision of government at that time largely cut off the standard for proceeding housing purchase and land transaction, like it reduced housing transaction tax and lowered interest rate of personal housing loan. During the period of global economic stagnant, we can know that China’s government majorly resorted to housing market and other series of big infrastructure construction program, which served as a kind of economic buffering industries, then to compulsively increase aggregate investment and consumption; and to strengthen confidence of internal market stability. The method of government rescue could be said successful, at least China still maintained relatively high GDP growth rate 9.03% in 2006, 7.25% in 2008, 3.79% in 2009 and 7.30% in 2010, though China experienced low growth rate in 2009, it rebounded back to normal track in 2010 soon. But on the other hand, the occasional event of global financial crisis cracked down the initial plan of stabilizing housing market and of inhibiting over-investment in housing market, the housing market that benefited from government’s indirect rescue became “over-hot” again—the quantity of housing supply-and-demand and the housing price were both increasing fast in 2009. The

¹⁰ The statistic is from Huang Jing’s *Research on Generalized Wealth Effects of Real Estate Price Rising in China* (Antai College of Economics and Management Shanghai Jiao Tong University, 2010 April), which is supported by National Natural Science Fund (NO.70741018).

basic condition and major events of macro economic regulation and control before 2010 are all described here.

6. Contribution of Housing Market in China's Economy

In the past, China's economy development emphasized on "the Three Carriages"—export, investment and consumption. China export has achieved great success in boosting economy and increasing employment as well as earning foreign exchange reserves. The achievement of export was mainly relying on China's position as "the World Factory, in effectually China relied on low cost advantage of labor forces and raw material to proceed international manufactural processing and to occupy global manufactural market soon. "Made in China" has become the brand for China and has been familiar among worldwide. Despite of all this, simple manufactural processing industry gradually lost the great meaning for promoting national economy growth, since we face the pressure under increasing cost of income payment and other developing countries' challenge with respect to their lower cost of labor forces. Even though China did not give up the export-oriented economy, our central government more prefers to encourage social investment and consumption, also at the same time we advocated that using investment advances internal consumption. Under this circumstance, real estate market could be counted as popular investment field and simultaneously its development could effectively stimulate consumption in China.

Firstly, housing market development involves various social sectors' coordination, like government's policy guidance, commercial bank's lending and construction industry's technology progress. In reality, housing market's prosperity indeed stimulated its related upstream and downstream industries' development, among which some scholars demonstrated that real estate market development could drive up construction industry and manufactural industry the greatest. By empirical study, "every ten billion yuans investment in real state will correspondingly follow by twelve more billion yuans output in manufactural sector, nine billion yuans output in construction industry, 1.6 billion yuans in output of mineral industry, 1.1 billion yuans in commerce, and even about 0.66 billion yuans in industries supplying gas and water"¹¹.

¹¹ The empirical result here is taken from Zhenyu Huang's *The Reason Analysis of Housing Price Rising in Housing Market Between 1998 and 2007 in China (2010)*

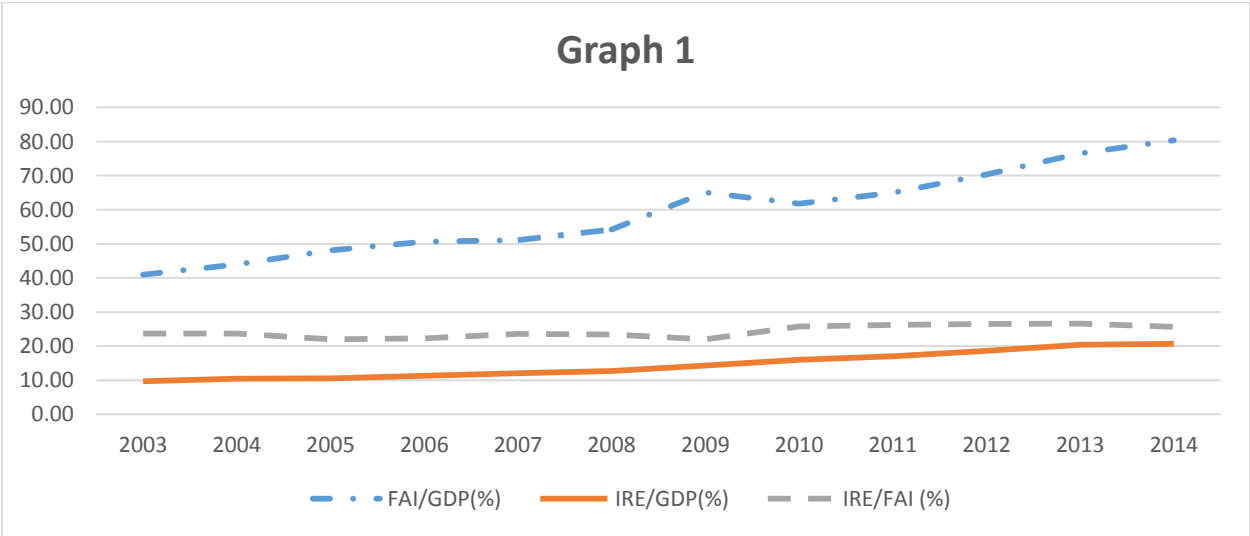
In addition, real estate industry belongs to not only capital-intensive industry but also labor-intensive industry, in virtue of vast demand market and capacity for attracting social capital pool, it was playing an important role on absorbing social employment, in 2003 and 2014, respectively the practitioners in real estate was 1.2 millions and 4 millions; and from 2003 to 2014, the average growth rate of employment in real estate was 10.18% obviously larger than other industries' employment growth rate, among which it reached the lowest growth rate 3.59% in 2013 and reached the highest growth rate 26.75 at 2013¹². Therefore, real estate market could serve as mainstay industry function which has the pulling effect on other various industries to increase consumption and to optimize structure of employment market.

From the prospect of investment, investment admittedly made a large contribution to national economy and was regarded as one of the economic growth engines in China. Graph 1 respectively describes the ratio of fixed assets investment (FAI) to GDP, the ratio of investment in real estate (IRE) to GDP and the ratio of investment in real estate to fixed assets investment from 2003 to 2014. From graph 1, we can see that investment has occupied the dominant fraction of GDP, the ratio FAI/GDP has increased from 40.94% in 2003 to 80.41% in 2014. Moreover, we found that the ratio IRE/FAI is relatively invariant, that means the investment in real estate stably occupies around 25% fraction of fixed asset investment. Following by investment scale escalating, the ratio IRE/GDP increased from 9.68% in 2003 to 20.63% in 2014. In addition, we can compare the historic growth rate of GDP, fixed investment and investment in real estate, from which the growth rate of investment in real estate is higher than the growth rate of GDP in general and in some periods higher than the growth rate of fixed assets investment. In reality, the high economic growth rate of China was famous to world, but investment in real estate was inclined to be more explosive growth, in which the growth rate of investment in real estate reached the lowest level at 10.55% in 2014 and the highest level at 32.27% in 2007, and experienced the average growth rate of 23.43% which is higher than nominal GDP's average growth rate of 15.19% and fixed assets investment's growth rate of 22.48% from 2004 to 2014 (see the graph 2).¹³

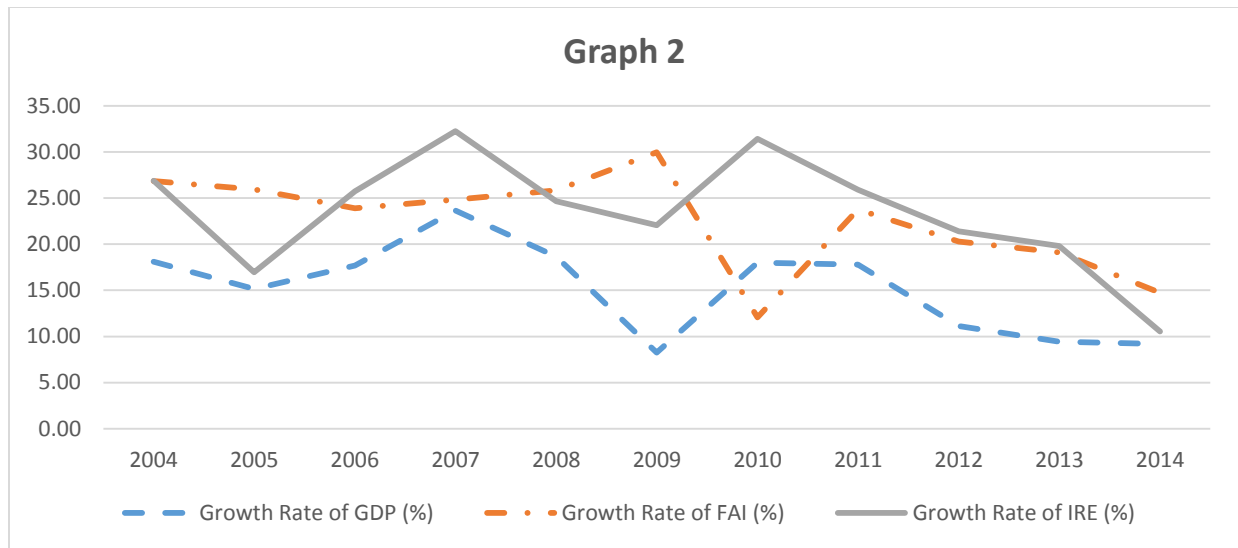
¹² The statistics is from the National Bureau of Statistic of China

¹³ The relative statistic is from National Bureau of Statistic of China

The statistic above could only underestimate the role of real estate market in national economy rather than overestimate, in fact some studies insist that real estate could directly or indirectly affect more than 60 industries and could guarantee at least two percentage points of GDP growth rate. Also central government’s report emphasized that “we need to promote real estate market’s sustainable development. Real estate is the pillar industry of China, it can effectively drive up development of steel, building material, household electrical appliance industries as well as other industries; at the same time, it has profound and vital effect on maintaining financial stability; and it can optimize residents’ consumption structure then further promote living standard in general.” For all these, the importance of real estate was undisputed in China.



Note: the statistics are from National Bureau of Statistics of China



Note: the statistics are from National Bureau of Statistics of China

7. Sectional Conclusion

The period from 1998 to 2009 recorded the major events of China's real estate evolution which shaped the foundation of the current housing market, the market experienced from the stage that created by government to the stage of rapid development then to the stage of macro economic regulation and control by government and to the last stage of over-prosperity. Even though China has implemented the Open and Reform policy for more than at least 35 years, the shadow of central planned economy was still veiling on the market. In reality, market and government are not in the paralleled position in China, government has the absolute authority to overrun market. The housing market could be counted as one of the representative cases of "big government and relatively small market". Government more prefers to use market as a kind of instrument to achieve its practical goal, like replacing welfare housing distribution system by housing marketization initially designed to alleviate burden for government and state-owned enterprise; creating housing market investment as a new breakthrough point to drive up relevant various industries' development then to boost national economy; to a large extent, relying on real estate as a buffering mechanism to stabilize economy during global financial crisis. Two points here should be stated (1) the framework of "big government and relatively small market" is neither a passive nor positive design but a neutral design in my mind. At least, real estate development, though directed by government a lot, indeed promote housing quality for the more majority of people and injected robustness to other market and also guarantee the high economy growth rate. (2) we emphasized the positive and dominant effect of real estate, but it also causes emergent

social problem in recent years--housing unaffordability which reversely has adverse effect on residents' living issues. The economic pattern and condition in China is largely different from western countries', this difference reminds us that we cannot resort to current most economy theory to analyzing housing market in China; however, we could choose to quantitative analysis combined with practical analysis.

Third Section: Econometric Model Establishment and Quantitative Analysis

This section mainly focuses on applying econometric model to conduct quantitative analysis; moreover, we try to give reasonable explanation for the quantitative result. The description of this section is divided into two parts: the first part tries to reveal the interrelationship between new added bank loan and real estate investment through VAR model (Vector Autoregressive Model) establishment, Impulse Response analysis and variance decomposition analysis as well as Granger Causality Test; the second part will establish a VEC model (Vector Error Correction Model) to measure respectively the short-run effect and long-run effect of real estate investment on national output.

1. Interrelationship between Bank Loan and Real Estate Investment

Why we choose VAR model is because VAR model's establishment does not need to base on complicated theory but can be used as convenient tool to predict interrelationship among variables. In fact, there are a lot of studies supporting positive effect of bank loan on real estate investment. According to the past knowledge, we have reason to believe that easy bank loan policy could stimulate not only investment sector but also other sectors, like consumption sector.

Here we choose four variable--new added bank loan (L), real estate investment (IRE), other investment (OI) and retail consumption (RC) for model analysis, among which we recognize other investment as the part of fixed asset investment (FAI) lacking of real estate investment so that we have the relationship $OI = FAI - IRE$ ¹⁴. All data collected are monthly data from 2010 June to 2016 April¹⁵. Compare with other scholars' VAR model, we prefer to use real estate investment rather than housing price index for analysis. It is based on two reason: (1) economy development condition is totally different among regions, then housing price level is different between developed region and underdeveloped region so that we can not rely on a uniform

¹⁴ According to China's statistical classification, fixed asset investment mainly includes four parts respectively infrastructure investment, renewal and transformation investment, real estate exploitation investment and other fixed asset investment.

¹⁵ Data of bank loan is from the People's Bank of China (central bank); and data of real estate investment, retail consumption and fixed asset investment is from the National Bureau of Statistics of China.

housing price index among nationwide. The housing price indexes in China could only suitably applied to study specific cities rather than the whole country; (2) real estate investment can directly reflect the economic activity in real estate field, basing on the common sense that the higher investment level is always accompanied with the more profitable opportunities in specific field. In another sense, housing market in China principally relies on price difference to gain profit from transaction, so the higher investment level in real estate can indirectly reflect the higher housing price level among nationwide. At the same time, the bank loan here does not only mean the housing loan but represents a broader credit-and-loan offered by commercial bank, targeting at personal or enterprises. In view of finance, bank loan could be recognized as a kind of public disposable capital. In this sense, the flow of bank loan could be seen as the flow of public capital. For instance, if a large volume of bank loan inflows into housing market, it will always be followed by a large pile of other public capital going into housing market. Therefore, the new added bank loan majorly serves as a role as indication of “capital flow”. For smoothing the raw data, we take the logarithmic form of raw data. Then we respectively have variables LL, LIRE, LOI and LRC.

Before establishing VAR model we must conduct the Unit Root test¹⁶ to check whether our time-series data is stationary or not, since VAR model can only be applied on stationary data. By Eviews 9.5, we find out that LL, LIRE, LOI and LRC are not stationary time-series data; while the first difference of them, say DLL, DLIRE, DLOI and DLRC, all satisfy the stationary condition so that we can add the new four variables into VAR model. In practise, DLL, DLIRE, DLOI and DLRC can respectively represent for the percentage change or growth rate of new bank loan, real estate investment, other investment and retail consumption.

(1) VAR Model Establishment

The corresponding VAR model establishment is as follows:

$$A_t = C + \sum_{i=1}^3 C_i A_{t-i}$$

¹⁶ We take ADF (Augmented Dickey-Fuller) method to proceed Unit Root test

where

$$A_t = \begin{pmatrix} DLL_t \\ DLIRE_t \\ DLOI_t \\ DLRC_t \end{pmatrix} ; \quad A_{t-i} = \begin{pmatrix} DLL_{t-i} \\ DLIRE_{t-i} \\ DLOI_{t-i} \\ DLRC_{t-i} \end{pmatrix} \quad i = 1, 2, 3$$

and the coefficient vector is

$$C_{t-i} = \begin{pmatrix} \alpha_i \\ \beta_i \\ \eta_i \\ \theta_i \end{pmatrix} \quad i = 1, 2, 3$$

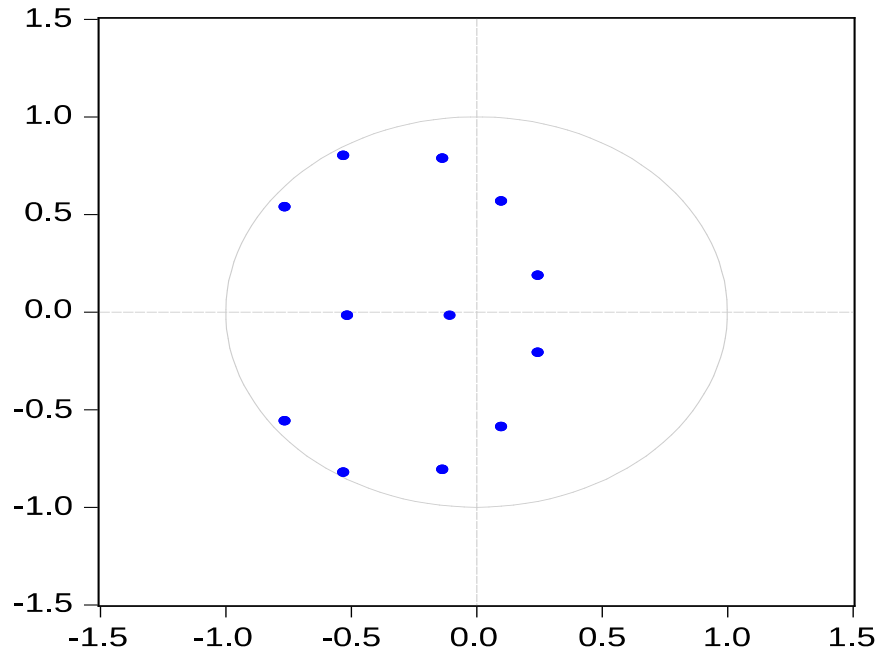
as well as the constant vector

$$C = \begin{pmatrix} \alpha \\ \beta \\ \eta \\ \theta \end{pmatrix}$$

Even though the AIC (Akaike Info Criterion) and the SC (Schwarz Info Criterion) both suggest that the best lagging value of our VAR model should be 5, we still choose the lagging value for our VAR model as 3, since lagging value of 3 can satisfy the stability requirement of VAR model while lagging value of 4 or 5 can not do so. With lagging value of 3, there is no root lying on the unit circle, so VAR model satisfies the stability condition (see graph 3). Further more, the VAR model's stability helps us to proceed impulse response analysis and variance decomposition analysis.

Graph 3

Inverse Roots of AR Characteristic Polynomial



According to our VAR model, we have:

$$DLOI_t = -0.610DLIRE_{t-2} - 0.685DLIRE_{t-3} + 0.807DLOI_{t-3}$$

$$R^2 = 0.84$$

and

$$DLRC_t = 0.084 - 0.186DLIRE_{t-2} - 0.187DLIRE_{t-3} - 0.746DLRC_{t-1} \\ - 0.611DLRC_{t-2} + 0.550DLRC_{t-3}$$

$$R^2 = 0.93$$

The two equations above both neglect the coefficients with non-significant level at $\alpha = 0.1$. Then we can infer that growth increase in real estate investment will probably impede growth of other investment and retail consumption in future. In view of impulse response analysis (see table 3), it indicates the response of DLIRE, DLOI and DLRC to one positive standard error shock

in DLL (about 0.2663) occurred at period 1. We can see that in general the same positive DLL shock will provoke higher DLIRE than DLOI and DLRC. In another word, it suggests new bank loan accompanied with other potential capital more prefers to inflow into real estate investment than into other investment fields or retail consumption sector. Besides, we have stipulated that $FAI = OI + IRE$. Under this circumstance, even though real estate investment and other investment are both inclined to increase in long-run, we still have reason to believe that investment in real estate field has more attractiveness than investment in other fields in view of absorbing new bank loan or other public disposable capital. The analysis here is in effectually corresponding to the result of two equations of VAR model above. Therefore, I believe that real estate investment will more or less squeeze out other field's investment.

Table 1. Response of DLIRE, DLOI and DLRC to DLL Shock

Period	1	2	3	4	5	6	7	8	Average
DLIRE	0.0123	-0.0243	0.0297	0.0004	-0.0128	-0.0003	-0.0035	0.2240	0.0282
DLOI	-0.0046	0.0138	-0.0045	0.0031	0.0019	-0.0204	0.0221	0.0013	0.0016
DLRC	0.0060	0.0036	-0.0070	0.0046	-0.0013	-0.0059	0.0086	-0.0013	0.0009

With respect to variance decomposition (see table 2, table 3, table 4 and table 5), the result shows that in 12-period range DLOI contributes the largest part to DLL's variance; DLOI contributes the largest part to DLIRE's variance; DLIRE contributes the largest part to DLOI's variance; and DLIRE also contributes the dominant part to DLRC's variance. From the result, we could infer that fluctuation in real estate investment will spread over to other investment and retail consumption's fluctuation, then at last indirectly cause fluctuation in new added bank loan. And if bank loan or other similar capital input encounters fluctuation, it will probably trigger large-scale fluctuation in production of real economy.

Table 2: Variance Decomposition of DLL (%)

Period	1	4	8	12
DLL	100.00	81.96	72.36	68.92
DLIRE	0.00	1.35	3.06	2.97
DLOI	0.00	16.15	23.98	27.13
DLRC	0.00	0.54	0.62	0.98

Table 3: Variance Decomposition of DLIRE (%)

Period	1	4	8	12
DLL	3.08	13.76	14.07	17.05
DLIRE	96.92	67.64	49.22	42.41
DLOI	0.00	14.65	32.29	36.22
DLRC	0.00	3.94	4.41	4.30

Table 4: Variance Decomposition of DLOI (%)

Period	1	4	8	12
DLL	0.40	2.88	0.12	0.13
DLIRE	42.45	51.82	37.27	35.15
DLOI	57.14	45.50	53.51	49.37
DLRC	0.00	0.04	1.23	3.47

Table 5: Variance Decomposition of DLRC (%)

Period	1	4	8	12
DLL	0.20	12.40	18.36	17.50
DLIRE	23.01	41.37	49.59	46.45
DLOI	3.49	5.53	5.30	13.35
DLRC	73.30	40.71	26.74	22.69

(2) Causal Relationship Analysis

We try to use the Granger Causality test to detect the causal relationship among growth rate of new bank loan, real estate investment, other investment and retail consumption. The Granger Causality Test only focused on causal relationship in view of statistics rather than causal relationship existing in traditional economic theory. Besides, as DLL, DLIRE, DLOI and DLRC all satisfy the stationary data condition, so we can directly add them into Granger Causality Test. In fact, the Granger Causality Test is based on a two variables VAR model with lagging value p, like:

$$\begin{pmatrix} x_t \\ y_t \end{pmatrix} = \begin{pmatrix} a_{10} \\ a_{20} \end{pmatrix} + \sum_{i=1}^q \begin{pmatrix} a_{11}^{(i)} & a_{12}^{(i)} \\ a_{21}^{(i)} & a_{22}^{(i)} \end{pmatrix} \begin{pmatrix} x_{t-i} \\ y_{t-i} \end{pmatrix} + \begin{pmatrix} \epsilon_{1t} \\ \epsilon_{2t} \end{pmatrix} \quad \text{where } q = 1, 2,$$

3 ...q;

Only if all the coefficients $a_{12}^{(q)}$ are equal to zero, we can say that the variable x is not the Granger Causality of the variable y; and given that all the coefficients $a_{21}^{(q)}$ are equal to zero, vice versa. So the null hypothesis is that the variable x is not the Granger Causality of the variable y and the alternative hypothesis is that the variable x is the Granger Causality of the variable y.

$$H_0: a_{12}^{(q)} = 0$$

$$H_1: \text{at least one coefficient exists that } a_{12}^{(q)} \neq 0$$

It is complied with Chi-square distribution, so

$$S = \frac{T(RSS_0 - RSS_1)}{RSS_1} \sim \chi^2(p)$$

where $RSS_1 = \sum_{t=1}^T \epsilon_{1t}^2$

$$RSS_0 = \sum_{t=1}^T \epsilon_{1t}^2 \quad \text{and} \quad y_t = a_{10} + a_{11}^{(1)} y_{t-1} + a_{11}^{(2)} y_{t-2} + \dots + a_{11}^{(p)} y_{t-p} + \epsilon_{1t}$$

Then we have the result of Granger Causality test choosing lagging value $p=5$ (see table 6). Combine with the result of VAR model above, we can infer that, at $\alpha= 0.1$ significant level, growth rate change in real estate investment is the Granger Causality of growth rate change in new bank loan; and growth rate decrease in other investment dose “Granger” cause growth rate increase in real estate investment; also growth rate increase in real estate investment does “Granger” cause growth rate decrease in retail consumption.

Table 6: Granger Causality Test

Null Hypothesis	F-Statistic	Prob	Conclusion
DLIRE does not Granger Cause DLL	3.066	0.042	Reject
DLL does not Granger Cause DLIRE	0.491	0.778	Accept
DLOI does not Granger Cause DLIRE	3.165	0.038	Reject
DLIRE does not Granger Cause DLOI	1.343	0.300	Accept
DLRC does not Granger Cause DLIRE	0.582	0.710	Accept
DLIRE does not Granger Cause DLRC	16.886	1.E-0.5	Reject

2. Effect of Real Estate Investment on National Output

The VEC model including four variables to demonstrate both long-run and short-run interrelationship among GDP (Y), Investment in Real Estate (IRE), Retail Consumption (RC), Fiscal Revenue of government (FR). All data collected are quarterly data from the 1st quarter of 2006 to the 4th quarter of 2016¹⁷. For smoothing the raw data, we take the logarithmic form of raw data. Then we respectively receive variables LY, LIRE, LRC and LFR. Before establishing VEC model, similarly we need to satisfy the stationary condition. According to the unit root test, LY, LIRE, LRC and LFR all do not satisfy the condition of stationary data, while the first difference of them are stationary time-series data.

¹⁷ Data source is form the National Bureau of Statistics of China

(1) Cointegration Test

The precondition for VEC Model establishment is that there exists the Cointegration relationship among the four variables. Through the Cointegration test¹⁸, it proves that the four variables, say LY, LIRE, LRC and LFR indeed exist one internal Cointegration relationship. The Cointegration relationship proof here is in order to prevent from the spurious regression. Therefore, there is a Cointegration equation which represents long-run relationship. The Cointegration equation is:

$$LY = \beta_0 + \beta_1 LIRE + \beta_2 LRC + \beta_3 LFR + error$$

(2) VEC Model Establishment

According to the Cointegration relationship existence, the equation can be transformed as below:

$$error = LY - \beta_1 LIRE - \beta_2 LRC - \beta_3 LFR - \beta_0$$

In our model, we choose the lagging values as 4 corresponding to the Cointegration relationship. Through Eviews 9.5, we have the equation:

$$error = LY + 0.58 LIRE - 3.37LRC - 0.04 LFR - 0.93$$

t-statistic (2.60) (-5.48) (-0.35)

The coefficients of LIRE, LRC and LFR above respectively mean their economic elasticity with GDP. Combine with the Cointegration equation and its transformed equation, it indicates that 1% increase in real estate investment will accompany with 0.58% decrease in GDP, while 1% increase in retail consumption will be accompanied with 3.37% increase GDP in long-run; by contrast, the change in fiscal revenue has limited impact on output. In fact, the coefficient of

¹⁸ We adopt Johansen method here.

LFR does not show significance at $\alpha = 0.10$ level, but the coefficients of LIRE and LRC are both significant even at $\alpha = 0.05$ level¹⁹.

With respect to short-run relationship detection, we set DLY, DLIRE, DLRC and DLFR respectively as the first difference of LY, LIRE, LRC, LFR. The corresponding practical meaning of the variables could be quarterly growth rate of GDP, real estate investment, retail consumption and fiscal revenue. The VEC model is

$$D_t = D_0 + E_0 VEC'_{t-1} + \sum_{i=1}^4 L_i D_{t-i}$$

where

$$D_t = \begin{pmatrix} DLY_t \\ DLIRE_t \\ DLRC_t \\ DLFR_t \end{pmatrix} ; \quad D_{t-i} = \begin{pmatrix} DLY_{t-i} \\ DLIRE_{t-i} \\ DLRC_{t-i} \\ DLFR_{t-i} \end{pmatrix} \text{ and } i=1, 2, 3, 4$$

$$VEC_t = \begin{pmatrix} error_t \\ error_t \\ error_t \\ error_t \end{pmatrix}$$

and the coefficient vectors are

$$L_i = \begin{pmatrix} \alpha_{1i} & \beta_{1i} & \gamma_{1i} & \theta_{1i} \\ \alpha_{2i} & \beta_{2i} & \gamma_{2i} & \theta_{2i} \\ \alpha_{3i} & \beta_{3i} & \gamma_{3i} & \theta_{3i} \\ \alpha_{4i} & \beta_{4i} & \gamma_{4i} & \theta_{4i} \end{pmatrix} ; \quad E_0 = \begin{pmatrix} e_1 \\ e_2 \\ e_3 \\ e_4 \end{pmatrix}$$

as well as the constant vector

¹⁹ The critical value of t-statistics is respectively 2.58, 1.96 and 1.64 at the level of $\alpha = 0.10$, $\alpha = 0.05$, $\alpha = 0.01$

$$D_0 = \begin{pmatrix} d_1 \\ d_2 \\ d_3 \\ d_4 \end{pmatrix}$$

In addition, we can attain the short-run relationship among the variables above by VEC model, like we have:

$$\begin{aligned} DLY_t = & 0.034 - 1.253error_{t-1} - 0.268DLY_{t-1} - 0.297DLY_{t-2} - 0.321DLY_{t-3} \\ & + 0.595DLY_{t-4} + 0.330DLIRE_{t-1} + 0.340DLIRE_{t-2} + 0.257DLIRE_{t-3} \\ & + 0.163DLIRE_{t-4} - 1.443DLRC_{t-1} - 0.895DLRC_{t-2} - 1.056DLRC_{t-4} \end{aligned}$$

$$R^2 = 0.996$$

One thing should be noticed is that the equation above neglects the coefficients of variable which are non-significant at $\alpha = 0.10$ level. According to the equation above, we can know that the long-run equilibrium has the reverse correction effect on the short-run dynamic change, since the coefficient of previous period error term is negative. It means that the short-run dynamic equilibrium will reversely re-correct once shock occurs in the long-run equilibrium. For instance, if one positive shock causes output level deviating from the long-run equilibrium level in previous period, it will have negative effect on output growth rate at current period, since it allows that the short-run equilibrium more adheres to the long-run equilibrium though reverse correction mechanism. Moreover, previous periods growth rate of investment in real estate has positive effect on current period's growth rate of GDP, since the coefficients of $DLIRE_{t-1}$, $DLIRE_{t-2}$, $DLIRE_{t-3}$, $DLIRE_{t-4}$ are all positive; on the other sides, previous periods' growth of retail consumption will impede growth of GDP at current period; the result is similar as in the Cointegration equation, the effect of fiscal revenue is limited and ignorable. Our result indicates that increasing investment of real estate will help to promote GDP level in short run, but in sense of long-run equilibrium, excess investment in real estate may barricade other sectors' growth like absorbing excess essential capital from producing departments and then further impede aggregate output as a whole.

Similarly we can know the short-run relationship of other other variables as dependent variable:

$$DLFR_t = -1.407error_{t-1} + 1.562DLIRE_{t-1} + 1.735DLIRE_{t-2} + 1.462DLIRE_{t-3} \\ - 5.455DLRC_{t-4} - 0.713DLFR_{t-1} - 0.654DLFR_{t-2} - 0.499DLFR_{t-3}$$

$$R^2 = 0.96$$

The equation also suggests that there is reverse correction effect in the short-run dynamic change. In the same way, at the $\alpha = 0.10$ significant level, the coefficients of $DLIRE_{t-1}$, $DLIRE_{t-2}$ and $DLIRE_{t-3}$ are all positive, demonstrating that real estate investment growth rates of past three periods will increase fiscal revenue of government in current period; while the retail consumption growth rate in the past four period may have negative effect on growth rate of government fiscal revenue. The result here, to a large extent, fits for the “Land Finance in China” proposed by some scholars (we will also discuss this topic in the next section), where pointed out that many local governments in China without enough tax revenue but relied on public land transaction to satisfy local fiscal revenue. Admittedly, real estate market evolution is positively connected with land transaction between local government and developers. Therefore, probably among nationwide, local governments prefer to raise their fiscal revenue by encouraging real estate exploitation more than by encouraging retail consumption. On the other side, we can see that past three fiscal revenue growth rate all will impede growth rate of fiscal revenue at current period, this accords with the practise that government need to balance its fiscal revenue to accompany with external economic condition.

Also, we have:

$$DLIRE_t = 0.09 - 0.675error_{t-1} + 1.185DLIRE_{t-4} - 4.674DLRC_{t-2}$$

$$R^2 = 0.99$$

The same we neglect the non-significant coefficient based on t-statistic. From the equation, the reverse correction mechanism also applies to real estate investment growth rate at current period. Besides, the coefficient of $DLIRE_{t-4}$ is positive, it means that real estate investment of the past 4 period may promote real estate investment at current time. In practise, it probably indicates that

the past potential high profit procured in housing market could give developers more incentive to increase investment scale into this field. With respect to retail consumption, we can see that the past two period of retail consumption could only impede the growth of real estate investment at current period. In a sense, it can be regarded as a kind of negative relationship existing between real estate investment and retail consumption in short-run. Moreover, we can say that there is inappreciable effect of past periods' output or government fiscal revenue growth on current period's real estate investment growth.

3. Sectional Conclusion

This section majorly provides us the quantitative analysis with respect to the effect of real estate investment on other economic sectors. Even though we know that the scale of investment and consumption was tended to growing up in long run specially under the background of China's fast economic growth speed, the real estate investment growth will probably impede the growth of other field's investment and retail consumption. Such phenomenon can be attributable to the bank loan or the other public capital are more preferred to chase profit in field of real estate rather than in other fields, since the growth rate of real estate investment is higher than the growth rate of other investment and consumption given a specific volume of new bank credit-and-loan released into market. Besides, in our four variables VAR model, the fluctuation occurred in real estate field is the main reason for triggering the fluctuation in other field' investment and retail consumption. In review of our VEC model, the result demonstrates that real estate development will promote national economic growth as well as government fiscal revenue growth in short-run, which is exactly the authority's desirable expectation; however, in long-run, the probably excessive investment in real estate field does not have positive effect on total output of society. In a word, public capital over-accumulated in real estate industry and real estate market's fluctuation altogether spawn adverse effect on other economic sectors in short-run then have no benefit for national economy in long-run.

Fourth Section: Three Aspect Simulation Analysis—Revelation of high Housing Price Secret in China

Combine with the quantitative analysis in the second section, this section mainly tries to reveal what has caused the problem of housing unaffordability in China. It is based on three aspects simulation analysis--the individual-individual aspect, the individual-capital market aspect and the government-financial system aspect. In fact, we are analyzing the economic agents' behaviour in housing market, given the special background of China's economy which is differential to other western economies. At the same time, analysis of other countries' experience of housing market evolution will be combined with, like the last 90's bubbles burst in Japan and the 2008 subprime crisis in America both of which are closely related to housing market and gives us revelation of our housing market development in future. The China's housing market here includes not only the activity of real estate investment described in the second section but also other related transactions, like transaction of usage right for land and housing. So the conception of housing market is broadened, even once businesses involves housing or land it can be recognized as activities in housing market.

1. Individual-individual Aspect Analysis

We could say that the social problem of unaffordable housing price in China principally is reflected on the individual-individual aspect, that means some people in big cities are all trying to push up the housing price then to gain price difference return in future; while other people from outside migrating into big cities have inelastic demand for housing but could not afford. The current contradiction is that individual or household with more than one housing asset in city have enough money to purchase more housing assets, which is not an essential necessity but a sort of investment necessity for them; on the other side, individuals or household and even the young generation living in cities without sufficient income to buy a housing, even though housing is essential demand for them. Before our analyzing the individual-individual aspect, it is necessary for us to define the duality of real estate wealth.

(1) Duality of Real Estate Wealth

The duality makes real estate property different from other goods, and this is the reason why housing market is distinct to other markets and why housing problem can become a severe social problem attracting attention among nationwide. Initially, housing and land both are durable consumption good, it provides essential and necessary place for household living and production proceeding, it has practical value in use. Besides, housing expenditure always almost occupies the largest proportion of household wealth of normal family and housing' ownership is the basic requirement for family organization. The high expenditure and inelastic demand for housing altogether have impact on household consumption behaviour and household living quality. Maybe foreign people could not understand how inelastic demand for housing in China, the most impressive image for housing's function is to provide private space for living, but the meanings of housing is more for Chinese. For instance, whether a man has housing or not to a great extent determines his marriage success or not, in tradition, the bride's side will require the bridegroom's side to offer housing for the the couple's living after marriage, in a lot of cases the failure of offering housing by the bridegroom's side means the marriage disagreement by the bride's side and many couples of young lovers have to face the fact of "broke up" at the end. Some scholars call this as the "mother-in-law economy" which gives satiric explanation for inelastic demand for young generation who has plan to get marriage. The "mother-in-law economy" is only one case to reflect how important role of housing in Chinese mind. With respect to housing consumption, we could classify the commercial housing price constitution as follows (see table 7²⁰) in general. Here we adopt the pricing structure decomposition in the table 7 and set the pricing here as the fundamental price of commercial housing. The fundamental price here is corresponding to the housing's usage value.

²⁰ The pricing method here is take reference on Yong Li, *The research about Real Estate Price Financial Stability*. In Yong Li's description of the "determinant of real estate price", the author used the "Cost plus profit" method to decompose the pricing structure of commercial housing, the result is showed as in the table 7.

Table 7: The Constitution of Commercial Housing Price

The Commercial Housing Price	Production Process	Land Price or Land-transferring Fees	Price of Farmland Transferred into Urban Land	Arable Land Occupation Fee	
				Land Compensation	
				Resettlement Subsidy	
				Ground Attachment and Young Crop Compensation	
				Land Development Fees	
				Investment Interest	
				Management Fee	
				Land Development Profit	
				Urban Land Price	Demolish Resettlement Fees
					Land Redevelopment Fees
	Investment Interest				
	Management Fees				
	Land Development Profit				
	Construction Price	Survey and Design Fees			
		Building Material Cost			
		Construction Fees			
		Investment Interest			
		Management Fees			
		Housing Construction Profit			
	Circulation Process	Sales Cost and Profit	Fees (Advertisement, Insurance and Management)		
Investment Interest					
Housing Sales Tax					
Operating Profit					

The investment necessity is coming later than the consumption necessity, but currently using housing as a kind of investment tool has gradually become popular among public. Housing investment has admittedly been a substitution of other financial assets, so like other financial assets, housing itself possesses nature of virtual asset. The virtual asset refers to the good without practical usage for people. As real estate assets could be considered as a complex of consumption good and investment good, based on two different natures their pricing should be divided into

two fraction: the first fraction is housing's fundamental price; the second fraction is housing's price in sense of virtual asset value, we call it as the "expectation price". Therefore, we can consider that the part of price over the housing's fundamental price should be accounted as the housing's expectation price, which is mainly derived from investment demand, so that we have the equation that Real Housing Price = Fundamental Price + Expectation Price. Relative to other financial assets like stock which lacks of practical utility value for normal people, housing price change faces smaller fluctuation or trend-down, since it is backed by its usage value which guarantees its lowest price bound and the fluctuation probably occurred in the fraction of the expectation price existing in housing price. Besides, the housing holder could earn rental revenue then receive a stable cash stream at usual. Therefore, housing investment perfectly satisfies the investors' requirement for safety and inflation hedge. In addition, the nature of essential consumption good could strengthen real estate asset's nature as an investment good. As land is a kind of scarce resources and housing's supply is relatively inelastic in short-term, the housing price in cities will keep growing continually, which provides investors opportunity "buy at low price and sale at high price". At the same time, the nature of investment tool in turn gives higher demand for housing even though the price unacceptable, as people are concerned that the housing price will become more unaffordable in future if they do not buy it now. Then the concern of people here we will explain below. Comprehensively, we need to combine the two natures of housing and the concrete background in China to analyze housing market.

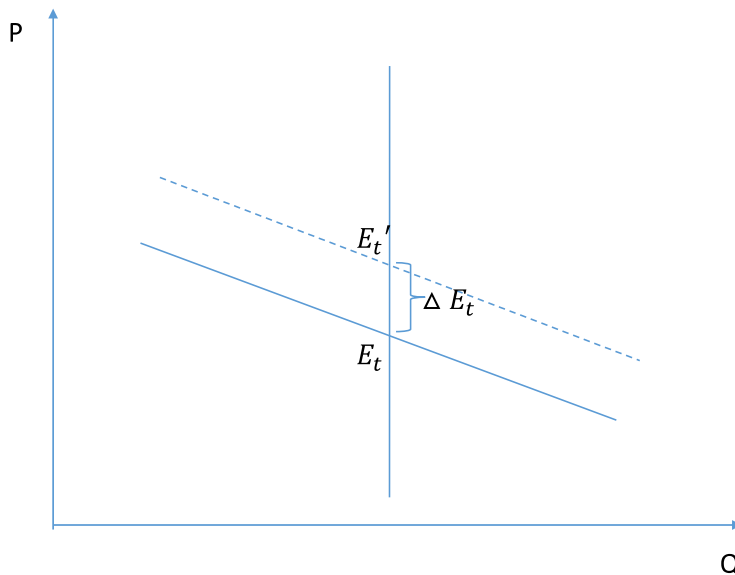
(2) Simulation of Real Life

As China started to stop welfare housing distribution system in 1998, this measure directly spawned private demand for housing in cities. In addition, high economic growth rate accelerated people migration from countryside to cities. The urbanization rate of China is 36.22% in 2000 and 56.10% in 2015²¹. The counterpart of urbanization rate is rural population, the notable promotion in urbanization implies that numerous rural population was constantly migrating into city where owns more job opportunities and higher living standard. From above we see that there are at least 2.6 six hundred million rural populations who have finished migration into cities. Nonetheless, there are still more than six hundred million populations in countryside and at the same time a large proportion of them will plan to migrate in cities. In

²¹ The statistics here is from the National Bureau of Statistic of China

practise, the migration here is underestimated, since the urbanization rate change only reflects rural population migration while there exist a lot of migration from small cities to big cities. The big cities or metropolises' (like Beijing, Shanghai, Guangzhou and Shenzhen) pressure of absorbing migration is vast, because people will concern that if they have to choose to migrate into other places why not go to the most developed cities they can reach. In this sense, migration among nationwide aggravated rigid demand for housing in cities especially in big cities and intensify competition of local housing resource with local residents. More developed city is facing more intense competition for housing. Now we try to simulate the practises to reveal the competition for housing in real life among public. A disputable fact that the relatively constant supply of housing and increasing migrated population in short-run together escalate housing price level in each period just as the graph 4 showed. In each short period t ($t = 1, 2, 3 \dots n$), the supply of housing is inelastic due to urban land supply's scarcity; also we suppose that the growth rate of migration into cities is constant, so the demand for housing is increasing in each period, then we can see that the demand curve in the graph 4 will shift upward then the equilibrium price level will increase from E to E' . In period t , the price increase is ΔE_t and the price growth rate is $\frac{\Delta E_t}{E_t}$ (where E_t could be equal or unequal to E_{t-1} , and also ΔE_t could be equal or unequal to E_{t-1}).

Graph 4: Demand and Supply of Housing in Short-run



In our simulation, we suppose that there are three kinds of different individual, say, A, B and C at each period.

Individual A: local citizens own two or more than two housing assets or equivalent assets in city and their income resource could be from own labor force and capital investment (housing asset or other assets).

Individual B: local citizens own only one housing asset for living in city and their major income comes from own labor force.

Individual C: people possess no housing asset in city so that they have to rent housing from the Individual A and their income only comes from own labor force. The Individual C here principally represents for people from outside migrating into cities and young residents in cities but lacks of sufficient financial support from their family to buy a housing in city.

The initial housing endowment distribution here directly increases gulf between the rich and the poor and indirectly intensifies social contradictions, the Individual A, B and C are respectively representative of the middle class or wealthy class, the working-class and the new “proletariat²²” class in cities. We simplify the social class classification dependent on the quantity of real estate asset or equivalent wealth people have. Distinguish from developed countries where the middle class family occupies dominant fraction in society, China is still a big agricultural country. The agricultural country here does not mean that China’s economy relies on the agricultural sector output, the fact is opposite that the agricultural sector output only contributes small fraction of GDP while currently the third sector has become the largest sector and contributes 48.1% output in GDP; but the agricultural country mainly implies that more than half population in China is rural population²³. Moreover, some scholars point out that the urbanization in China is only staying at preliminary stage, the urbanization process is passively pushed by government

²² The “proletariat” here is differentiated from the conception in political science. It only refers to people living in cities but without actual ownership of real estate assets, like housing.

²³ In China, we use the hukou system to distinguish the rural population and the urban population. In past, the rural population is the majority.

instruction so that a lot of small cities and towns lack of supporting infrastructure and matching social services. To some extent, the process looks like “being urbanized”. In effectually, the Individual C accounts for the vast majority of population among nationwide and most of them tend to leave their hometown and hunt jobs in cities; the Individual B is the majority in cities and most of them are normal residents leading with stable life; and the individual A could be recognized as the wealthiest group in China who possess substantial social wealth, though the proportion of them in total population cannot be accounted as majority, the big population base of China indeed could give rise to large numbers of the Individual A. It is noteworthy to study the implication of China’s population, for instance, if there is 10% population of Individual A in China, their aggregate wealth is unprecedentedly enormous and correspondingly more than 130 million population have sufficient capacity to consume and invest, this is why we could see numerous Chinese crazy shopping for luxury good in the U.S or Europe, even to the extent that a lot of Chinese buy housing in foreign big cities in lump sum payment rather than resort to bank loan so that their housing speculation behaviour raised housing price for foreign residents, the representative case should be in Vancouver of Canada where the housing price is unaffordable for most of local Canadian and the local government is planning to tax extra tax for foreign housing buyer; similarly if there is 20% population of Individual C in China, the number here only underestimated, it indicates that at least 260 million population who has housing demand in city and this demand is based on essential for living totally inelastic, the vast demand is naturally accompanied with prosperous real estate market. In sense of individual wealth, China is still a developing country due to its low per capita income, but at the same time it also spawns a large number of middle class or wealthy class.

One of common characteristic of middle class or wealthy class is that these individuals own two or more than two real estate asset, and the high value of real estate asset constitutes high individual wealth. In a city, the Individual C will work hard to buy housing then become B; the Individual B also could gradually accumulate wealth then become A; and the Individual A is rarely encounter bankrupt event so that population of the individual A will constantly grow up in long-run. For convenient to analyze the evolution of multiple generation, we respectively set A_n , B_n and C_n as the n^{th} generation of Individual A, B and C. For example, A_1 means the first generation of Individual A. The first generation we can trace back to 1998, at that time the

central government started to displace welfare housing distribution system. Initially, A_1 only accounts for the minor population in cities, since the past housing distribution is based on family unit and the market did not provide opportunities for real estate property transaction among individual. And the further reason is that the low real income level determined that residents could only satisfy their normal consumption let alone investment necessity in real estate property. B_1 should be those holders of “Urban Hukou²⁴”, they are the majority of original residents in city. C_1 's population will increase obviously from the beginning, and C_1 's identification is the most complicated relatively to the other two. C_1 may refers to the farmers planning to earn living in cities, most of them could only access to the non-skills job, we usually call them “migrant worker”; and refers to the young people who has finished their studies in cities plans to hunt a job and stay in big city where they think big cities could provide more opportunities for their career development. For the first generation, they could choose the strategies as follow:

A_1 : real estate asset price increasing could raise rental revenue from their second housing or shops or other housing asset, and could promote their individual wealth and their expectation of future income since their own real estate asset on their hands are more valuable. Under such circumstance, they could choose to consume more or increase working hours to earn more income, or choose both of them. But in general, the Individual A could accumulate individual wealth faster then the individual B and C, so A_1 are more inclined to use their savings for future investment.

B_1 : B_1 can be divided into two groups, say the positive group $B_{1positive}$ and the negative group $B_{1negative}$. $B_{1positive}$ will aggressively plan to become the Individual A in future so that they will increase working hour to increase savings, when they get sufficient savings they could turn the

²⁴ The Hukou system is one of basic national administrative system in China. In history, Hukou served as a population management mode rooted in family, clan and clan tribe. The current Hukou system registers residents, collects information about the populace, and provides personal identification and certifies relations and residence. We can say that Hukou system is the basis of social welfare allocation since economic development is differential in different region and people enjoy basic social welfare according to their Hukou registered location. In general, it separates into the “Urban Hukou” holder and the “Rural Hukou” holder, and the “Urban Hukou” holder shares more benefit than the “Rural Hukou” holder. Currently, China is planning to take reform in Hukou system which is regard as a roadblock for social development.

savings into investment and become wealthy as the Individual A. And in large likelihood, the real estate asset, which could be served as investment tool or could be left for their children living in future, are the best choice for them. However, B_{negative} do not feel much living pressure and lead a stable life as past.

C_1 : the best strategy for the Individual C is to buy a housing as soon as possible then become the individual B. In practise the housing has more meanings for the Individual C than the Individual A and B. In order to get housing's ownership C_1 has to increase working hours as much as possible. The unfortunate is that the Individual C has no way to get access to capital investment for promoting income like the individual A and has to face larger living burden than the Individual B, say the rental payment in every month.

One of question should be disentangled in the first generation's evolution, that is why the Individual C has to purchase housing in city. Urbanization gave rise to hundreds of cities in China, but the cities here mainly refers to the big cities including the first-tier cities, the second-tier cities and the third-tier cities²⁵. As result of the heterogeneity among different-tier cites for which it is impossible for us to precisely cover each case, but in general the more developed cities are more appropriate in this individual-individual aspect analysis. Though the county towns or small cities also are accounted into urbanization category, their matching infrastructure and social service cannot be comparable with the big cities at all. In addition, we say China's society is full of the "social network" (it can be simply understood as a powerful family background), this phenomenon is strongly rooted in county town and small cities where lack of market competitiveness and transparency, that means you can rely on "social network" rather than personal capacity to acquire a comfortable job without performance pressure or to make

²⁵ The city classification is dependent on political status, economic strength, city scale and regional influence. The first-tier cities are those political, economic and cultural center of China, like Beijing, Shanghai, Guangzhou and Shenzhen; the second-tier cities are majorly those provincial capitals or economic strong cities, like Tianjin, Chengdu, Wuhan, Xian, Hangzhou, Nanjing, Xiamen, Jinan, Qingdao, Shenyang, Dalian, Changsha, and etc; and the third-tier cities are majorly those cities with economic development potential, like Changchun, Changzhou, Fuzhou, Kunming, Dongguan, Wenzhou, Nanning, and etc. A lot of booming and emerging cities are added into the third-tier cities category under urbanization proceeding, like Haikou, Huzhou, Quanzhou, Zhongshan, Lanzhou, Jinhua, Huian, Jilin, Weihai, Wuhu, and etc.

contract with government program to earn big money without other competitors. And the poor social security system in the “small places” (the small towns or cities) largely cannot satisfy local residents’ requirement, the undesirable medical treatment which makes resident have to seek treatment in metropolises is one of the cases. Moreover, a lot of small cities have their own specific function during the planed economy era and are trapping in dilemma now. For instance, some cities are heavy industries-oriented, the representative is steel industry in the three provinces in the northeast region of China, but steel industry has been declining and is facing oversupply situation, so the commitment of reducing production in steel department indeed has undesirable impact on local economy and triggers a severe laid-off tide; and some cities are resource-based cities, their industry is too single without other extended industries, where it adequately shows social planner’s short-sighted behaviour in view of city’s future development, like the coal industry-oriented cities in Shanxi Province, so once resource-exhaustiveness occurred or the central government adopt regulation on related resource sector, these cities are probably put at the brim of collapse following with high unemployment rate. All the unfavorable factors above give the image for young people in the “small places” that big cities have more brightened future for them. In general, the third-tier cities cannot be comparable with the second-tier cities, and the second-tier cities cannot be comparable with the metropolis, say the first-tier cities. This fact provides motivation for people to migrate into more developed and more prosperous place. Housing for the Individual C means a “right” for living in the cities they like, a right to enjoy convenient urban facilities and desirable social service like accepting reliable medical treatment and healthcare system; a right to get more access to fair employment in which they do not need much family background but rely on their personal capacity to compete for a decent job; a right to allow their future generations to accept better studying opportunities which their hometown could not offer; a right to get rid of unequal Hukou system toward them, since most cities support the policy of “getting Hukou registered in city by purchasing housing”. To some extent, we could say that housing for the rural population is beyond the demand for normal consumption or investment but more like an acquisition for equal right which is initially blocked by Hukou system. The “right” here we uniformly call it as the heterogeneous right. According to our analysis of the heterogeneous right, the pricing structure for housing implicitly should include the part for its heterogeneous right value, like the housing in small cities cannot be comparable the same quality housing in Beijing, even though the two have the same construction

cost, their price can impossibly be the same due to heterogeneous rights for the two holders, in which housing holder in Beijing share the “superlative” right among nationwide. Therefore, we could have that $\text{Real Housing Price} = \text{Fundamental Price} + \text{Heterogeneous Right Price} + \text{Expectation Price}$, among which the fundamental price is given while the heterogeneous right price and the expectation price is dependent by market. And this should be one of the reason why real housing price largely overpasses its fundamental price and its pricing method should be differential to the asset pricing method for financial asset.

For the second generation, the urban population has increased, where the population of A_2 , B_2 and C_2 are respectively more than A_1 , B_1 and C_1 's. The housing competition in cities is more intensified. People has recognized that the real estate property's scarcity and its inelastic demand both determine its price constantly growing, in which the potential huge price appreciation space gives incentives for investors. Relative to A_1 and B_1 , A_2 and B_2 are more keen on real estate asset investment especially housing investment, this point is manifested in the aspect that A_2 raises the real estate property ratio in his individual wealth; B_2 is more inclined to become “positive”. And compare with C_2 , A_2 and B_2 possess more initial capital and get more access to the decent job so that these two has larger probability to receive financial support then to purchase real estate property for investment. For C_2 , only the high income people could afford housing price, since the high price could not allow C_2 to buy it only by increase working hours.

For the third generation, the urban population keep growing. The investment in real estate asset gradually becomes over-hot and speculation phenomenon becomes severe. A_3 as well as B_3 starts to employ various financial leverage to procure their new asset. C_3 is still in the most disadvantage position to compete for housing resource, and compare with C_2 , it is more difficult for C_3 to buy housing in cities due to higher living cost in cities, like the higher expense in rental payment. In short-run, the real income level of society will not change, but the Individual C will probably ask for enhancing wage level; correspondingly in order to increase or maintain current consumption, the housing holder could choose to raise their housing sales price and rental payment. At last it will lost in the circle as below after the third generation:

Once housing price increases, the living cost and nominal wage level will also increase; in the same way once nominal wage level increases, it always means that the living cost and housing price in urban will increase also. And in current situation, housing price grows faster than people's real income does. Through roughly underestimation²⁶ from 2010 to 2016, the new housing price in the first-tier cities has grown 1.6 times and the second-tier cities has grown 1.3 times. In practise, the new housing price and its growth rate both are lower than the second-hand housing's. It is for the reason that the second-hand housing owns more location advantages, say more closing to the commercial centers and office locations. And the new residential area now is rarely built in urban centers but in the periphery area of city; while residents in metropolis are more preferred to live in the center area closing to their working location as result of traffic inconvenience. The unavoidable fact is that some of the individual C without housing in cities have no choice but have to go back his hometown sooner or later. Under this circumstance, the population in cities will reach the highest point in future, which implies that the population moving in and the population moving out are equal with respect to C, just as we usually say "some people are squeezing into metropolis, while some people are leaving from metropolis. To a large extent, expenditure on housing has been the major financial burden on cities residents in future, let alone the people from other places, the descendants of A or B, who in effectually are the nth generation of C, will also face their own housing purchasing problem at the end. Someone even give ironical comment that "most of Chinese are only chasing for a housing in their whole life", from which we can recognize how severe is the living pressure derived from housing's rigid demand in cities. In here, we should warn of the middle income-trap in China, it is that

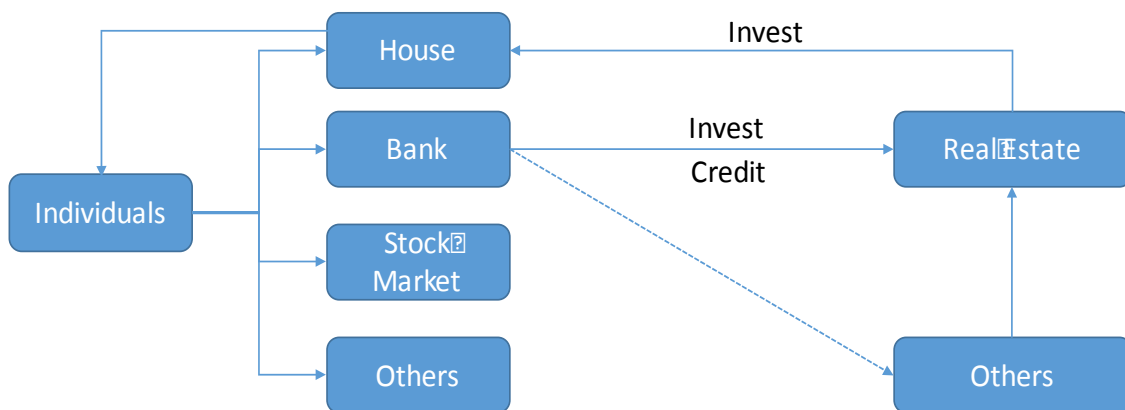
²⁶ In appendix 1, we provide the new housing price tendency from June 2010 to April 2016 of the first-tier cities, the partial second-tier cities and the partial third-tier cities.

people's real income level does not be promoted comparing to housing price even though the nominal income level looks high.

2. Individual-Capital Market Aspect Analysis

The individual-capital market aspect is the extension of the individual-individual aspect where we described that individual is likely use real estate asset for investment. Nevertheless, the aspect here tries to explain it. Chinese residents' high saving inclination is famous in the world, distinguished from western developed countries' economy relying on high individual consumption. The high saving rate in China may be attributed to individual's habit, but in depth consideration it also implies that people are concerned for future life' uncertainty, especially afraid of large expense in some accident events like getting the serious illness suddenly. In a word, social welfare in China could not provide desirable social insurance for the public, or we say the desirable social insurance could only cover minor part of people like those who are serving in government or state-owned enterprise. With respect to China's social insurance, it has taken great attention from the central government but it is still at the starting stage and, in currently or in short-run it cannot be comparable to the developed countries', like the social insurance in Canada or Countries in western Europe, and this can be one of the reason why we still call China as developing countries. Given the high saving preference, few people will just let their savings stay in bank's deposit account, while most people will try to use their savings for investment at least to catch up with inflation, the graph 5 below describes the investment path for public.

Graph 5: The Investment Path for Public



According to the graph 5, we can see that except for directly investing into “house”, individual could choose to buy bank financial products whose return is higher than normal interest but not so much and is guaranteed by credit of commercial bank; or people could choose to invest into the stock market as well as funds market whose return is higher than normal interest but the return cannot be guaranteed; or some people has investment preference on the “others”, say rare metals investment, artwork investment and rare goods investment like the Rosewood investment and the jade article investment. Compare with normal financial products, housing investment are more profitable. Even though commercial banks are likely to offer high-level financial products for wealthy people, the high return always links with high venture in which banks will allocate their capital pool into those high risk investment program. At the same time, even if people put their money at banks no matter as deposits or financial products, banks will still employ the money to invest or give credit-and-loans to real estate program, where is relatively low risk at least guaranteed by the “real thing” underlying assets accepted by market. For the stock market, it is full of uncertainty. We admit that the initial stock market prosperity indeed spawned a large number of wealthy people and the equity or its related financial asset has been a popular public investment for a long time. However, some scholar commented that China’s stock market is a “freak” which cannot be forecasted well and even to the extent that at some time its tendency is opposite to national economy development tendency, for scenarios, the stock price fell sharply during the period of China’s economy prosperity; and the Shanghai Index could raise 2000 points and then would slump back to original level in relatively short-time, say in several months. As far as I am concerned, China’s stock market is immature, which is primarily reflected on excessive authority’s restriction and lacking of financial openness. In a word, the market is too weak to determine itself how to develop. By contrast, stock market in the U.S. at the same time could provide indispensable financial support for enterprises’ research and development as well as expansion and could provide opportunities for the public to earn long-run benefits, the return here is largely dependent on invested enterprises’ revenue and operation; while the stock market in China is a place for enterprises to seize money but not for self-development and a place for the mass to proceed speculation. Moreover, the dumb delisting provision strangles the competitiveness and robustness in China’s stock market, where the inefficient enterprise cannot be easily withdrew from market while the promising enterprises can hardly enter into. The “freak”

formation in stock market only allows for short-run speculation but far from long-run investment, the experience here is back by numerous practical cases. For the “others” investment--rare metal investment, like golden and silver investment was once popular in past, but following by international rare metal price collapse the wave of investment has decayed a lot; and the investment threshold of artwork investment or rare goods investment is only acceptable for partial wealthy people; while real estate investment are more acceptable, dependent on individual capacity and preference you could purchase the housing or shop in big cities, even individual could invest housing in smaller cities where does not ask for big investment.

From above, we can find that real estate market is a desirable investment market for individual as well as for the large financial institution, the reason for that could be real estate market is more like a mature market relatively to other investment markets. Besides, the housing investment is built on consumption demand, so the large-scale infrastructure led by government and the inelastic demand for housing in cities jointly gave rise to profitability in real estate investment. The analysis here is consistent with the result in the third section’s quantitative analysis, that is higher profit could appeal to more capital flow, say bank credit-and-loan flowing into real estate, so we can see that in each period the real estate investment growing rate is higher than the other investment growing rate. And to a large extent, real estate sector seizes investment from other fields, the representative case should be that some China’s biggest iron and steel enterprises²⁷, even some of them are the state-owned enterprises, withdrew funds from their original industry to invest in real estate. In addition, the “expectation price” we mentioned in the individual-individual aspect is mainly derived in real estate investment demand. On the other side, excessive investment has evolved to speculation and has created the “deserted city phenomenon” in some third-tier cities whose housing vacancy rate is high. Now a lot of economists are warning of property bubbles in housing asset, but in my mind, the property bubbles only exist in the part of “expectation price” but not in the part of “fundamental price” and “heterogeneous right price”. Here we do not have method to prove whether bubbles exist in real estate market or how serious the bubble is, but even if the “expectation price” become zero the housing price can still be braced by its “fundamental price” and “heterogeneous right price”. In another word,

²⁷The biggest iron and steel enterprises includes Hebei Iron and Steel Group, Baosteel Group, Shougang Group, Anshan Iron & Steel, Shandong Steel Group, and etc.

given the failure in housing investment, the investors' retirement life could largely rely on their housing property²⁸.

3. Government-Financial System Aspect Analysis

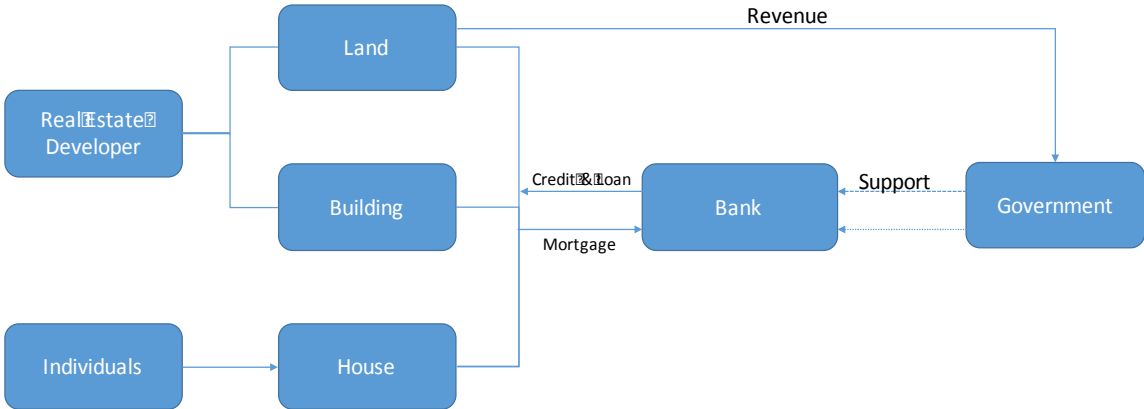
The fact of “big government and relatively small market” in China determines the commitment that government need to maintain stability of various market. For the financial market's great influence on national economy, the central government as well as local government will have to pay attention on preventing from financial market's system risks occurrence. Distinguished from the individual-individual aspect analysis and the individual-capital market aspect analysis which are focusing on micro-aspect, the government-financial system aspect analysis mainly studies the macro-topic at the national level. As result of the high speed expansion in real estate market and excessive social wealth accumulated in real estate market, directly or indirectly government has supported real estate market, the relationship is portrayed in the graph 6 below.

Firstly, we say that the large financial institutions are keen on investing real estate property before, differential from the U.S. where there are various kinds of influential institution trading in financial market, commercial banks in fact dominate China's financial system so that the large financial institutions principally refer to the commercial banks. The radical reason for banks' special favor in real estate could be that real estate investment became the new growth pole of national economy, it is well reflected on the fact that the percentage of real estate investment in GDP became more and more significant, so the commercial banks are bound to actively catching up with this desirable investment opportunities, just as we say “the nature of capital is profit driven”; if without other investment market suitable, it does not make sense that banks withdraw investment from real estate market then invest into the less profitable market. In addition, in view of Bernanke's Financial Accelerator Theory, asymmetric information causes high extra external finance costs between debtor and lender; and this kind of imperfect information determines that banks' investment option will depend on enterprise's balance sheet condition, without doubt higher cash flow and net asset value give positive signal to banks then the

²⁸ In China, the program of “housing design for the old pension” has been brought up. The main idea is that government provides sufficient retirement pension and guarantees retirement living quality to those who transferred housing to government. Currently the more popular practise is to earn housing rental payment in retirement life.

enterprise could receive higher investment following with lower finance cost. In general, the real estate developers own more real estate asset on their hand, it means that their net asset value conditions are more acceptable to banks then more easily to get banks' loans or credits than other enterprises. One point needs to be added is that although the scale of bank financing is not small in China, the vast majority of finance support firstly will flow into state-owned enterprises that usually lacks of production efficiency, while the private and small business without mortgage is hard to obtain bank's finance support. The Adverse Selection also sustains the viewpoint above as it will increase bank system risk by extensively financing the enterprises whose asset value cannot reach standard. To a large extent, we could say that real estate asset is an enterprise's general certification of whether deserve to be financed by banks, without such certification it is harsh to get any financial support. Back to the individual housing problem, as result of national policy's encouragement, purchasing housing by bank loan has been common among residents, and commercial banks are also likely to provide housing loan service for residents. The vast demand for housing loan indirectly injects investment in real estate market where there has been a large amount of bank's asset.

Graph 6: The Relationship among Government, Bank and Real Estate Market



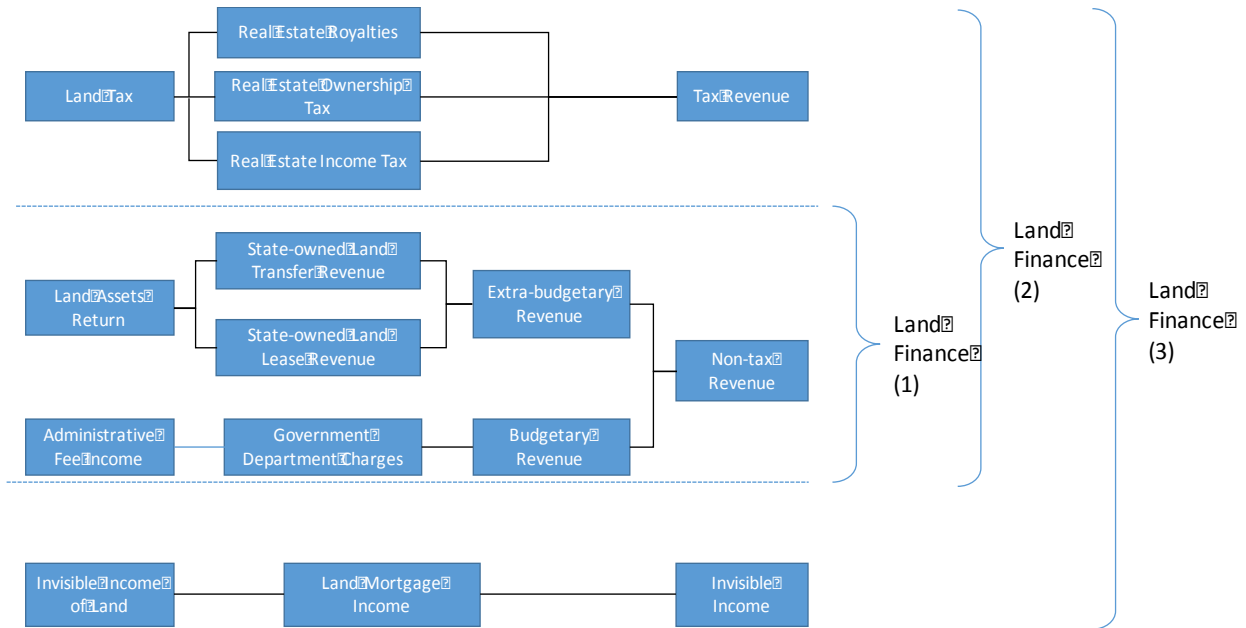
Secondly, the land finance problem has rooted in practise. During the real estate market booming period, local government could collect land “rent” from real estate transaction. The composition

of government land finance in details is described in the graph 7²⁹ below. In our econometric model established in the section 2, it has proved that investment in real estate has positive effect on government fiscal revenue, where real estate investment increased in previous periods could stimulate current growth of government fiscal revenue. Moreover, the percentage of land finance income in government fiscal revenue is dominant, for example, just the percentage of land transfer income in aggregate fiscal revenue maintains more than 10% level³⁰ all the time. In fact, the aggregate fiscal revenue is also divided into two part: the central government fiscal revenue and the local government fiscal revenue, whereas local government are more relying on land finance. Some scholars even evaluate that just the land transfer income has occupied 40% of local government available financial resource. In some small cities without sustainable industry for development, local governments would encounter fiscal crisis when the central government introduced policy to restrict public land transaction. Besides, we always measure local government's performance and achievement by local GDP. However, real estate investment contributes to local GDP directly, so basing on this concern it is impossible for the government officials not to support real estate industry. In some sense, over-relying on land finance reflects the short-sighted behaviour of some local governments.

²⁹ The composition of government land finance here takes reference from Luo Zuchun's *Essays on Fiscalisation of Land in China*, the first section –the characteristics, composition and scale of land finance.

³⁰ The statistics is from the National Bureau of Statistics of China, from 2006 to 2015.

Graph 7: The Composition of Government Land Finance



Trace back to the Japanese property bubble burst in last century 90's and the American subprime crisis in 2008, the two events are both closely related to the collapse of real estate asset price. For Japan, people blindly chased for speculation in real estate market, they even considered that only if the demand for land does not decline the national economy will not slide downward and they believed that land price as well as real estate property price will always keep rising. Besides, banks maintain a large stock of real estate property as mortgage then still constantly to offer loan to enterprises. At the same time big enterprises in Japan only focused on multiplying scale but rather real return rate, which in fact only generated spurious prosperity in book value; furthermore, the book value was backed by the enterprise's asset value braced. The reason for bubble burst is complicated, but the fact is that land price as well as real estate price collapse will firstly have seriously adverse impact on enterprise's operation and banks' balance sheet and then trigger extensive financial crisis. Until now Japan is still in the shadow of property-bubble-burst. For America, as lacking of supervision a large pile of highly risky subprime debt concentrated in real estate market. Through over five years housing and credit boom, real estate gradually became full of bubbles. Once the real estate bubble bursts, the default rate of housing payment will

increase. Under this circumstance, bank and other financial institutions had no options but to sell their real estate mortgage at lower price to rescue their balance lost, this approach made real estate price fall further and exaggerated the financial bad debt condition. At the end, numerous bankrupt of influential financial institution spawned financial crisis in 2008 which cause giant turbulence around global economy.

From the government-financial market analysis above, Chinese government has responsibility and obligation to maintain financial system stability. Currently the finance built on real real estate property automatically asks authority to give substantial support for real estate industries as well as its other related industries. We could say China's real estate market is closely related to government department and financial market. In practice, the macro-regulation in real estate market, like the central bank raises benchmark interest rate; some metropolises adopt policy to restrict residents' housing purchased quantity; and some metropolises plan to levy the property tax³¹ on the second housing of individual, does not target at suppressing housing price but at confining speculation behavior and optimizing housing resource allocation. In general, serious property price slump among nationwide has no help but only dreadful impacts on government and financial system. Therefore, in order to maintain real estate industry, government will more or less provide essential financial support for real estate market. This explain why real estate investment could gain more financial supports than other fields from this standing point.

³¹ In China, we say purchasing housing or land in fact means receiving 70-years usage right. In this sense, levying property tax from second housing sounds unreasonable.

Fifth Section: Conclusion

Comprehensively, real estate market like other markets in China was developing under complete guidance of Government. The promising profitability made the real estate industry become the indispensable economy growth pole in China. But in a practical sense, government tried to employ real estate market as a tool to achieve economic goal. For instance, government planned to promote people's living standard by releasing housing market to private sectors; government expanded domestic consumption and investment in virtue of real estate market development; and even government successfully utilize the vast housing market as a buffer to stabilize economy during the period of global crisis in 2008, from which maintained the aggregate consumption and investment. The real estate market here is one of representatives of "big government and relatively small market", but relatively to other markets the real estate market was endowed by government more competitiveness and transparency and was more like a "market" we say in western countries. The enormous housing demand committed by urbanization requirement simultaneously brought out with huge returns in real estate investment; on the other sides, the close relationship with government helped real estate enterprises obtain more advantageous and tendentious policy which further strengthen capital concentration in real estate field. The excessive investment demand as well as the speculation demand to a great extent squeeze out the investment originally belonging to other production sectors, it is consistent with the result in the third section where the growth rate of real estate investment is always higher than the other investment's growth rate once a certain amount of new bank loan is projected into market. At the macro level, the real estate investment will boost aggregate output in short-run but have adverse impact on aggregate output in long-run. The short-run boosting could be the high-value consumption and high-value investment in housing market. Nonetheless, the long-run adverse effect can be explained by that other sectors' investment grabbed by real estate sector, which has blocked the growth of other various industries then blocked the growth of national economy in view of long-run. So in this sense, the unsustainable real estate economy toward the whole society created the spuriously prosperous national economy. Maybe this effect is not obvious now, since China is still in the high speed economic growth lane; but if the current condition does not improve, the effect will become more and more significant.

From the three aspect analysis, we simulate the practical cases to analyze the economic agents' behaviours in market. We see that except for consumption and investment purposes, the real estate asset especially the housing asset could be also introduced as an asset accompanied with heterogeneous rights whose distribution is unequal between the rural population and the urban population according to the Hukou system; or as a kind of certification to prove that the individual or company deserves to be financed by bank. The simulation shows that the rich people prefers to invest in real estate property due to the fact that China lacks of other sustainable investment approaches; and the large number of "poor" people has inelastic demand for housing in cities to lead a better life, in other meanings which backs up the price of housing; while the financial institution also has preference on investing real estate market where is profitable and relatively safe and also has preference on offering housing mortgage services; at last government has no option but to directly and indirectly provide supports for real estate industry, even though in some times government need to proceed the macro-regulation then to relieve housing unaffordable problem. In addition, we have the pricing method for housing, say $\text{Real Housing Price} = \text{Fundamental Price} + \text{Heterogeneous Right Price} + \text{Expectation Price}$. The property bubble part is probably reflected on the "expectation price" derived from market investment and speculation; while the "heterogeneous right price" will disappear only if the heterogeneity disappear in different regions of China, where the heterogeneity always exists between countryside and city, and even among the first-tier cities, the second-tier cities and the third-tier cities. The heterogeneous right with respect to housing holder may be a good topic to further study, but here we say the intense housing competition in cities is to a large extent the competition for scarce heterogeneous right. In sense of individual, the unaffordable housing price strangles the public social welfare, the fact is that nominal income increasing also accompanied with higher expenditure on housing payment so the real income level may not be promoted a lot. But in general, real estate property price collapse generates no benefit for any participants in market at the end, even if the "poor" people could afford housing he or she may lose job due to the potential financial crisis. The most plausible scenario is that government suppresses speculation behaviours and avoids fast growth of housing price; whereas it is the production efficiency promotion that enhances people's real income level to catch up with housing price. The main shortcoming of the fourth section is that the simulation here cannot cover all the cases in China, consider that China's situation is too complicated. In further study, we could choose to

study more specific cases and establish the corresponding DSGE model based on our simulation analysis.

At last, excessive real estate investment problem and the unaffordable housing price problem both occurred at the national economic transient phase, in fact other countries will also encounter the similar situation but the solution here must be different. The problems here are not attributed to the real estate market but the fact of lacking of other markets and the fact of country's fundamental realities. The fundamental realities could be low per capita income and could be rural population's intense motivation migrating into cities. I believe that following by social progress, the problems will be naturally disentangled sooner or later. In this paper, I do not appreciate or depreciate the economic pattern in China. Nonetheless, the distinct economy pattern could shape specific market form, and the real estate market form has its own characteristic in China. Until now, we have no evidence to show whether the economy pattern in China is successful or failed, but this pattern with respect to real estate market is deserved for our further study.

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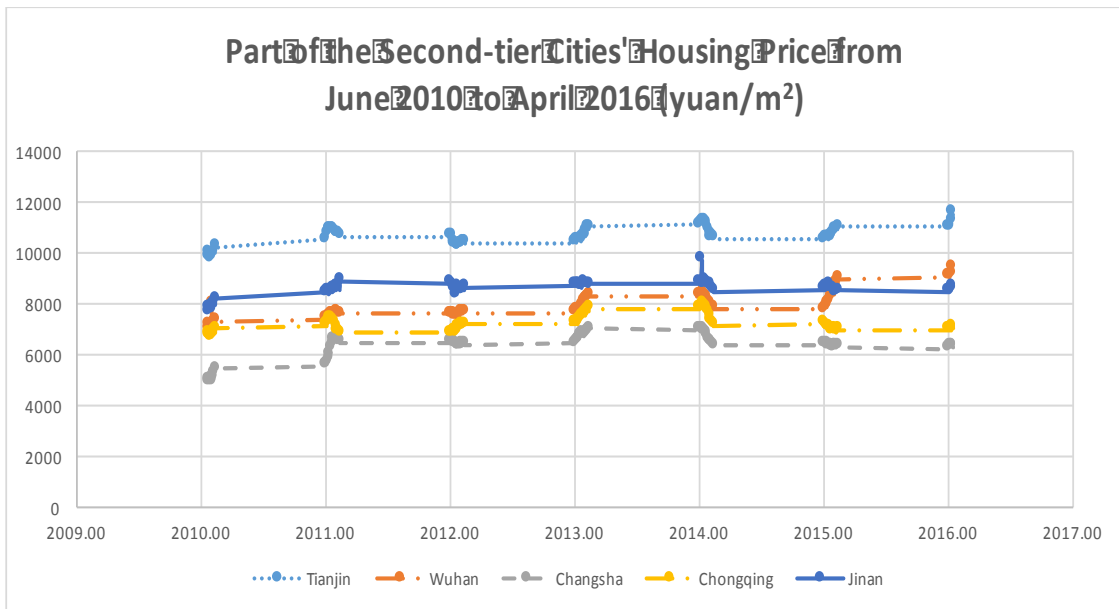
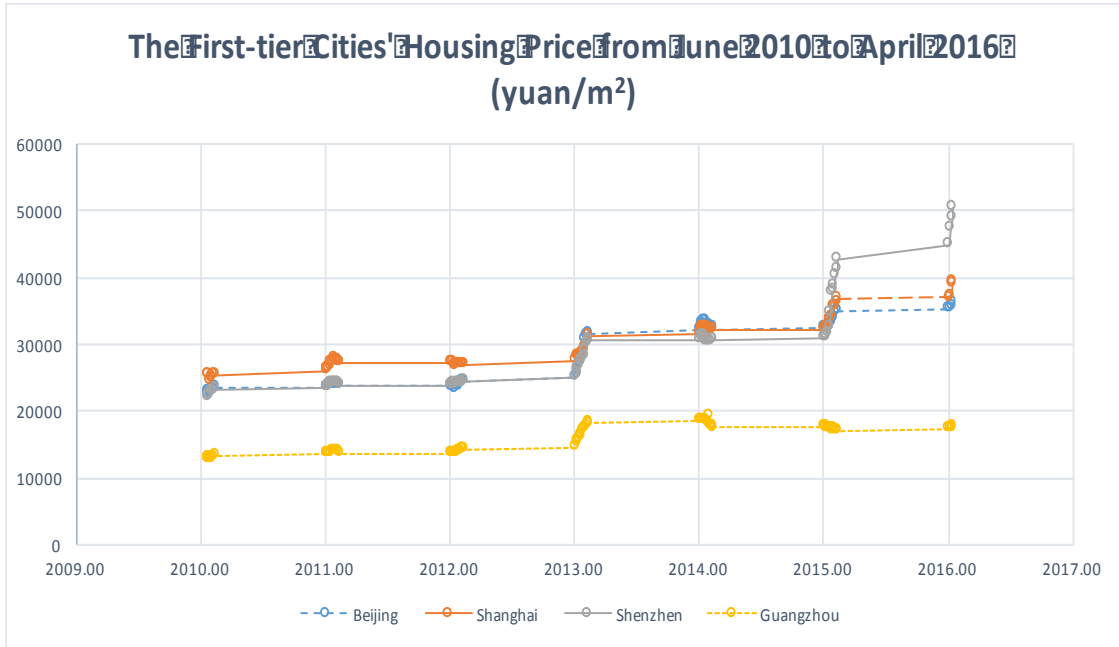
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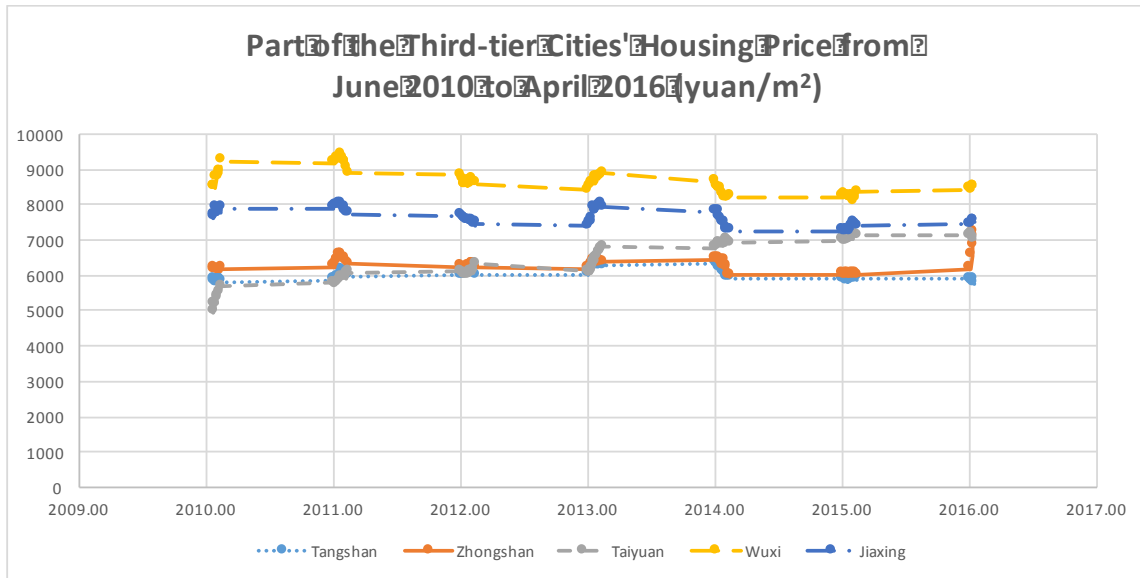
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Appendix





Note: (1) The statistics above come from China Index Academy.

(2) The index majorly reflects the new housing price in cities.