

THE PENNSYLVANIA STATE UNIVERSITY

SCHREYER HONORS COLLEGE

DEPARTMENTS OF FINANCE AND ECONOMICS

THE STORY OF UNAFFORDABLE HOUSING IN CHINA

CHULING YUAN

SPRING 2011

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Finance and Mathematics
with interdisciplinary honors in Finance and Economics

Reviewed and approved* by the following:

Edward Coulson
Professor of Economics
Thesis Supervisor

David Shapiro
Professor of Economics and Co-director of
Undergraduate Studies
Honors Adviser

James Miles
Professor of Finance
Honors Adviser

* Signatures are on file in the Schreyer Honors College.

ABSTRACT

This thesis seeks to investigate whether the housing filtering model holds in China, to explore violated criteria of the filtering model, and to argue for a causal relationship between violated criteria and unaffordable housing for low- and middle-income families. The paper consists of an overview of Chinese housing policy since its establishment, a discussion of potential factors that contribute to unaffordable housing, and a series of hypothesis tests to specify violated criteria of the housing filtering model. There are several findings in this paper. First, the housing filtering process does not take place in China's major cities. Second, strong housing demand from rich families worsens housing affordability for the poor. Third, speculation from rich families is partially accountable for unaffordable housing for low- and middle-income families. Overall, the findings suggest that tightening monetary policies will not necessarily improve housing conditions of the poor. Instead, expanding credit accessibility is a novel way to solve the problem.

TABLE OF CONTENTS

LIST OF FIGURES	iv
LIST OF TABLES	v
LIST OF DIAGRAMS	vi
ACKNOWLEDGEMENT	vii
1. Introduction.....	1
2. An Overview of China’s Housing History.....	4
2.1 Planned Economy (1949-1978).....	4
2.2 Transition to Market-oriented Housing System (1980-1997).....	6
2.2.1 Initial Commercialization of Housing Market (1980-1993).....	6
2.2.2 A Complete Transition to Market-oriented Housing (1994-1997).....	7
2.3 Further Development of the Housing System (1998-2007).....	9
2.4 Higher Prices and Macro-regulation Measures (2007-now).....	11
3. Main Factors Related to Housing Affordability	13
3.1 Increasing Demand due to Boom in the Macroeconomy.....	13
3.2 Structural Problem--Unbalanced Supply-Demand Relationship	16
3.3 Speculation in the Housing Market	19
3.3.1 Speculation from Domestic Investors.....	19
3.3.2 Speculation from Foreign Investors	21

3.4	Land Availability and Land Prices	23
3.5	Credit Accessibility- Home Mortgage	26
3.6	Fluctuation of Benchmark Interest Rate.....	29
4.	Filtering Model and Housing Affordability	32
4.1	Theoretical Framework: Filtering Model.....	32
4.2	Evidence of Violation of the Filtering Process	36
4.2	Speculation and Housing Affordability.....	47
	Hypothesis 1: The Fundamental Demand from the Wealthy Undermined Housing Affordability of the Poor.....	47
	Hypothesis 2: Speculation Undermined Housing Affordability of the Poor	54
	Hypothesis 2A: Speculation by Developers Undermined Housing Affordability of the Poor	54
	Hypothesis 2B: Speculation by Home Buyers (the wealthy) Undermined Housing Affordability of the Poor.....	59
5.	Conclusion	65
	REFERENCES	67

Vita

LIST OF FIGURES

Figure 1: Household Size and Housing Price	15
Figure 2: Living Space per Capita and Family Size in Beijing	15
Figure 3: Finished Area/ Area Sold in Shanghai	16
Figure 4: Sales from High-end Apartments in Shanghai	17
Figure 5: Floor Space for Sale in Beijing	18
Figure 6: Growth rate of House Prices V.S. Growth rate of Income in Beijing	19
Figure 7: Increase of National Land Value Increment Tax (LVIT)	21
Figure 8: Sources of Investment	22
Figure 9: Different Channels for Foreign Investors	23
Figure 10: Land Space Purchased v.s. Land Space Developed in Beijing	24
Figure 11: Investment in Land Purchase in Beijing	25
Figure 12: Percentage Change of Land Price Index in Shanghai and Beijing	26
Figure 13: Personal Loans Composition	28
Figure 14: Percent Increase of Personal Loans and Loans from Accumulation Fund	28
Figure 15: Reserve Requirement for Banks	30
Figure 16: Required Reserve Interest Rate (percent)	30
Figure 17: Interest Rate of Accumulation Fund Loans	31
Figure 18: Household Size and Housing Construction	42

LIST OF TABLES

Table 1: Compound Annual Growth rate of Household Size (2002-2008).....	39
Table 2: Correlation between Sold Floor Space and Prices.....	41
Table 3: Annual Price Increase	49

LIST OF DIAGRAMS

Diagram 1: Accessibility to Housing Units	40
Diagram 2: Inelasticity of Demand	49

ACKNOWLEDGEMENT

I would like to thank my thesis supervisor, Dr. Edward Coulson, for being such a distinguished role model in providing thesis ideas and guiding me on the proper way to finish my analyses. His scintillating wit and keen intelligence motivated me to uphold high standards throughout the thesis writing process. I truly enjoyed my conversations with him discussing the topic and appreciate the time he devoted to reading the thesis. Without his sparkling ideas and incisive comments on my analyses, this paper would not be possible.

I would also like to extend the deepest gratitude to my honors advisor in Department of Finance, Dr. James Miles, who admitted me as a Schreyer Scholar through Junior Gate, in providing me this great opportunity to explore the topic I am interested in. His willingness to help students, along with his contribution to teaching exemplifies the philosophy of all Smeal faculties. I also wish to acknowledge Dr. David Shapiro, the honors advisor in Department of Economics, in providing me thesis writing guidance.

I wish to acknowledge all of the bright students I met in BA 412 course and Dr. Orié Barron who taught this class, for giving me valuable critiques in the early stage of thesis development. Finally, I would like to thank my parents and my friends in unselfishly encouraging and supporting me when I need them the most. They are the best assets I attain at Penn State.

1. Introduction

Since the major housing system reform in 1998, China's privatized real estate market has been going through a golden period where housing demand is partially met but housing affordability becomes a social concern. Compared to 2008, investment in residential housing, which weighed 70.7 percent in real estate investment, rose 14.2 percent to reach ¥3.6 trillion in 2009 (State Information Center, 2010). National sales of residential housing units in 2009, according to Wind Info Database, increased 83.77 percent compared to 2008 to achieve ¥4.4 trillion. Though the prosperity of the housing market proves crucial to economic development, low- and middle- income families find housing more and more unaffordable. According to an announcement by the government in September, 2010, property prices in 70 major cities rose 9.3 percent from August, 2009 to August, 2010 ("Report of National Real Estate Market from January to August", 2010). Housing affordability problems are even evident when two benchmarks are measured to gauge housing affordability for average people: rent-to-price ratio and income-to-price ratio. By definition, rent-to-price ratio represents rents per square meter divided by sales price per square meter; price-to-income ratio is computed by dividing median house price by median family disposable income. A report from the Chinese Academy of Social Sciences suggested that the rent-to-price ratio of old housing units had crossed the acceptable limit, $1/200$ ¹, for major urban centers such as Beijing, Shanghai, Shenzhen, and Hangzhou. Typically, rent-to-price ratios of these mentioned cities were between $1/270$ and $1/400$. In other words, the payback period of housing investment with an

¹ By the global standard, the acceptable limit is $1/200$.

annual return of 5 percent-6 percent was between 27 years and 60 years. Another indicator, the national average price-to-income ratio in 2009 was 7.3 (Wuhan Housing Security and Management Bureau, 2009)², while in some first-tier cities, such as Beijing and Shanghai, this ratio was as high as 13.6 and 9.8, respectively.

Hoping to conduct effective policies to rein in house prices in a prudent measure so that the economic growth momentum is preserved, China's central government finds itself in a quandary. This is due to the entangled, complicated relationships that are causing conflict of interest among home buyers, real estate developers, local governments, and the central government. Home buyers purchase housing units based on personal needs and for speculative purposes; real estate developers build new units for sale or for hoarding; local governments earn revenue from leasing land, but also have to monitor house prices on behalf of the poor's interest; the central government is busy balancing economic development and housing affordability. Home buyers and real estate developers, foreign and domestic investors comprise the group of speculators who aim at driving up prices by any manner, including bulk purchasing and land hoarding. More suspicious speculative activities are supported by foreign funds. For example, Blackstone, the US private equity group, has made its first significant investment in the booming Chinese housing market after agreeing a deal with one of Hong Kong's largest property developers to build luxury apartments in the country (Thomas, 2010).

Facing the challenge, the central government shows its determination to monitor the housing market by tightening credits, increasing mortgage rates, and banning land

² By the global standard, the acceptable range is between 3 and 6.

hoarding. However, linking current housing market performance and government strategies begs the question whether these policies are effective. If not, then what are the roots of high sales and investment? Is it fundamental demand or speculation, or is it a mixture of both? Which group is the housing demand from? Finally, do these factors lead to unaffordable housing for low-income families?

The purpose of this thesis is to offer tentative answers to these questions. The structure of the paper is as follows: Section 2 gives an overview of housing policies since the establishment of the country. Section 3 analyzes various roles engaged in the residential housing market. Section 4 outlines guiding questions and presents answers based on data analyses.

2. An Overview of China's Housing History

2.1 *Planned Economy (1949-1978)*

Early urban residential housing system in China heavily relied on planned distribution. After the Chinese Communist Party took power in 1949, urban residents, who became employees of government or of state-owned enterprises, started to receive housing accommodation by paying nominal rents. In the bureaucratic distribution process, land was owned exclusively by government; construction funds came primarily from appropriation by central government to local governments, and then were passed to state enterprises. State enterprises were responsible for constructing, maintaining, allocating residential housing units. In the beginning, this new system was welcomed by most Chinese residents as more housing units were constructed to meet housing demand. However, allocating housing administratively resulted in inefficient market, declined productivity, immobile labor force and severe social inequality.

First, housing market barely existed during this period. Characterized by “low salary, low rent plus subsidy and provision of goods in kind,” the housing system kept expenditures on housing low for employees. While nominal rents held constant in a long period, household income was progressively rising. Therefore, residential costs were so low that owning apartments seemed economically irrational. Consequently, there was no such thing as a “market” existing in the housing sector. In addition, low-quality projects and inefficiency appeared common among enterprises as leaders were distracted by housing issues from core businesses.

Second, labor force was extremely immobile and the housing system was one of many factors that were accountable for this. According to World Bank, there was only 1 percent mobile labor force among the entire non-agricultural population (World Bank, 1992). One fact should be noted is that most employed people were working for state-owned enterprises that dominated the housing system. Consequently, housing conditions of urban population hinged to their employment status. Another fact is that employees received housing based on seniority but not merit. Relocation implied losing low-rent apartment that they had been in line waiting for at least five years.

Third, the prevailing bureaucratic system in all state-owned enterprises eventually led to problematic social inequality. Typically, profitability of enterprises determined housing conditions of their employees. For example, all receiving low salaries (this means employees were all levied heavy taxes), employees from the profitable steel industry, would have better housing conditions, while employees from less-profitable clothing industry, would be worse off. This, in exchange, was destructive to employees' morale, thus diminished productivity since hard working was not associated with better payoff.

All these drawbacks of this system, together with sufferings from natural disasters³ from 1958- 1961, signaled an imminent failure of the housing reform. Before

³ The Great Chinese Famine was in the period in the People's Republic of China between 1958 and 1961 characterized by widespread famine. Drought and weather conditions contributed to it, but as well as the poor leadership of the Communists Party of China. The government statistics indicated 15 million deaths.

1978, the beginning of economic reform⁴, national annual investment in residential housing was stunningly low—only 5.6 billion dollars, or 1.5 dollars per capita (Wu, 2009). Confronting the insatiable demand from unprecedentedly large population⁵, financial difficulties due to the natural disaster, and a rush for success in heavy industry, the Chinese government was forced to release some power in hands and subsequently embarked on another housing reform after 1978.

2.2 Transition to Market-oriented Housing System (1980-1997)

2.2.1 Initial Commercialization of Housing Market (1980-1993)

From 1980, the central government started to encourage homeownership. Individuals were allowed to construct or to purchase housing units. To catalyze the process, the government even subsidized purchases on newly constructed apartments, discounted sales prices of old units, and increased rent for existing enterprise-owned apartments. More specifically, each of the three parties—the government, individuals, and enterprises—was responsible for one third of house prices.

Another benchmark was the policy change regarding land usage. Before the housing reform, government distributed land for free. Central government was under

⁴ The reform initiated in 1978 and was led by Deng, Xiaoping. The goal of Chinese economic reform was to transform China's stagnant, impoverished planned economy into a market economy capable of generating strong economic growth and increasing the well-being of Chinese citizens. Since then, the government attempted privatization of some sectors but still kept major industries—steel, energy—as state-owned.

⁵ After the Communist Party of China took over power in 1949, the government believed that large population could win the country advantages over capitalism during the Cold War period. Therefore, the government blindly encouraged fertility, resulting around six children per woman.

significant financial pressure when it had to be responsible for large scale land development due to increased demand. After the housing reform, land was “leased” to private parties at costs. The government remained the owner of the land, but it was allowed to collect revenue from leasing land to state-owned enterprise and private real estate developers.

Unfortunately, the housing reform neither established an efficient market for the housing sector, nor did it promote homeownership. Some aftermaths of this housing reform even aggravated inequality and financial difficulties of state-owned enterprises. For state-owned enterprises, they rushed to sell newly constructed units and old units at costs or even at discount so that market price could not reflect the true value of the property. There were two groups of home buyers: old employees already living in state-owned apartments and those young employees living in dorms but wanted to shop for newly constructed apartments. Because the credit system was not established, young employees soon found out they could not afford full payment for newly constructed units. They could not access to old units since occupants of those units had the priority to purchase. Hence, most public apartments sold were old units and only 1/2000 of new units were sold (Wu, 2009, pp30). The privatization of occupied apartments could do nothing but to reinforce inequalities.

2.2.2 A Complete Transition to Market-oriented Housing (1994-1997)

The former flawed housing reforms forced the government completely give up administrative housing allocation system. To make purchasing newly constructed apartments a viable option for low-income families, Shanghai government, first initiated “surplus reserve system of residential housing” program and strived to establish a credit

system. The program refers to long-term money reserves fed by contributions from both employees and employers for house purchasing purpose. Employees could borrow money from the fund at a lower interest rate. The management of the surplus reserve system of housing is overseen by the Committee for the Management of the Surplus Reserve System. It is operated by the Management Center of the Surplus Reserve System. Because of its relatively lower mortgage interest rate compared to the one offered by commercial banks, funds from the program are the primary source to finance housing. The government even stepped further to build affordable apartments exclusively for low-income families since 1994. These affordable apartments for rent or purchase are either among regular housing units or are built separately⁶.

Financial framework for mortgage loans was gradually established and improved during this period: more and more banks acted as mortgage originators; more and more insurance companies engaged in the housing market. Detailed regulations are now available so that consumers' interests are better protected.

Unlike previous fruitless attempts, the reform proved an outstanding achievement. Privatization not only helped government shed burdens of house constructions and maintenance, but also freed the housing market. Real estate developers, usually private-owned, were allowed to enter the market. They were providing commercial housing at market price for high-income families, while the government subsidized home purchases of low- and middle-income families. In 1997, commercialized housing units had

⁶ The purpose of this mechanism is to avoid location disadvantages for low-income families. Government need to subsidize more to units located in the center of the city and less to units located around.

dominated the market, representing over 80 percent of housing stock (Wu, X., 2007, pp 280). In the meanwhile, the establishment of the surplus reserves promoted the development of the primary mortgage market, which was followed by financial system overhaul and insurance market reform. By 1997, total reserves amounted to ¥1.76 billion (Wu, L., 2009). In some regions, 60 percent to 70 percent of public-owned housing units were sold at costs (Wu, X., 2007).

Just as any reforms in history have flaws, this housing reform has several weaknesses. Beginning in 1992, the liberated real estate industry experienced abnormally rapid growth, with the highest monthly growth reaching 146.9 percent (Wu, X., 2007). Facing such chaotic housing market, the government had to implement tightening regulatory measures. Subsequently, the market was severely dampened and did not recover for several years.

Since the surplus reserves system was not fully developed, the program only covered a small portion of the population, in particular, urban residents who were employed by state-owned enterprises. Unemployed, low-income individuals were precluded from the program.

2.3 Further Development of the Housing System (1998-2007)

As personal income levels steadily increased, housing became a new focus of consumption. Investment in real estate flourished, becoming one of the pillar industries of the national economy. The booming housing market undoubtedly fostered urbanization. The growth rate of urbanization doubled from 0.73 percent to 1.16 percent. Real estate investment represented nearly 20 percent of the total national fixed asset investment.

Residential housing investment reached 68.51 percent of the total real estate investment (Wu, L., 2009, pp 66).

Standard of living was consistently improving in terms of increased floor space per capita, from 22.8 square meters in 2002 to 28 square meters in 2007(Wu, L., 2009, pp 67). Area of commercial housing units available for sale expanded three times during the period of 1997-2003. Community amenities added values to apartments. In some cities, more and more families were planning to buy additional houses for vacation.

More people were qualified for the surplus reserves system program. By 2007, the program covered 110 million people, and sources from the program funded 71 percent of real estate development (Wu, L., 2009, pp 69).

Policy-encouraged mortgages grew. By the end of 2004, the total volume of policy-encouraged household mortgages amounted to \$37.4 billion. Total bank loans invested in real estate development exceeded 55 percent.

Regardless of these achievements, policy makers had concerns about the overheating housing market. First, to please the central government, local governments deliberately created high demand to inflate house price level that was regarded as an indicator of urbanization. Second, the impressive amount of revenues from land leasing enticed local governments to raise land prices. In reaction to higher land prices, real estate developers inclined to build luxury, high-end town houses instead of modest-sized apartments to achieve a more lucrative business, ignoring to accommodate demand from low- and middle-income families. Growth of house prices in first-tier cities exceeded 10 percent for six consecutive years. Finding a solution to making housing more affordable became a matter of great urgency.

2.4 Higher Prices and Macro-regulation Measures (2007-now)

China's real estate market becomes eye-catching not just because of its high return, but also due to woes from low-income families. Besides a handful of accomplishments brought by the housing reform, issues related to rocketing land prices, scarce housing units for low-income families, and a lack of incentives for local governments to subsidize affordable housing bombard policy makers.

To tame the overheating property market before any financial crisis triggered by the collapse of the housing market, the central government leverages its powerful fiscal and monetary tools since 2007. Comprehensive measures exert impacts on the mortgage market, interest rate, taxes, construction structure, and sale prices of land.

Unlike before, the government starts to discourage banks from originating loans for speculative purposes. In some regions, banks can discretionarily disapprove the third home loan, or stop lending money to out-state residents. Local governments can limit the number of properties owned by individuals. The interest rate spread between loans from surplus reserves and from commercial banks is narrowed. In 2011, Qingdao Housing Provident Fund Management Center⁷ decided that interest rate for the second home loan should be at least 1.1 times higher than the rate offered by the surplus reserves fund. Moreover, to prevent land hoarding activities, real estate developers with massive to-be-developed land are less likely to finance through loans from banks.

Tax rates are generally higher for both real estate developers and property owners. Government is striving to establish detailed laws and regulations on gains from

⁷ Another name of the Management Center of Surplus Reserve Fund

transferring land leases. Investment tax credits are set to expire in 2009. Previously, value-added tax was waived if properties had been owned for more than two years. Nowadays, only appreciation from properties that have been possessed more than five years can be exempt from taxes.

Types of residential housing are being directed to cater to demand from middle- and low-income families. Lower-rent and smaller apartments are promoted by the government's command stipulating that at least 70 percent of leased land must be used for "economical housing"⁸. As a result, by May 2010, 5.8 million units of apartment catering to low-income families were completed.

In April, 2010, the China Banking Regulatory Commission announced that suspicious real estate developers who intended to hoard land and housing supplies would be barred from borrowing from banks. In the meantime, commercial banks should share the responsibility of monitoring the land appraisal process, sales activities of apartments, and the progress of construction to facilitate loan payment (Bei, H., 2010).

Measures from the five aspects discussed above are apparently the sternest in the history of China's housing policies. Though we do not know whether these policies are effective, they certainly demonstrate Chinese government's resolution to quell the housing market chaos.

⁸ Economical housing units are characterized by lower price and smaller size to cater the housing needs from low-income families.

3. Main Factors Related to Housing Affordability

3.1 Increasing Demand due to Boom in the Macroeconomy

Analysis of the interaction between the macroeconomy and the housing market has a history of more than 15 years. Among these analyses, both empirical or theoretical, demand and supply sides of the economy are always the focus. Though more and more scholars are arguing for the heterogeneity of housing markets, real GDP growth, income level, and changes of the labor market (migration, employment) can generally explain the demand side of the Chinese housing market. On the other hand, the supply side can be explained by an increasing demand, and also by factors that will be addressed in the following sections.

Since the economic reform in 1979, the growth of GDP of China has been impressive. The increased wealth of the country is converted to the increased wealth of its citizens. With 1978 as the basis year with GDP per capita of 100, national GDP per capita in 2006 reached 1496.9 (China Statistical Year Book 1978- 2006). The income level increased, too. The annual salary level of urban residents in 2008 is almost four times higher than in 1992, from \$1256 to \$4387 (China Statistical Year Book 1978- 2006)⁹. More and more people can afford to buy apartments by leveraging home loans.

In the meanwhile, China experienced the largest internal migration from rural areas to well-developed cities. On top of the existing 103 million urban migrants, China's cities will face an influx of another 243 million migrants by 2025, taking the urban

⁹ Data before 1992 are not available.

population up to nearly 1 billion people (Griffiths, B., 2010). Millions more households were formed, creating huge demand for housing. In theory, supply will adjust to increased demand, so that the price should not be too high. Also, household size should depend on house prices. For instance, if the price of housing is high, grown children (and even married children) may live with parents longer, resulting in larger household size. In contrast, increasing housing prices and decreasing average household size are going hand in hand in China, as shown in Figure 1. Figure 2 shows the historical living space per capita has been on an upward trajectory in recent years, while average family size is shrinking.

Better financial situations improve Chinese people's living standard. Households are expecting larger floor space, better community amenities, while having smaller household size. The one-child policy implemented in the early 1980s also shows its implicit impact on the housing demand side. The first generation under the policy is supposed to enter the labor market and form families after 2003. Therefore, it is not surprising to see a large demand from this age group due to demographic change.

Figure 1: Household Size and Housing Price

Figure 1 indicates that household size is decreasing, while housing price increases.
Source: Beijing Statistical Yearbook

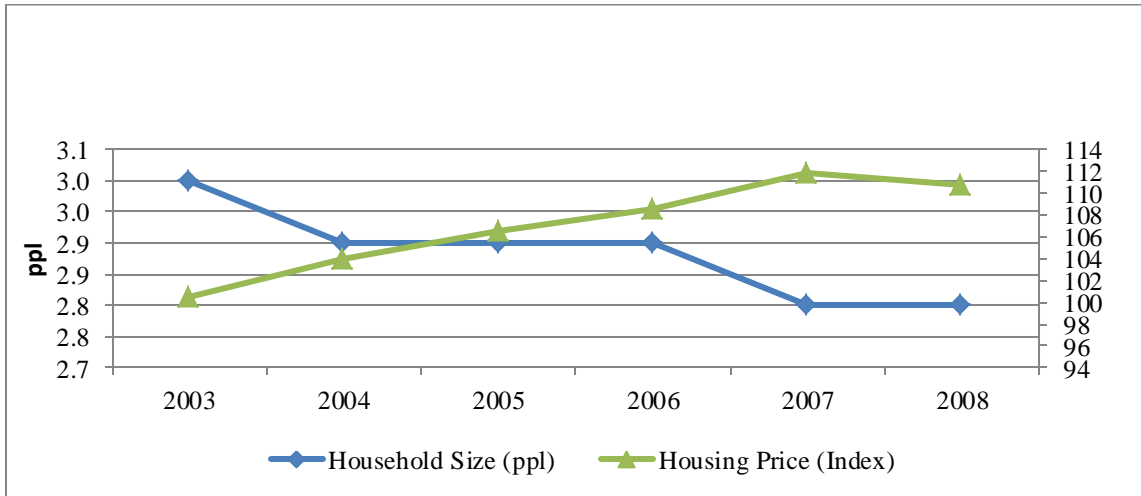
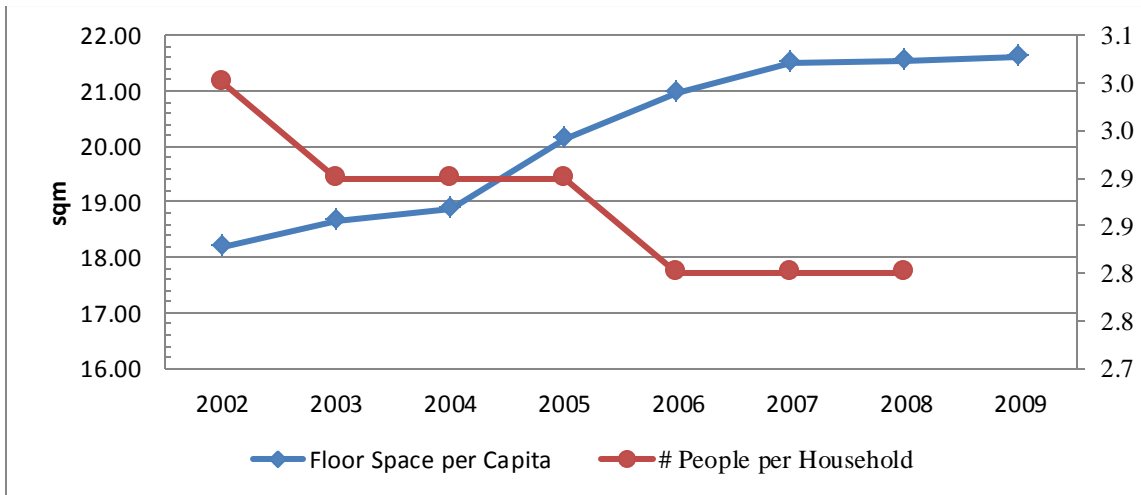


Figure 2: Living Space per Capita and Family Size in Beijing

This figure shows the increase of living space per capita is larger than the decrease of family size, implying larger demand for housing units.
Source: Beijing Statistical Yearbook

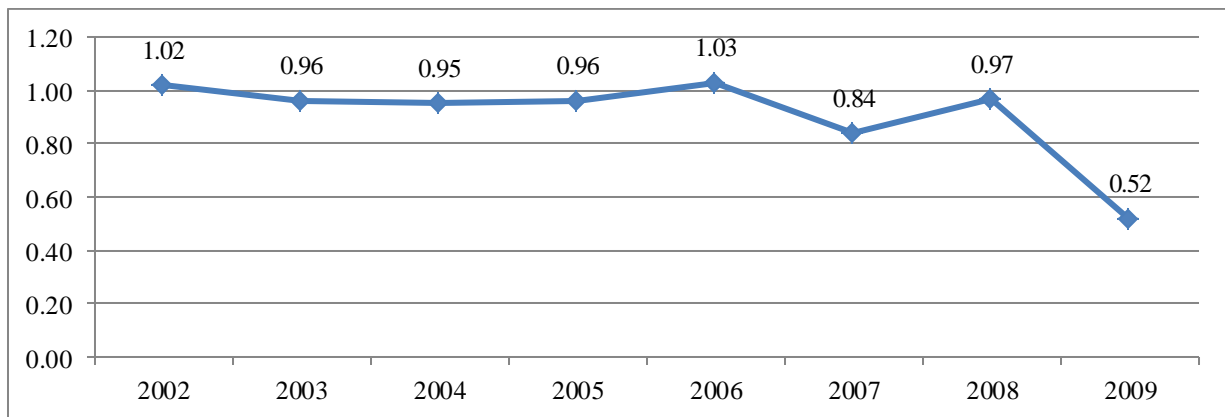


Based on the analysis above, it is clear that the mismatch of increases in housing supply and housing demand contributes to high house prices. The shortfall of the supply

side stems from decreasing land availability, productivity, government policies, and apartment hoarding activities by developers. In Beijing, floor space completed-to-floor space sold ratio dropped from 1.35:1 in 2008 to 0.85:1 in 2009.¹⁰ Shanghai's numbers are more impressive. From 2002 to 2009, the ratio is constantly below 1 except in year 2002 and 2006. Figure 3 plots the ratio of Shanghai from 2002 to 2009.

Figure 3: Finished Area/ Area Sold in Shanghai

This figure plots ratio of finished area and sold area within the year. *Source: Shanghai Statistical Yearbook*



3.2 Structural Problem--Unbalanced Supply-Demand Relationship

Supply side of housing is affected by many factors. Availability and costs of land, speculation by real estate developers, and wealthy individuals are all determinants of structures of residential housing. Scarcity and high costs of land will persuade real estate developers to construct buildings with higher profit margins, such as high-end apartments

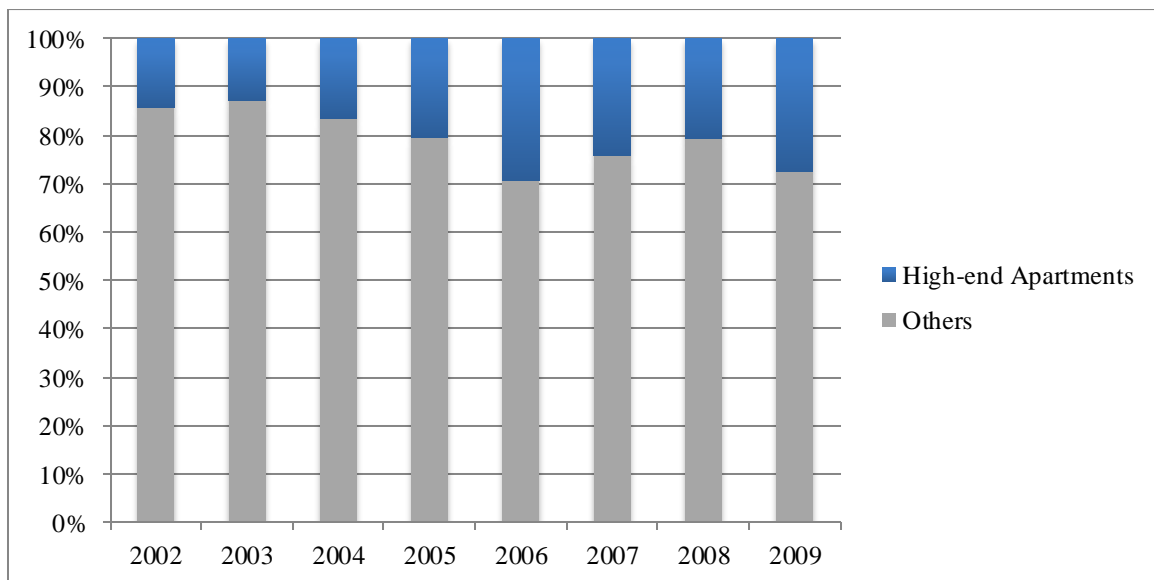
¹⁰ Floor space completed refers to construction activities within the year. If the ratio is less than 1, this means that vacant units from previous years are sold. If the ratio is bigger than 1, this implies that real estate developers have unsold units.

for the affluent. Despite the fact that speculation will inflate the general house prices, prices for high-end apartments are expected to be more volatile than average. Figure 4 shows larger and larger portion of sales of residential housing is coming from high-end apartments. In 2009, 27 percent of sales of apartments come from high-end apartments.

In consequence, less affordable housing projects are conducted. Figure 5 clearly indicates that the portion of floor space for sale from high-end apartments has kept increasing steadily, while the portion contributed by affordable housing is diminishing.¹¹

Figure 4: Sales from High-end Apartments in Shanghai

Figure 4 plots proportion of sales contributed by high-end apartments to the total sales of residential housing units. *Source: Shanghai Statistical Yearbook*

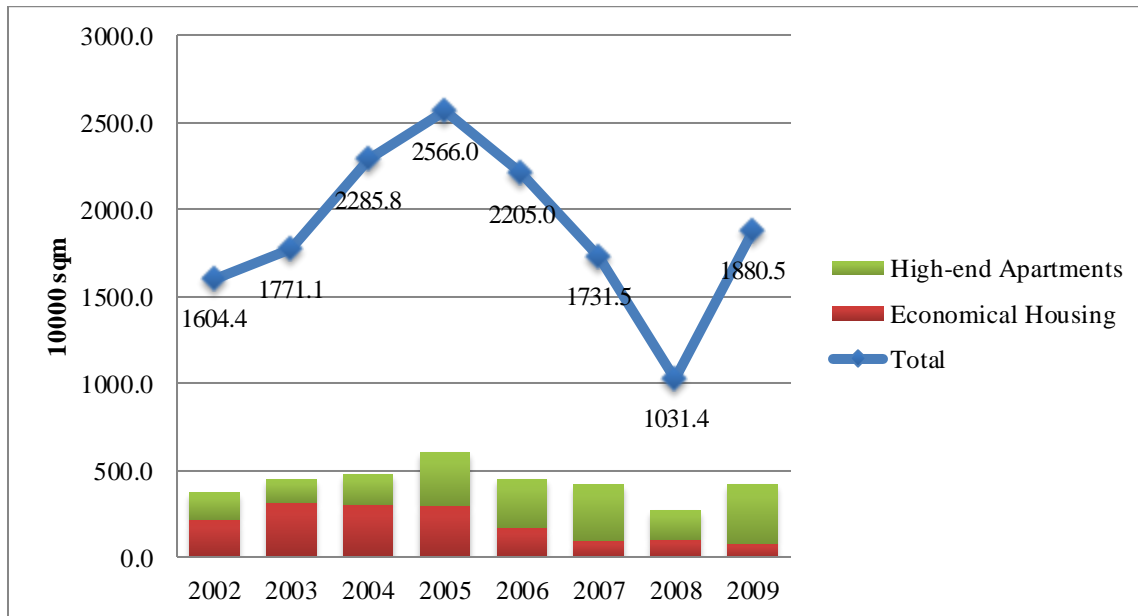


¹¹ Affordable housing refers to apartments with price restrictions. The construction of economical housing is heavily subsidized by the government to meet demand from low-income families.

Figure 5: Floor Space for Sale in Beijing¹²

Figure 5 shows floor space for sale of economical housing constitutes smaller portion of the total floor space for sale. More high-end apartments are available for sale instead.

Source: Beijing Statistical Yearbook



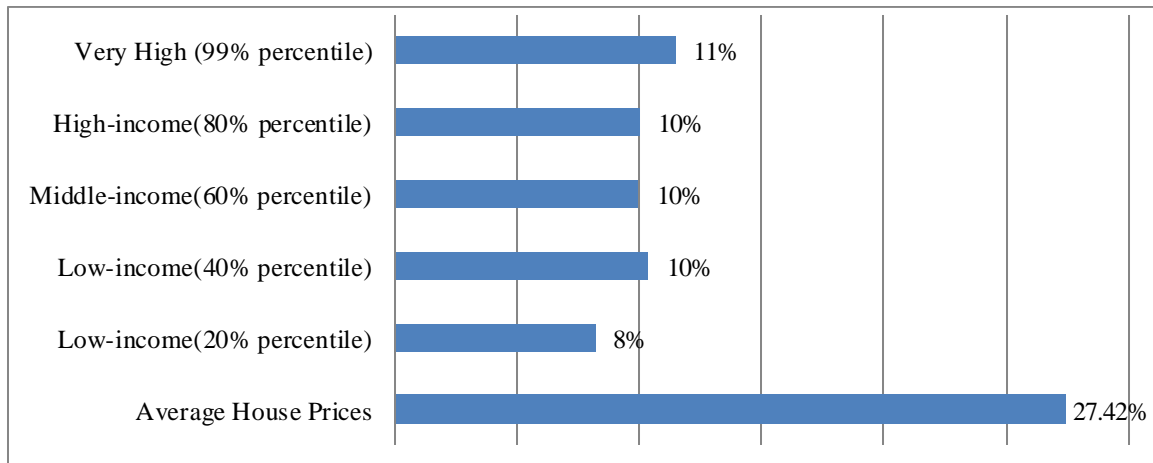
While real estate developers and speculators are celebrating profits from the housing market, people from low-income families looking for accommodation in cities are worried. The gap between what they can afford and actual housing prices is widening. Figure 6 shows that albeit the average 10 percent disposable income growth rate is quite promising, it still cannot catch up with the fast pace of house price increases. Housing affordability issues are even outstanding for those low-income families who only have 8

¹² Ordinary housing, which is defined as commercialized housing units targeting at middle-income families, represents the gap between high-end apartments and affordable housing/economical housing. In Figure 5, ordinary housing fills the blank between bars and the line.

percent increase in disposable income, compared the average increase in house prices from 2006-2009 is 27.42 percent.

Figure 6: Growth Rate of House Prices v.s. Growth Rate of Income in Beijing

Figure 6 shows that low-income families have the lowest growth rate of disposable income, and the small increase cannot match the fast price increase of housing. *Source: Beijing Statistical Yearbook*



3.3 Speculation in the Housing Market

3.3.1 Speculation from Domestic Investors

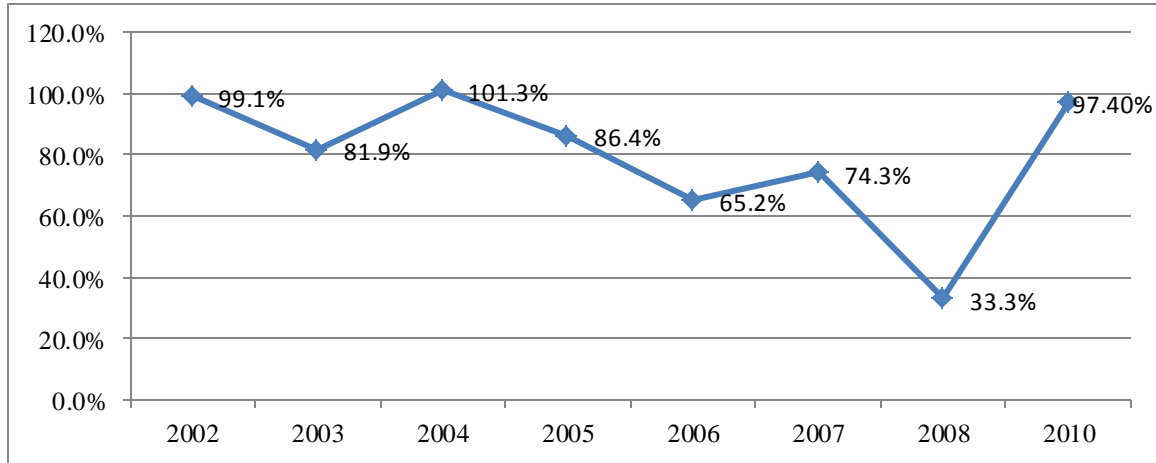
Annual rental prices increase less than 2 percent since 2000 (Wu, X., 2007), but it is still higher than mortgage rates. Facing a promising return from the housing sector, wealthy people who are betting on lasting momentum in house prices rush to shop properties. After having purchased apartments, they lease the property at an annual return higher than the mortgage rate, then profit again from selling the units at higher prices. According to research carried out by the People’s Bank of China, 17 percent of house purchases in Beijing served investment purposes. Among those newly purchased units, 28.5 percent of them were resold, 23 percent were subleased, and 48 percent were vacant. The newly developed concept “sub-new house” describes used apartments that are resold

within two years after their purchases. In Shanghai, the transaction volume of “sub-new houses” accounted for 46 percent of the total transaction volume of old unit in 2004 (People’s Bank of China, Real Estate Group, *The 2004 Financial Report of China’s Real Estate Industry*, Pg. 10). Though these pieces of evidence are scattered and not comprehensive, we can still sense how much speculative activities weigh in China’s housing market. Other than high vacancy and transaction volume of “sub-new houses”, another piece of strong evidence is the doubled National Land Value Increment Tax (LVIT) that is derived from transference of real estate (e.g., land, factories, and mining sites). Figure7 plots the percentage increase of LVIT revenues each year since 2002. Before 2005, LVIT, of which 90 percent came from the real estate industry, almost doubled every year. Reasons for the startling tax revenue jump are two-fold. First, higher housing prices partially explain the phenomenon. Second, unusually large transaction volume indicating speculation triggers high LVIT revenue.

In section 4, the thesis will delve into a comprehensive analysis of the relationship between speculation and housing affordability.

Figure 7: Increase of National Land Value Increment Tax (LVIT) Revenue

Figure 7 plots the percentage increase of national LVIT Revenues. *Source: National Taxes Yearbook*



3.3.2 Speculation from foreign investors

Lured by large profits from increasing demand, foreign speculators infiltrated into China's housing market by heavily investing in luxurious housing units, such as town houses and high-end villas.

There are three direct or indirect means for foreign investors to enter the game. The first option is to found a foreign-funded investment company and then enter the housing market through joint venture with domestic real estate developers. The second option, which is indirect, is to buy bonds issued by real estate developers. The third option is only viable for foreign banks that are acting as mortgage generators.

Two things should be recognized. Figure 8 plots sources of investment into the housing market. The black line represents percentage changes of foreign investment since 2002. It shows that foreign investment picked up by reaching an average increase of 40 percent from 2005-2007, during which the US housing market boomed. Right after the

collapse of the US housing market in 2007 and at the beginning of the so called “Great Recession,” foreign investment into China’s housing market plunged as woes of the financial crisis spread over the world. Figure 9, which plots direct and indirect foreign fund, shows direct investment is preferred since 2006. This shows foreign investors are more confident and aggressive about the market.

Figure 8: Sources of Investment

Figure 8 plots sources of investment to address foreign investment in the housing market in Shanghai. *Source: Shanghai Statistical Yearbook*

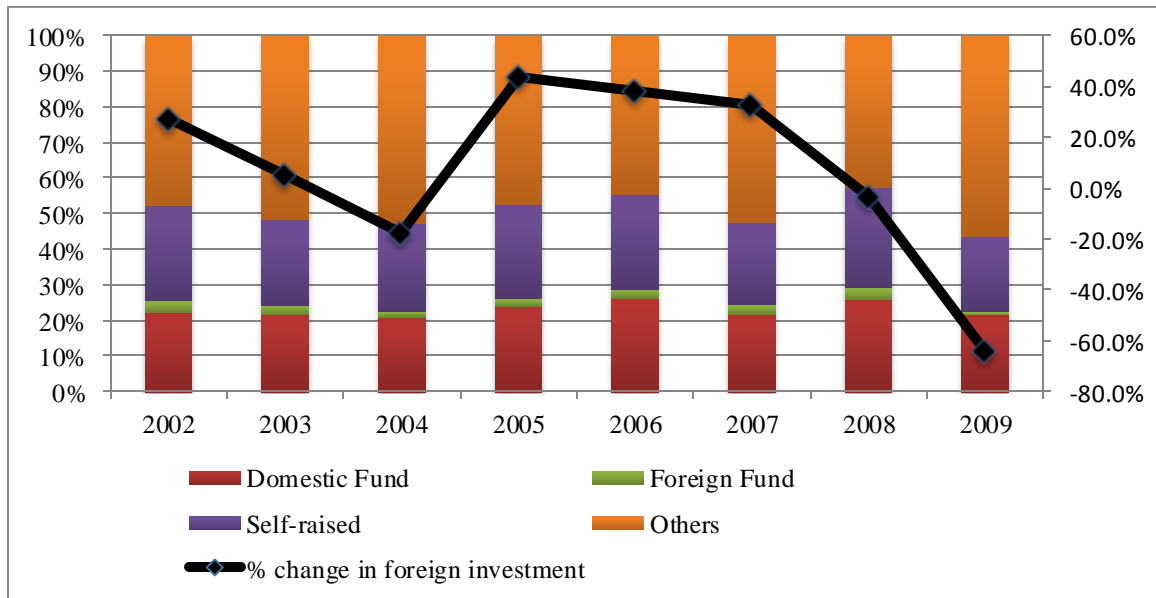
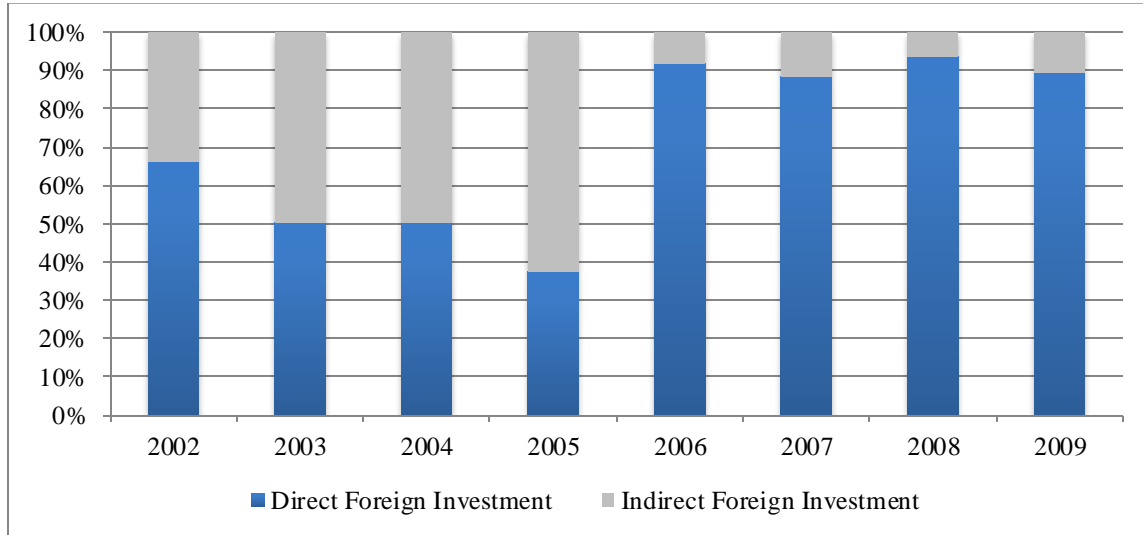


Figure 9: Different Channels for Foreign Investors

Figure 9 shows there is a major change regarding methods used to invest into the housing market for foreign investors. Direct investment increases. *Source: Shanghai Statistical Yearbook*



3.4 Land Availability and Land Prices

Land is exclusively owned by local governments but could be leased through auctions to real estate developers and enterprises. As a result, “property owners” virtually rent, but not own, the land on which their apartments are built for at most 70 years if the government does not recall the land. Nevertheless, once the land is recalled for the use of other purposes (e.g. city planning, public infrastructure construction), home owners do not have the right to repeal and the gap between the market value and the arbitrarily decided compensation cannot be recovered.

The system gives the government the incentive to not act in the best interest for home buyers. Government generates revenues by leasing land to real estate developers. This kind of transactions foster GDP growth, making local governments’ financial report “looks good”. In some cases, the local government intentionally recalls pre-occupied land

that is worth more now. Of course, the process is sneaky and excuses are fabricated.

Property owners suffer losses by accepting lower-than-market price for their properties.

Many may think that the marginal profit for real estate developers will be eroded by higher land prices. But this is not the case. Developers see it as a great opportunity to speculate land by hoarding it, waiting the best timing to sell it at a higher price. Figure 10 shows that area of land purchased is always lagging behind area of land developed. If we match land purchased in the previous year with land developed in the current year, the gap is even wider. Figure 11 shows that the amount of money invested in land development has a downward trend over the past years, which is contradictory to increases in land purchase. We can also see that investment invested in the real estate market is growing faster than investment into land purchases and land development. It is either due to less land being available or land hoarding. Investment overall may be rising, but money is more likely contributed to higher construction costs of high-end housing.

Figure 10: Land Space Purchased v.s. Land Space Developed in Beijing

Figure 10 shows large gap always exists between land purchased and land developed.
Source: Beijing Statistical Yearbook

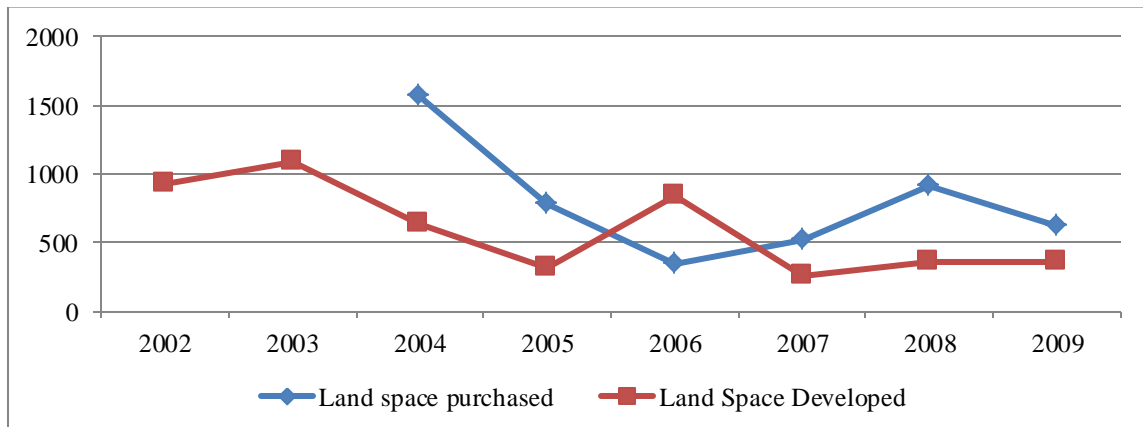


Figure 11: Investment in Land Purchase in Beijing

Figure 11 compares investment in land purchase and investment in land development, with an upward trend of completed investment. *Source: Beijing Statistical Yearbook*

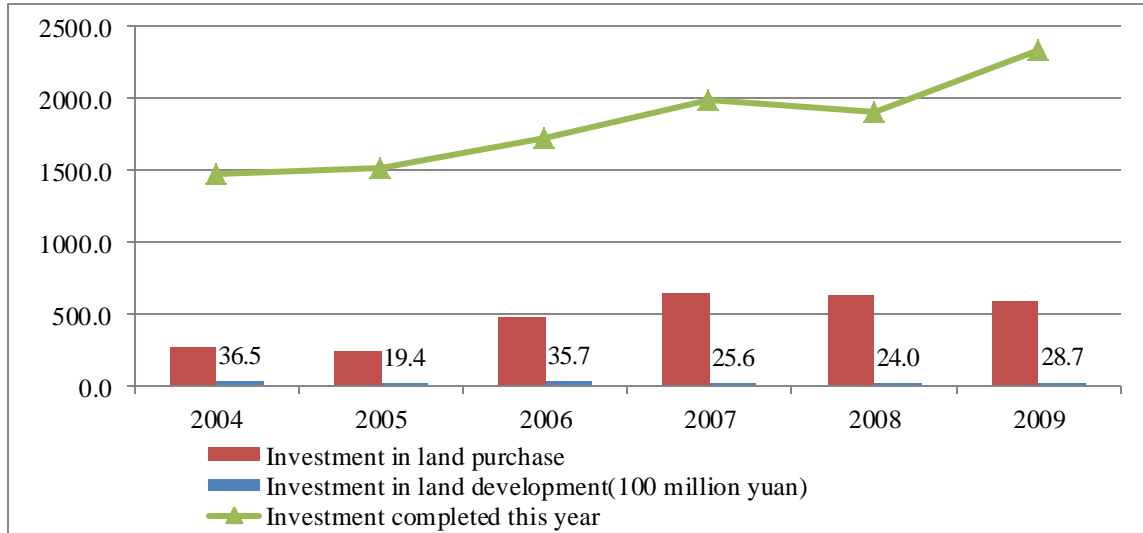
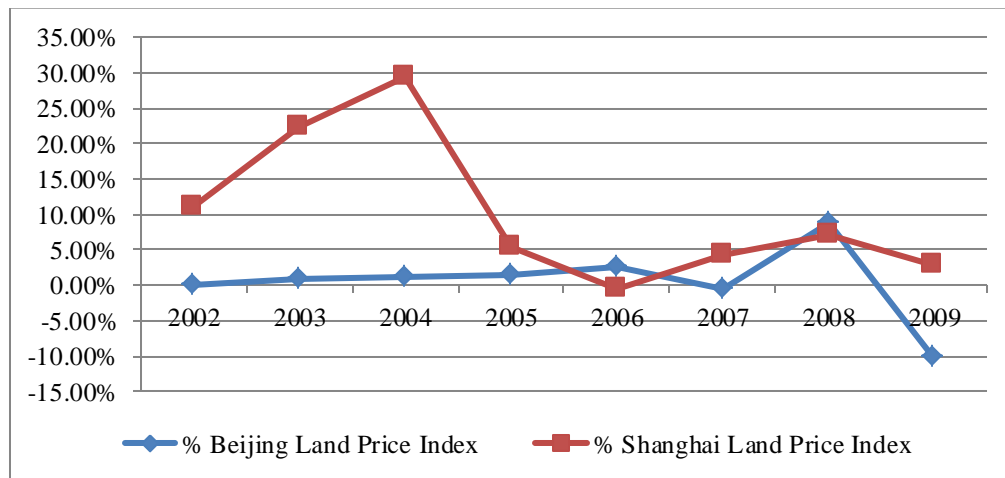


Figure 12 plots the percentage change of land price index for residential housing. Since 2002, land is leased through auction. Land prices of Beijing and Shanghai both increased from 2002 to 2004, but the price increase in Beijing was quite lackluster compared to in Shanghai, whose land prices leaped 30 percent in just 3 years from 2002 to 2004. To rein in the runaway land prices in hope of lowering housing prices, the central government begins to leverage their powerful fiscal policies: taxation. If land remains undeveloped in one year after its purchase, then real estate developers are bound to be fined. If land remains undeveloped in two years, the government will confiscate the land (State Council Notice [2008.No.3]). Also, fees for using newly leased land are doubled. A series of tightening method is quite effective. Though the land price is still increasing by about 8 percent every year in Shanghai, it is capped under 10 percent. Land prices are also event-driven. Beijing first saw its land prices leaped 10 percent from the mid-2007 to mid-2008. This fact perfectly corresponds to Figure 10 and Figure 11 where land

investment and developed land area both decrease. In 2007, developed land area dropped 70 percent. This is because developers started shedding light on suburban areas around the Olympics Valley, betting that residential constructions would be profitable with better community amenities and improved transportation system. Right after the government promulgated new regulations of taxation, land price dropped while the developed land area in 2008 went up by 41 percent.

Figure 12: Percentage Change of Land Price Index in Shanghai and Beijing

Source: Shanghai Statistical Yearbook, Beijing Statistical Yearbook



3.5 Credit Accessibility- Home Mortgage

The outstanding value of personal mortgage has experienced a sharp growth since 2002. According to the statistics department of the People’s Bank of China (PBC), personal consumption loans increased 48.6 percent in 2009. The outstanding value of personal mortgage in 2009 increased 47.9 percent from 2008 (People’s Bank of China, 2010).

There are several reasons for the expanding home mortgage businesses of banks. The most direct effect stems from the government. Since 1997, the central bank is

leveraging any measures to encourage commercial banks to issue mortgages. Not only state-owned commercial banks can issue personal mortgages, all commercial banks are allowed to do so.

Besides policies, more and more commercial banks nowadays self-enter into the competition as mortgage generators seeking for high-return-low-risk assets on the balance sheet. According to the 2004 Financial Report of China's Real Estate Industry by the PBC, (People's Bank of China, Real Estate Group, The 2004 Financial Report of China's Real Estate Industry, published 8/5/2005), NPL rate of personal household mortgages in the four national banks ¹³ was about 1.5 percent, far below the average NPL rate of other smaller banks. Because the default rate of personal household loans has been the lowest among all credit products of banks, commercial banks are racing to generate qualified home mortgages as their premium assets. In China, individuals get the same mortgage interest rate regardless which bank he or she goes to. Therefore, service qualities, other diversification of personal financial management products associated with home mortgages differentiate one bank from another.

Figure 13 shows that home loans are the primary composition of personal loans – above 90 percent year by year. Loans from the accumulation fund keep increasing from 2003. Figure 14 shows that the percentage increase of loans from accumulation fund

¹³ Even small private owned commercial banks start issuing home mortgages, the four state-owned banks—Industrial and Commercial Bank of China (ICBC), China Construction Bank, Bank of China Limited, and Agriculture Bank of China—are dominant as home mortgage issuers. Each bank has its own specialization as its name implies.

exceeds the increase of personal loans, implying a broader coverage of the accumulation funds.

Figure 13: Personal Loans Composition

Figure 13 plots personal loans, which includes accumulation fund loans and home loans, issued by domestic commercial banks. *Source: Shanghai Statistical Yearbook*

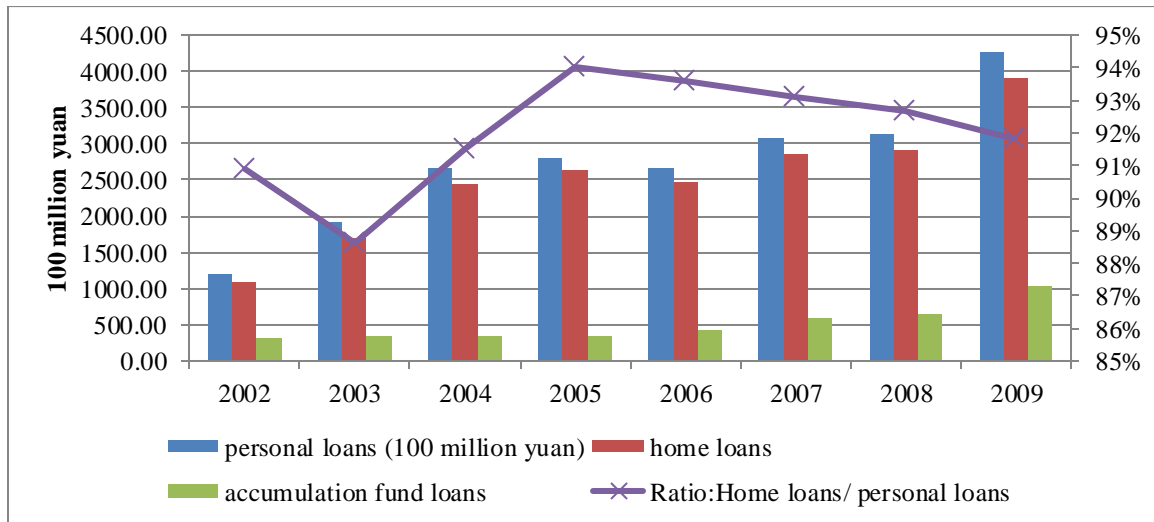
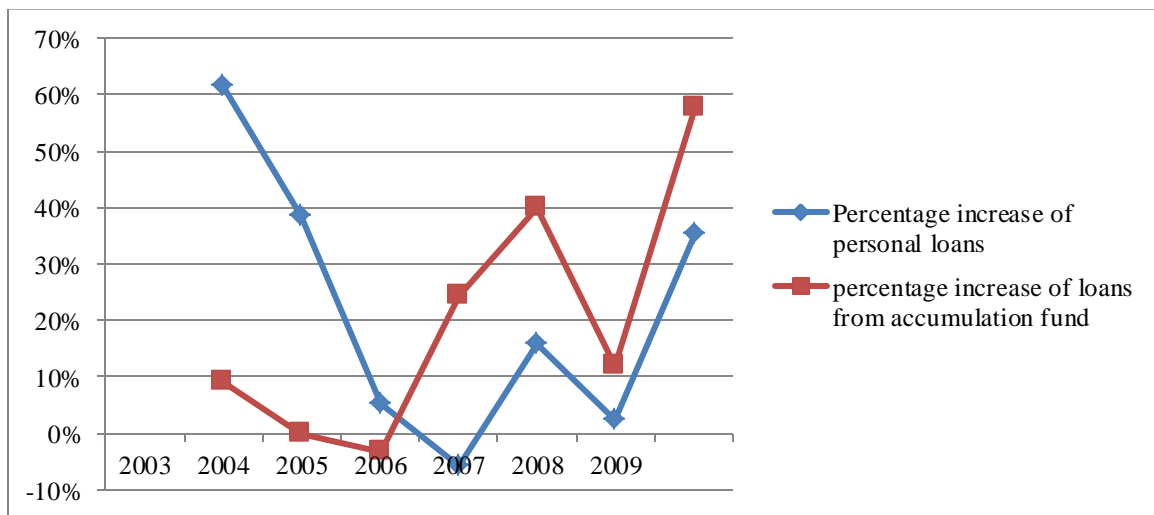


Figure 14: Percent Increase of Personal Loans and Loans from Accumulation Fund

Figure 14 compares percentage change of personal loans and of accumulation fund loans. *Source: Shanghai Statistical Yearbook*



3.6 Fluctuation of Benchmark Interest Rate

As speculation is suspicious of causing the astonishingly high housing prices, the central bank adopted tightening policies (i.e. increased bench mark interest rate) to deter speculator taking loans in 2007.

On one hand, the central bank attempts to discourage lending activities of commercial banks. Both required reserve rate and require reserve interest rate increased: the required reserve rate for banks rose from 7 percent in 2003 to 18.5 percent in 2010 (data from The People's Bank of China); required reserve interest rates closely traced the movement of house prices. This rigidity of this measure, however, is adjustable contingent to the overall economic situations. For example, lower benchmark interest rate amid the global financial crisis served a buffer to negative impact on the real estate industry, but it was immediately followed by an overall interest rate increase for lending and saving from 2009 to 2010, when the housing sector started to pick up, as shown in Figure 15.

On the other hand, the central government requires a higher mortgage rate for loans from accumulation fund with exceptions during the global financial crisis. Overall, the mortgage rate from the accumulation fund and the one from commercial banks move together.

Figure 15: Reserve Requirement for Banks

Source: The People's Banks of China

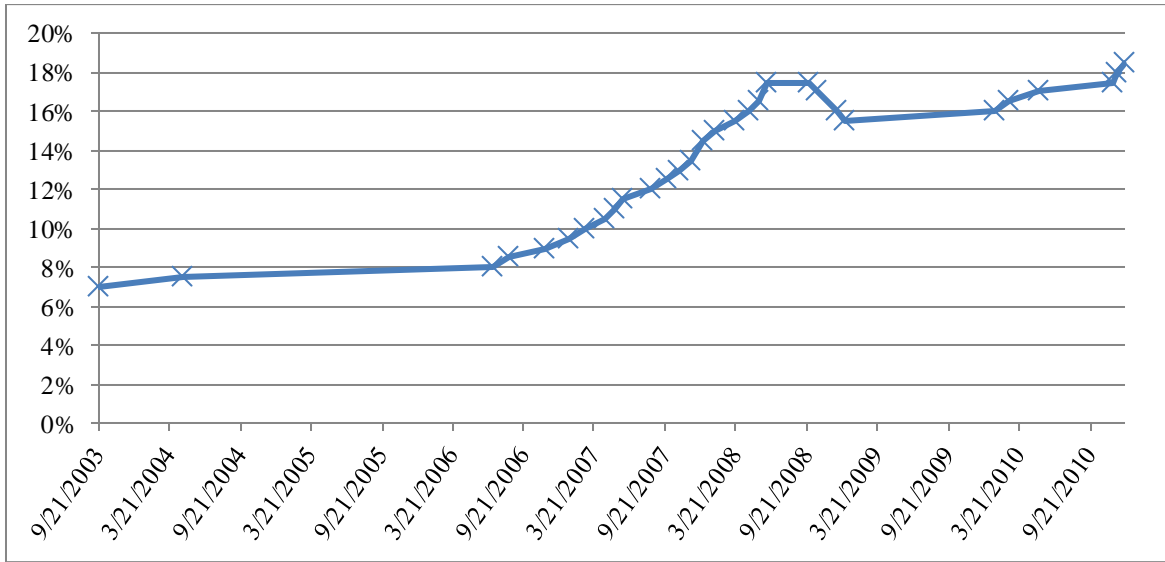


Figure 16: Required Reserve Interest Rate (percent)

Source: The People's Bank of China

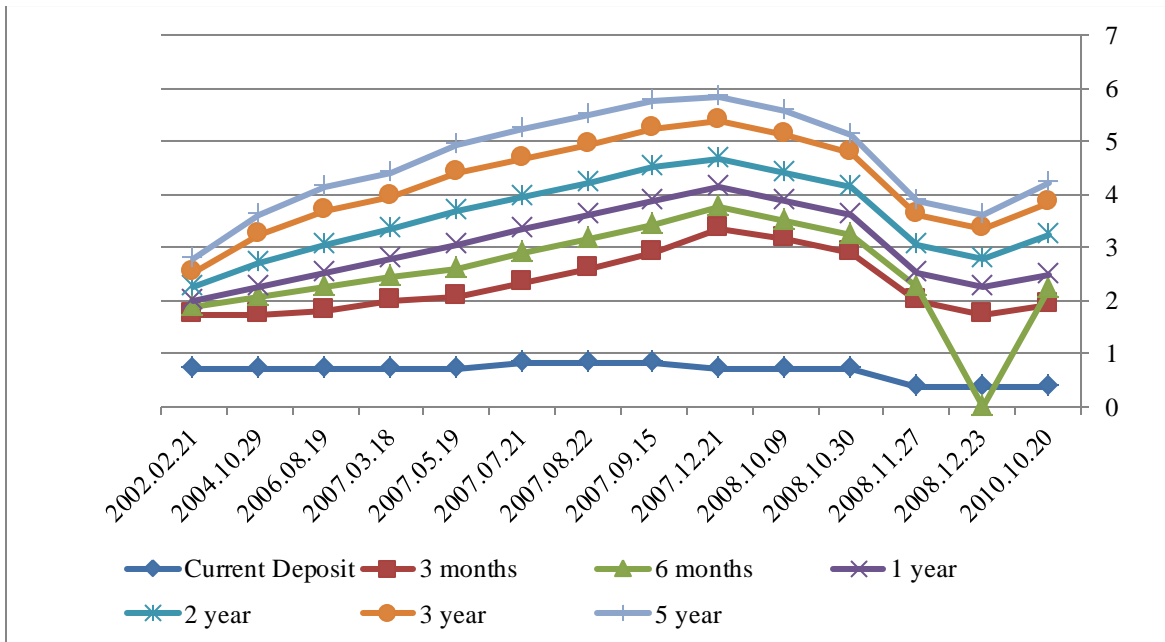
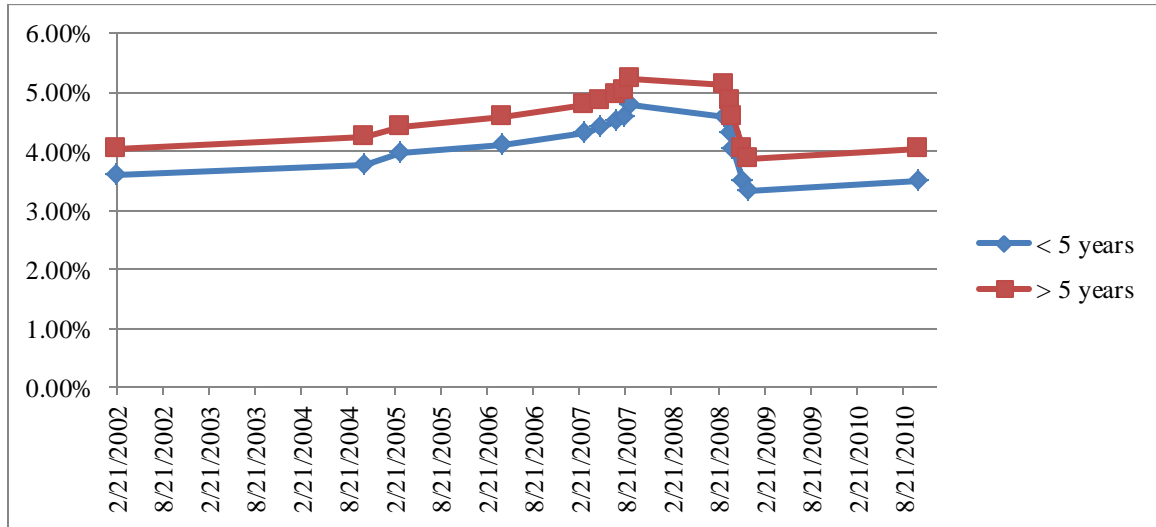


Figure 17: Interest Rate of Accumulation Fund Loans

Source: The People's Bank of China



4. Filtering Model and Housing Affordability

The previous chapter uses housing data of Shanghai and Beijing to explore factors that contribute to China's booming housing market. These factors, including increasing aggregate demand for housing units, structural housing problems, speculations, credit accessibility, and benchmark interest rate, all direct to high house prices, but not necessarily obstruct housing affordability for middle- or low-income families. After all, the gap between income growth and house price growth can be filled by other sources, such as mortgage loans and windfall from the stock market. These elements are intractable. Nevertheless, we can attack this problem by investigating the relationship between living conditions (usually measured by household size of families of various income levels) and problems discussed before, therefore concluding whether housing units are overall unaffordable, or they are just primarily unaffordable to a specific subgroup of consumers. In the following section, analyses will be based on the filtering model elaborated by housing economic theorists over the past thirty years.

4.1 Theoretical Framework: Filtering Model

William Grigsby (1963) introduced the earlier work on filtering process. But Sweeney (1974) is credited with the first thorough treatment of the filtering model, where the level of maintenance moves along with the level of depreciation. In the Sweeney model, housing market is described as a series of submarkets differentiated by unit quality. If without maintenance, rents will fall as quality declines, so units that are on the lower quality ladder have lower rents than units of the same size in the same location at

the top. However, it is on landlords' discretion whether to move the units back up the quality ladder by spending more on maintenance, or simply let them deteriorate when extra expenditures on maintenance and renovation are equal to costs of new constructions with higher quality. Assuming the costs to maintain a given level of quality will increase as units are getting older, and landlords are profit oriented, when higher incomes, larger population, and relative small housing stock result in stronger demand for higher quality units, landlords are more inclined to cause the quality to filter up. In other words, the overall quality of the housing units will be improving by either means: renovation or new construction. Reducing the supply of low-end affordable units can potentially exacerbate affordability problems for the least well-off in a short-term period. In long-term, the efficiency of the housing market will adjust supply and demand. Eventually, the effects of improving technology will lead to higher quality housing units with lower prices, thus previously high-end units become more affordable for the poor (Mayer, Christopher, 2003).

The filtering process was evident in the housing history in the United States, especially in the early postwar years (Straszheim, M., 1975). After World War II, employment suburbanization accelerated, incomes rose, and birth rates increased. In the meanwhile, federal tax laws and mortgage guarantees also promoted homeownership. In contrast to the declining demand for central-city housing, demand for newer, lower-density housing was stimulated by the rapid suburbanization. Most new construction occurred in suburbs at lower costs. This implies that maintenance costs for housing units in the central city are higher than the construction costs of new units in suburbs. Corresponding to the larger housing supply in the suburb areas, the price differences

between newer and older structures were kept small, which also facilitated the movement of lower-income households into newer houses via the filtering process. Of course, before the suburbanization took off, the central city was at the expanding stage first. This evidence is well supported by the filtering process in Chicago metropolitan area in the 1960s that is more similar to situations of major cities in China. Berry (1976) found that after the war, “there was a vast increase in housing available in the metropolitan area, and a combination of accelerated filtering and rapid residential relocation produced a substantial sag in demand in areas of traditional minority residence” (Berry, p. 417). According to Berry’s paper, 76 percent of housing transactions in the central city Chicago from 1986 to 1972 are sales from white to black households.

Filtering model is often referred as “welfare filtering” such that the original owner, after some periods of occupancy, vacates for a newer unit and the old one “filters” down to a lower-income household. But this theory does not always hold. Indeed, there are several conditions required. First, the housing market should be efficient. This means that government intervention into the filtering process is kept at the minimum level. Whether to build new constructions or renovate is at landlords’ discretion. Decisions on whether to vacate for another unit are dependent on income levels and consumer population. Second, each subgroup of housing units has its designated consumers. High-income families are supposed to purchase high quality units, while low-income families are assumed to purchase units that are on the lower quality ladder. Third, the secondary housing market should be fully developed. This means that the metropolitan area has to function as an integrated market and speculations should not be the leading factor of the increasing

demand. Only in this way can the older units be “filtered” down at a lower price to the poor.

If one of these three criteria is not met, the healthy cycle of the filtering model is broken and the gentrification, which is the reverse of filtering, will exacerbate the living conditions of low-income families. Gentrification is the process where inner-city neighborhoods attract higher-income households who drive up the house prices. Consequently, low-income occupants are displaced.

Chapter 2 overviews China’s housing policy since 1949 till present. In 2002, the Chinese government completely abandoned the distributive housing market, stopped subsidizing state-owned enterprises in providing housing units to employees, and ultimately entered into privatized housing market. Ever since then, the development of the housing market heavily relies on private real estate developers. Further, most citizens only have access to the so called “commercialized housing units”, which are transferrable private housing properties that are owned by individuals, not the public, up to 70 years if the land is not recalled by the government. Because of this, we can consider that the China’s housing market meets the first criterion of the filtering process: free capital market with minimum government intervention. Unfortunately, the following section provides strong evidence to show that the filtering model does not hold in China. Section 4.2 and section 4.3 are devoted to finding which criteria among those three are violated in China’s the housing market.

4.2 Evidence of Violation of the Filtering Process

In this section, the thesis is dividing families into 5 categories based on their income level: 20 percentile, 40 percentile, 60 percentile, 80 percentile, and 99 percentile. Then the thesis uses household size as the proxy to gauge living conditions of families with different income level. Families falling into the 20 percentile category are considered low-income families; families falling into the 40 percentile category are considered medium low-income families; families falling into the 60 percentile are considered middle-income families; families falling into the 80 percentile category are considered medium high-income families; families falling into the 99 percentile category are considered high-income families. Data on 9 major cities such as Beijing, Shanghai, Guangzhou, Shenzhen, Tianjin, Shenyang, Qingdao, Wuhan, and Ningbo is from China Real Estate Statistics Yearbook. Also, the thesis uses the following shorthand to denote relevant variables:

hhs_low: household size of low-income families;

hhs_md1: household size of medium low-income families;

hhs_mdh: household size of medium high-income families;

hhs_high: household size of high-income families;

fsc_high: floor space constructed of high-end housing in the given year, measured by square meters;

fsc_high_acc: accumulative floor space constructed of high-end housing in the given year, measured by square meters;

fss_high: floor space sold of high-end housing in the given year, measured by square meters;

fsc_ov: floor space constructed of the overall housing market in the given year, measured by square meters;

fsc_ov_acc: accumulative floor space constructed of the overall housing market in the given year, measured by square meters;

fss_ov: floor space sold of the overall housing market in the given year, measured by square meters;

price_ov: housing price of the overall market, measured by yuan/sq.m;

transvol_ov: transaction volume of the secondary housing market, measured by square meters.

Table 1 computes the compound annual growth rate of household size of nine major cities in China. Overall, household size of families with various income levels decreased from 2002 to 2008, with the fact that household size of high-income families declined more dramatically than the one of low-income families. The difference ranges from 0.069 percent to 3.915 percent. While some families from certain categories of some cities experience increased household size, household size of medium high- and high-income families is consistently decreasing, implying that high-income families benefit from new constructions and therefore have larger living space per capita. In fact, stories of house purchases of these high-income families are very similar. Primary income source is from parents, who are from 40 to 50 years old and have only one child who is considering purchasing an apartment in the city right before or after marriage. Having stable, high income does not necessarily guarantee homeownership. This is simply because a lack of accumulation of wealth as a young adult. Given that parents have already accumulated a certain amount of wealth, they could not tolerate their only

child (due to the one-child policy) not being able to afford an apartment, which is becoming more and more important as a premise of marriages. As a result, the wealthy parents will purchase an apartment for the couple as a marriage gift. The story for the low income families is completely different. Because neither the parents nor the young couple can afford owning an apartment, the newly-wed will then choose to live with their parents, causing household size increase.

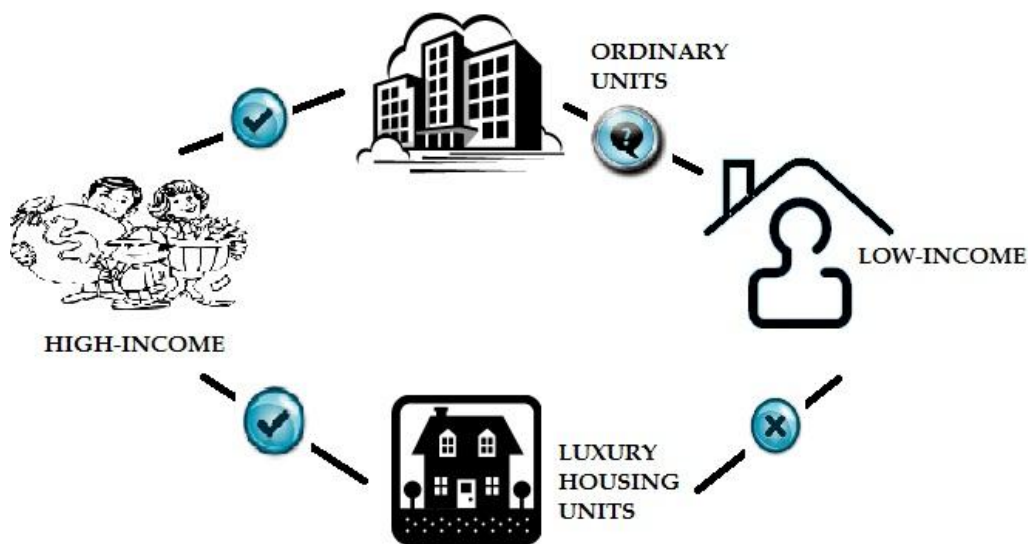
Table 1: Compound Annual Growth Rate of Household Size (2002-2008)

Source: China Real Estate Statistical Yearbook

	Compound Annual Growth Rate of Household Size (2002-2008)								
	Beijing	Shanghai	Guangzhou	Shenzhen	Tianjin	Shenyang	Qingdao	Wuhan	Ningbo
hhs_LOW	-0.408 percent	-0.127 percent	-0.127 percent	0.058 percent	-0.178 percent	-1.280 percent	0.778 percent	0.399 percent	-1.548 percent
hhs_MidLow	-0.467 percent	-0.090 percent	-0.090 percent	-0.213 percent	-0.927 percent	-0.641 percent	-0.341 percent	-0.602 percent	-3.061 percent
hhs_MidHigh	-1.016 percent	0.499 percent	0.499 percent	-0.451 percent	-1.184 percent	-1.380 percent	-0.399 percent	-0.733 percent	-1.494 percent
hhs_HIGH	-1.093 percent	-0.196 percent	-0.196 percent	-0.847 percent	-0.675 percent	-3.132 percent	-3.137 percent	-1.014 percent	-1.662 percent
Compound Annual Growth Rate of transaction volume of the secondary market	63.325 percent	8.107 percent	18.201 percent	24.431 percent	5.936 percent	4.760 percent	N/A	1.573 percent	N/A

Another fact needed to be noticed is the unbalanced access to subgroups of the housing market. “Unbalanced access” means that high-income families are financially capable of purchasing either luxury units or ordinary units, while low-income families can only rely on reasonable priced ordinary units, if exist, or affordable housing subsidized by the government. Diagram 1 shows the dynamic of the purchasing power of families from these two extreme cases. It is undoubted that luxury housing units are continuously being added to the housing stock, but the unsatisfied demand for housing from high-income families has to be fulfilled not only by high-end units, but also by ordinary housing units to achieve smaller household size.

Diagram 1: Accessibility to Housing Units



Though this section does not discuss whether demand from high-income families is fundamental or speculative, we do see, from Table 2, that the demand is inelastic because the climbing price is positively correlated with floor space sold for most cities

except for Beijing and Qingdao. This is probably due to its exposure to shrinking foreign investment into the real estate market during the 2008 financial crisis.

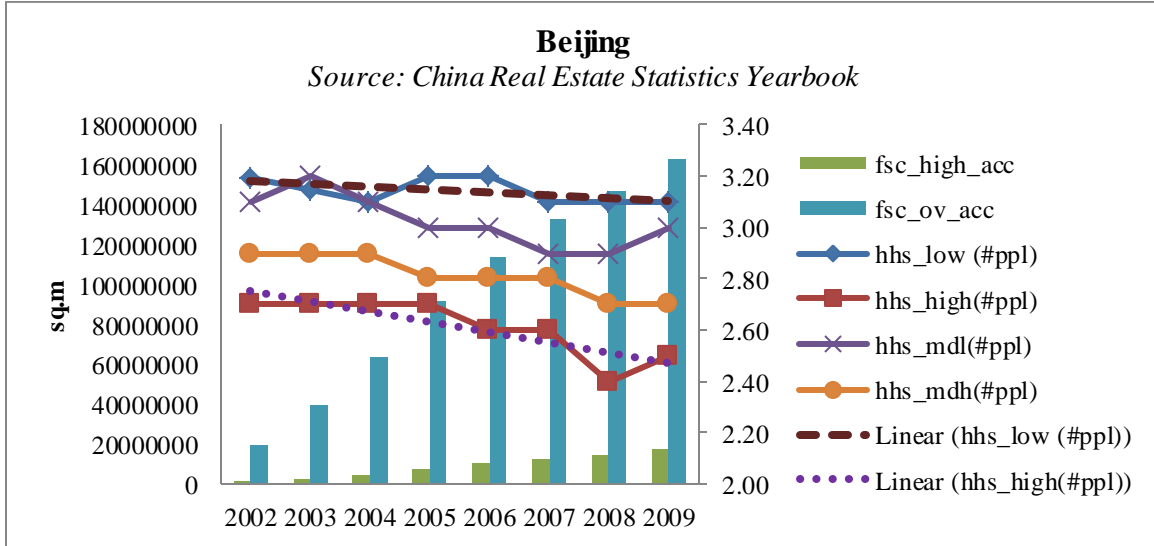
Table 2: Correlation between Sold Floor Space and Prices

Beijing	-0.125668014
Shanghai	0.44707472
Guangzhou	0.647309206
Shenzhen	0.149253824
Tianjin	0.847328185
Shenyang	0.915398291
Wuhan	0.742686167
Qingdao	-0.258011659

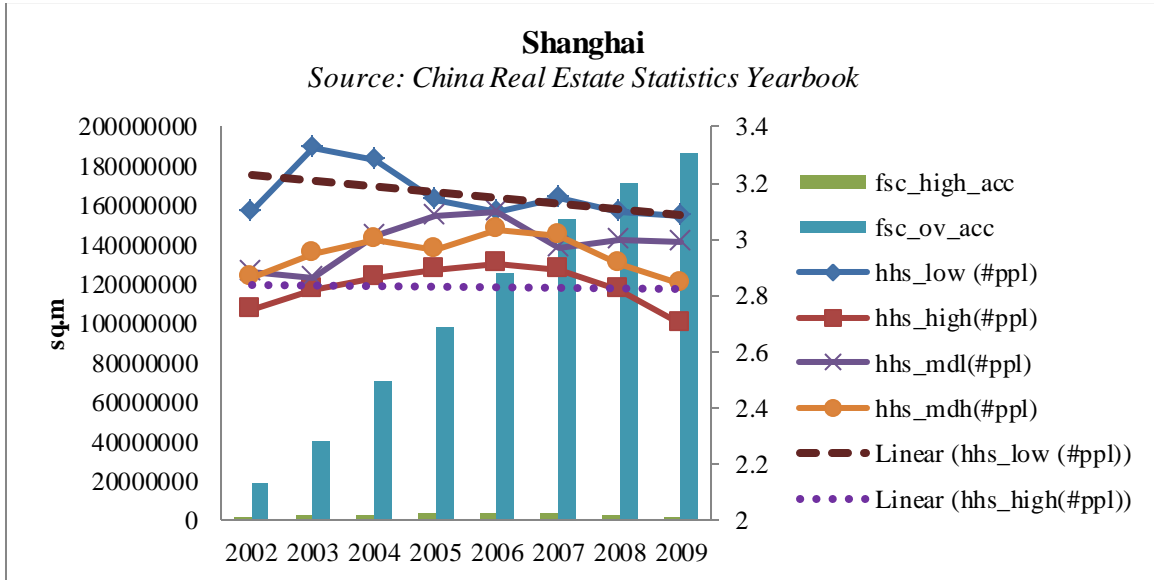
Figure 18 plots the household size of families from different income levels and the accumulated floor space constructed through year 2002 to 2008. The dashed lines are the trend of household size of low- and high-income families. All of the nine cities experienced rapid constructions of housing units during this period. The significant downward trend of household size of high-income families is well presented by the lower dashed line; the stable household size of low-income families is well presented by the upper dashed line. This piece of evidence corroborates the fact that house purchasing activities of high-income families crowds out housing affordability of low-income families. Household size in Guangzhou, Shengyang, and Ningbo decreases.

Figure 18: Household Size and Housing Construction

Panel A



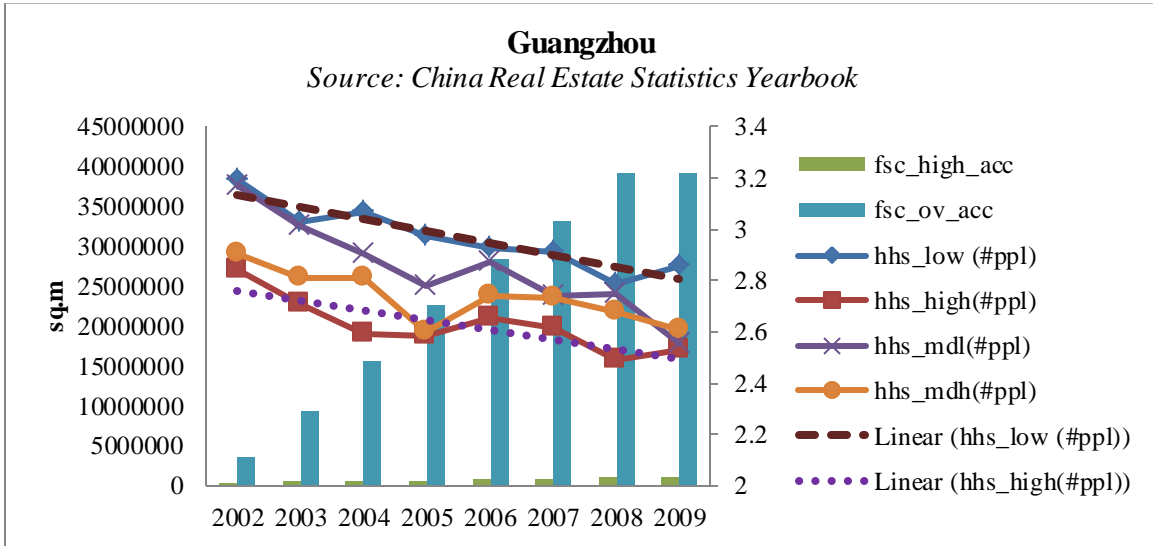
Panel B



Panel C

Guangzhou

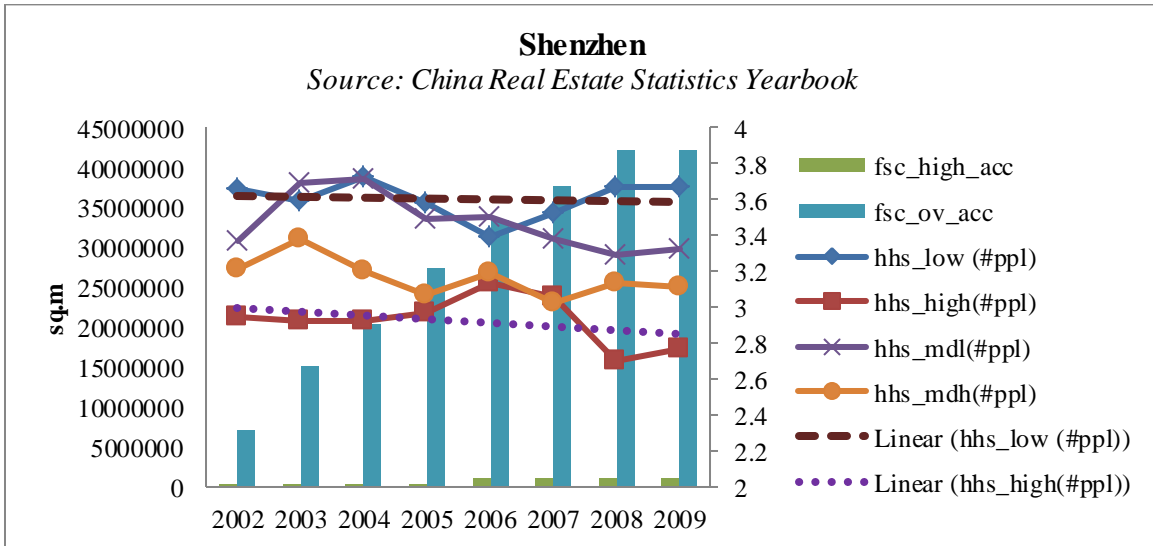
Source: China Real Estate Statistics Yearbook



Panel D

Shenzhen

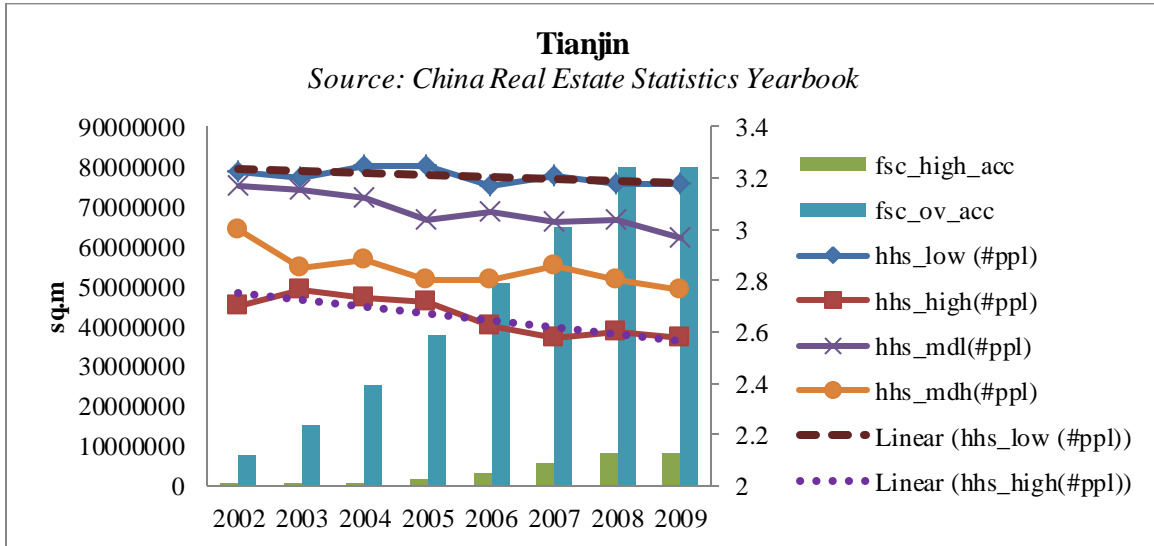
Source: China Real Estate Statistics Yearbook



Panel E

Tianjin

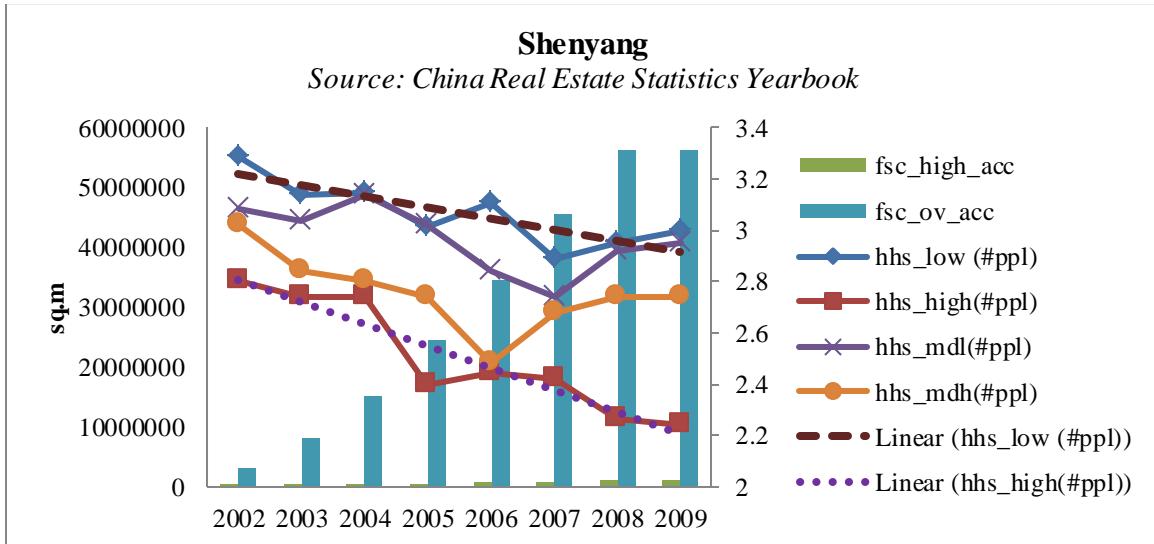
Source: China Real Estate Statistics Yearbook



Panel F

Shenyang

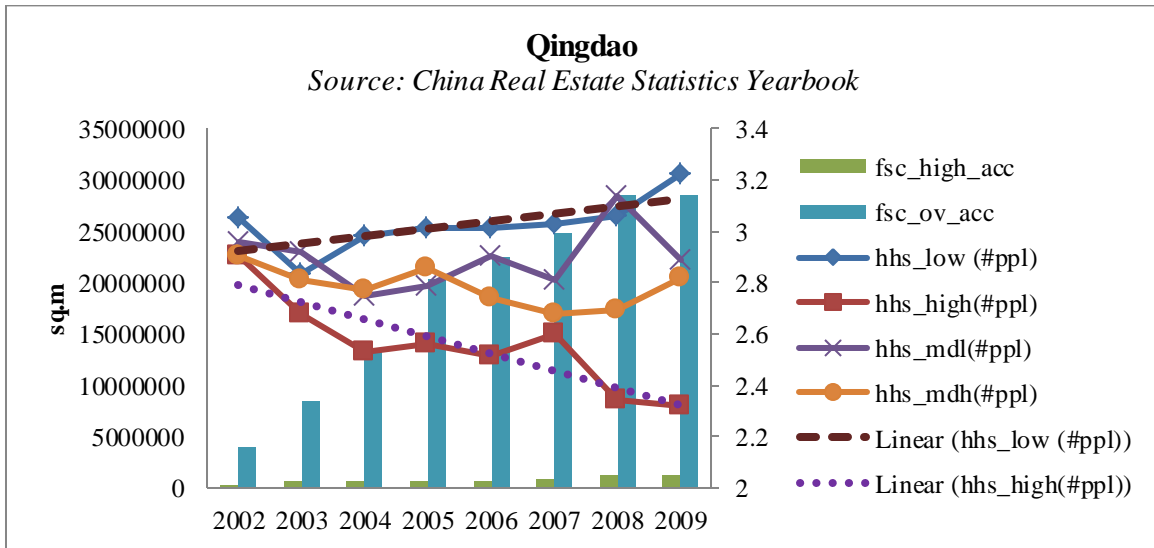
Source: China Real Estate Statistics Yearbook



Panel G

Qingdao

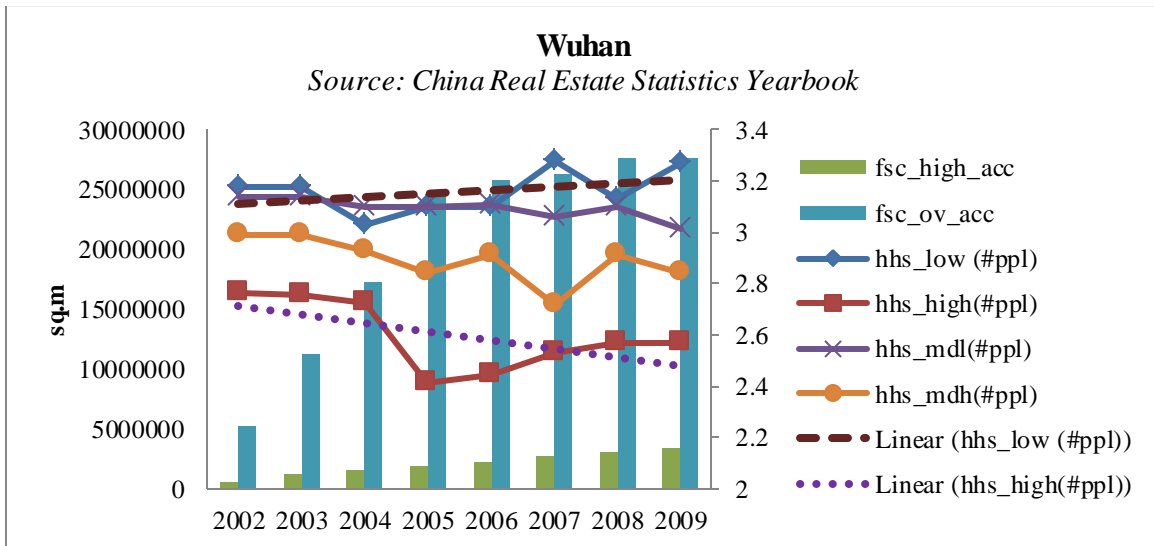
Source: China Real Estate Statistics Yearbook



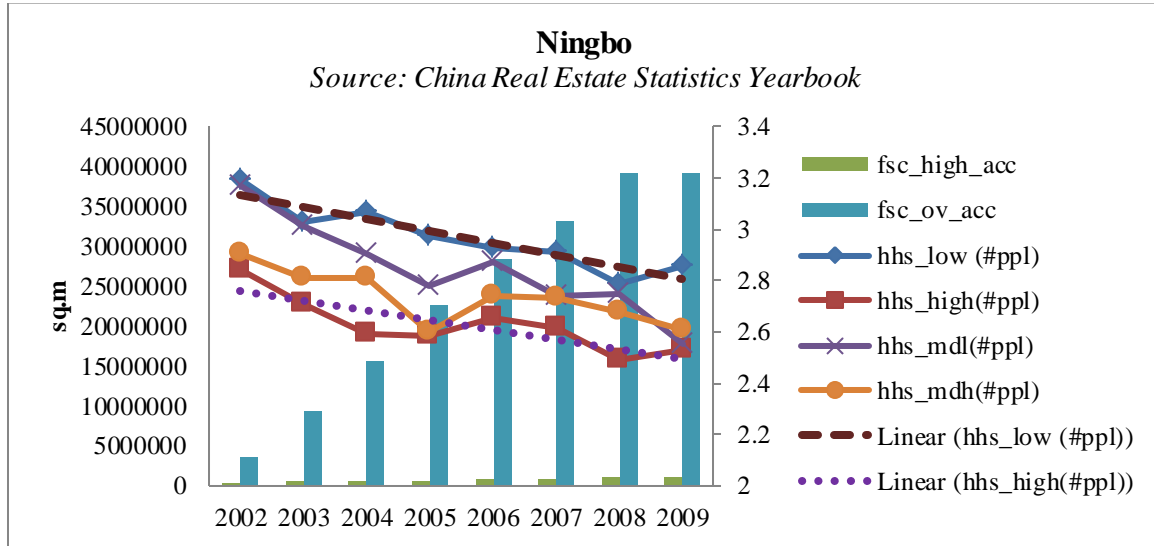
Panel H

Wuhan

Source: China Real Estate Statistics Yearbook



Panel I



The fact that high-income families are tapping both ordinary and luxury housing units, combined with the divergent trend of household size of low- and high-income families, is not sufficient to conclude that the filtering model does not hold because the transactions in the secondary market has not yet been considered in the analysis.

Theoretically, low-income families should be the major consumers of old housing units in the secondary market. Such assumption should result in a negative correlation between household size of low-income families and transaction volume of the secondary market.

However, the data of seven cities spanning from 2002 to 2008 shows that the stable household size of low-income families is unrelated of the increasing transaction volume. Most transactions in the secondary market take place among the wealthy who are also active in the primary housing market.

In conclusion, the second condition—each subgroup of the housing market should have its own consumers—is violated.

4.2 Speculation and Housing Affordability

Section 4.1 concluded that high-income families are purchasing both luxury housing units and ordinary “commercialized” units. This strong demand momentum from high-income families not only crowds out low-income families’ access to newly constructed units, but also excludes the poor from the secondary housing market, according to the stagnant/increasing household size of the poor. There are two possible reasons accounted for the unquenched demand: a larger number of wealthy people are seeking larger living space, or speculation fostered demand. The following analyses are contributed to verifying these two hypotheses:

Hypothesis 1: The Fundamental Demand from the Wealthy Undermined Housing Affordability of the Poor

The data shows that the household size of high-income families dropped dramatically during the last decade. As discussed before, seeking better living conditions which are usually gauged by living space, the wealthy will purchase more than one apartment, most of time for their child¹⁴. Admittedly, house prices are high and demand is unquenched. This does not necessarily violate the theory of supply and demand because the inelasticity of the housing demands, whether from the wealthy or from the middle-income families, can nicely explain the strong demand momentum. Diagram 2 shows the dynamic of the interaction between the housing demand from buyers and house prices set by real estate developers. In the graph, demand is inelastic when

¹⁴ Remember the one-child policy and the effects on parent’s concern about their child’s financial situation and housing condition.

percentage increase of house prices is larger than the percentage increase of the housing demand. In other words, real estate developers enjoy large price increase and therefore more profits when they see a small increase of housing demand. Table 1 containing annual price increase of housing, further demonstrates that the average house prices of the nine major cities in China keep an enduring upward momentum from 2002 to 2008. In general, price increases peaked in 2006 and 2007 for the selected cities, which is aligned with the worldwide booming housing market. As the 2008 financial crisis led to investment capital withdraws by foreign investment institutions, China's housing market overall experienced the slowest growth since 2002. Some cities, for example, Shanghai and Shenzhen, even saw a price decline of -0.86 percent and -4.09 percent respectively. Regardless of the slowing down growth in 2008, the price quickly rebounded and even surpassed the previous level. In 2009, Shanghai's average house prices increased 51.11 percent, while Shenzhen's average house prices increased 24.9 percent (China Real Estate Statistics Yearbook, 2008, 2009).

Diagram 2: Inelasticity of Demand

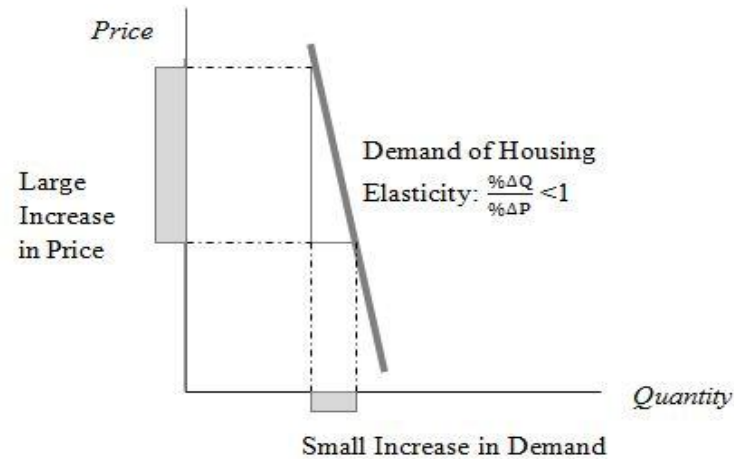


Table 3: Annual Price Increase

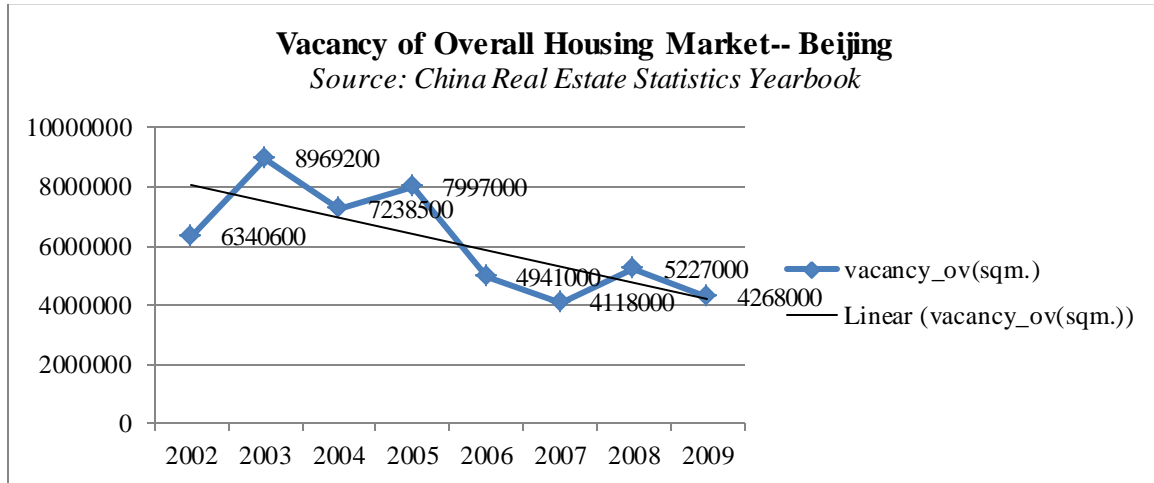
	Beijing	Shanghai	Guangzhou	Shenzhen	Tianjin	Shenyang	Qingdao	Wuhan	Ningbo
2003	-0.04 percent	24.51 percent	0.11 percent	9.99 percent	-0.87 percent	5.84 percent	11.18 percent	5.60 percent	-21.56 percent
2004	7.78 percent	27.97 percent	8.93 percent	10.22 percent	23.31 percent	3.58 percent	19.60 percent	21.73 percent	21.73 percent
2005	25.43 percent	4.90 percent	15.73 percent	9.57 percent	35.14 percent	6.14 percent	30.80 percent	21.26 percent	21.26 percent
2006	42.85 percent	5.09 percent	22.04 percent	26.47 percent	16.60 percent	5.20 percent	83.67 percent	18.39 percent	70.96 percent
2007	48.33 percent	17.25 percent	37.17 percent	51.10 percent	19.93 percent	11.05 percent	34.94 percent	27.73 percent	19.43 percent
2008	10.71 percent	-0.86 percent	4.05 percent	-4.09 percent	0.40 percent	9.06 percent	-	3.65 percent	12.23 percent
2009	7.81 percent	51.11 percent	2.37 percent	23.90 percent	-	-	-	-	-

The purpose of this part of the thesis is not only to verify that house prices keep rising every year, but also to find out whether the demand for housing is fundamental. If the demand is so strong and fundamental, vacancy, measured by square meters, should be declining year by year, because most newly built units will be consumed immediately when they are ready for sale. Figure 19 depicts vacancy trend of the overall housing market of the selected nine major cities in China from 2003 to 2009. The vacant area of Beijing, Qingdao, Shenzhen, and Tianjin apparently has been declining over years. Some cities, such as Ningbo, Shanghai, and Wuhan have an overall downward trend, though it is not that convincing compared to the previously mentioned cities. Guangzhou experienced the minimum change in the vacant area, while Shenyang even has an upward trend in vacancy. Presumably, the trend of vacant area should be against the trend of the continuously climbing prices. To put it more straightforward, vacant area should have a perfect downward trend. But according to the graphs, the bumpy trends of vacant area violate the assumption that fundamental demand is the single factor accountable for its inelasticity.

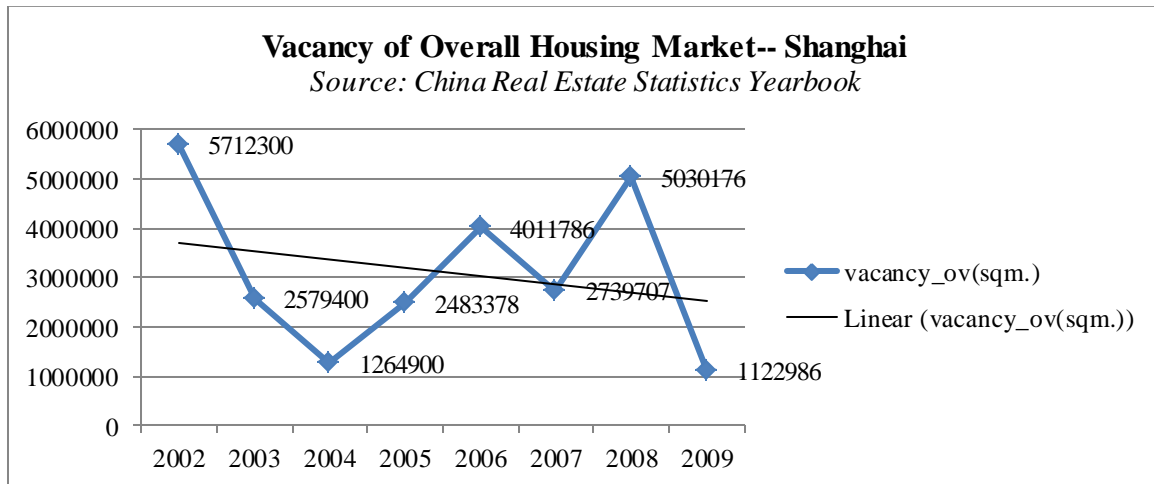
The conclusion is that house purchasing activities due to personal consumption needs is merely one of the reasons for inelastic demand. There has to be explanations for years with increased vacancy. The following section is devoted to exploring whether speculation should be a complementary explanation.

Figure 19

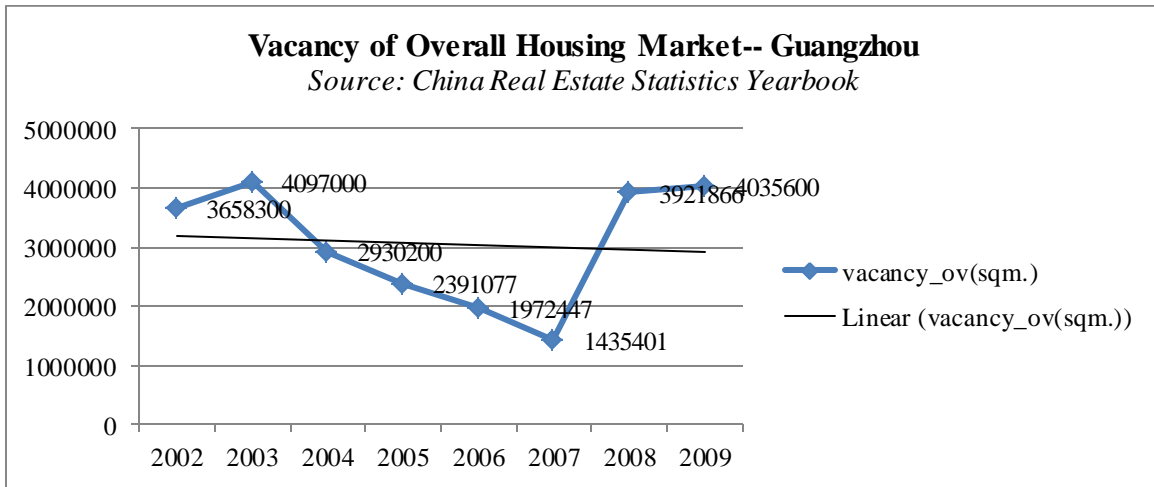
Panel A



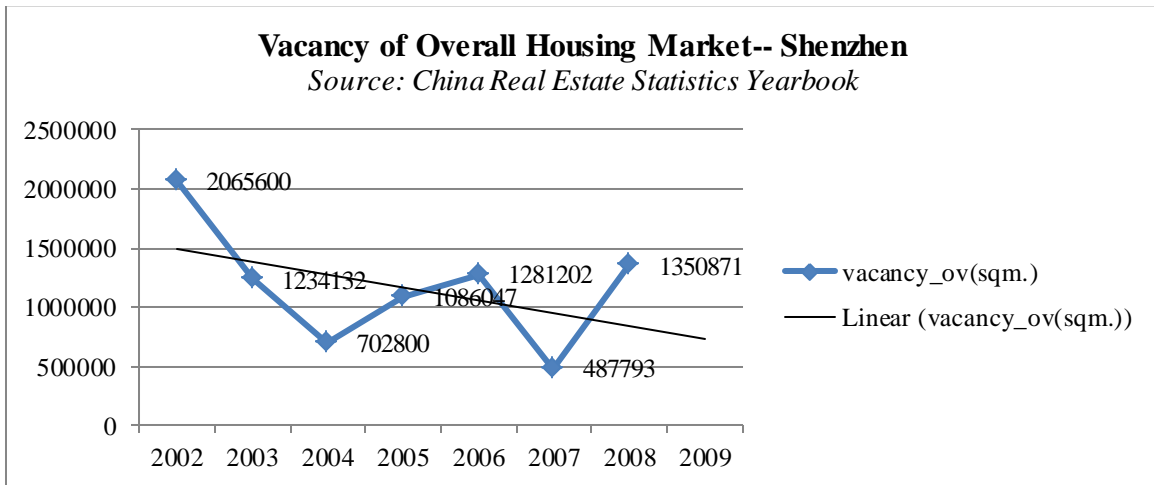
Panel B



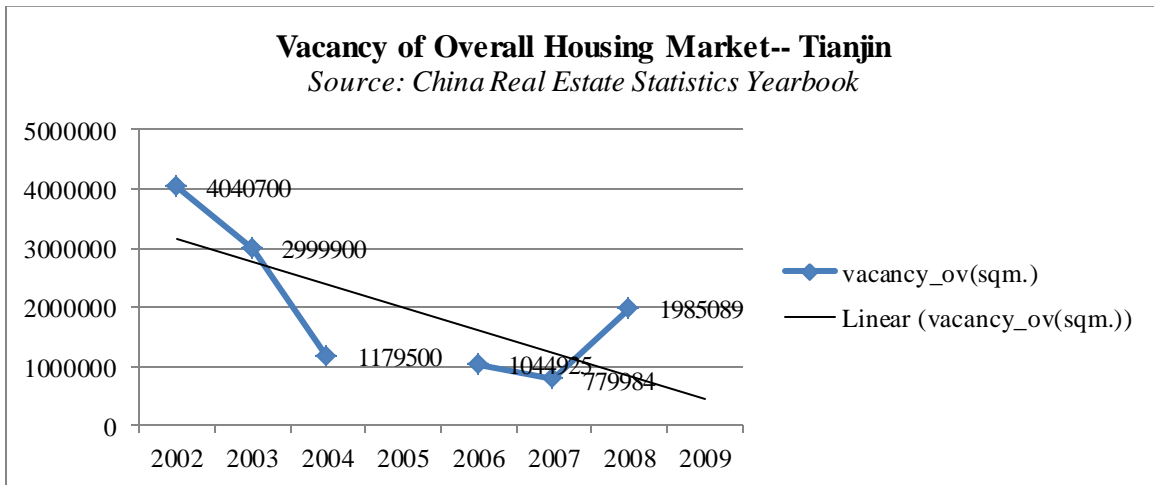
Panel C



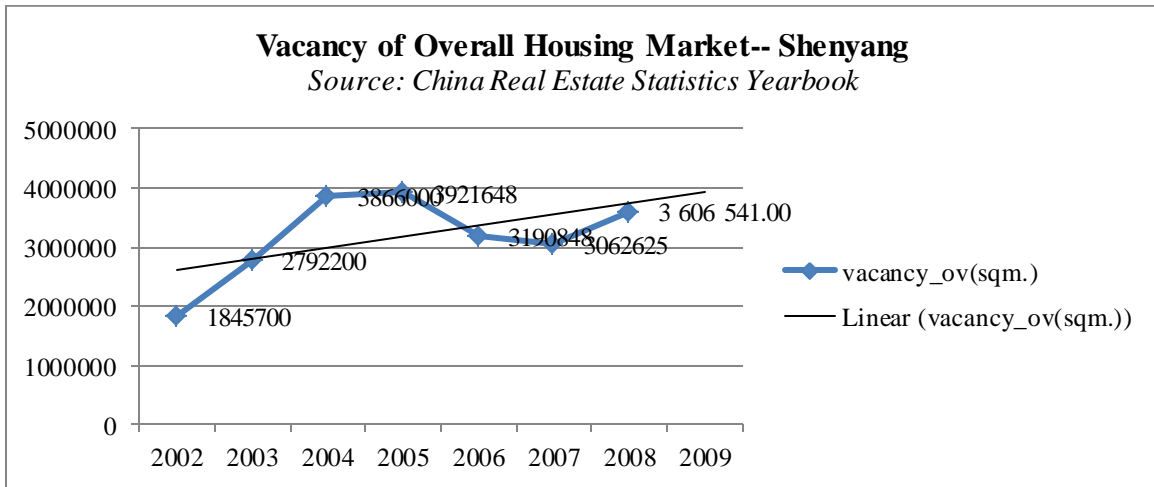
Panel D



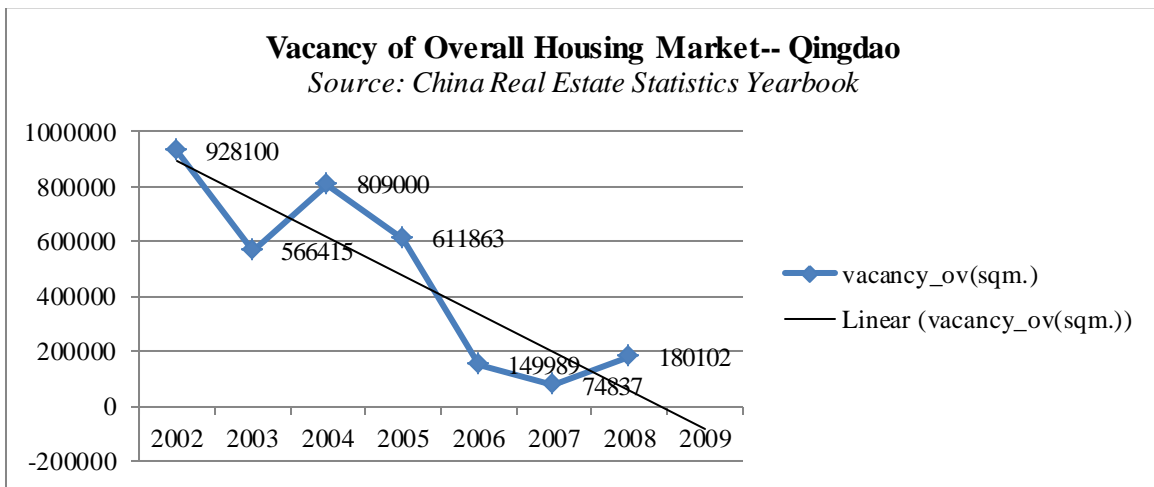
Panel E



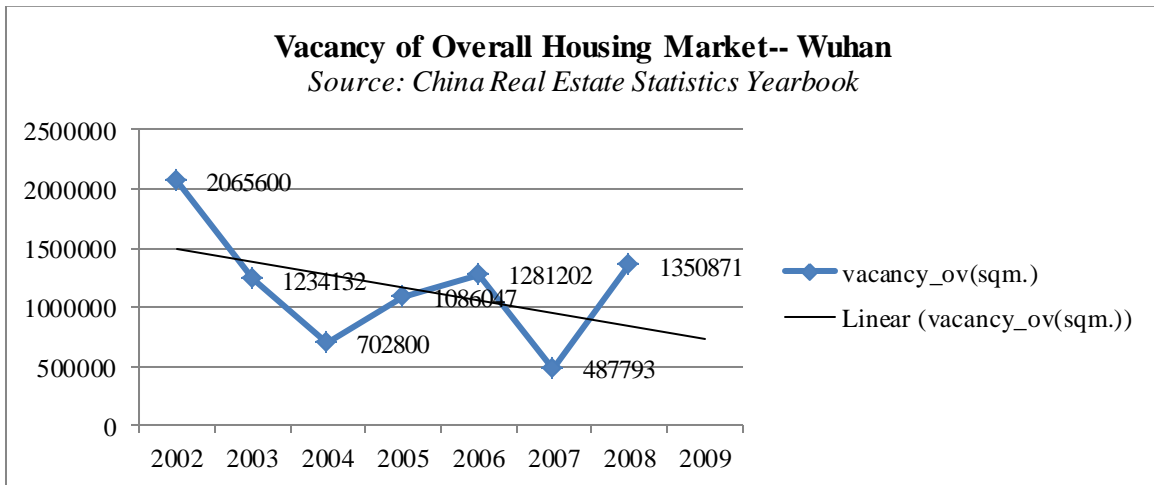
Panel F



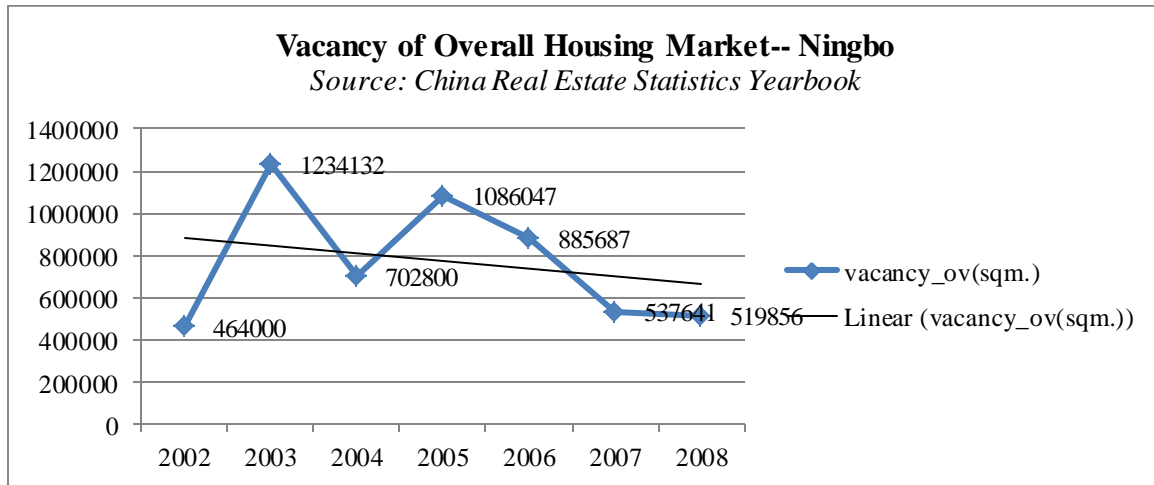
Panel G



Panel H



Panel I



Hypothesis 2: Speculation Undermined Housing Affordability of the Poor

In the previous sections, the thesis concluded that the living conditions are not improving for the poor, but for the wealthy families. Evidence also implicates that housing units are not being filtered down because the rich are engaged in purchases of both newly constructed and old housing units, which precludes the poor’s access to better housing conditions. The previous conclusion states that fundamental demand from high-income families is only partially responsible for the inelastic demand, while speculation may explain the rest. This section is devoted to finding out if speculation exerts any effects on housing affordability of the poor. Since two parties are possibly involved in speculation—real estate developers and home buyers—the thesis will discuss activities by each party in different cases.

Hypothesis 2A: Speculation by Developers Undermined Housing Affordability of the Poor

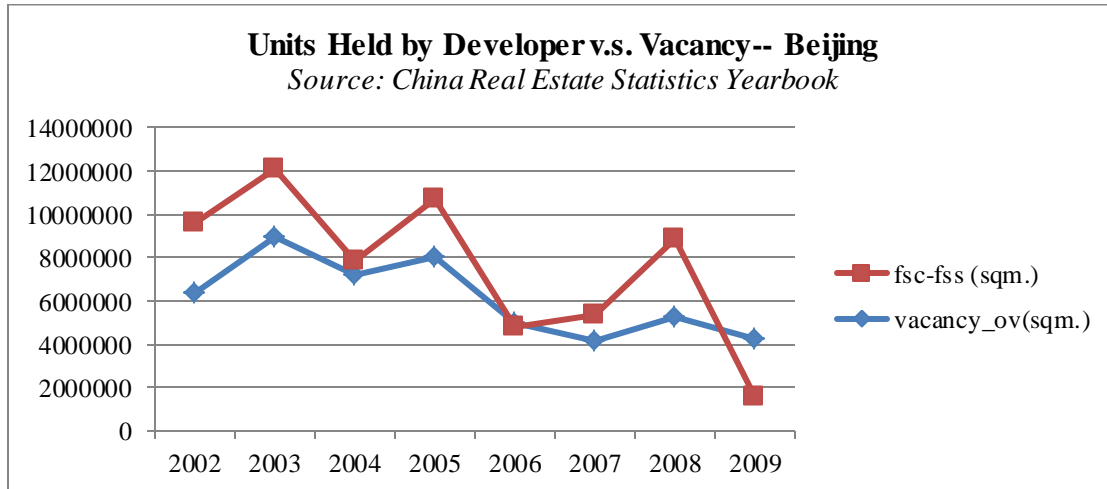
Developers are profit-oriented. If the market is efficient and the price, which is the indicator of demand, is increasing year by year just as the case in China, developers

should have sold almost all newly constructed units and have little contribution to the vacant area. But this is not the case, according to the data. The thesis uses the difference between floor space completed (fsc_ov) and floor space sold (fss_ov) to measure house units held by developers each year. The following figures illustrate the movement of vacant area and unsold units by developers. As these two factors are closely related and have almost the exact same trend, it is safe to conclude that regardless of the peaking house prices and unquenched demand, developers seem reluctant to sell their newly constructed units. Their intention to build is not to sell, but to speculate. One interesting fact is that while both developers and home owners are accountable for vacancy, the proportion of contribution from either party to vacancy seems to be negatively related: when price increases, vacancy contributed by developers is lower; when price decreases, developers curtail inventories but home buyers start to stock up. Previously, Table 2 showed that Chinese housing market experienced the highest growth from 2004 to 2007, when real estate developers started selling their inventories built up a few years ago. This can be clearly shown by the downward trend of units held by developers in Figure 20. Later, when house prices started suffer under the impacts of global recession starting in 2008, units held by developers steeply increased. It is suspicious that developers are unsatisfied with the lackluster market and have the faith that the housing market would recover soon. Indeed, their expectations are correct. As Table 2 has shown, house prices started to pick up in 2009 in some cities, and this evidences is corresponding to an increased number of units held by real estate developers. If we look back to household size of these selected nine cities, household size of low-income families increase without exception. Ignoring high demand, developers deliberately hoard housing units,

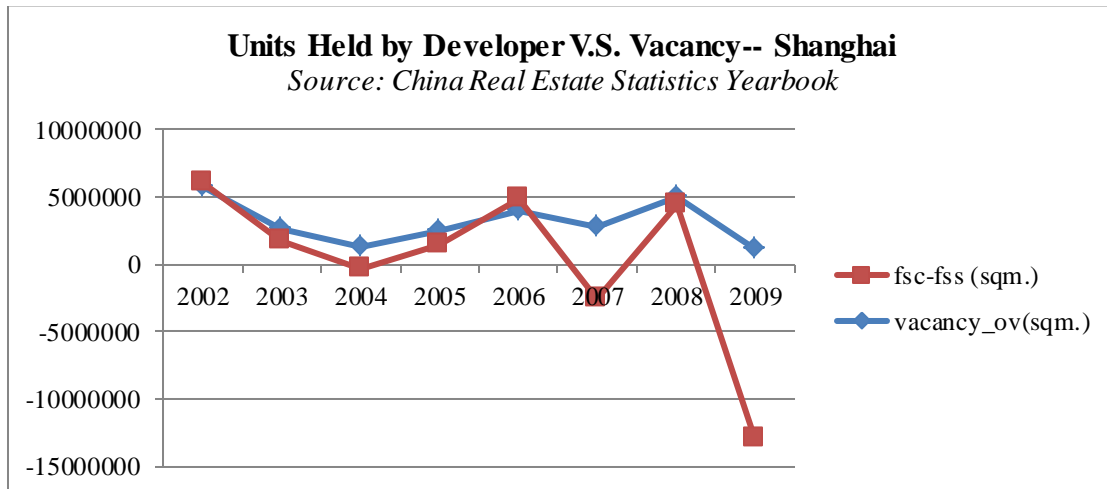
intentionally cause panic over housing scarcity, and finally accomplish their goal—to drive up the housing price and make their business more lucrative than ever.

Figure 20

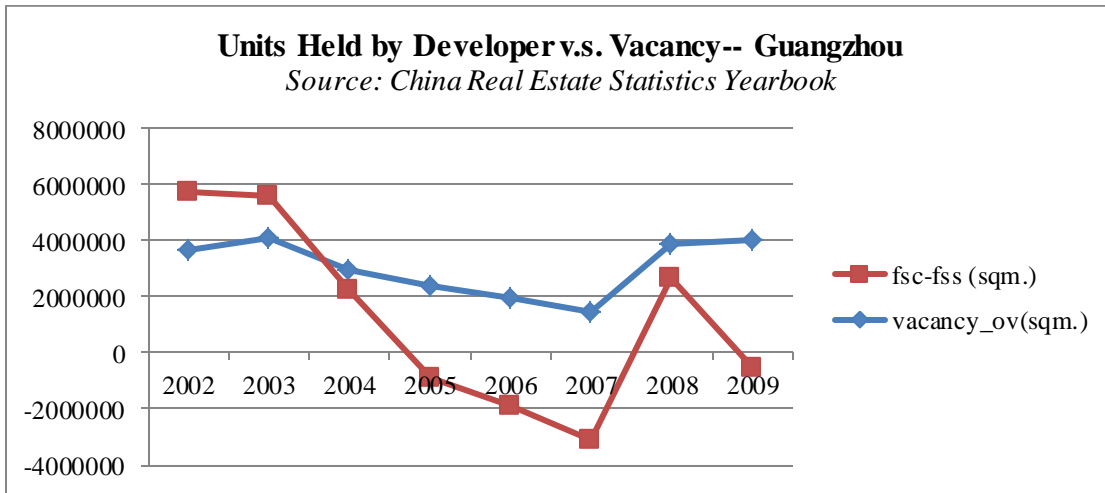
Panel A



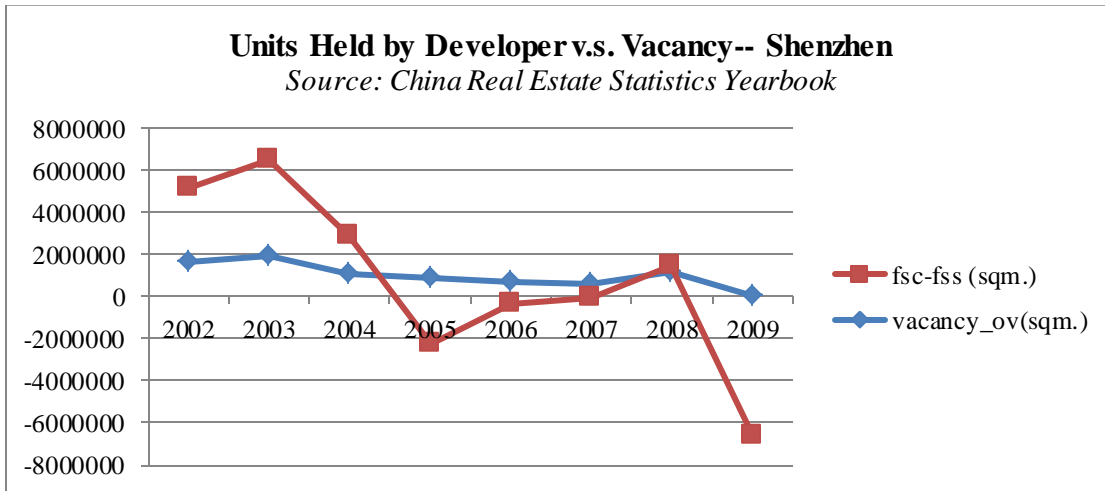
Panel B



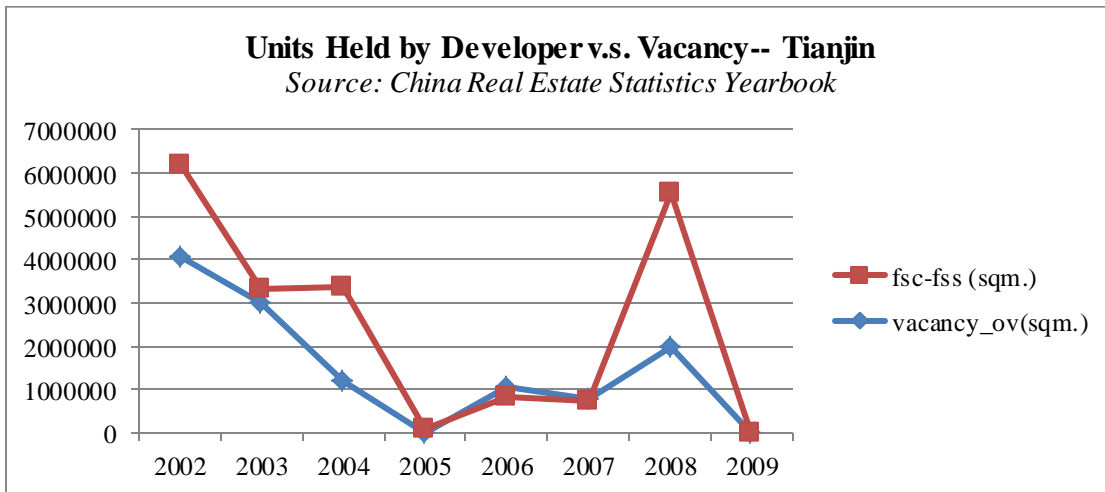
Panel C



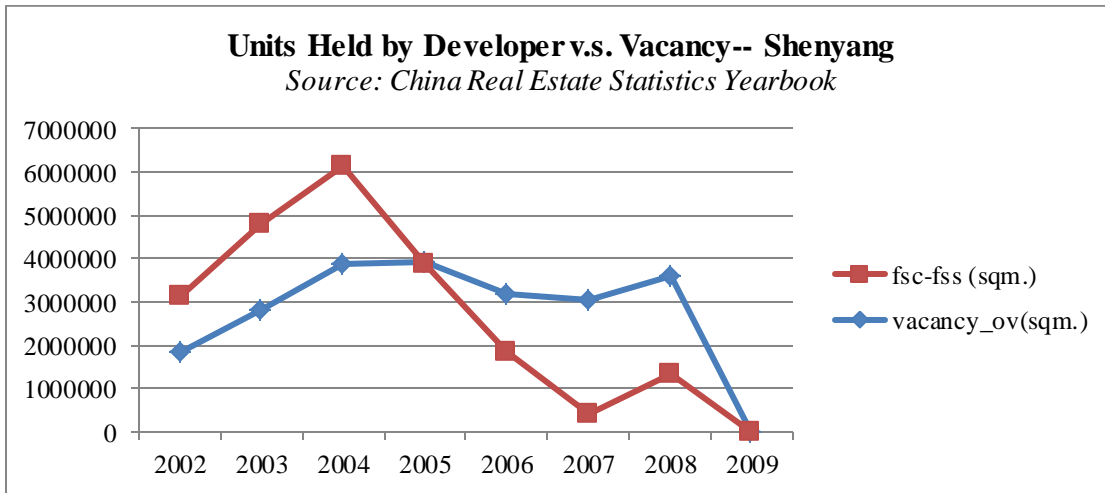
Panel D



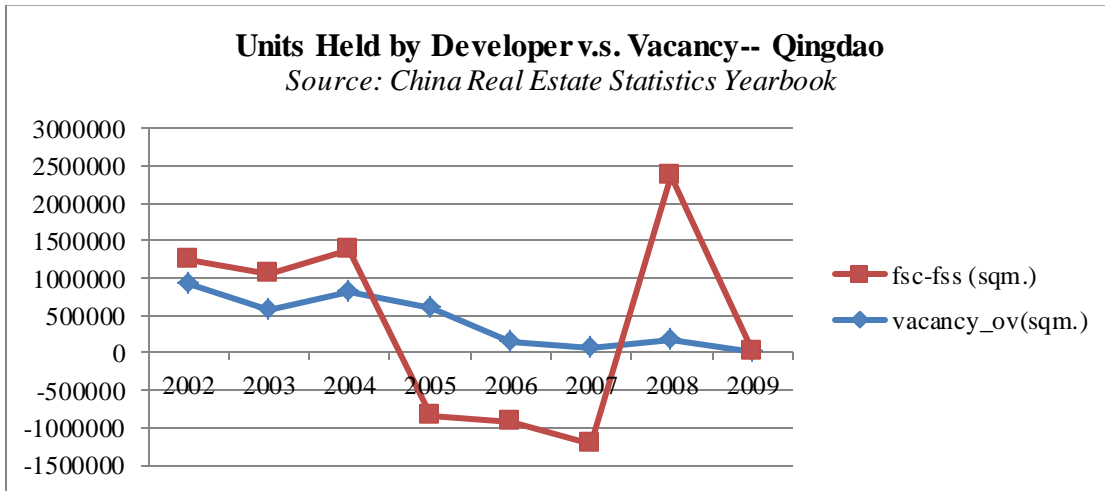
Panel E



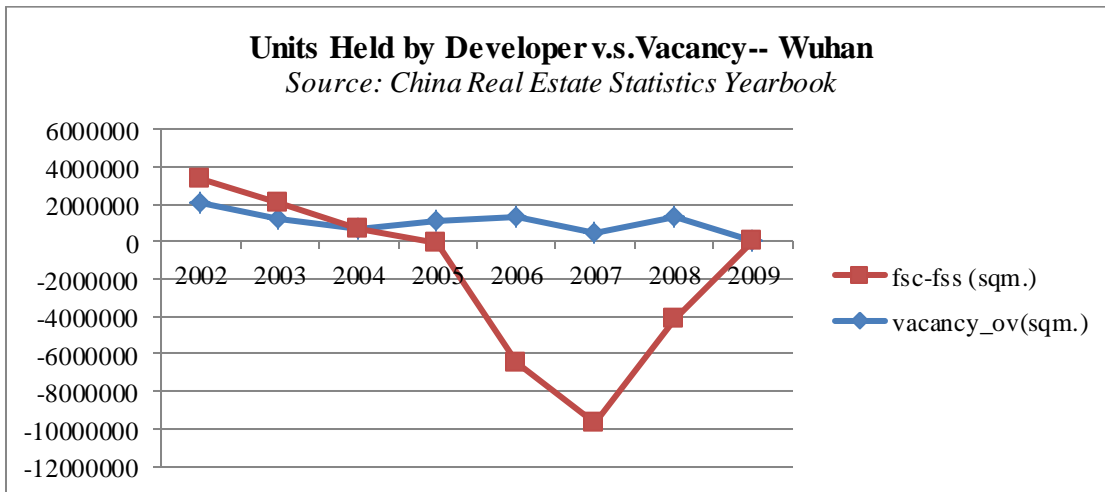
Panel F



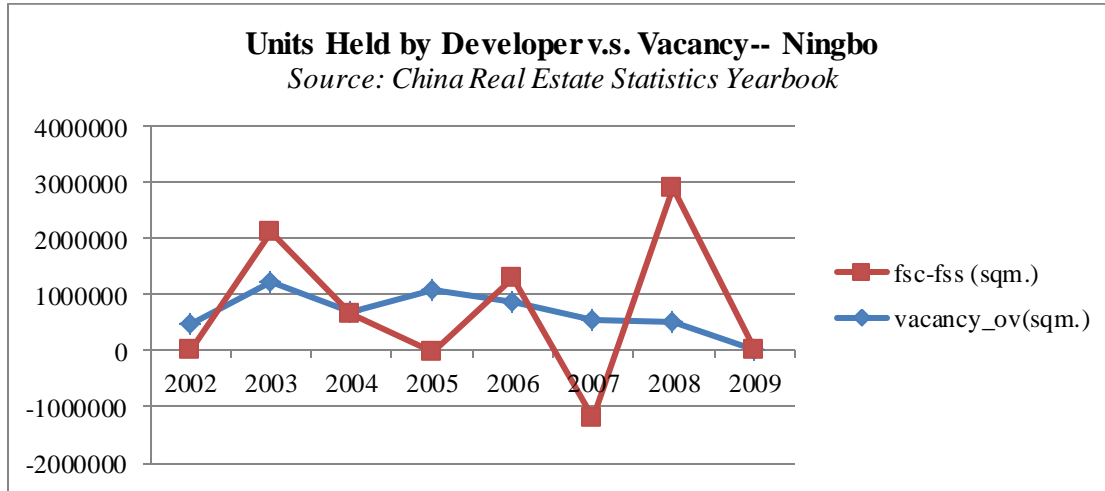
Panel G



Panel H



Panel I



Hypothesis 2B: Speculation by Home Buyers (the wealthy) Undermines

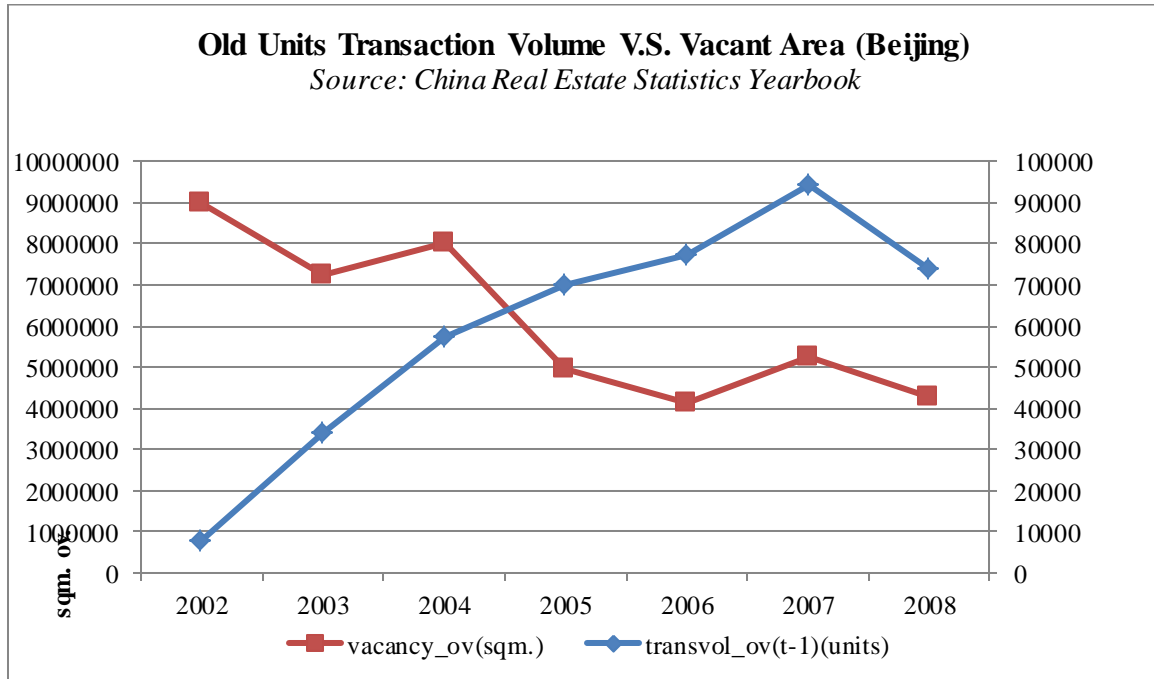
Housing Affordability of the Poor

This section aims to investigate whether speculation by home buyers, most of which are high-income families, contributes to the inelastic demand for housing. The process of speculation by home buyers is very similar to the one by real estate developers: home buyers will eventually sell the extra housing units they purchased a few years ago for speculative purposes. No matter by what means they obtain a windfall from the rising house prices, the speculators' ultimate goal is to inflate house prices by causing panic over housing scarcity, and therefore to force people to buy high. To argue for this point, the thesis investigates into the relationship between the transaction volume of the secondary market in the previous year and housing vacancy in the current year. Though only seven out of nine selected cities have recorded the transaction volume in the past six consecutive years, Figure 19 has well supported the argument by showing that the transaction volume of the secondary market in the previous year is a strong indicator of

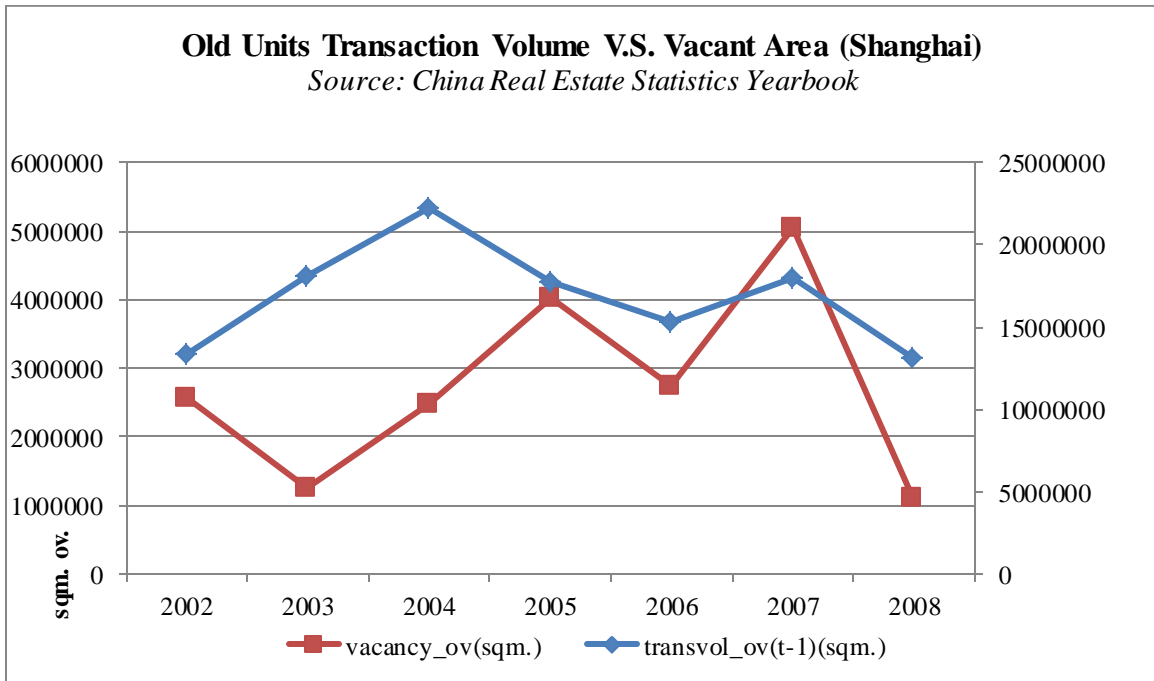
the vacant area of the year later. In other words, transactions of old housing units are not based on actually needs because most of them will be vacant for at least one year.

Figure 19

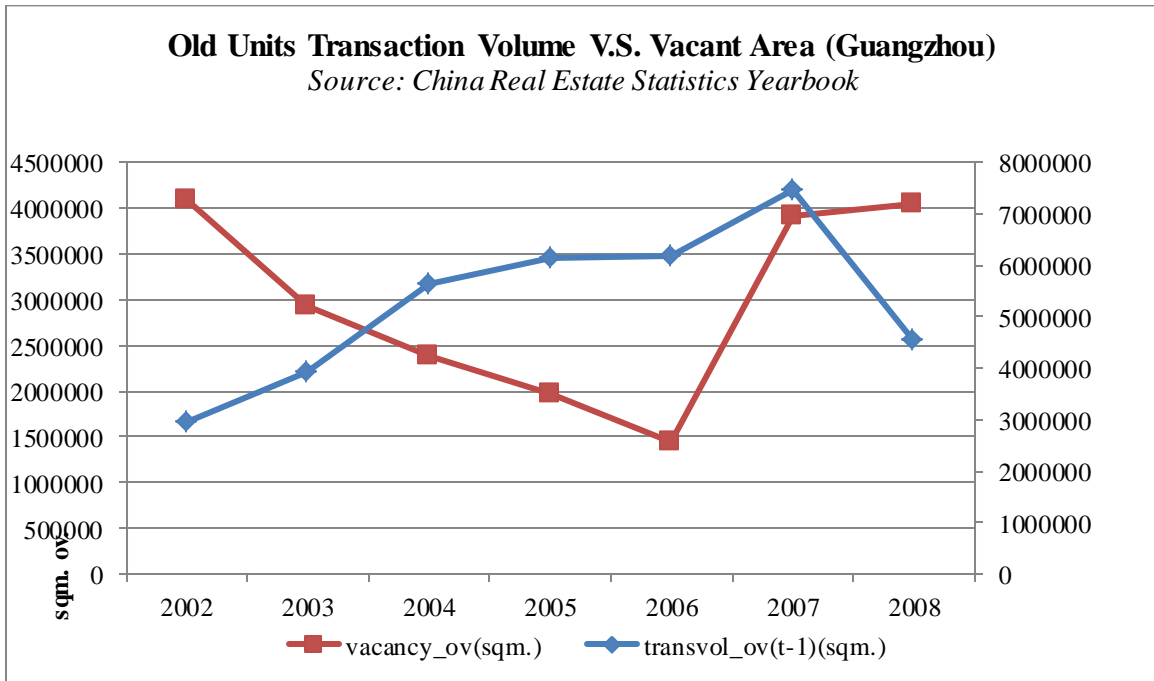
Panel A



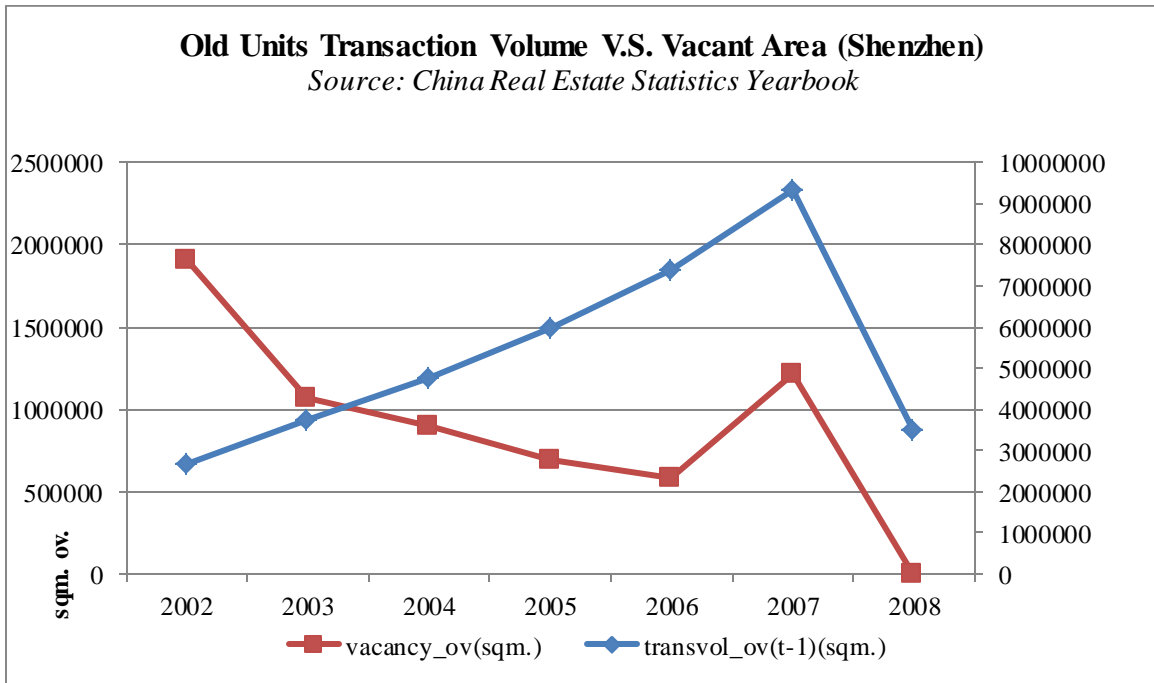
Panel B



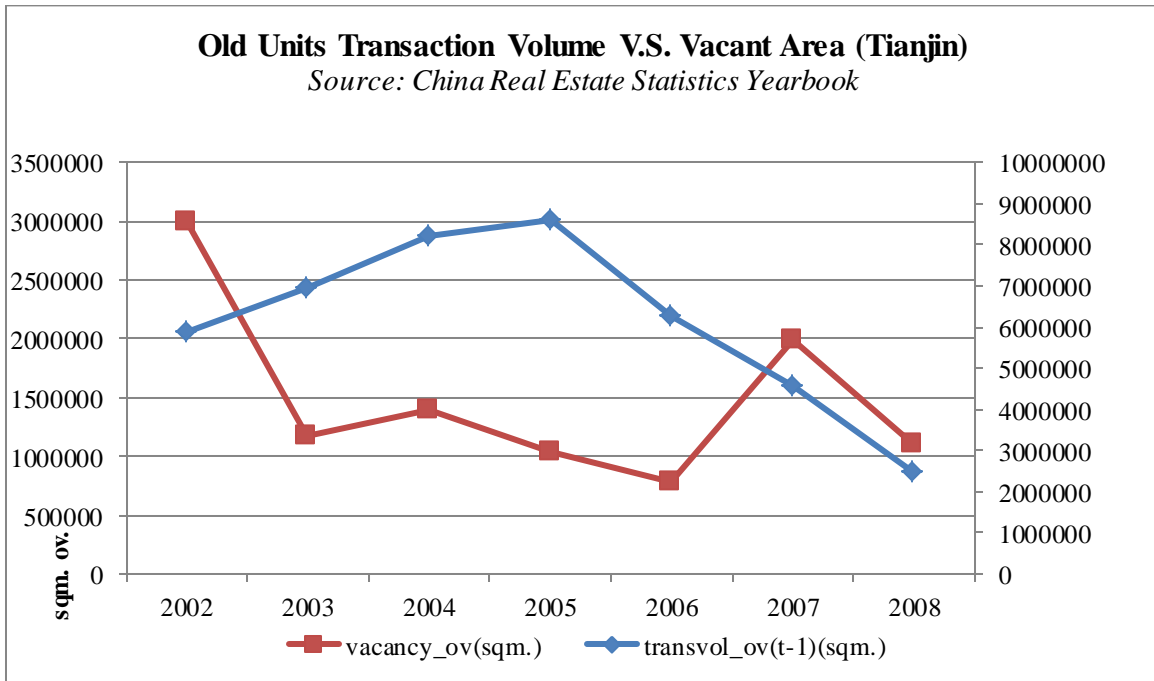
Panel C



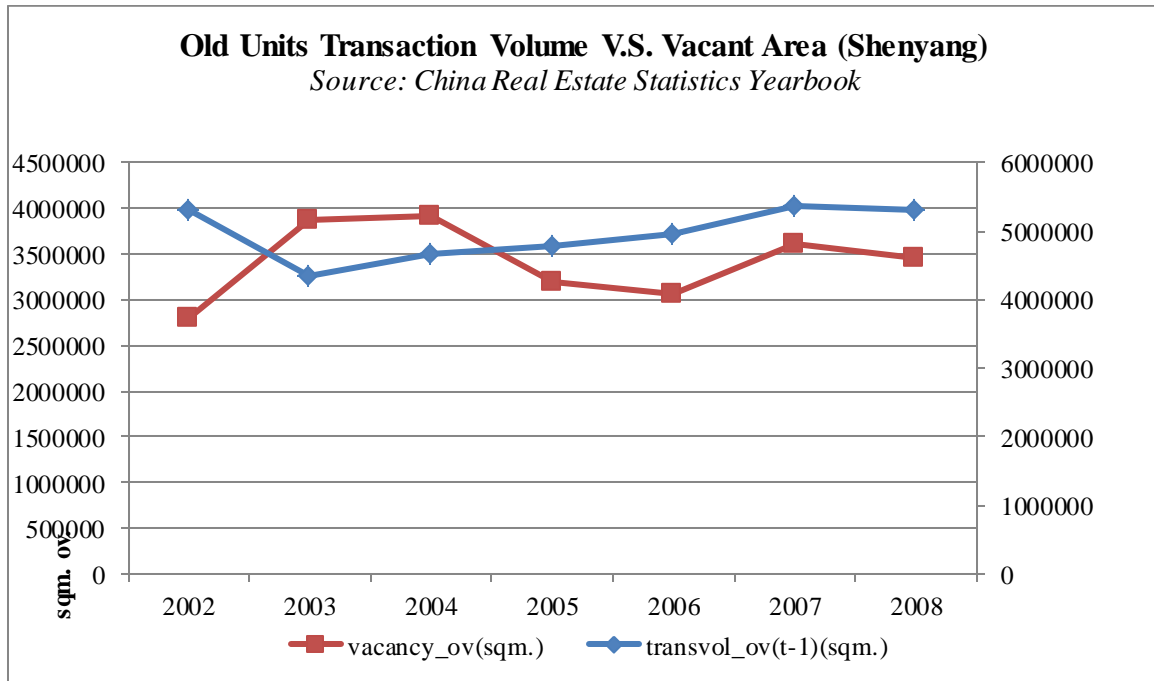
Panel D



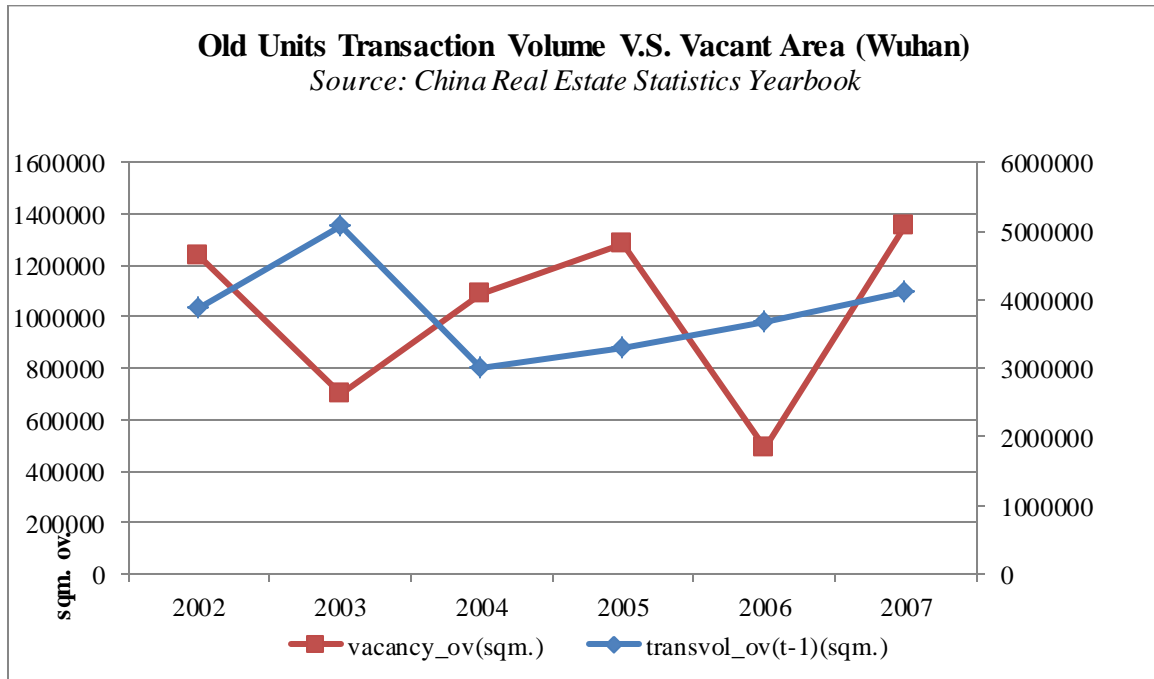
Panel E



Panel F



Panel G



The conclusion in this section is that speculative activities by home buyers cause inelastic demand for housing units. Low-income families neither could afford to the

driven up prices, nor have the access to both new and old units, which explains why housing is unaffordable for the poor.

5. Conclusion

In this thesis, I used data from the People's Bank of China to address housing market conditions that are relevant to housing affordability of the poor. Some problems have emerged since the privatization of the housing sector in 1998. These problems include mismatch of supply and demand, a lack of ordinary/affordable housing units supply, speculations from domestic/foreign investors, tight land availability, and unfair credit accessibility. Further, I used data from China's Real Estate Statistics Yearbook from 2002 to 2009 to analyze if the housing filtering process takes place in nine major cities. The results show that housing filtering process does not happen in China because living conditions of low-income families are not improving, while high-income families' are. Living conditions are gauged by household size. Data shows that household size of the poor stays stable, while the one of high-income families shrinks. The thesis then further explores if there is any violations of China's housing market against one of the three criteria such that the filtering model holds. The thesis finds that two criteria are violated. First, rich families exhausted both luxury housing supplies and ordinary units, leaving the poor with no access to newly built units. Second, secondary housing market is not developed as speculative activities by developers and home buyers jeopardize market efficiency. Though fundamental demand drives up house prices, speculation facilitates unreasonable prices. Many units are bought and vacant the next year, as data shows high transaction volume of old units a leading indicator of high vacant area. What is even worse is developers are also involved in speculation by hoarding finished units. The speculative activities of home buyers, compound with those of developers, exacerbate the

situation of the poor. Given the limited access to newly built units and old units in the secondary market, housing becomes unaffordable for low-income families.

China has never experienced such housing situations in its history. While policy makers are making efforts to cool down the frenetic housing market by encouraging more affordable housing supplies, the problem is unlikely to be solved as long as the speculative incentives are not quenched. Instead, policy makers should attempt a more novel way, such as lifting the profit cap for developers who are building affordable housing, or expanding credits by introducing mortgage securitization in a prudent way so that a financial crisis similar to the Great Recession in the US does not apply to China.

REFERENCES

- Bei, Hongwei. China International Capital Corporation Limited, (2010). *Report of China's real estate market*. Retrieved from <http://www.cicc.com.cn/CICC/chinese/index.htm>
- Berry, Brian. (1976). Ghetto expansion and single-family housing prices, 1968-1972. *Journal of Urban Economics*, 3(4), 397-523. San Diego, CA: Academic Press Inc.
- China's price-to-rent ratio suggests bubble: study. (2007, May 04). In *Reuters*. Retrieved from <http://www.reuters.com/article/2007/05/05/businesspro-china-property-dc-idUSPEK1435320070505>
- Chinanews (2011). *Interest rate for mortgage increased in Qingdao*. [Electronic version]. Retrieved from <http://www.chinanews.com/estate/2011/01-03/2762830.shtml>
- Grigsby, William. (1963). *Housing markets and public policy*. Philadelphia: University of Pennsylvania Press.
- Griffiths, Michael B. (2010). Lamb Buddha's migrant workers: Self-assertion on China's urban fringe. In *Journal of Current Chinese Affairs* (pp.39, 2, 3-37). Hamburg, Germany: Hamburg University Press.
- National Bureau of Statistics of China, (1978-2006). *China statistics yearbook*. Beijing, China: China Statistics Press.
- National Bureau of Statistics of China, (2010). *Report of national real estate market from Januaray to August*. Beijing, China: National Bureau of Statistics of China.
- People's Bank of China, Real Estate Group. (2005) *The 2004 Financial Report of China's Real Estate Industry* (pp. 10). Beijing, China: Retrieved from http://www.pbc.gov.cn/history_file/files/att_15025_1.pdf
- People's Bank of China, Real Estate Group. (2005). *The 2004 financial report of China's real estate industry*. Retrieved from http://www.pbc.gov.cn/history_file/files/att_15025_1.pdf
- People's Bank of China, Currency Policy Analysis Group. (2010). *The 2009 financial report of China*. Retrieved from <http://my.gov.cn/image20090724/141088.pdf>
- Somerville, C. Tsuriel and Mayer, Christopher J. (2003). Government Regulation and Changes in the Affordable Housing Stock. *Economic Policy Review*, 9(2), 45-62. New York: Federal Reserve Bank of New.

- State Information Center, Economic Forecast Group. (2010). *Monthly report of the real estate sector*. Beijing, China: Retrieved from <http://download.chinagate.cn/ch/pdf/20100511/fangdichan.pdf>
- State Council, (2008). *Notice about economizing land use* (No.2008-03). Retrieved from http://www.gov.cn/zw/gk/2008-01/07/content_85_San_Diego_1750.htm
- Straszheim, Mahlon. National Bureau of Economic Research, (1975). The Role of the Housing Market in Metropolitan Development: Concluding Observations. In M. R. Straszheim (*Editor*), *An econometric analysis of the urban housing market* (pp. 166 - 173).Cambridge, MA: NBER.
- Thomas, D. (2010). Blackstone invests in Chinese housing [Electronic version]. *Financial Times*. Retrieved from <http://cachef.ft.com/cms/s/0/65415dc8-ae17-11df-bb55-00144feabdc0.htm#axzz1H0ZPASSf>
- Wuhan Housing Security and Management Bureau, (2009). *Unbalanced price-to-rent ratio and price-to-income ratio*. Retrieved from http://www.whfg.gov.cn/upload_files/whfcj/contents/552/15264.html
- Wu, Lifan and Luo, Danglun (2009). *Residential Housing Policies in China*. Beijing, China: Economic Science Press.
- Wu, Xuchuan (2007). China's Mortgage and Housing Market. In N. Salih & M. Yuan (Eds.), *China's Financial Markets* (pp. 279-305). San Diego, CA: Academic Press.
- Xinhua (2010). Chinese government gears up for cooling housing market [Electronic version]. *ChinaDaily*. Retrieved from http://www.chinadaily.com.cn/china/2010-09/30/content_11371500.htm

April, 2011

Vita **Chuling Yuan**

Present Position

Undergraduate Student
Pennsylvania State University
130 Farmstead Ln. Apt. 116
State College, PA 16803
Cell Phone: 814-321-3957
Email Address: cij5022@psu.edu

Home Address

Apt. 701 No. 41 Sui Yun Yuan, Le Jia Road
Guangzhou, People's Republic of China

Education

B.S., Finance, expected Spring 2011, Pennsylvania State University, University Park, PA
B.S., Mathematics, expected Spring 2011, Pennsylvania State University, University Park, PA

Honors and Awards

- Honors in Finance, Pennsylvania State University, expected May 2011
- Schreyer Honors College, Pennsylvania State University
- President's Freshman Award, Pennsylvania State University
- The Evan Pugh Scholar Award, Pennsylvania State University
- Dean's List, Pennsylvania State University, 7/7 semester

Association Memberships

- International Student Council
- Habitat for Humanity
- Global Connection Program

Professional Experience

- HSBC Premier, HSBC Bank, Student Trainee, Guangzhou, China, June 2009-July 2009
- Marketing Department, GF Fund Management Co., Ltd., Intern, Guangzhou, China, June 2009-July 2009

Research in Progress

"The Story of Unaffordable Housing in China," Department of Economics, Pennsylvania State University, supervisor Edward Coulson, to be completed by May 2011