



LUND UNIVERSITY

School of Economics and Management

**Master Program in International
Economics with a focus on China**

Prices and Bubbles: Factors Affecting the Chinese Real Estate Market

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Abstract: This paper aims at analyzing what factors that influence the Chinese real estate prices in different regions. It also contains an estimation of to what degree the Chinese real estate market is experiencing a bubble. In order to achieve the main goal, the following research questions are set. Initially, what factors can affect the real estate price in China? Secondly, how and to what extent do these factors affect the Chinese real estate price? Thirdly, what is the future trend of the development of the Chinese real estate market? The theoretical basis and empirical practice are closely connected to the research problems. The controversial issue whether the Chinese real estate market is experiencing bubbles which may burst and bring economic recession will also be discussed in the paper.

Key words: Chinese real estate market, real estate price, housing bubbles.

EKHM51

Master thesis (15 credits ECTS)

June 2015

Supervisor: Christer Gunnarsson

Examiner: Anders Ögren

ACKNOWLEDGEMENT

I fully appreciate all the people who helped and supported me for completing my thesis. In the first place, my grateful thanks go to my dear parents. I sincerely appreciate their unconditional love and encouragement. As always, I am deeply thankful for the loving support from my grandmother.

More importantly, I would like to express my deep gratitude to my supervisor Professor Christer Gunnarsson for his useful suggestions, comments, remarks and time. He is an excellent and professional teacher, and it is my great pleasure to work with him. Without his insightful criticism and guidance, the thesis could not have achieved its present form.

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1. INTRODUCTION

China started the economic reform and trade liberalization in 1979, which promoted economic growth dramatically. China has become one of the countries which has the fastest growing economies in the world, with real annual gross domestic product (GDP) growth averaging approximately 10% through 2013 (Morrison 2014). According to Morrison (2014), China has become the world's largest manufacturing trading country and the largest manufacturer. Meanwhile, China ranks as the largest holder of foreign exchange reserves and the second-largest destination of foreign direct investment (FDI). China plays a crucial role in the world economy.

The development of the real estate plays an essential role in the contribution to GDP in China. The statistics show that around 50 industries and their products are related to the real estate industry (Ding 2014). For example, the real estate industry has a positive relationship directly with the construction industry, the financial sector, the wholesale and retail industry, and accommodation and catering industry. In addition, the real estate industry has a positive relationship indirectly with other industries like light industry and special purpose equipment manufacturing. According to Ding (2014), the proportion of the real estate in GDP in 2012 was over 10%. Moreover, the real estate industry contributes to employment and the tax revenue as well.

For the household, the real estate is usually an important investment, which influences individuals' living environment and life quality, as well as the leading crucial risk (Yao and Zhang 2005). On the other hand, the abnormal fluctuation of the housing price may lead to macro economic recession (Ding 2014). Take "the lost decade" of Japan as an example; the Japanese economy slumped dramatically because of collapse of the asset price bubble. During the period 1991 to 2000, the Japanese real estate and stock market prices were significantly inflated (Wood 1992), the bubble of the rapid acceleration of asset prices and overheated economic activity result in the collapse of the asset price in 1992 (Demaestri and Masci 2003). After that affair, Japan's average

GDP growth in the recession period declined to less than 1%, and at times even became negative growth.

Overall, it is necessary to study the Chinese real estate market and factors affecting the housing price, for its unavoidable influence on the GDP growth of the country, for the income and consumption of the individual household, and even for the economic fluctuations of the world economy.

1.1 The Real Estate Concept

The real estate regularly includes the land, the construction on the land, the infrastructure, the nature resource like water and minerals, as well as the property related to the land and the housing. More generally, the real estate is about “the business of buying, selling, and renting real property” (Oxford English Dictionary 2011).

The real estate price contains the house price and the land price. This paper studies the price of commercialized residential buildings, which involve land costs, construction and installation costs, project management costs, financial costs, sales and advertising costs, sales taxes, and the development of profits. Consequently, a large number of factors will affect the real estate price. For instance, the nature element of the real estate, the economic development condition, the interest rate, the income of the citizen, the inflation rate, related land policies, tax and revenue, the urbanization level and environmental factors.

1.2 Objectives of the Study and Research Questions

This study focuses on different provinces located in mainland China. Based on different economic development conditions, 31 provinces have been selected for analyzing primary affecting factors for housing prices in three regions.

In order to achieve the main aim, the following research questions are set:

1. What factors can affect the real estate price in China?

There are numerous factors which could influence the real estate price, such as the income, interest rate and exchange rate, inflation and monetary supply, the population, the lending rate and the stock market. This paper analyzes common affecting factors that influenced Chinese real estate price strongly.

2. How and to what extent do these factors affect the Chinese real estate price?

These factors have their own functions and influence the real estate price in different aspects. Hence, the study of the affecting factors will offer readers a good knowledge of the present trend of real estate price and prediction of the future trend as well. The way they impact the real estate price is supposed to be investigated through elaborate models, so that the degree of effect will be figured out.

3. What is the future trend of the Chinese real estate market development?

The heated issue that whether the Chinese real estate market has heavy bubbles which may burst and arise the economic recession is controversial. The paper presents indicators of bubble degrees and the related influencing factors to provide readers with a comprehensive picture of the Chinese real estate development trend for their own predictions.

1.3 The Structure of the Thesis

Econometric methods will be utilized in this paper, in particular panel least squares, for the empirical part to analyze the real estate price in different regions. All the data are gained directly from the National Bureau of Statistics and China's Statistical Yearbooks.

This paper is structured as follows. The first part is the introduction chapter, and it aims at giving the reader a whole picture of the thesis content and research questions. The second one is the theoretical part including chapter 2 and chapter 3, which explains the specific real estate development in China, and presents factors frequently affecting the real estate prices. The third part is the empirical part of the paper and focuses on analyzing the correlation between selected factors and the real estate price

in certain regions. Combined with the results of the third part, the last part will contribute a conclusion about the Chinese real estate development.

1.4 Limitations of the Thesis

There are numerous factors affecting the real estate price, and it is difficult to include all of them in this study. Hence, the reliability of the result could be weakened. More specifically, some special events and government policies, sometimes even the result of bankrupt of a real estate company, actually have huge influence on the price of the real estate in a certain province. And the community environment, the quality of houses, the traffic cost, and the culture preference (such as the floor and the location) play important roles in influencing the housing price. The paper chiefly targets at the economy, which means the conclusion is not comprehensive.

Also, although the data and statistics in the paper are directly obtained from China's Statistical Yearbooks and National Bureau of Statistics of China, the data collection from these statistical departments may not be totally accurate. Additionally, the study and test in the empirical part mainly focuses on commercialized residential buildings.

2. OVERVIEW OF CHINA'S REAL ESTATE MARKET

In order to analyze factors affecting the Chinese real estate market, this chapter will introduce the history of the Chinese real estate briefly as the basic background for the reader, and then explain the current development of the Chinese real estate. The influential and important government policies will also be presented for explaining the reason of Chinese real estate price fluctuation.

2.1 History of the Chinese Real Estate

Compared with western countries, commercialized residential buildings in the real estate market in China are more prevalent than secondhand housings. China's housing market experienced a revolution in 1998, which turns the housing market into the commercialization direction. In fact, this revolution also changed the situation that the government and state owned enterprises (SOEs) assigned houses to the citizens. The next, demand and supply are predominantly controlled by the market (Xu and Khanam 2012).

Furthermore, although market leads the trade of the real estate in China, the local government is the permanent owner of the land. The government only permits the inhabitant to enjoy 70-year property usage right after purchasing the house (Xu and Khanam 2012). Moreover, housing companies are allowed to sell houses before they have been built, so that those companies can acquire pre-paid money to support construction costs and the government also promotes the housing market.

Therefore, commercialized residential buildings take the largest proportion of the Chinese real estate market share (Ding 2014). The study in this paper targets at commercialized residential buildings to analyze the affecting factors.

2.2 The Current Situation of the Chinese Real Estate Market

The following four aspects are utilized to present the development of the Chinese real estate and housing prices.

2.2.1 The Trend of the Chinese Real Estate Market Development

After the revolution of the real estate in 1998, the demand of houses increased spectacularly and the real estate market grew rapidly. In the meantime, there was a quantum jump in housing prices in China. The table 1 contains statistics about the average selling price of commercialized building (yuan/sq.m) and total sale of commercialized buildings sold (100 million yuan) from 1991 to 2013. According to the table 1, the average selling price of commercialized buildings was only 786 (yuan/sq.m) in 1991, and the total sale of commercialized buildings sold was about 237.86 (million yuan). However, in 1998, the average selling price of commercialized buildings jumped to 2063 (yuan/sq.m), which was two times more expensive than that in 1991. Whereas the total sale of commercialized buildings sold in 1998 was about 2513.30 (million yuan), approximately 10 times as much as the one in 1991.

Table 1. Average Selling Price of Commercialized Buildings And Total Sale of Commercialized Buildings Sold (1991-2013).

Indicators	Average Selling Price of Commercialized Buildings (yuan/sq.m)	The Average Growth Rate of Commercialized Buildings' Selling Price (%)	Total Sale of Commercialized Buildings Sold (100 million yuan)	The Average Growth Rate of Commercialized Buildings' Sold Total Sale (%)
1991	786	-	237.86	-
1992	995	26.59	426.59	79.34
1993	1291	29.75	863.71	102.47
1994	1409	9.14	1018.5	17.92
1995	1591	12.92	1257.73	23.49
1996	1806	13.51	1427.13	13.47
1997	1997	10.58	1799.48	26.09
1998	2063	3.3	2513.3	39.67
1999	2053	-0.48	2987.87	18.88
2000	2,112.00	2.87	3,935.44	31.71
2001	2,170.00	2.75	4,862.75	23.56
2002	2,250.00	3.69	6,032.34	24.05

2003	2,359.00	4.84	7,955.66	31.88
2004	2,778.00	17.76	10,375.71	30.42
2005	3,167.66	14.03	17,576.13	69.4
2006	3,366.79	6.29	20,825.96	18.49
2007	3,863.90	14.77	29,889.12	43.52
2008	3,800.00	-1.65	25,068.18	-16.13
2009	4,681.00	23.18	44,355.17	76.94
2010	5,032.00	7.5	52,721.24	18.86
2011	5,357.10	6.46	58,588.86	11.13
2012	5,790.99	8.1	64,455.79	10.01
2013	6,237.00	7.7	81,428.28	26.33

Data Sources: National Bureau of Statistics

During 1998 to 2003, the average growth rate of commercialized buildings' selling price kept in more than 2%, and the average growth rate of commercialized buildings' total sale was nearly 28%. In 2005, influenced by the government policies, the growing pace of the real estate market became slow. And the average selling price of commercialized buildings was around 3168 (yuan/sq.m), only increased by 14% compared with the last year. While the total sale of commercialized buildings sold in 2005 increased significantly to 17576.13 (million yuan) and its growth rate was 69.4%. Because the international economic crisis occurred in 2008, there is a negative growth for both the average selling price of commercialized buildings and the total sale of commercialized buildings sold in the real estate market. In detail, the average selling price of commercialized buildings in 2008 was just 3800 (yuan/sq.m), which decreased by 1.65% compared with 2007, and the total sale of commercialized buildings sold was 25068.18 (million yuan), which reduced by 16.13% compared with 2007 (Tang 2014).

In 2009, the government carried out a series of policies to support the development of the real estate market (Tang 2014). As a result, the average selling price of commercialized buildings reached 4681 (yuan/sq.m), which increased by 23.18%, whilst the total sale of commercialized buildings sold soared to 44355.17 (million yuan), which increased by 77.94%. From 2010 to 2013, the average selling price of

commercialized buildings was relatively steady and its average growth rate was about 7.42%. Combined with the figure 1, it can be concluded that although different groups of commercialized buildings have distinct prices, their overall trend showed a continuing increase.



Figure 1. Average Selling Prices of Different Types of Buildings

Data Sources: National Bureau of Statistics

2.2.2 The Regional Difference in Chinese Real Estate

The real estate regularly is influenced by the economic condition and to some extent, has influenced on the economic development as well. Since the economic level is different in each province in China, the development of the real estate is also different. From table 2, it can be noticed that the average selling price of commercialized buildings in Shanghai, Wuhan, and Urumqi had large disparities.

Table 2. The Average Selling Price of Commercialized Buildings (yuan/sq.m)
(2004-2013)

Indicators	Country	Shanghai	Wuhan	Urumqi
2004	2,778.00	5,761.21	2,462.73	1,796.51
2005	3,167.66	6,698.00	2,986.20	1,920.37
2006	3,366.79	7,039.00	3,535.26	2,020.94
2007	3,863.90	8,253.00	4,515.76	2,528.47
2008	3,800.00	8,115.00	4,681.00	3,031.00

2009	4,681.00	12,364.00	5,199.00	3,285.00
2010	5,032.00	14,290.00	5,550.00	4,265.00
2011	5,357.10	13,565.83	6,675.99	4,969.78
2012	5,790.99	13,869.88	6,895.35	5,255.04
2013	6,237.00	16,192.00	7,238.00	5,858.00

Data Sources: National Bureau of Statistics

Basically, the housing price trend of Shanghai was growing except for the period of economic crisis. By contrast, Wuhan and Urumqi all had a continuously increasing housing price trend in the whole period regardless of the economic crisis period. The housing price of Shanghai was quite high and it was more than the whole country's average price level. During the ten-year period, the average selling price of commercialized buildings in Shanghai, Wuhan, and Urumqi grew up to 281%, 34% and 31%, respectively. To sum up, the east costal cities like Shanghai had much higher housing price than those cities in the central part (Wuhan) and western part (Urumqi). Also, the housing price in the central part was more expensive than that in the western part. The real estate price has considerable regional difference in China.

2.2.3 The Bubble of China's Real Estate Market

This section will use two methods, CPI and the real estate price as well as the house price-to-income ratio, to get insights into the degree of the real estate bubble in China.

CPI and the Real Estate Price

Table 3 below shows that the growth rate of commercial buildings' average selling price is divided by the growth rate of CPI (Customer Price Index), which is an indicator to measure the bubble degree of the real estate (Tang 2014). The result indicates the degree that the growing speed of the real estate exceeds the growing speed of the economic development. For this indicator, usually the result exceeds two means the bubble existing in the real estate, the result ranging from two to four means the light bubble degree of the real estate, and the result exceeds four means the high bubble degree of the real estate (Tang 2014).

Table 3. The Growth Rate of the Housing Price/ The Growth Rate of CPI (%)
(1998-2003)

Indicators	The Growth Rate of Average Selling Price of Commercialized Buildings (%)	Growth Rate of CPI (%)	The Growth Rate of the Housing Price/ The Growth Rate of CPI
1998	3.3	-0.8	-4.13
1999	-0.48	-1.4	0.34
2000	2.87	0.4	7.17
2001	2.75	0.7	3.93
2002	3.69	-0.8	-4.61
2003	4.84	1.2	4.03
2004	17.76	3.9	4.55
2005	14.03	1.8	7.79
2006	6.29	1.5	4.19
2007	14.77	4.8	3.08
2008	-1.65	5.9	-0.28
2009	23.1	-0.7	-33.11
2010	7.5	3.3	2.27
2011	6.46	5.4	1.2
2012	8.1	2.6	3.12
2013	7.7	2.6	2.96

Data Sources: National Bureau of Statistics and China's Statistical Yearbooks.

From table 3, it is clear that in 2000 and 2003- 2006, the Chinese real estate market had a high bubble degree; while in 2001, 2007, 2010, 2012, and 2013, the Chinese real estate market had a light bubble degree.

House Price-to-Income Ratio

The house price-to-income ratio is a common and important indicator to evaluate the bubble degree of the real estate, since consumers' purchasing power is important to the housing price. Generally speaking, the growth rate of the real estate price is

supposed to follow the same pace of consumers' income level. The bubble appears when the growth rate of the real estate price heavily outstrips the growth rate of consumers' income (Hao 2014).

Table 4. House Price-to-Income Ratio (1998-2012)

Indicators	Per Capita Living Areas	Average Selling Price of Commercialized Buildings (yuan/sq.m)	Per Capita Annual Disposable Income of Urban Households (yuan)	House Price-to-Income Ratio
1998	18.7	2063	5,425.10	7.11
1999	19.4	2053	5,854.00	6.8
2000	20.3	2,112.00	6,280.00	6.83
2001	20.8	2,170.00	6,859.60	6.58
2002	24.5	2,250.00	7,702.80	7.16
2003	25.3	2,359.00	8,472.20	7.04
2004	26.4	2,778.00	9,421.60	7.78
2005	27.8	3,167.66	10,493.00	8.39
2006	28.5	3,366.79	11,759.50	8.16
2007	30.1	3,863.90	13,785.80	8.44
2008	30.6	3,800.00	15,780.80	7.37
2009	31.3	4,681.00	17,174.70	8.53
2010	31.6	5,032.00	19,109.40	8.32
2011	32.65	5,357.10	21,809.80	8.02
2012	32.91	5,790.99	24,564.70	7.76

Data Sources: National Bureau of Statistics and China's Statistical Yearbooks.

The calculation formula in the paper is: House Price-to-Income Ratio= Per Capita Living Areas* Average Selling Price of Commercialized Buildings/ Per Capita Annual Disposable Income of Urban Households, and the calculation result from 1998 to 2012 are presented in the table 4. Commonly, the real estate price in a country is reasonable if its house price-to-income ratio between three to six (Hao 2014). Nonetheless, the house price-to-income ratio was over six since 1998 until 2012. In

2005-2007 and 2009-2012, the bubble of the Chinese real estate was quite heavy.

According to the statistics above, it can be summarized that the Chinese real estate market exists bubbles, and bubbles are becoming much more heavy in recent years.

2.3 Government Policies for the Chinese Real Estate Market

Despite the fact that the real estate market is supposed to be controlled by the market, the government actually plays the definitive role in leading the real estate development direction and influencing the real estate price in different years, to some extent. The aim of this section is to study the effect of government policies on the real estate market, and to provide the reader with a clear picture of the background information why the authority tried to take such measures to control the market.

2.3.1 The Government Policy from 1979 to 1998

During the period of planned economy, the housing provision was entirely controlled by the SOEs, which was a huge burden on the Ministry of Finance (Gu 2011). From 1979 to 1998, the government had planned to reform the land and house system, and established the effective relationship between the real estate system and the market economy. In 1980 April, China's paramount leader Xiaoping Deng, suggested that "Urban residents should be allowed to purchase houses, or build their own house," and then in 1983 December, the private households were legally allowed to "own, purchase, sell and rent private homes in urban areas" according to a notice from the State Council "Regulations on urban private housing" (SC [1983] No. 194) (Yang and Chen 2014).

In 1988, the State Council published a notice on "Implementation plan for a gradual housing system reform in cities and towns" (SC [1988] No. 11), which officially made a plan of commercialization of the housing. And in 1992, the fourteenth national congress of the Chinese communist party acknowledged that the national economy was supposed to focus on marketization and the housing market took off formally. In 1994, the housing system shifted to the market system to establish multi

levels provision based on a notice issued from the State Council “The decision on deepening the urban housing reform” (SC [1994] No. 43) (Yang and Chen 2014).

Since the Asian financial crisis occurred in 1997, China encountered the threat to depreciate the renminbi (RMB) against the US dollar (USD). Conversely, the Chinese government insisted on not depreciating RMB, but relatively appreciated it compared with the other Asian countries that depreciated their currencies pretty much. Consequently, the demand from China’s overseas market was negatively influenced, and the domestic market also suffered from a deflationary spiral. The Chinese government planned to reform the housing market as a new potential area of the GDP growth (Gu 2011).

2.3.2 The Government Policy after 1998

In June of 1998, the government declared “The Notice of State Council on Further Deepening the Reform to Urban Housing System and Speeding up the Housing Construction” (SC [1998] No. 23) as a signal of stopping the welfare housing system. In order to stimulate the consumption of housing, develop the diverse housing buildings, and achieve the goal of monetization of housing distribution, the government carried out a series of policies to support the reform (Hui 2009, Deng 2010). The central bank of China issued articles to promote the home mortgage loan in February of 1999, and then started to regulate property developer’s financing in June of 2003 (Gu 2011).

In August of 2003, the State Council published a notice on “Strengthening Land Supply Management and Promoting Sustainable Development in the Real Estate Market.” (SC [2003] No. 18) (State Council 2003, Gu 2011). This was the first time that the government defined the real estate as the “pillar of the national economy” (Yuan 2010). In 2003, the investment of the real estate occupied around one third of the total fixed asset investment, and contributed about two-percentage to the annual growth of GDP. The added value of the real estate and the construction industry was over 900 billion (yuan), which accounted for nearly nine-percentage in GDP in 2003.

Meanwhile, the number of employed person in the real estate market increased by 4.46%. It was just below the number in the service section (Deng 2010).

In the March of 2004, the Ministry of Land and Resources and the Ministry of Supervision published a joint decision to restrict the free purchase of operational land deals and encourage people to bid them, which was considered as lifted barriers to land reform (Gu 2011). Later in October, the State Council issued a notice on “Decisions on deepening strict land management reform” (SC [2004] No. 28), which aimed at building a strict land management system based on China’s situation (Yang and Chen 2014). At that time, China was experiencing a period of spiraling inflation that the CPI index climbed to 5% at a time, and the China Banking Regulatory Commission (CBRC) regulated that “developers must hold at least 35% of their capital, and house purchasers could only apply for mortgages if monthly repayments would not exceed 50% of their monthly income” (Gu 2010, State Council 2004).

Continued in 2005, the government claimed that the preferential policy for the house buyer was canceled and for those provinces with over heated housing prices, the ratio of individual housing loan that the buyer should pay for the first time of buying a new house increased from 20% to 30%. Later in March and May, the general office of the State Council issued “Notice of the circulation on stabilising housing price” (GOSC [2005] No. 8) and “Suggestions on making efforts to stabilise housing prices” (GOSC [2005] No. 26) so as to reduce the speculative demand of housing and ensure “the supply of affordable housing to low income families” (Yang and Chen 2014).

The Ministry of Housing and Urban-Rural Development (MOHURD) published a notice on “Several opinions about implementing of new constructed housing ratio” (MOHURD [2006] No. 165) (Yang and Chen 2014), and stated that “from June 1, 2006, every new commercial housing development plan must contain a certain proportion of small houses (under 90 square meters), including ‘affordable homes,’ and that this must account for over 70% of the total residential area of new developments.” (General Office of The State Council 2006, Gu 2011). The policy was aiming at slowing down the soaring housing prices, because in 2005 large amount of foreign investment entered into China with the benefit of abundant liquidity that leads

to the growing asset prices. However, this policy was criticized by several scholars because this policy had a negative influence on the housing supply and housing prices in the following two years (Gu 2011).

In spite of the extensive and restrict policies the government implemented, the housing price was still increasing and construction projects reached to a new height. In 2007 August, the State Council issued “Opinions on solving the housing difficulties of urban low income families” (SC [2007] No. 24) to support the unaffordable housing family. For individual buyers’ second and subsequent homes, the authority increased the down-payment ratio to 40% as well as raised the interest rate to 1.1 times the benchmark rate. What’s more, the authority prevented developers from receiving new loans (Guo, Li and Yang 2007).

On 15th of September in 2008, the Lehman Brothers went bankrupt and the global financial crisis occurred. The Chinese exporting industry was influenced by the decreasing demand of goods from other countries, which results in the GDP “dropped to 6.6% from a third quarter year-on-year showing of 9.8%”, and also “the volume and value of property sales fell abruptly” (Gu 2011). To respond to the global financial crisis, the General Office of the State Council published a notice on “A notification on promoting the healthy development of the real estate market” (GOSC [2008] No. 131) so as to stimulate the housing market. The government adjusted the property transaction taxes as well as loosened market regulations. In 2009 May, a notice of “A notification on the adjustment of capital proportion of fixed assets investment project” (GOSC [2009] No. 27) was issued by the General Office of the State Council (Yang and Chen 2014). The government encouraged developers to invest in the housing market and allowed them to hold only 20% of capital instead of 35%. Moreover, developers could pay less and later for the land (Gu 2011).

In 2010, the General Office of the State Council published two notices in total to re-stress the housing market with “A notification on the promotion of stable and healthy development of the real estate market” (GOSC [2010] No. 4) and “A notification on resolutely curbing the soaring housing prices in some cities” (SC [2010] No. 10). The purposes of implementing these policies were to provide low and

medium income householders affordable houses and reduce the increasing house prices.

After the commercialization of the real estate market in 1998, the Chinese real estate price increased dramatically. To be specific, average selling price of commercialized buildings jumped from 786 (yuan/sq.m) in 1991 to 6237 (yuan/sq.m) in 2013; the price in 2013 amounted to nearly 8 times higher than the one in 1991. Total sale of commercialized buildings sold and the average selling price of different types of buildings significant increased continuously. Although the housing price sharply rose in the average level, housing prices have considerable regional difference: the rising speed of prices in the east region grew fastest, and then followed by the middle part, while the housing price in the west part is even lower than the country level. Since the heavy bubbles existed in the Chinese real estate market, the government implemented a series of policies to adjust the real estate price in different years according to the current development situation. The government published notices to urge main participants in the real estate market to decrease the housing price at the year when the degree of real estate bubbles were quite heavy.

3. FACTORS AFFECTING THE REAL ESTATE PRICE

This chapter is divided into three sections. It is arranged as follows: section one provides the related literature review in different aspects. Section two lists the primary affecting factors of the real estate price, which will also be set in the empirical part as independent variables. Afterwards, some other common factors are provided in section three, which aims at introducing the affecting factors comprehensively. This chapter also solves the first research question -- what factors can affect the real estate price in China.

3.1 Review of Related Literature

Regularly, factors affecting the real estate price are analyzed through the aspects of economics, social society, culture and environment (Ding 2014). According to various researches from scholars, the common affecting factors are presented in this section.

Income

Like common commodities, supply and demand exerts an influence on the price of the real estate as well. The income is a significant factor that reflects purchasing power and analyzed by several economists. Nellis and Longbottom (1981) studied the real estate price in UK based on the theory of supply and demand, and held the opinion that income is the primary affecting factor for analyzing the real estate price.

Fortura and Kushner (1986) illustrated that income is an essential contributor for analyzing the housing price. They found that the house price of 30 samples, which are located in inner cities in Canada, increased with the increasing trend of the average income of the local people. Abraham and Hendershott (1996) proposed the hypothesis about the real estate price and conducted the model to analyze its affecting factors, and their conclusion was that income is one of the most important factors which could influence housing prices. Moreover, Collyns and Senhadji (2002) utilized GDP per capita as the indicator for the real estate study and summarized that there is a firm relation between the GDP per capita and the house price in the US. In 2005, Jacobsen

and Naug concluded that a 1% increase in average wage results in a 1.75% increase in house price growth. Miller and Peng (2006) utilized the data from 1990 to 2002 within 277 cities in America to estimate the fluctuation of housing prices. The result showed that the average income and the anticipative housing price are main reasons for housing price fluctuation.

Interest Rate and Exchange Rate

The bank and financial system plays the fundamental role in the development of the real estate, since this industry needs large capital demand to be credible. Besides, the interest rate has a huge influence on the cost of the real estate as well as the housing demand of the citizen. Harris (1989) stated that the house price would decrease if the nominal interest rate increases. Muellbaue and Murphy (1997) analyzed the price of residential buildings between 1957 and 1994 in UK, and found that the real interest rate and the anticipated income are important reasons for the fluctuation of housing prices. Jorge and Luis (2003) studied the house price in Spain through the error correction model, and found that the nominal interest rate and the income are key factors for the changing of the house price. Cooper in 2004 analyzed the house price in the United Kingdom via the OEF economic model, and claimed that UK has enjoyed a relatively stable house price since 1980, because it benefited from the system of the interests rate.

What's more, the exchange rete also has a great influence on the price of the real estate. For example, Miller (1988) studied the relation between the Japanese buyer and the house price in Hawaii, and summarized that “an increase in the value of the yen to the dollar by 10% will increase Waialae-Kahala real estate prices by approximately 27%.”

Inflation and Monetary Supply

The inflation is one of the driving forces. Barkham, Ward and Henry (1996) studied the relationship between commercial real estate returns (from both public and private markets) and inflation, which targeting at US and UK markets. They claimed that the inflation results in the increase of the real estate returns. And these two factors have strong relationship in the long-term period.

Nellis and Longbottom (1981) used an error-correction estimation methodology to analyze key factors affecting the housing price in UK, and summarized that the mortgage has important effect on the housing price. Elbourne (2008) employed a SVAR approach to study the correlation between the housing price and the supply of money, and the conclusion was that they have a positive relationship.

Land Prices and Government Policies

For the factor of land prices, Wachter and Pollakowski (1990) conducted an empirical study and concluded that the house price and the land price would rise if the right to use the land were limited. The supply and demand of the land has a positive relation with the land and house prices. Kauko (2003) stated that the land policy has a great influence on the real estate price when the limitation on the supply of the land is small. Sze_Teck and Lee (2006) applied Granger causality test model in an error-correction framework by using the latest 16 years' statistics from Singapore, and proved that the residential land and house prices are integrated. Also, the increase of land prices could lead to the increase of housing prices.

In terms of the government policy, Landies (1992) pointed out that local growth controls, especially the control process and procedure, are more important than specific policies for the housing price. However, McMillan and McDonald (1991) argued that house and land prices are decided by the market, which means actually the policy does not have a vital influence on the house price.

Other Factors

On the other hand, some comprehensive factors also influenced the real estate price. Stegman (1969) offered empirical evidence that for residential locators, the consideration of neighborhood is more important than the accessibility to the place of work. Carey (1990) pointed out that the real estate price is influenced by the number of investors, the income level, the number of supply, the financial policy, and so on. Kenny (1999) highlighted that the forecasting housing supply has a huge influence on people's purchase decision when they buy houses. Roehner (1999) analyzed the relation between speculative trading intensiveness and price-supply inelasticity in the

real estate market. The conclusion was that the speculative trading could lead to the increase of the housing price.

In 2001, Quigley studied the relationship between the financial crisis in Asia and the disequilibrium of the real estate market, and emphasized the importance of the macroeconomic control to the healthy development of the real estate market. The study from Henderson and Wang (2007) found that the price of the real estate is also influenced by the traffic cost, commuting distance, and the air condition.

Meen (1999) found that the change of housing price in UK has regional difference. The housing price increased from the southeast part and then followed by other parts, while the decreasing trend of housing price started from the southeast part and then followed by other parts. Green, Malpezzi, and Mayo (2005) also concluded that the supply and demand has significant influence on the housing price in different cities.

3.2 Factors Affecting Demand and Supply

This section includes seven primary affecting factors of housing prices in China, and these factors will be utilized as independent variables in the empirical part of the paper.

The Population

The objective of the real estate market is people, which definitely have relationship with the real estate price. Regularly, the increasing number of registered residence population results in the increase of the demand, which influences the housing prices quite much. Since China implemented the family planning policy (the one-child policy for every family) in 1980, the family structure has changed into small families for most people. Theoretically, the rise of the per capita living area, to some extent, lays the foundation for the increasing trend of the demand, which would lead to the increase of housing prices (Ding 2014).

Generally speaking, the change of the population has influence over the housing price. According to Ding (2014), specific influences are listed; first the rise of the

population promotes the increasing trend of the demand, which actually increases the housing prices. Second, the increase of the population will promote the development of related industries, such as the service industry, the business circle, and the basic industry, that stimulates the housing price. The last one is that the excessive population has a negative influence on the living environment and the land carrying capacity in a certain city, which will result in the decrease of housing prices. Frequently, the third one is not quite common since the government has the responsibility to control the city size and keep the population stable. So here another two influences will be applied in the research.

Disposable Income Per Capita

The income is usually influenced by the macroeconomic development, the income distribution, and the policy about the consumption from the authority. The disposable income per capita decides the purchasing power of the consumer, for example, people with higher disposable income normally have higher purchasing power to buy houses. The disposable income per capita in China has increased dramatically after 1979, and the buying power of Chinese individuals also increased while the housing price increases (Ding 2014). In addition, as the income increases, people have more requirements for the house quality, living environment, and the related infrastructure. This generally increases the construction cost, which then pushed the housing price to rise.

To be more specific, the Engel's coefficient gradually decreases as income rises. The proportion of income spent on food drops, and the proportion of income spent on improving the life quality rises. According to Li and Li (2002), the United Nations (UN) suggests setting the Engel coefficient between 40% to 50% as a moderately well-off standard of living, and the expenditure on the residence in the circumstance is about 15% of the Engel coefficient. Thanks to the reform of housing system in 1998, the expenditure on the residence of the Engel coefficient jumped from around 2% in 1998 to over 15% in 2001.

Consumer Price Index

The Consumer Price Index (CPI) is used as a measure of inflation and an indicator of

price fluctuation. In general, the country has inflation if the CPI is more than 3%, while the country has heavy inflation once the CPI exceeds over 5%. According to the study from International Business Times (2008), the most important social economic goals for China are keeping the CPI stable, the employment rate increasing, and the growth of GDP stable. The CPI will improve as the economic growth rates increase, however, the growth of CPI would have a negative influence on the economic growth if the growing speed of CPI exceeds the income level of the resident.

The inflation has the following two effects on the real estate. Firstly, the inflation and the real estate have relation with each other, and the price of the real estate increases as the commodity price grows up. The rise of some prices, particularly the cost price and the labor price, influences the real estate cost which finally causes the rise of the real estate price. Secondly, when the price of consumer goods increases abnormally, a devaluation of the RMB would happen. The growing price of consumer goods may counterbalance the interest from the bank, and then the majority of consumers would like to choose the real estate as an investment instead of currency assets. Hence, the abnormal inflation, to some extent, has possibilities to increase the real estate price (Ding 2014).

Lending Rates

There is no doubt that the interest rate plays a significant role in the development of the real estate. Regularly, the interest rate has a big influence on the real estate developer and the household in terms of the real estate market. For real estate developers, they obtain less construction costs for the investment of the real estate if the interest rate increases, so that the real estate price usually goes up. For buyers, the increase of the interest rate results in the high cost of buying houses and more pressure of loan repayment. Hence, the rise of interest rates diminishes the demand of purchasing houses, and then leads to the decreasing trend of housing prices.

According to Ding (2014), the loan amount from the real estate developers is huge, and usually its proportion accounts for around 40% to 60% of the total investment amount that year. The lending rate has a direct influence on the investment amount for the real estate and the supply of the real estate. The interest rate has effect on both

supply and demand aspects, and the research in this paper will consider the interest rate as the factor of supply aspect in order to access data completely. In fact, even the slight adjustment of the interest rate have a huge influence on the real estate market, so the government always uses the interest rate as an effective method to control the real estate market. Commonly, the authority decreases the interest rate to stimulate the increase of housing prices.

Gross Domestic Product

Gross Domestic Product (GDP) is the monetary value of all final goods and services produced in a country in a specific time period, and it is usually calculated on an annual basis. It not only can reflect the economic condition of a country, but also can indicate the citizen's living quality. The GDP is regarded as the common indicator to compare the economic condition in different countries.

The GDP influences the real estate price in these aspects. To begin with, the growth of GDP contributes to the improvement of living conditions and economic status. As a consequence, the consumption rate would be improved for people who have more buying power, and the consumption of the real estate would increase. Moreover, the urban population and the employed population increase as the improvement of the economic status, so the demand of the house soared. Furthermore, as an economic indicator, the increasing trend of GDP strengthens the real estate developers' confidence in the real estate market and the macroeconomic condition (Jian and Zhang 2012).

Total Investment Amount in Fixed Assets

The total investment amount reveals development and prosperity levels of the real estate market, because it influences the supply of houses. Thus, the more total investment amount in fixed assets, the more supply of houses. The total investment amount in fixed assets has close relationship with the real estate price, and the increasing supply of houses frequently leads to the decrease of the housing price. Nonetheless, in the certain circumstance, real estate developers invest in the improvement of the house quality and environment instead of construction of new

commercialized residential buildings. Therefore, the increase of housing prices sometimes results from the increase of the total investment amount.

Floor Space of Buildings Completed

In general, the floor space of buildings completed has a negative influence on the housing price (Ding 2014). The more floor space of buildings completed, the more supply of housing industry. Then, if the demand does not change, the housing price will decrease.

3.3 Common Economic Factors

The Exchange Rate

The exchange rate influences the real estate price as well. The low exchange rate benefits the export industry which usually requires abundant labor force, capita, and land. Due to the huge population in China, a large number of labor force from rural areas transfer to urban areas for working with higher wages. The immigration of labor force accelerates the urbanization, which contributes to the demand of houses. Also, since foreigners are allowed to invest in the real estate in China and they can benefit from the low exchange rate, the house price would be increased because of the increase of demand (Ding 2014).

The Stock Market

The real estate and the stock market are two chief investments in China, because there are limited investment choices for the majority of Chinese citizens (Ding 2014). When the stock market does not developed very well, people take their money back and then turn to invest in the real estate market. It results in the increase of the demand of houses and the increase of housing prices.

Rental Price of Apartments

The rental price of apartments has relation with the real estate price. First of all, if the total demand of houses does not change, the decrease of the rental price of apartments will raise the demand of renting houses. Then, the demand of buying houses will reduce, and the housing prices will decline as well. More importantly, for property

speculators, if the anticipative rental price is rewarding, they will purchase more houses and the real estate price will climb. Last but not the least, the rental price is a part of the commodity price, so the growth of the rental price results in the increase of the commodity price level and finally leads to the increase of the house price (Cao 2003).

There are numerous factors influencing the real estate price due to the complexity of the real estate. This chapter concludes the affecting factors mainly in the aspect of demand and supply, which are supposed to be utilized in the next chapter to conduct the empirical test and to solve the second research question. Additionally, the content also includes commonly used factors that influence the real estate price significantly, so that the reader can obtain a relatively comprehensive picture of affecting factors of housing prices.

4. EMPIRICAL ANALYSIS

This chapter focuses on analyzing affecting factors in different regions that influence the housing price in China by using econometric methods, and also the second research question, how and to what extent do these factors affect the Chinese real estate price, will be solved.

4.1 Data and Methodology

In this section, to start with, all provinces in China will be divided into three regions based on the economic development level and the geographic distribution; then followed by selected variables that will be used into the empirical test. The model will be established at last.

Regional Difference

In order to analysis the regional difference in the real estate market objectively, provinces in China are divided into three regions in this paper: the east part, the middle part, and the west part.

Sheng (2014) utilized the classification analysis method based on the statistical testing, with three indices – the real estate investment per capita, the fixed assets investment per capita, and GDP per capita, to differentiate certain regions by the economic situation in different provinces in China (see table 5).

Sheng (2014) divided 31 provinces into four groups (see table 5- I) according to the statistics in 1997 and the nearest-neighbor method. 1 stands for the excellent area for the real estate investment, 2 stands for ordinary area for the real estate investment, 3 stands for poor area for the real estate investment, and 4 stands for very poor area for the real estate investment (Sheng, Fang, and Yu 2000). This division standard is quite similar to the differentiation from The Chinese Regional Development Report published in 1997 (Song, 1999). In the report, the whole provinces are categorized into seven parts (see table 5- II): 1 reflects economic developed cites, 2 reflects

economic developed provinces, 3 reflects excellent economic developing provinces, 4 means good economic developing provinces, 5 means not so good economic developing provinces, 6 means poor economic developing provinces, and 7 means very poor economic developing provinces (Sheng et al. 2000).

Although there are numerous division approaches to divide the economic zones, basically the divided regions here are in accordance with the geographical locations of the provinces, especially keeping the same pace of the regional division by the National Bureau of Statistics. From table 5, it can be illustrated that the divided regions can reflect the actual economic development status of different provinces in China (Sheng 2014).

Table 5. The Status of Economic Development in Provinces And Main Cities
(Sheng 2014).

The East Part			The Middle Part			The West Part		
City	I	II	City	I	II	City	I	II
Shanghai	1	1	Jilin	2	3	Xinjiang	2	4
Beijing	1	1	Heilongjiang	2	3	Shanxi	3	6
Tianjin	1	1	Hubei	2	4	Sichuan	3	7
Guangdong	1	2	Hunan	3	5	Chongqing	3	7
Zhejiang	1	2	Shanxi	3	5	Yunnan	3	7
Liaoning	1	2	Henan	3	6	Guizhou	4	7
Jiangsu	1	2	Anhui	3	6	Qinghai	4	6
Fujian	1	3	Jiangxi	3	6	Gansu	4	7
Hainan	2	2	Inner Mongolia	3	6	Ningxia	4	5
Shandong	2	3				Tibet	4	7
Hebei	3	4						
Guangxi	3	6						

Data Selection

The data are ranging from 1998 to 2013 with totally 31 provinces that have been

mentioned in table 5, and data resources are directly obtained from National Bureau of Statistics. Here the dependent variable is average selling price of commercialized buildings and the method is Panel Least Squares. Furthermore, the confidence level in this study is 99%(***), 95% (**), and 90%(*).

In general, the following factors have close relationship with the housing price (Ding 2014):

X1 (PO)- Urban Population (10000 persons);

Here the urban population refers to the total resident population in urban areas.

The population is a quite influential factor in terms of house prices. Here the urban population is selected for the test since the real estate price in China mainly fluctuates in urban areas. In most rural areas, the economic condition is pitiable and the residential houses are designed as well as built by the local people themselves (Mo 2008), hence it is accurate to use data concerning urban population to analyze rather than those of overall population.

X2 (IN)- Per Capita Disposable Income of Urban Households (yuan);

X3 (CPI)- Consumer Price Index (1978=100) Household;

Here the consumer price index is chosen to reflect the inflation effect.

X4 (LR)- Lending rate (over 5 years);

X5 (GDP)- Gross Domestic Product (100 million yuan);

X6 (FI)- Total Investment in Residential Buildings in Urban Area (100 million yuan);

X7 (JG)- Floor Space of Residential Buildings Completed (10000 sq.m).

These seven variables are chosen because of the factor analysis in chapter 4.2 and data availability.

Model Establishment

Based on the model from Bensen, Hansen, Arthur, and Smersh (1997) and Ding (2014), the model in this paper is:

$$\ln P_{it} = \alpha + \sum_{j=1}^k \beta_j \ln X_{jit} + \varepsilon_{it}$$

P_{it} = “sales price of property i at time t where $i=1,\dots,n$, and $t=1,\dots,T$ ”; X_{jit} = “a vector of variables measuring property characteristic $j=1,\dots, k$ for property i at time t ”; (Bensen et al. 1997).

Furthermore, the model for empirical test is (Bensen et al. 1997; Ding 1997):

$$\text{Price index} = \beta_1 + \beta_2 PO + \beta_3 IN + \beta_4 CPI + \beta_5 LR + \beta_6 GDP + \beta_7 FT + \beta_8 JG + u_i$$

The regression model applies logged variables, so as to narrow the variation among different data. To start with, the unit root test is applied for checking the stability of the data, and the co-integration test is applied so that residuals are stationary. Regularly, three methods can be used to conduct the panel data: pooled regression, fixed effect model, and random effect model. The Hausman Test is used to check which method is proper to use. The next step is to run the Panel Estimation and obtain the results (See the Appendix for specific model processing).

4.2 Empirical Findings

The East Region

Table 6. The East Region

Variable	PO	IN	CPI	LR	GDP	FT	JG
Coefficient	0.108338	0.323451	-1.477066	0.055811	0.945182	-0.075233	0.023984
Prob.	0.0000	0.0282	0.0000	0.1534	0.0000	0.0240	0.4137
	***	**	***		***	**	
<i>R-squared</i> : 0.339611		<i>Adjusted R-squared</i> : 0.265778		<i>Panel observations</i> : 180			
<i>F-statistic</i> : 4.599754		<i>Prob (F-statistic)</i> : 0.000000		<i>Durbin-Watson stat</i> : 1.977723			

The result shows that in the east region, the variables of Urban Population, Consumer Price Index, and Gross Domestic Product have significant relationship with the average selling price of commercialized buildings at 1% significant level. And then, Per Capita Disposable Income of Urban Households and Total Investment in Residential Buildings in Urban Area have relation with the average selling price of commercialized buildings at 5% significant level.

The coefficient results indicate that a unit increase in urban population, disposable income per capital, and gross domestic product results in a 0.11, 0.32, and 0.95 increase in the average selling price of commercialized buildings, separately; a unit increase in consumer price index and total investment in residential buildings in urban area results in a 1.48 and 0.08 decrease in the average selling price of commercialized buildings, separately.

The Middle Region

Table 7. The Middle Region

<i>Variable</i>	PO	IN	CPI	LR	GDP	FT	JG
<i>Coefficient</i>	0.027359	0.051411	-0.293947	0.078813	0.537438	-0.051984	-0.021161
<i>Prob.</i>	0.1791	0.7582	0.4723	0.148	0.0019	0.1226	0.6547

<i>R-squared:</i> 0.16678	<i>Adjusted R-squared:</i> 0.120854		<i>Panel observations:</i> 135				
<i>F-statistic:</i> 3.631524	<i>Prob (F-statistic):</i> 0.001329		<i>Durbin-Watson stat:</i> 2.224589				

The result indicates that in the middle region, only Gross Domestic Product has significant relationship with the average selling price of commercialized buildings at 1% significant level. The coefficient result reveals that a unit increase in gross domestic product results in a 0.54 increase in the average selling price of commercialized buildings.

The West Region

Table 8. The West Region

<i>Variable</i>	PO	IN	CPI	LR	GDP	FT	JG
<i>Coefficient</i>	-0.009706	0.092556	-0.859746	-0.049117	0.940464	-0.067343	-0.067181
<i>Prob.</i>	0.0938	0.6573	0.0323	0.3508	0.0000	0.0129	0.0024
	*		**		***	**	***
<i>R-squared:</i> 0.289259	<i>Adjusted R-squared:</i> 0.254222		<i>Panel observations:</i> 150				
<i>F-statistic:</i> 8.255915	<i>Prob (F-statistic):</i> 0.000000		<i>Durbin-Watson stat:</i> 2.226953				

The result implies that in the west region, the variables of Gross Domestic Product and Floor Space of Residential Buildings Completed have significant relationship

with the average selling price of commercialized buildings at 1% significant level. Consumer Price Index and Total Investment in Residential Buildings in Urban Area have significant relationship with the average selling price of commercialized buildings at 5% significant level. Additionally, Urban Population has significant relationship with the average selling price of commercialized buildings at 10% significant level.

The coefficient results reveal that a unit increase in gross domestic product results in a 0.94 increase in the average selling price of commercialized buildings. By contrast, a unit increase in urban population, consumer price index, total investment in residential buildings in urban area, and floor space of residential buildings completed results in a 0.01, 0.86, 0.0673 and 0.0671 decrease in the average selling price of commercialized buildings, separately.

4.3 Chapter Conclusion

According to results of each model, affecting factors that influence the housing price have significant regional difference.

Table 9. Results of Three Regions

		Ranking of Variables			
East region	CPI	GDP	PO	IN	FT
<i>Coefficient</i>	-1.477066	0.945182	0.108338	0.323451	-0.075233
<i>Prob.</i>	0.0000	0.0000	0.0000	0.0282	0.0240
	***	***	***	**	**
Middle region	GDP				
<i>Coefficient</i>	0.537438				
<i>Prob.</i>	0.0019				

West region	GDP	JG	CPI	FT	PO
<i>Coefficient</i>	0.940464	-0.067181	-0.859746	-0.067343	-0.009706
<i>Prob.</i>	0.0000	0.0024	0.0323	0.0129	0.0938
	***	***	**	**	*

The table 9 indicates the ranking of different variables in each region. Gross Domestic Product in all the regions have significant influence on the average selling price of commercialized buildings, and have positive relation with the selling price at 1% significant level. While the gross domestic product grows, the housing prices also increases.

Here the Consumer Price Index is chosen to reflect the inflation effect as explained in chapter 4.2. Surprisingly, the variable of Consumer Price Index has a negative relation with the average selling price of commercialized buildings significantly in the east region and the west region, and it does not have significant relationship with the housing price in the middle region. Commonly, the inflation and the real estate have relation with each other, and the price of the real estate increases as the commodity price grows up. The rise of some prices, particularly the cost price and the labor price, influences the real estate cost that finally causes the rise of the real estate price (Ding 2014). The high house price results in the decreasing demand of houses, especially for those people without a huge amount of money to afford houses. For the property developer, as the demand of houses decreasing, it is difficult to sell houses with higher prices, and the wise way to solve this issue is to sell houses in a lower price level so as to keep business funded.

In the aspect of Urban Population, it is clear that the average selling price of commercialized buildings has positive relation with the urban population in the east region at 1% significant level. In contrast, this factor probably has negative relation with the selling price in the west region. Since the increase of population represents the increasing trend of the house demand, which means that the housing price is supposed to increase, as well as the result is not that ideal with 0.28 R-square at 10% significant level. Hence, the slightly negative influence is not included here.

Concerning the variable of Total Investment in Residential Buildings in Urban Area, it has negative relation with the average selling price of commercialized buildings in the east region and the west region at 5% significant level. However, this factor does not have significant relationship with the housing price in the middle region. According to the explanation in chapter 4.2, it is clear that the more total investment

amount in fixed assets, the more supply of houses. And the increasing supply of houses frequently leads to the decrease of the housing price.

In terms of Per Capita Disposable Income of Urban Households, results show that the factor has positive relation with the average selling price of commercialized buildings in east region at 5% significant level. A unit increase in per capita disposable income of urban households results in a 0.32 increase in the average selling price of commercialized buildings in the east region. Habitually, the people with higher disposable income normally have higher purchasing power to buy houses, which results in the increasing trend of housing prices. On the other hand, as the income increases, people have more requirements concerning the house quality, living environment, and the related infrastructure. This generally increases the construction cost, which then pushed the housing price to rise (Ding 2014).

The variable of Floor Space of Residential Buildings Completed has negative relation with the average selling price of commercialized buildings in the west region at 1% significant level. According to the result, a unit increases in the floor space of residential buildings completed results in a 0.07 decrease in the average selling price of commercialized buildings in the middle region. Usually, the more floor space of buildings completed, the more supply of housing industry. Then, if the demand does not change, the housing price will decrease.

According to the study of Sheng (2014), 31 provinces are divided into three regions based on their different economic conditions. The data ranged from 1998 to 2013, because the real estate market turned into commercialization direction in 1998. And the data are directly gained from the National Bureau of Statistics for they are official. Seven key factors are chosen to be applied in the model. Based on results from the model testing, the variable of the lending rate (over 5 years) did not have significant relation with the average selling price of commercialized buildings in all three regions, while the factor of gross domestic product influenced housing prices in three regions significantly, say at the 1% significant level. Other factors influenced the housing price in each region differently, and the regional difference is significant.

5. DISCUSSION ON REAL ESTATE BUBBLES

This chapter presents examples of burst real estate bubbles in the world and public housing models, and then comes out suggestions for improving the Chinese real estate development based on the previous experience summarized from both negative and positive examples.

5.1 Burst Bubbles in the World's Real Estate Market

This section consists of four countries' influential real estate events, and the goal of this section is to conclude common problems in the past real estate development process in order to set examples for the Chinese real estate development.

5.1.1 The America Real Estate Bubble

The Florida Real Estate Boom of the 1920s

The earliest real estate bubble occurred between 1923 and 1926 in Florida of America (Weiss 1989). Florida is located in the southeast of the USA and enjoys the advantageous location. The climate there is warm and humid in winter. After the World War I, Florida became a prevalent vacation spot, and also an ideal place for investment (Grebler, Blank and Winnick 1956).

To start with, the attractive location of Florida triggered the increase of the house price. Then, the speculator bought houses there to turn over the investment for the increasing demand of the house (Grebler et al. 1956). A large proportion of banks and rating agencies offered easy credit terms so as to make more profit (Lin 2014). During the period of 1923-1926, the housing price in Florida jumped dramatically. Taking a land in the Palm Beach as an example, its price was 800 thousand dollars in 1923, whereas the price became 1500 thousand dollars in 1924, and the 4000 thousand dollars in 1925. In 1925, more than 2000 real estate enterprises exist in Miami, a city of 75 thousand inhabitants population. The statistics show that 25 thousand local people were the real estate agents, which imply that the real estate industry was extremely popular and profitable at that time (Lin 2014).

In 1926, the real estate bubble in Florida burst. The real estate market plays a quite important role in the economic system in a country, and Florida was the most popular tourist place in the USA that with the biggest bubble in the real estate market as well. Hence, the bubble stimulated the financial crisis of the whole country (Lin 2014).

The Housing Bubble and Credit Crisis

From 2007 to 2009, the housing bubble in the U.S. burst and the credit crisis occurred around the world. In the 1990s, the economic condition gradually became better and the U.S. government promoted the development of the real estate to accelerate the economic recovery. The low interest rates and foreign capital inflows benefited the real estate development as well as created conditions for easy credit. In 1994, the people who owned houses occupied around 64% of the whole population, and this rate increased to 69.2% in 2004 (United States Census Bureau 2007). Between 1997 and 2006, the general housing price in the U.S. rose by 124%. (The Economist 2007).

Numerous speculators entered into the real estate market, some of them were lacking funds obtained loans from banks. On the other hand, since the majority of banks in America were private, the competition among them was quite fierce. Hence, the bank loosened credit terms to attract customers (Lin 2014). The “subprime mortgage crisis”, usually refers to the behavior that the bank offers borrowers loans even though those borrowers probably are not capable of paying the debts. In the banks’ perspective, the bank could take mortgagors’ houses as collateral and still make profit (Lin 2014).

In 2006, the U.S. government realized the potential menace of the credit crisis, so it adjusted benchmark interest rates from 1% to 5.25%. The cost of loan interests exceeded the profit from real estate. As a result, a large number of investors took back their funds from the market, and the real estate price started decreasing. In fact, the bank could not achieve its initial goals since the house price at that time was much lower than the purchase price. The bank lost profits because of the unqualified mortgage, and the real estate bubble influenced the financial market as well (Wilse-Samson 2010; Lim 2008; Lin 2014).

The result of the credit crisis was extensive. The principal banks in the U.S. went bankrupt, and the crisis spread to the world economy (Lin 2014).

5.1.2 The Real Estate Bubble in Japan

The real estate bubble in Japan started in the 1970s and burst in the 1990s. After the World War II, the U.S. assisted Japan in its economy, and the Japanese economic condition was nearly as good as the U.S. one in the late 1970s. In 1984, the fiscal deficit of the U.S. reached 160 billion U.S. Dollar, which occupied 3.6% of its GNP. Nonetheless, Japan became the U.S.'s biggest creditor in 1985 that threatened the U.S. economy. As a result, the Plaza Accord was signed in September 1985 (Lin 2014; Destler and Henning1993).

The Plaza Accord, which is an agreement between the governments of France, West Germany, Japan, the United States, and the United Kingdom, is about to depreciate the U.S. dollar concerning the Japanese yen. At that time, Japan was the victim of this agreement, with its foreign exchange reserves in the U.S.. At the time when the Plaza Agreement was signed, the dollar to the yen exchange rate was about 1:250; however, it turned to around 1:200 only after three months. In the end of 1986, the dollar to the yen exchange rate reached 1:152, and it was 1:120 in the end of the next year. Japan lost a huge amount of money due to the exchange rate of its net foreign assets, namely approximately 4000 billion Japanese Yen after the agreement was signed (Lin 2014; Destler and Henning1993).

From 1985 to 1990, the annual percentage growth rate of the land price was 15% and that of the stock price was 30%. People increasingly invested in the real estate speculatively in Japan, so that the house price became gradually high. Take house prices in Tokyo for example, in the early 1990s, the house price in Tokyo was 7.9 times higher than that in New York. There were 4.5 times, 4.2 times, and 3.1 times as much as the housing price in Paris, London, and Frankfurt, respectively. In addition, the annual growth rate of the GDP of Japan was only near 5% in that period. It can be concluded that the development of the real economy was relatively slow (Lin 2014).

In 1989, the Japanese government realized the potential menace of the real estate bubble, and started implementing a tight monetary policy as well as improving the exchange rate. Furthermore, between March 1989 and August 1990, the Bank of Japan improved the discount interest continuously. This measure actually accelerated the burst of the real estate bubble in Japan, and after that period, the housing price and the stock price decreased about 50%. In 1993, the overall real estate bubble in Japan burst and bad debts were above 600 billion dollars. The event triggered its financial crisis and Japan experienced over 10 years of recession (Reuters 1989; Lin 2014).

5.1.3 The Real Estate Bubble in Thailand

The financial crisis of the East Asia started from Thailand, which implies that the study of Thailand is representative and necessary.

In the 1980s, Thailand followed the economic development path from the “Four Asian Tigers” and changed its industrial structure into export-oriented industry. In order to improve its infrastructure construction and solve its fund shortage issue, the government determined to carry out easy monetary policy and also pegged the Thai Baht to the U.S. Dollar. These policies attracted a huge number of international investors to step into its domestic market; accordingly, the country acquired a large amount of international loans. On the other hand, in the late 1980s, the appreciation of the Japanese Yen and the burst of the domestic economic bubble lead Japan to capital export direction. At that time, Thailand had the abundant labor force, relatively low wage level and consumption level, and also with several preferential policies targeted at foreign investors. Japanese investors imported their capital into the Thai market (Lin 2014; Pornchokchai 2003).

Another, the majority of loans did not flow into the production department; instead, it flowed into the non-tradable sector, particularly in the real estate market and the stock market. The reason for that phenomenon was that these industries usually experience high rates of return and people can get the money back in a relatively short term. In 1989, the residential loan was 45.9 billion Thai Baht in Thailand while the amount turned into 790 billion Thai Baht in 1996. During the period of 1988- 1992, the

annual growth rate of the land price was between 10% and 30%; however, that annual growth rate went up to over 40% during the period of 1992- 1997. In 1997, the overall vacancy rate of residential houses was 21%, namely, with 850 thousand uninhabited residences in Thailand and 350 thousand uninhabited residences in Bangkok (Lin 2014; Quigley 2001; Collyns and Senhadji 2002).

From the end of 1995, the stock market started falling down in Thailand, and it slumped by approximately 70% in April 1997. In particular, the stock about the real estate slumped by around 85% and the stock about financial sectors and banks slumped by nearly 80%. A large number of international investment funds went back, which had heavy pressure for the Thailand economy and its interest rates. Although the government took measures to make up, the Thai Baht depreciated more than one time. In the end of 1997, the stock market reduced to one third of that in the early 1997. In addition, the price of the real estate dramatically decreased at that time and the bubble of the real estate burst eventually (Lin 2014; Quigley 2001; Collyns and Senhadji 2002).

5.1.4 Burst Bubbles in Chinese Real Estate Market

The Hainan Province Bubbles

On August 23rd, 1988, Hainan became a new province by separating from Guangdong Province, which also is the largest Special Economic Zone in China. Although at that time, Hainan province only had 23 thousand populations with 35 thousand square kilometers' area, thousands of people from other cities came to Hainan province to establish their business in order to enjoy abundant benefits that the special economic zone offers (Wu, Reed, and Robinson 2006; Lin 2014).

The large number of new added population requires more houses and better infrastructure, which promotes the demand of houses and development of the real estate. The increasing trend of the real estate leads most investors to invest in the real estate industry to make profits. In 1992, the investment amount of the real estate in Hainan province achieved 8.7 billion yuan, which accounted for a half amount of the fixed-asset investment. The house price in Haikou increased from 160 thousand

yuan/mu in 1991 to 600 thousand yuan/mu in 1992. Meanwhile, the economic growth rate of Haikou reached 83%, and another big city, Sanya, enjoyed 73.6% economic growth rate. The real estate industry occupied 40% of financial revenue in Hainan province. According to the report from Yearbook of China Real Estate Market (1996), the average selling price of commercialized buildings in Hainan Province was 1350 yuan/ sq.m in 1988 and 1400 yuan/ sq.m in 1991; the price jumped to 5000 yuan/ sq.m in 1992, and reached 7500 yuan/ sq.m in 1993. The price was more than four times higher than that in three years ago. Additionally, The Beihai city from Guangxi province is close to Hainan province, and its real estate market was growing prosperity as well. In 1992, more than 1000 real estate enterprises existed in Beihai, whose population was only 100 thousand (Lin 2014).

The bank, the local government, and the property developer cooperated very well in the real estate market. The four commercialized banks, state-owned enterprises, township and village enterprises, and private enterprises provide property developers with huge amount of money to invest (Lin 2014; Wu et.al).

In June 1993, the vice primer Zhu Rongji claimed that the government would strengthen macro-economic control that limited the huge amount of funds to continuously flow into the real estate market and terminated the listing of the real estate companies. The flourishing real estate market immediately fall down because of the huge real estate bubble. As a result, Hainan province owned 10% overstocked commercialized houses in the Chinese real estate market, which population only occupied 0.6% of the whole population in China. The idle land was up to 18834 hectares and the bad debt in four commercial banks of China was over 30 billion yuan. In addition, the sedimentary money of Beihai real estate market was approximately 20 billion yuan. Furthermore, the property developer bankrupted and the company was not solvent, so that the bank suffered 60% non-performing loans ratio with great loss and its cash recovery ratio was less than 20% (Lin 2014).

Before 1998, the government and state-owned enterprises controlled and allocated the house for the citizen. Hence, property developers were targeted at luxury villas and hotel markets. However, in the 1990s, the average wage in Hainan province was only 300 yuan per person, and the large proportion of local people was not capable to

purchase these high-end houses. Another, only 30% houses were used for living and entertainment while 70% of houses were stocked by the speculator for hype (Lin 2014).

The Ordos Bubbles

Ordos is located in the south part of Inner Mongolia, and it increasingly became one of the well-developed cities in recent years in China. Its GDP growth rate has been over 20% since 2003 until 2010 and the rate was even more than that of Hong Kong. However, Ordos suffered from the economic recession in 2012 due to the burst bubble of its real estate (Woodworth 2011; Lin 2014; Hayes 2013).

Ordos is rich in cashmere wool, coal, rare earth element, and natural gas. The amount of its cashmere wool product accounted for one third of that in China and occupied one fourth of that in the world. The discoverable amount of natural gas reached about 188 billion cubic meters. It is the largest city of coal production in China that the discoverable amount of coal was more than 149.6 billion tons. Additionally, Ordos has abundant chemistry and industry resources, such as trona, mirabilite, salt, sulfur, peat, magnesium, and phosphate (Lin 2014).

The demand of resources in Ordos was continuously increasing after 2000, the price of resources, especially the coal, jumped, and the exploitation method of those resources became more advanced; hence, the economic growth increased dramatically. Additionally, with better economic condition, the urbanization level in Ordos improved significantly. The population increased from around 400 thousand in 2000 to over one million in 2008. The urbanization rate was up to 65% at that time, which was even higher than the average urbanization rate (45%) in China. Accordingly, the urban construction area improved from 69.2 square kilometers in 2000 to 186 square kilometers in 2008. What's more, the local government officers encouraged the development of the real estate to improve the local GDP growth, so as to achieve decent achievements for promotion. Consequently, the real estate market developed prosperously in Ordos (Lin 2014; Woodworth 2011).

The inhabitant of Ordos became rich in a quite fast speed and had a huge amount of capital because of the coal mining and demolition cost. However, since the bank loan

had limitation and also investment methods in China are limited, a huge amount of money flowed into the real estate market and the coal industry by private lending. According to Lin (2014), the local inhabitant provided the property developers with a loan of over 200 billion yuan. Moreover, before 2010, frequently for a new building, 50% of the fund was from the private lending, while that percentage increased to 70% after 2010. The heated real estate investment causes speculation (Lin 2014).

The statistics from the local statistic bureau show that in 2004, the construction area in Dongsheng District, which is the core area in Ordos, was only 890 thousand square meters. However, the number increased from about 1.57 million square meters in 2005 to approximately 3.06 million square meters in 2006 (Lin 2014).

In 2012, the real estate bubble in Ordos burst since the central government implemented a series of policies to provide low and medium income householders affordable houses and reduce the increasing house prices. These policies were not aiming at certain cities but for the whole country. Nonetheless, the real estate bubble in Ordos was quite heavy, so that the housing price and the local economy were influenced pretty much. The housing price in Ordos fell from 15 thousand yuan sq.m or 20 thousand yuan sq.m to 3000 yuan sq.m in 2012, and the local economy started experiencing the recession (Woodworth 2011; Lin 2014).

The real estate bubble in Ordos demonstrates that it would be better if the economic structure in a city were diverse instead of singular, and excessive private lending and speculation have a negative effect on the development of the real estate. Ordos regarded its abundant resources as the pillar industry, but it did not have a stable industry structure to support its economic development when compared to the Shanghai, Beijing and other well-developed cities with high house prices.

5.2 Models of Public Housing System

This section lists three countries' housing system as references to improve the housing system in China.

5.2.1 The Public Housing System in Hong Kong

Hong Kong is considered as a good example that solved the housing problem

effectively. Basically, the secret is to combine the public houses with commercialized buildings.

There are four sorts of public housing in Hong Kong real estate market. The first type is “Public Rental Housing”, which is only allowed to rent. So far, Hong Kong has 2.6 million public rental houses that could accommodate seven million people. The second one is “Home Ownership Scheme”, which aims at providing each citizen with a house to live. This kind of house can only be purchased by Hong Kong citizens and its price is far lower than the market price. The third one is “Sandwich Class Housing Scheme”, namely it made for the people who is in the middle class. The last one is “Tenants Purchase Scheme” housing plan; this program can be used for both renting and purchasing (Li and Nie 2014; Legislative Council Secretariat 2013).

According to the data from Hong Kong Housing Society, approximately 48% of citizens live in the public housing, and among it, more than 30% of citizens are living in public rental houses and nearly 18% of citizens are living in “Home Ownership Scheme”. The rest citizens, who accounted for almost 52% of the whole population, are living in the commercialized house (Li and Nie 2014).

The public housing in Hong Kong is economical with nice environment and convenient traffic. When the economic condition is good, the local government decreases the supply of public housing for the citizen has better purchasing power with more income. Contrarily, when the housing price jumps too much and the average income is in a low level, the government increases the supply of public housing (Yan 2011).

[The Character of Hong Kong House System](#)

Firstly, it has a professional management system. The decision-making institution is Hong Kong Housing Society, which consists of representatives from the nongovernment organization and representatives from the political organization. Its main responsibility is to arrange the supply of public housing and the house management. And the executive is Housing Department from the government, which is responsible for planning and constructing the public housing.

The Government's Support

The local government pays the piper of public housing or sometimes Hong Kong Housing Society contributes the rent from leasing the public housing to build new public housing. Another, the government evaluates the demand of houses termly so that the organization could prepare enough land and infrastructure better.

The Transparent System

In Hong Kong, before citizens get their public housing, they have to accept the investigation on their income and assets, so that the Hong Kong Housing Society can ensure that public houses are allocated to the people who really need them. If applicants report the false information, Hong Kong Housing Society will end the contract and also has right to prosecute those applicants. Additional, the regulations concerning the Hong Kong Housing Authority said that it is illegal for applicants to provide Hong Kong Housing Society with false information, and those people will be fined 20 thousand HKD (Hong Kong dollar) and sentenced to six months imprisonment.

Hong Kong government does not totally turn the housing market into commercialization direction; instead, it also offers different kinds of public houses for the people from different classes. Moreover, the strict law and regulations support the allocation of houses under fair and transparent circumstances.

5.2.2 The Housing System in Singapore

Singapore is the first country to fulfill the promise to contribute houses to every citizen. The housing system consists of Housing and Development Board (HDB), and the Central Provident Fund (CPF), which is in charge of construction, allocation and management of the public housing, and is responsible for the collection, management and operation of the provident fund, separately (Li and Nie 2014).

Public Housing in Singapore

All the public housing is constructed and priced by the government and is also sold as the cost price to every citizen. At the same time, the government offers preferential

loan rates for house buyers. And every household is permitted to purchase one house, which can be both rented and bought (Li and Nie 2014).

The Housing Development Board is the largest real estate developer in Singapore, which is a non-profitable organization and specialized in construction of the public housing project. The government contributes free land to the Housing Development Board and also the financing support. From 1960 to 2006, the Housing Development Board established 974 thousand public houses. And the statistics indicate that in 2007, 81% of total population in Singapore lives in the public houses, among them, 95% of population who live in public houses purchased the public houses and only 5% of them still rent the public house (Lin 2014; Li and Nie 2014).

Almost 20% of total population in Singapore live in commercialized buildings, housing price of which is several times higher than the price of public houses. Usually, the majority of citizens prefer to pay more attention to the public house for its high quality and economical price (Lin 2014).

Central Provident Fund in Singapore

In Singapore, the fund of purchasing houses is chiefly from the central provident fund. The payment of central provident fund is from both employers and employees. There are four categories of accounts set for different practical purposes: Ordinary Account, Special Account, Medicare Account, and Retirement Account. More specifically, the ordinary account can be utilized to purchase public houses (Lin 2014; Li and Nie 2014).

The Central Provident Fund Board not only lends funds to the Housing Development Board to establish the public housing, but also supports the construction of public infrastructure. All the members of the Central Provident Fund Board hand in payment based on their wages, which implies that the systems is quite fair for citizens. In particular, it is not necessary for people whose wage is under the average wage level to submit the payment (Li and Nie 2014).

The Character of Singapore House System

Compared the housing system in Hong Kong with the housing system in Singapore, they have both difference and similarity characters.

These governments play a vital role in establishing the housing system that is consisting of public houses and commercialized buildings. The house system in Hong Kong is more in commercialization direction while that in Singapore is more in welfare direction. And also, the privatization degree of public houses in Singapore is better than that in Hong Kong.

The government organizations are in charge of construction and management of public housing, and the government frequently offers financial support and free land to responsible organizations. The government implements strict and comprehensive laws and regulations concerning the public housing system.

5.2.3 The Housing System in Germany

The housing price in Germany keeps a stable trend for several years, and the demand and supply is relatively balanced. The majority of citizens rent the house and does not have speculative activities in the real estate market (Lin 2014).

The government implements two policies for providing low-income citizens with public housing: public welfare housing policies and housing rent subsidy policy. The government decrees the housing rent standard for renting public welfare houses; usually the rent price is near the cost price so that the low-income families can afford the house rent. More specifically, the rent only occupied 50%- 60% of the average housing rent price. More importantly, the government pays the balance of payment between the actual rent and the affordable rent for the citizen, and the affordable rent is calculated by 25% of the household income. Both the federal government and the state government undertake the rent subsidy (Lin 2014; Li and Nie 2014).

In Germany, a large proportion of people rent houses instead of purchasing houses. The statistics show that over 58% citizens rent houses while only around 42% citizens

have their own houses. The reason is that the government publishes specific Tenancy Law to protect the benefit of the tenant. The regulation says that it is illegal for the landlord to charge 20% more of reasonable rent, and the standard of the reasonable rent is ruled by the city construction department, the housing rent agency, and trading agencies together. Another, the government charges those people who have speculative activity in the real estate market heavy taxation (Li and Nie 2014).

5.3 Suggestions for the Chinese Real Estate Development

The Experience from Real Estate Bubble Events

The real estate development has both positive and negative effect on a country's economic development. The prosperity real estate market stimulates the economy; however, the big bubble of the real estate would lead to economic recession. The government policy is quite important in the development of the real estate; the government should not just encourage the real estate development without regulating overly increasing trend of house prices.

To be more specific, it is important for the authority to deal with the flaw of the financial regulatory framework. There are several improper measures that the Japanese government took concerning the monetary policy according to the case. After the Plaza Accord signed, the Japanese Yen appreciated, and the government implemented the overly loose monetary policy at that time; when the authority recognized the potential menace of the real estate bubble, it raised interest rates too often in a relatively short period (excessive macro control). To establish the flexible interest rates system is quite important (Lin 2014). Moreover, the U.S. government lacked effective bank supervision and was also supposed to improve the rating agencies. (Mayer 2009; White 2009).

The real estate occupied unreasonable proportion in the economic structure of Florida, Japan, and Thailand during the real estate bubble periods. Hence, China is supposed to stimulate its economy by various economic projects, and the proportion of the real estate should be controlled in a reasonable proportion. From the credit crisis of the U.S. real estate bubble event, it would be better for China to improve the financial

system and correct the flaw of the financial regulatory framework. What's more, heated speculative activities in three countries accelerated the burst of real estate bubbles, so the speculation should be noticed and controlled in the Chinese real estate market.

The Experience from Public Housing Models

The Housing system of three countries in this chapter is covered with comprehensive welfare policies to guarantee citizens' benefits. The government participates in the construction of houses and publishes specific laws and regulations to provide citizens, especially low-income citizens, with preferential housing rent.

In China, the majority of citizens do not have high income to purchase houses freely, and the real estate price is dramatically high, in particular in metropolis. Nonetheless, the public system, for instance, the education system and the Medicare system, is also not well-developed, which implies that it is not practical for the government to implement a series of welfare policies to improve citizens' housing conditions instantly. The economic condition of China is not developed, and the national competitiveness probably will be weakened if the government contributes most expense to the welfare program (Li and Nie 2014).

Since China is a communist nation and the government permanently owns the land, the citizen should be treated with the comprehensive welfare, or at least the housing system should be improved (Li and Nie 2014). The government is supposed to improve the housing system and learn the rewarding experience from other countries. Especially the excessive speculative activities in the real estate market should be controlled effectively. Moreover, it is necessary for the government to legislate specific laws concerning the real estate market, so that the right of the citizen could be protected and the market will be more stable. Although in certain provinces, the local government provides low-income citizens with welfare house that can be purchased in a relatively cheap price; this policy is not applied in the whole country's level. In fact, since the problem of corruption, in several provinces, the welfare house does not allocate to the low-income citizen. In addition, the evaluation standard of the local government officer's achievement is not ideal and should not mainly focus on the

GDP growth. It would be better if the standard could also cover the employment rate, the education development, the medical care, the environment condition, infrastructure construction levels, and so on.

6. BUBBLES IN CHINESE REAL ESTATE MARKET

This chapter is divided into two sections. Firstly, the real estate bubble degree in China will be analyzed; next, to study the reason why Chinese real estate bubbles still exist even though numerous economists predicted that the Chinese real estate bubble was supposed to burst, so that the reader would get a comprehensive picture of the Chinese real estate market. More importantly, the third research question, the future development trend of the Chinese real estate market, will be settled in this chapter.

6.1 If Chinese Real Estate Market Existing Bubbles

It is a controversial topic that whether the Chinese real estate market has bubbles. This section will use the index that can reflect the housing bubble degree, the development of the urbanization, the population aging issue, and the influence of the birth control policy to verify the bubble degree in Chinese real estate market.

6.1.1 The Index of the Real Estate Bubble

In general, the House Price-to-Income Ratio (this section is calculated in the chapter three), the House Rent-to-Price Ratio, and the Housing Vacancy Rate are the important index to evaluate house bubble degrees in a country. This section will use these indexes to show the bubble degree in Chinese real estate market.

Rent-to-Price Ratio

The rent-to-price ratio is dividing total house price by monthly rent, which is mainly used to measure the undervaluation or overvaluation degree of the real estate price and the operation status of a region's housing market (Beijing International 2015). This indicator can also show the real estate bubble degree; to be specific, the normal ratio by international standard is 160:1, and the higher ratio indicates the heavier real estate bubble. The research shows that the average rent-to-price ratio in China is 200:1, and especially in those well-developed cities, such as Shanghai and Beijing, the ratio reaches to around 500:1 (Beijing International 2015; Li and Nie 2014).

Housing Vacancy Rate

By international standard, the housing vacancy rate of the commercialized buildings between 5% and 10% is normal, the rate between 10% and 20% is abnormal, and the rate above 20% is dangerous. Nonetheless, the housing vacancy rate has already reached 26% in 2005, which surpassed the 10% standard significantly. After that year, the central government stopped publishing the official housing vacancy rate, while the central government did not publish the data of the floor space of vacant commercialized buildings since 2008. The government claimed that to calculate the accurate housing vacancy rate now is an "international challenge" in August 2010 (Li and Nie 2014).

In 2010, the State Grid Corporation of China published a research of the electricity consumption for urban residential areas that covered with 660 cities in total. The result shows that 65.4 million houses did not use any electricity continuously for six months. This reflects the house vacancy status in 2010 in those cities that 65.4 million houses were capable of 200 million people (Lin 2014). Despite the missing data concerning the housing vacancy rate, it can be inferable that the housing vacancy rate is pretty high in China.

Therefore, it can be summarized that the real estate bubble in China is quite heavy based on obtained statistics.

6.1.2 The Role of Urbanization

The process of the urbanization has firm relationship with the development of the real estate in China. Regularly, the higher urbanization level results in more investment demand of the fixed asset and the increasing house demand of the people from rural areas. In 1996, the urbanization rate was 30%, and it reached 51.3% in 2011. During this period, the real estate market developed quite fast. Floor Space of Residential Buildings Completed in Urban Areas, increased from 370 million sq.m in 1995 to 870 million sq.m in 2010 (Li and Nie 2014).

According to Li and Nie (2014), in the next decade, the added urban population will reach around 400 million, and the added urban fixed-asset investment will be 40 trillion yuan. Based on the data from the National Bureau of Statistics of China, the real estate investment accounted for 20% in whole fixed-asset investment in 2011, which means that the investment on the real estate will increase 8 trillion yuan in a future decade. The report from China Index Research Institute shows that as the development of urbanization in China, Floor Space of Commercialized Residential Buildings Sold will reach 12 billion sq.m in the next ten years (Li and Nie 2014; Lin 2014).

Although the development of urbanization has a positive effect on the development of the real estate, it cannot demonstrate that the real estate market will definitely be prosperity in the near future. According to the statistics from Sixth National Population Census of the PRC, in 2010, the population of people over 60 years old was 178 million that occupied 13.26% in the whole population, which percentage increased 2.93% compared with that in 2000. Population aging has become an important issue in China in recent years: the birth rate is decreasing while the life expectancy is increasing (Li and Nie 2014). This phenomenon results in the decreasing trend of house demand. According to the statistics from Li and Nie (2014), after 2015, the house demand will stay in a decreasing trend, or at least not increase any more.

The typical family structure in China now is “2+2+1” type, which mainly caused by the one-child policy (birth-control) implemented in the 1970s. The generation after 1980s plays an important role in the future economic development in China. Furthermore, based on the research of Wang (2009), a large proportion of the younger generation would like to have only one or zero child even though the child policy changes in the future, because people are under heavy pressure of high house price, high education cost, and high living cost. Under this circumstance, the family structure will lead to the high housing vacancy rate (Wang 2009). Take figure 2 as an example, it is clear that for two families (each of them only has one child), their children would get married in the future, and the new marriage creates the same family structure that basically will obtain three houses from both families. Therefore,

the house demand will decrease in the future because of the one-child policy and population-aging trend.

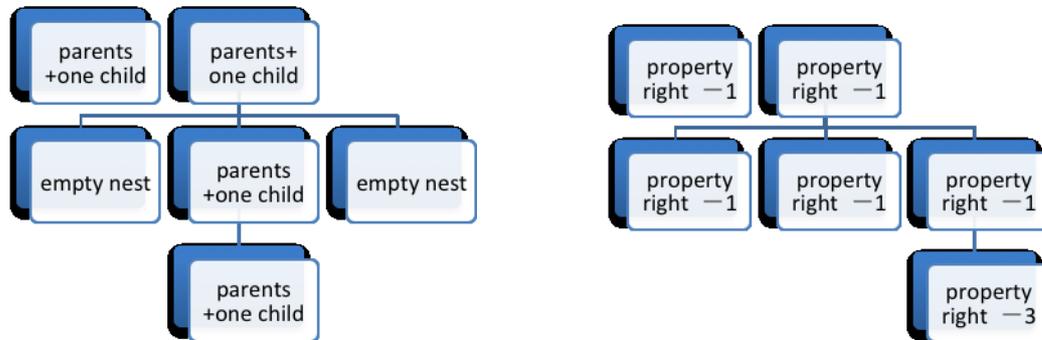


Figure 2. The Family Structure Under Birth-control Policy And The Housing Demand Trend (Wang 2009).

It is undoubted that as the development of urbanization, large amount of people from rural areas will move into urban areas and the house demand will increase. Also, the development of urbanization will stimulate domestic demand and citizens will have more disposable income to buy houses. However, if the house price is too high for the majority inhabitant, these potential conclusions will not actualize. According to the study from Li and Nie (2014), there are 260 million people from rural areas who work in urban areas, but less than 1 percentage people purchased the house. So the development of urbanization cannot absolutely guarantee that the new-added house can be purchased. And combined with the summarization from Wang (2009) and figure 2, the high house vacancy rate implies that the empty house in the future also can meet the house demand of large proportion of people.

Additionally, the government in some provinces provides the welfare house for the low-income inhabitant. The targeted buyers based on the development of urbanization are the people from rural areas and under-developed cities, and those kinds of people actually have low income and low purchase power to buy houses even in the future. Hence, the development of urbanization cannot demonstrate the prosperity of the real estate market.

6.2 Why the Real Estate Bubble in China Still Does Not Burst?

George Soros in 2005 predicted that the real estate bubble in the U.S. would burst within one or two years while that bubble in China would burst as well within three years (Lin 2014). His prediction about the U.S was illustrated to be right; however, the Chinese real estate bubble still does not burst. Based on the House Price-to-Income Ratio calculated in Chapter 3 and other index calculated in this chapter, it is obvious that China has heavy real estate bubbles since 2009 until now. This section aims at analyzing reasons why the real estate bubble in China is different from other countries' and unexpectedly still does not burst.

The Chinese real estate market is supposed to be controlled by the market; in fact, the government plays an essential role in the development of the real estate. The political issue is the primary reason that prevents the real estate bubble from bursting. For local governments in different provinces, they have dual-role in terms of the real estate development. On the one hand, they are responsible to implement the policy from the central government to keep the real estate market stable; on the other hand, they tend to support the increasing trend of house prices for the GDP growth is the standard to evaluate their achievements (Lin 2014).

The real estate contributes to the GDP growth pretty much and gradually becomes the fastest economic project to increase the GDP. The real estate industry was over 4% of the GDP in 1998, and gradually increased to more than 5% of GDP in 2007. In particular, the rate achieved 5.6% of GDP in 2007. Between 2003 and 2008, the real estate industry was around 23% of the fixed-assets investment, and the rate was nearly 25% in 2010. Moreover, that percentage in the east coastal cities was much higher than that in other cities. In the proportion of fixed-assets investment, the proportion of the real estate investment is just below that of the manufacturing industry (Li and Nie 2014).

Besides, in order to achieve decent achievements, usually local governments not only promote the real estate development and housing prices to improve the GDP growth, but also report inaccurate data. The total sum of provincial data from each provincial

statistics bureau is different from data from the national statistics bureau. In 2012, the sum of the total provinces' GDP was 57.66 trillion yuan while the national GDP was 51.93 trillion yuan (see table 9 below) (Li and Nie 2014).

Table 10. The Data Disparity (Li and Nie 2014).

Year	The difference between data from local statistics bureau and data from national statistics bureau	Percentage deviation
2007	1.2 trillion yuan	5.1%
2008	2.6 trillion yuan	8.8%
2009	2.9 trillion yuan	8.6%
2010	3.5 trillion yuan	8.8%
2011	4.6 trillion yuan	9.75%
2012	5.73 trillion yuan	11.03%

It is possible that the main reason why these data, which are all from official data source, have such big difference is that the calculation method and data sources are quite different. However, since there exists a huge gap according to statistics, some local governments can be considered to use fake data.

In the central government's perspective, the best solution probably is to slow down the speed of the bubble burst. In the 1990s, the government implemented policies to decrease the house price in Hainan province and Beihai city, because the burst of relatively small bubbles (compared with other provinces, these bubble existed areas only occupied a small part) did not influence the whole real estate market. Now, the situation changes completely, and the real estate has a firm relationship with the Chinese economy, which has to be controlled and protected by the central government. From the significant government policies presented in the chapter three, it can be demonstrated that the government issued the new policy to rebalance the housing price every time when the real estate price gets off track.

Heavy real estate bubbles exist in China according to the indicators presented in this chapter. However, different from other countries, Chinese real estate bubbles ought to have burst. Based on the urbanization development, the birth-control policy, the population aging, and also the vacancy rate, it can be illustrated that the commercialized residential buildings probably do not have huge demand in the future and the housing price perhaps will stay in a relatively normal level, especially in the developing cities that economic structure is not diverse – namely cities like Hainan and Ordos. In fact, due to the importance of the real estate market, the central government usually takes measures to control the market so that the real estate bubbles in the whole country would not burst at the same time or immediately. Although the aim of the central government is clear, the future real estate development trend is still unpredictable for the existed heavy bubbles and different execution of local governments. In addition, it has to be admitted that the data is not totally accurate for the huge gap between the local statistics bureau and the national statistics bureau. The local government encourages the development of the real estate market and the increase of housing prices so as to obtain decent achievements based on the GDP growth in local provinces, some local governments even submit the inaccurate statistics.

7. CONCLUSIONS

This paper is aiming at analyzing affecting factors of the real estate price in different regions and distinguishing their different influences. In the first place, the history, the character, and the trend of the Chinese real estate development are explained. Since the government plays a major role in Chinese real estate market and implements a series of macroeconomic policies to control the real estate price, the important policies are listed for better understanding of fluctuation of real estate prices in different years. In the theoretical part, the common factors that affecting the real estate price are presented based on relative literature. In the empirical part, the econometric model is made to test the regional difference of affecting factors concerning the real estate price. After that, examples of burst bubbles in the world's real estate market and public housing system models are chosen to be learnt and utilized in the Chinese real estate development. In the last part, in order to deal with the controversial issue that whether the Chinese real estate market has bubbles that about to burst, the paper collects evidence to analyze the bubble degree.

Based on all the study mentioned in this paper, the Chinese real estate market does exist heavy bubbles, but the bubble probably would not burst immediately. Chapter 2.2, chapter 5.1.4 and chapter 6 illustrates that the Chinese real estate market has bubbles and it is necessary to improve the development of the real estate. Also, the chapter 2.3 describes the essential role of the central government and its goals in different periods; chapter 5.1.4 indicates that regulations and policies that published by the Chinese government decide a city's economic development, and the Chinese government is quite powerful. More importantly, combined with the results from chapter 4, it is clear that the real estate bubble does not cover each city in China. Actually, the real estate market has significant regional difference and a large number of cities do not have bubbles in their real estate market; hence, even if more real estate bubbles burst in the future, the Chinese economy would not wholly collapse. What's more, considering the severe consequence of the real estate bubble, the Chinese government definitely would take measures to improve the situation, though the result

is still not predictable.

According to the real estate event and experience summarized from examples of chapter 5, it can be learnt that it would be better for the Chinese real estate development if the government could improve the financial system and correcting the flaw of financial regulatory framework; establish the flexible interest rates system; solve speculation fever problem in the real estate market; keep stable and diverse economic structure to support the economic development; and keep in touch with the latest development in the real estate market and the market mentality.

Although the data in this paper are directly obtained from the National Bureau of Statistics and China's Statistical Yearbooks, the result is not totally accurate and reliable. There exists a huge gap between the data from local statistics bureau and data from national statistics bureau (illustrated in chapter 6.2), which implies that the results in chapter 4 may not be perfectly right.

Undoubtedly, the paper is not comprehensive and there still exists several shortcomings. Everyone is warmly welcomed to point out the mistake in this paper, and share different opinions as well as suggestions with the author through email.

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APPENDIX:

The statistic tests and regressions are derived from the EViews 8. The regression model applies logged variables, so as to narrow the variation among different data. To start with, the unit root test is applied for checking the stability of the data, and the co-integration test is applied so that residuals are stationary. Regularly, three methods can be used to conduct the panel data: pooled regression, fixed effect model, and random effect model. The Hausman Test is used to check which method is proper to use.

East Region

Unit Root Test

We test the existence of the unit root for data series of the first difference. Here null hypothesis is that a unit root is present, and we can use OLS if null hypothesis is rejected. Based on results below, we reject the null hypothesis and conclude that there is no unit root for lag 1.

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X1

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 434

Cross-sections included: 31

Method	Statistic	Prob.
ADF - Fisher Chi-square	200.249	0.0000
ADF - Choi Z-stat	-5.39227	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X2

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 403

Cross-sections included: 31

Method	Statistic	Prob.
ADF - Fisher Chi-square	194.654	0.0000
ADF - Choi Z-stat	-9.27078	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X3

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 434

Cross-sections included: 31

Method	Statistic	Prob.
ADF - Fisher Chi-square	136.788	0.0000
ADF - Choi Z-stat	-6.60706	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X4

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 403

Cross-sections included: 31

Method	Statistic	Prob.
ADF - Fisher Chi-square	212.841	0.0000
ADF - Choi Z-stat	-10.2899	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X5

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 403

Cross-sections included: 31

Method	Statistic	Prob.
ADF - Fisher Chi-square	104.814	0.0006
ADF - Choi Z-stat	-4.51615	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X6

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 403

Cross-sections included: 31

Method	Statistic	Prob.
ADF - Fisher Chi-square	167.511	0.0000
ADF - Choi Z-stat	-7.58584	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X7

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 403

Cross-sections included: 31

Method	Statistic	Prob.
ADF - Fisher Chi-square	160.823	0.0000
ADF - Choi Z-stat	-7.03342	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_Y

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 403

Cross-sections included: 31

Method	Statistic	Prob.
ADF - Fisher Chi-square	116.387	0.0000
ADF - Choi Z-stat	-5.06445	0.0000

Cointegration

The hypotheses are: H0 is nonstationary whereas H1 is stationary. In this model, the result rejects null hypothesis at 5% significant level and there exists cointegration.

Kao Residual Cointegration Test

Sample: 1998-2013

Included observations: 496

Null Hypothesis: No cointegration

Trend assumption: No deterministic trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-6.431332	0.0000

Fix/Random Effects Test

In general, three methods can be used to conduct the panel data: pooled regression, fixed effect model, and random effect model. The Hausman Test is used to check which method is proper to use. In Hausman Test, the pooled regression method cannot be chose, since pooled regression does not classify different regions in this empirical study. Null hypothesis is the random effect model, while alternative hypothesis stands for fixed effect model. The outcome shows that results reject null hypothesis. Hence, the fixed effect method is chose to run models.

Correlated Random Effects - Hausman Test

Test cross-section random effects

	Chi-Sq.		
Test Summary	Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	41.672185	7	0.0000

West Region

Unit Root Test

We test the existence of the unit root for data series of the first difference. Here null hypothesis is that a unit root is present, and we can use OLS if null hypothesis is rejected. Based on reslusts below, we reject the null hypothesis and conclude that there is no unit root for lag 1.

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X1

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 140

Cross-sections included: 10

Method	Statistic	Prob.
ADF - Fisher Chi-square	43.3117	0.0019
ADF - Choi Z-stat	-0.28759	0.3868

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X2

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 130

Cross-sections included: 10

Method	Statistic	Prob.
ADF - Fisher Chi-square	53.5681	0.0001
ADF - Choi Z-stat	-4.60960	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X3

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 130

Cross-sections included: 10

Method	Statistic	Prob.
ADF - Fisher Chi-square	162.590	0.0000
ADF - Choi Z-stat	-10.7454	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X4

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 130

Cross-sections included: 10

Method	Statistic	Prob.
ADF - Fisher Chi-square	68.6583	0.0000
ADF - Choi Z-stat	-5.84426	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X5

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 130

Cross-sections included: 10

Method	Statistic	Prob.
ADF - Fisher Chi-square	44.6393	0.0012
ADF - Choi Z-stat	-3.64432	0.0001

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X6

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 130

Cross-sections included: 10

Method	Statistic	Prob.
ADF - Fisher Chi-square	61.3873	0.0000
ADF - Choi Z-stat	-5.02325	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X7

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 130

Cross-sections included: 10

Method	Statistic	Prob.
ADF - Fisher Chi-square	66.7429	0.0000
ADF - Choi Z-stat	-5.54320	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_Y

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 130

Cross-sections included: 10

Method	Statistic	Prob.
ADF - Fisher Chi-square	43.3480	0.0018
ADF - Choi Z-stat	-3.31006	0.0005

Cointegration

The hypotheses are: H0 is nonstationary whereas H1 is stationary. In this model, the result rejects null hypothesis at 5% significant level and there exists cointegration.

Kao Residual Cointegration Test

Sample: 1998-2013

Included observations: 160

Null Hypothesis: No cointegration

Trend assumption: No deterministic trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-5.609844	0.0000

Fix/Random Effects Test

In general, three methods can be used to conduct the panel data: pooled regression, fixed effect model, and random effect model. The Hausman Test is used to check which method is proper to use. In Hausman Test, the pooled regression method cannot be chose, since pooled regression does not classify different regions in this empirical study. Null hypothesis is the random effect model, while alternative hypothesis stands for fixed effect model. The outcome shows that results reject null hypothesis. Hence, the fixed effect method is chose to run models.

Correlated Random Effects - Hausman Test

Test cross-section random effects

	Chi-Sq.		
Test Summary	Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	23.062669	7	0.0017

Middle Region

Unit Root Test

We test the existence of the unit root for data series of the first difference. Here null hypothesis is that a unit root is present, and we can use OLS if null hypothesis is rejected. Based on resluts below, we reject the null hypothesis and conclude that there is no unit root for lag 1.

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X1

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 126

Cross-sections included: 9

Method	Statistic	Prob.
ADF - Fisher Chi-square	43.5199	0.0007
ADF - Choi Z-stat	-2.16599	0.0152

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X2

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 117

Cross-sections included: 9

Method	Statistic	Prob.
ADF - Fisher Chi-square	56.8624	0.0000
ADF - Choi Z-stat	-5.13211	0.0000

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X3

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 126

Cross-sections included: 9

Method	Statistic	Prob.
ADF - Fisher Chi-square	45.2826	0.0004

Cross-sections included: 9

Method	Statistic	Prob.
ADF - Fisher Chi-square	37.2184	0.0049
ADF - Choi Z-stat	-3.11679	0.0009

Null Hypothesis: Unit root (individual unit root process)

Series: LN_X7

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 117

Cross-sections included: 9

Method	Statistic	Prob.
ADF - Fisher Chi-square	31.4155	0.0258
ADF - Choi Z-stat	-2.12791	0.0167

Null Hypothesis: Unit root (individual unit root process)

Series: LN_Y

Sample: 1998-2013

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 117

Cross-sections included: 9

Method	Statistic	Prob.
ADF - Fisher Chi-square	39.0517	0.0028
ADF - Choi Z-stat	-3.26097	0.0006

Cointegration

The hypotheses are: H0 is nonstationary whereas H1 is stationary. In this model, the

result rejects null hypothesis at 5% significant level and there exists cointegration.

Kao Residual Cointegration Test

Sample: 1998-2013

Included observations: 144

Null Hypothesis: No cointegration

Trend assumption: No deterministic trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-3.200696	0.0007

Fix/Random Effects Test

In general, three methods can be used to conduct the panel data: pooled regression, fixed effect model, and random effect model. The Hausman Test is used to check which method is proper to use. In Hausman Test, the pooled regression method cannot be chose, since pooled regression does not classify different regions in this empirical study. Null hypothesis is the random effect model, while alternative hypothesis stands for fixed effect model. The outcome shows that results reject null hypothesis. Hence, the fixed effect method is chose to run models.

Correlated Random Effects - Hausman Test

Test cross-section random effects

	Chi-Sq.		
Test Summary	Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	75.855152	7	0.0000

Multicolinearity

VIF (Variance Inflation Factor) = $1 / (1 - R^2)$, and if the VIF result less than 5, the multicollinearity is acceptable.

Based on the result presented in the chapter 4, in the east region, R-squared is 0.339611 (VIF=1.13), which is a reasonable value, and the model does not have strong motivation to suspect the multicollinearity. Similarly, for middle and west regions, R-squared are 0.16678 and 0.289259, whose VIF results are 1.03 and 1.09. The value is reasonable that the model does not have strong motivation to suspect the multicollinearity.