Housing Affordability Problem in Shanghai
1995-2009

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Stockholm 2010
Master of Science thesis

Title
Housing Affordability Problem in Shanghai 1995-2009

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Master Thesis number
43

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Keywords
Shanghai, housing affordability, Revised Price to Income Ratio

Abstract
This paper seeks to increase the awareness of the housing affordability problem in Shanghai. It begins with an overview of the economy and politics background in China, especially in the Real Estate area. The methodology applied in this paper is called Revised Price to Income Ratio which calculating the maximum amount of disposable income by minus the minimum living expenditure. The data selection part takes account of the whole distribution of household income rather than just the Median which contributes to the Revised Price to Income Ratio. The special case followed by the empirical result shows big difference between the theory (the result) and the reality. At the end of paper, more concerns about land scarcity statement, vacancy rate and data reliability have been discussed.

Keywords: Shanghai, housing affordability, Revised Price to Income Ratio
Acknowledgement

I would like to express my gratitude to all those who helped me during the writing of this thesis. My sincere gratitude goes foremost to my supervisor, Professor Hands Lind, for his constant encouragement and guidance. I am so impressed by his erudition and grand memory. Without his illuminating and consistent instruction, this thesis could not reach its present form. Then, I would like to express my heartfelt gratitude to my beloved family, for their loving considerations and great confidence in me all through these years. I also want to thanks my friends and classmates who spent these two years abroad days with me. They are friendly and kind-hearted which makes me feel so moved.
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1. Introduction

1.1 Background

In recent years, the affordability problem has become more and more important in a large number of housing markets in China, especially in the city such like Shanghai or Beijing. People have to cut their expenditure on food, traffic, and clothing, even electricity in order to arrange housing, no matter if they rent or buy. Housing price keeps rising in big cities along with income and living standard increase, but the gap between price and income seems larger and larger. In Chinese culture, housing is the necessity for a family and Chinese people do not get used to rent housing since there is no sound renting market and formal regulation to protect their renting life\(^1\).

1.2 Purpose

Shanghai has been one of the leading housing markets in urban China. After year 2005, many cities in China, especially metropolitan of Shanghai, have experienced a dramatic rise in housing prices which brought much concerns to the households as well as the government. This article is to discuss the housing affordability problem in Shanghai from year 1995 until 2009.

1.3 Method

The study is based on the quantitative indicator of Revised Price to Income Ratio. When calculating the Income data, here use the average income minus the minimum living expenditure get the maximum amount of disposable income. So we can get the minimum ratios according to the indicator which indicate the minimum years need to obtain a house. Besides, all the data in the article are real number. Moreover, a real case study is used to give a more direct picture of the situation.

1.4 Structure of the thesis

After a brief description of urbanization and economic development in China in Section 2,  

\(^1\) Lessee might be evicted without enough or even no prior notice time when the lessor decide to sell the house under high price or rent it to someone else who offer a higher price. In China, renting is a lessor-market.
this article presents a compact but clear introduction of the study area Shanghai in Section 3. Section 4 is the literature review on the topic of affordability problem in Western countries and China, as well as housing affordability indicators list in Section 5. Then this paper reports the empirical results and real cases comparison in Section 6 and discusses some additional problems about data and main high housing price reason in Section 7. Finally, this paper draws conclusion about the housing affordability problem in Shanghai in Section 8.
2. Urbanization and economic development in China

2.1 Urbanization

Nowadays, there is about half of the world’s population living in urban areas and the trend is growing. The prediction of urban growth in Asia and Africa in the future will be up to 93%, and by the year 2050, two thirds population of the world, that’s over six billion people, will live in the urban area. On 25th, March, 2010, United Nations released a report that said that China has a quarter of half-million-population cites of the world. Right now, the global world has 961 cities with over half-million population and the China occupies 236. United Nations Economic and Social Affairs Population Division issued another report at the same day in New York said China has 51 cities with over half-million population in the year 1980 and this number increased by 185 till the year 2010. They predict that by the year 2025, another 107 cities in China will join this rank.

Diagram 2.1 Urbanization level of China (reference from http://ww2.unhabitat.org/habrrdd/conditions/eastasia/china.htm)
The number of cities with significantly increased substantial size of the population indicating the level of urbanization in China increased rapidly. In fact, China's urbanization level jumped from 19% in 1980 to 47% in 2010, and expected to reach 59% by 2025. It is reported that in the next dozen years, China may have hundreds of millions of people that move to the cities, and this figure could be the equivalent of the population of a Europe. Actually, before reforming, China is anti-urbanization which means that it not only limits the rural-urban migration, but also decentralized urban population (mainly a large number of urban youth) to the rural. Since the 1980s, urbanization process started and more and more rural people move to the cities for living which speeds up urbanization.

According to the National Bureau of Statistics of China (NBSC) data, Shanghai urbanization rate has reached 89.09% in 2006 over 83.62% of Beijing. Shanghai, as the most urbanization city in China, foreign (means the people from place outside Shanghai) resident population has already accounted for 27% of the total resident population in the year 2008. Shanghai extensively incorporates foreign talents and enhances the degree of internationalization, making Shanghai a high-end talent gathering place. At the same time, Shanghai reasonably attracts skilled technical workers, builders, domestic workers to provide ancillary services of urban construction and development. When these people are moving to the cities, they need places to live which virtually increases the demand for real estate, but also accelerated the rise in house prices.

2.2 GDP and the contribution of real estate
The Chinese Academy of Social Sciences (CASS) Department of Economics released "China's economic prospects - 2010 spring report" on 22nd April, 2010 said China's GDP growth will be 9.9% this year and CPI growth will be 3.5% according to their prediction. International Monetary Fund (IMF) did a same prediction in << China Quarterly Update 2010>>: Under spurs in the investment-led policies and the real estate market driven, China's GDP in 2010 will grow 9.5%, inflation rate will be 3.5-4% and real estate prices will continue to rise.

The World makes a step progress, the China makes three. It is an image description of China's economy growth. World Bank Experts Madison (1998) pointed out that in 1700 ~ 1820, China's GDP growth rate is zero, and in 1820 ~ 1952, China's GDP growth rate is negative. According to China's State Statistical Bureau (SSB) data, from 1952 to 1999, China's GDP average annual growth rate is 7.7%. In 1978 ~ 2008, China’s average GDP growth rate is 9.83% according to the data which give China a great confidence to outstrip Japan to be the second biggest economy.

In China, there is an obvious relation between GDP and Real estate price. NBSC data show that Real estate sales in 2009 accounted for 13.11% of GDP. Rising real estate price has brought social concerns on the real estate bubble, but Real estate as an important pillar of our economy can never be shaken. And, withal, well-known China expert, National University of Singapore East Asian Institute Yongnian Zheng pointed it out as GDP Doctrine. In China, the real estate is only considered as part of economic policy, rather than social policy. So the GDP function (contribution to economic growth) is prominent, and its social function (the housing needs of the community members and people's "space power") is ignored. Because of both the investment and consumption value of the commercial house, people have expectation of price rising. Developers take advantage of such social expectation to hoarding land and new houses, and buyers can not wait to buy new houses, finally, driving a high price step by step.

Also as a financial center, Shanghai’s GDP is 1.5 trillion (RMB) and surpass Hong Kong in the year 2009. Because of short-time financial crisis and high external dependence, Hong Kong’s economy growth rate indeed falls behind Shanghai right now, but once the global economy picks up, Hong Kong will have strong rebound immediately. However, there is no doubt that Shanghai has a very important position in the national economy and for social development.
As rapid development of Shanghai’s economy, improvement of consume structure and raising people’s income level, coupled with the establishment of real estate market institution, the real estate plays very important role in Shanghai’s economy. We can have a look at the contribution in GDP from Real estate. See table 2.1 below.

Table 2.1 Contribution in GDP from Real estate data (year 1995-2008)

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<td>676</td>
<td>688</td>
<td>807</td>
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<tr>
<td>Z</td>
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<td>4.2%</td>
<td>4.3%</td>
<td>4.9%</td>
<td>5.0%</td>
<td>5.3%</td>
<td>6.1%</td>
<td>6.5%</td>
<td>6.9%</td>
<td>7.7%</td>
<td>7.4%</td>
<td>6.6%</td>
<td>6.6%</td>
<td>5.5%</td>
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X=Shanghai’s GDP Value (in 100 million); Y=Real Estate Value (in 100 million); Z=Contribution in the GDP from Real Estate

Graph 2.1 Contribution in GDP from Real estate data (year 1995-2008)

As we see, the contribution in GDP from Real estate rises to 5% from year 1999 and goes up since then, even there seems a decrease after year 2005, but the average level is still higher than 5%. And the newest data we get from the Shanghai statistic department said the proportion of Real estate value in GDP is 8.19% in year 2009. So housing affordability problem in Shanghai does not only concern to people’s living but is also a concern to the national economy.
3. Study area

Shanghai is the study area in this paper. It is the city having the largest population in China. Located in north latitude 31 degrees 12 minutes and east longitude 121 degrees 30 minutes where the connection point of Yangtze River and East China Sea is, the city is administered as a municipality of China. At the end of year 2008, the land area of Shanghai is 6340.5 square kilometers, accounting for 0.06% of the total area of China. By contrast the city's permanent population is 18, 88 million, of which foreign resident population is 5, 17 million. The city's resident population density is 2,978 people per square kilometer.

![Picture 3.1 Location of Shanghai Municipality within China](reference from “Wikipedia”)

Shanghai grew to importance in the 19th century as a fishing and textiles town due to its favorable port location and as one of the cities opened to foreign trade by the Treaty of Nanking of 1842. The city flourished as a multinational center of finance and business by the 1930s. After 1990, the economic reform policies introduced by Deng Xiaoping resulted in intense re-development and financing in Shanghai, and lead it into the world's largest cargo port since 2005.

The real estate market of Shanghai rebounded from year 1999 to 2003, and then it experienced “crazy increase” from 2003 to the early 2005, after that there was a short-term stagnation from June of 2005 to April of 2007, however, housing price started to rise again after that. Although the government has introduced some credits, tax and land policies to restrict the housing price, the effect is not significant. As an international metropolis and one of the China's economy centers, Shanghai has many powerful big real estate companies. International capitals continue to be optimistic to invest in Shanghai which speeds up the
economy development of Shanghai, coupled with psychological expectation of all parties, so housing price stay high.
4. Housing affordability: literature review

4.1 Housing affordability: literature from developed countries

In the 1960s and early 1970s, a number of U.S. housing analysts was concerned with poverty and urban problems, such as income adequacy and living standards since before that time, the leading housing experts deeply believe that the housing cost to income ratio is the appropriate affordability indicator without any doubt.

Lerman and Reeder (1987) have developed and applied their “predict-rent” model using the standard ratio. On the basis, if the predicted rent for a given type of household does not exceed 30% of its income; there will be no housing affordability problem according to their logic. They also state a household having housing affordable problem not because of housing cost in relation to income is high, but because of what it would cost to maintain a basic standard within the given region. It might be impossible for a low-income household to choose a minimum living standard housing to keep their rent to income ratio under 30%, because that kind of housing may not be readily available in the market which has been stated by Thalmann (1999). Even from the above, the set standard might not truly tell us the way households experience the squeeze between housing costs and incomes, but the ratio of shelter expenditures to household income is the appropriate indicator since the pure number can be compared across time and space (Pedone 1988 and Yip 1995).

Michael E. Stone (1990, 1993) proposed housing-induced poverty thought and developed it as a measure of the housing affordability problem. In his model, he calculates the maximum amount of disposable income minus the minimum amount need to adequate one household’s living consumption. This is the inspiration of the methodology used in the later part of this paper. Therefore, Stone (2006) pointed out that the residual income model is sound, robust and effectively compete with the traditional measures of housing affordability. He stated three points:

First, it offers a more precise and finely honed instrument for assessing housing needs and problems. Second, it points toward revisions in housing subsidy formulas that would result in a more equitable and efficient allocation of subsidies. And third, it suggests a way of refining residential mortgage underwriting that might perhaps yield a more accurate assessment of risk.
Another work done before which inspires this paper is by Quan Gan and Robert J. Hill (2009). They argue that the housing affordability problem is not an issue of direct relevance to homeowner, but some first-time home buyers, so it raises the problem to all income-levier. Therefore, they operationalize the distinction between the concepts of purchase affordability and repayment affordability in the context of a new methodology that taking account of the whole distribution of household income and house prices rather than either just low income or the median. They also show that the housing affordability problem may be significantly worse for median income families compare to other income distributions in the methodology.

4.2 Housing affordability: literature from China

In the part before, the literature review discussion is more inclined to the housing affordability measures. Here this part will talk more on Chinese scholars’ opinion on Housing affordability problem in China, especially in Shanghai.

Yuan XF and Fu ZM (2003) think real estate market has already presented a warning signal of the economic bubble. Firstly, the housing price is very high and the trend is continuing to rise which increases the distance between actual value and sales price; secondly, real estate development investment grows too fast; thirdly, commercial property vacant rate keeps growing; fourthly, more and more bank money flow into real estate market. Wang XG (2004) pointed out the situation of real estate market irrational growth as well. Higher and higher housing price is not driven by high demand but artificially pushed up by speculators. It is dangerous because the whole society bears the risk but the minority gets the profits.

Xie GZ (2005) criticized the boom of real estate in Shanghai. He refuted three boom excuses: Shanghai should have the same housing price level as Hong Kong, London and New York; high housing price is reasonable because of high cost; we don’t have much surplus land. He explained, real estate price reflects the productivity level of people living in that region, which we called disposable income per capita. That’s the reason real estate analysts usually use housing price to disposable income ratio to measure affordable index. With this ratio, Shanghai has triple housing price of the other international financial centers mentioned above. As to second excuse, he said, the public land bidding approach by the government is the dominant way of supplying real estate land in China, and rapid growing land price reflects exaggerated speculative demand, also increase the expected profit of real estate developers, so they are willing to buy the land with higher price. The third point, he said there is no warning
of land supply by government. Even there does exist land shortage in the central city, the
government can still create another city, such as Pudong of Shanghai. So land shortage can
not prove the real estate price level is reasonable, but people’s purchasing power can.

research on Chinese real estate bubble. They get conclusions: 1. the boom real estate in China
has solid market foundation; 2. high vacancy still can not indicate existence of bubble; 3.
since we joined WTO, there are more and more floating population and they have much
strong demand on real estate market; 4. low speculation might affect the development of real
estate market; 5. real estate credit is the key to real estate development, and both its shortage
or surplus can lead depression of the industry.

Li YL (2005) mentioned the main factors of real estate price rising are supply and demand.
When price rising, inflation is higher than the bank interest, deposit can not keep the money
value and there are much variables of stock, so people tend to invest in real estate to hedge
against inflation. From the view of supply, the cost increase will also lead to a real estate
price increase which is reasonable.

Wu YZ (2005) believed the real estate market is only partly overheating but have not formed
bubble economy yet, because: first, the central government has strong macro-control ability
on real estate economy to keep it stable and healthy; second, our real estate commodities,
especially residential housing, has a big domestic demand potential and real estate developers
have relative high productivity to fulfill the demand; third, Chinese real estate industry can
have even 20 or 30 years more development; fourth, from the view of consumer motivation,
people will be more rational and mature to inhibit the rising-price expectation.

Hou YZ (2009) examine whether there exist housing price bubbles in China by a multi-
indicator analysis. The result suggests, there possible existed housing bubble for Shanghai
city from 2003 to 2004, because the housing price change exceeded the upper control chart
line for both years. He also argues that Chinese housing market can be adversely influenced
by international financial crises which may risk the dramatic fluctuations of housing prices.

“China regional financial operation- 2009 report”2 released by the Central Bank of China
shows that national real estate development available funds are 5.7 trillion RMB for the whole

2009 and increase 44.2% comparing to the last year. In 2009, national personal housing loans reaches 2.2 trillion RMB which support to purchase 7.071 million housing units and the average loans of a suite housing is 310 thousands RMB. Under the series of national macro-control policies, the current real estate market turnover falls to freezing point and the housing price shows some flexibility.
5. Methodology

5.1 Description

There are four indicators mostly used to measure housing affordability in the world:

- **Indicator 1: Price Growth to GDP Growth Ratio**

  This index is designed based on the meaning of Real estate bubble. Bubble economy is the reflection of deviation of virtual economy and real economy. From the macro-perspective, the degree of bubble expansion depends on economy growth rate and its expectation, but the real economy development is the basis of virtual economy development, real estate bubble as well, so we can compare the real estate price growth rate and real GDP growth rate to reflect the deviation. It is the dynamic indicator for monitoring the trend of real estate bubble. The greater the index value, the higher degree of the real estate bubble.

- **Indicator 2: Price to Rent Ratio**

  This index is a universal standard used to determine whether the real estate has investment value or bubble. Normally, if the index value (house unit price divided by monthly rent) is between 1:200 and 1:250, it means regional real estate runs well; if the index value exceeds 1:300, it means the house price deviates the real estate value, therewith investment value decreasing and investment risk increasing.

- **Indicator 3: Affordability Index** *(House Mortgage/Residential Monthly Income)*

  This index is designed based on the second factor of the real estate bubble—investment credits support. The expansion of the real estate speculative demand strongly links with the sufficient financial support, and sufficient financial support relies on the banks and the other financial sectors. Therefore, the expansion of residential speculative demand depends on the promotion of credit leverage. The index reflects the support degree of credits to the residential house needs and residential house consumption level also, on behalf of the degree of development and realization of real estate bubble. The greater the index value, the higher support degree of credits to the residential house needs.

- **Indicator 4: Price to Income Ratio**
This index is designed based on the first factor of the real estate bubble—excessive speculative demand. House price- Residential income ratio reflects the households’ capability to afford a house. The greater the index value, the lower capability to pay. When the index increases continuously, and there is no sign of shrinking market, indicating that the growth of house price surpass the growth of residential income, and the degree of speculative demand is high, so the possibility of real estate bubble is great.

5.2 Discussion

Generally, Price to Income Ratio is the most suitable indicator for China case here. Discussions about the reasons see below:

Price Growth to GDP Growth Ratio is determined by two factors, one is the price growth and the other one is GDP growth. However, in order to avoid data “distortion” problem (data reliability about GDP will be discussed in section 7), which might probably influent the analysis result, here the Price Growth to GDP Growth Ratio is not applied.

Since there is no sound rent market in China, not only because the data is mess to collect but also because of no formal leasing regulation, here Price to Rent Ratio is also ruled out.

Affordability Index measures the ratio of the actual monthly cost of the mortgage to after tax income. In China, different banks have different down-payment requirements as well as different mortgage interest level. Households even get used to forge their income documents in order to get the loan qualification to buy housing. It is normal that a man has to pay double of his monthly income or even more for the monthly cost of the mortgage since his parents can fix it. So it is not a practicable measure and the result will not be reliable for China case here.

Price to Income Ratio is the basic affordability measure for housing for median income families. In this paper, we discuss the general housing affordability problem, since we use the data of general average housing price and general average income, so it is practicable to calculate the ratio and figure out the result.
6. Dataset and Result

6.1 Dataset description

- **Residence sales data**

From year 1995 to year 2009, the residence average sales price has increased 200% in average; the residence sales area has increased up till 350% in average; the residence sales amount has increased more than 800% in average according to government given data. See table 6.1 below.

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X = Residence Average Sales Price (RMB/square-meter); Y = Residence Sales Area (10 thousands square-meters); Z = Residence Sales Amount (100 million RMB).

Graph 6.1 Residence sales data (year 1995-2009)

We can see there is an up and down trend before and after year 2007 which indicate the upsurge in these years. In year 1995, the residence sales amount is only 13300 million RMB; until the year 2008, this number raises till 160800 million RMB.

- **Residence average living building area**

Not only the residence average sales price goes up these years, according to our data, people living standard raises and residence living building area also changes a lot because of the increasing residence housing development. In year 1995, shanghai urban civic living area per
capita is only 14.7 square-meters, and it reaches 33.4 square-meters in year 2008. See table 6.2 below.

Table 6.2 Residence average living building area per capita (year 1995-2009)

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</table>

X= Residence average living building area per capita (square-meter)

Diagram 6.1 Residence average living building area per capita (year 1995-2009)

- **Urban disposable income**

Coupled with people’s living standard, urban disposable income per capita has a rapid expansion. In the year 1995, urban disposable income is only 7172 RMB per capita, until year 2009, it reaches 26675 RMB, which has increased 370%. See table 6.3 below.

Table 6.3 urban disposable income per capita (year 1995-2009)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>7172</td>
<td>8159</td>
<td>8439</td>
<td>8773</td>
<td>10932</td>
<td>11718</td>
<td>12883</td>
<td>13250</td>
<td>14867</td>
<td>16683</td>
<td>18645</td>
<td>20668</td>
<td>23623</td>
<td>26675</td>
</tr>
</tbody>
</table>

X=urban disposable income per capita (RMB)

Graph 6.3 urban disposable income per capita (year 1995-2009)
Minimum Living Guarantee

Disposable income is the amount exclude income tax, but if we need to use it to calculate how much can be distributed to residence expense, we need to exclude basic living expense also. Here we use minimum living guarantee which is handed out by government to maximize the residence expense we talked before. See table 6.4 below.

Table 6.4 minimum living guarantees per year

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</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>1752*</td>
<td>1908*</td>
<td>2064*</td>
<td>2220*</td>
<td>2376*</td>
<td>2532*</td>
<td>2688*</td>
<td>2868*</td>
<td>3000</td>
<td>3480</td>
<td>3600</td>
<td>3840</td>
<td>4200</td>
<td>4800</td>
</tr>
</tbody>
</table>

X=minimum living guarantee (RMB); *the number marked with "*" is calculated by average increment since we only get the data of year 1993 and 2003
**Urban Disposable Income after Minimum Living Guarantee**

As mentioned in the part of literature review, urban disposable income after minimum living guarantee is the thought inspired by Michael E. Stone (1990, 1993) using to maximize the urban disposable income by minus the minimum living expenditure.

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<tbody>
<tr>
<td>X</td>
<td>7172</td>
<td>8159</td>
<td>8439</td>
<td>8773</td>
<td>10932</td>
<td>11718</td>
<td>12883</td>
<td>13250</td>
<td>14867</td>
<td>16683</td>
<td>18645</td>
<td>20668</td>
<td>23623</td>
<td>26675</td>
</tr>
<tr>
<td>Y</td>
<td>1752*</td>
<td>1908*</td>
<td>2064*</td>
<td>2220*</td>
<td>2376*</td>
<td>2532*</td>
<td>2688*</td>
<td>2868*</td>
<td>3000</td>
<td>3480</td>
<td>3600</td>
<td>3840</td>
<td>4200</td>
<td>4800</td>
</tr>
<tr>
<td>Z</td>
<td>5420</td>
<td>6251</td>
<td>6375</td>
<td>6553</td>
<td>8556</td>
<td>9186</td>
<td>10195</td>
<td>10382</td>
<td>11867</td>
<td>13203</td>
<td>15045</td>
<td>16828</td>
<td>19423</td>
<td>21875</td>
</tr>
</tbody>
</table>

X= urban disposable income per capita (RMB); Y= minimum living guarantee (RMB); *the number marked with “*” is calculated by average increment since we only get the data of year 1993 and 2003; Z= Urban Disposable Income after Minimum Living Guarantee (RMB)

### Diagram 6.2 Urban Disposable Income after Minimum Living Guarantee

6.2 Result

Here we apply Revised Price to Income Ratio which is used to measure indicators of consuming capacity of residents in housing. It is a ratio between the residential housing price and the residential income of the people in this region. The higher ratio is, the weaker of consuming capacity is, and it indicates the gap between housing price and the income. This indicator is affected by three factors: 1. residence housing average sales price per square-meter; 2. residence living housing area standard; 3. residence income level in this region (how much they can contribute on housing).

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<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Y</td>
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<td>12000</td>
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<td>16000</td>
<td>18000</td>
<td>20000</td>
<td>22000</td>
<td>24000</td>
</tr>
</tbody>
</table>

Here we apply Revised Price to Income Ratio which is used to measure indicators of consuming capacity of residents in housing. It is a ratio between the residential housing price and the residential income of the people in this region. The higher ratio is, the weaker of consuming capacity is, and it indicates the gap between housing price and the income. This indicator is affected by three factors: 1. residence housing average sales price per square-meter; 2. residence living housing area standard; 3. residence income level in this region (how much they can contribute on housing).
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</thead>
<tbody>
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<td>2891</td>
<td>3026</td>
<td>3102</td>
<td>3327</td>
<td>3659</td>
<td>4007</td>
<td>4989</td>
<td>6385</td>
<td>6698</td>
<td>7039</td>
<td>8253</td>
<td>7005</td>
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<tr>
<td>Y</td>
<td>14.7</td>
<td>16.2</td>
<td>17.5</td>
<td>18.5</td>
<td>20.8</td>
<td>21.7</td>
<td>22.3</td>
<td>24.1</td>
<td>25.3</td>
<td>27.2</td>
<td>28.4</td>
<td>29.3</td>
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<td>33.4</td>
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<tr>
<td>Z</td>
<td>5420</td>
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<td>6375</td>
<td>6553</td>
<td>8556</td>
<td>9186</td>
<td>10195</td>
<td>10382</td>
<td>11867</td>
<td>13203</td>
<td>15045</td>
<td>16828</td>
<td>19423</td>
<td>21875</td>
</tr>
<tr>
<td>R</td>
<td>6.72</td>
<td>7.69</td>
<td>7.93</td>
<td>8.54</td>
<td>7.54</td>
<td>8.00</td>
<td>9.30</td>
<td>10.15</td>
<td>12.64</td>
<td>13.15</td>
<td>12.26</td>
<td>13.68</td>
<td>10.70</td>
<td></td>
</tr>
</tbody>
</table>

X = Residence Average Sales Price (RMB/square-meter); Y = Residence average living building area per capita (square-meter); Z = Urban Disposable Income after Minimum Living Guarantee per capita (RMB); R = Revised Price to Income Ratio.

From table above, we can see the Revised Price to Income Ratio is 6.72 in 1995 and 10.70 in 2008. The highest ratio is in 2007 which means a person can only afford standard living area housing without any expense other than basic living needs after 13.68 years and we assume there will be no inflation as well as the housing price and income keep constant.

But if we fix residence average living building area to 15 square-meters from year 1995 to year 2008, the result will be different. See table 6.7 below.

### Table 6.7 Revised Price to Income Ratio

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>2477</td>
<td>2986</td>
<td>2891</td>
<td>3026</td>
<td>3102</td>
<td>3327</td>
<td>3659</td>
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<td>4989</td>
<td>6385</td>
<td>6698</td>
<td>7039</td>
<td>8253</td>
<td>7005</td>
</tr>
<tr>
<td>Y'</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Z</td>
<td>5420</td>
<td>6251</td>
<td>6375</td>
<td>6553</td>
<td>8556</td>
<td>9186</td>
<td>10195</td>
<td>10382</td>
<td>11867</td>
<td>13203</td>
<td>15045</td>
<td>16828</td>
<td>19423</td>
<td>21875</td>
</tr>
<tr>
<td>R'</td>
<td>6.85</td>
<td>7.12</td>
<td>6.80</td>
<td>6.93</td>
<td>5.44</td>
<td>5.43</td>
<td>5.38</td>
<td>5.79</td>
<td>6.31</td>
<td>7.25</td>
<td>6.88</td>
<td>6.27</td>
<td>6.37</td>
<td>4.80</td>
</tr>
</tbody>
</table>

X = Residence Average Sales Price (RMB/square-meter); Y' = Residence average living building area per capita (square-meter); Z = Urban Disposable Income after Minimum Living Guarantee per capita (RMB); R' = Revised Price to Income Ratio.

The World Bank said: a reasonable P-I ratio is from 3 to 6. Since P-I ratio of developing country is higher than the developed country, so the ratio in table 6.7 seems much more normal. Therefore, the result seems to indicate that there is no housing affordability problem in Shanghai. However, back to the part of literature review, Thalmann mentioned that there might no kind of housing to maintain the housing affordability in the market. Since China applied family planning (birth control) policy, almost urban families are consisting of three persons. According to above table, if residence average living building area per capita is 15 square-meters, so it will be 45 square-meters for a family. Apparently, there is not enough small apartments available for three persons’ family which can contribute to the reasonable P-I ratio.
6.3 Special case

This is a real case about the experience of a woman who bought 5 houses in Shanghai between the year 1999 and 2009.

- In the autumn of year 1999, she bought a 64 square-meters house in **Pudong** with less than 100 thousands RMB, which means average sales price is 1560 RMB/square-meter. It is under the average sales price (3102RMB) that year.

- In the year 2001, she bought a 100 square-meters house in **Huangpu** with average sales price of 5900 RMB/square-meter. Now it reaches 16000 RMB/square-meter for the same type. The price today has trebled to the year 2001 which does not match the data from statistical department.

- In the year 2002, she bought a 148 square-meters house in **Pudong** with 670 thousands RMB, which means average sales price is 4527 RMB/square-meter. This house values 1.8 million RMB nowadays which means the average sales price reaches 12,160 RMB/square-meter.

- In the year 2003, she bought a 133 square-meters house in Nanhui (Now it has been merged into **Pudong**) with 400 thousands RMB, which means average sales price is only 3000 RMB/square-meter. (The price of this house seems too low.) This house values 800 thousands RMB nowadays which means the average sales price reaches 6000 RMB/square-meter.

- In the year 2009, she bought a 70 square-meters public house (it is usually cheaper than the other type of house) in **Pudong** with 520 thousands RMB, which means average sales price is 7430 RMB/square-meter.
Picture 6.1 The 18 districts and 1 country that make up the Municipality of Shanghai

Even in the same area, housing price can be varied a lot because of building year, location, selling time and other factors. The valuation price today might be aimed to the new building and large or luxurious housing.

It is reasonable to define this woman as the Median income, so we apply the average median income in Shanghai region as her disposable income to calculate the P-I ratio in this special case.

Table 6.8 Average Median Disposable Income per year

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>8984*</td>
<td>9645*</td>
<td>10705*</td>
<td>11629</td>
<td>12602</td>
<td>14149</td>
<td>15668</td>
<td>16774</td>
<td>20249</td>
<td>22675</td>
</tr>
</tbody>
</table>

X=Average Median income, *the number marked with “*” is calculated by median income to average income per capita ratio (1.05) since we only get the data from year 2002 to 2008;

http://en.wikipedia.org/wiki/Shanghai
Table 6.9 P-I ratio for special case

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>8984*</td>
<td>10705*</td>
<td>11629</td>
<td>12602</td>
</tr>
<tr>
<td>Y</td>
<td>100000</td>
<td>590000</td>
<td>670000</td>
<td>400000</td>
</tr>
<tr>
<td>Z</td>
<td>11.13</td>
<td>55.11</td>
<td>57.61</td>
<td>31.74</td>
</tr>
</tbody>
</table>

X=Average Median income, *the number marked with “*” is calculated by median income to average income per capita ratio (1.05) since we only get the data from year 2002 to 2008; Y=Housing price; Z=Price to Income Ratio.

It is hard to explain how this woman can afford these five housings. This might be a probability that she is a real estate amateur investor, and if her family (include her parents whole life saving) can offer the down payments, she can rent them out and pay the mortgages with rents. Nowadays, housing price increases so much and her housings’ value are doubled or even tripled which makes them good investments. But such high P-I ratio is absolutely non-normal.

6.4 Price in different part

Real estate agents keep telling us that housing prices in the central city raise the quickest because the land there is scarce. However, according to a research by an e-friend, shanghai’s ten-year housing price records tell us a different story. There are 15 premises located mainly in Xuhui and Minhang, and Minhang is far from the central of city relative to Xuhui according to picture 6.10.

Table 6.10 Premise A to H

<table>
<thead>
<tr>
<th>Premise</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Changqiao Bacun</td>
<td>Huadong Garden</td>
<td>Taurus Garden</td>
<td>Nanyi Garden</td>
<td>Huichen ggu Garden</td>
<td>Orient Paris</td>
<td>Chuangs hji Garden</td>
<td>Teng Wang Ge</td>
</tr>
<tr>
<td>Location</td>
<td>Xuhui</td>
<td>Xuhui</td>
<td>Xuhui</td>
<td>Xuhui</td>
<td>Xuhui</td>
<td>Xuhui</td>
<td>Xuhui</td>
<td>Xuhui</td>
</tr>
</tbody>
</table>

Table 6.11 Premise I to O

<table>
<thead>
<tr>
<th>Premise</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
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<td>Qingchun yuan Ercun</td>
<td>Xinmei Square</td>
<td>Huatang Garden</td>
<td>Weiming Yuan</td>
<td>Shanghai Spring city</td>
<td>Wujing Xiaoqu</td>
</tr>
<tr>
<td>Location</td>
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<td>Minhang</td>
<td>Minhang</td>
<td>Minhang</td>
<td>Minhang</td>
<td>Minhang</td>
<td>Minhang</td>
</tr>
</tbody>
</table>
Table 6.12 Price increase for premise A to H

<table>
<thead>
<tr>
<th>Premise</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price*(1999)</td>
<td>2472</td>
<td>3025</td>
<td>3600</td>
<td>4466.5</td>
<td>6084</td>
<td>10250</td>
<td>7550</td>
<td>4168</td>
</tr>
<tr>
<td>Price**(2009)</td>
<td>13907</td>
<td>16059</td>
<td>18096</td>
<td>19865</td>
<td>28648</td>
<td>42586</td>
<td>26694</td>
<td>21490</td>
</tr>
<tr>
<td>Increase</td>
<td>5.626</td>
<td>5.309</td>
<td>5.027</td>
<td>4.448</td>
<td>4.709</td>
<td>4.155</td>
<td>3.536</td>
<td>5.156</td>
</tr>
</tbody>
</table>

(Average increase= 4.746); Price* data comes from Shanghai Morning Post, Housing purchase review, 10th page, 1999, November 19th and 26th; Price** data comes from average sales price on Search House Web, Oct, 2009.

Table 6.13 Price increase for premise I to O

<table>
<thead>
<tr>
<th>Premise</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price*(1999)</td>
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<td>2800</td>
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<td>2015</td>
<td>3450</td>
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<td>1272</td>
</tr>
<tr>
<td>Price**(2009)</td>
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<td>15691</td>
<td>10892</td>
<td>15853</td>
<td>15786</td>
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<tr>
<td>Increase</td>
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<td>4.198</td>
<td>3.998</td>
<td>5.404</td>
<td>4.595</td>
<td>5.443</td>
<td>7.381</td>
</tr>
</tbody>
</table>

(Average increase= 5.337); Price* data comes from Shanghai Morning Post, Housing purchase review, 10th page, 1999, November 19th and 26th; Price** data comes from average sales price on Search House Web, Oct, 2009.

The average increase of Xuhui and Minhang districts are 4.746 and 5.337. Among these 15 premises, premise O is the farthest from the central city but it has the highest increase from year 1999 to year 2009. So the notion of shortage land in central leading high real estate price is not reasonable according to our data.
7. Discussion

7.1 Vacancy rate

A popular perspective on housing prices by Glaeser, Gyourko, and Saks (2005) is that limits in supply can explain the rise in housing prices. However, statistics data shows that currently a lot of real estate has vacancy rate higher than 50% in Beijing, Shanghai and Shenzhen along with 85% of households can not afford an apartment\(^4\). Accordance with international practice, 5-10% commercial housing vacancy rate is reasonable; 10-20% commercial housing vacancy rate is dangerous; higher than 20% commercial housing vacancy rate means serious backlog. Because of real estate investors’ excessive speculation, real estate invest is overheating, plus frequently buying and selling, leading to high vacancy rate and high probability of real estate bubble.

7.2 Data reliability

The first half of the year 2009, sum of regional GDP is 1.4 trillion RMB higher than the national data; the first three quarter of the year 2009, sum of regional GDP is 2.5 trillion RMB higher than the national data; the whole year of 2009, sum of regional GDP is much higher than the national data. Since year 1985, GDP accounting at regional and national level respectively, sum of regional GDP is always higher than the national data, and sum of local cities GDP is also often higher than the province data.

Fraud is terrible, but long-term blatant forgery is much more terrible, and the most terrible thing is the act of turning a blind eye and let the problem intensified. Fraud erodes the credibility of the government and GDP distortion can mislead national policy, and it severely damages China's international image. China might not be the only one having such a problem, but no other big economy country has such long-term fraud problem.

Because of the problem of data reliability, even we get “satisfied” ratio above indicating there was a reasonable gap between house price and residential income in Shanghai, we still need to doubt: Really?

\(^4\) <<2010 Economy Blue Book>> issued by the Chinese Academy of Social Sciences (CASS) on 7\(^{th}\), December, 2009
7.3 Why isn’t price falling?

In China, there are a lot of reasons which making the price stays high, such like political factor, economic factor, social factor and so on.

1. Immigration demand

Some People come from the rural area or small city create the wealth through their own hard working and they want to live in the urban city or big city. They want to be the urban people and they want their posterity can live in the urban area as the urban people. This group of people can not count on the welfare housing, so they have the strong demand of the commercial housing market. Shanghai has foreign immigration of 5, 17 million by the end of year 2008. How can possible for the housing price to fall when there is so much demand of housing?

2. Market economy

It is the market economy, so the market sets the housing price. People have the habit of buying something more when the price rises but falls, because they have expectation that the price will keep rising and they can make profit of the difference, so it is normal that the housing price rise while people are rushing to buying it. The housing price will not fall until no one buy the housing anymore.

3. Interest of the housing buyer

The buyers can not accept the situation that the housing price falls down after their purchasing. Most of the Real Estate investors are rich people, if they will lose money by investing, they will try their best to resist the housing price falling. Poor people can not afford the housing rising, but the rich people can not afford the housing falling, which makes the result of game very obvious—the housing price are not allowed to fall down.

4. The cost of land

Nowadays, the new built housings are mostly commercial housing. Other than demolition housing, the commercial housing developers have to buy the land through the way of government auction sale price bidding which makes the cost of land much higher than before, so the cost of the building project goes up, leading the price of housing goes up. The housing
price will not fall until the land price falls down which is not only impossible for the China market but also for the world market.

5. Government action

Now the Real Estate development is kind of the government action, and it is an important economic pillar industry for the local government. If the Real Estate developers quit, whom can the government sell land to? How can the government get taxes? How can the government develop the city without taxes? How can the government run? The government has to consider the interest of the ordinary people, the interest of the Real Estate developers and the interest of the government. We are informed that “the interest of the government is the interest of the ordinary people”, so the housing price can never fall down.

6. National interest

All the housing developers are more or less financed by the bank loan, if the housing price falls down, the developers can not pay back the loan on time, and it will hurt the national interest, so it is not possible for the housing price to fall.
8. Conclusion

This paper examines housing affordability problem in Shanghai. As the financial center of China, Shanghai plays very important role in today’s economy development; housing, as the necessity for our life, affect people’s living standard. According to the empirical study in this paper, there seems no housing affordability problem in Shanghai by official data under the assumption that residential living area per capita is 15. However, the real case study analysis tells a different story. Since high housing price created high GDP, it seems unable to lower down the housing price without hurting GDP which is the achievement of the government. The most concerned doubt in the paper is about the data reliability which is even though much better than a decade before but still has many problems. At the end of the paper, list the main reasons which making the housing price keeps high and comfort readers that the price is kind of reasonable even it is unaffordable for most of people. This paper is based on a new measure of housing affordability, and the result might not convince audiences, but it is also one of the points of view.
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