



LUND UNIVERSITY
School of Economics and Management

**Master programme in Economic Growth,
Innovation and Spatial Dynamics**

**Urbanization and Income Inequality in China
in the period 2001-2012**

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Abstract: This thesis studies the relationship between urbanization and income inequality in China in the period 2001 to 2012. To analyze this question, firstly, it studies the urbanization development by looking of the urbanization ratio, growth rate of urban population and the share of agriculture in GDP. Secondly, it conducts the Gini coefficient of urban and rural sector respectively based on the data published by the National Bureau Statistics of China. Our results find that the income inequality in urban sector follows the Kuznets inverted U curve and the eastern coastal region has a higher income inequality.

Key words: Urbanization income inequality Kuznets inverted U shape

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1 Introduction

1.1 Background

Since 1978, when China began to implement the reform and opening up policy, great transformation has happened in the urbanization process and economic growth. The GDP has experienced a sharp growth from 3645.2 billion RMB in the year of 1978 to 518942.1 million RMB in the year of 2012¹. Meanwhile, the urbanization rate of China has also kept a rapid upward trend. It increased by more than 30% in thirty years (from 17.92% in 1978 to 52.57% in 2012).² According to the general pattern of urbanization development, the urbanization rate would follow a S curve as time goes by. That is to say, in the beginning, the urbanization rate grew slightly, and then it has a rapid increase, after this significant growth, it changed steadily. In terms of China, it was in the second stage. The accelerated development of urbanization and population mobility in a large size has already become a prominent feature of Chinese economy. However, with the significant progress of economy and urbanization, the income inequality in China also enlarged. According to Li (2003), the level of unequal income distribution in China has already ranked higher around the world. Therefore, it is essential to study the relationship between urbanization process and income inequality.

1.2 Aim and Scope of the Study

The aim of this paper is to make an empirical analysis on the urbanization development and income inequality of China during the period 2001 to 2012. The reason for choosing this period is that the globalization trend of China accelerated since 2001 because of entering the WTO. Therefore, it is worth to see whether the globalization has an effect on the income inequality and urbanization in China. If it has, is the effect negative or positive. For the year

¹ NBS (2013), “China Statistical Yearbook 2013” National Bureau of Statistics of China

² NBS (2013), “China Statistical Yearbook 2013” National Bureau of Statistics of China

2012, it covers the latest data of average income and urbanization population published by the National Bureau of Statistics of China. What's more, to conduct our research, we divide China into three regions: east, middle and west and analyze income inequality from two aspects: urban inequality and rural inequality. The contribution of this thesis is that the majority of the research before on the urbanization development and income inequality is from the national view. Because of the fact that the size and population of China are large and there are twenty-eight provinces, it is essential to study the relationship between these two variables from a regional level. Therefore, in the thesis, we use the provincial level data to make an analysis.

1.3 Outline of the thesis

Section 2 provides an overview and discussion about the literature and theoretical models on the relationship between urbanization and income inequality. Section 3 presents the methodology that will be used in the study. One is to measure the urbanization development; The other is to calculate the income inequality of urban and rural households. Section 4 describes the data that will be utilized to complete the empirical analysis. Section 5 makes an empirical analysis about the urbanization development and describes the urban income inequality and rural income inequality by using the Gini coefficient. Section 6 discusses the results obtained from section 5. Section 7 put forwards some policy implications. Finally, Section 8 makes a conclusion and suggestion for further research on this topic.

2 Theoretical Framework and Literature Review

For the purpose of our analysis, we classify the theoretical framework into two types. The first one covers the migration model (Lewis dual sector model in the 1950s and Todaro Model in the 1970s), which laid the foundation of explaining the development of urbanization. The second one covers the theories of income inequality.

2.1 Lewis dual sector model

In the paper “Economic Development with Unlimited Supply of Labor” published by Lewis (1954), “Dual Sector Model” in terms of the economies in developing countries has been proposed. In this model, he firstly defines two terms. One is “capitalist” sector (modern urban sector), which utilizes reproducible capital and is more commercial and profitable. The other is “subsistence” sector (traditional rural sector), which does not use reproducible capital. He also assumes that surplus labor is unlimited in the traditional rural sector. That is to say, there is an elastic labor supply in agricultural sector. To some extent, it is a proper assumption for China because of the fact that population is extremely large relatively to resources and capital. In 1978, there are about 656.64 million Chinese residents living in the rural areas, which accounts for 82.08% of the total population. Therefore, lots of surplus labor indeed existed in the agricultural sector in China. What's more, workers in this sector are assumed to be paid at their average product (total output divided by total labor input). If labor is plentiful, while capital is limited, the marginal productivity of labor in rural economies will reduce to zero, which means although there is one additional unit of labor use, the total output is constant. Therefore, the average product of labor in rural areas has a decrease trend. In this situation, with more capital becoming available in modern sector, labor from subsistence sector in rural area will transfer to the capitalist sector in urban area to obtain wages amount to the mean product in traditional sector. This geographical interaction involves the redistribution and effective utilization of labor force and happens until modern urban sector receives all the surplus labor or “disguised unemployment”. After this period, with the labor-to-land ratio falling, the marginal product of labor in traditional sector will rise above zero, which is identified “Turning point” by Lewis.

Besides the analytical difference in productivity between two sectors, Lewis also takes account of income inequality. In the paper, he puts forward that the wage of traditional rural sector is relatively lower than that of modern urban sector, and the gap is usually 30 percent. This is firstly because the output per head in modern sector is higher than in the traditional sector. In addition, the

higher cost of rents and transport in urban areas and the influence labor unions have on wage levels can also account for this inequality.

Although the model proposed by Lewis is clear and simple to understand and roughly describes the procedure of economic growth, it also has three disadvantages. Firstly, it is based on a free mobility of labor from rural economies to urban economies. However, there may be some restrictions on the labor flow either from the side of agricultural sector or the industrial sector in developing countries. For example, in China, there is a formal restriction, *Hukou* (household registration) system, to limit the mobility from traditional rural areas to modern urban areas. Besides the formal limitation, in some countries, there may be some traditional customs that limit the labor flow. Secondly, it only emphasized on the accumulation and enlargement of the capitalist sector, but ignores the development of traditional agricultural sector itself. Last but the most important fact is that he assumes surplus labor only exists in rural area, and there is no unemployment problem in urban areas. Because of the full employment and significantly competitive labor markets in the modern sector, the real urban wage is constant. However, it is not reality in most developing countries. Before 1980s, there was a significant increase in the wage of urban labor both from the absolute income and relative to average rural income.

2.2 Todaro Migration Model

However, in the following several decades, although there was an increase in the levels of urban unemployment and underemployment, lots of rural population migrated to the urban areas, which challenged the Lewis two-sector model. In this situation, Todaro (1969), Harris and Todaro (1970) made a further study about the decision mechanism of individual immigration. Todaro proposed the concept of “expected income” to explain this paradoxical phenomenon, which was known as the Todaro migration model.

In this paper, he put forward that the rural-urban migration is determined by the urban expected income which involves two variables, the actual wage gap

and the employment probabilities. The labor firstly compares average rural income with urban expected income and moves if the former is less than the latter. This procedure contains the calculation both of the financial and psychological costs. For example, there is opportunity cost of unemployment possibility during the first period of immigration and the social adjustment. Although the rate of unemployment falls in the urban areas, lots of rural individuals still choose to move because they believe that better education and skills attained in the urban cities can make them achieve a higher expected income which can cover the previous costs. Therefore, one characteristic of Todaro model is that the fact that the rate of migration exceeds the rate of labor employed growth is possible. This may be helpful to explain why there are high rates of urban unemployment in most underdeveloped countries.

The above mentioned theories laid the foundation of explaining the process of urbanization. In this paper, we would like to build a relationship between urbanization and income inequality. Therefore, in the following part, we will make literature reviews about the distribution of income over the period of time.

2.3 Kuznets Hypothesis

Kuznets (1955) proposed Kuznets inverted U hypothesis to explain the relationship between economic growth and income gap. In the paper, he used time series data of developed countries (Germany, Britain and the United States) and deduced that the income inequality worsened at the early phase of economic growth, and then leveled off. As the development proceeded to a high level, the income gap had a decrease trend. He argues that more labor migrated from rural low production rate sector to urban high production rate sector during the early phase of economic development, which gives rise to an increase of income inequality. However, when the economy develops to a higher stage, the high-productivity sector occupies the dominant status. In this situation, the income inequality declines.

Kuznets Hypothesis provided a basic study for the relationship between income gap and economic development. However, it also has some problems.

Firstly, there is limitation of data used in terms of reliability and sufficiency. Secondly, the empirical foundation of Kuznets hypothesis still remains some argument. One of the problems is that it is difficult to build income distribution series that can be compared between different countries.

2.4 Robinson Model

According to the dual economy and Kuznets hypothesis, Robinson (1976) made a further study about income inequality. He firstly makes an assumption that according to the different income distributions, there are two sectors in one economy. Then, he measured the income gap by using overall log variance. Here comes the formula.

$$\sigma^2 = W_1 \sigma_1^2 + W_2 \sigma_2^2 + W_1(Y_1 - Y)^2 + W_2(Y_2 - Y)^2 \quad (1)$$

Y_1 and Y_2 : the log mean of income in two sectors

σ_1^2 and σ_2^2 : the log variance of income in two sectors

W_1 and W_2 : the population shares of the two sectors

$$W_1 + W_2 = 1 \quad (2)$$

and

$$Y = W_1 Y_1 + W_2 Y_2 \quad (3)$$

Then replacing (2) and (3) into (1), one could get:

$$\sigma^2 = AW_1^2 + BW_1 + C \quad (4)$$

where

$$\begin{aligned} A &= -(Y_1 - Y_2)^2 \\ B &= (\sigma_1^2 - \sigma_2^2) + (Y_1 - Y_2)^2 \\ C &= \sigma_2^2 \end{aligned}$$

The Equation (4) shows that the overall income inequality has a maximum due to $A < 0$. And when there is an increase in W_1 , the gap firstly rises, reaches the highest point, and then declines. In addition, although labor flows from a

sector whose income is distributed more equally to the one with less, the overall income inequality will still improve. And the maximum value of income gap is:

$$W_1 = \frac{\sigma_1^2 - \sigma_2^2}{2*(Y_1 - Y_2)^2} + \frac{1}{2} \quad (5)$$

The equation (5) means that when the income inequality between urban sector and rural sector ($Y_1 - Y_2$)² is significantly great or the differential of income inequalities within each sector ($\sigma_1^2 - \sigma_2^2$) is relatively small, the population share in each sector is almost equal. In the paper, Robinson also puts forward that population change from 0.4 to 0.6 will have little influence on the income inequality because the parabola is nearly even around $W_I=0.5$ in the real economy (Robinson 1976). Therefore, he makes a conclusion that a developing country, if its policies are not effective and efficient, will face enlarged or unchanged income gap for a long term during the urbanization development.

2.5 Apply to China

Besides the above foreign study, some scholars also did research on the relationship between urbanization and income inequality in China by using qualitative and quantitative methods.

Zhao and Li (1997) found that the labor inflow from traditional rural area to modern urban area helped narrow the gap. Lu and Chen (2004) used panel data method to analyze the data of 1987-2001 in China and made a conclusion that the improvement of urbanization level could significantly narrow down the income inequality between urban sector and rural sector. By using time series data of China, Yao (2005) built a VAR model to prove that the development of urbanization would have a positive influence on the urban-rural income inequality in a long period. However, in a short period, the influence can be negligible. Chen and Zhou (2005) found that there was an inverted U curve between economic development and income gap. And they predict that the gap would reach the highest point during the period of 2008-

2010. Based on the panel data of China, Cao (2010) also found that during the process of urbanization, income inequality would narrow down. However, it had obvious difference between regions. Chen (2013) put forward that the acceleration of urbanization could expand employment demand in urban areas. Therefore, more labor from traditional rural sector could flow freely to modern urban sector and the income inequality decreased.

However, there are some researchers who had different opinions. Some of them think that the improvement of urbanization would have negative effect on the income inequality. Others believe that the relationship between these two variables was uncertain. By using multiple regression model, Chen and Dong (2007) collected the data of 1985-2003 and found that there was an increase tendency in income gap during the process of urbanization. By using the method of variance decomposition, Cheng and Li (2007) found that the income inequality would rise because of the urban-biased policies. In the paper of Lin (2007), he suggested that there is no obvious answer to the question whether the process of urbanization could improve income gap between urban and rural areas. By collecting the data of 1978-2007, Guo (2009) also found that the relationship between urbanization and income inequality was complicated, and it could not simply be described by reduce or increase.

3 Methodology

3.1 Income Inequality Measurement

Based on the standard of National Bureau of Statistics, the income distribution of urban and rural households in China is divided into five levels: lowest, lower, middle, higher and highest. In order to estimate the income inequality of the two sector in selected provinces respectively, this paper applies the Gini coefficient, which is calculated based on the average income of quintile groups. The formula is as follows (Anand,S 1978 p312)

$$G = 1 - \sum_{i=0}^{n-1} (F_{i+1} - F_i)(\Phi_{i+1} + \Phi_i) \quad (1)$$

where n represents the income levels that is equal to 5;

F_i represents the cumulative population share, for $i = 0, \dots, n-1$, with $F_0 = 0$, $F_n = 1$;

Φ_i represents the cumulative income share, for $i = 0, \dots, n-1$, with $\Phi_0 = 0$, $\Phi_n = 1$;

Because this study employs the data of quintile groups, the proportion of population in each income group is the same, which is equal to 0.2.

Therefore, the above Gini Equation can also be written as:

$$G = 0.8 - 0.4 * (\Phi_1 + \Phi_2 + \Phi_3 + \Phi_4) \quad (2)$$

This method can give an estimation of Gini coefficient, whose value changes between 0 and 1. And the closer it is to zero, the more equal of income households can have. On the contrary, when it is close to 1, it means that the income distribution of this province is perfectly inequality. However, low numbers do not always mean economic health. Because sometimes it suggests a relatively equal distribution of poverty. By using Gini coefficient, comparison of income distribution across different population sectors becomes sufficiently simple and easily interpreted. Besides, the income inequality can be measured in a way of ratio analysis, rather than the per capital income or GDP, which is less representative.

The approximation for Gini coefficient of average income of urban households in these representative provinces in the year 2001, 2002, 2004, 2008 and 2012 are listed in “Appendix 1”. And the data of rural households in the year 2002, 2004, 2008, and 2012 are listed in “Appendix 2”.

3.2 Urban population Growth Measurement

To calculate the growth rate of urban population across these selected provinces during this period, this paper uses natural logarithms. Here comes the formula:

$$\Delta Y_{0-T} = (\ln(Y_T) - \ln(Y_0))/T \quad (3)$$

where Y represents the urban population of one province and T represents the years, which is equal to eleven in this paper.

By using of the logarithms, the annual rate of urban population change is not given in percentages. Therefore, we use the equation (4) to transform the calculation into percentages.

$$\Delta Y_{in\%} = EXP(\Delta Y_{0-T}) - 1 \quad (4)$$

The calculation result is shown in Table 1. We make use of this data as one of the indicators when analyzing the urban development of each province.

4 Data

This paper makes an empirical analysis of urbanization and income inequality in China based on the national, regional and provincial dataset, which derive from The World Bank, Chinese Statistical Yearbooks and provincial statistical yearbooks. These various statistical yearbooks are conducted every year by National Bureau of Statistics of China in order to reflect the general situation of Chinese economic and social development. In this thesis, it collects and calculates the data of urban and rural household respectively to observe inequality in average income for fifteen representative provinces in three regions from 2001 to 2012. There are twenty-eight provinces in three regions, so the fifteen representative samples can make this study comprehensive and convincing. However, due to the lack of data of rural household in some provinces, we can only choose eight samples. To urban household, we select the year of 2001, 2002, 2004, 2008 and 2012. The reason we add the year 2001 is to make a comparison in income inequality before and after entering the WTO during the urbanization process. To rural household, we begin from the year 2002 for the reason that the average income of rural households by level of income started from this year. In this paper, we would like to build a relationship between income inequality and urbanization, therefore, in the following part, it covers the data of urban population account for the total population, the growth rate of urban population and the share of agriculture in GDP in the selected provinces,

which are the featured indicators of urban development from the World Bank. Figure 1 shows the administration divisions of China and divides them into three regions: east, middle and west.



Figure 4.1 Administration Divisions of China

In this paper, we choose representative provinces in each province. In the east region, we select six provinces: Beijing, Jiangsu, Shanghai, Zhejiang, Fujian and Guangdong. This is because Beijing is the capital city of China and Shanghai is the commercial and financial center in the mainland China. In addition, Jiangsu, Zhejiang, Fujian and Guangdong are located in the eastern costal region, which firstly had significant changes when China opened its economy in 1978. And they always rank higher in terms of regional GDP and population density. In the middle region, we select all provinces except Hunan and Shanxi for the reason that the average income of urban and rural households by the level of income is not available. In the west region, we select Xinjiang, Sichuan, Shaanxi, Yunnan and Guangxi. This is because the size of land of Xinjiang is the largest among the whole country. And it is in the northwest. Sichuan and Shaanxi are the main agricultural production bases and major industrial centers of western China. Yunnan is located in the southwest. Therefore, the selection of these five provinces could cover the western region at large extent.

5 Empirical Analysis Based On the Provinces of Three Regions in China

5.1 Urbanization Development

In this part, we would like to use the indicators suggested by the World Bank to analyze the development of urbanization in provinces and then compare the differences between them. The data of urbanization rate and share of agriculture in GDP we will use are listed in “Appendix 3” and “Appendix 4” respectively.

5.1.1 Urbanization Rate

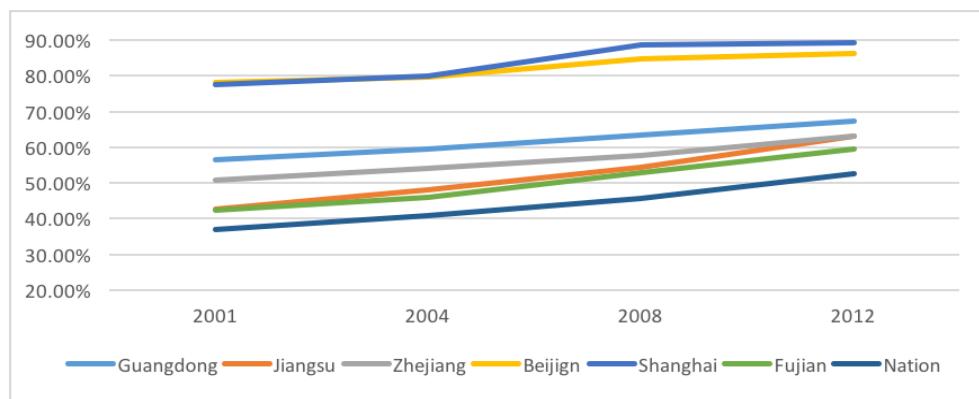


Figure 5.1 Urbanization Rate of the east region and whole country from 2001 to 2012. *Source:* based on own calculation and China statistical yearbooks and provincial Statistical Yearbooks 2001, 2004, 2008 and 2012. *Note the urbanization rate is calculated by the urban population account for the whole population. And the urban population means that people live in urban area not people register in the urban area.*

From Figure 5.1, there are some characteristics we can conclude for the eastern region.

- (1) During the period 2001-2012, the urbanization level of the eastern provinces kept an upward trend steadily. After 2004, the urbanization rate of all the eastern provinces has already exceeded 50%.
- (2) The development of urbanization in the east region was higher than the national level, especially Beijing and Shanghai, which was beyond 70% in 2001 and reached almost 90% in 2012.
- (3) Compared with Beijing and Shanghai, the urbanization level of the eastern coastal provinces (Guangdong, Zhejiang, Jiangsu and Fujian) was relatively lower, which changed from 40% to 70%. However, it was still

far beyond the rate of the whole country (around 50%).

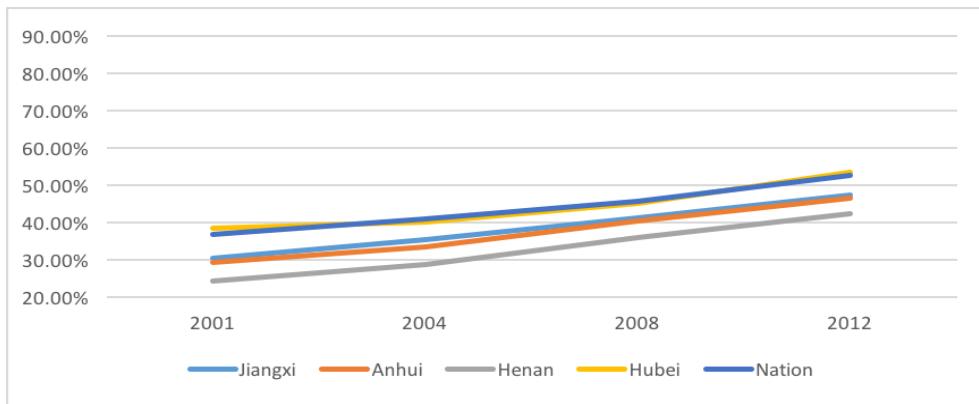


Figure 5.2 Urbanization Rate of the middle region and whole country from 2001 to 2012. Source: based on own calculation and China statistical yearbooks and provincial Statistical Yearbooks 2001, 2004, 2008 and 2012.

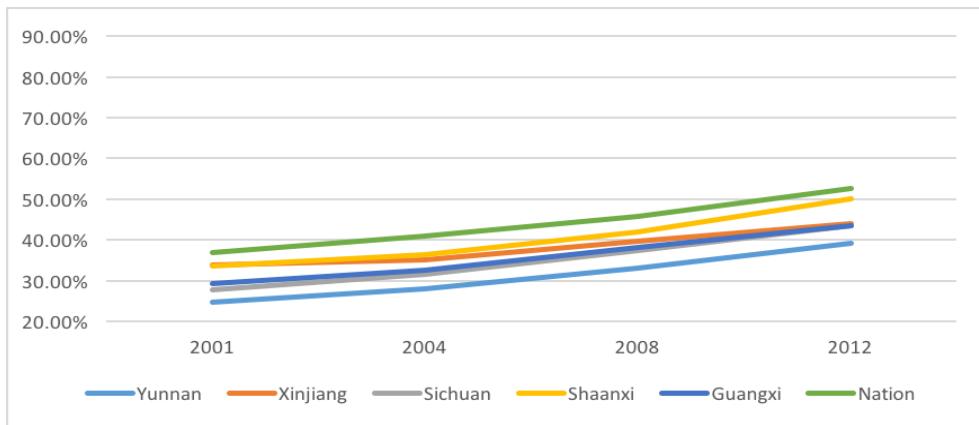


Figure 5.3 Urbanization Rate of the west region and whole country from 2001 to 2012. Source: based on own calculation and China statistical yearbooks and provincial Statistical Yearbooks 2001, 2004, 2008 and 2012.

From Figure 5.2 and Figure 5.3, we can see that the development trend of urbanization in the middle and west regions is similar to the trend of east region. That is to say, during the period 2001-2012, it experienced an increase all the time. However, there is also difference between these regions. For example, in most provinces of the middle and west regions, the urbanization level is lower than the national level. After 2008, most of them kept close to or below 50%. Therefore, the middle and west regions are lower than the east region in terms of urbanization rate.

5.1.2 Growth Rate of Urban Population

By using the equation (3) and (4), we calculate the growth rate of urban population in selected provinces during this period. The result is as follows:

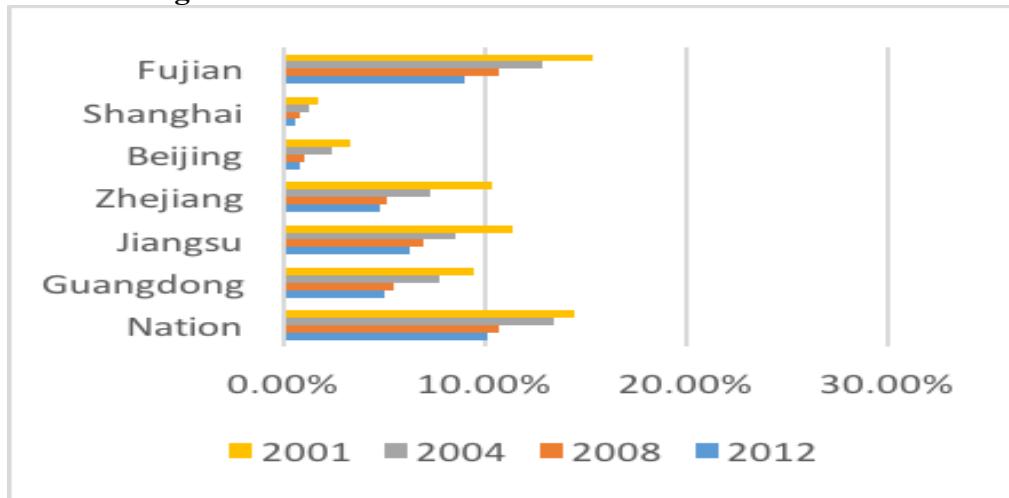
| Provinces | Urban Population | | Growth Rate of Urban Population |
|-----------|------------------|-------|---------------------------------|
| | 2001 | 2012 | |
| Guangdong | 4389 | 7140 | 4.42% |
| Jiangsu | 3133 | 4990 | 4.23% |
| Zhejiang | 2347 | 3461 | 3.53% |
| Beijing | 1081 | 1784 | 4.55% |
| Shanghai | 1251 | 2126 | 4.82% |
| Fujian | 1462 | 2234 | 3.85% |
| Jiangxi | 1273 | 2140 | 4.72% |
| Anhui | 1854 | 2784 | 3.70% |
| Henan | 2334 | 3991 | 4.88% |
| Hubei | 2309 | 3092 | 2.65% |
| Yunnan | 1066 | 1269 | 1.58% |
| Xinjiang | 633 | 982 | 3.99% |
| Sichuan | 2410 | 3516 | 3.43% |
| Shaanxi | 1230 | 1877 | 3.84% |
| Guangxi | 1407 | 2038 | 3.37% |
| Nation | 47221 | 71182 | 3.73% |

Table 5.1 Growth Rate of Urban Population in the East, Middle and West Regions from 2001 to 2012. Source: China statistical yearbooks and provincial Statistical Yearbooks 2001, 2004, 2008 and 2012.

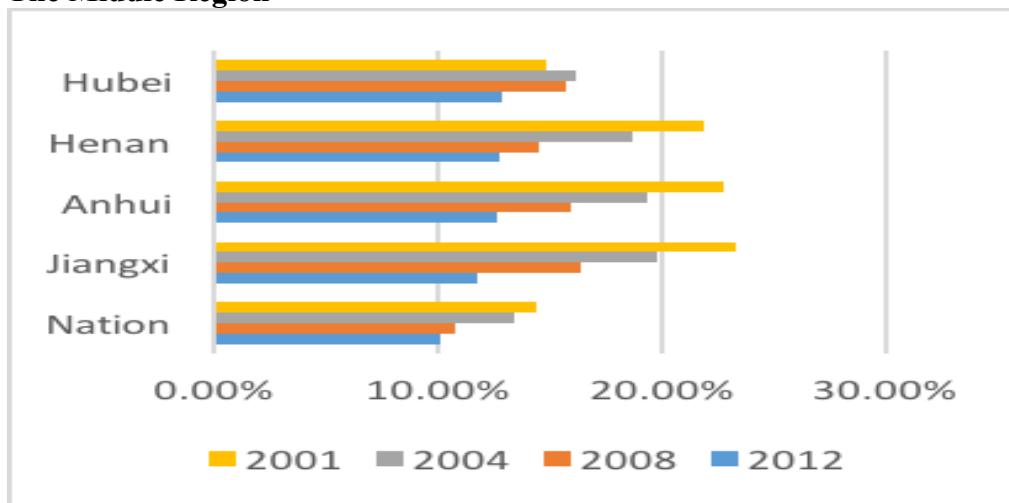
From Table 5.1, we can see that the growth rate of urban population in most eastern provinces was higher than the national level. In addition, four eastern provinces have already beyond 4% in terms of urban population growth rate among six. However, compared to the east region, the urban population growth in most provinces of middle and west regions was lower than the national growth rate. And only Henan and Jiangxi were higher than 4% among nine selected provinces from the aspect of urban population increase rate.

5.1.3 The share of agriculture in GDP

The East Region



The Middle Region



The West Region

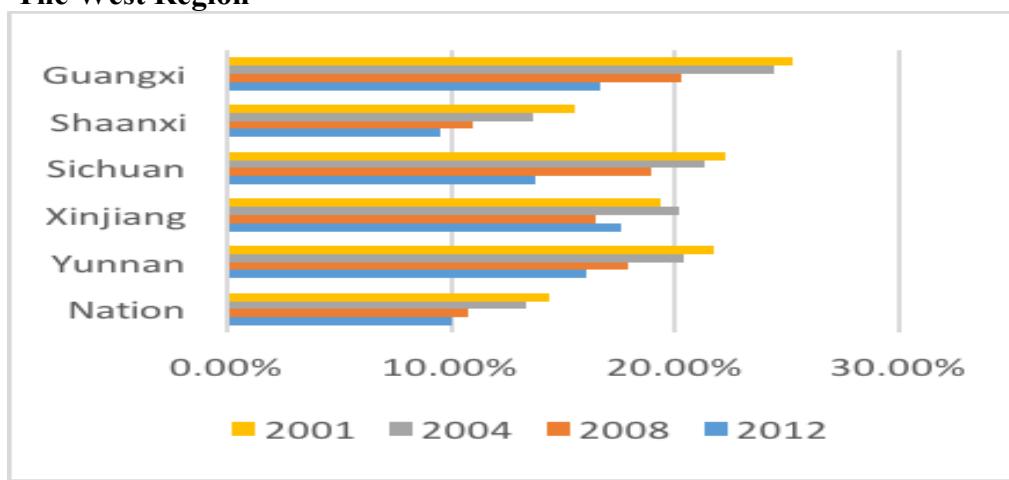


Figure 5.4 the Share of Agriculture in GDP of Provinces in Three Regions in 2001, 2004, 2008 and 2012. Source: China statistical yearbooks and provincial Statistical Yearbooks 2001, 2004, 2008 and 2012.

Figure 5.4 shows that from 2001 to 2012, the share of agriculture in GDP in each observed provinces has declined gradually. In the east region, it decreased to below 10% in 2012, which was lower than the national level. In Beijing and Shanghai, they were the lowest (less than 1% in 2012). Compared with the east region, although there is a decrease tendency in the share of agriculture in GDP in middle and west regions, it was still higher than the national level.

Therefore, from above analysis on urbanization rate (urban population account for the total population), urban population growth rate and the share of agriculture in GDP, there are some conclusions we could make. Firstly, during the period 2001 to 2012, the urbanization level of all the selected provinces in three regions has improved. Secondly, the urbanization development of east region is, to some extent, higher than the middle and west regions.

In this thesis, we would like to study the relationship between urbanization and income inequality. Therefore, in the next part, we will focus on the income gap in these provinces of three regions.

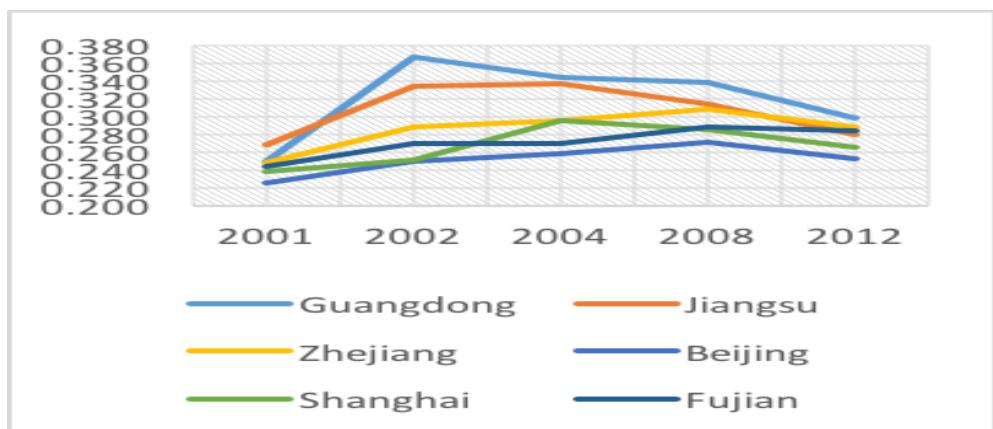
5.2 Income Inequality

In this section, we will give an empirical analysis about the current situation of income inequality in China based on the results we have already calculated. Firstly, we will give an illustration about the inequality for urban households in different regions. Secondly, we focus on the income gap of rural households.

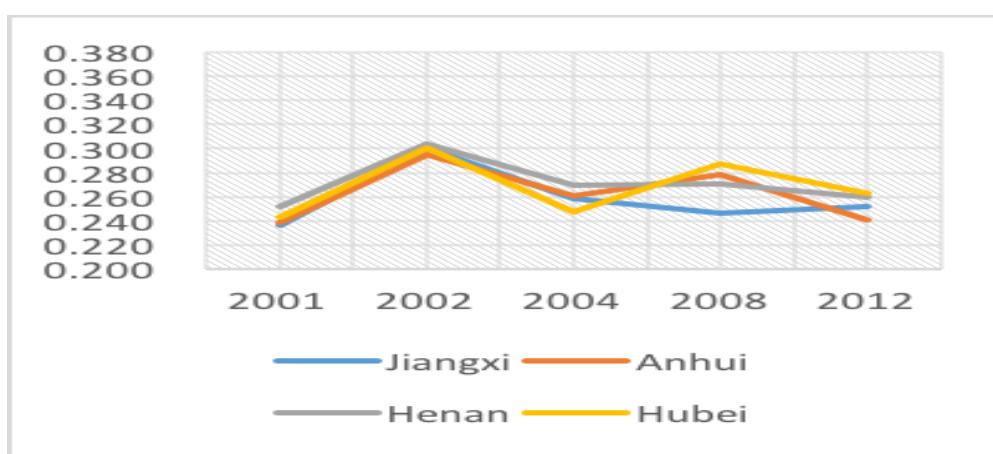
5.2.1 Urban Households

By using the equation (1) and (2), we calculate the Gini coefficient of urban households in three regions in the year 2001, 2002, 2004, 2008 and 2012 and then make empirical analysis based on this data. Our findings are as follows:

The East Region



The Middle Region



The West Region

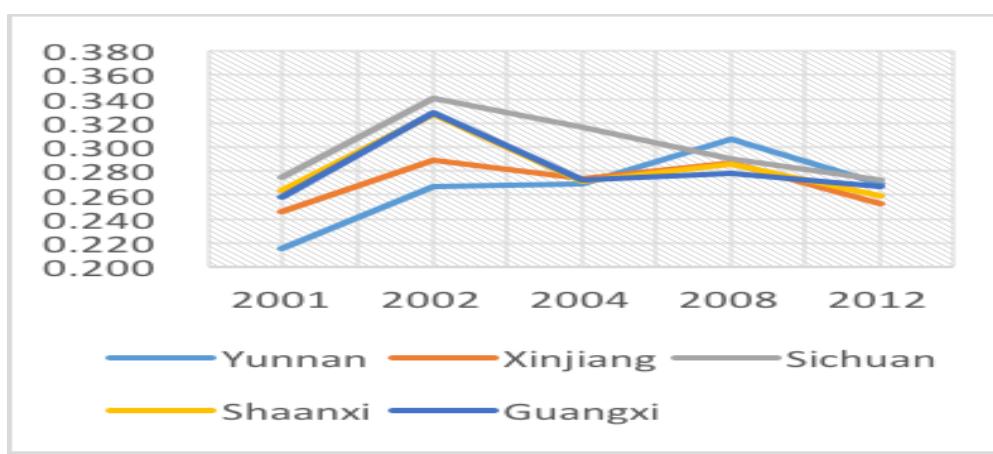


Figure 5.5 Gini coefficient of Urban Households in the East, Middle and West Regions from 2001 to 2012. Source: based on own calculation and China statistical yearbooks and provincial Statistical Yearbooks 2001, 2002, 2004, 2008 and 2012. Note the Gini coefficient is calculated to measure the income inequality.

From Figure 5.5, we can find some features about the income inequality of urban households in the east, middle and west region.

- (1) The Gini coefficient increased in the beginning and then had a decrease trend among three regions. That is to say, it follows an inverted U shape.
- (2) Although the Gini coefficient of all provinces except Jiangxi declined after 2008, it was still higher than the beginning. In 2001, the Gini coefficient of most provinces was around or below 0.260, however, in 2012, it was mainly around or above 0.260. Therefore, generally speaking, the income inequality enlarged in the provinces of three regions during this period.
- (3) The income inequality had a rapid increase from 2001 to 2002 in all the observed provinces, and Guangdong was the most significant.
- (4) The income inequality of urban households in Guangdong is the highest among the eastern provinces.

From above analysis about the urbanization development, we can find that the urbanization level of middle and west regions was relatively lower than that of the east region. What's more, after 2004, there is a fact that the urbanization development in east region was beyond 50%, however, in the middle and west regions, it was still less than half. Therefore, in the following context, we would like to make a comparison in income inequality of urban household among different regions to see the relationship between these two variables.

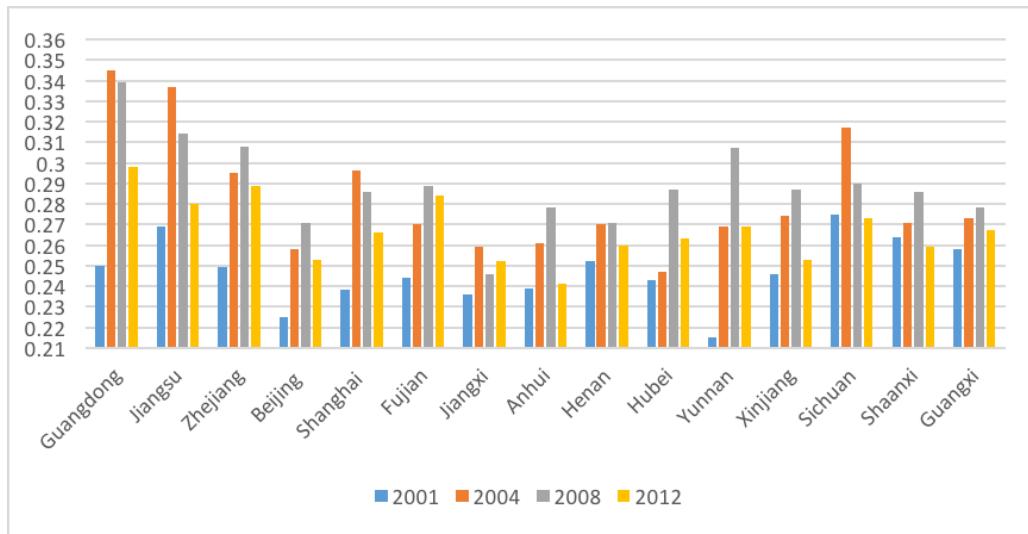


Figure 5.6 Gini Coefficient of Urban households in observed provinces in 2001, 2004, 2008 and 2012. Source: based on own calculation and China statistical yearbooks and provincial Statistical Yearbooks 2001, 2004, 2008 and 2012.

Figure 5.6 firstly shows that from 2001 to 2012, the income inequality of urban households in the east region (Guangdong, Jiangsu, Zhejiang, Fujian and Shanghai) was relatively higher than most provinces located in the middle and west region, especially during the period 2004 to 2008. After 2008, the difference between eastern coastal region and middle, west region was relatively smaller than before in terms of the urban income inequality. In 2004 and 2008, the Gini coefficient in eastern coastal provinces reached above or near 0.300 while in the middle or west, it was between 0.240 and 0.290. After 2008, there was a decrease trend in income inequality in most provinces. In the east, it was between 0.290 and 0.300. In the middle and west regions, it was mainly in 0.250-0.270. Secondly, from this figure, we can find that the urban income inequality of Beijing was different from that of provinces which were also located in the east region. In the year 2001, 2004, 2008 and 2012, the Gini coefficient of urban households in Beijing was always lower than the provinces in middle and west regions.

After the analysis on urban households of three regions, we will try to find how income inequality of rural households has changed during the urbanization process.

5.2.2 Rural Households

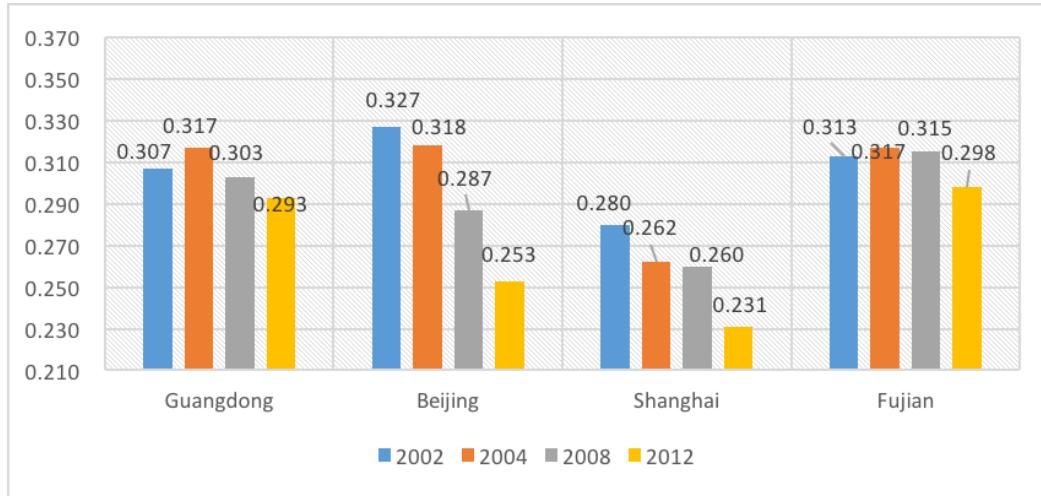


Figure 5.7 Gini Coefficient of Rural households in eastern provinces in 2002, 2004, 2008 and 2012. Source: based on own calculation and China statistical yearbooks and provincial Statistical Yearbooks 2002, 2004, 2008 and 2012.

From Figure 5.7, we can see that the Gini coefficient of rural households in the eastern regions had a decrease tendency during this period. Guangdong and Fujian has experienced a growth in first and then declined while Beijing and Shanghai has fallen all the time. They were in the second stage of the inverted U curve.

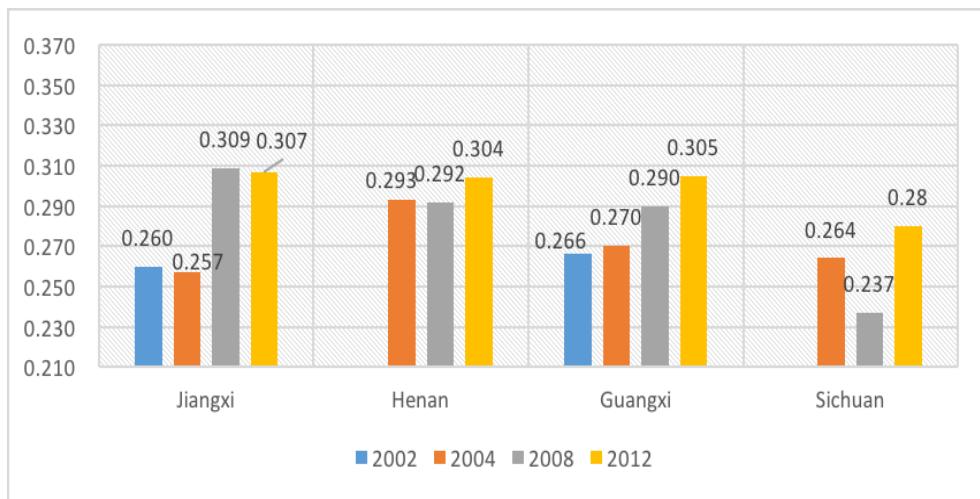


Figure 5.8 Gini Coefficient of Rural households in middle and west provinces in 2002, 2004, 2008 and 2012. Source: based on own calculation and China statistical yearbooks and provincial Statistical Yearbooks 2002, 2004, 2008 and 2012.

Figure 5.8 illustrates an opposite situation as Figure 7. It shows that the income inequality of rural households in middle and west regions kept an

increase tendency from 2002 to 2012. In 2012, the income inequality of most observed provinces has already exceeded 0.300.

After the above analysis about urbanization and income inequality respectively, we will conclude the relationship between these two variables.

(1) During the urbanization process, the income inequality of urban households in all selected provinces in the three regions shows an inverted U curve, which follows the Kuznets Hypothesis.

(2) In the urban sector, when the urbanization development is higher, the income gap is also relatively higher than other regions. For example, in the eastern coastal region, after 2004, the urbanization level of all provinces was above 50%, while in the middle and west regions, it develops still under 50%. However, the income gap in the east region was also higher than the middle and west regions.

(3) Although the urbanization development in Beijing is higher, the income inequality of urban households was lower than other provinces.

(4) In the rural sector, during the urbanization process, the income inequality of the middle and west regions still enlarged, which means that these provinces still in the first stage of the inverted U shape.

6 Discussion

In the fourth section, we have already analyzed the relationship between urbanization and income gap and found that it followed inverted U curve in the urban households. However, the reasons behind the income inequality within each sector is uncertain yet. Therefore, in this section, we will find the dominating reasons of it. We attempt to explain five questions in the following content.

- (1) Why did the income inequality of urban households appear an inverted U curve in three regions?
- (2) Why was there a significant increase in Gini coefficient from 2001 to 2002?
- (3) Why was the income inequality of urban households in eastern costal regions, especially Guangdong, relatively larger when the urbanization

development was higher than other regions?

- (4) Why was the urban income inequality in Beijing lower than other provinces while its urbanization level was higher?
- (5) Why did the income inequality of rural households still expand in the middle and west regions?

To the first question, the explanation may be as follows:

In the Kuznets paper, he stressed that the income inequality between two sector will give rise to a mobility from low income rural area to high income urban area. In China, the urbanization process and industrialization happed simultaneously. Before 2008, the share of industry in GDP in the whole country kept an upward trend all the time and reached the highest point of 47.45%, after 2008, it began to decreased to 45.3%.³ When China became industrial, individuals in the urban sector firstly profited from the increasing productivity. And large number of surplus labor indeed existed in the agricultural sector in China. Besides, after entering the WTO, according to the agreement, the tariff of agriculture product need to be reduced. In 2004, it declined from 22% to 17.5%.⁴ With the decreased tariff, more foreign product would come into Chinese market and compete with domestic agricultural product, which would probably have a negative influence on the rural income and labor unemployment. In this situation, the labor from rural sector would flow to the urban sector to seek a higher wage. However, according to the previous study (Meiyang Wang, 2005; Yunyan Yang, Yongjin Chen 2000), in the labor market of urban sector of China, there was a lot of unsystematic, unregulated, legal but unregistered and small-scale production firms. And most of them existed in the industrial sector. That is the informal sector, which is characterized by easy entry, labor- intensive methods, perfect competition. In china, it is difficult for the rural labor to enter the formal modern sector. On one hand, most of the new inflow rural labor were less

³ NBS (2013), “China Statistical Yearbook 2013” National Bureau of Statistics of China

⁴ Yin, Y. (2004), “the Opportunities and Challenges of China after Entering the WTO”, The Economy Research, January 2004, p36-38 (*in Chinese*)

educational and unskilled. On the other hand, the strict *hukou* system (residence registration system) limits them to get a registered identity in cities. Therefore, most of them went to the informal sector. In 2005, employment in the informal sector accounted for 58.85% in the urban area.⁵ However, this phenomenon had a negative effect on the local labor in urban sector due to the relatively higher employment substitution. When facing this strike brought by the outside rural workforce, local labor of the informal sector would choose to reduce wages rather than quit the job. That is to say the impact on the wages is higher than the employment. In this situation, the outside and local local labor may have the same market equilibrium wages finally. However, to the formal sector which is more technological and innovative, the influence can be little. And with the growth of economy, the wages in formal sector would increase gradually. Therefore, in the first stage of urbanization, the income inequality of urban households would go up. What's more, if we take account of the working conditions, job security and pensions, the inequality may be higher.

After this period, the increasing income inequality within the urban group caused by the social mobility will follow a declined path. This firstly because the migrants have already settled down and could benefit from the advantages of urban life. For example, they can receive a higher level of education and gain more skills, which will improve the economic positions of them. Secondly, as we have already said before, the urban income inequality could be raised due to the growth of the informal sector. However, when the urbanization develops to a higher level, the income of agricultural sector would have an increase because of the less land pressure. At this time, less individuals would leave the rural area and those who suffered in the urban informal sector would come back. Besides, the improvement of service sector in China is also an important factor. According to Kuznets, compared with the manufacturing sector, income is more equal in the service sector. This is because people get income through their individual excellence in the service

⁵ NBS (2013), “China Statistical Yearbook 2006” National Bureau of Statistics of China

sector. Therefore, the descendants of richer people are unnecessary to seek for the higher service income. What's more, when people have already occupied a relative high-income job, the possibilities of getting a higher income were restricted. Therefore, in service sector, the possibilities of rising income in lower workers is relatively higher. In China, the contribution of service sector to GDP growth kept an upward tendency, from 0.7% in 1990 to 3.5% in 2012.⁶

After the explanation of first question, we would like to say something about why the Gini coefficient has dramatic rise in the urban areas of three regions from 2001 to 2002. In 2001, China entered the WTO and became more globalization than before. In this situation, there is more foreign direct investment inflow to China. According to the data of World Bank, before 2001, there is a decrease trend in FDI, however, after 2001, the tendency of FDI began to increase.⁷ With the development of FDI, more job opportunities were created in urban areas, which attracted more individuals in rural sector flowing to urban sector. According to Zhao (2001) who studied the influence FDI had on the skilled labor wage in China, to protect the intellectual property rights better, the FDI enterprises always paid more for skilled labors together with other immeasurable benefits such as working environment, pensions and medical health care. In addition, in 2001, FDI reached around 6.87759 billion US dollars, and most of them went to the industrial sectors (65.9%).⁸ Based on these factors, from 2001 to 2002, there was an enlarged income inequality in urban areas in three regions. And Guangdong is the most obvious, which has an increase from 0.250 to 0.367.⁹

However, the effect FDI has on the income inequality also follows an inverted U curve. That is to say, in the long term, the income inequality will reduce.

⁶ NBS (2013), “China Statistical Yearbook 2013” National Bureau of Statistics of China

⁷ The World Bank Data

(<http://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS?page=2>)

⁸ Li Y. (2010) “Globalization and Inequality in China”

⁹ NBS (2013), “China Statistical Yearbook 2013” National Bureau of Statistics of China

From Figure 5.5, we can see that after 2008, there is a downward trend in urban Gini coefficient in eastern regions. This is due to the spill-over effects of FDI. The foreign firms will bring technology and innovation to China, which on one hand could promote the transformation of economy, on the other hand help the labor enter the higher-income sector by improving their skills.

From the analysis in section four, we can find that the development of urbanization in eastern coastal region (Guangdong, Zhejiang, Jiangsu and Fujian) is higher than other provinces, however their urban inequality is also larger than most observed provinces in the middle and west regions, especially from 2004 to 2008. Next, we would try to carry out the reasons of it.

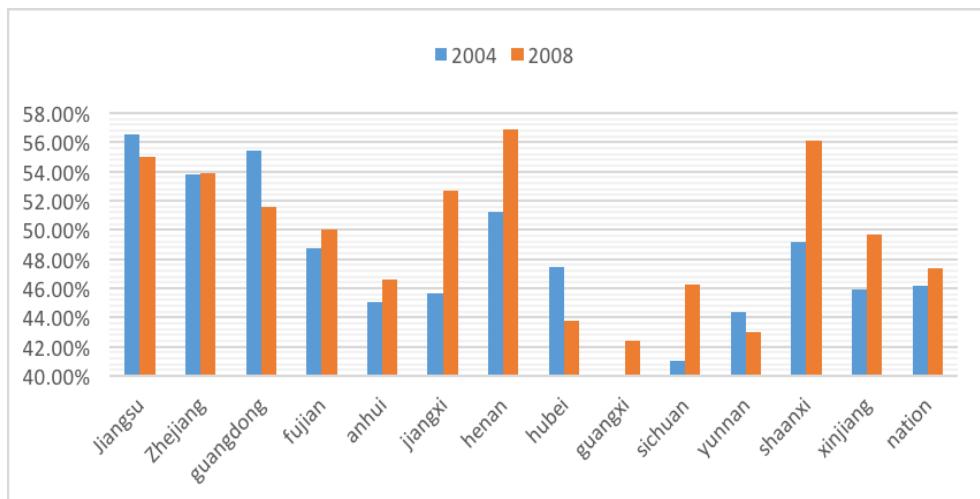


Figure 6.1 the share of industry in GDP of Provinces in the eastern coastal, middle and west regions in 2004 and 2008. Source: China statistical yearbooks and provincial Statistical Yearbooks 2004, 2008.

As we have already said before, the urbanization development and industrialization happened at the same time in China. From Figure 6.1, we can find that in 2004 and 2008, the share of industry in GDP in eastern coastal provinces (above 50%) was higher than the average level (46.20%, 47.40%) and most middle and west regions. During the industrialization process, more surplus rural labor could be received by the urban sector. However, in China the outside rural labor can not blend in the city life well, and most of them entered the inferior labor market, that is the informal sector. As above

analysis, the existence of informal sector would raise the urban income inequality. What's more, after the reform and open-up in 1978, the eastern coastal region was chosen to develop firstly and could have preferential treatment (lower tax or tax free). This is because the location can make foreign investment inflow and manufactured goods export more easily. For example, in Guangdong and Fujian, it set up four particular economic zones (Zhuhai, Shenzhen, Shantou and Xiamen) in 1980 and then opened up fourteen cities along the coastal region in 1984, which were mainly in Zhejiang and Jiangsu. These privileges gave the eastern coastal provinces more opportunity to attract FDI. Based on the research of Greaney and Li (2012), compared with the state-owned capital, a higher share of collective and FDI capital can create more employment and wage, which facilitate the mobility from rural sector to urban sector.

Different from other provinces in the east region, although the urbanization development of Beijing reached 86.20% in 2012¹⁰, which was far beyond the level of provinces in the middle and west regions, the income inequality of urban household was lower during the period 2001 to 2012. Next, we would explain it from the development of service sector.

| | | 2001 | 2004 | 2008 | 2012 |
|----------|---------|--------|--------|--------|---------|
| Service | Beijing | 60.51% | 60.00% | 73.25% | 76. 46% |
| | Nation | 40.46% | 40.38% | 41.82% | 44. 59% |
| Industry | Beijing | 36.22% | 37.60% | 25.68% | 22. 70% |
| | Nation | 45.15% | 46.23% | 47.45% | 45. 56% |

Table 6.1 The Share of Service in GDP of Beijing and the Whole country in 2001, 2004, 2008 and 2012. *Source:* China statistical yearbooks and provincial Statistical Yearbooks 2001, 2004, 2008 and 2012.

From Table 6.1, we can see that from 2001 to 2012, the share of service in GDP in Beijing was more than 20% higher than the national level. However, its industry share was always lower than the level of whole country. In addition, during this period, the share of service in GDP in Beijing has

¹⁰ NBS (2013), “China Statistical Yearbook 2013” National Bureau of Statistics of China

increased by more than 15%, especially from 2004 to 2008. On the contrary, its industry share has declined all the time. As we have explained before, income is more equal in the service sector than in the manufacturing sector. Therefore, when the service share was higher than the industry share, the income inequality could be relatively lower.

After the analysis of income inequality in urban sector, next, we will consider the gradually enlarged income inequality in rural sector in the middle and west regions. From Figure 3, Figure 4 and Figure 5, we can find that the share of agriculture in GDP in the middle and west regions is higher than the national level, but its urbanization rate is lower than the average level. The relatively lower urbanization level limit the rural surplus labor flowing to the urban sector. What's more, compared to the east region, the agricultural technology is low efficient in the middle and west regions. And it was less advantageous in terms of soil fertility, climate, geography and irrigation conditions. These factors all caused a lower land and labor productivity. Therefore, the surplus labor in rural areas become potential unemployment, which increase the income inequality in rural sector. Besides, the social security in rural sector is imperfection. If individuals lost jobs, they would not get the unemployment compensation.

Based on the causes we discussed about the urban and rural household income inequality, in the following section, we will give some policy implications.

7 Policy Implication

(1) Improve and perfect the labor market intermediary which provides the job information.

As we have analyzed before that the raising urban income inequality is due to the labor transformation from rural sector to urban sector during the industrialization. In the last decades, China has put much emphasize on increasing the urbanization rate and encouraged rural residents to settle down in the urban areas which could help increase the income of rural residents and lead them to live a better life as those urban residents. However, during this process, the most important issue is to solve the problem of employment for the rural residents. Thus, it is quite important that in urban areas, there are

enough and high quality of labor market intermediary which could provide enough and correct job information to those rural residents and reduce the information asymmetry during the process. This policy could help increase the employment among the rural residents when they settle down in urban areas.

(2) Increase the input in human capital in rural areas.

The lack of education and job skills among rural labor has been an important internal reason which cause the income inequality in urban sector. In China, the education resources in the rural areas are not as abundant as that in the urban areas, which brings a problem that when these rural labor migrates to the urban sector, they do not equip with enough skills. In this situation, they can only enter the informal sector, which will increase the income inequality. Therefore, the government could take action to ensure that the rural labor can have the same educational opportunity for the future career as the urban labor. For instance, the government could devote funds into improving the conditions of teaching in rural areas, building better schools, providing more qualified teachers, helping the rural labor get hang of knowledge and techniques that could afford competing with the labor from urban areas.

(3) Develop modern agriculture and improve productivity in the agricultural field.

Even though the development of Chinese economy has turned lots of agricultural population into non-agricultural population, the share of agriculture in GDP in the middle and western regions is still higher than the national level. As we have discussed before that the agricultural sector of these regions is still low-efficient due to the lack of high technological support. And the relatively lower agricultural productivity has been a crucial factor that leads to an expansion in the rural income inequality. Therefore, developing the modern agricultural technology and improving the agricultural productivity could solve the income inequality to a large extent

(4) Continue to adjust the policies of the income distribution

The policies of income distribution could largely affect the income inequality. In many countries, the governments use the tool of tax policies to adjust the income distribution. They impose a relatively high tax policy on higher income residents in order to decrease the income inequality between the rich and poor people. Therefore, the Chinese government could protect the benefits of the staff meanwhile implement a high-efficient policies of tax in order to adjust the income distribution. This could help reduce the inequality between the high-income labor and low-income labor.

(5) Complete the social insurance system and improve the social welfare in the rural sector.

Compared with the western countries, China's social insurance system and social welfare system is not complete. The imperfection of social welfare among rural residents causes the enlarged income inequality. For example, in rural China, individuals will not get compensation when they are unemployment. And they usually cannot have access to the same medical environment and social welfare benefits as urban population. Therefore, Chinese government could distribute more funds into solving the rural social insurance and welfare system, such as making appropriate unemployment benefits available in rural sector.

8 Conclusion

8.1 Summary

The aim of this thesis is to make a study about the relationship between urbanization and income inequality in three regions in China. Based on a careful calculation about Gini coefficient of urban and rural sector respectively, our empirical analysis finds that during the urbanization development, the income inequality in urban household follows an inverted U shape at the provincial level. The upward tendency is mainly caused by the facts that the possibility of getting job in urban is uncertain and there is vast employment in informal sector of rural labor during the early urbanization. However, when they have settled down and receive better education, the income inequality within the urban sector would decrease. Therefore, we give suggestion about the improvement of education and labor market intermediary.

Furthermore, we also find that the income inequality in urban sector rose after China became more globalization, which was possibly relevant to the inflow of foreign direct investment. However, this happens in the first period. After several years, the spill-over effects of FDI would bring a reduction in inequality.

In addition, the empirical analysis shows that in urban sector although the urbanization level is higher in eastern coastal region, the income inequality is larger than other regions. This situation could be explained by the government special policy. Thus, the government can also use tax policies to adjust the income inequality.

The last phenomenon we have found in the paper is that in rural areas, there is an increase trend in inequality in the west and east regions, which was caused by the relatively low-efficient agricultural productivity and imperfect social security. And based on these two reasons, we also give some policy implications.

8.2 Limitation and Further Research

Unlike most previous research based on the national viewpoint, we study the income inequality by comparing different regions in China. However, our study was restricted by the accessibility of rural provincial data. Therefore, it is difficult for us to calculate the Gini coefficient to measure urban-rural income inequality. We suggest that the National Bureau of Statistics of China could make an effort to collect and publish more inequality data in the future. Based on a more abundant data, we could investigate the relation between urbanization and income inequality in China deeper and richer. For example, in the further, we could make a comparison in urban-rural income inequality between east, middle and west regions during the urbanization process.

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Appendix 1

The Gini Coefficient of Urban Household in Fifteen Observed Provinces of Three Regions in China (a) 2001, (b) 2002, (c) 2004, (d) 2008, (e) 2012

source: Statistical Yearbooks 2001, 2002 2004, 2008 and 2012. Columns (2)-(6) denote the average income of five different groups;

| Province | Lowest | Lower | Middle | Higher | Highest | Gini |
|-----------------|--------|-------|--------|--------|---------|-------|
| a (2001) | | | | | | |
| Guangdong | 5150 | 7433 | 9503 | 12236 | 19609 | 0.250 |
| Jiangsu | 3436 | 5218 | 6599 | 8784 | 14651 | 0.269 |
| Zhejiang | 4886 | 7438 | 9693 | 12588 | 19040 | 0.249 |
| Beijing | 6271 | 8579 | 10631 | 13236 | 20652 | 0.225 |
| Shanghai | 6924 | 9229 | 11242 | 13895 | 23999 | 0.238 |
| Fujian | 4056 | 6029 | 7773 | 9998 | 15189 | 0.244 |
| Jiangxi | 2819 | 4099 | 5142 | 6624 | 10008 | 0.236 |
| Anhui | 2746 | 4174 | 5466 | 6962 | 10188 | 0.239 |
| Henan | 2468 | 3827 | 5011 | 6485 | 9857 | 0.252 |
| Hubei | 2884 | 4301 | 5418 | 6907 | 10767 | 0.243 |
| Yunnan | 3509 | 5297 | 6682 | 8200 | 11538 | 0.215 |
| Xinjiang | 3095 | 4983 | 6423 | 7983 | 12314 | 0.246 |
| Sichuan | 2792 | 4422 | 5808 | 7654 | 12605 | 0.275 |
| Shaanxi | 2545 | 3903 | 5050 | 6565 | 10701 | 0.264 |
| Guangxi | 3012 | 4695 | 6362 | 8133 | 12457 | 0.258 |
| b (2002) | | | | | | |
| Guangdong | 3664 | 6197 | 8713 | 12857 | 27218 | 0.367 |
| Jiangsu | 2820 | 4977 | 6939 | 9647 | 18763 | 0.339 |
| Zhejiang | 2784 | 5416 | 7256 | 9365 | 15282 | 0.289 |
| Beijing | 6058 | 8941 | 11316 | 14211 | 23349 | 0.250 |
| Shanghai | 6683 | 9294 | 11629 | 14488 | 25185 | 0.251 |
| Fujian | 3804 | 5989 | 7908 | 10310 | 16777 | 0.270 |
| Jiangxi | 2630 | 4261 | 5608 | 7406 | 13727 | 0.301 |
| Anhui | 2524 | 4169 | 5583 | 7500 | 13007 | 0.296 |
| Henan | 2525 | 4243 | 5793 | 7681 | 13915 | 0.307 |
| Hubei | 2599 | 4484 | 6113 | 8011 | 14066 | 0.300 |
| Yunnan | 3031 | 5085 | 6732 | 8544 | 13657 | 0.267 |
| Xinjiang | 2784 | 5416 | 7256 | 9365 | 15282 | 0.289 |
| Sichuan | 2070 | 4106 | 5737 | 7915 | 14991 | 0.341 |
| Shaanxi | 2154 | 3797 | 5097 | 6778 | 13422 | 0.327 |

| | Guangxi | 2643 | 4666 | 6453 | 8676 | 16671 | 0.328 |
|-----------|---------|-------|-------|-------|-------|-------|-------|
| c (2004) | | | | | | | |
| Guangdong | 4670 | 7781 | 11321 | 16567 | 31134 | 0.345 | |
| Jiangsu | 3611 | 6248 | 8789 | 12295 | 23508 | 0.337 | |
| Zhejiang | 5870 | 9322 | 12708 | 17663 | 29325 | 0.295 | |
| Beijing | 7401 | 10961 | 14245 | 18454 | 29635 | 0.258 | |
| Shanghai | 7065 | 10664 | 14149 | 19371 | 34404 | 0.296 | |
| Fujian | 4781 | 7337 | 9386 | 12199 | 20682 | 0.270 | |
| Jiangxi | 3603 | 5482 | 7082 | 8963 | 14821 | 0.259 | |
| Anhui | 3631 | 5591 | 7266 | 9576 | 15069 | 0.261 | |
| Henan | 3539 | 5734 | 7565 | 9771 | 15875 | 0.270 | |
| Hubei | 3731 | 5783 | 7521 | 9581 | 14540 | 0.247 | |
| Yunnan | 3514 | 6086 | 8195 | 10523 | 16317 | 0.269 | |
| Xinjiang | 3027 | 5434 | 7139 | 9505 | 14596 | 0.274 | |
| Sichuan | 2782 | 5025 | 7096 | 9787 | 16878 | 0.317 | |
| Shaanxi | 3074 | 5016 | 6558 | 8483 | 13899 | 0.271 | |
| Guangxi | 3435 | 5788 | 7833 | 10091 | 15982 | 0.273 | |
| d (2008) | | | | | | | |
| Guangdong | 6650 | 11579 | 17491 | 25258 | 44463 | 0.339 | |
| Jiangsu | 7025 | 11575 | 15910 | 21505 | 39490 | 0.314 | |
| Zhejiang | 8992 | 14263 | 19294 | 26113 | 47890 | 0.308 | |
| Beijing | 10681 | 16713 | 21888 | 28453 | 47110 | 0.271 | |
| Shanghai | 11593 | 17550 | 22675 | 30239 | 53733 | 0.286 | |
| Fujian | 7972 | 11999 | 15419 | 20448 | 37438 | 0.289 | |
| Jiangxi | 6285 | 9631 | 12326 | 15792 | 24228 | 0.246 | |
| Anhui | 6130 | 9580 | 12491 | 16215 | 27974 | 0.278 | |
| Henan | 5839 | 9728 | 12856 | 16614 | 26630 | 0.271 | |
| Hubei | 5609 | 8784 | 11689 | 15611 | 26797 | 0.287 | |
| Yunnan | 4985 | 8423 | 12012 | 16465 | 27587 | 0.307 | |
| Xinjiang | 4213 | 8224 | 11473 | 14918 | 23030 | 0.287 | |
| Sichuan | 5383 | 8856 | 11939 | 16078 | 26826 | 0.290 | |
| Shaanxi | 5157 | 8347 | 11211 | 14778 | 25026 | 0.286 | |
| Guangxi | 5800 | 9674 | 12938 | 16947 | 27454 | 0.278 | |
| e (2012) | | | | | | | |
| Guangdong | 12093 | 19516 | 26810 | 36698 | 61985 | 0.298 | |
| Jiangsu | 12404 | 19404 | 25402 | 34220 | 59761 | 0.280 | |
| Zhejiang | 14059 | 23073 | 30173 | 40064 | 69536 | 0.289 | |
| Beijing | 16386 | 25506 | 32196 | 40846 | 65966 | 0.253 | |
| Shanghai | 19059 | 27597 | 34351 | 44474 | 78522 | 0.266 | |

| | | | | | | |
|----------|-------|-------|-------|-------|-------|-------|
| Fujian | 12294 | 19465 | 25432 | 34062 | 58085 | 0.284 |
| Jiangxi | 9698 | 14691 | 18959 | 23690 | 38379 | 0.252 |
| Anhui | 11480 | 16625 | 21150 | 27132 | 41884 | 0.241 |
| Henan | 9899 | 15098 | 19507 | 25168 | 40692 | 0.26 |
| Hubei | 9269 | 14836 | 19099 | 24805 | 39754 | 0.263 |
| Yunnan | 10002 | 15836 | 20152 | 25846 | 43857 | 0.269 |
| Xinjiang | 8152 | 14024 | 18337 | 23534 | 34527 | 0.253 |
| Sichuan | 9583 | 14628 | 19092 | 25046 | 41989 | 0.273 |
| Shaanxi | 9131 | 14333 | 18811 | 23829 | 38144 | 0.259 |
| Guangxi | 9491 | 14619 | 19101 | 24476 | 40834 | 0.267 |

Appendix 2

The Gini Coefficient of Rural Household in Fifteen Observed Provinces

of Three Regions in China (a) 2002, (b) 2004, (c) 2008, (d) 2012 *source:*

Statistical Yearbooks 2002, 2004, 2008 and 2012. Columns (2)-(6) denote the average income of five different groups;

| Province | Lowest | Lower | Middle | Higher | Highest | Gini |
|-----------------|--------|-------|--------|--------|---------|-------|
| a (2002) | | | | | | |
| Guangdong | 1657 | 2492 | 3311 | 4478 | 8498 | 0.307 |
| Beijing | 2083 | 3625 | 5076 | 6915 | 12972 | 0.327 |
| Shanghai | 2429 | 4266 | 5701 | 7513 | 11989 | 0.280 |
| Fujian | 1372 | 2343 | 3140 | 4184 | 7854 | 0.313 |
| Jiangxi | 993 | 1691 | 2208 | 2841 | 4335 | 0.260 |
| Guangxi | 888 | 1403 | 1835 | 2400 | 3838 | 0.266 |
| b (2004) | | | | | | |
| Guangdong | 1658 | 2801 | 3769 | 5090 | 9581 | 0.317 |
| Beijing | 2614 | 4515 | 6140 | 8366 | 15386 | 0.318 |
| Shanghai | 3122 | 5148 | 7006 | 8775 | 13652 | 0.262 |
| Fujian | 1496 | 2668 | 3653 | 4934 | 8988 | 0.317 |
| Jiangxi | 1242 | 2180 | 2827 | 3641 | 5429 | 0.257 |
| Henan | 1091 | 1693 | 2203 | 2904 | 5338 | 0.293 |
| Guangxi | 973 | 1589 | 2159 | 2829 | 4387 | 0.270 |
| Sichuan | 1211 | 1867 | 2387 | 3085 | 5109 | 0.264 |
| c (2008) | | | | | | |
| Guangdong | 2659 | 4217 | 5633 | 7555 | 13806 | 0.303 |

| | | | | | | |
|-----------|------|-------|-------|-------|-------|-------|
| | | | | | | 42 |
| Beijing | 4458 | 7186 | 9566 | 12790 | 21629 | 0.287 |
| Shanghai | 4690 | 8065 | 10487 | 13094 | 20748 | 0.260 |
| Fujian | 2195 | 4137 | 5676 | 7583 | 13484 | 0.315 |
| Jiangxi | 1533 | 3277 | 4450 | 5957 | 9873 | 0.309 |
| Henan | 1813 | 2999 | 3989 | 5233 | 9161 | 0.292 |
| Guangxi | 1423 | 2571 | 3475 | 4595 | 7493 | 0.290 |
| Sichuan | 2135 | 3147 | 3967 | 5118 | 7667 | 0.237 |
| | | | | | | |
| d (2012) | | | | | | |
| Guangdong | 4099 | 7188 | 9683 | 12836 | 21578 | 0.293 |
| Beijing | 7019 | 12094 | 15754 | 20063 | 29873 | 0.253 |
| Shanghai | 7707 | 13071 | 16490 | 20340 | 29180 | 0.231 |
| Fujian | 3787 | 6761 | 9249 | 12375 | 20653 | 0.298 |
| Jiangxi | 2990 | 5355 | 7265 | 9882 | 17011 | 0.307 |
| Henan | 2594 | 4407 | 5900 | 7862 | 14129 | 0.304 |
| Guangxi | 2186 | 4110 | 5558 | 7584 | 12693 | 0.305 |
| Sichuan | 3074 | 4950 | 6709 | 8905 | 14428 | 0.280 |

Appendix 3

The Urban Population, Total Population and Urbanization in Fifteen Observed Provinces of Three Regions in China (a) 2001, (b) 2004, (c) 2008, (d) 2012 source: Statistical Yearbooks 2001, 2004, 2008 and 2012.

| Provinces | Urban Population | Total Population | Urbanization Rate |
|-----------|------------------|------------------|-------------------|
| a (2001) | | | |
| Guangdong | 4389 | 7783 | 56.39% |
| Jiangsu | 3133 | 7354 | 42.60% |
| Zhejiang | 2347 | 4613 | 50.88% |
| Beijing | 1081 | 1385 | 78.05% |
| Shanghai | 1251 | 1614 | 77.51% |
| Fujian | 1462 | 3440 | 42.50% |
| Jiangxi | 1273 | 4185 | 30.42% |
| Anhui | 1854 | 6325 | 29.30% |
| Henan | 2334 | 9555 | 24.43% |
| Hubei | 2309 | 5974 | 38.65% |
| Yunnan | 1066 | 4287 | 24.86% |
| Xinjiang | 633 | 1876 | 33.84% |
| Sichuan | 2410 | 8640 | 27.90% |
| Shaanxi | 1230 | 3659 | 33.62% |

| | | | |
|-------------------|---------------|----------------|------------------|
| Guangxi Nation | 1407 47221 | 4788 127627 | 29.40% 37.00% |
| b (2004) | | | |
| Guangdong | 4949 | 8304 | 59.60% |
| Jiangsu | 3580 | 7432 | 48.17% |
| Zhejiang | 2593 | 4803 | 53.99% |
| Beijing | 1187 | 1492 | 79.56% |
| Shanghai | 1395 | 1742 | 80.08% |
| Fujian | 1615 | 3511 | 46.00% |
| Jiangxi | 1524 | 4283 | 35.58% |
| Anhui | 2164 | 6461 | 33.50% |
| Henan | 2809 | 9717 | 28.91% |
| Hubei | 2427 | 6016 | 40.34% |
| Yunnan | 1240 | 4415 | 28.09% |
| Xinjiang | 690 | 1963 | 35.15% |
| Sichuan | 2724 | 8595 | 31.70% |
| Shaanxi | 1347 | 3705 | 36.36% |
| Guangxi | 1588 | 4889 | 32.50% |
| Nation | 53295 | 129988 | 41% |
| c (2008) | | | |
| Guangdong | 6048 | 9544 | 63.37% |
| Jiangsu | 4148 | 7676 | 54.30% |
| Zhejiang | 2949 | 5120 | 57.60% |
| Beijing | 1439 | 1695 | 84.90% |
| Shanghai | 1673 | 1888 | 88.60% |
| Fujian | 1798 | 3604 | 53.00% |
| Jiangxi | 1819 | 4400 | 41.36% |
| Anhui | 2484 | 6135 | 40.50% |
| Henan | 3397 | 9429 | 36.03% |
| Hubei | 2581 | 5711 | 45.20% |
| Yunnan | 1499 | 4543 | 33.00% |
| Xinjiang | 844 | 2130 | 39.64% |
| Sichuan | 3043 | 8138 | 37.40% |
| Shaanxi | 1583 | 3762 | 42.10% |
| Guangxi | 1837 | 4816 | 38.16% |
| Nation | 60667 | 132802 | 45.68% |
| d (2012) | | | |

| | | | |
|-----------|-------|--------|--------|
| Guangdong | 7140 | 10594 | 67.40% |
| Jiangsu | 4990 | 7920 | 63.00% |
| Zhejiang | 3461 | 5477 | 63.20% |
| Beijing | 1784 | 2069 | 86.20% |
| Shanghai | 2126 | 2380 | 89.30% |
| Fujian | 2234 | 3748 | 59.60% |
| Jiangxi | 2140 | 4504 | 47.51% |
| Anhui | 2784 | 5988 | 46.50% |
| Henan | 3991 | 9406 | 42.43% |
| Hubei | 3092 | 5779 | 53.50% |
| Yunnan | 1269 | 4659 | 39.31% |
| Xinjiang | 982 | 2233 | 43.98% |
| Sichuan | 3516 | 8076 | 43.53% |
| Shaanxi | 1877 | 3753 | 50.02% |
| Guangxi | 2038 | 4682 | 43.53% |
| Nation | 71182 | 135404 | 52.57% |

Appendix 4

The Share of Agriculture in GDP in Fifteen Observed Provinces of Three Regions in China (a) 2001, (b) 2004, (c) 2008, (d) 2012 *source:* Statistical Yearbooks 2001, 2004, 2008 and 2012.

| Provinces | Agriculture | GDP | the Share of Agriculture in GDP |
|-----------------|-------------|----------|---------------------------------|
| a (2001) | | | |
| Guangdong | 1004.35 | 10647.71 | 9.43% |
| Jiangsu | 1082.43 | 9511.91 | 11.38% |
| Zhejiang | 695.15 | 6748.15 | 10.30% |
| Beijing | 93.08 | 2845.65 | 3.27% |
| Shanghai | 85.50 | 4950.84 | 1.73% |
| Fujian | 651.11 | 4253.68 | 15.31% |
| Jiangxi | 506.00 | 2175.68 | 23.26% |
| Anhui | 750.07 | 3290.13 | 22.80% |
| Henan | 1234.34 | 5640.11 | 21.89% |
| Hubei | 692.17 | 4662.28 | 14.85% |
| Yunnan | 450.54 | 2074.71 | 21.72% |
| Xinjiang | 288.12 | 1485.48 | 19.40% |
| Sichuan | 981.68 | 4421.76 | 22.20% |
| Shaanxi | 287.24 | 1844.27 | 15.57% |

| | | | |
|-----------------|----------|-----------|--------|
| Guangxi | 562.52 | 2231.19 | 25.21% |
| Nation | 15781.30 | 109655.20 | 14.39% |
| b (2004) | | | |
| Guangdong | 1245.42 | 16039.46 | 7.76% |
| Jiangsu | 1315.38 | 15403.16 | 8.54% |
| Zhejiang | 816.00 | 11243.00 | 7.26% |
| Beijing | 102.90 | 4283.31 | 2.40% |
| Shanghai | 96.71 | 7450.27 | 1.30% |
| Fujian | 777.87 | 6053.14 | 12.85% |
| Jiangxi | 711.70 | 3595.94 | 19.79% |
| Anhui | 932.42 | 4812.68 | 19.37% |
| Henan | 1647.48 | 8815.09 | 18.69% |
| Hubei | 1020.09 | 6309.92 | 16.17% |
| Yunnan | 604.33 | 2959.48 | 20.42% |
| Xinjiang | 444.70 | 2200.15 | 20.21% |
| Sichuan | 1394.26 | 6556.01 | 21.27% |
| Shaanxi | 394.98 | 2883.51 | 13.70% |
| Guangxi | 811.38 | 3320.10 | 24.44% |
| Nation | 21412.70 | 159878.30 | 13.39% |
| c (2008) | | | |
| Guangdong | 1970.23 | 35696.46 | 5.52% |
| Jiangsu | 2100.00 | 30312.61 | 6.93% |
| Zhejiang | 1095.43 | 21486.92 | 5.10% |
| Beijing | 112.81 | 10488.03 | 1.08% |
| Shanghai | 111.80 | 13698.15 | 0.82% |
| Fujian | 1157.75 | 10823.11 | 10.70% |
| Jiangxi | 1060.38 | 6480.33 | 16.36% |
| Anhui | 1418.08 | 8874.17 | 15.98% |
| Henan | 2658.80 | 18407.78 | 14.44% |
| Hubei | 1780.00 | 11330.38 | 15.71% |
| Yunnan | 1020.94 | 5700.10 | 17.91% |
| Xinjiang | 691.10 | 4203.41 | 16.44% |
| Sichuan | 2366.15 | 12506.25 | 18.92% |
| Shaanxi | 753.72 | 6851.32 | 11.00% |
| Guangxi | 1453.90 | 7171.58 | 20.27% |
| Nation | 33702.00 | 314045.40 | 10.73% |
| d (2012) | | | |

| | | | |
|-----------|----------|-----------|--------|
| Guangdong | 2847.26 | 57067.92 | 4.99% |
| Jiangsu | 3418.29 | 54058.22 | 6.32% |
| Zhejiang | 1667.88 | 34665.33 | 4.81% |
| Beijing | 150.20 | 17879.40 | 0.84% |
| Shanghai | 127.80 | 20181.72 | 0.63% |
| Fujian | 1776.71 | 19701.78 | 9.02% |
| Jiangxi | 1520.23 | 12948.88 | 11.74% |
| Anhui | 2178.73 | 17212.05 | 12.66% |
| Henan | 3769.54 | 29599.31 | 12.74% |
| Hubei | 2848.77 | 22250.45 | 12.80% |
| Yunnan | 1654.55 | 10309.47 | 16.05% |
| Xinjiang | 1320.57 | 7505.31 | 17.60% |
| Sichuan | 3297.21 | 23872.80 | 13.81% |
| Shaanxi | 1370.16 | 14453.68 | 9.48% |
| Guangxi | 2172.37 | 13035.10 | 16.67% |
| Nation | 52373.60 | 518942.10 | 10.09% |

Appendix 5

The Share of Industry in GDP in Fifteen Observed Provinces of Three Regions in China (a) 2004, (b) 2008 *source:* Statistical Yearbooks 2004 and 2008.

| Provinces | Industry | GDP | the Share of Industry in GDP |
|-----------------|----------|----------|------------------------------|
| a (2004) | | | |
| Guangdong | 8890.29 | 16039.46 | 55.43% |
| Jiangsu | 8716.11 | 15403.16 | 56.59% |
| Zhejiang | 6045.00 | 11243.00 | 53.77% |
| Beijing | 1610.37 | 4283.31 | 37.60% |
| Shanghai | 3788.22 | 7450.27 | 50.85% |
| Fujian | 2950.33 | 6053.14 | 48.74% |
| Jiangxi | 1595.74 | 3595.94 | 44.38% |
| Anhui | 2169.82 | 4812.68 | 45.09% |
| Henan | 4515.35 | 8815.09 | 51.22% |
| Hubei | 2994.67 | 6309.92 | 47.46% |
| Yunnan | 1314.19 | 2959.48 | 44.41% |
| Xinjiang | 1010.07 | 2200.15 | 45.91% |
| Sichuan | 2690.00 | 6556.01 | 41.03% |
| Shaanxi | 1416.82 | 2883.51 | 49.14% |
| Guangxi | 1288.26 | 3320.10 | 38.80% |

| Nation | 73904.30 | 159878.30 | 46.23% |
|-----------------|-----------|-----------|--------|
| b (2008) | | | |
| Guangdong | 18402.64 | 35696.46 | 51.55% |
| Jiangsu | 16663.81 | 30312.61 | 54.97% |
| Zhejiang | 11580.33 | 21486.92 | 53.89% |
| Beijing | 2693.15 | 10488.03 | 25.68% |
| Shanghai | 6235.92 | 13698.15 | 45.52% |
| Fujian | 5415.77 | 10823.11 | 50.04% |
| Jiangxi | 3414.88 | 6480.33 | 52.70% |
| Anhui | 4137.75 | 8874.17 | 46.63% |
| Henan | 10477.92 | 18407.78 | 56.92% |
| Hubei | 4963.61 | 11330.38 | 43.81% |
| Yunnan | 2451.09 | 5700.10 | 43.00% |
| Xinjiang | 2086.74 | 4203.41 | 49.64% |
| Sichuan | 5790.10 | 12506.25 | 46.30% |
| Shaanxi | 3842.08 | 6851.32 | 56.08% |
| Guangxi | 3037.74 | 7171.58 | 42.36% |
| Nation | 149003.40 | 314045.40 | 47.45% |

Appendix 6

The Share of Service in GDP in Beijing and the Whole Country (a) 2001, (b) 2004, (c) 2008, (d) 2012 *source:* Statistical Yearbooks 2004 and 2008.

| Provinces | Service | GDP | the Share of Service in GDP |
|-----------------|---------|-----------|-----------------------------|
| a (2001) | | | |
| Beijing | 1721.97 | 2845.65 | 60.51% |
| Nation | 44361.6 | 109655.20 | 40.46% |
| a (2004) | | | |
| Beijing | 2570.04 | 4283.31 | 60.00% |
| Nation | 64561.3 | 159878.30 | 40.38% |
| b (2008) | | | |
| Beijing | 7682.07 | 10488.03 | 73.25% |
| Nation | 131340 | 314045.40 | 41.82% |

| | | | |
|----------|----------|-----------|--------|
| d (2012) | | | |
| Beijing | 13669.93 | 17879.40 | 76.46% |
| Nation | 231406.5 | 518942.10 | 44.59% |