

# **Hukou Discrimination in the Chinese Urban Labour Market**

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## **Abstract**

*Using the Chinese Household Income Project (CHIP) 2002 dataset, this paper examines the effects of the Chinese hukou system and of other human capital indicators on employees' chances to work in high-income industries and on their wages. The hukou system is a household registration and management system in China that consists in dividing households into two types: rural and urban. People register in the same household type that they inherit from their parents. The results show that rural hukou causes migrants to have a lower probability to enter high-income industries. Moreover, the highly educated rural migrants are more likely to find jobs in high-income industries than lower educated migrants. Similarly, the hukou system is an important factor in the explanation of the wage gaps in the Chinese labour market, although its effect is smaller than the one of education. In addition, for higher educated people, the wage gap between rural migrants and urban citizens are larger than those among other education groups. Other personal characteristics such as gender, marital status and political status are also important in explaining hiring discrimination and earning differences.*

## 1. Introduction

With the free movement of labour between urban and rural areas since China's reform and opening-up in the late 1970s, the Chinese economy dramatically developed in recent decades. A large number of people from rural areas migrated to cities to pursue their dreams. From 1978 to 2009, the proportion of the population living in urban areas increased from 18% to 47%. However, the proportion which is officially recognized as urban increased only from 18% to 27%. This is due to a household registration system, called hukou, that identifies individuals to their place of birth as urban or rural. Section 2 will provide detailed explanations of hukou. In 2009, more than 200 million city residents were rural-urban migrants<sup>1</sup>. Finding jobs in the urban labour market brings migrants with more money than what they can receive working in their hometowns as farmers. Urban companies can draft them to fulfill job vacancies. However, rural migrants also face problems in the labour market. To be specific, there exists a wage gap between urban residents and rural migrants (Gagnon, Xenogiani & Xing 2011). Furthermore, it is harder for rural migrants to find high-income jobs in the urban labour market than for urban residents (Meng & Zhang, 2001). If the wage gap and employment differences are due to workers' individual characteristics, then the existence of those differences is consistent with the rules of the market economy. However, many facts show that because of the presence of the Chinese household register system, rural migrants face a series of unequal treatments in the urban labour market.

In this paper, I examine the effects of hukou and other variables on the probability of entering high-income industries. If I can find that rural migrants have a lower probability to enter

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<sup>1</sup> National Bureau of Statistics of China, Migrants Labour Survey, 2009

high-income industries than urban citizens, then I can conclude that hukou can cause hiring discrimination in the Chinese labour market. Further, I also try to detect earning differences with respects to hukou type and other variables. My dataset is the Chinese Household Income Project (CHIP) 2002. This survey contains the data of “urban residents income, consumption, and employment” and “rural-urban migrant individual”. Beside the hukou variable, I include other variables such as education attainment, gender, experience, marital status, political status, health and regional variables. The main finding is that the hukou system can explain both hiring discrimination and earning differences, with urban hukou benefiting more to males than to females. Also, highly educated rural migrants face less hiring discrimination but experience a higher wage gap, compared with urban citizens who have the same level of education, then less educated rural migrants. In addition, gender, education attainment, marital status and political status also contribute to these two outcomes.

This paper is organized as follows. Section 2 provides a description of the Chinese hukou system and of its evolution. Section 3 presents a literature review on the economic effects of hukou. In section 4, I describe the data and the variables and I present some summary statistics. Section 5 focuses on setting the econometric model and its specifications. Section 6 presents the empirical results and discusses them. Section 7 offers a conclusion and research value of this paper.

## **2. The Hukou System**

The hukou system is a household registration and management system in China. It has existed for more than 3,000 years and it is still the basic household administrative arrangement nowadays. The system consists in dividing households into two types: rural and urban. People

register in the same household type that they inherit from their parents after they are born. Despite the fact that the revolution of the People's Republic of China (PRC) in 1949 changed the economic and social institutions radically, the new government maintained the hukou system.

PRC's household registration system has experienced some developments and evolutions. In 1958, the National People's Congress promulgated the "People's Republic of China Household Registration Ordinance", which was a record household registration system by law. Between 1958 and 1979, hukou policy limited rural population flows into cities and towns in the purpose of strictly controlling urban population growth. That means that there was no free labour force moving and people could only live and work within their hukou registration region. In the case of the strict implementation of the household registration system, the cost of labour mobility became very high. Thus, industries could only find their employees from neighbouring areas or hire the employees allocated by the government's administrative order. Thus, the hukou system caused distortions in the price of labour and lead to an imbalanced regional economic development. Specifically, the wage gap between urban and rural areas increased since most factories and corporations were located in cities. An even worse consequence was that an individual's social welfare was linked with his or her hukou location. In other words, with the unbalanced development between urban and rural areas, the urban citizens could enjoy more education resources and other social welfare benefits than rural residents.

However, things changed after China shifted to market socialism. From the early 1980s, with the implementation of the reforms and the opening up policy, a series of measures were applied to the hukou system. The measures were mainly focused on alleviating the contradiction in the labour market between the traditional household registration system and the need for economic development. However, the reformed hukou system had its limitations. For example,

China's household registration system still categorizes citizens into urban and rural types because those reform measures were within the framework of the implementation of the rural household registration structure. Also, the restrictions on housing, education and social welfare for rural-to-urban migrants still existed in large cities.

In the last decade, various provinces relaxed their household registration system to implement economic development. Specifically, cities generated much more job vacancies than they used to. At the same time, the economic growth decreased arable land in rural areas, which produced millions of surplus rural workers. The hukou system is gradually weakening and rural migrants can work in cities by buying affordable “temporary urban residency permits”. Moreover, the migrants’ children can go to school in their working cities, although they still have to pay higher tuition than urban children. However, the identity nature of the hukou system provides urban households with more favourable conditions because the hukou system still cannot offer the migrants exactly the same social welfare as urban citizens. The migrants have to go back and forth between their rural hometown and the city when their permits expire and need to be renewed, which means that they still do not have the rights to live in urban areas.

Nevertheless, there is also a radical reform taking place now with the attenuation of the hukou policy. People can convert their rural hukou to urban hukou by satisfying some conditions (Chan & Buckingham, 2008). Those include being admitted to university for higher education, joining the Chinese Communist Party (CCP), being promoted to an administrative position, being employed as a permanent employee by a state-owned corporation, joining the People’s Liberation Army (PLA) and getting demobilized to cities. The purpose of the hukou status conversion policy is to attract more skilled rural residents into the urban labour market. However, this policy is implemented mainly in small and medium cities. That means that it is still hard to

convert hukou status in large cities, like Beijing and Shanghai, where a huge number of migrants work and live.

### **3. Literature Review**

Since hukou is not a standard household registration system worldwide, it is important to review empirical analyses and findings that are specific to that system before doing this research.

A recent survey of the literature on the hukou system was done by Yang (2014). According to the author, the impact of the hukou system on the Chinese economy can be divided into two components. One is that urban hukou holders enjoy more public services and welfare benefits than rural residents (Li & Qiu, 2010). The other one is that there is labour market discrimination against rural-to-urban migrants (Jiang, Lu & Sato, 2009). Specifically, the urban hukou have access to public services and social welfare such as paying less when going to hospitals because they are protected by government medical health insurance (Xu, 2013). Urban residents also face relatively lower costs of living in cities than rural migrants. With respect to labour market discrimination, most of the surveyed studies find that there exists income inequality caused by wage discrimination between urban and rural hukou holders (Demurger, Li & Yang, 2012). Another problem is that rural migrants may face hiring discrimination. Some studies argue that migrants have a lower probability to find formal sector jobs, which are defined as jobs that provide official labour contracts (Gagnon, Xenogiani & Xing, 2011). That discrimination reduces job opportunities for migrants and increases the costs of job-hunting and job changing. More importantly, the hukou system generates pre-market discrimination (Fu & Ren, 2010). It means that rural children can only accept relatively poor quality education, which will affect their future performance in the labour market.

The rest of this literature review investigates further those and other issues. To analyze the situation of rural migrants who work in urban companies, Knight, Song & Jia (2007) use a random sample of 118 companies in four cities (Beijing, Shenzhen, Wuhan and Suzhou) that used the services of 2,900 rural hukou employees in the year 1995. They consider three perspectives. The first one is the point of view of the migrants themselves. They find that the links with the rural hometown are greater for lower educated migrants and that they are more likely to go back to their homeland. Specifically, a high percentage of rural migrants' income was remitted to their hometown, and 57% of the migrant workers wanted to go back home after working in the cities for a certain time. Second, from the perspective of the companies, they find that most of them are satisfied with the performance of rural employees. Third, the government needs to promote more rural-to-urban migration to satisfy the increasing labour demand of urban companies. According to the authors' calculations, 81% of the companies are restricted in drafting migrant employees to protect the employment rate of urban residents, and more than 77% of them have to pay fees to the local government when they hire rural migrants.

Focusing on examining the reasons for the increasing rural-urban income inequality in China, Yang (1999) divides the overall variation in income into three distinct parts: rural areas inequality, urban areas inequality, and sectoral disparity. By using the household survey data from China's State Statistical Bureau, he chooses data from the Sichuan and Jiangsu provinces for the years 1986, 1988, 1992 and 1994. Yang analyzes Gini ratios and employs entropy methods. He finds that the increase in income inequality between rural and urban areas is the main reason for the increasing income inequality in China. He argues that increased urban subsidies and investments caused the rise in sectoral disparity. The finding implies that the urban-biased policies will lead urban citizens to receive more benefits from health, housing and

education than rural citizens and will limit China's growth in the long-term because of the larger rural-urban income gap. The wage gap not only distorts economic incentives of workers in their work, but it also affects the human capital attainment of their children.

In a similar study, Goh, Luo & Zhu (2009) analyze income growth, poverty reduction and wage gaps between rural and urban areas in eight Chinese provinces. Their dataset is the China Health and Nutrition Survey (CHNS) and they select eight years of data from 1989 to 2004. They examine real income change from 1989 to 2004 and they divide the eight provinces into coastal and inland. They find that, although both coastal and inland provinces' income grew rapidly, the income gap between urban and rural areas increased. In the inland provinces, cities' Gini coefficients increased substantially during those years. The wage gap between inland urban areas is larger than the one between coastal urban areas. They also find that, with the fast income growth, poverty reduction was significant in that period. Poverty decreased mostly in rural coastal areas, and the wage gap between rural and urban areas became smaller in coastal provinces. Finally, the education level is crucial to household income determination for both rural and urban areas. In other words, the higher rate of return to schooling can help people enter higher income jobs. However, the rate of return to education is different between urban and rural areas. The authors suggest that providing more education opportunities in rural areas will narrow income inequality.

Maurer-Fazio and Dinh (2002) examine further the importance of education in determining labour income in the Chinese labour market. They divide the workforce into different groups by employees' current working status, such as "continuously employed" urban hukou residents and rural migrants, and "laid-off but subsequently re-employed" workers. They use data from the Urban Labour Market Integration Project, which was funded by the Ford Foundation. They select

the data from the fall of 1999 to the spring of 2000. The dataset contains three groups of individuals: employed urban residents, laid-off urban residents and employed migrants. Their main finding is that the education level is the key explanatory variable of income discrimination in the Chinese urban labour market. However, the rate of return to the education of rural migrants ranked the lowest. Compared to the constantly employed urban residents, they find that 75% of the wage gap for migrants and 40% of the wage gap for laid-off workers can be explained. From their empirical results, they argue that the education level and the hukou system have a tremendous impact on income inequality in the Chinese labour market.

Analyzing changes in hukou status, Wu and Treiman (2004) discuss the upward social mobility of people who transform their hukou type from rural to urban by using the 1996 Survey of Life Histories and Social Change in Contemporary China. They choose hukou status at 14 years old as the reference and compare it with current hukou status to examine the determinants of mobility from rural to urban hukou status. The results show that education level is the most important reason for the change of status. Cities' labour markets need more talented people (master or above graduates) to help with the development. Some cities use the possibility of changing from rural to urban hukou to attract highly educated rural candidates. Generally speaking, rural people with high education level are more likely to convert to urban hukou than people with a low education background. Chinese Communist Party membership also plays a key role, although its impact is less important than education. For example, when a rural officer is promoted to a leadership position in the state bureaucratic system, he is qualified to obtain urban hukou. Last but not least, military experience improves the chance of obtaining an urban hukou. Other findings tell us that rural-origin females are more likely to change their hukou than rural-origin males. This is because rural-origin women have more probability to marry with

urban men than rural-origin men marry with urban women. In general, rural hukou reduces the chances of obtaining education and the opportunity of being a Party member. However, rural residents may have more chance of gaining urban status when their parents work for state-owned enterprises.

Some studies analyze the relationship between hukou and other outcomes. A recent research from the World Bank by Bosker, Deichmann & Roberts (2014) analyzes the combined effects of the hukou system and of the construction of the National Expressway Network (NEN) on spatial differences in development across China. The innovation of that paper is that it considers those two factors together using the same underlying New Economic Geography (NEG) model. Robert *et al.* (2012) extend the model by taking labour mobility into consideration in order to detect differences in amenities across cities as well as the changes in real wages caused by the lower trade cost that results from the construction of the NEN. The data show that by the construction of the NEN, the urbanized regions become more urbanized. Meanwhile, the better-connected areas urbanize faster and show faster GDP growth rate per capita. The authors conclude that the NEN only had limited labour mobility effects on people relocation and urbanization. The better-connected places get more benefits from becoming urbanized. With respect to the hukou system, the authors suggest that its abandonment would increase overall social welfare. However, the potential drawback of abolishing the hukou system would cause the population to migrate to the well-developed regions. Also, without hukou policy, the southeast coastal cities would develop faster, and the GDP per capita in smaller regions would grow more rapidly than before. Then, they conclude that abolishing the hukou system would be more helpful to balance regional development in China than the building of the National Expressway.

Jiang, Lu & Sato (2009) consider another outcome by investigating the relationship between

happiness and hukou status. They divide urban residence into three groups: native urban residents, rural migrants, and new urban residents who acquired their hukou from rural to urban. They use the 2002 Chinese Household Income Project (CHIPS) to do the empirical work. They find that the income difference between the three groups can affect individual happiness. They call this kind of income difference “horizontal inequality”. To be specific, the results show that when the wage gap between rural migrants and urban residents increases, the former become unhappier. On the other hand, city residents are happier when the incomes increase in their group. However, rural migrants show more indifference in happiness when they obtain higher wages since their reference group is the urban residents. Another finding is that the new urban hukou are happier when their income grows. Nevertheless, they have the same attitudes as migrants when facing income inequality. The paper also illustrates that native urban residents show less happiness when they become old. In addition, Communist Party members feel unsatisfied with the horizontal inequality.

Chen, Lu and Zhong (2012) provide a new perspective from the Chinese Household Income Project (CHIPS). They suggest that the hukou system could explain the problem of Chinese low consumption-to-GDP ratio. The empirical results show that rural migrants have about 30% lower consumption than urban citizens when other variables are controlled for. The hukou system can explain the different consumption behaviour between migrants and city residents better than culture, social norms or personal habits. Because rural migrants receive less social welfare than city residents, the income difference decreases migrants’ job stability and increases their inter-regional mobility, and they consequently have to reduce their expenditure because of future uncertainty. Furthermore, under hukou restrictions, migrants have to spend higher tuition for their children to go to school. This forces them to save more. In conclusion, with the growing

number of migrants in China, the authors suggest to reduce hukou restrictions in order to promote aggregate consumption.

There are also some studies that analyze industry entry bias and income inequality caused by hukou. Meng & Zhang (2001) investigate occupational discrimination and income gap between urban citizens and rural migrants in Shanghai. They utilize two datasets: the Shanghai Floating Population Survey (FP) and the Shanghai Residents and Floating Population Survey (RFP) 1995-1996. They mainly find that the people who have urban hukou in Shanghai are more likely to work in higher-income occupations than those who are rural hukou. Based on a test of actual and predicted occupational distribution, they estimate that 22% of urban residents do white-collar works although they are only qualified to do blue-collar jobs; in contrast, 6% of rural migrants do blue-collar work even though they have the ability to do white-collar work. Another finding is that rural migrants get lower pay than urban residents within the same occupation. They find that 82% of the wage gap is due to the inequality of payments within the same businesses between urban residents and migrants.

The study that is closest to the topic of this paper is the one by Zhao, Lu & Sato (2009). The authors look at the determinants of entry into high-income industries in the Chinese labour market. Their dataset is the 2002 Chinese Household Income Project (CHIPS). They categorize industries into three groups by regressing an income equation and controlling for the variables denoting productivity (e.g., age, gender and education). Their main finding is that social network, parents' education, urban hukou, education level, work experience and communist party membership help find jobs in high-income industries. Other findings are that it is much easier for males to find a job in high-income industries than for females and that social networks are more helpful in coastal provinces than in inland regions. This may be because coastal provinces are

developing faster and that the pressures of competition are stronger than in the inland regions.

As shown in the literature review above, some researchers analyze the causes and effects of the wage gap between rural migrants and urban residents, while others examine the factors that help rural migrants to find urban jobs. Apparently, the hukou system in China has caused a series of inequalities in entering some industries, in incomes and in other welfare benefits. In order to have a deeper understanding, this paper will check whether it is easier for urban residents to find jobs in high-income industries than for rural migrants based on the empirical method of Zhao, Lu & Sato (2009). Differently from Zhao *et al*, I divide industries into two groups instead of three groups. Another contribution of this paper is that it will examine the wage gap between rural and urban hukou types. Besides the primary variable “hukou”, I will also select some reasonable variables to examine which indicators are more important with respect to entering high-income industries’ jobs and wage gap.

#### **4. Data and Summary Statistics**

In this paper, I utilize the 2002 Chinese Household Income Project Survey (CHIPS 2002) as my dataset. The data was collected by the Chinese Academy of Social Sciences. The main purpose of CHIPS 2002 was to estimate and analyze the personal income distribution and other economic factors in urban and rural areas of China. CHIP 2002 has ten sub-datasets that focus on different aspects of urban and migrant data. Some of the datasets are about the demographic and economic indicators of urban or rural households and individuals. Others concentrate on specific topics like village administrative, rural school-age children or rural-to-urban migrants. In my research, I selected the urban survey, called “Urban Individual Income, Consumption, and Employment Data”, and the “Rural-urban Migrant Individual Data” as my datasets. The urban

survey contains data for 20,632 individual urban citizens. The rural-urban migrant dataset contains 5,327 individual rural-urban migrants who worked and lived in urban areas.

The purpose of this study is to analyze the importance of urban hukou in accessing high-income jobs (defined as jobs in the high-income industries) and to estimate the effect of hukou system on wages in the urban labour market. If urban hukou makes people more likely to enter high-income industries and to earn higher wages after controlling for other variables such as education, marital status, and political status, then it can be inferred that the hukou system causes industry entry discrimination and income inequality in the Chinese labour market.

#### **4.1 Sample Restrictions**

The sample is restricted to working or employed people. Thus I dropped individuals whose working status is one of those categories: retired, unable to work, laid-off, unemployed, and full-time homemaker. Furthermore, I restrict the sample to individuals aged 22 and above. The reasons are as follows. First, 22 years old is the minimum legal age of marriage for males, while it is 20 years old for females. Second, the minimum age at which one can apply for Chinese Communist Party (CCP) membership is 18 years old. Third, the minimum legal age working is 16 years old in China. Thus, given all those considerations, I dropped individuals under 22 years old to get a more homogeneous sample. I did not set a maximum age since my samples are restricted as currently employed people and some senior people from rural areas are still at work as they do not have pensions. In addition, with respect to marital status, I only keep the single and married individuals since other marital statuses, like divorced or widowed, account for a tiny proportion of the data. Focusing on the single and married will make my work more straightforward to interpret. Similarly, the few individuals in the communist youth league and other parties' members are dropped since this research only focuses on the relationship between

CCP members and people who do not belong to any political parties. Also, I dropped the lowest one percent of incomes as well as those who did not report their income in that year. Those individuals reported an annual income of less than 1800 CNY, equivalent to \$360 CAD. This very small value may indicate individuals who did a very small amount of work. After the above sample restrictions and dropping missing values, 14,958 observations of the initial samples were removed. There are 11,001 observations left in my sample with 6,298 (57.25%) males and 4,703 (42.75%) females.

## **4.2 Variables**

### **4.2.1 Dependent Variables**

In order to analysis the urban labour market discrimination caused by the hukou system. I use two outcome variables: *Type of Industry* and *the natural logarithm of annual salaries in 2002*. The first outcome is defined as a binary variable.

Regarding the type of industry, I divide all the industries into high-income industries and low-income industries based on Zhao, Lu & Sato (2009)'s classification and I further adjust this classification according to China Labour Statistical Yearbook 2003<sup>2</sup>.

Differently from my categorization, Zhao, Lu & Sato (2009) classified industries into three groups by doing a regression on wages and salaries. They included industry dummies and controlled for other productivity variables such as education, age and CCP membership. They observed the signs, statistical significance and magnitude of the industry coefficients. Setting manufacturing industry as benchmark, only “social services” was defined as a low-income industry because the coefficient was significantly negative. On the other hand, “production and supply of electricity, gas and water”, “transport, storage and post and telecommunications”,

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<sup>2</sup> China Labour Statistical Yearbook 2003 is conducted by National Bureau of Statistics

“finance and insurance” and “real estate” were categorized as high-income industries since the coefficients of these industries were significantly positive. The rest of the industries including “manufacturing” were considered as medium-income industry. Then, Zhao, Lu & Sato adopt an ordered probit model to do their research.

However, in my paper, since my econometric model is probit model, the dependent variable is a binary variable. Thus, I further separate Zhao, Lu & Sato’s medium-income industries into high-income industries and low-income industries by checking the data from China Labour Statistical Yearbook 2003. The yearbook provides the average earnings of employees by each industry for urban area in 2002. An industry is defined as a high-income industry if its average wage is higher than manufacturing. Likewise, the other industries are categorized as low-income industries if they have a lower average wage than manufacturing. Manufacturing industry can be seen as high-income industry since its average wage is above the average wage level of overall sectors in that year. Then, all the industries are divided as follows:

| <b>Classification of industries</b>   |  |
|---|--|
|   | <b>Name of Industries</b>  |
| <b>High-income Industry</b>   | <ul style="list-style-type: none"> <li>• Manufacturing</li> <li>• Production and supply of electricity, gas and water</li> <li>• Geological prospecting and water conservancy</li> <li>• Transport, storage, post and telecommunications</li> <li>• Finance and insurance</li> <li>• Real estate</li> <li>• Health care, sporting and social welfare</li> <li>• Education, culture and arts, radio, film and television</li> <li>• Scientific research and polytechnic services</li> <li>• Government agents, party agencies and social organizations</li> </ul> |
| <b>Low-income Industry</b>  | <ul style="list-style-type: none"> <li>• Farm, forest, animal husbandry and fishery</li> <li>• Mining and quarrying</li> <li>• Construction</li> <li>• Wholesale, retail trade and catering services</li> <li>• Social services</li> </ul>   |
| Source: The classification is based on Zhao, Lu & Sato (2009) and on China Labour Statistical Yearbook 2003 |  |

The other dependent variable is the natural logarithm of wages and salaries in 2002. The logarithm allows us to interpret the estimated coefficients as the proportional variation on annual income resulting from one unit change in a given independent variable. It is expected that, after controlling for other explanatory variables, people who have urban hukou will have a higher income than rural migrants.

#### **4.2.2 Independent Variables**

Many factors may cause individuals to have better opportunities to enter high-income industry or to earn a high wage. They include the type of hukou, gender, education attainment and working experience. Other important additional factors are marital status, political status, health condition and the development level of the working location. This part will provide the description of the key explanatory variables.

With respect to the type of hukou, I divide samples into urban hukou and rural hukou. The expected result is rural hukou owners would be less likely to entering high-income industries and would have lower earning than urban citizens.

Education attainment is the most important human capital factor in the labour market. I generate education level as three dummy variables. The first group is called higher-education level, which includes people who finished college or university and received a degree or certificate. The second group is the medium-education level, which includes people who finished high school education (equivalent to Grade 12 in Canada) but did not go to college or university. This education level is very common in Chinese rural area, as most rural families cannot afford to send their children to college or university. The third group is the lower education level, which includes people who only finished middle school (equivalent to Grade 9 in Canada) or have an education even below that level. People from the less developed rural area usually have lower

chances to receive higher education because of their family's financial situation. The medium-education level is taken as a benchmark.

Potential working experience is calculated by the Mincer approximation as "*age - years of schooling - 6*". Since the minimum age of entering elementary school is six in China, then working experience can be calculated by that formula. People with more working experience are expected to have higher probability enter the high-income industry and to earn more income.

Marital status is also important to individuals in the Chinese labour market. By dividing my samples between single and married, I want to examine whether married individuals have better chances to enter high-income industries. Some employers prefer to draft married people since they are considered to be more stable and mature for both males and females.

Regarding political status, a dummy variable equals one if individuals have a membership in the CCP and it equals zero for people with no political status. Although there are other political parties in China now, the CCP is still the largest political party group. This paper only observes the effects between CCP members and non-political status individuals. In general, the high-income industries would draft CCP members as a priority. Thus, the income gap would be large between CCP members and ordinary people.

Health condition is another qualitative variable that may determine who has more chances to enter a high-income industry and to obtain higher salary. The prediction is not apparent since health is relatively more important to manual workers than to white-collar workers, such as those who work in government offices.

About the geographical variables, since the dataset contains 31 provinces, I divide the provinces into coastal and inland regions. This way of dividing provinces is based on the economic development level of different provinces. The coastal provinces (from north to south)

of Hebei, Beijing, Tianjin, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong and Hainan are more developed than the inland provinces<sup>3</sup>. It is expected that people will earn more income in the coastal labour market. However, individuals have to face a more competitive environment in the coastal provinces.

### 4.3 Summary Statistics

Table 1 shows the summary statistics with the unweighted<sup>4</sup> means for my variables. The dependent variables are the type of industries and log income. There are 59% of my observations who work in high-income industries. The proportion of males (62.9%) is higher than that of females (54.8%) with respect to this variable. Similarly, the average earning for men is 2,000 CNY higher than that of women while the overall samples' average annual income is 11,799 CNY.

The table also shows the mean values of the explanatory variables, which include the type of hukou, gender, education attainments, age, potential work experience, marital status, health condition, political status and region. To be specific, rural hukou owners account for 24% of both male and female samples. The rural-to-urban samples are relatively small because the “Rural-urban Migrant Individual Dataset” has relatively fewer observations than the “Urban Individual Income, Consumption, and Employment Dataset”.

Apart from hukou type, the other independent variables are also important for this study. With respect to education level, only around 25% of the people received a college diploma or bachelor degree while 40% finished junior high school and 35% obtained senior high school degrees. Dividing each education attainment by gender, we can see that a higher proportion of

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<sup>3</sup> Inland region include 21 provinces whose list includes Heilongjiang, Jilin Liaoning, Henan, Hubei, Hunan, Anhui, Jiangxi, Shanxi, Inner Mongolia, Shannxi, Ningxia, Gansu, Xijiang, Qinghai, Xizang, Chongqing, Sichuan, Guizhou, Yunnan, Guangxi

<sup>4</sup> The sample numbers for urban and rural residents do not represent the proportions in the population.

men (27%) graduated from higher education institutes than of women (23%). This is different from Canada and other developed countries where females have higher education than males. By contrast, a higher percentage of women (37%) finished medium-education than men (32%). For the lower level education, the values are almost the same for males and females, at 39%.

In addition, the average age is about 40 years old for both men and women. The oldest age is 77 years old, which indicates that there are still some migrants working after reaching the official retirement age, which is 60 years old for males and 55 years old for females. Further, the average potential work experience is 23 years. The distribution of potential work experience is from zero to 66 years.

The gap between the two marital statuses is fairly large. Only 6% of people are single for both genders. This is because I dropped from the samples those who were under marriage age and I excluded the divorced or widowed individuals. Another crucial indicator is the political status. The data show that 25% of the people in the sample are CCP members, including 30% of males and 18% of females.

On average, the health condition is “good”, as the number 1 means “very good” and the number 5 means “very poor”. The health condition of females is slightly better than that of males. The distribution by region shows that 27% of the observations are from the coastal provinces. Overall, there are 11,001 observations in my dataset with 6,298 are males while 4,703 are females.

## **5. Econometrics Model**

In order to analyze whether or not the rural migrants are facing industry entering discrimination and income inequality in Chinese urban labour market, I ran two groups of

regression models with two different outcomes.

## 5.1 Model One: Industry Type

The outcome in this estimation is *type of industry*, which is a binary variable. Thus, it is proper to use a probit model to analyze the probabilities of entering a high-income industry for different hukou holders by controlling for human capital and regional variables. To interpret the result of the probit regressions, I report the marginal effects since the probit model is non-linear. Then, I can analyze the marginal effects on each unit change of explanatory variables on the probability of entering high-income industries. I estimate this model for males and females separately with three specifications, adding each time additional independent variables.

### *Specification 1*

$$Pr(\text{Industry type} = 1 | X) = \Phi(\beta_0 + \beta_1 \text{Hukou} + \beta_2 \text{Male})$$

where  $\Phi$  is cumulative normal distribution, *industry type* is the binary explained variable, which means the probability of entering high-income industries. *Industry type* equals one if individual *i* can enter into high-income industries, and it equals zero otherwise. *Hukou* is the key binary explanatory variable, which is equal to one if an individual owns rural hukou, and it is equal to zero otherwise. *Male* is also a binary independent variable equal to one if individual *i* is male and equal to zero for a female. By estimating this simple model, I can obtain the gross effect of rural hukou on entering a high-income industry.

### *Specification 2*

$$\begin{aligned}
Pr (\text{Industry type} = 1 | X) \\
= \Phi (\beta_0 + \beta_1 \text{Hukou} + \beta_2 \text{Male} + \beta_3 \text{Higher education} \\
+ \beta_4 \text{Lower education})
\end{aligned}$$

The second specification adds the crucial human capital variable, education. The main purpose to this specification is to detect the change of the original effect of rural hukou on the dependent variables. *Higher education* and *Lower education* are the education attainment dummy variables for individual *i* while *Medium education* is the reference group.

### ***Specification 3***

$$\begin{aligned}
Pr (\text{Industry type} = 1 | X) \\
= \Phi (\beta_0 + \beta_1 \text{Hukou} + \beta_2 \text{Male} + \beta_3 \text{Higher education} + \beta_4 \text{Lower education} \\
+ \beta_5 \text{exp} + \beta_6 \text{expsq} + \beta_7 \text{marital status} + \beta_8 \text{political status} \\
+ \beta_9 \text{health conditon} + \beta_{10} \text{coastal} )
\end{aligned}$$

More independent variables are added to investigate the effects of different factors that contribute to the probability of entering high-income industry. These independent variables were explained in the previous section. This third specification controls for the full range of potential confounding factors that will be included in this study. As a further step, I re-estimate the third specification separately under different education levels to see if the effects of hukou and other explanatory variables differ across those levels. The model is written as follows and it is also estimated with the whole sample and for males and females separately.

$Pr (\text{Industry type} = 1 | X)$

$$= \Phi (\beta_0 + \beta_1 \text{Hukou} + \beta_2 \text{Male} + \beta_3 \text{exp} + \beta_4 \text{expsq} + \beta_5 \text{marital status} \\ + \beta_6 \text{political status} + \beta_7 \text{health conditon} + \beta_8 \text{coastal})$$

(For low education, medium education and high education respectively)

## 5.2 Model Two: Income

The purpose of estimate the second model is to investigate the earning differences between rural migrants and urban citizens. The outcome is *lnincome*, which makes this model a proper complement to the previous one. If the probit model shows that rural migrants have lower probabilities to enter a high-income industry, then we should observe an income gap between urban residents and rural hukou owners. The three specifications are similar to the probit model's outlook since the explanatory variables are the same.

### *Specification 1*

$$\lnincome = \alpha_0 + \alpha_1 \text{Hukou} + \alpha_2 \text{Male} + \varepsilon$$

### *Specification 2*

$$\lnincome = \alpha_0 + \alpha_1 \text{Hukou} + \alpha_2 \text{Male} + \alpha_3 \text{Higher education} + \alpha_4 \text{Lower education} + \varepsilon$$

### *Specification 3*

$$\lnincome = \alpha_0 + \alpha_1 \text{Hukou} + \alpha_2 \text{Male} + \alpha_3 \text{Higher education} + \alpha_4 \text{Lower education} \\ + \alpha_5 \text{exp} + \alpha_6 \text{expsq} + \alpha_7 \text{marital status} + \alpha_8 \text{political status} \\ + \alpha_9 \text{health conditon} + \alpha_{10} \text{coastal} + \varepsilon$$

where *lnincome* is the natural log of annual income.  $\alpha$  represents the coefficients of the independent variables while  $\varepsilon$  is the error term. The coefficients of this OLS estimation will

show the percentage change in income with one unit change of any explanatory variables. As in the first outcome, I re-estimate the third specification under different education attainments to compare the different extents of the impacts of hukou. Again, all of these OLS regressions are estimated with men, women and the entire sample.

$$\begin{aligned} \ln income = & \alpha_0 + \alpha_1 Hukou + \alpha_2 Male + \alpha_3 exp + \alpha_4 expsq + \alpha_5 marital\ status \\ & + \alpha_6 political\ status + \alpha_7 health\ conditon + \alpha_8 coastal + \varepsilon \end{aligned}$$

(For low education, medium education and high education respectively)

## 6. Empirical Results

In this section, the empirical results are presented and discussed separately in four sub-sections. Using the industry type and income models discussed in the last section, I obtain sequential estimations of both the probability of entering a high-income industry and of earnings for males, females and the whole sample.

### 6.1 Three specifications on the probability of entering a high-income industry

The marginal effects from the probit regression results on the probability of entering a high-income industry are shown in Table 2. Specification (1) controls only the type of hukou and gender to obtain a preliminary indication of industry access differences. Specification (2) adds the education attainments into consideration. Further, specification (3) adds the other human capital and regional variables.

In specification (1), first and foremost, the marginal effect signs of rural hukou are negative, which is the expected sign, and they are statistically significant and large. For example, the value

of -0.449 means the probability of rural residents to enter in high-income industries is 44.9 percentage point less than that of urban citizens. The result from this fundamental regression is in line with the prediction - people with rural hukou have fewer chances to find jobs in high-income industries than people who have urban hukou. The negative effect of rural hukou on males (43.9 percentage points) is slightly less than the one on females (46.2 percentage points) in this specification. Regarding gender, males are 8.1 percentage point more likely to find jobs in high-income industries than females in the labour market.

By adding education level in specification (2), rural hukou still shows a negative marginal effect, but the magnitude is reduced by almost nine percentage points compared to specification (1). This is because part of the estimated effect in specification (1) is capturing differences in average educational attainment between urban and rural hukou holders. Unlike the first specification, the negative effect of rural hukou on males (36.7 percentage points) is slightly larger than the one on females (34.6 percentage points). Likewise, the magnitude of the marginal effects of gender decreases slightly when education is added, but men still have a 7.4 percentage point higher probability to obtain high-income jobs than women. Setting medium-education as the reference group, the regression results show that owning a college certificate or a bachelor degree brings a 15.3 percentage point higher chance to find work in a high-income industry than having a high school degree. On the other hand, lower educated people are 7.1 percentage points less likely to find jobs in high-income industries compared to high school graduates. Note that the level of education affects more females than males. Comparing with high school graduates, higher educated females have a 4.8 percentage point higher probability of entering high-income industries than males, while the number of percentage points for females is 4.3 less than that of males with respect to those who only finished nine-year compulsory education.

Specification (3) controls for the full range of potential variables. Then, the magnitude of hukou effect is reduced since the estimated effect in specification (2) is capturing differences in those variables between urban and rural hukou holders. To be specific, all the signs of hukou, gender and education attainment are consistent with the previous two groups of results. Compared with specification (2), hukou and gender have smaller marginal effects on the probability of entering a high-income industry. Nevertheless, rural migrants are still 34.0 percentage point less likely to find jobs in high-income industries than urban citizens, while males gain a 6.50 percentage point higher probability to jobs in high-income industries than females. This shows evidence of gender inequality in the Chinese labour market.

With respect to the education variables, the results still demonstrate that better-educated people own more opportunities to obtain jobs in high-income industries. This is because high-income industries like finance, insurance, and scientific research need lots of employees with professional knowledge and skills. Most of the knowledge must be obtained from colleges or universities rather than from high schools or lower education institutions. Considering genders, compared with medium-education, the higher-education level is even more crucial to women (18.9 percentage points) than to men (11.1 percentage points). This may be because higher educated females are relatively fewer than males in the labour market. Then, the competition of entering high-income industries may be smaller for them.

Potential working experience is another key variable in this analysis. Combining the results from experience and the squared experience, males show a negative marginal effect for individuals who have a short period of working experience; however, after gaining enough experience, they become more likely to enter high-income industries. In contrast, women with more working experience have only a 0.60 percentage point higher probability to enter

high-income industries, while the coefficient of squared experience is insignificant.

With respect to marital status, the results indicate that single individuals are 8.4 percentage point less likely to enter high-income industries than married ones. The reason could be that the employers in high-income industries consider married people more mature or that married people would less likely resign their jobs. Meanwhile, the negative marginal effect is 10.1 percentage points for males, while it is 5.7 percentage points for females.

Considering the marginal effects on political status, CCP members enjoy a 6.0 percentage point higher probability to find a job in a high-income industry than non-members. The result is similar for both males (6.6 percentage points) and females (5.3 percentage points). This is because CCP membership is a résumé booster in China. CCP members are usually considered as being highly loyal to the country, having great personalities and high working abilities. As a part of high-income industries, most government agencies and state-owned corporations only draft employees who are CCP members.

The health condition and regional variables are insignificant for both genders and for the whole sample. However, the signs of the coefficients are consistent with the prediction. The negative sign of health condition means that people who have bad health condition have more probability of work in high-income industry. As discussed in data description section, individuals in low-income industries are usually manual workers, such as constructor or farmers. Then they may care more about their health condition since it is close to their working performance. However, white-collar employees in high-income industries do not care that much about their health condition. In the case of the regional variables, the negative signs may imply that it is relatively harder to find a job in high-income industries in the coastal than in the inland region. It may be because the competition in the coastal areas is stronger than in the inland areas.

## **6.2 The effects on the probability of entering a high-income industry for three education levels**

Based on specification (3), I further study the entry probability for different education groups. This part will discuss the overall results and compare the marginal effects on males and females. The results are shown in in Table 3.

Looking first at the hukou variable, no matter whether rural migrants have high or low education, they have lower probabilities to enter high-income industries than urban residents who have the same level of education. However, the negative effect is smaller in the higher education group (21.1 percentage points) than in the medium education group (32.9 percentage points) and the lower education group (36.7 percentage points). This suggests that higher education benefits rural migrants in narrowing down the entry barrier. Within high-educated group, rural males show lower negative effects (18.9 percentage points) than rural females (26.7 percentage points). In the medium and lower groups, however, rural males are affected more than rural females.

For the gender dummy variable, the marginal effect is insignificant in the higher education group, while being a male increases the probability of working in a high income industry by 6.9 percentage points in the medium education and by 9.1 percentage points in the lower education group.

With respect to potential experience, most of the regression results are insignificant. This may be because the sample number in each group is small. Nevertheless, the marginal effects of working experience for medium and lower educated males are consistent with the previous analysis. With positive signs in experience and negative signs in experience squared, the marginal effects imply that males who have few years working experience will have more

chances to enter high-income industries, whereas they will obtain more opportunities to find jobs in high-income industries after they gain enough working experience.

Regarding marital status, the result for the highly educated single people shows a 7.4 percentage point lower negative effect on entering a high-income industry than that of for medium educated single people. In general, single people are still facing stronger entry barriers than married ones.

Considering the political status, the results tell us that CCP members have between a 5.3 and a 6.9 percentage point higher probability to enter high-income industries within each education group. Furthermore, CCP membership is more important for lower education males than for high and medium educated ones. Interestingly, CCP membership has no effect on lower education females, but for the higher and medium education groups, owning CCP membership benefits more to females than to males.

While most of results for the health condition are insignificant, only two significant results in the lower education group show that people who have worse health condition have about 2.0 percentage point more probability to enter high-income industries.

The regional indicator shows that high-educated coastal people have 6.4 percentage point fewer chances to enter high-income industries than similarly educated inland people. The medium education group shows a similar pattern but with lower negative effects at 3.5 percentage points. In contrast, lower-educated coastal people enjoy a 5.2 percentage point higher probability of entering high-income industries than low-educated inland individuals. The results of the regional indicator may explain the fact that the higher and medium education groups in the coastal area are confronted with more competition than in the inland region.

### 6.3 Three specifications on earning differences

The earnings regressions are presented in Table 4. Similarly to section 6.1, a simple regression that controls only for hukou and gender is presented first. I then add more variables in the second specification and the fullest specification is presented last.

The results of specification (1) show that urban citizens earn almost 30% more than rural migrants. The negative effect of rural hukou for females (32%) is slightly larger than that for males (28%). In addition, there is gender inequality since the earning difference between males and females is about 23%. Further, by adding education attainment in specification (2), the signs of the coefficients of hukou and gender are still the same, although the magnitudes of those coefficients are smaller than in the basic regression. The magnitudes of hukou coefficients dropped by 18% while the coefficients of gender decreased only by 1%. This implies that urban hukou has lower effects on earning differences when taking education into consideration. This statement is supported by the regression results of specification (3). With the fullest specification, the effects of hukou on earning differences are much smaller than in specification (2) while the magnitudes of the gender and education coefficients only change a little.

Focusing on the OLS regression results in the fullest specification, rural migrants' wage is 3.4% less than that of urban hukou owners, which is statistically significant but economically small. Also, rural males earn even less than urban males by 4.2%. However, the result for rural females is insignificant. Meanwhile, the gender discrimination indicates that males earn 20.2% more than females.

With respect to education attainment, higher-educated people earn 30% more than the reference group, while lower-educated people earn almost 20% less than people who have a medium education level. Similarly to the result of the third specification of the probit model, the

OLS regression shows that education is more important to women than to men. Specifically, with the medium-educated group as the benchmark, a high-educated woman will earn 7.7% more than a man who have a bachelor degree, whereas women with lower education background have 7.1% lower income than men who are also low educated.

Regarding potential working experience, the positive coefficients of experience and the negative coefficients of experience squared indicate that workers, both males and females, earn more when they have more working experience. However, the effect on wages diminishes when their working experience increases.

The other independent variables show more information on income differences. In terms of marital status, single individuals' wage income is 13% less than that of married ones. The negative effect for single males is one percent larger than the one for single females. The coefficients of political status imply that CCP members enjoy about 13% higher earnings than people who are not in any political party. Particularly, CCP males earn 13.3% more than non-CCP males while non-CCP females earn 16.5% less than CCP females. Similarly to the employment regression, the coefficients of the health condition are all insignificant. Considering the regional indicator, workers in the coastal area earn 40% more than those in the inland area, with the effects for males and females being about the same.

#### **6.4 Earning differences for three educational levels**

Similarly to section 6.2, Table 5 illustrates the earning differences within three different education attainment groups for both males and females.

For the key hukou variable, the wage gap between high-educated migrants and urban citizens is relatively large at 18.6%, while the gaps within the medium and lower education groups are 7.0% and 4.0%, respectively. This is different from the results in table 3, where the

hukou coefficient was smaller for the high education group. This implies that high-educated migrants have a better chance to enter high-income industries than low educated ones. However, it does not show up in their earnings. The reason of this fact may be that high-educated urban graduates can usually find jobs in high-income industries; since they have urban hukou, their expected salary is higher. However, high-educated rural graduates find it harder to enter high-income industries compared to urban ones. Then, they tend to lower their expected salary and accept relatively low paid jobs within high-income industries so that they can settle down in the urban area first. Zhang and Cui (2007) also provide support to this argument. Their empirical study shows that the salary of university graduated rural students is 20% less than that of urban ones. In my results, high-educated rural males earn 22.1% less than high-educated urban males. In contrast, low-educated rural males earn only 6.2% less than low-educated urban males.

With respect to gender, the results show that the wage gap between males and females is narrowed down with the increase in education level. Specifically, males earn 27% more than females in the lower education group, while the gaps are 19% and 10% in the medium and higher education groups respectively. The potential reason may be that low-educated people are more likely to do manual work, providing an advantage to males in physical productivity.

Regarding potential working experience, the results for all of education groups are consistent with those of the previous section. Although some of the coefficients are insignificant, most of the coefficients show that people with more working experience earn more, with the effect slowing down when the working experience accumulates to a certain level.

Comparing the marital statuses, single marital status affects medium-educated people the most (17.8% lower salary than married) while it shows smaller effects on high-educated and low-educated people, with 11.1% and 9.7% respectively.

With respect to political status in these three education groups, CCP membership affects wage differences among high-educated people (14.4%) more than among the other two groups (both about 12.5%). Particularly, high-educated males get more wages (16.5%) from CCP membership than high-education females (11.3%). In contrast, medium and lower educated females (17.0% and 18.7%) are better off than males (9.5% and 9.8%) within their respective groups if they are CCP members.

Health condition shows that both higher educated males and females earn about 3.2% more if their health condition worsens by one unit in the five-unit scale. On the other hand, the results in the medium-educated group show that people will earn 2.4% if their health improves by one unit.

Finally, all the coefficients of the regional variables are significant at the 1% level. While all education groups earn at least 35% higher wages in coastal than in inland region, the magnitude for the high-educated groups is larger than for the other two groups. The variation between males and females for all the education groups are very small.

## **7. Conclusion**

In this paper, I have analyzed the effects of the hukou system on the probabilities of Chinese people entering high-income industries and on earning differences by using the 2002 Chinese Household Income Project. Individuals included in the sample are divided into males and females as well as between three education groups. The two outcomes are *Type of Industry* and *the natural logarithm of annual salaries*. The paper proposed different specifications to estimate the effect of the hukou system. The empirical results can be summarized as follows.

First and foremost, there exists hiring discrimination against rural migrants since urban

citizens have a more than 30 percentage point probability to enter a high-income industry. The negative impact of rural hukou is smaller within higher education group than within the medium and lower education groups for both males and females. Moreover, the hukou system causes earning differential in the labour market, but the wage gap between migrants and urban citizens is not very large after controlling for personal and regional characteristics. This implies that the hukou system is important to explain hiring discrimination, but it is not the most important variable in explaining wage gaps. In addition, higher education background helps rural migrants to reduce hiring discrimination.

Secondly, there is gender discrimination in Chinese labour market. Females are not only facing entry barriers to high-income industries but also earn about 20% less than males, even after controlling for personal and regional characteristics.

Thirdly, education attainment has a significant positive effect on both outcomes. Specifically, higher education helps people in their chances to enter high-income industries and in earning higher wages. This argument applies more to females since the returns to education for females are larger than those for males in both outcomes.

Fourthly, potential working experience benefits people with more wages but this positive effect diminishes when experience reaches a certain level. By contrast, people with less working experience have lower probabilities to enter high-income industries. However, the probabilities increase when their working experience accumulates to a certain level.

There are also other findings that show that single individuals are less likely to be hired by high-income industries and that they earn lower wages than married ones. Also, CCP members are more likely to enter a high-income industry than non-political status individuals. This is more so for males than for females. In contrast, CCP membership seems to be more important for

females than for males to earn higher wages. In general, the health variable did not show important effects with the coefficients often being insignificant. Finally, both men and women in coastal region earn higher wages. However, it is harder for high-educated people to enter high-income industries in the coastal region than in the inland area.

The negative effect of the hukou system that was observed in this research has alarmed the Chinese government. On July 30<sup>th</sup>, 2014, the State Council of the People's Republic of China published the reform bill of the hukou system. The main intention of this bill is to gradually abolish the current hukou system and to unify urban hukou and rural hukou into one system (called "resident hukou") before the year 2020. The purpose is to eliminate the hukou discrimination in the labour market as well as to break the structure of urban-rural dual economic barriers. Although the hukou system will still exist in the short term, the reform gives a positive signal aimed at increasing the availability of skilled and qualified rural workers in high-income urban industries.

To conclude, some shortcomings of this paper should be mentioned. First, the dataset is old. CHIP 2002 is a well-organized dataset for my empirical study since it includes information on both urban individuals and rural migrants. However, CHIP2002 was collected more than a decade year ago. I also checked the more recent versions of CHIP, but they did not provide information on migrant individuals anymore. Moreover, there may be endogeneity problems in my models. Specifically, there are potential measurement errors due to some individuals providing unsure or wrong answers. For example, some rural migrants or low-educated individuals did not have a chance to go to school. Therefore, they may have misunderstood the real meaning of the survey questions and provided their answers in the wrong way. Additionally, there are omitted variable biases since explanatory variables such as network, family size and

nationality were not included in the regressions. Finally, another drawback is that the estimated coefficients on rural hukou could be simply capturing the effect of being a migrant as opposed to the effect of having a rural hukou.

## References

- Bosker, M., U. Deichmann & M. Roberts (2014) 'The Impact of China's Spatial Development Policies on Urbanization and Regional Inequality' *World Bank Group, Development Research Group, Environment and Energy Team, June 2015 Policy Research Working Paper 7350*
- Chan, K. W., & W. Buckingham (2008) 'Is China Abolishing the Hukou System?' *The China Quarterly* doi: 10.1017/S0305741008000787
- Chen, B., M. Lu & N. Zhong (2012) 'Hukou and Consumption Heterogeneity: Migrants' Expenditure is Depressed by Institutional Constraints in Urban China' *Global COE Hi-Stat Discussion Paper Series 221*
- China Labour Statistical Yearbook 2003, National Bureau of Statistics of China  
[http://www.stats.gov.cn/english/statisticaldata/yearlydata/yarbook2003\\_e.pdf](http://www.stats.gov.cn/english/statisticaldata/yearlydata/yarbook2003_e.pdf)
- Demurger, S., Li, S. & Yang, J. (2012) 'Earning Differentials between the Public and Private Sectors in China: Exploring Changes for Urban Local Residents in the 2000s' *China Economics Review*, 23, 138-153
- Fu, Q., & Ren, Q (2010) 'Educational Inequality Under China's Rural-urban Divide: The Hukou System and Return to Education' *Environment and Planning A*, 42(3), 592-610
- Gagnon, J., Xenogiani, T., & Xing, C. (2011) 'Are All Migrants Really Worse Off in Urban Labour Market: New Empirical Evidence from China' *Discussion Paper, No. 6268. IZA*
- Goh, C., X. Luo & N. Zhu (2009) 'Income Growth, Inequality and Poverty Reduction: A Case Study of Eight Provinces in China' *China Economic Review* 20, 485-496
- Jiang, S., M. Lu & H. Sato (2009) 'Happiness in the Dual Society of Urban China: Hukou Identity, Horizontal Inequality and Heterogeneous Reference' *Global COE Hi-Stat*

*Discussion Paper Series 020*

- Knight, J., L. Song & H. Jia (2007) 'Chinese Rural Migrants in Urban Enterprises: Three Perspectives' *Journal of Development Studies* 3, 73-104
- Li, J. & Qiu, B. (2010) 'The Differences in Social Security Systems for Different Hukou Statues' *Economics Probe*, 10, 111-114 (in Chinese)
- Maurer-Fazio, M. & N. Dinh (2002) 'Differential Rewards to, and Contributions of, Education in Urban China's Segmented Labour Markets' *Pacific Economic Review* 3, 173-189
- Meng, X. & J. Zhang (2001) 'The Two-Tier Labour Market in Urban China: Occupational Segregation and Wage Differentials between Urban Residents and Rural Migrants in Shanghai' *Journal of Comparative Economics* 29, 485-504
- Roberts, M., Deichmann, U., Fingleton, B., & Shi, T. (2012) 'Evaluating China's road to prosperity: A new economic geography approach' *Regional Science and Urban Economics*, 42(4), 580-594
- Wu, X., & D. Treiman (2004) 'The Household Registration System and Social Stratification in China: 1955-1996' *Demography*, 41, 363-384
- Xu, Q. (2013) 'The Reform of Household Registration System from the Housing of Migrant Workers' *Scientific Development*, 5, 14-17 (in Chinese)
- Yang, D. (1999) 'Urban-Biased Policies and Rising Income Inequality in China' *The American Economic Review* 89, 306-310
- Yang, S. (2014) 'What Should Economists Know about the Current Chinese Hukou System?' *China Economic Review* 29 (2014) 200-212
- Zhang, J., & H. Cui (2007) 'An Empirical Analysis of the Wage Differences of University

Graduates' *Chinese Journal of Population Science* No.5 68-7

Zhao, C., M. Lu & H. Sato (2009) 'Social Networks and Labour Market Entry Barriers: Understanding Inter-industrial Wage Differentials in Urban China' *Global COE Hi-Stat Discussion Paper Series* 084

**Table 1: Summary Statistics of the main variables.**

| <i>Variable</i>  | <b>Overall</b> | <b>Male</b> | <b>Female</b> |
|--|----------------|-------------|---------------|
| Means of the variables for both genders                | Mean           | Mean        | Mean          |
| <b>A. Type of Hukou</b>                                |                |             |               |
| Rural hukou  | 0.244          | 0.244       | 0.243         |
| <b>B. Type of Industries</b>                           |                |             |               |
| High-income Industries                                 | 0.594          | 0.629       | 0.548         |
| <b>C. Total Annual Income in 2002 (in CNY)</b>         |                |             |               |
| Income (From 1,800 to 360,000)                         | 11,798.66      | 12,937.15   | 10,274.06     |
| <b>D. Gender</b>                                       |                |             |               |
| Male   | 0.572          | -           | -             |
| <b>E. Education</b>                                    |                |             |               |
| Higher-education (College or bachelor level and above) | 0.255          | 0.274       | 0.231         |
| Medium-education (Finished high school level)          | 0.347          | 0.327       | 0.373         |
| Lower-education (Below high school level)              | 0.398          | 0.399       | 0.396         |
| <b>F. Age</b>  |                |             |               |
| Age (22 and above)                                     | 40.032         | 41.168      | 38.511        |
| <b>G. Potential Working Experience</b>                 |                |             |               |
| Working Experience (From 0 to 66 years)                | 23.466         | 24.477      | 22.112        |
| <b>H. Marital Status</b>                               |                |             |               |
| Single   | 0.062          | 0.066       | 0.057         |
| <b>I. Political Status</b>                             |                |             |               |
| Member of Chinese Communist Party                      | 0.251          | 0.303       | 0.180         |
| <b>J. Health Condition</b>                             |                |             |               |
| Health (Value 1-5 means good to poor)                  | 2.032          | 2.002       | 2.072         |
| <b>K. Region</b>                                       |                |             |               |
| Coastal  | 0.272          | 0.267       | 0.278         |
| <b>Number of observations</b>                          | 11,001         | 6,298       | 4,703         |

Source: Calculated based on Chinese Household Income Project, 2002

**Table 2: Marginal effects from probit regression results of three specifications on the probability of enter a high-income industry, males and females**

|  | (1)                    |                        |                        | (2)                    |                        |                        | (3)                    |                        |                        |
|--|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | Overall                | Male                   | Female                 | Overall                | Male                   | Female                 | Overall                | Male                   | Female                 |
| <b>Type of Hukou</b> (Reference: Urban hukou)                |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Rural hukou  | -0.4495***<br>(0.0070) | -0.4393***<br>(0.0085) | -0.4621***<br>(0.0118) | -0.3605***<br>(0.0090) | -0.3665***<br>(0.0109) | -0.3462***<br>(0.0156) | -0.3404***<br>(0.0100) | -0.3461***<br>(0.0124) | -0.3263***<br>(0.0167) |
| <b>Gender</b> (Reference: Female)                            |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Male   | 0.0810***<br>(0.0083)  | -                      | -                      | 0.0742***<br>(0.0082)  | -                      | -                      | 0.0650***<br>(0.0084)  | -                      | -                      |
| <b>Education Attainment</b><br>(Reference: Medium-education) |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Higher-education<br>(College or Bachelor level and above)    |                        |                        |                        | 0.1526***<br>(0.0109)  | 0.1326***<br>(0.0143)  | 0.1804***<br>(0.0170)  | 0.1412***<br>(0.0117)  | 0.1106***<br>(0.0152)  | 0.1889***<br>(0.0184)  |
| Lower-education<br>(Below High school level)                 |                        |                        |                        | -0.0706***<br>(0.0098) | -0.0540***<br>(0.0127) | -0.0971***<br>(0.0154) | -0.0765***<br>(0.0103) | -0.0589***<br>(0.0134) | -0.1023***<br>(0.0161) |
| <b>Potential Working Experience</b>                          |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Experience (0-66)  |                        |                        |                        |                        |                        |                        | -0.0038*<br>(0.0020)   | -0.0096***<br>(0.0026) | 0.0060*<br>(0.0032)    |
| Experience Square  |                        |                        |                        |                        |                        |                        | 0.0001**<br>(0.0000)   | 0.0002***<br>(0.0000)  | -0.0001<br>(0.0001)    |

|  |                                   |        |        |        |        |        |            |            |           |
|--|-----------------------------------|--------|--------|--------|--------|--------|------------|------------|-----------|
| <b>Marital Status</b> (Reference: Married) |                                   |        |        |        |        |        |            |            |           |
|  | Single                            |        |        |        |        |        | -0.0842*** | -0.1014*** | -0.0571*  |
|  |                                   |        |        |        |        |        | (0.0202)   | (0.0257)   | (0.0327)  |
| <b>Political Status</b>                    |                                   |        |        |        |        |        |            |            |           |
| (Reference: Non-Political status)          |                                   |        |        |        |        |        |            |            |           |
|  | Member of Chinese Communist Party |        |        |        |        |        | 0.0600***  | 0.0658***  | 0.0531*** |
|  |                                   |        |        |        |        |        | (0.0108)   | (0.0134)   | (0.0183)  |
| <b>Health Condition</b>                    |                                   |        |        |        |        |        |            |            |           |
|  | Health                            |        |        |        |        |        | 0.0059     | 0.0095     | 0.0007    |
|  | (Value 1-5 means good to poor)    |        |        |        |        |        | (0.0052)   | (0.0069)   | (0.0080)  |
| <b>Region</b> (Reference: Inland)          |                                   |        |        |        |        |        |            |            |           |
|  | Coastal                           |        |        |        |        |        | -0.0104    | -0.0105    | -0.0087   |
|  |                                   |        |        |        |        |        | (0.0092)   | (0.0120)   | (0.0142)  |
| <b>Pseudo R<sup>2</sup></b>                | 0.1538                            | 0.1589 | 0.1377 | 0.1792 | 0.1786 | 0.1722 | 0.1847     | 0.1866     | 0.1772    |
| <b>Observations</b>                        | 11,001                            | 6,298  | 4,703  | 11,001 | 6,298  | 4,703  | 11,001     | 6,298      | 4,703     |

Notes: The Probit regression generated by unweighted values. Standard errors are in brackets. \* indicates that the marginal effect is significant at the 10% level, \*\* indicates that the marginal effect is significant at 5% level, \*\*\* indicates that the marginal effect is significant in 1% level.

**Table 3: Marginal effects from probit regression results on the probability of enter a high-income industry, different education attainment**

|  | (1) Within Higher Education Level |                        |                        | (2) Within Medium Education Level |                        |                        | (3) Within Lower Education Level |                        |                        |
|--|-----------------------------------|------------------------|------------------------|-----------------------------------|------------------------|------------------------|----------------------------------|------------------------|------------------------|
|  | Overall                           | Male                   | Female                 | Overall                           | Male                   | Female                 | Overall                          | Male                   | Female                 |
| <b>Type of Hukou</b> (Reference: Urban hukou)                |                                   |                        |                        |                                   |                        |                        |                                  |                        |                        |
| Rural hukou  | -0.2108***<br>(0.0411)            | -0.1888***<br>(0.0517) | -0.2669***<br>(0.0691) | -0.3287***<br>(0.0225)            | -0.3447***<br>(0.0258) | -0.2827***<br>(0.0416) | -0.3671***<br>(0.0116)           | -0.3756***<br>(0.1534) | -0.3531***<br>(0.1769) |
| <b>Gender</b> (Reference: Female)                            |                                   |                        |                        |                                   |                        |                        |                                  |                        |                        |
| Male   | 0.0126<br>(0.0146)                | -<br>-                 | -<br>-                 | 0.0690***<br>(0.0152)             | -<br>-                 | -<br>-                 | 0.0906***<br>(0.0134)            | -<br>-                 | -<br>-                 |
| <b>Potential Working Experience</b>                          |                                   |                        |                        |                                   |                        |                        |                                  |                        |                        |
| Experience (0-66)  | 0.0035<br>(0.0033)                | -0.0003<br>(0.0043)    | 0.0028<br>(0.0059)     | -0.0037<br>(0.0044)               | -0.0135**<br>(0.0057)  | 0.0096<br>(0.0069)     | -0.0066*<br>(0.0035)             | -0.0083*<br>(0.0048)   | -0.0015<br>(0.0055)    |
| Experience Square  | -0.0001<br>(0.0001)               | 0.0000<br>(0.0001)     | 0.0000<br>(0.000)      | 0.0001<br>(0.0001)                | 0.0003**<br>(0.0001)   | -0.0002<br>(0.0001)    | 0.0001**<br>(0.0001)             | 0.0002**<br>(0.0001)   | 0.0000<br>(0.0001)     |
| <b>Marital Status</b> (Reference: Married)                   |                                   |                        |                        |                                   |                        |                        |                                  |                        |                        |
| Single   | -0.0483*<br>(0.0292)              | -0.0507<br>(0.0389)    | -0.0596<br>(0.0452)    | -0.1231***<br>(0.0355)            | -0.1508***<br>(0.0452) | -0.0936<br>(0.0577)    | -0.0033<br>(0.0401)              | -0.0406<br>(0.0496)    | 0.0935<br>(0.0693)     |
| <b>Political Status</b><br>(Reference: Non-Political status) |                                   |                        |                        |                                   |                        |                        |                                  |                        |                        |

|                                   |                        |                        |                      |                       |                      |                      |                       |                       |                     |
|-----------------------------------|------------------------|------------------------|----------------------|-----------------------|----------------------|----------------------|-----------------------|-----------------------|---------------------|
| Member of Chinese Communist Party | 0.0534***<br>(0.0149)  | 0.0492***<br>(0.0184)  | 0.0629**<br>(0.0254) | 0.0606***<br>(0.0185) | 0.0568**<br>(0.0232) | 0.0613**<br>(0.0302) | 0.0688***<br>(0.0232) | 0.1023***<br>(0.0278) | -0.0253<br>(0.0434) |
| <b>Health Condition</b>           |                        |                        |                      |                       |                      |                      |                       |                       |                     |
| Health                            | -0.0110<br>(0.0089)    | -0.0092<br>(0.0111)    | -0.0124<br>(0.0146)  | 0.0086<br>(0.0095)    | 0.0147<br>(0.0128)   | 0.0016<br>(0.0140)   | 0.0167**<br>(0.0085)  | 0.0205*<br>(0.0113)   | 0.0113<br>(0.0127)  |
| (Value 1-5 means good to poor)    |                        |                        |                      |                       |                      |                      |                       |                       |                     |
| <b>Region (Reference: Inland)</b> |                        |                        |                      |                       |                      |                      |                       |                       |                     |
| Coastal                           | -0.0641***<br>(0.0153) | -0.0732***<br>(0.0189) | -0.0510*<br>(0.0261) | -0.0349**<br>(0.0163) | -0.0332<br>(0.0217)  | -0.0353<br>(0.0246)  | 0.0521***<br>(0.0148) | 0.0608***<br>(0.0198) | 0.0433*<br>(0.0224) |
| <b>Pseudo R<sup>2</sup></b>       | 0.0331                 | 0.0291                 | 0.0462               | 0.0603                | 0.0810               | 0.0368               | 0.1736                | 0.1841                | 0.1417              |
| <b>Observations</b>               | 2,810                  | 1,725                  | 1,085                | 3,817                 | 2,062                | 1,755                | 4,374                 | 2,511                 | 1,863               |

Notes: The Probit regression generated by unweighted values. Standard errors are in brackets. \* indicates that the marginal effect is significant at the 10% level, \*\* indicates that the marginal effect is significant at 5% level, \*\*\* indicates that the marginal effect is significant in 1% level.

**Table 4: OLS log income regression results of three specifications on earning differences, males and females**

|  | (1)                    |                        |                        | (2)                    |                        |                        | (3)                    |                        |                        |
|--|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|  | Overall                | Male                   | Female                 | Overall                | Male                   | Female                 | Overall                | Male                   | Female                 |
| <b>Type of Hukou</b> (Reference: Urban hukou)                |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Rural hukou  | -0.2952***<br>(0.0130) | -0.2797***<br>(0.0177) | -0.3159***<br>(0.0190) | -0.1021***<br>(0.0147) | -0.1089***<br>(0.0195) | -0.0862***<br>(0.0225) | -0.0342**<br>(0.0155)  | -0.0421**<br>(0.0207)  | -0.0160<br>(0.0235)    |
| <b>Gender</b> (Reference: Female)                            |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Male   | 0.2299***<br>(0.0116)  | -                      | -                      | 0.2181***<br>(0.0111)  | -                      | -                      | 0.2026***<br>(0.0106)  | -                      | -                      |
| <b>Education Attainment</b><br>(Reference: Medium-education) |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Higher-education<br>(College or Bachelor level and above)    |                        |                        |                        | 0.2815***<br>(0.0143)  | 0.2673***<br>(0.0188)  | 0.3069***<br>(0.0221)  | 0.2999***<br>(0.0141)  | 0.2707***<br>(0.0187)  | 0.3477***<br>(0.0213)  |
| Lower-education<br>(Below High school level)                 |                        |                        |                        | -0.1972***<br>(0.0140) | -0.1663***<br>(0.0182) | -0.2416***<br>(0.0221) | -0.1916***<br>(0.0141) | -0.1620***<br>(0.0183) | -0.2328***<br>(0.0222) |
| <b>Potential Working Experience</b>                          |                        |                        |                        |                        |                        |                        |                        |                        |                        |
| Experience (0-66)  |                        |                        |                        |                        |                        |                        | 0.0188***<br>(0.0027)  | 0.0195***<br>(0.0035)  | 0.0204***<br>(0.0044)  |
| Experience Square  |                        |                        |                        |                        |                        |                        | -0.0003***<br>(0.0001) | -0.0003***<br>(0.0001) | -0.0004***<br>(0.0001) |

|  |           |           |           |           |           |           |            |            |            |
|--|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|
| <b>Marital Status</b> (Reference: Married) |           |           |           |           |           |           |            |            |            |
| Single                                     |           |           |           |           |           |           | -0.1297*** | -0.1332*** | -0.1213*** |
|  |           |           |           |           |           |           | (0.0272)   | (0.0358)   | (0.0424)   |
| <b>Political Status</b>                    |           |           |           |           |           |           |            |            |            |
| (Reference: Non-Political status)          |           |           |           |           |           |           |            |            |            |
| Member of Chinese Communist Party          |           |           |           |           |           |           | 0.1345***  | 0.1245***  | 0.1647***  |
|  |           |           |           |           |           |           | (0.0129)   | (0.0163)   | (0.0211)   |
| <b>Health Condition</b>                    |           |           |           |           |           |           |            |            |            |
| Health                                     |           |           |           |           |           |           | -0.0042    | -0.0037    | -0.0055    |
| (Value 1-5 means good to poor)             |           |           |           |           |           |           | (0.0067)   | (0.0089)   | (0.0101)   |
| <b>Region</b> (Reference: Inland)          |           |           |           |           |           |           |            |            |            |
| Coastal                                    |           |           |           |           |           |           | 0.4031***  | 0.4060***  | 0.3984***  |
|  |           |           |           |           |           |           | (0.0123)   | (0.0166)   | (0.0182)   |
| Constant                                   | 9.1130*** | 9.3391*** | 9.1181*** | 9.0792*** | 9.2906*** | 9.0870*** | 8.7006***  | 8.8944***  | 8.6843***  |
|  | (0.0096)  | (0.0086)  | (0.0104)  | (0.0115)  | (0.0130)  | (0.0144)  | (0.0373)   | (0.0497)   | (0.0572)   |
| <b>R<sup>2</sup></b>                       | 0.0746    | 0.0389    | 0.0481    | 0.1487    | 0.1069    | 0.1384    | 0.2540     | 0.2159     | 0.2503     |
| <b>Observations</b>                        | 11,001    | 6,298     | 4,703     | 11,001    | 6,298     | 4,703     | 11,001     | 6,298      | 4,703      |

Notes: The OLS regression generated by unweighted values. Standard errors are in brackets. \* indicates that the coefficient is significant at the 10% level, \*\* indicates that the coefficient is significant at 5% level, \*\*\* indicates that the coefficient is significant in 1% level.

**Table 5: OLS log income regression results on earning differences, different education attainment**

|  | (1) Within Higher Education Level |                       |                       | (2) Within Medium Education Level |                        |                        | (3) Within Lower Education Level |                       |                       |
|--|-----------------------------------|-----------------------|-----------------------|-----------------------------------|------------------------|------------------------|----------------------------------|-----------------------|-----------------------|
|  | Overall                           | Male                  | Female                | Overall                           | Male                   | Female                 | Overall                          | Male                  | Female                |
| <b>Type of Hukou</b> (Reference: Urban hukou)                |                                   |                       |                       |                                   |                        |                        |                                  |                       |                       |
| Rural hukou  | -0.1860***<br>(0.0679)            | -0.2219**<br>(0.0875) | -0.1503<br>(0.1067)   | -0.0704**<br>(0.0321)             | -0.0403<br>(0.0409)    | -0.1416***<br>(0.0517) | -0.0406**<br>(0.0198)            | -0.0622**<br>(0.0273) | -0.0118<br>(0.0287)   |
| <b>Gender</b> (Reference: Female)                            |                                   |                       |                       |                                   |                        |                        |                                  |                       |                       |
| Male   | 0.1061***<br>(0.0198)             | -<br>-                | -<br>-                | 0.1918***<br>(0.0183)             | -<br>-                 | -<br>-                 | 0.2702***<br>(0.0171)            | -<br>-                | -<br>-                |
| <b>Potential Working Experience</b>                          |                                   |                       |                       |                                   |                        |                        |                                  |                       |                       |
| Experience (0-66)  | 0.0182***<br>(0.0048)             | 0.0121**<br>(0.0061)  | 0.0228***<br>(0.0083) | 0.0121**<br>(0.0058)              | 0.0227***<br>(0.0068)  | -0.0064<br>(0.0100)    | 0.0108**<br>(0.0045)             | 0.0099<br>(0.0065)    | 0.0137**<br>(0.0063)  |
| Experience Square  | -0.0003**<br>(0.0001)             | -0.0002<br>(0.0001)   | -0.0003<br>(0.0002)   | -0.0001<br>(0.0001)               | -0.0003***<br>(0.0001) | 0.0003<br>(0.0002)     | -0.0002***<br>(0.0001)           | -0.0002*<br>(0.0001)  | -0.0003**<br>(0.0001) |
| <b>Marital Status</b> (Reference: Married)                   |                                   |                       |                       |                                   |                        |                        |                                  |                       |                       |
| Single   | -0.1117**<br>(0.0470)             | -0.9674<br>(0.0635)   | -0.1334*<br>(0.0709)  | -0.1784***<br>(0.0442)            | -0.1592***<br>(0.0579) | -0.2122***<br>(0.0678) | -0.0974*<br>(0.0536)             | -0.1413**<br>(0.0684) | 0.0026<br>(0.0847)    |
| <b>Political Status</b><br>(Reference: Non-Political status) |                                   |                       |                       |                                   |                        |                        |                                  |                       |                       |

|                                   |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Member of Chinese Communist Party | 0.1441***<br>(0.0203) | 0.1657***<br>(0.0265) | 0.1127***<br>(0.0315) | 0.1253***<br>(0.0206) | 0.0956***<br>(0.0260) | 0.1698***<br>(0.0333) | 0.1244***<br>(0.0293) | 0.0980***<br>(0.0344) | 0.1872***<br>(0.0558) |
| <b>Health Condition</b>           |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| Health                            | 0.0321***<br>(0.0119) | 0.0307**<br>(0.0155)  | 0.0351*<br>(0.0186)   | -0.0243**<br>(0.0115) | -0.0324**<br>(0.0162) | -0.0155<br>(0.0162)   | -0.0114<br>(0.0110)   | -0.0025<br>(0.0144)   | -0.0239<br>(0.0170)   |
| (Value 1-5 means good to poor)    |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| <b>Region (Reference: Inland)</b> |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| Coastal                           | 0.4837***<br>(0.0237) | 0.4903***<br>(0.0312) | 0.4692***<br>(0.0363) | 0.3928***<br>(0.0201) | 0.3697***<br>(0.0280) | 0.4134***<br>(0.0287) | 0.3593***<br>(0.0205) | 0.3799***<br>(0.0276) | 0.3313***<br>(0.0308) |
| Constant                          | 8.9440***<br>(0.0556) | 9.1117***<br>(0.7294) | 8.8902***<br>(0.0856) | 8.8038***<br>(0.0729) | 8.9096***<br>(0.0916) | 8.9612***<br>(0.1129) | 8.6370***<br>(0.0707) | 8.9072***<br>(0.1008) | 8.6244***<br>(0.0973) |
| <b>R<sup>2</sup></b>              | 0.2306                | 0.2023                | 0.2421                | 0.1605                | 0.1282                | 0.1564                | 0.1297                | 0.0905                | 0.0746                |
| <b>Observations</b>               | 2,810                 | 1,725                 | 1,085                 | 3,817                 | 2,062                 | 1,755                 | 4,374                 | 2,511                 | 1,863                 |

Notes: The OLS regression generated by unweighted values. Standard errors are in brackets. \* indicates that the coefficient is significant at the 10% level, \*\* indicates that the coefficient is significant at 5% level, \*\*\* indicates that the coefficient is significant in 1% level.