Hukou System and Migration in China: A new perspective of the effects from Hukou System

Thesis

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Abstract

This project involves discovering how the hukou system affects the migration and the equality in China. With the results from the three models as well as the comparison between the data from the different groups, this research confirms the existing of the education gap and income gap among rural residents, urban residents and the rural to urban migrants; however, the difference of schooling years decreased over the years; In addition, when converting the norminal income into the real income with house price index, there shows no significant difference between the rural and urban hukou holders. Moreover, the average self-reported social level of the rural residents is higher than that of the urban ones, which indicate that, in average, people in rural areas are more satisfied with their life status.

The results also show the hukou system has the "filter effects" on the rural hukou holders: people with higher education background are more likely to convert their hukou type to the urban ones; Although this effects might result in the "brain drain" of the rural areas, it may in fact ends up to encourage the efforts of individuals to "go ahead" and benefit society in the whole.

Dedication

I dedicate my thesis work to my family and many friends. A particular feeling of gratitude to my loving parents, Zhenxin Guo and Guilin Chen whose words of encouragement and push for tenacity ring in my ears.

I also dedicate this thesis to my friends and my American family who have supported me throughout the process. I will always appreciate all they have done, especially Gene Green and Phillis Green for helping me get familiar with the life in U.S., Kim McClenathan for helping me to improve my English and communication skills.

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Chapter 1: Introduction

1.1 History of Hukou System

In 2011, China reached the 50% urbanization. However, some researches point out that this figure is based on the population who lives in the cities, instead of their Hukou types. If the calculations were based on the Hukou system, rather than the residency, this figure would be only about 36% (see Figure 1). The reason for this difference is that although there are many people migrate to the cities, only few of them successfully change their hukou type.

Figure 1. Rate of Urbanization in China (2000-2010)

Source: CEIC

In China, unlike most of the other countries, whose migration barriers are constructed from the speech, habits and manners, Hukou system (also called house registration system) plays a crucial part in limiting the migrations from rural to urban areas. Before 1978, people in rural areas are forbidden to move to urban areas. After the reformation of the old Hukou system, people from rural areas are allowed to move and live in cities, but the conversion from rural hukou to urban ones are still difficult. Most migrations who live in big cities with their rural hukou type will face routine discriminations from residents. A survey by Chinese Academy of Social Science shows that nearly one-third of local citizens in Shanghai are reluctant to have migrants as their neighbors; In Changchun, a less-open city in Northeast of China, the situation is even worse: less than one third of the local residents can accept the migrants as their neighbors.

With the discrimination from local people and the hard access to the welfare and public service provided by the local government, migrants will still treat themselves as rural people, with the hukou documents as their identification. The small hukou documents acted as an internal passport in China. When the hukou system was established in 1958, it immediately contrasts the passage in the constitution that said that every citizen in China could enjoy the "freedom of residence and freedom of change their residence". But the reform of this system only took place in the late 1980s, which allow labors to move to cities to get jobs, when China is at the beginning of its economic boom and required cheap workers for factories.

However, this change only allows free migration, but the restrictions of the conversion of the hukou type are still remaining, and it matters a lot. Since the hukou type, rather than its residence, is closely related to the level of the welfare one can gain from the local government. Such public welfare as better education, health insurance and the chance to get into the state-owned companies are all limited to migrants who keep their rural hukou. The conversion from rural hukou to urban ones is a long and hard process: only few of the migrants over the past 30 years have successfully obtained their urban hukou (see figure 2 and figure 3). Figure 2 and Figure 3 shows the data from the surveys conducted by the China Family Panel Studies (CFPS) in 2010 and 2012. Among 33046 respondents in the 2010 survey, only 4691(14.2%) successfully converted their rural hukou to urban form, and in 2012, only 841(13%) out of 6468 respondents made the conversion.

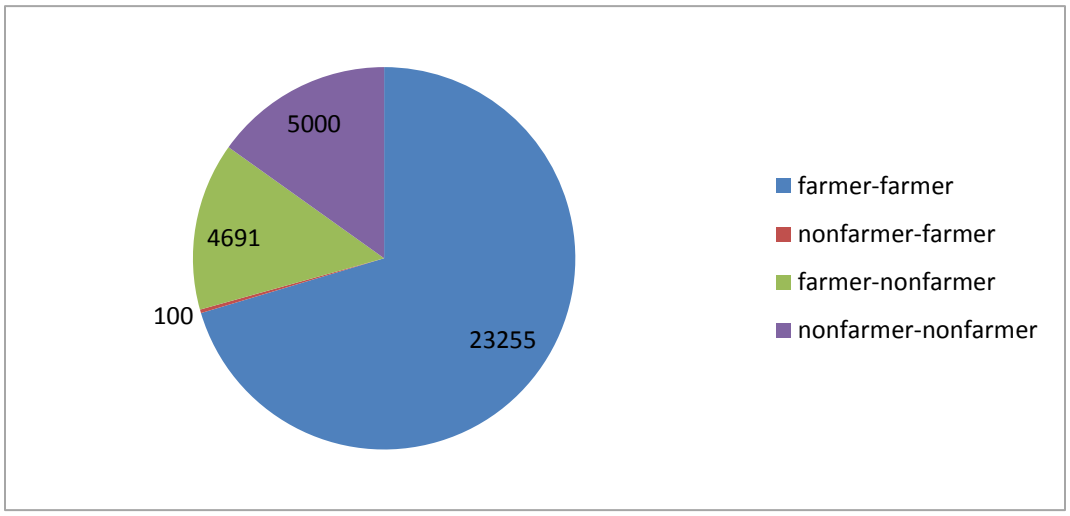


Figure 2. The rate of the Hukou Conversion (2010)

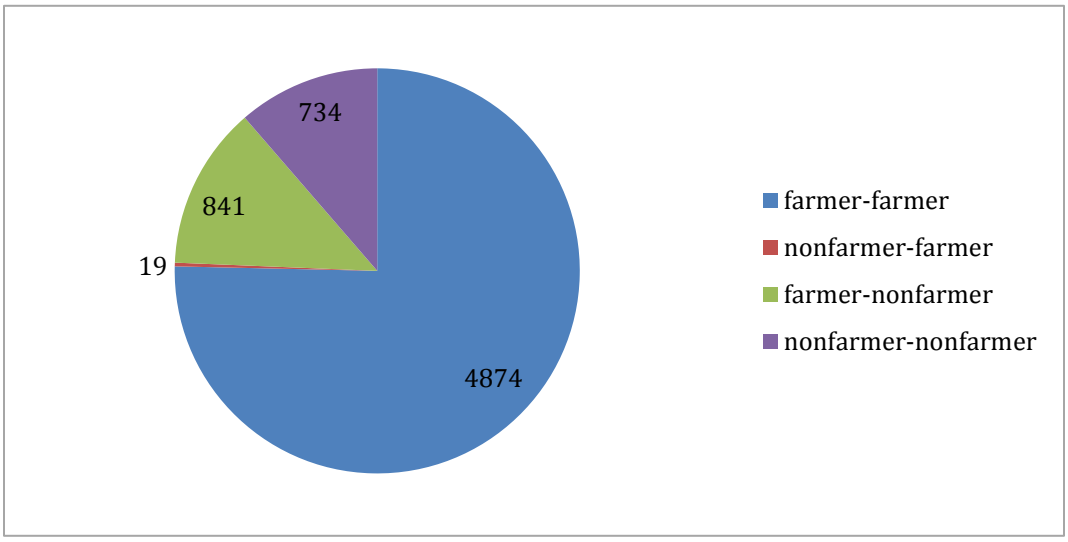


Figure 3. The rate of the Hukou Conversion (2012)

The remaining of this hukou system separated the China into different classes, and among urban hukou owners, the hukou location also play a significant role in dividing the citizens from different areas. In those megacities, migrants without the local hukou will also face various type of discrimination: In Beijing and some other megacities, migrants without local hukou are forbidden to buy cars or houses and their children are not allowed to go to state-run schools; the opportunities to enter local universities is all most 40 times lowers than the local residents. These migrants, although they have excellent education background and form part of the middle class in the cities, they still are called the "second-class citizens." In these metropolises, both the hukou type and the hukou location are the determinants to the social status of the residence. The local hukou is even worth

2000,000 yuan (about 300,000 US dollars) in some market that provide the hukou conversion service. This price is out of the affordability of most of the migrants.

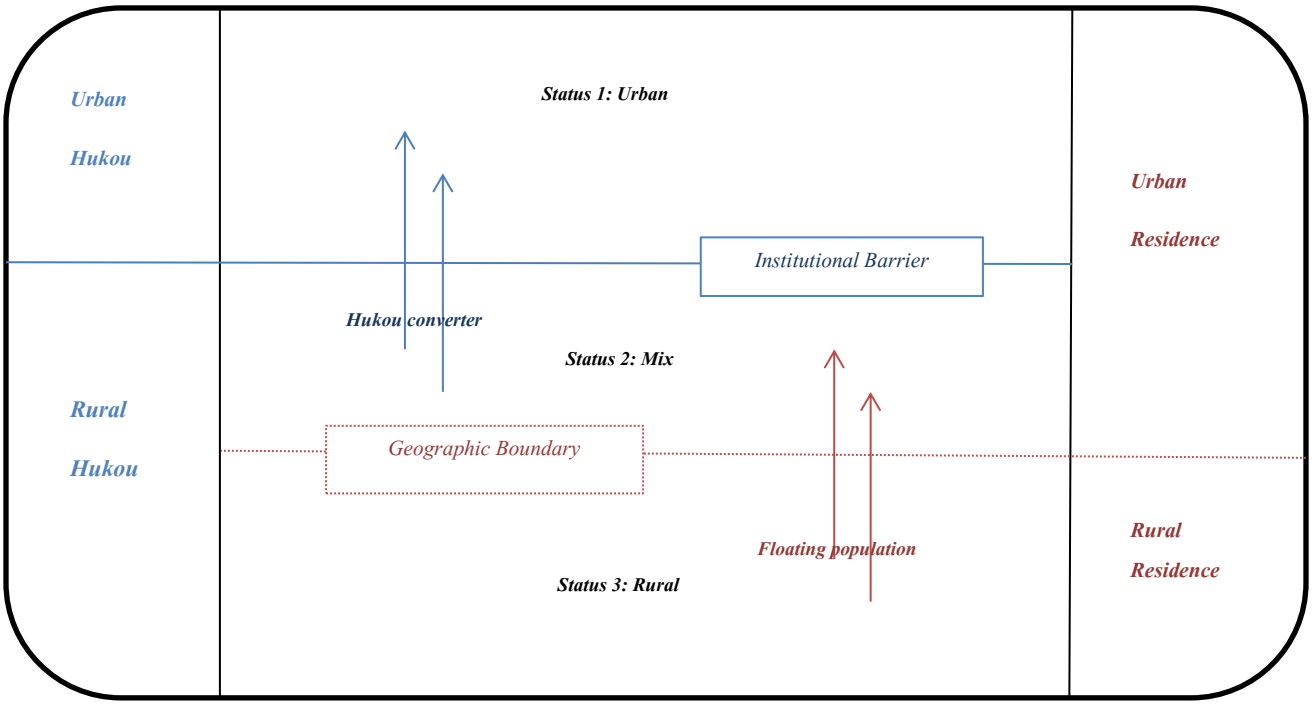


Figure 4 Migration and Hukou Conversion

The one that can successfully make the conversion are the ones who either have the extraordinary academic experience or get into an excellent company or the ones who are rich enough. Those people are relatively smarter than their counterparts in other developing countries, according to one of the UN reports. The hukou system acts as the filter of the excellent migrants.

1.2 The Coming Reform of Hukou System

The requirement for the Hukou reform has been proposed for years and until recently, the party seems to realize the urgency of the reform. The prime minister has come up with a new idea called "human-centered new style of urbanization," which aimed to avoid short urbanization. The new proposal includes three aims to solve the existing three 100 million people issues.

1. promote the transfer of a population of about 100 million to settle agricultural town;
2. transformation of shanty towns around 100 million people live and villages;
3. 100 million people guide nearest urbanization in the Midwest.

In the last November, the party made the decision to speed up the pace of the hukou reform, in response to the requirements from urban residents (without urban hukou) who have been calling for "equal rights". The term 'Shiminhua" has become popular among the party member, which means to turn the migrants into urban hukou holders. The aim of this reform will not just to move the people into the city, but to give the rights for them to allow them stay in the city as long as they want.

The reform will be a significant challenge, not only for the party, but also for China. The new reform plan will be costly since the money is needed to pay the bills for the increasing citizens if they are allowed to change the hukou type. However, the way to foot those huge bills has not been figured out, and the local governments, in the face of such tremendous cost, might probably be reluctant to support the

reform. In addition, the local residents, who fear their privilege to get access to education and health care will be stripped away, might also show strong resistance to the new plan.

Meanwhile, the rural hukou holders also have their concerns. Although they suffer from various discriminations in the urban areas, most of them are unwilling to give up their rural hukou. The main reason is that the rural hukou can guarantee their owning of the farmland, and if they concur difficulties in the cities, they can always choose to go back and feed themselves by farming.

However, the new reform plan failed to give the option to go back to their villages and provide the assurance for their living. In fact, a study conducted by the agriculture ministry in 2013 shows that among 7000 rural hukou holders, only 25% of them think the earning an urban hukou is important. Even among those whose family members are living in urban areas, only 50% showed their willingness to gain an urban hukou. The survey confirmed that the fear to lose their right of the property is the main reason that those people did not want to convert their hukou type. Although most of the migrants would like to stay in cities, they did not wish to give up their privilege as a rural hukou holder-the patch of the farmland.

It seems odd that these rural migrants also resist to the hukou reform, but the situation may not change until the land reform come hand in hand with the hukou reform. With no promise of the free selling of the land, they have no choice, but to hold their rural hukou, to ensure that can at least make a living with the land. Although the new urbanization plan has claimed to allow 100 million people to

become urban citizens by the year 2020, it requires the applications to have a stable job and a legal place to live. Given these restrictions, only a small portion of migrants can successfully become urban hukou holder.

Several cities and province have tried to reform the hukou system with their ways. Zhongshan, a city in the Southern part China in Guangdong Province, is the pioneer to push the hukou reform. The migrants their can apply to the local hukou based on the points they get. The points are the mix indexes of the individuals' educational background, ownership of the property, payments for the social security contributions as well as their volunteer work. However, only about 18% of the migrants successfully gained their urban hukou through the new score system. Other cities like Shanghai, also adopt the similar score system and allow the locally born children to gain the urban hukou in spite of their parents' hukou type. Twelve provinces (including Hebei, Liaoning, Jiangsu, Zhejiang, Fujian, Shandong, Hubei, Hunan, Guangxi, Chongqing, Sichuan, Shanxi) eliminated the different between the urban hukou and rural hukou, and use the uniform hukou type (usually called "juminhukou" in Chinese) instead.

1.3 Benefit and Cost

Whenever there come with benefits, there will be cost. There is no exception for the hukou reform. Numbers of studies focused on the negative effect of the hukou system, and shows what we can gain from the reform: faster pace of the urbanization, less inequality and more consumption. However, all of these come with a price tag. Lifting the hukou restriction means extra massive spending on

education, health care and housing. Also when moving to cities become less difficult, people would not like to live in rural areas, which will impede the development of the countryside; Moreover, when the migrants have the same hukou type with the urban residents, they may also want to get the stable job in the state-owned company, instead of living by self-employment. In this case, the entrepreneurship might be limited due to fewer people would like to make a living by starting his or her own business. In addition, the living cost in the city is much higher than that in the country, and most of the rural hukou holders get part of their current income from the land, therefore the reform may lead to the drop of the real income for some migrants.

1.4 Research Objective

Based on the possible benefits and cost of the reform, it is hard to tell the effects of the coming reform of the Hukou system. This paper is going to study the effects of the Hukou system from a more positive viewpoint, to find both pros and cons of the system, instead of mainly focus on the negative side. The paper is organized in the following ways: the second chapter of the paper will review the recent studies of the migration and the hukou system; the data used in this research will be illustrated in the third chapter; the fourth chapter will focus on the explanation of the three models applied in this paper as well as the specific dataset used in each model. Estimation results will be displayed in the first part of the chapter five and further analysis of the results is given in the following part; finally, the conclusion and the future research are in chapter six.

Chapter 2: Literature Review

2.1 Current Hukou System in China

China's Hukou system, also known as the household registration system, is believed to be the main drivers of the great gap between urban-rural areas. Most of the urban population live in a higher standard and can enjoy more welfare benefits and more flexible social mobility; In rural areas, however, the welfare and the migration opportunities are highly limited (Martin King Whyte, 1996-21). Because of the difficulties to convert Hukou from rural to non-rural and from one location to another, the Chinese labor market, although dramatically freed up since 1990, is still in uniquely limited status.

The Hukou system was created in 1958, which requires all the Chinese citizens should be given a "rural" or "non-rural" Hukou with a particular location. Currently, the Hukou location is assigned at birth and mainly passes down by one's parents (Zhang, 2010). A complete Hukou contain two aspects: the Hukou type (rural or non-rural) and the Hukou location (usually the place where one was born). Both the Hukou type and the Hukou location define the eligibility for welfare and public services provided by the local government.

Since the establishment of in 1958, the Hukou system experienced numbers of alternations and reforms, and Zhang (2010) divided the reform process into two

stages: (1) 1958-1979: In this period, the rural Hukou holders were not allowed to move to cities for jobs. (2) 1980-now: Local governments have more and more power to administrate the local Hukou system, and were allowed to establish location-specified Hukou admission criteria and Hukou system (Chan, 2009, ; Wang 2005a-05). There are some achievements during the reform in the second stage. Twelve provinces eliminate the distinction between the rural Hukou and non-rural Hukou, i.e. the different Hukou types were removed in these regions, and people in these provinces now have an uniform Hukou type (usually called "jumin Hukou" in Chinese)(Chan 2012-05). Specifically in Shanghai, the newborn children will automatically gain non-rural Hukou despite their parents' Hukou type (Peng, Shi and Zhu, 2013-05).

Although the reform of the Hukou system has allowed more flexibility of migration, the conversion of the Hukou type and Hukou location is still hard for individuals, especially for those who want to move to metropolis, such like Beijing and Shanghai. The city entry barrier (CEB) index, calculated by Zhang and Tao (2012), is to rank the degree of the hardness to gain urban Hukou in different cities. Within the 45 sample cities, big cities, including Beijing and Shanghai, have the highest value of CEB index. In these "hard conversion" cities, the job opportunities and the government-provided benefits are much higher than smaller ones. By comparing the individual and collective Hukou converters, Zhang and Treiman (2013) provide a new aspect regarding the determinants of the migration. It found that the single converters were much younger than the collective ones, and most of

them use their attributes to obtain the urban Hukou rather than governmental activities. It also reported that the collective converters earn much less than individual ones. Zhang and Treiman (2013) conclude that the urban Hukou continues to provide much more benefits in current China. The current Hukou conversion policy in "hard conversion" cities, however, mainly allows rich people and the highly educated ones to make the conversion (Zhang, 2010). In this sense, the Hukou system will increase the urban-rural differences and promote the inequality in China.

2.2 Hukou System and Inequality

In recent years, there has been an increasing interest in the relationship between Hukou system and inequality. A considerable amount of literature has been published on this topic. These studies are mainly concerned with the limitation effects of the Hukou system on migration and the inequality between the migrants with different Hukou types. There have been a number of studies involving Hukou system that have reported that this system plays a crucial role in limiting the migrations from rural to urban areas in China.

With the reform of the Hukou system since 1990s, the number of the migrants increased and those migrants play the primary role in the population redistribution in modern china. The migration is also highly related to the regional development (Fan, 2005). Based on both cross-section and time time-series analysis, Zhang and Song (2003) confirms that the main contribution factor to China's urban development in the last 20 years is the migration from rural areas to urban areas.

This migration trend is affected by the economic growth and encouraged by the rural-urban gap in the individual income. However, the geological distance plays a negative role in driving the migration.

Furthermore, based on the place-to-place migration model, Chan, et al. (1999) reported that the foreign investment play a majoring role in creating the non-Hukou migration. And the rural labor migrants tend to move out from the area with high population density to the ones that are better endowed. This migration pattern supports the network migration hypothesis. But the urban migrants display a contrast moving preference. In addition, Bao et al. (2009) investigated elasticity and sensitivity of migration rates to restrictions with the extended migration model. The paper concluded that the reform of Hukou system will not only influence the scale of the migration, it will also affect the structure of the migration i.e. the determination of the migration.

Due to its limitation effects on migration, the Hukou system discourages the efficiency in the China's labor market and creates a productivity loss in the Chinese economy (Zhang, 2010). By simulation approach, Whalley and Zhang (2007) supports the idea that the Hukou system impede the labor flowing from rural to urban areas, as a result prevent the Chinese economy to reach a more equal distributed status.

The Hukou system, on the other hand, is believed to drive significant inequality between rural and urban population, and the difference is so great that some even referring it as "heaven and earth" by separating the Chinese people in to

two societies, (Whyte, 2010; Treiman, 2012). Much of the current literature, therefore, pays particular attention to the relationship between Hukou system and inequality. Most of those studies based on a comparison between different groups of people defined by the Hukou system.

With the examination of four different cases (2 region case, 3 region case , 6 region case, and 31 province case), Whalley and Zhang(2007) shows that the Hukou system is the primary cause of the unequal income distribution in China. Lu and Song (2006) also provide empirical evidence with the survey data of Tianjin to support the idea that the Hukou is the primary factor which widening income gap between migrants and non-migrant labors.

The reason for the inequality is mostly believed to be caused by the vast difference between rural and urban residents,; The later can enjoy more public services, better education and welfare programs, thus create imbalance in the whole society((Wu and Treiman, 2007)); Fu and Ren(2010)confirmed the Hukou status affects the income and mainly through its influence on the education return since education is the main determinant of the income level in the labor market. In addition, the rural Hukou holder is less likely to achieve higher education and entering the Party (Wu and Treiman, 2004). On the other hand, the Hukou converters who made the conversion in a later time share the characteristics of lower educational background, and are less likely to get jobs in state-owned institutions. The possibility of both self-employment and unemployment is high among those later converters. In fact, people with rural Hukou status are always treated as lower

human capital than the ones who have non-rural Hukou status. Therefore, the income gap can be explained by education and occupation, and those special features in the Chinese labor market were particularly affected by the Hukou system (Fu and Ren, 2010).

Moreover, using a more representative sample data set, Xing (2014) reveals that the self-selection effects of the rural-urban migration can play a important role in reducing the rural income level as well as the inequality; as a result, it will increase the rural-urban income gap since the permanent migrants from rural to urban is most from the high rural income levels. Nevertheless, with the particular channel of the Hukou system to recruit merited ones, the selective process of the migration (with the Hukou system) also provides a sense of social equality (Wu and Treiman, 2007).

In order to settle in urban areas and get full access to the benefits from cities, rural residents generally prefer to convert their Hukou type and location. However, the conversion is currently rather hard, especially for those who want to move to big cities. The difficult conversion process divided the population into four groups: permanent migrants, temporary migrants, rural residents and urban residents. Zhang (2010) focused on the distinctions among those groups and particularly investigated the situations of the temporary migrants in the labor market. The results are not surprising. Those temporary ones are in little possibility to change jobs, and are also less likely to get higher-paid jobs in state-owned institutions. Other than the income gap, they also need to deal with other difficulties and sometimes will be forced out

with a high living expense in large cities and return to their rural homes. Moreover, Chan et al. (1999)'s comparative study found that the major interprovincial migrants are mostly married males between 20-29 years old. And this sharing feature is in line with migrants elsewhere. Furthermore, the study confirmed the difference between the temporary migrants and the permanent ones: the latter often ends up in lower-skilled jobs and have much lower education than the former ones.

Since benefits such as the good education, subsides for housing, health insurance plans and social security programs can only be attained with an urban Hukou in large cities. Temporary migrants have little access to the welfare programs in big cities and generally discriminated in the local labor market. In addition, the current Hukou conversion policy can only allow the wealthy and highly educated individuals to change their Hukou status to urban Hukou in big cities (Zhang, 2010). As a result, temporary migrants in the lowest level of the socioeconomic hierarchy, urban residents remain in the middle, and the permanent migrants end up in the most well-off level (Fan, 2002). Meng and Zhang (2001) further examined the degree of the segregation of the labor market in Shanghai, and reported that 22% of the urban residents were given white-collar jobs while they are more suitable for the blue-collar ones; In contrast, the rural migrants who are qualified in the white collar jobs were forced to take the blue collar ones. The labor productivity would be affected negatively by this mismatch as a result. Moreover, the endowment of a person can contribute 50% to the income distinctions, but the occupational segregation can only

explain 6% of the income gap. The paper suggests eliminating the market segregation to encourage equal competition.

Unlike previous studies, the results of Huang (2010) show that the income of the rural migrants has been improved with urbanization, but the consumption have been declined due to the saving motivations. In addition, the paper did not find significant income growth for non-migrants with the urbanization. Consumption decline seemed to have links with the urbanization. Although China has made a great leap toward prosperity, it will not continue its miracle without the further reform of the Hukou system. The dual segregation in China's society and economy need to be eliminated in order to enjoy an extended social and economic progress (Chan, 2013).

2.3 Positive Effects of Hukou System

Much of the available literature deals with the question of the relationship between the inequality and the Hukou system; however, the settlement intention of the migrants from the rural to urban areas is not as strong as anticipated in most studies (Zhu, 2007). If this is the case, then, the limitation effects of the Hukou system on the migration would be weakened. As a result, the difference between migrants and urban residents, which mainly believed to be caused by the Hukou system, may not be as severe as expected. In fact, individuals who have a childhood in a rural area and then move to cities are much happier than urban residents (Zhang and Treiman, 2013). This indicated that the rural experience might have some positive effects in their life.

High inequality is not necessarily restricted the mobility chances, and openness may help little to reduce inequality (Touche, 2005-Wu and Treiman, 2007). Although the Hukou system, which is introduced by the government to cope with the high population density and resource allocation, form a barrier for rural-urban migration; its selective process, which provide channels for the higher educated people, ends up to encourage the efforts of individuals to "go ahead"(Wu and Treiman, 2007). This selection mechanism can also benefit society in the whole: it drive the young's to learn skills in order to meet the requirements of good jobs, and thus can live a better life; it also push people to acquire higher education, in order to meet the conditions to convert the Hukou status and gain more benefits. This will result in a more active community with more skilled and higher educated people.

Therefore, what kind of role does the Hukou system played in China is still ambiguous. This paper is going to study the effects of the Hukou system from a more positive viewpoint, to find both pros and cons of the system, instead of mainly focus on the negative side. Thus, with the analysis We will focus on the following aspects:

(1) What are the effects of the Hukou system on the education?

(2) Will Hukou system have positive effects on entrepreneurship?

(3) Does the "real income gap" exist between rural and urban areas?

(4) What are the main factors in the selection process, and what is the result from its "filter effect"?

With those questions and their answers, we could examine the Hukou system in a more objective way, and thus to further understand the function of this system and its socioeconomic effects.

Chapter 3: Survey and Data Description

The data used in this paper is collected through a household survey conducted in China in 2010 and 2012. This chapter is going to illustrate the survey and the data used in the empirical estimation.

3.1. The introduction of the Survey

The Institute of Social Science Survey (ISSS) of Peking University started the China Family Panel Studies (CFPS) in the year 2010. It is a national representative survey and conducted every two years. The CFPS is designed to collected data from the three levels-the individual level, the family level and the community level. They mainly focus on the economic as well as wellbeing of Chinese children and adults. The domain covers economic activities, education outcomes and family dynamics. It started its baseline survey in the year 2010. About 15000 families and 40000 individuals were participated in the survey. In the follow-up survey in 2012, 85% household and 82% of the individuals were successfully interviewed.

3.2 The data Selection and Description

There are four kinds of survey dataset -the adult, the children, the community and the family- provided by the CFPS. Since the analysis in this paper is mainly focused on the Hukou system, the income and the education, two datasets-the adult dataset in 2010 and the family data set in 2012- are chosen for the research.

Before providing the basic information of the original data used in the paper, the definition of the four groups based on the Hukou system is introduced in table 1.

Table 1. The classification of the People

--	**Rural Hukou (3 years old)**	**Urban Hukou (3 years old)**
Rural Hukou (Present)	Rural Residence	Urban to Rural Migrant
Urban Hukou (Present)	Rural to Urban Migrant	Urban Residence

According to table 1, there are four groups of people based on their hukou type when they are three years old and at present. “Rural residence” did not made any change of their rural hukou and the “urban residence” keep their urban hukou type all the time; “Urban to rural migrant” change their previous urban hukou to rural hukou type, while the “rural to urban migrant” convert their rural hukou to the urban ones. All the summary statistics in table 2 is based on this definition.

Table 2. Summary statistics for individuals based on Hukou type

Classification	2012	2010
Rural Residence	4874	23255
Urban to Rural Migrant	19	100
Rural to Urban Migrant	841	4691
Urban Residence	734	5000
Total	6468	33046

Based on table 2, almost 70% of the 33046 respondents in 2010 survey are the rural residents, and 15% are urban residents; the hukou converters, who make the conversion from rural hukou type to urban hukou type, are account for 14% all the individuals and only 100 respondents change their urban hukou to the rural ones. Similar to the survey results in 2010, the proportion of the rural residents in the 2012 survey is still about 70%, while the urban residence take up about 13% of total number of people; there are 19 people made the conversion from urban to rural hukou and 841 out of 6468 individuals change the rural hukou to urban form[1].

[1] Note: The total number here is calculated by elimination of the people who did not provide the information about their present and original hukou type.

Table 3. Summary Statistics for Individuals based on Birth Year

Birth Year	2012	2010
1900-1950	6103	7028
1950-1960	6030	6457
1960-1970	7445	7748
1970-1980	6164	5796
1980-1990	6656	4697
1990-	3332	1874
Total	35730	33600

According to table 3, among the 33600 respondents in the survey in 2010, about half of them were born between 1950-1980, while the age of the 6571 respondents are less than 34 years old and 7028 individuals are more than 64 years old; In the 2012 survey, there are 3417 more individuals who were born after 1980 than those in 2010, and about 1000 less than the people born before 1950 in 2010; the ones whose age between 34 to 64 are still account for about 50% of the total number of respondents.

Table 4. Summary Statistics for Individuals Based on Education

Highest Education	2012	2010
Uneducated	5733	9920
Primary School	6462	6973
Junior School	10563	9809
High School	4479	4533
Junior College	1528	1417
Undergraduate	865	871
Master	55	48
PhD	1	4
Total	29686	33575

Table 4 shows the academic background of the participants in the survey. There are eight levels of education-Uneducated, Primary School, Junior School, High School, Junior College, Undergraduate, Master, Ph.D. Typically, we based our analysis based on the assumption that the schooling years of an uneducated is 0 years; for an individual whose highest education is primary school, the schooling years is 6 years; for junior school students, their schooling years is calculated as 9 years; the schooling years of a high school students is 12 years; as it often takes 3 years to finish the junior college in China, the schooling years for a person who graduated from a college is 15 years; For an undergraduate, the schooling years is one year more than those whose highest education is junior college; It often takes a master student 19 years to complete schooling and 22 years for a Ph.D student to graduate.

Table 5. Summary statistics for individuals based on location

Location	2012	2010
Beijing	202	230
Tianjin	230	225
Hebei	1949	1737
Shanxi	1562	1564
Inner Mongolia	0	0
Liaoning	3069	3129
Jilin	582	691
Heilongjiang	1048	1193
Shanghai	2388	3126
Jiangsu	748	646
Zhejiang	592	471
Anhui	741	543
Fujian	453	377
Jiangxi	754	594
Shandong	1554	1404
Henan	4348	3732
Hubei	526	614
Hunan	1023	956
Guangdong	3512	3070
Guangxi	684	669
Chongqing	354	363
Sichuan	1648	1777
Guizhou	1234	1053
Yunnan	1026	991
Shanxi	709	705
Gansu	4616	3704
Qinghai	1	0
Ningxia	3	0
Xinjiang	2	0
Total	35558	33564

The table 5 shows the number of the individuals based on the location. The study participants are from 29 provinces. Specifically, in the 2010, the number of the respondents in the three provinces-Qinghai, Ningxia and Xinjiang-is zero; and in 2012 survey, the number of the individuals is less than 5. Henan has the largest number of participants in the survey in 2010 and 2012; Gansu has 4616 respondents, which is the most.

Table 6. Summary Statistics For Individuals Based on Income

Income (yuan/year)	**2012**	**2010**
0-10000	23165	24156
10000-20000	4907	5391
20000-30000	3687	2134
30000-40000	1900	851
40000-50000	839	428
50000-100000	936	507
100000-200000	176	102
200000-	120	2158
Total	35730	35727

The summary statistics based on the income is provided in the table 6. Most individual's income is between zero to 10000 yuan (1587 dollars, based on the interest rate 6.3)[2].There is some difference between the data collected in 2010 and obtained in 2012: About 5.3% of the individuals earn 30000-40000 yuan (4761-6349 dollars) per year in 2012 and only 2.3% in 2010. In addition, only 120 out of

[2] The interest rate 6.3 will be used in the paper.

35730 individuals have income above 200,000 yuan(31746 dollars), but this number is 2158 in the study in 2012.

Chapter 4: Sample data and Empirical Method

In this section, the sampling procedure as well as the sample data description will be provided with different models. Three models are going to be introduced. The objective of the models and the hypothesis will also be discussed.

4.1 Education and the Hukou system

The first model is formulated to test the hypothesis that the Hukou type will be the important determinant of the years of education. For rural hukou holders, the schooling years will be less than that of the urban hukou holders. In this model, there are five explanatory variables which including two dummy variables:

$$Edu_i = \alpha + \beta_1 HK_i + \beta_2 Age_i + \beta_3 Gender_i + \beta_4 Edu\_Fa_i + \beta_5 Edu\_Mo_i + \varepsilon_i \quad (1\text{-}1)$$

$$Edu_i = \alpha + \beta_1 HK_i + \beta_2 Age_i + \beta_3 Gender_i + \beta_4 Edu\_Fa_i + \beta_5 Edu\_Mo_i + \beta_6 Loc_i + \varepsilon_i \quad (1\text{-}2)$$

In equation (1-1), Edu_i is the years of education for a specific person and the school years for its parents are represented by the Edu_Fa_i, which is the years of schooling of its father and Edu_Mo_i, which is the years of schooling of its mother. Age_i is calculated by subtracting the year of the birth from 2014 (e.g. If a

person born in 1988, then its age is 26 years old). In addition, both HK_i and $Gender_i$ are dummy variables:

$$HK_i = 0: \text{Rural hukou type};\ HK_i = 1: \text{Urban hukou type};$$

$$Gender_i = 0: \text{Female};\ Gender_i = 1: \text{Male};$$

In equation (1-2), the location dummy (Loc_i) is added to the original model . The ordinary least square (OLS) method and two sample datasets will be used in the estimation.

4.1.1 Sample A1

Sample A1 is based on the data of the CFPS's family survey in the years 2010. The sample dataset is selected by eliminating the NULL observations in the six variables used in the model A.. The summary statistics are provided in table 7, and the frequency histograms of age and years of education are shown in figure 5 and figure 6.

Table 7. Summary statistics for sample A1 (2010)

Variable	Obs	Mean	Std.Dev	Min	Max
Age	11877	35.8	10.8	20	84
Years of Education	11877	8.5	4.4	0	22
Years of Education (Father)	11877	5.9	4.6	0	19
Years of Education (Mother)	11877	4.0	4.4	0	22

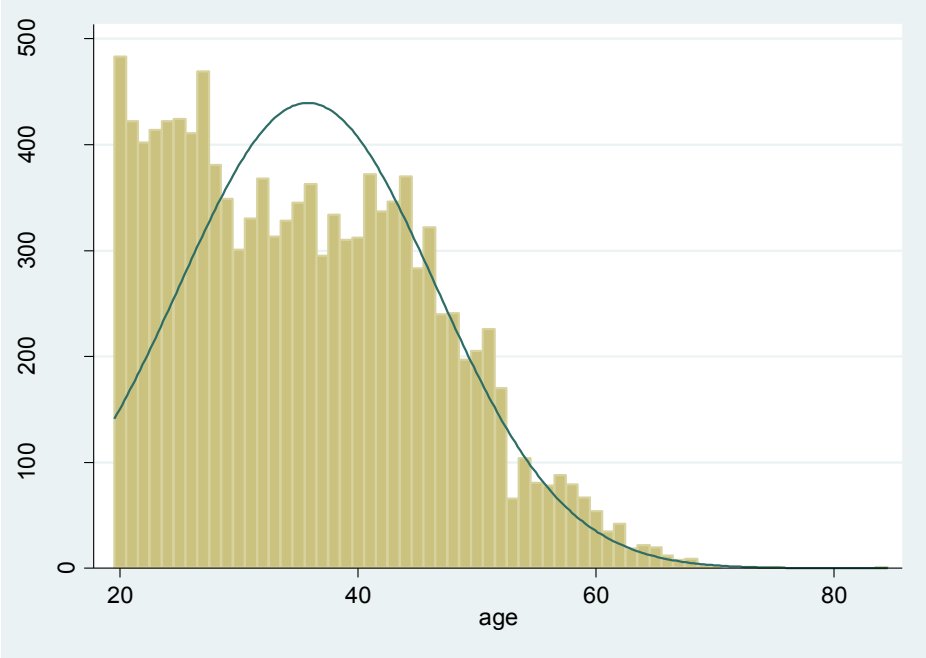


Figure 5. Frequency Histogram of Age (Sample A1)

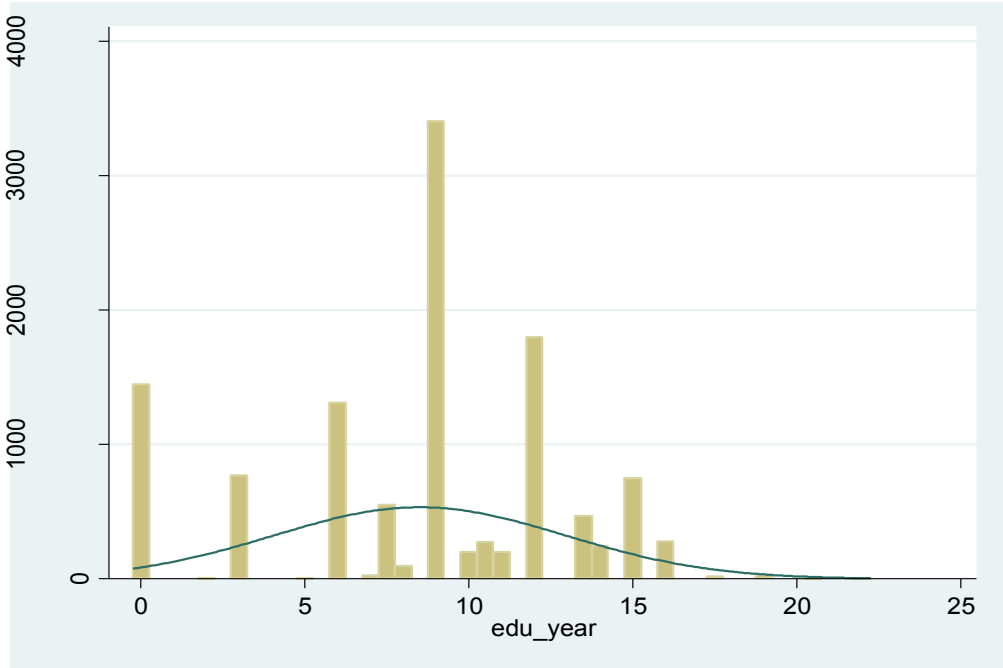


Figure 6. Frequency Histogram of Years of Education (Sample A1)

4.1.2 Sample A2

Sample A2 is based on the data of the CFPS's adult survey in the years 2012. The sample dataset is selected by eliminating the NULL observations in the six variables used in the model A. There are 5770 individuals selected from 35730 observations. The summary statistics are given in table 8. Figure 7 and figure 8 are the frequency histogram of age and years of education in sample A2.

Table 8. Summary statistics for sample A2 (2012)

Variable	Obs	Mean	Std.Dev	Min	Max
Age	5770	39.3	15.4	18	97
Years of Education	5770	8.7	4.1	0	19
Years of Education (Father)	5770	5.5	4.4	0	22
Years of Education (Mother)	5770	3.5	4.2	0	22

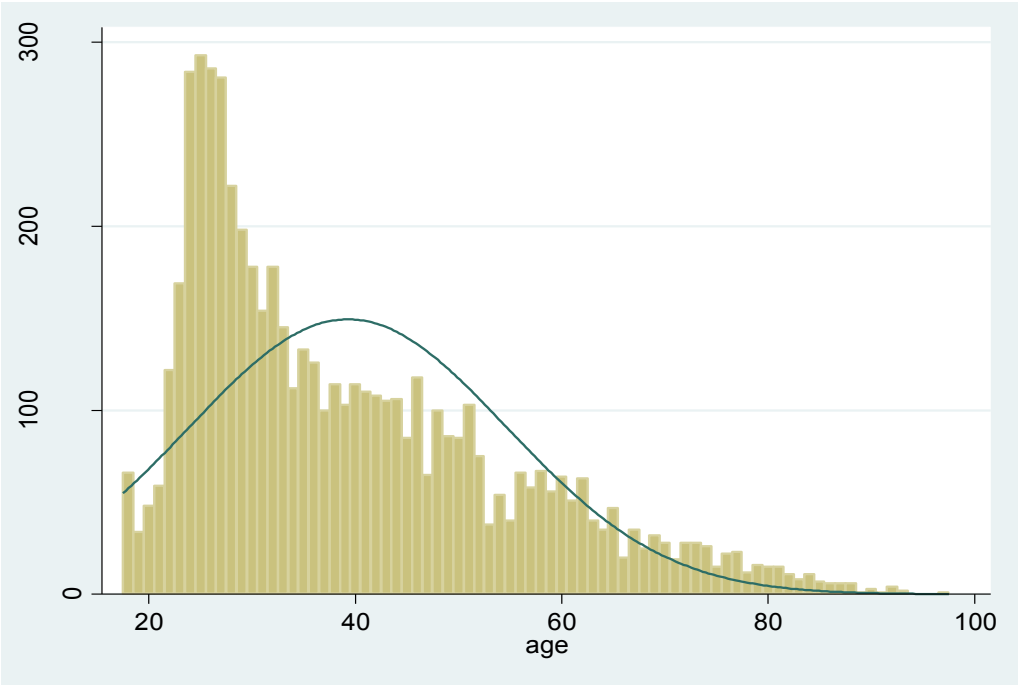
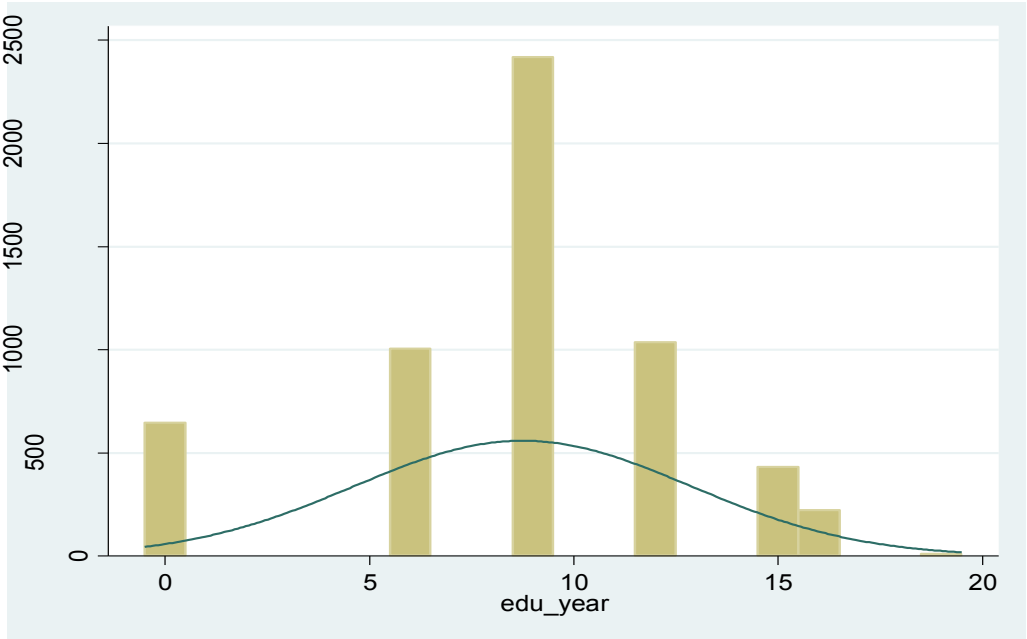


Figure 7 Frequency Histogram of Age (Sample A2)



4.2 I Figure 8. Frequency Histogram of Years of Education (Sample A2)

The second model is formulated to test the hypothesis that the Hukou type will affect the entrepreneurship in China. It is more likely for rural hukou holders, especially the ones who is living in cities with rural hukou type, to start their own business (self-employed) than that of the urban hukou holders. In this model, the dependent variable is a dummy variable and four explanatory variables are included:

$$SE_i = \alpha + \beta_1 HK_i + \beta_2 Age_i + \beta_3 Gender_i + \beta_4 Edu_i + \varepsilon_i \quad (2)$$

In the equation (2), SE_i is a dummy variable:

$SE_i = 0$: Non-self-employment;

$SE_i = 1$: Self-employment;

Edu_i is the years of education for a specific person; Age_i is calculated by subtracting the year of the birth from 2014, and $Gender_i$ are dummy variables with the same definition in the model A. The Logit method and two sample datasets will be used to estimate model B.

4.2.1 Sample B1

Sample B1 is based on the data of the CFPS's family survey in the years 2010. The sample dataset is selected by eliminating the NULL observations in the five variables used in the model B. The sample size of the dataset is 16205. The summary statistics are given in table 9. Figure 9 and figure 10 are the frequency histogram of age and years of education.

Table 9. Summary statistics for Sample B1 (2010)

Variable	Obs	Mean	Std.Dev	Min	Max
Age	16205	46.7	12.5	20	114
Years of Education	16205	6.8	5.0	0	22

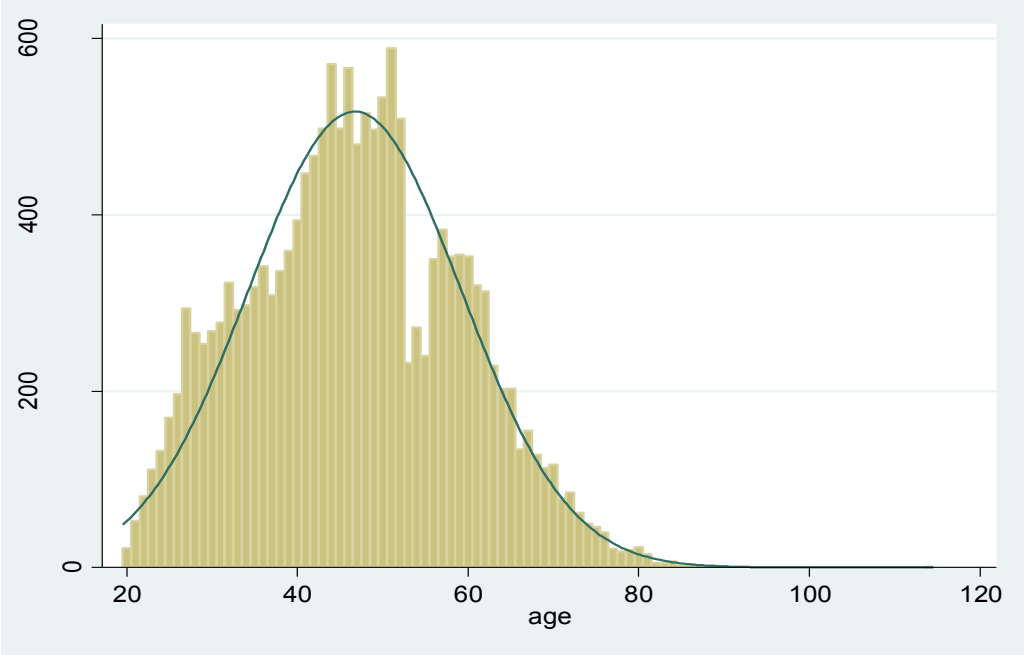


Figure 9. Frequency Histogram of Age (Sample B1)

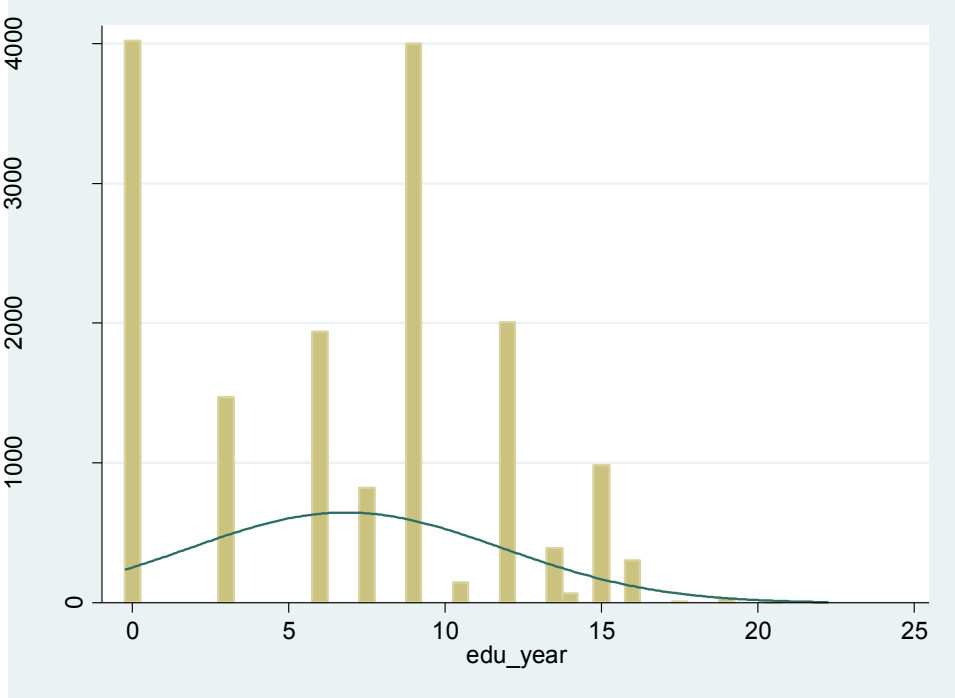


Figure 10. Frequency Histogram of Years of Education (Sample B1)

4.2.2 Sample B2

Sample B2 is based on the data of the CFPS's adult survey in the years 2012. The sample dataset is selected by eliminating the NULL observations in the five variables used in the model B. There are 21675 individuals selected from 35730 observations. The summary statistics are given in table 10, and the figure 11 and figure 12 are the frequency histogram of age and years of education.

Table 10. Summary Statistics for Sample B2 (2012)

Variable	Obs	Mean	Std.Dev	Min	Max
Age	21675	45	13	18	92
Years of Education	21675	7.9	4.4	0	22

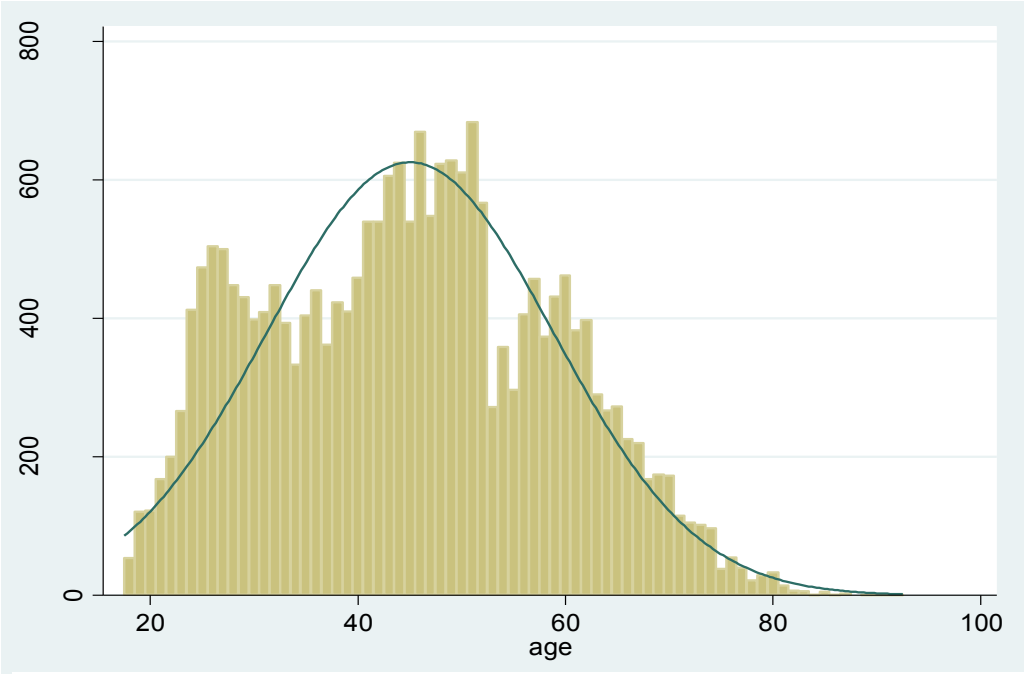


Figure 11. Frequency Histogram of Age (Sample B2)

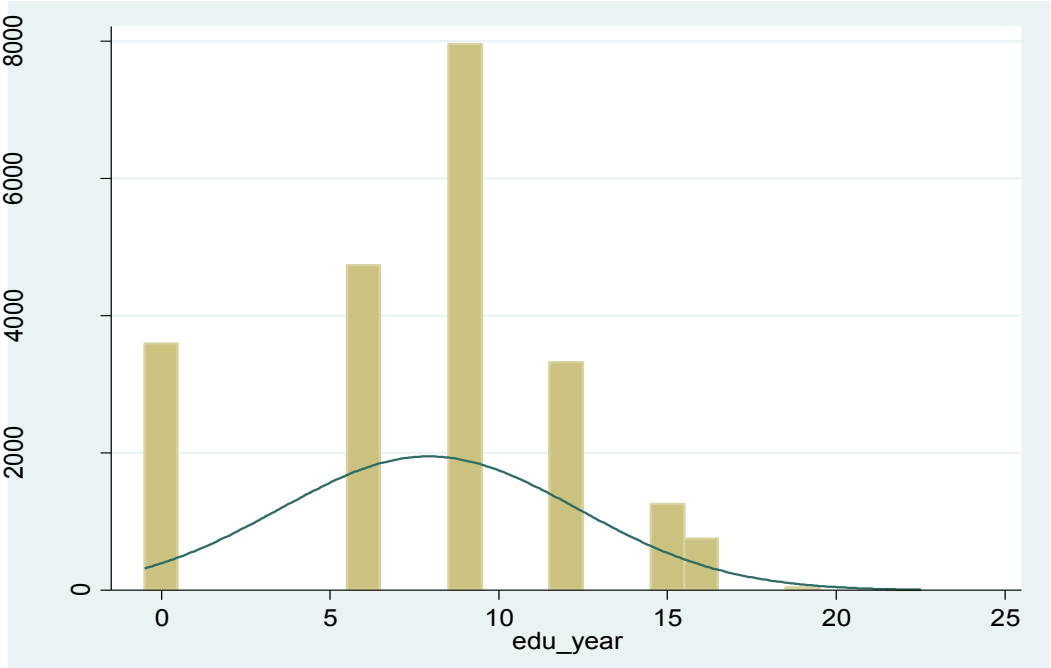


Figure 12. Frequency Histogram of Years of Education (Sample B2)

4.3 Income and the Hukou System

The third model is formulated to analyze the relationship between Hukou type and the income. Income is believed to be higher for urban hukou holders than rural hukou holders. In this model, the dependent variable is the income, and six explanatory variables are included:

$$Income_i = \alpha + \beta_1 HK_i + \beta_2 Age_i + \beta_3 Gender_i + \beta_4 Edu_i + \beta_5 Exp_i + \beta_6 Slevel + \varepsilon_i \quad (3\text{-}1)$$

$$Income_i = \alpha + \beta_1 HK_i + \beta_2 Age_i + \beta_3 Gender_i + \beta_4 Edu_i + \beta_5 Exp_i + \beta_6 Slevel_i + \beta_7 Loc_i + \varepsilon_i \quad (3\text{-}2)$$

In the equation (3-1), the four variables - Edu_i, Age_i HK_i and $Gender_i$ - have the same definition in the model A. Exp_i is working experience, and the years of working will be a proxy variable of it. *Slevel* is a dummy variable for the social level. There are five different levels range from 1-5, and all the data are self-reported. In equation (3-2), the location dummies (Loc_i) are added in the model. The ordinary least square (OLS) method and two sample datasets will be used to estimate model C.

4.3.1 Sample C1

Sample C1 is based on the data of the CFPS's family survey in the years 2010. The sample dataset is selected by eliminating the NULL observations in the seven variables used in the model C. We also eliminated the people whose income is less than 1000 yuan (158 dollars). There are 13288 individuals selected from 35727

individuals. The summary statistics are given in table 11, and the frequency histograms of each variable are provided in the figures below.

Table 11. Summary statistics for sample C1 (2010)

Variable	Obs	Mean	Std.Dev	Min	Max
Age	13288	45.8	12.2	20	114
Years of Education	13288	7.5	4.9	0	22
Work Experience (in years)	13288	20.0	14.6	4	73
Income	13288	17019.6	25839	1000	80000
Social Level	13288	2.8	0.9	1	5

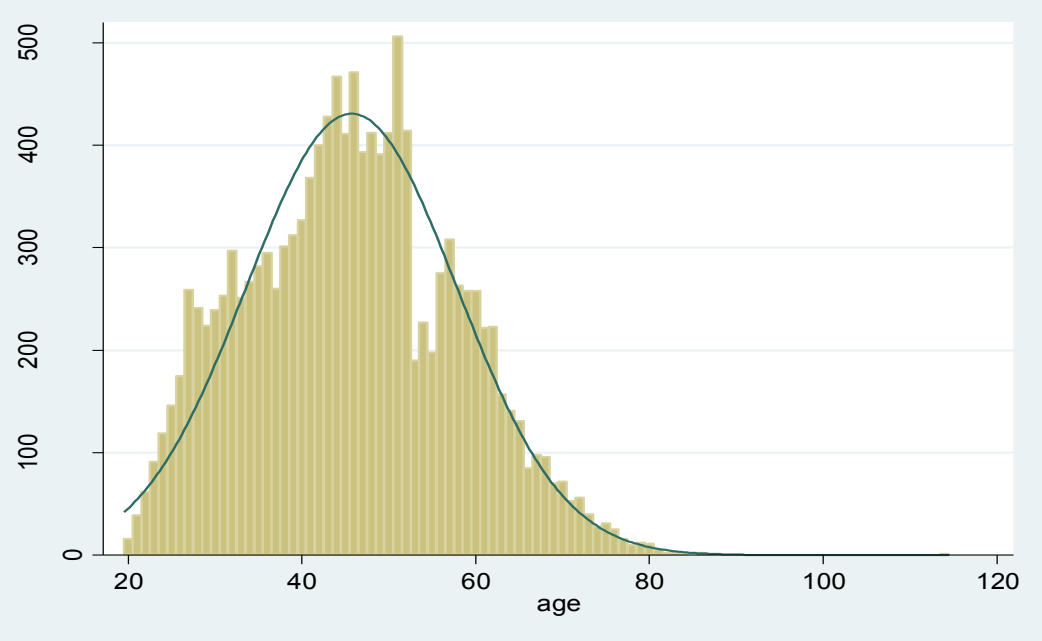


Figure 13 Frequency Histogram of Age (Sample C1)

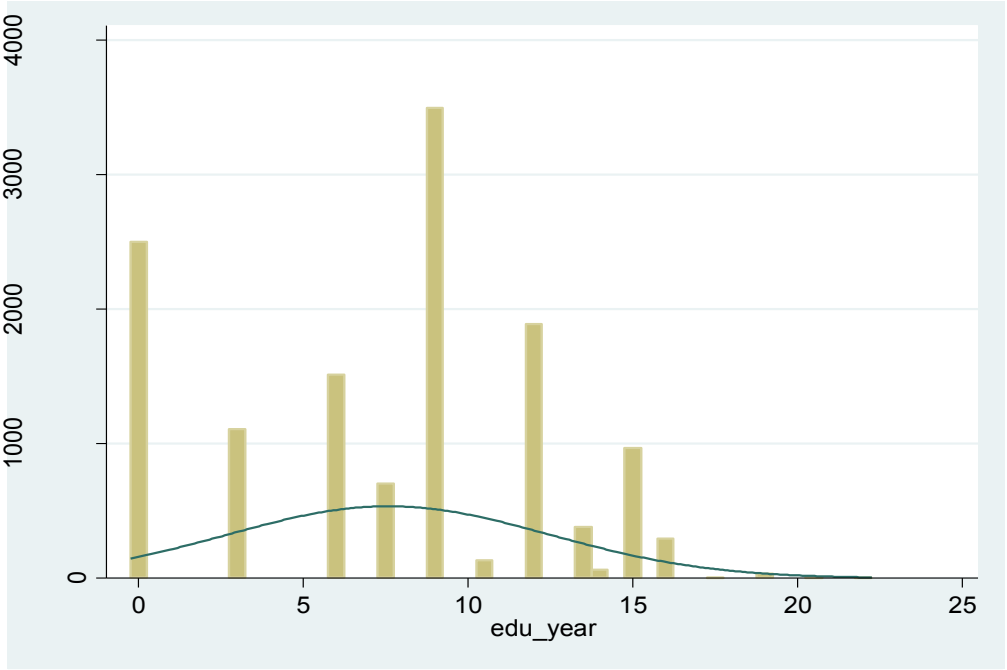


Figure 14. Frequency Histogram of Years of Education (Sample C1)

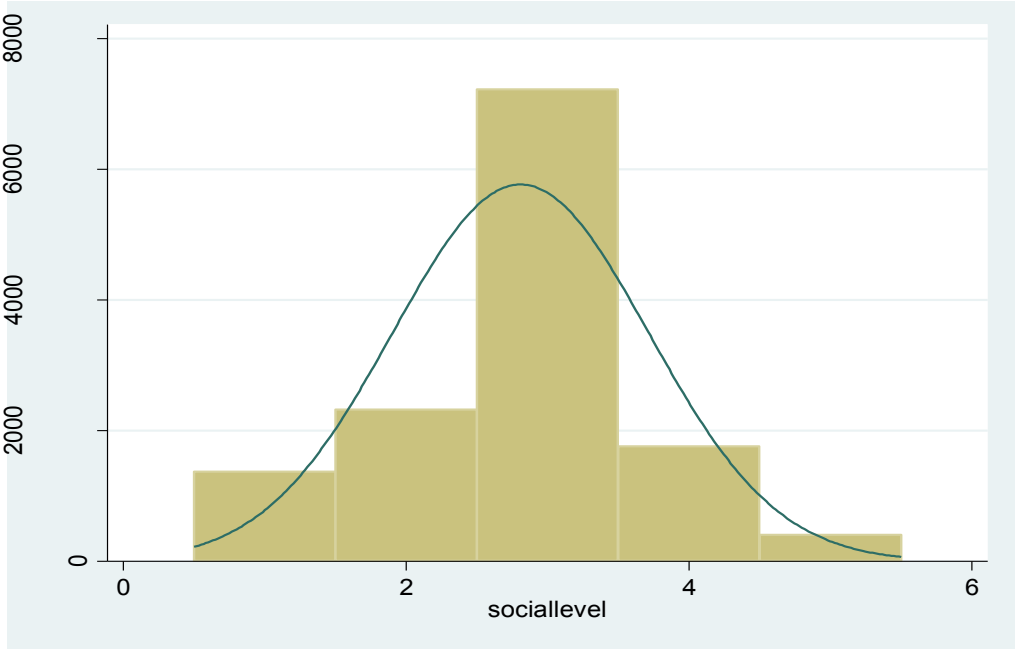


Figure 15. Frequency Histogram of Social Level (Sample C1)

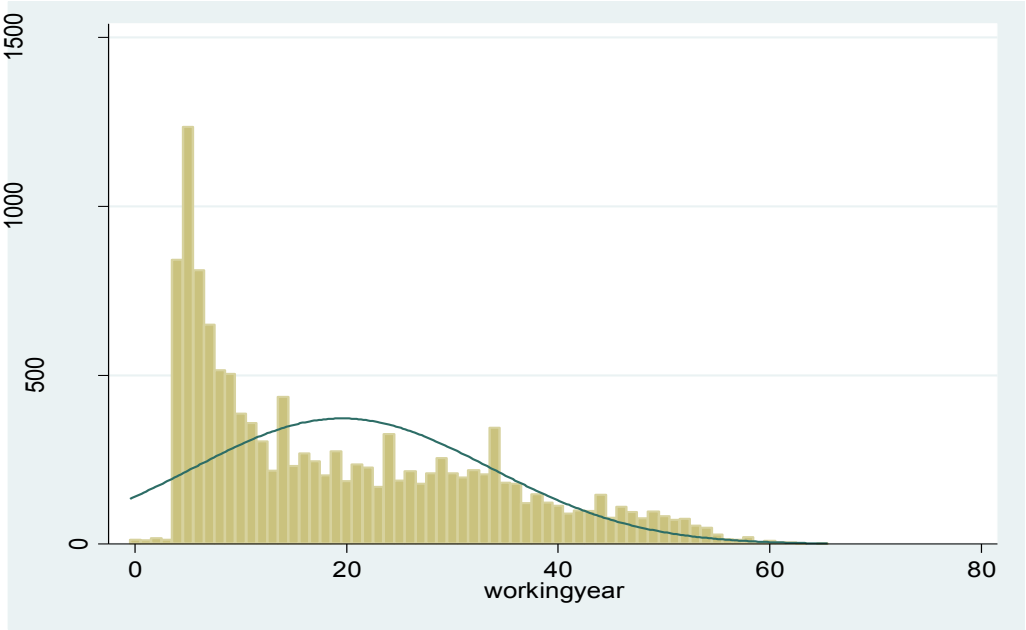


Figure 16. Frequency Histogram of Working Years (Sample C1)

4.3.2 Sample C2

Sample C2 is based on the survey data of the CFPS's family questionnaire in the years 2010. The sample dataset is selected by eliminating the NULL observations of the original dataset based on the variables used in the model C. We also eliminated the people whose income is less than 1000 yuan (158 dollars). The real income is calculated with the house price index[3]. The remaining number of the observation is 10826. The summary statistics are given in table 12. Figure 17 to figure 20 shows the frequency histograms of each variable separately. Sample C2 is used in the real income comparison and did not used in the estimation.

[3] Real income=Income/Average house price.

Table 12 Summary Statistics for Sample C2 (2012)

Variable	Obs	Mean	Std.Dev	Min	Max
Age	10826	45.8	12.2	20	114
Years of Education	10826	7.6	4.9	0	22
Work Experience (in years)	10826	19.8	14.6	4	73
Real income	10826	2.2	1.9	0.03	10.0
Social Level	10826	2.8	0.9	1	5

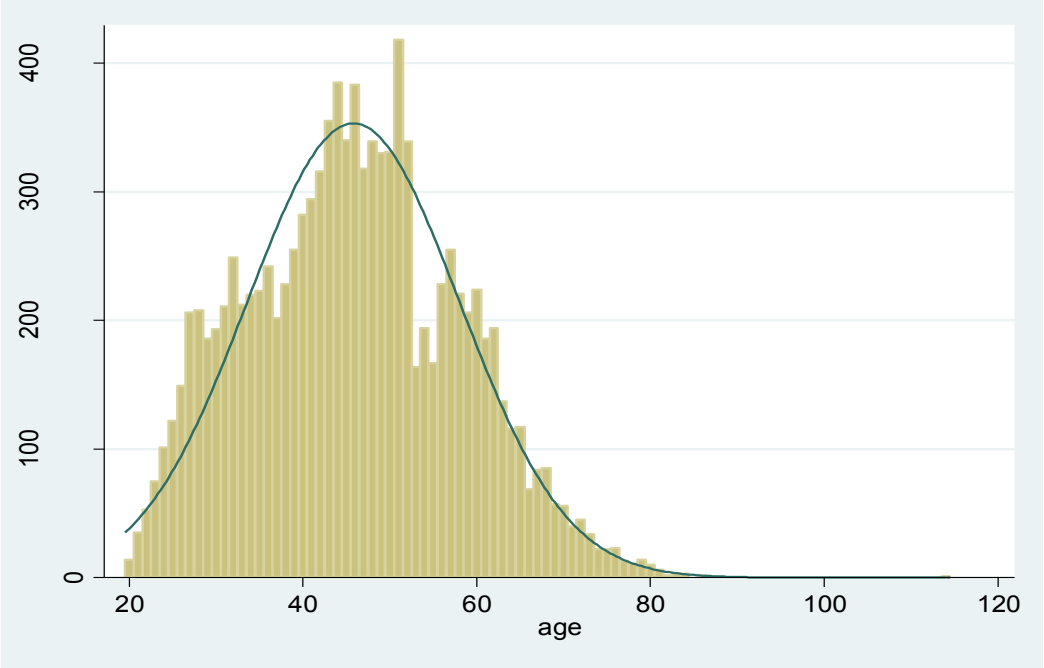


Figure 17. Frequency Histogram of Age (Sample C2)

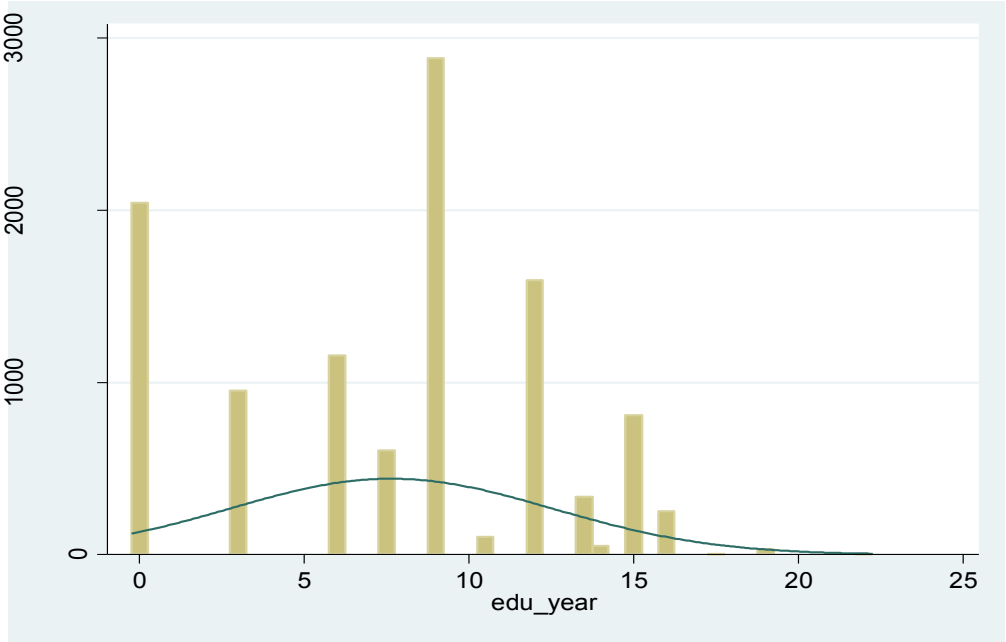


Figure 18. Frequency histogram of Years of Education (Sample C2)

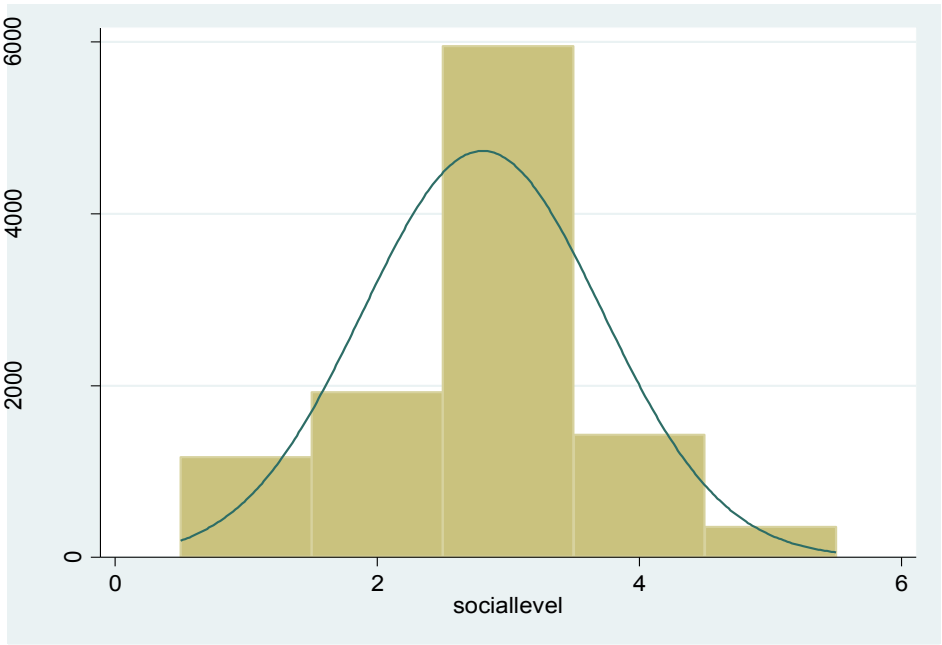


Figure 19. Frequency Histogram of Social Level (Sample C2)

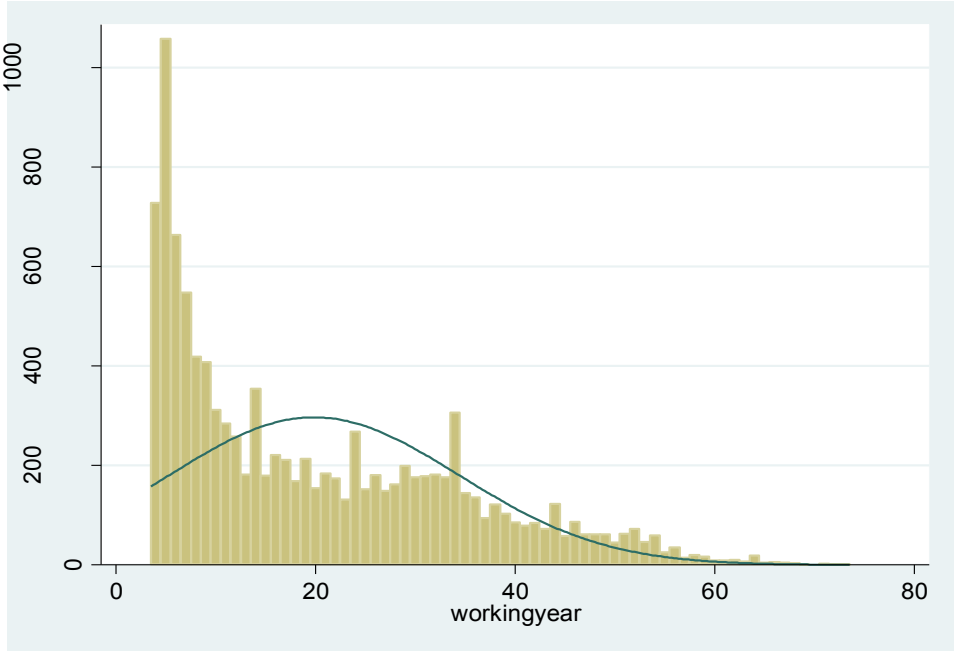


Figure 20. Frequency Histogram of Working Years (Sample C2)

Chapter 5. Empirical Analysis

5.1 Education and Hukou system

5.1.1 Empirical results

Table 13 and table 14 provide the coefficients for the education and hukou model in the year 2010 and 2012 separately. The second column of both tables shows the results from the model in which the present hukou type are used for the "Hukou Type" variable, while the coefficients for the model using the original hukou type (hukou type in three years old) are given in the third column.

Table 13. Coefficients of Education and Hukou Model (2010)

--	Dependent Variable	
Independent Variable	Years of education	Years of education
Hukou Type(present)	3.352(0.772)***	--
Hukou Type(3 years old)	--	2.367(0.982)***
Age	-0.078(0.003)***	-0.060(0.003)***
Gender	0.799(0.064)***	0.859(0.067)***
Years of education (Father)	0.204(0.009)***	0.241(0.009)***
Years of education (Mother)	0.161(0.009)***	0.196(0.010)***
Adjusted R-square	0.389	0.325

Note: Standard errors are reported in parentheses, "***," "**" and "*" denote statistical significance at 1%, 5% and 10% level respectively.

Table 14. Coefficients of Education and Hukou Model (2012)

--	Dependent Variable	
Independent Variable	Years of education	Years of education
Hukou Type(present)	3.221(0.101)***	--
Hukou Type(3 years old)	--	2.500(0.150)***
Age	-0.093(0.003)***	-0.081(0.003)***
Gender	1.219(0.083)***	1.209(0.878)***
Years of education (Father)	0.157(0.011)***	0.181(0.012)***
Years of education (Mother)	0.143(0.013)***	0.165(0.013)***
Adjusted R-square	0.427	0.357

Note: Standard errors are reported in parentheses, "***," "**" and "*" denote statistical significance at 1%, 5% and 10% level respectively.

The results from the models with the location dummy are presented in table 15. The coefficients showed in the second column is estimated from the sample data in 2010 (Sample A1), and the third column provided the results based on the sample data in 2012(Sample A2).

According to the results given by table 13 and table 14, all the coefficients are statistically significant. The coefficient for present hukou type is 3.35 for 2010 and 3.22 for 2012, which indicate the average years for present urban hukou holders spend three years more at school than the rural hukou holders. The factors for original hukou type, which is 2.37 in 2010 and 2.5 in 2012, is smaller than that for the present hukou type. This implies that the difference of the education years between the individuals with original rural hukou and the original urban hukou is 2.4 years.

Table 15. Coefficients of Education and Hukou Model with Location Dummy

--	Dependent Variable	
Independent Variable	Years of education (Individual)/2010	Years of education (Individual)/2012
Hukou Type	3.169(0.080)***	3.152(0.105)***
Age	-0.085(0.003)***	-0.096(0.003)***
Gender	0.792(0.063)***	1.242(0.083)***
Years of education (Father)	0.191(0.009)***	0.153(0.012)***
Years of education (Mother)	0.139(0.009)***	0.131(0.012)***
Beijing	1.393(0.396)***	0.044(0.657)
Tianjin	0.942(0.358)***	0.128(0.608)
Hebei	0.199(0.162)	-0.220(0.202)
Shanxi	-0.103(0.164)	-0.322(0.228)
Liaoning	0.119(0.143)	-0.450(0.188)**
Jilin	-0.372(0.245)	-1.070(0.449)**
Heilongjiang	-0.450(0.192)**	-1.033(0.301)**
Shanghai	1.034(0.142)***	0.375(0.231)
Jiangsu	1.116(0.236)***	-0.360(0.301)
Zhejiang	2.167(0.264)***	0.138(0.281)
Anhui	0.317(0.260)	-0.131(0.250)
Fujian	-0.498(0.303)*	-0.751(0.354)**
Jiangxi	-0.315(0.243)	-0.739(0.260)**
Shandong	0.399(0.185)**	-0.034(0.234)
Hubei	1.171(0.232)***	0.624(0.377)*
Hunan	0.963(0.215)***	0.296(0.245)
Guangdong	0.189(0.139)	-0.565(0.170)**
Guangxi	-0.157(0.247)	-0.533(0.306)*
Chongqing	-0.376(0.348)	-0.288(0.457)
Sichuan	-0.965(0.170)***	-0.646(0.240)**
Guizhou	-1.064(0.218)***	-1.102(0.240)***
Yunnan	-0.522(0.201)***	-0.897(0.299)**
Shanxi	0.283(0.238)	-0.254(0.317)
Gansu	-0.839(0.134)***	-0.859(0.154)***
Adjusted R-square	0.409	0.434

Note: Standard errors are reported in parentheses, "***," "**" and "*" denote statistical significance at 1%, 5% and 10% level respectively.

The coefficients for age in both models are negative, but the values are rather small. It indicated that the years of education did not differ significantly with different ages. For the gender variable, the coefficients are positive. As in the model, the female is zero, and the male is one, therefore, the average education years for male individuals is more than the years for female individuals. The difference is about 0.8 years from the sample data in 2010 and 1.2 years from the sample data in 2012.

The parents' education does have positive effects on the individuals' education, but not as important as once expected. The coefficient of fathers' education years on the individuals is about 0.2 in 2010 and 0.16 in 2012; the effects of the mother's education on individuals is a little bit smaller than fathers', which is 0.16 in 2010 and 0.14 in 2012. Based on the estimation results, the father with one year more education will have children with 0.2 years more education, and the mother with one year more education will have children with 0.16 more years of education.

Table 15 shows the results from the model with 24 location dummies for each province (the basic group is dropped). The basic group is the Henan province, which is a poor area with the largest population in China. Based on the estimation results from the data in 2010, 14 coefficients of the location dummy variables are statistically significant. Specifically, the coefficient for the Zhejiang Province dummy has the greatest value, which is 2.16. This indicates the people in Henan province spend two years less at school than the people in Zhejiang province. The

coefficients for Beijing, Shanghai, Jiangsu and Hubei are also more than one. But for other provinces, the coefficients are less than one.

Based on estimation results from the data in 2012, there are 12 out of 24 provinces has coefficients that are statistically significant. For the three provinces dummies-Liaoning, Jilin and Heilongjiang- in the northeast of China, the coefficients are negative. This implies that the average school years in these three regions is less than that in Henan province. The other two provinces-Fujian and Jiangxi- in the southern part of China also have negative coefficients. The school years of Henan is also more than that in four western provinces-Sichuan, Guizhou, Yunnan and Gansu; Only the people in Shandong province have studied for more than people in Henan. However, particular attention should be paid to the results. Because the estimation is based on the sample data, for different samples the results are dissimilar, but the difference is not significant.

5.1.2 Comparison for Average Education

Although the results in the previous model indicate that the benefits of the urban hukou type in education is evident than that of the rural hukou type, this advantage is weakened over the years and the difference varies among different groups. Table 16, table 17 and table 18 give the average years of education for rural residents, urban residents and rural to urban migrants born in different years.

Table 16. Average Education for Rural Residents (Individual/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	386	8.3	2.3	0	13.5
1984-1994	2929	8.9	3.7	0	17.5
1974-1984	2140	6.8	4.0	0	19
1964-1974	2058	5.4	4.0	0	16
1900-1963	758	5.3	4.6	0	15

Table 17. Average Education for Urban Residents (Individual/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	97	9.9	0.8	8	13.5
1984-1994	1066	12.6	2.5	0	19
1974-1984	1158	12.2	3.2	0	22
1964-1974	855	10.8	3.7	0	22
1900-1963	430	9.38	4.0	0	19

Table 18. Average Education for Rural to Urban Migrants (Individual/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	10	9.9	0.7	9	11
1984-1994	349	12.3	2.8	0	17.5
1974-1984	555	11.8	3.2	0	19
1964-1974	446	10.3	4.0	0	22
1900-1963	181	8.3	4.5	0	16

The average years of education for urban residents is larger than that of rural residents based on the information from table 16 and table 17. For people born between 1900 to 1963, the average schooling is 5.3 years for rural hukou holders and 9.38 for urban hukou holders; for people born in the years 1964 to 1984, the average schooling gap between different hukou types is about 5.4 years; the education gap is become smaller among the younger people, the difference decreased to 3.7 years between the people born in 1984-1994 and 1.6 years in people born after 1994[4].

According to table 18, the rural to urban migrants (who convert the rural hukou types to urban ones) have relatively higher average education years than rural residents. This indicated the "filter effects" of the hukou system: people who can convert their hukou type are mainly ones who has better academic background.

5.1.3 Comparison for Average Education Gap

More importantly, the comparison between the education gap shows that the difference between the years of schooling of individuals and their father has also become smaller over the years.[5]. It indicated that the hukou system has fewer adverse effects on education at present than that in the past, and the overall education level of the entire population in China has been significantly improved.

[4] Note: The observations are rather limited in the age group younger than 20 years old. Therefore, special attention should be paid when interpreting the data.
[5] The education gap here refers to the difference between the years of schooling of individuals and their father.

Table 19. Average Education Gap for Rural Residents (Individual-Father/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	386	2.3	3.8	-9	11
1984-1994	2929	2.7	4.5	-12	16
1974-1984	2140	2.2	4.6	-15	16
1964-1974	2058	4.8	4.8	-15	15
1900-1963	758	5.4	5.4	-15	15

Table 20. Average Education Gap for Urban Residents (Individual-Father/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	97	-0.2	4.2	-9	10
1984-1994	1066	2.9	3.9	-9	16
1974-1984	1158	3.8	4.3	-12	16
1964-1974	855	3.7	4.9	-16	19
1900-1963	430	4.4	5.5	-15	19

Table 21. Average Education Gap for Rural to Urban Migrants (Individual-Father/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	10	1.8	3.6	-2	10
1984-1994	349	3.9	4.1	-9	16
1974-1984	555	4.5	4.6	-7	16
1964-1974	446	4.1	5.2	-16	19
1900-1963	**181**	4.3	5.6	-15	16

Table 19, table 20 and table21 shows the average education gap for three different groups of people-the rural residents, the urban residents and the rural to

urban hukou migrants- based on the sample data from 2010[6]. The difference is significant before 1974, when the hukou has seriously limited the rural to urban migration. And among the three groups, the migrants have rather large education gap than the other two from the year 1974 to 1994[7]. It indicates that the permanent migration has positive effects on the education for the next generation[8]. However, the benefits have become smaller after 1994, because the gap is only 1.8 years for migrants and less than that for rural residents, who have a gap for 2.3 years; For urban residents, the gaps even become negative for the people less than 20 years old.

Table 22. Average Education Gap for Rural Residents (Individual-Mother/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	386	4.4	4.0	-9	12
1984-1994	2929	4.8	4.6	-15	16
1974-1984	2140	4.2	4.6	-12	19
1964-1974	2058	3.5	4.4	-12	15
1900-1963	758	4.3	4.8	-9	15

[6] The education gap here refers to the difference between the years of schooling of individuals and their mother.

[7] The first hukou reform happened in the year 1978. Since then, the people can convert their hukou type. Therefore, the people who were born before 1978, can only do the conversion after 1978. It is to say that people who were born before 1978 are most probably did the conversion at an older age than those who were born after 1978.

[8] Permanent migration indicates the migrants who can convert their hukou type.

Table 23. Average Education Gap for Urban Residents (Individual-Mother/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	97	0.8	4.1	-6	10
1984-1994	1066	4.0	4.4	-10	17.5
1974-1984	1158	5.6	4.5	-9	17.5
1964-1974	855	5.9	4.8	-9	20.5
1900-1963	430	6.5	4.7	-4.5	19

Table 24. Average Education Gap for Rural to Urban Migrants (Individual-Mother/2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	10	3.7	3.4	0	10
1984-1994	349	6.0	4.8	-6	17.5
1974-1984	555	7.0	4.6	-6	17.5
1964-1974	446	6.7	4.9	-9	20.5
1900-1963	181	6.6	4.7	-3	16

The average education gap between individuals and their mothers are given in table 22, table 23 and table 24. Tables above indicate that the migrants still have significant education gap than the other two before 1994. In addition, the gap is larger between individuals and their mothers than that between individuals between their fathers. But after 1994, the rural residents have the largest gap, which is 4.4 years. The statistics confirm the filter effects of the hukou system, especially before the year 1974. Moreover, it also shows that the benefits of the urban hukou have become less after 1994.

However, since most individuals born after 1994 are still at school, the years of the total education years are not settled. Also, the observations for the sample data are rather small for young individuals. Therefore, it should be careful to interpret the statistics in tables.

5.2 Entrepreneurship and Hukou type

5.2.1 Empirical results

In order to test the hypothesis that the rural hukou holders are more likely to start their own business, we use the Logit model to estimate the relationship between the hukou type and the self-employment. In the model, the dependent variable is constructed from the survey results conducted by CFPS in 2010 and 2012. In the survey, the respondents are asked to choose one answer from the three options-company employee, self-employment and farmer. If the respondents choose the self-employment, the dependent variable=1; if not, the dependent variable=0. Table 25 shows the results from the Logit estimation.

Table 25. Coefficients of Entrepreneurship and Hukou Model (2010/2012)

--	Dependent Variable	
Independent Variable	Self-employment (2010)	Self-employment (2012)
Hukou Type	-0.244(0.064)***	-0.037(0.064)
Age	-0.015(0.002)***	-0.008(0.002)***
Gender	0.800(0.096)***	0.338(0.052)***
Years of education	0.028(0.011)**	0.038(0.125)***

Note: Standard errors are reported in parentheses, "***," "**" and "*" denote statistical significance at 1%, 5% and 10% level respectively.

According to the table 25, all the coefficients are statistically significant based on a 2010 sample data, but for the estimation on the 2012 sample data, the coefficient for hukou is insignificant.

As expected, the hukou type has adverse effects on the self-employment. For urban residents, they are less likely to be self-employed than those with rural hukou type; Moreover, the age also has negative effects on the self-employment, but the effects are rather limited. Although the coefficient for the years of schooling is positive, it is also tiny. Therefore, the effects of education on the entrepreneurship are not as significant as expected. However, the gender plays a central role in the model. It is easy to tell from the results that the male individuals have a much higher opportunity to start their own business than their female counterparts.

Particular attention is still needed for the interpretation of the results. The factors are different when using different sample dataset. Although the sign of the four coefficients is the same, the value varies a lot. Since the samples are selected randomly from the whole population, it is hard to decide which results are more reliable. The results can only represent the individuals in the sample. Nevertheless, the sample included individuals from 20 provinces with various backgrounds. Thus, the results can be treated as typical results at some level.

5.3 Income and Hukou type

In the income and hukou model, the years of working are calculated based on the survey question –when you started your work. For the rural hukou holders, we assume that they end their work at the age of 65 for females and 70 for males; for

the urban hukou holder, as the legal age to retire is 55 for female and 60 for male worker, we assume that the people will stop working at the legal retirement age. We also eliminate the samples whose age is smaller than their working years. The estimated working years for each are used as proxy variable for working experience. The model are estimated using OLS regression method and the results are showed in the table 26.

5.3.1 Empirical Results

As indicated in table 26, the second column is the coefficients from the estimation of equation (3-1) without adding the location dummy in the model. The third column is the results from the same model with the inclusion of the location dummy. The basic group of the location dummy is still the Henan province, which has the lowest average income per capita. The basic group for the social level dummy is the social level 1, which is the lowest among five social levels.

According to the results from the model without location dummy, people with urban hukou earn 8786 yuan (1394 dollars) more than rural hukou holders. It also indicated that old people earns more than younger ones, which is as expected. Individuals with one more year of education earns 5836 yuan (926 dollars) higher; however, there is no big difference in the annual salary between female and male workers. Specifically, unlike previous studies, which showed e annual income and the working experience are positively related, the results from this model, indicates that the work experience has negative effects on the annual income, which is out of expectation.

Table 26. Coefficients of Income and Hukou Model (2010)

--	Dependent Variable	
Independent Variable	Income (without location dummy)	Income (with location dummy)
Hukou Type	8786.8(549.2)***	6554.4(555.9)***
Age	1074.1(55.1)***	962.8(54.5)***
Gender	69.2(24.00)**	-28.793(23.785)
Years of education	5836.6(434.4)***	6231.3(423.0)***
Work Experience (in years)	-184.9(20.7)***	-71.3(20.8)**
Social Level 02	1775.8(817.8)*	1160.5(797.2)
Social Level 03	5236.1(709.6)***	5315.7(696.3)***
Social Level 04	8105.9(870.7)***	8734.7(856.4)***
Social Level 05	5469.4(1359.0)***	6454.6(1330.6)***
Beijing	--	15921.3(2547.1)***
Tianjin	--	15759.1(2258.8)***
Hebei	--	2589.9(1117.3)**
Shanxi	--	3970.5(1167.4)**
Liaoning	--	3985.8(985.1)***
Jilin	--	1477.2(1702.1)
Heilongjiang	--	2535.1(1340.8)*
Shanghai	--	20269.2(922.3)
Jiangsu	--	11181.1(1531.7)***
Zhejiang	--	14960.2(1608.3)***
Anhui	--	6718.9(1754.8)***
Fujian	--	8110.2(1862.6)***
Jiangxi	--	3045.6(1675.6)*
Shandong	--	3065.9(1160.9)**
Hubei	--	9188.4(1620.0)***
Hunan	--	10359.8(1322.9)***
Guangdong	--	7294.9(917.2)***
Guangxi	--	1665.9(1372.7)
Chongqing	--	6705..4(2309.9)**
Sichuan	--	2949.8(1071.5)*
Guizhou	--	2299.7(1301.4)*
Yunnan	--	1561.3(1466.5)
Shanxi	--	846.5(1454.2)
Gansu	--	1154.2(942.5)
Adjusted R-square	0.14	0.19

Note: Standard errors are reported in parentheses, "***," "**" and "*" denote statistical significance at 1%, 5% and 10% level respectively.

For the coefficient of the social levels, the results are also a little different from the expectation. As the social level 5 is higher than social level 4, it would be reasonable for the people in social level 5 makes higher income than those in social level 4; However, the results shows that individuals from social level 4 earns 8000 yuan(1270 dollars) more than the ones from the social level 1, while those from social level 5 only earn about 5000 yuan(793 dollars) more than from social level 1. It indicated that people from social level 5 earns less than people from social level 4. The reasons for these results are most probably due to the social level used in the model are based on the survey results, which are mainly self-reported.

When the location dummies are included in the model, the results are similar to the model without dummies. With the location dummy, we can tell that people in shanghai have the highest income, which is 20000 yuan (5555 dollars) more than the average income in Henan Province. The income gap between the Henan province and the other five areas-Beijing, Tianjin, Zhejiang, Jiangsu and Hunan- are also enormous, which are more than 10000 yuan (2777 dollars) per year. The results also indicate people in Henan province is the poorest among the sample individuals, since all the coefficient are positive for the location dummies.

However, for a different location, the living cost varies a lot. In Beijing, for example, the average house price is about 36000 yuan (5714 dollar) per square meters, which is three times than that in Zhengzhou, the capital city of Henan province. In rural areas, the house price is significantly cheap, the house price in some areas is only 2000 yuan (317 dollar) per square meters. Therefore, if

accounting for the living cost for different areas, the income gap may not as big as the results shown in table 26.

In order to test whether the income gap exists, we convert the nominal income into a real income. The local house price is calculated based on the information from the average house price reported in October, 2014. And for each province, we constructed two average house prices indexes. One for rural areas and the other for urban areas. Table 27 and Table 28 show the summary statistics for real income.

Table 27. Real Income for Rural Residents (2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	13	0.8	0.6	0.3	2.0
1984-1994	913	2.1	1.8	0.1	9.5
1974-1984	1346	2.4	2.0	0.1	9.8
1964-1974	2309	2.2	1.9	0.05	10.0
1900-1963	2792	1.6	1.6	0.03	9.8

Table 28. Real Income for Urban Residents (2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	1	0.2	--	0.2	0.18
1984-1994	415	1.9	1.7	0.06	9.4
1974-1984	978	2.7	1.8	0.08	10.0
1964-1974	1082	2.8	2.0	0.03	9.8
1900-1963	977	2.5	2.1	0.12	9.9

By comparison between the table 27 and table 28, the income gap do did not as significant as expected, and for people born before 1984, the real income urban residents are more than the rural residents, but for those born ofter 1984, the rural residents earns more than the urban residents if based on the real income. The reasons for this change will be discussed in a following session. For people born after 1994, as they may still at school, and the observations are rather limited, it is not appropriate to join them into discussion.

Table 29. Social Level for Rural Residents (2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	13	2.5	0.8	1	4
1984-1994	913	2.7	0.9	1	5
1974-1984	1346	2.8	0.9	1	5
1964-1974	2309	2.8	0.9	1	5
1900-1963	2792	3.0	0.9	1	5

Table 30. Social Level for Urban Residents (2010)

Birth year	Obs	Mean	Std.Dev	Min	Max
1994-	1	1	1	1	1
1984-1994	415	2.6	0.8	1	5
1974-1984	978	2.7	0.8	1	5
1964-1974	1082	2.7	0.9	1	5
1900-1963	977	2.7	1.0	1	5

In addition, in order to compare the self-satisfaction for individuals with different hukou types, the social level are being compared in table 29 and 30. The social level used here is based on the results from the survey question-what do you think your ranking in the society. As it is self-reported, it can represent their satisfactions with the present life. For those who select the higher social, they are more likely to be happy with their life, and for the ones who choose lower social level are the ones who are more likely to be unhappy with their current social status.

It is clear that for the rural hukou holders, their average self-reported social level are higher than urban hukou holders for all age groups. Although they earn less than the urban residents, they are more happy or self-satisfied with themselves. This result is consistent with the conclusion drawn from Zhang and Treiman (2013). A possible reason for this difference will be discussed below.

5.4 Analysis of the Results

5.4.1 Education and Hukou type

From the empirical results showed in the previous section, the urban residents have significant benefits over the rural residents in terms of the education. This is consistent with the previous conclusions, which indicated the hukou system is the primary cause of the education inequality in China. The reason for the education gap is obvious: in urban areas, there are more schools to recruit students; the teacher there are highly trained which can help students to achieve higher degrees; the average education years for parents in urban areas are also longer than

those in rural areas; and the average income is higher. With more education resources and annual salary, the opportunities for urban residents are much higher than rural ones.

In addition, the migrants who convert their rural hukou to urban ones are mostly the people with higher education; with this "filter effect", the rural residents who has longer years of schooling are more likely to become urban citizens, and thus, the average schooling of rural hukou holders will become lower when the higher educated people choose to convert the hukou type, while the average of the urban residents will become higher with the new migrants who earns higher degrees. The filter effect is encouraged by the hukou conversion policies initiated by the local government. Therefore, the hukou policies play the leading role to introduce inequality between rural residents and urban residents.

However, the education gap between urban and rural residents seems to decrease over the years, especially after the year 1984. With the matching method used to compare rural and urban residents in different age groups, the gap with individuals who were born between 1964-1984 is more than 5.4 years, but for those whose age between 20 to 30 years old, the gap is 3.7 years, which is almost 2 years lower. It indicates the effects of the hukou type on education become less important than before. Moreover, the education gap between the individuals and their parents also becomes smaller, especially for the rural residents. This implies the nine years free education policy in China has improved the education level among people in

China, and it helps the development of the education in rural areas. As a result, the hukou type is no longer the biggest barrier for equality.

To sum up, although the average years of education of urban residents and rural to urban migrants are still higher than that of rural residents, the difference becomes smaller since the 1984. And the inequality of education caused by the hukou system has been reduced over the years. This may be the results of the previous hukou reform which allows the free migration from rural areas to urban cities; therefore, the effects of the hukou system on inequality are rather limited at present. In addition, despite of the "filter effect" can cause the "brain drain" for rural to urban areas, its selective process, which provide channels for the higher educated people, ends up to encourage the efforts of individuals to "go ahead"(Wu and Treiman, 2007). This selection mechanism can also benefit society in the whole: it drive the young's to learn skills in order to meet the requirements of good jobs, and thus can live a better life; it also push people to acquire higher education, in order to meet the conditions to convert the Hukou status and gain more benefits. This will result in a more active community with more skilled and higher educated people.

5.4.2 Entrepreneurship and Hukou type

With the restriction of the hukou system, rural residents are less likely to work in the state-owned companies in urban cities, and the local companies are also reluctant to recruit the people with rural hukou. Therefore, a large portion of the migrants from rural areas, in order to support themselves, will start their own business. The results confirmed this hypothesis.

As the hukou system play a role in encouraging the entrepreneurship in China, the hukou reform, by eliminating the difference between the urban hukou and rural hukou type, may reduce the possibility of the self-employment. Because the self-employment workers need to work much harder than employees in companies, when treated equally and have the same opportunity to get into the state-owned companies, most individuals will prefer to be the member of the company instead of being the employer of themselves. On one hand, the hukou reform brings equality to the rural hukou holders; On the other hand, the elimination of the discrimination will impede the development of the entrepreneurship. As a small business plays an important role in the economic development, the possible decline of the self-employment may be a cost for the coming hukou reform.

5.4.3 Income and Hukou Type

The empirical results from the third model supported the idea that the hukou system is one of the factors that rural residents have much lower annual income than urban residents. In addition, the income gap exists among people from different areas: people in large cities and eastern part of China earn more than the ones in the other areas. The reason for the income inequality is mainly due to the economic reform which starting in the year 1978. The reform provides preferential policies to promote the development of the eastern coastal cities, including government investment, foreign investment, tax incentives, etc. Since then many eastern coastal cities' economies going through a huge development, and the economic take-off led to a rapid increase in income. As a result of the imbalance of economic development

between eastern and elsewhere, it led directly to the current regional income disparities.

However, the real income gap is not as great as the nominal ones. When real wages were calculated, the difference between the rural and the urban annual income is subtle. The enormous living cost in the urban areas can explain the situation. When living in urban areas, especially large cities like Beijing and Shanghai, the food cost could be three times of the small towns; in terms of the house price, one need to pay an average price of 36000 yuan (5714dollars) per square meters for houses in Beijing, but only need to pay 3600 yuan (571 dollars) to buy a house in Luoyang, a small city in Henan province. Therefore, although the hukou system did contribute to the great nominal income gap, it did not separate people to live in a similar life status (with a similar purchase power in the local areas).

In addition, the comparison of the self-reported social levels shows the rural residents are more satisfied with their income than urban residents. These results come with no surprise. For rural residents with 20000 yuan (3174 dollars) annual income, their income can meet their daily needs, including the consumption of food, clothing and housing; but for urban residents with the same income level, their earnings can hardly cover their living cost of housing. In this sense, the hukou system, although impede the migration at some level, it helps some rural residents to live a happy life: the people without enough ability will be less likely to live a happy and healthy life in urban areas, and the hukou system, by preventing them from

moving to cities, protect these rural residents from the hardship of living in urban areas.

Chapter 6. Conclusion and Future Research

This paper depicts and analyzes the education years, self-employment and the income between the rural residents, urban residents and migrants in nineteen Chinese provinces. Hukou system was commonly regarded as the primary factor which caused the inequality in schooling and income, and thus impedes the economic development and the equal rights among citizens. However, the Logit regression and the matching method indicate that the negative effects of the hukou system are not as significant as once believed. There are no significant real income between rural residents and urban residents; moreover, the hukou system has positive effects in the economic development by encouraging the self-employment. The results also show the rural residents are more satisfied with their life than the urban residents.

In addition, the education plays a significant role in the selection process, which only allows migrants with qualified academic background to convert the rural hukou to urban type. This effect resulted in the brain drain in the rural areas: the higher educated individuals are more likely to meet the conversion requirements and thus are more possible to become urban residents; thus the residents stayed in the rural areas are most the ones with lower education. The results show that the average education years for rural to urban migrants are much longer than the rural residents.

However, the “filter effect” also has a positive influence by providing channels for the higher educated people and benefit society in the whole: it drive the young’s to learn skills in order to meet the requirements of good jobs, and thus can live a better life; it also push people to acquire higher education, in order to meet the conditions to convert the Hukou status and gain more benefits. This will result in a more active community with more skilled and higher educated people.

In addition, before the economic reforms, the original hukou system plays an important role for Chinese government to regulate and control the rural to urban migration, thus cause significant inequality between the rural and urban residents in their access to education. Nevertheless, the adverse effect has been substantially weakened over the years. The average education gap, which was more than five years in the past, has declined to three years (among people whose age is between 20 to 30 years old); the intergenerational education gap has also been reduced.

After the lift of the restrictions of free migration, the function of the hukou system seems to be weakened over the years. While the hukou system still separate people in different groups, impede the rural migrants from better works, and prevent rural migrant to entering to public schools, its negative effects has been significantly reduced since the hukou reform started in 1978. The “filter effect” of the hukou system by selecting the excellent rural migrants to urban areas, can benefit to the development of both the urban and rural areas. However, the problem with the filter functions is that it selection requirements are limited in academic background, which prevent other types of excellent migrants to become urban residents.

While the migration from rural to urban areas can increase the earnings, the real income may drop due to the high cost of living in urban areas. The rural migrants who lack the ability to get good jobs in urban cities will end up at a lower living situation than rural areas. They may be less satisfied with their current life than rural residents, and also need to bear the risk of remaining in the more precarious underpaid position. With their rural hukou, they can always come back to their home and make a living with their farmland, but the elimination of the rural hukou might also cut off their right to coming back.

In conclusion, the hukou system, instead of being the primary factor of the education and income inequality, also have positive effects by protecting rural residents to live in a good situation in sense of their own ability. Similar to the selection system of the college, the hukou system performs as the filter of the people who can adapt and make a living in urban areas. It also encourages people to work hard in order to be qualified for the urban hukou and remain in the urban areas. In addition, it plays a role in support of the enterpretuenship in China. Therefore, the effects of the coming hukou reform are still ambigious. Further research is needed to study the cost and the benefits of the hukou reform among rural residents, urban residents and the rural to urban migrants.

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Appendix-VIF Test Results

Table 31 VIF test results for Model A (2010)

--	Dependent Varible	
Independent Varible	VIF	1/VIF
Hukou Type	1.38	0.724638
Age	1.19	0.840336
Gender	1	1
Years of education (Father)	1.56	0.641026
Years of education (Mother)	1.69	0.591716
Beijing	1.07	0.934579
Tianjin	1.07	0.934579
Hebei	1.41	0.70922
Shanxi	1.4	0.714286
Liaoning	1.61	0.621118
Jilin	1.15	0.869565
Heilongjiang	1.29	0.775194
Shanghai	1.73	0.578035
Jiangsu	1.16	0.862069
Zhejiang	1.13	0.884956
Anhui	1.13	0.884956
Fujian	1.1	0.909091
Jiangxi	1.15	0.869565
Shandong	1.29	0.775194
Hubei	1.17	0.854701
Hunan	1.21	0.826446
Guangdong	1.64	0.609756
Guangxi	1.15	0.869565
Chongqing	1.07	0.934579
Sichuan	1.38	0.724638
Guizhou	1.21	0.826446
Yunnan	1.25	0.8
Shanxi	1.16	0.862069
Gansu	1.78	0.561798

Table 32 VIF test results for Model A (2012)

--	Dependent Varible	
Independent Varible	Years of education (Individual)	Years of education (Individual)
Hukou Type	1.2	0.833333
Age	1.45	0.689655
Gender	1.01	0.990099
Years of education (Father)	1.62	0.617284
Years of education (Mother)	1.68	0.595238
Beijing	1.03	0.970874
Tianjin	1.04	0.961538
Hebei	1.34	0.746269
Shanxi	1.25	0.8
Liaoning	1.45	0.689655
Jilin	1.06	0.943396
Heilongjiang	1.16	0.862069
Shanghai	1.34	0.746269
Jiangsu	1.19	0.840336
Zhejiang	1.17	0.854701
Anhui	1.21	0.826446
Fujian	1.1	0.909091
Jiangxi	1.18	0.847458
Shandong	1.24	0.806452
Hubei	1.09	0.917431
Hunan	1.22	0.819672
Guangdong	1.55	0.645161
Guangxi	1.13	0.884956
Chongqing	1.06	0.943396
Sichuan	1.24	0.806452
Guizhou	1.25	0.8
Yunnan	1.14	0.877193
Shanxi	1.12	0.892857
Gansu	1.78	0.561798

Table 33 VIF test results for Model C (2010)

--	Dependent Varible	
Independent Varible	Income (without dummy)	Income (with dummy)
Hukou Type	1.57	0.636943
Age	2.01	0.497512
Gender	1.03	0.970874
Years of education	1.7	0.588235
Work Experience (in years)	2.06	0.485437
Social Level 02	2.24	0.446429
Social Level 03	2.89	0.346021
Social Level 04	2.06	0.485437
Social Level 05	1.29	0.775194
Beijing	1.08	0.925926
Tianjin	1.09	0.917431
Hebei	1.44	0.694444
Shanxi	1.4	0.714286
Liaoning	1.69	0.591716
Jilin	1.16	0.862069
Heilongjiang	1.31	0.763359
Shanghai	1.98	0.505051
Jiangsu	1.2	0.833333
Zhejiang	1.18	0.847458
Anhui	1.15	0.869565
Fujian	1.13	0.884956
Jiangxi	1.16	0.862069
Shandong	1.4	0.714286
Hubei	1.17	0.854701
Hunan	1.29	0.775194
Guangdong	1.84	0.543478
Guangxi	1.27	0.787402
Chongqing	1.08	0.925926
Sichuan	1.53	0.653595
Guizhou	1.33	0.75188
Yunnan	1.23	0.813008
Shanxi	1.22	0.819672
Gansu	1.72	0.581395