Returns to Investment in Education in Urban China: Are there gender differences?

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Dedication

To my family

Abstract

This study investigates the rate of returns to private investment in education in urban China, focusing on gender differences. It shows that in general females have higher rates of returns to schooling than males after taking account of sample selection bias and the endogeneity of schooling, despite the fact that females usually have less schooling and lower income. However, the advances of females become less prominent after controlling for occupational choices. Furthermore, the sub samples of rural-to-urban migrant workers and urban-resident workers display different patterns: for urban residents, females have slightly higher rates of returns to schooling, while migrant workers show an opposite hierarchy of gender differences in returns to schooling, in the sense that males have higher returns to schooling than females.

Table of Contents

List of Tables

Ⅰ Introduction

It is universally acknowledged that education plays an important role in an individual's future career success. Formal education provides skills that are necessary in the labor market, or serves as signals for productivity (Jaeger, 1996). This makes people willing to invest in it. In the standard economic theory, the investment decision in education is a process in which the individual gives up some portion of current income during the period of education in return for increased future earnings (Hansen, 1963). The money returns from private investment on education have been estimated by economists since the 1950s (Psacharopoulos, 2004), since it helps individuals make investment decisions (Hansen, 1963).

The variation of education among individuals also explains a large portion of income inequality (Becker, 2010). As one of the most important aspects of income inequality, the gender wage gap has drawn a lot of attention, both politically and socially, in most developed or developing countries in the Twenty-first Century. And China is not an exception. Its government has put a lot of effort into mitigating the gender gap in the areas of education and employment, and substantial progress has been made. For example, the recent nationwide statistics in the Educational Statistic Yearbook of China show that the enrollment rate for primary school has reached 99.79 percent for females , and for higher education such as college or universities, females comprise 44 percent of overall students. Meanwhile, Chinese women have the highest labor participation rate compare to other transitional economies (Josephs 1995).

Despite the progress, there still exists a significant gender gap in terms of income and educational attainment. On average, females in China often have lower wages and educational levels compared to males (Hughes, 2002). Moreover, it is often less clear whether the returns to education are different between males and females in China despite the fact that there are well documented gender gaps on both income and schooling.

The overall objective of the thesis is to estimate the money returns to schooling for males and females who work in the urban areas in China, and to investigate whether or not there exists a gender difference. To achieve this goal, I first estimate the returns to schooling with various estimation methods including the Ordinary Least Squares method, the method that corrects for sample bias, and the Instrumental Variable method for males and females separately. Then I investigate the significance of the gender differences in the returns to schooling with statistical tests. In the last part of my analysis, I compare urban resident workers and rural migrant workers, and see whether or not these two groups have different patterns of returns to schooling by gender.

Data from the recent nationwide survey of Chinese Household Income Project 2002 (CHIP2002) allows me to distinguish between the return for each additional year of schooling and the return for different educational degrees. In addition, I also investigate the role that occupation choices played in affecting the gender difference in returns to schooling. The main message of this paper is that, researchers who estimate the returns to schooling by gender should select methods and interpret results with caution, since my finding shows that the estimated returns to schooling differ among estimation methods.

Moreover, more attention should be paid to the two-tiered nature of the urban labor market when studying the Chinese labor market, which differentiates urban residency workers and rural migrant workers.

In the following section, I will first describe the institutional change in the Chinese labor market and its impact on the gender wage gap, and then perform a literature overview to give the insight of my study. The empirical strategy is presented in Section 3. Section 4 discusses the data and the variables. Section 5 presents the results, and Section 6 concludes and discusses the limitations and the policy implications of my study.

Ⅱ Background and Literature Review

Changes in the Chinese Labor market and its impact on the gender earnings gap

The institutional structure of the labor market in China has undergone a great change because of the economic reforms in the late 1980s. While the primary focus of this study is not about the relationship between the institutional change and its impact on the money returns to education, it is necessary first to have a brief review of the background of my study, that is, the institutional change of the labor market caused by the economic reform, and furthermore, how such change affected the gender gaps in the past few decades in China.

The People's Republic of China had a centrally planned economic system until the early 1980s. Prior to the 1980s, under the planned system, the allocation of labor was also subject to the overall government plan. The central or local labor bureaus assigned workers to various job positions, most of the time without considering the worker's own preference (Bian, 1994). The government guaranteed lifelong employment which was referred as the "iron rice bowl", and determined the salaries. They did this in order to reduce labor costs, and at the same time provided subsidized food prices and other non-wage benefits, such as housing, child care and pensions. (Zhang, 2005)

However, only urban residents were entitled to enjoy the non-wage benefits mentioned above, whereas rural residents were tied to the land in order to provide cheap agricultural products to urban industries (Zhao, 2007). As the government had to restrict the urban population under such system, labor mobility between the urban and rural areas was extremely low. The Residence Registration System (*Hukou*) was the main mechanism used to restrict mobility. The system was nationally adopted in 1950s and it identified individuals as rural or urban residents, primarily based on their birth place. Any migration must be approved by both original and destination government, and the duration of staying was also limited (Cai, 2008). One consequence of such restriction of labor mobility was that the income disparity between urban and rural areas was extremely large (Zhao, 1997).

However, under the centrally planned economic system, the gender wage and participation gaps were low. This is mostly because of the government's implementation of equal pay and equal work under the socialist regime. At this time, the female labor market participation rates reached 90 percent prior to the late 1980'ss (Croll, 1995),. Since the wage structure was also subject to the central plan and were mainly determined by seniority (Bian, 1994), which led to the lower level wage gap between male and female.

With the advent of economic reform in the late 1970s, the government began to retreat from the labor market, and private enterprises began to have more autonomy in recruiting, dismissing, promoting and relocating employees (Coady, 2001). From this time workers were also allowed to find their own jobs. The age structure also changed. Workers' wages were directly linked to their productivity and the profitability of the firm. The lifelong employment policy was gradually discontinued.

At the same time, the restriction of labor mobility became less strict: although the Residence Registration System (Hukou System) still exists, the farmers were allowed to enter the urban area if food was provided by the farmer themselves (Zhao, 2007). Today, migrant workers comprise a large part in the Chinese urban labor market. Statistics show that the number of migrant workers from rural area exceeded 98 million in 2003 (Wong, Keung 2007). But still, the income gap between urban residents and rural residents was significant big, since urban residents were entitled to more job opportunities and food subsidies, while the rural households did not have the opportunity to enjoy the above mentioned welfare.

As to the change in the gender gap at this time, scholars have different views. Some suggest that gender as a trait is not correlated with productivity, thus has less of an impact on an individual's position during the market reform (Shu, 2003). Others predict an increase of gender inequality. For example, Gustafsson and Li (2002) find that the gender earnings gap appeared to be small in the 1980s, but kept increasing in the later decades with the deepening of the economic reforms.

To sum up, the economic reform in the late 1970s divided the institutional structure of the Chinese labor market into two patterns. Before the economic reform, the centrally planned strategy dominated every aspect of the labor market from allocating workers to determining salaries. The mobility between rural and urban was extremely low. A byproduct of the socialist regime was that the recorded gender difference in work and education was very low. After forty years of reform and opening up, nowadays the government has less control of the labor market. The firms and individuals in the labor market have more autonomy to act with their own desires. Another feature of today's urban labor market is the huge labor migration from countryside to city. With such institutional change and economic development, scholars, however, have different views on the likely impact of reform on gender equality. Some believe the economic reform has increased the gender equalization, while others do not, arguing the marketization widens the gap between females and males.

Returns to Education: Review of the estimation problems and studies in China

There is a growing literature studying the returns to education in China. Many of them estimate a semi-logarithmic type model that was first used by Mincer (1974). Among the studies that use this method to estimate the return to schooling in China between 1980s to 1990s, researchers consistently find that the rate of return to schooling in China is relatively low. For example, Johnson and Chow estimated that the return to education (1988) was 3.29 percent for urban residents and 4.02 for rural residents (Johnson, 1997). Haizheng Li reported that the average return to education in 1995 is only 4.7 percent (Li, 2003;).

Scholars who studied the returns to education using simple Mincer equation estimated with Ordinary Least Square method in China between 1980s and 1990s often attributed such low returns to education to the lack of a competitive labor market (Peng Yusheng 1992; Xie 2002). However, despite the fact that the rate of return to education has been increasing over time (Zhang, 2005; Bian, 1994), the return to education in China kept lower than the world average of 10.1 percent, and even lower than middle income countries of 11.2 percent according to the study of Pscharopoulos (1994**).**

As to the question why such low returns to education persist, some social scientists blamed the lack of true competitive labor market in China, (Xie 1996; Shu, 2003), while others, most of whom are economists, cast doubt on the estimation methods. They argue that OLS estimates are biased and inconsistent because of two reasons: omitting measured ability and measurement error in schooling. The latter suggested that omitted ability causes the OLS estimates bias *upward*, and measurement error of schooling cause OLS estimates bias *downwardly* (Wooldridge 2002).

One effective solution is to use the Instrumental Variable method. In principle, the instrumental variable should be correlated with schooling but uncorrelated with the error term. The key challenge is to find effective instruments. In the study of return to education, a variety of instruments were proved as valid such as college proximity (Card, D.1993; Kane, 1999), quarter of birth (Angrist 1991; Staiger, Douglas O 1994), and instrumental variables based on exogenous social experiments (Ichino, Andrea 1998; Meghir, 1999). Other Instrumental variables that are widely applied in studies are family background variables such as parental education or spouses' education level (Fleisher, B. 2004; Aslam, 2007; Heckman, Li 2003; Giles 2004; Chen, Guifu 2009). These studies show that using family background as an instrumental variable doubles the OLS estimates of returns to schooling. However, the use of parental education as instrument of ability has been questioned as it may contain a higher upward ability bias than OLS estimates. (Card, 1999).

Studies in the Chinese labor market also shed light on choosing different instrument variables to estimate the return to education. Noticing the traditionally strong preference for male children in China, Li and Luo (2004) use the presence or the number of brothers as an instrument for omitted ability to estimate the return to schooling for women. The rationale is that the Chinese family traditionally has a strong preference for male children than female children, thus a girl's educational investment would be adversely affected by the presence of brother given a certain family budget. The presence of brothers in the family would negatively correlate with the girl's education level, yet uncorrelated with the error term. They find that measurement error in schooling causes a considerable downward bias in the OLS estimates. Chen and Shigeyuki (2009) use Spouse's education as an instrumental variable to correct omitted variable bias. Giles et al. (2004) handle this issue by using correlation between parental characteristics and educational attainment as an instrumental variable. Their estimate of return to years of schooling in 2001 urban China using IV methods is 13.1 percent for an additional year of schooling, which is higher than the OLS estimates of 8.3 percent.

Studies on Gender Difference on the Returns to Schooling

Among the literature that studies the overall returns to education in China, gender usually plays a role of demographic control factor that is not of the primary interest. However, even as a control variable, researchers consistently find that the female return to schooling is higher than that of males in China. For example, using data from 1988 Chinese Household Income Project (CHIP 1988) Johnson and Chow (1997) found that the rate of return to education was 4.46 percent for females and 2.78 percent for males. Using the same data set, Maurer-Fazio found that the return to education was 4.5 percent for females and 2.9 percent for males (Maurer-Fazio, Margaret 1999). The pattern persisted when using CHIP 95 dataset: the study of Haizheng Lin (2003) found that the returns to schooling for women was 6.9 percent while for men was 4.3 percent in the urban area. In terms of the gender earning gap among different education levels, Gustafsson and Li (2002) found that the gender earnings gap was smallest among those with a longer education, while was larger for those with short educations using datasets form 1988 and 1995. The only exception is from Chen Guifu (2009), who used China Health and Nutrition Survey conducted in 2004 and 2006, and found that the OLS estimates of return to schooling for males was a slightly higher (8.06%) than that for females (7.67%) , while the IV estimates was higher for females than males.

As to the time trends, Xiaoling Shu (2003) discovered that the proportion of the gender gap in earnings attributable to education increased over time using longitudinal data (Shu, X. 2003). The similar results also obtained by John Knight and Lina Song (2003) , who applied quantile regression and found out that the coefficient on female became larger from 1988 to 1995.

While the above mentioned studies all use urban household data , Rozelle et al (2002) revealed that the same pattern may also persist for rural households. They found that for rural-urban migrants, the return to schooling for females was higher than men at the high school level, but lower if the highest educational level is higher than high school, after controlling for industries and regional differences. More specifically, the rate of return to middle school for males is 11 percentages higher than that of females. (Rozelle, 2002).

The findings that women have higher returns to schooling are not only confined in China. Although studies may differ in terms of the magnitude of the point estimates, the situation that females usually have higher returns to schooling than males prevails from a worldwide perspective. For example, by studying the Indonesia labor market, Deolalikar (1993) found that males had significantly lower returns at secondary and tertiary schooling levels than females. The same goes for Aslam (2003), who found the same pattern also persisted in Parkestain's labor market. Not only developing countries, other developed countries such as U.S (Card, 1999) and most of the European countries (Trostel, 2002) also find the similar patterns. Actually a recent worldwide review on the return to education has confirmed that it is common that women have higher return to education than men from a global perspective. (Psacharopoulos, 2004).

Given the worldwide institutional differences, there are three explanations on why females generally have higher returns to schooling, based on the characteristics of different countries as summarized below.

The first explanation is that, the estimation of women's rate of returns to schooling suffers more upward bias than males. For example Luca (1999) argues that the amount of bias is asymmetric by gender and it could hide the real hierarchy between the two coefficients in Italy . His study showed that when he used Ordinary Least square Estimates, the schooling coefficient for female is higher than that of men, yet the instrumental variable estimates show a reversed order, that is men have higher returns to schooling than female.

The second popular explanation is that compared to men, women's labor market data suffers a more severe selection bias. For example Zhang Junsen et al (2005) suggest that the higher return to education for female in China was partly due to the greater positive self-selection of women in the labor force. Their study showed that in the mid-90s, women were more likely to lose jobs because of the adjustment of the industry structures. They then used the Heckman selection model to estimate the returns to schooling in China, and found out that for men, no significant differences are found in estimated returns after controlling for selection bias, while the returns to schooling were slightly lower for women after controlling for selection.

The third explanation is given from the perspective of differences of occupational choices between males and females. One hypothesize is that the returns to schooling is relatively low in categories where females are under-represented. For example, Deolalikar (1993) argued that from labor supply side, the reason for higher returns to education to female in Indonesia labor market is partly due to the occupational segregation between two sexes. Men usually dominate occupations which require more physical strength, which leave room to women for more skill-intensive jobs, thus schooling becomes relatively more important to women since they can acquire skills that necessary for the future work.

There is a growing literature which study the returns to the private investment on education in China as summarized above, and scholars have also discussed the issue of gender difference on the returns to education. However, most of the studies fitted pooled regressions on both sexes, only by including a simple dummy variable to allow gender differences. Moreover, among the studies that focus on the Chinese urban labor market, most of them treated workers as a homogeneous entity, and disregarded enormous differences between those who have urban residency entitlement and those who migrated from rural areas. This usually causes them results unrepresentative for the Chinese urban market as a whole.

My study seeks to address the problems mentioned above. Separate regressions are conducted for both sexes to allow estimated parameters differ for two groups. I also scrutinize the sample selection issue and the endogeneity of schooling, to see if any of these reasons affect the estimation of the schooling coefficient. Furthermore, the two-tired nature of the urban labor market is also investigated: I include both urban residents and rural-migrant workers in my analysis, and also study the differences between these two groups.

Ⅲ Empirical Strategy

Ordinary Least Square Model

I start with OLS models for the overall sample in order to have some baseline results. The standard Mincer equation is used as equation [1]:

$$\log w_i = \alpha_i + rS_i + \beta_1 exp_i + \beta_2 expsq_i + \beta_3 Married_i + \beta_4 Partymbmer_i + \beta_5 nonmigrant_i + \theta_j regions_i + \epsilon_i$$

Where $\log w_i$ is the log of hourly wages for individual i. S_i is educational attainment for individual i, and is measured in two ways: as total years of schooling and as a set of dummy variables for highest educational level completed. Other control variables include experience and experience squared, marital status, whether or not the individual is migrant worker and Communist Party membership. In addition, there are j=10 province dummies indicating the individual's place of residence. The reference provinces are Gansu and Yunnan Province, for these two provinces are the least economically developed provinces. ϵ_i is the residual term with $E(\epsilon_i) = 0$.

In equation [1], the coefficient of schooling will be my primary focus. In this semi-logarithm earning model, the marginal effect of schooling is r, which means that each additional year of schooling is estimated to yield (exp(r)-1)% change in one's future earnings. This number is interpreted as the money returns to schooling, since most of the empirical studies often neglect the cost of schooling (Becker, 2009), only focusing on the ceteris paribus effect of schooling on the future income.

For convenience, equation [1] can be further expressed as matrix form:

$$\log W = \beta X' + \epsilon$$

Where X is a $1 \times K$ vector of explanatory variables, β is the coefficient vector and ϵ is the error vector.

To estimate, I allow the parameters to differ between two genders.Statistic tests are conducted to detect whether the difference in the point estimates between these two groups are significant, following the strategy first proposed by Chow (1960).

One caveat is that, education may affect one's future salary through two channels. For one thing, education may affect the individual's occupational choice, which means the higher education one obtains, the more likely he/she to seek those high paid jobs, such as managers or professionals. For another, education may also affect one's earning within the same occupation. Based on this consideration, I develop two sets of specifications in my analysis. First I'll look at the effect of the education in general, without taking control of the different occupational choices. Second, I'll look at the effect of the education after controlling for the occupational choices.

Heckman Model corrects for sample selection bias

Previous literature suggested that the sample selection might contribute to the differences on the rate of returns to schooling for the two sexes (Li 2003). Males usually have higher labor force participation rates than females, whereas female's labor supply behavior could be adversely affected by non-market activities such as childbearing and housekeeping. Such sample selection bias could be different between two sexes, and this could attribute to the differences in OLS estimates.

Moreover, a further check in my sample, only forty four percent of female work for wage jobs in the total sample, which makes it necessary to check whether there exists sample selection bias, then to what extent such selection bias could attribute to the differences of OLS estimates between two gender groups. I therefore turn to a sample correction model, following the procedure first proposed by Heckman (1979).

Because we can only observe individuals who have positive wage, a labor participation equation is first assumed:

$$P_i \begin{cases} = 1 \; if \; [\gamma Z' + v_i \geq 0] \\ = 0 \quad\quad otherwise \end{cases} \quad [2]$$

Where **v** and **z** are independent and v~N(0, σ)

Equation [2] is a probit model that estimates participation probability. Here p=1 if we observe the individual has a wage job, and zero otherwise. The vector Z includes all the variables in the equation [1] and additional exclusion restrictions that affect labor force participation decision yet not directly correlated with wage. In my analysis, the exclusion restrictions in the participation equation include: the presence of children less than 7 years old, the presence of adults above 60 years old in the household. These two variables are commonly used in most of the studies on women labor force participation, as they are believed to only affect women's labor market participation decision, yet do not affect their wages.

To see how this sample correction model works, plug equation [2] into [1], take conditional expectation, get:

$$\begin{aligned} & E[logw|z, p = 1] \\ & = E[logw|\gamma Z' + v \geq 0] \\ & = E[\beta X' + \epsilon|\gamma Z' + v \geq 0] \\ & = \beta X' + E[\epsilon|v \geq -\gamma Z'] \end{aligned}$$

$= \beta X' + \beta_\lambda \lambda(\gamma' Z)$

where λ is the inverse Mill's ratio, that is the ratio of the probability density function, that is the ratio of the probability density function (pdf) of the standard normal distribution calculated in $\gamma' z/\sigma_v$, and $\beta_\lambda = \rho\sigma_\epsilon$.

Therefore the model that correct for sample selection will be :

$[\log w|(z, p = 1)] = \beta' X + \beta_\lambda \lambda(\gamma' Z) + v$

To estimate, the first step involves estimating a probit model of labor participation. Next the inverse Mills ratio λ is computed and is included in the earning function, as well as other exogenous variables The estimate should consistent and asymptotically normal after correcting for sample selection bias (Wooldridge, 2002). One caveat is when doing the empirical analysis the Heckman model, although involves two stages in theory, is actually done by maximum likelihood estimation using statistical software.

Instrumental Variable Model

Another issue that often discussed in the literature on returns to schooling is that OLS estimates are missspecified for two reasons: omitted "ability" bias and measurement error in schooling. Omitting variables that control for ability could cause OLS to overestimate the true returns to schooling, if we assume the individual's ability is positively correlated with education. The existence of measurement error in schooling would cause bias downward in OLS estimates due to attenuation as summarized by Card (2001).

I address these endogeneity problems by using a set of instrumental variables for individual's own educational attainment. The chosen instrument should be correlated with schooling, yet uncorrelated with unobserved ability.

To conduct instrumental variable Model, I first write a reduced form equation as:

$\mathbf{S} = \boldsymbol{\varphi}\mathbf{Z}' + \mathbf{u}$[3]

In equation [3] Schooling is estimated on a vector of additional instrumental variables and all exogenous variables in the equation [1] and an error term. By construction, $E(u_i)=0$ and $cov(z_i, u_i)=0$. Estimating equation [3] enables me to obtain fitted values of $\widehat{S_i}$, which purges S_i of its correlation with unobserved ability before doing OLS in equation [1].

The second stage involves estimating structural equation of equation [1], using fitted value $\widehat{S_i}$ instead of S_i, and get unbiased estimation of schooling.

In choosing an instrumental variable, given the availability of the data, the first set of instruments I use are the individual's spouse's education, following the idea of Chen (2009), spouse's education are proven to be a workable instrument for own schooling if it is correlated with the individual's schooling level and uncorrelated with unobserved error terms such as individual's own ability. In addition to spouse's education, I develop another set of instrumental variable, which is parents' education, following the same idea that parental education is positively correlated with individual's own schooling, and is assumed not to have a direct correlation with the error term. In the actual analysis with statistical software STATA, The estimation process is two stage least squares.

Ⅵ Data and Variables

Data and Sample

The data used in my analysis are taken from the 2002 Chinese Household Income Project (CHIP2002). This project aims at measuring the distribution of personal income and other economic factors in both rural and urban areas of the People's Republic of China. The data were collected through a series of questionnaire-based interviews. So far the CHIP project has conducted three waves in 1988, 1995 and 2002.In each wave the survey collected information of all household members about their education levels, employment statuses, occupations, workplaces, party membership, and extensive information about their sources of income.

Compare to the previous two waves, the 2002 survey is more comprehensive and detail oriented as it recorded the work and education information of Chinese people from various perspectives, which enables me to construct more variables of interest than previous studies.For example, apart from asking individual’s own educational background, the survy also asked individual’s parents’ background. Moreover, the survey also records the individual’s occupational choices. Overall, the survey selected 12 province-level administrative units, within which 77 cities were chosen. The survey of urban areas contains two components. One component is 20,632 individuals belonging to 6835 urban households. Another component is an enlarged survey of 5,327 rural migrant workers. These workers belong to rural households but are working in wage earning jobs in the city. They are referred to as migrant workers because they retain direct ties to the village while working in the cities, and return to the village during spring festival or annual peak season farm operations. My sample size varies based on the different estimation model I choose. Earning functions using Ordinary Least Square estimates are fitted in the subsample for individuals who are in the labor market in the year of 2012. Heckman correction for sample selection are fitted for the entire sample, not only including people who are currently working in the urban area, but also those who are our of the labor force in the year of 2002. Whereas Instrumental Variable estimates are fitted for the household heads and their spouses. Table 1 below summarizes the sample size in different models.

Table 1 Sample Size In different models

Total Raw Sample	Number of observations
Total *(Heckman model)*	25,959
Urban Residents	20,632
Urban-Rural Migrant workers	5,327
Subsets of Sample	
Working for Full time job	13,774
Not missing education, wage and family background information *(Ordinary Least Square model)*	13,344
Household Heads and Spouses *(Instrumental Variable Model)*	11,427

The limitations of using CHIP (2002) dataset in this study are that the dataset lacks direct measurement of ability such as the IQ test or test results that comparable to AFQT score as those in the NLSY survey in U.S, which makes me unable to directly detect the impact of ability on schooling and wage as Glewwe (1996), and Heckman (2006) did.

Besides, due to the data limitation, I am unable to develop more effective instruments besides parental and spouse education, which makes it difficult to substantiate the robustness of my estimation.

Wage, Years of Schooling and Experience

The CHIP2002 survey recoded individual's annual earnings. For urban residents, I use the earnings from the individual's main job to calculate their hourly wages. Excluded are the earnings from secondary jobs and normal urban privileges such as subsidies and bonuses and other non-monetary benefits. For migrant workers who are initially rural residents, I use their annual income from their current job to calculate their hourly wages. Although the survey uses different questionnaires for urban residents and migrant workers, the hourly wage of urban residents and migrant workers are comparable because most of the questions that related with the hourly wage are the same, such as total earnings in the year of 2002, total working hours per day, and total working days in the entire year. And after a careful check, over 90 percent of the migrant workers report they are full time employees for the entire year of 2002. Therefore the issue that migrant workers could have mixed income which involves both urban job wages and agricultural activity gains can be safely avoided, since most of them work exclusively in the city. The average hourly wage is 4.7*Yuan* for male and 3.9 *Yuan* for female.

In the CHIP 2002 survey, the individual's education is specified in two ways, as total years of schooling, and as education dummies representing various education levels. Based on the Chinese educational system, there are seven categories: four year college and above (*Daxue*), Community college or three-year college (*Dazhuan*), middle level professional or technical school (*Zhongzhuan*), high school (*Gaozhong*), Middle school (*Chuzhong*) and Primary School *(Xiaoxue*) or less. I assign the last category *Primary school or less* as the reference group.

Table 2 shows the raw income distribution by gender and level of education. From the table it is obvious that not only male's income on average is higher than female's income, but also such pattern persists at all educational levels. The absolute gender wage gap is the highest in middle school and high school levels. Another characteristic of this annual income distribution is that the standard deviation of annual income is very high. One caveat here is that the gaps presented in Table 2 are absolute statistics that do not control of other factors such as experience and marriage status that may also affect education. Further regression analysis that explores the *ceteris paribus* effect of schooling on wage will be conducted in the remaining chapters.

The earnings function also includes experience and its quadratic form. Previous studies using CHIP data adopted a conventional way to calculate potential experience as: *Age-Years of Schooling-6* to measure potential experience, which is inaccurate because not everyone starts to attend school at age of six, and not everyone is able to find a job right away when they completed their education. Such measurement error can be avoided in my analysis, because in CHIP2002 survey, respondents are directly asked to report how many years have they have worked until the end of 2002. Admittedly, there may still be some measurement error, for example, respondents may have trouble in recalling the exact years they have been working, but this type of measurement error would be less than those which caused by using the conventional way of calculating potential experience.

Demographic Characteristics and other Control Variables

Studies of the Chinese labor market revealed that Communist Party Membership can affect one's labor market success. For example, Party members are more likely to be promoted in government agencies and receive job training sponsored by the Communist Party. (Shu, X. 2003; Zhang, 2005) Following their rationales, I include a dummy variable that denotes whether the individual is a Communist Party member or not to see if the party membership receives special treatment. I also add one dummy variable to control for individual's marital status. Other variables are added to capture regional differences: A dummy variable *Non-migrant* captures the individual's Household Registration category as urban residents or not. Another set of control variables are the 10 province dummies which indicate the individual's current place of residence.

Apart from above mentioned control variable, I also included occupational dummies in my analysis. There are five occupational dummies: *Manager* refers to the individuals who are the manager of the private companies, or individuals who own companies. *Director* refers to the inidivduals who are director of government agencies or insititutions (Shiye Danwei), or the director of certain department within a government agency. *Professional* refers to the individuals who work as teachers, lawyers, and doctors. *Staff* refers to the individuals who are the staffs or clerical in the government agency or private companies. *Worker* refers to the workers in the industries such as manufacturing, construction, transportation etc. The reference group includes the servants and other uncategorized occupations.

Table 3 displays the mean and standard deviation of the all variables for males and females. It shows that there is a consistent gender difference in many aspects. Working women on average are younger, have less education, less experience and lower hourly wages. And they are less likely to be communist party members. There are no obvious gender differences on marriage status . And the gender ratios in the region and residency status (Non-migrant) are very similar .

Because my study involves the comparison between migrant workers and workers with urban residency entitlement, Table 4 compares wage, educational and demographic differences between these two groups. As shows in the table, migrant workers are usually younger, with less experience, less formal education and have lower incomes and hourly wages compare to their urban counterparts. They are more likely to be self-employed, and they are less likely to join the Communist Party. As for the occupational choices, female are less likely to be in the position of manager or director of the government agency. They are more likely occupying lower position such as staffs or workers.

Ⅴ Results

5.1Ordinary Least Square Estimates

Ordinary Least Square estimates of the hourly wage earnings function are reported in Table 5 and Table 6. Table 5 presents the estimation that measures educational attainment as a single variable which denotes the individual's total years of schooling. Table 6 reports the estimates that treat schooling as a set of dummy variables that indicate the highest degrees the individual received.

In Table5, there are two sets of specifications: First I look at the overall effect of schooling without controlling for the occupational choices, and the results are shown in the first two columns. Then I look at the effect of schooling after controlling for occupational choices, and the results are shown in column 3 and 4. Other control variables in each specification include work experience and experience squared, marriage status , Communist Party membership, Residency Registration type (urban resident or rural resident), and province dummies.

The primary focus is the schooling coefficients for males and females respectively, and the differences between the two groups. In general, I find that the returns to schooling for females are higher than that of males and this finding is consistent with most of previous studies. More specifically, the result shows that on average, an additional year of schooling yields 6.7 percentage increase in wage for females and 5.7 percentage increase for males[1] without considering different occupational choices. The

[1] With the dependent variable in natural logarithms, the estimated coefficient can be interpreted as approximately the percentage change in the dependent variable for a unit change in the explanatory variable. The function is (exp(x)-1)% where x is the original parameter estimate. The

gender gap shrinks to only 0.3 percentage point as I controlled for the occupational choices. This implies that occupational choice may contribute to the gender differences in return to schooling. More specifically, the higher education females have, the more able they are to avoid those traditionally female concentrated occupations which are usually low paid.

To examine the significance of the differences, I conduct a simple regression that has all the above mentioned regressors and the interactions of female dummy with each regressor for the pooled sample of both sexes for the specifications that do not control for the occupational choices. A t test is performed for the interaction of the female and schooling. For the specification that do not control for occupation dummies, the test statistic is 2.43, suggesting the difference between two groups is statistically significant at the 5% level. However, when the similar test is conducted for the specifications that control for the occupational choice, the test statistic shows that the gender difference in returns to schooling become insignificant.

Other findings include: there is a marriage premium for males, but not for females. Being a Communist party member is positively associated with individual's wage for both groups. City residents get a wage premium over migrant workers. Although not reported in the table, workers in the economically developed provinces such as Beijing, Guangdong and Jiangsu have higher earnings for both males and females compared to the counterparts in less developed provinces.

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entire paper adopts this method when it comes to the explanation of the partial effect on the logarithm of the hourly wage.

One defect of the first specification is that education enters the wage equation in a linear form, which assumes that the return to schooling for each additional year is constant. However this may not necessarily the case as summarized by Jaeger (1996) and Lemieux (2006). I turn to the next model, which relaxes this assumption.

Table 6 reports the estimates for a model that measures educational attainment as a set of dummy variables representing the highest degree the individual received, with the reference group of the individuals who have a primary school education or less. To estimate the differences, I conducted a linear regression that includes all the control variables used in the previous models and additional interactions between *Female* and the rest of the control variables. A F test for the joint significance of gender differences on all five educational levels is conducted, the test statistic is statistically significant at the 1 % level regardless whether or not controlling for the occupation dummies.

There are two main findings: First, the coefficient for education increases as the level of education becomes higher for both groups, and that the estimated returns is the largest at the college and above education level for both groups. But the increases of the estimated coefficients of education are larger for female than for male. Second, females' return to education is not always higher than that of males': it is higher for females when one's final degree is higher than high school, yet lower than males' when the highest degree is less than high school. For example, for the specifications that do no control for occupation dummies, the rate of returns to middle school for female is 18.5 percent, compared to the reference group, and this number is 19.4 percent for male. While the return to education for Three year's College for a female is 95 percent higher compared to the reference group, and this number is 75 percent for males. However although the gender differences are jointly significant for the five educational levels, the t test for each educational level show that male and female only differ when their education level is high school or less, whereas the difference is insignificant when both groups reach a higher level of education.

The second finding is interesting because it not only suggests that earning profile is more convex for female, but also suggests that women suffer more for less education than men do. My finding is consistent with that of Belman's (1991). He argues that if educational degree serves as a single for true productivity in the labor market, and employers pay to employees based on the expectation of their productivity, women and minorities will have lower returns to signals of low productivity such as high school or less, and will receive larger returns to signals of high productivity such as college or graduate school.

To sum up, the OLS estimates reveal two findings: First, on average, the return to education for females is higher than for males. The gap becomes less significant after controlling individuals' occupational choices. Second, the finding that females usually have higher returns to schooling does not carry over for the all educational levels. If schooling enters the wage equation in a nonlinear form, for people who have less than high school as their ultimate educational level, the returns to education is higher for male than female. It suggests that female could benefit more from higher education than their male counterparts.

Heckman model correct for the sample selection

To see whether the sample selection problem biases the estimates of the differences in the rates of returns to schooling, I turn next to the model that corrects for potential sample selection bias for females as suggested in the previous sections. Two household demographic variables are used as exclusion restrictions. One is whether there are any adults older than 60 years and the other is whether there are children younger than 6 years old in the household. These two variables are believed to affect women's labor participation decision but not directly affect earnings, as women could spend more time on family caring if there are young or old family members, thus would adversely affect their decision to participate in the labor force.

Table 5 reported the first stage estimation which is a probit model that estimate labor participation rates for females.

A comparison of OLS and Heckman models shows that, the inclusion of inverse mill's ratio reduces the point estimates of schooling for females from 0.047 to 0.042 for the specifications that controlled for occupational choices, which is not a significant change. A further examination reveals that the Inverse mill's ratio is insignificant for the Heckman two stage models, and the two exclusive restrictions are insignificant in the first stage estimation. Therefore on the whole the evidence of sample selection bias is unclear.

My discovery of no obvious evidence of sample selection bias is inconsistent with that of Hang Junsen et al (2005)'s finding, who used CHIP1995 survey and found that there were a significant sample selection bias for female workers in the Mid 90s. However they inferred that such selection bias existed because there were massive layoffs of factory workers when many state owned enterprises were privatized during the economic reform. Most of those laid off workers were female. The situation may not carry over in the year of 2002 when the survey I'm using was conducted.

Instrumental Variable Method

Given there is no obvious evidence of sample selection bias, and considering the fact that OLS estimates are usually biased and inconsistent because of omitted ability variable or measurement error in schooling, I seek to solve this problem using the Instrumental Variable method.

The first instrumental variable is spouses' schooling. The assumption is that spouse's education does not seem to directly correlate with one's innate ability, but they are highly correlated with individuals' education level. The second set of instruments is parents' education, following the same rationale as the reasons to use spouse's education. There are three specifications. The first specification uses spouse's education, the second uses father's education only, and the third uses both father and mother's education level. The result is reported in Table 7.

The completed estimate which includes the first stage estimates and tests for over identification are reported in Table7.B.To assess the validity of the instruments, the first stage regressions in Table 7.B indicate that all the instruments satisfy the condition of relevance with own schooling very well.

One caveat is that because I use spouse's education to instrument for individuals' own schooling, only the observations of married couples are fitted for my IV estimation. Tocompare the results , I also fit the same subsample of married couple when using the parental education as instruments. However, when I compare the IV estimates with the previous OLS estimates for all current working people, it is difficult to judge whether the differences between OLS and IV are from the endogenous schooling problem, or from the use of different samples. Thus to avoid this inconsistency, I also estimate the schooling coefficient with the OLS method only for the sample of married couples. The result is reported in the last two columns of Table 7. Compared to the previous OLS results with an overall working population, using the subsample of married couple does not change estimation results too much.

From the results in Table 7, I find that compared to the OLS estimates of married couples, the estimation using parental education as instruments has much larger point estimates. For example, the estimated coefficient of schooling is 0.09 for females when only uses father's schooling as an instrument after controlling for the occupational choices, compared to that of 0.045 in OLS. This is consistent with Griliches's (1978) study who found that the IV estimates almost double the OLS estimate using family background variables as instruments for schooling. In fact it is not uncommon that using instrumental variable obtains much larger estimates than OLS even when using other instruments. For example Angrist and Krueger's study (1991) uses college's proximity as an instrument, and their IV estimate is also almost twice as large as OLS estimate. Card(2003) summarizes these studies by noting that, the IV estimates typically exceed OLS estimates by 20 percent or more.

Yet in standard econometric theory,OLS will be bias upward if omitted ability is positively correlated with schooling, implementing instrumental variable should obtain smaller estimates than OLS. One explanation for this inconsistency is that downward bias caused by measurement error in schooling would offset such upward bias due to omitted variables (Wooldridge, 2002), or even dominate the sign of the biasness of OLS estimates. (Griliches 1977; Angris &Kruger 1991). Another explanation is offered by Bound (1995), who proved that in a finite sample, when the instrumental variable explains small variation of the endogenous variable, even a small correlation between the instrumental variable and the error term could cause estimates to be biased toward the same direction as the biasness in OLS. However in my case, weak instruments seem unpersuasive, since the first stage estimates show that using individual's own schooling as dependent variable and parent's schooling as explanatory variable explains a very large portion of variation of schooling. The third explanation is the assumption that ability and schooling may not necessarily positively correlated if we believe that more abled person may choose to terminate their schooling early. If it is the case, then the assumed *upward* bias in OLS is questionable.

As to the gender difference, I find that there are also differences between the specifications which control for the occupational choices and which do not. For the specifications which do not control for the occupational chocies, female have higher returns to schooling than male, while for the specifications which control for the occupational choices, male have higher returns to female. Although the gender differences for both specifications are small and statistically insignificant.

Previous studies have mixed findings on the return to education by gender when using the IV method. Some find consistent patterns of gender difference across OLS and IV in which females consistently have higher returns to schooling than males regardless of which method they use. (Aslam, M. 2007), others find opposite patterns between OLS and IV. For example Flabbi Luca (1999) found very significantly different patterns of gender difference between OLS and IV, in the sense that the schooling coefficient is higher for female than males when use OLS method, yet lower than males when uses the Instrumental Variable method. He attributed this to the fact that the extent of the bias in OLS estimates are asymmetric in regard to gender and further stated there could be higher ability bias for female.

So far I have estimated the return to schooling with the Ordinary Least Square method, the Heckman model correcting for selection bias, and Instrumental Variable models. The returns to schooling differ under these three models: while the OLS estimation of return is as small as 4.2 percent for an additional year of schooling for males and 4.5 percent for female without controlling for the occupational choices, IV estimates are at least 50percent higher than the OLS estimates. The patterns of gender difference seem consistent across these three models: the schooling coefficients for female are always higher than male whichever estimation method I use. Moreover, the adoption of the Instrumental Variable methods that take into account of the endogeniety of schooling does not seem to explain the existed gender difference in OLS. Moreover whichever method I use, the estimated difference in schooling coefficient in China is relatively small, compared to other countries such as two percentage points greater for females than males in the US (Christopher 2005) and Italy (Luca 1999) , and almost seven percentage points greater for females than males in Pakistan (Aslam,2007).

Other than the returns to schooling, I find that Communist Party Membership is statistically significant for both males and females in OLS model, yet became insignificant in Instrumental Variable models. This is also an interesting finding, as most of the past literature that study Chinese labor market always conclude that Communist Party members usually receive additional benefits in the workplace, which seems to be true based on the usual understanding of the Communist Party. However the Instrumental Variable results suggest another possible explanation, in the sense that through a set of selection and application procedures, for those who have higher ability could also have higher possibility to be selected as a Communist Party member. As when I use instrumental variable methods, , the dummy variable of Party membership becomes insignificant.

5.2 Are there differences between migrant workers and city residents?

As mentioned above, the urban labor force in China nowadays is composed of two major parts: workers who are initially urban residents and workers who are migrants from rural areas. This section mainly focuses on detecting the difference between these two groups in terms of return to education by gender.

As to the methods, I apply both OLS and Instrumental Variable methods for these two groups. For the OLS, I estimate a model that is the same as the equation [1] for both total years of schooling and different education level. For IV, I use spouses' education as the instruments. The result is in Table 8, Table 9 and Table10. The extension results that are first stage estimates of IV model are presented in Table 10.B.

When comparing urban resident and migrant workers, the estimation results first show that, the returns to schooling are higher for urban residents than for the migrant workers without taking consideration of the different occupational choices. For example, the returns to education for female migrant workers are almost two percentage points lower than their urban counterpart when I use OLS. The gap is four percentage points lower for IV method. However, when add occupation dummies to the model, the gap between migrant and urban residents becomes smaller as reflected in the last four columns in Table 8. This implies that the differences of the occupational choices contribute a large portion of the gender gap for urban and migrant workers. This is confirmed by most of the studies in China, as most scholars attribute the difference of overall return to education between urban residency workers and migrant workers to the occupational segregation (Zhao, Yaohui 1997; Xie 1996).

However when it comes to gender differences, urban residents and rural migrant workers behave differently. The OLS estimates in Table 9 show that for the urban resident group, the returns to schooling for females are always higher thant that for males, regardless of whether controlling for the occupation dummies or not. Further t test which aims to detect gender differences shows that the difference is only significant for the urban resident group under the specification without controlling for occupation dummies. The same gender hierarchy pattern persists when education enters the wage equation as a set of dummies. Table 9 shows that for migrant workers, males have higher returns to schooling for every educational level. In contrast , for urban resident workers, female have higher returns to schooling for every educational level. F tests for the joint significance of gender differences on education coefficients are conducted. For the migrant workers, the test statistic is F(5,3403)=0.61, and is statistically insignificant. While for the urban residents, the test statistic is F(5,8359)=7.87, and is statistically significant at the 1 % level.

When using the IV method, the gender differences become larger for migrant workers: the estimated schooling coefficient is 0.074 for males and is 0.053 for females, and that the difference is almost two percentage points for the each additional year of schooling. The estimated difference in schooling coefficient does not change too much for urban residents' group. Noted that these esitmates also controlled for the occupational choices, therefore we may conclude that there are still a large portion of gender gap left unexplained under IV model when taking account of the effect of education on the impact of individual's occupational choices.

Among other findings, Communist Party Membership dummy is only significant for male urban residents when using the OLS method, yet when I instrument for the endogeneity of schooling, the Party membership became insignificant. This coincides with my previous finding when using the pooled sample of both urban resident workers and migrant workers.

I then seek the reasons why the gender differences in the schooling coefficients display different patterns between migrant workers and urban residents, even after controlling for the endogeneity of schooling and occupations. I notice that in table 10, the differences between the male migrant workers and the male urban residents are small (the schooling coefficient for the male migrant workers is 0.074, and for the male urban residents is 0.076), whereas the differences mainly lie at the female migrant workers and the urban resident females (the schooling coefficient for the female migrant workers is 0.053, and for the female urban residents is 0.82).

We can interpret these results from the perspective of the signaling theory, which is based on the assumption that in an imperfect information signaling model, employers who lack information about the individual's true ability would differentiate individuals based on their group characteristics, in this case gender and education levels. Under this theory, the minority groups are predicted to receive lower returns to schooling to signals of low quality, and have higher returns to schooling for higher education levels. This model is first demonstrated by Aigner (1977) and later substantiated by Belman (1991) in the U.S. labor market. This prediction coincides with my estimates on the difference for urban and migrant worker groups, because most migrant workers have less formal schooling compared to their urban counterparts. As a further check reveals that 81.97 percent of migrant workers have only nine years of formal schooling or less, that is they have only a high school diploma or less, compare to 30.5 percent of urban residency workers.

To test this hypothesis, I divide the data set into two sub samples: One group is the individuals who have at least a high school education and the other group is the individuals who have less than a high school education. And I expect these two groups would have the same gender hierarchy on the schooling coefficient as that of urban residents and migrant workers: For the individuals who have less than high school education, the returns to each additional year of schooling for females should be lower than their male counterparts, and for the individuals who have at least high school education, the returns to each additional year of schooling for males should be higher than that of females'. The results in table 11 confirms this hypothesis: As I use spouse's education as instruments to take into account of endogeneity of schooling, for the individual who has less than high school education, female have less returns to schooling; while for the individual who has at least high school education, the returns to education for females is higher than that of males.

Ⅵ Conclusion

In this paper I have examined the returns to schooling in urban labor market in China by gender using the data from CHIP 2002. I addressed the following issues:

(1) Using the standard Mincer model, what is the rate of return for each additional year of schooling in China and what are the rates of return to different educational levels?

(2) Does selection bias for females affect the estimate of gender differences on the rate of returns to schooling?

(3) To what extent do omitted ability bias and measurement error bias affect the estimates of schooling coefficients? Do these biases contribute to the gender differences in the schooling coefficients ?

(4) Do the returns to schooling by gender differ between urban residents and migrant workers?

I find that first, the estimated rate of returns to each additional year of schooling is about 5.7 percent for males, and 6.7 percent for females with the standard Mincer equation without taking control of occupational choices, and this number becomes 4.2 percent for male and 4.5 percent for female after controlling for occupational choices. Furthermore, I also find the earning profile is convex for both genders, suggesting that the individual usually have higher returns to schooling for having higher education levels.

Second, I find no significant evidence of sample selection bias for females. Usually we expect the basic Mincer equation estimates with Ordinary Least Square Method to be biased downward. When I use the Instrumental Variable method to take account of the endogeneity of schooling, the point estimates of schooling increase by at least 20 percent for both genders.

Third, when it comes to the gender difference, I find that females have higher returns to each additional year of schooling than males for OLS model. The gender difference is 0.8 percentage points, the number is small yet statistically significant. The gender difference does not change too much under the IV models without controls for the occupational choices. However, in IV model males have slightly higher returns to schooling than females when controlling for the occupational choices, although the difference is small and statistically insignificant.

Fourth, when looking at subgroups of urban-residency workers and migrant workers separately, the patterns of gender difference differ between two groups. For urban residency workers, the estimated return to education for females is slightly higher than that of males. The gap becomes small and less significant after controlling occupational choices. However, for rural migrant workers, the returns to education for females is considerably lower compared to their male counterparts even after taking account of endogeneity of schooling.

Part of the reason why migrant females suffer lower returns to school may due to two reasons. One possible explanation can be given from the perspective of the individual's occupational choices, and occupation segregation between two sexes. As the lower education the female gets, the less likely she would avoid those female concentrated jobs, which are usually low paid. This explanation is confirmed by in Table 10, when comparing the difference in column 1,2 and 3,4 . The gender gap on the returns to schooling narrows when I add additional occupation dummies into the model. Another possible explanation can be given for the statistical discrimination. As in an imperfect information signaling model, education degrees serve as signals for productivity. Employers who lack information for the individual's true ability would differentiate individuals based on their group characteristics, in this case gender. Under this theory, females are expected to receive lower returns to schooling as signals of low quality, and receive higher returns to schooling compare to males as signals of high quality.

Limitations of the study

In my analysis, I use parents' educational level to instrument for the individual's own schooling. However the endogenous nature of parental education may make the validity of using parental education as instruments subject to further scrutiny. First, because of the genetic transmission from parents to offspring, parental education may correlate with individual's innate ability. Second, parental education could correlate with individual's wage through other mechanisms. As Montgomery (1991) pointed out, parents' educational background could link with individual's wage through the mechanism of networking, that is, individuals whose parents with high educational level have friends and connections which enable them to find a better paid job. The same pattern may apply to the situation of spouse' education.

If this is the case, using parents' background as instrument could reduce the accuracy of my results, and leaves the issue of what are the real returns to schooling by gender in China open to debate. My analysis suggests that previous estimates of returns to schooling have to be considered with great caution: the level of biasness in OLS could be significant, and it could hide the real pattern of return to education between male and female groups.

In addition, the reason why the male migrant workers have higher returns to schooling than their female counterparts waits to be further explored. Although I do find that migrant workers usually have less formal education and it coincides with the literature that shows female benefit less from low educational level if education serves as a signal of productivity (Belman, 1991). However more thorough analysis is still needed if one intends to seek answers from signaling theory.

Policy implications

My findings reveal that both males and females benefit from higher education and females even benefit more. This suggests that besides allocating funds to primary education, that public investment in higher education is also desirable. Because otherwise educational inequality would expand, since people receive more private return to higher education, children from families with less budgets on education will face lower returns while rich families will benefit more on investing on higher education.

My finding also suggests the urgency of removal of the institutional barriers between urban residency workers and migrant workers. Migrant workers in China not only experience lower wages and less formal schooling, but also suffer from lower return to schooling. Previous findings in other countries reveal that for those underrepresented groups such as women or ethnic minority, the returns to education is usually higher

(Jaeger, David 1996; Dougherty,2003). The situation in the Chinese labor market is somewhat different: the low returns to education for migrant workers may disincentive them from higher education, which could eventually widen the gap between urban residency and rural migrant workers. Since it is well documented that occupational and sectoral segregation are the ones to blame for such low return to schooling, and institutional barriers attribute a lot for such segregation (Knight, John 1999; Dong, 2002), the elimination of the restrictions on rural labor migration can increase the returns to schooling for rural migrant workers, mitigate gaps and facilitate overall economic growth in the long run.

My finding shows that the gender differences for the urban residents are small, which suggests the increased status of urban females. However the gender inequalities in the rural area are still large. Although my study only involves the rural residents who migrate to the cities, it already shows that married females who are initially from rural area, are suffering the lowest returns to schooling. Rural Chinese women usually suffer more oppression from family authority than their urban conterparts. And studies have shown that migrating from cities serves a channel to escape from such operation(Gaetano, 2004) .The lack of attention on the gender inequalities for the migrant workers in the policy making could adversely affect their process of integrating into the urban life .

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Appendix

Table 2 Annual Income distribution by gender and education in 2002

	Male	Female	All	GAP (Male-Female)
Total *(Yuan)*	11,710.73	8,813.127	10,314	2897.55
	(10267.13)	(6950.96)	(5666.12)	
Primary School or less	6,944.97	6,624.718	8,832.242	320.25
	(6014.633)	(5727.902)	(8995.32)	
Middle school	10,242.02	7,285.316	10,126.52	2956.70
	(10924.71)	(5847.608)	(8391.574)	
High School	1,1506.55	8,668.40	10,126.52	2838.15
	(9562.02)	(6641.402)	(8391.574)	
Technical school	12,256.51	10,894.92	11,533.47	1361.59
	(7779.089)	(7334.423)	(7574.811)	
Community College or Three Year College	14,672.12	12,232.38	13,561.61	2439.74
	(9546.714)	(7597.185)	(8635.524)	
College and above	18,360.18	15,701.8	17,404.03	2658.38
	(11902.38)	(9476.442)	(10851.85)	
N	9643	8982	18634	

Note: Standard Errors are in parentheses

Table 3 Descriptive Statistics: Male, Female and Overall Sample

	Male		Female		All	
	Mean	SD	Mean	SD	Mean	SD
Age	40.224	9.769	37.568	8.885	39.050	9.480
wage	4.772	4.904	3.967	4.230	4.418	4.636
Log wage	1.316	0.693	1.127	0.697	1.233	0.701
Years of schooling	10.652	3.276	10.387	3.351	10.535	3.312
Experience	18.147	10.845	15.352	9.662	16.914	10.432
Father's education	5.536	4.554	6.092	4.572	5.780	4.570
Mother's education	3.175	4.106	3.933	4.274	3.508	4.197
Spouse's Education	9.716	3.339	10.672	3.316	10.133	3.363
Less than Primary school	0.019	0.136	0.036	0.187	0.026	0.161
Primary School	0.055	0.228	0.065	0.246	0.059	0.236
Middle School	0.327	0.469	0.294	0.456	0.313	0.464
High School	0.241	0.428	0.251	0.434	0.246	0.430
Technical School	0.088	0.284	0.120	0.325	0.102	0.303
Three Year or Community College	0.173	0.378	0.174	0.379	0.173	0.378
Four Year College and Above	0.094	0.292	0.058	0.234	0.078	0.269
Party Member	0.285	0.451	0.168	0.374	0.233	0.423
Married	0.892	0.310	0.874	0.332	0.884	0.320
Non migrant worker	0.743	0.437	0.755	0.430	0.749	0.434
Manager	0.195	0.396	0.169	0.375	0.183	0.387
Director	0.066	0.249	0.0171	0.129	0.042	0.199
Professionals	0.161	0.368	0.173	0.378	0.166	0.373
Staff	0.138	0.345	0.179	0.384	0.156	0.363
Workers	0.376	0.484	0.396	0.489	0.385	0.487
N	7666		6078		13744	

Data source :Chinese Household Income Project 2002. The sample only include individuals who worked in 2002

Table 4 Descriptive Statistics : Migrant workers and urban residents

	Migrant Workers				Urban Residents			
	Male		Female		Male		Female	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	28.495	14.723	28.209	13.549	38.299	18.256	38.182	18.033
wage	3.419	5.092	2.257	1.832	5.218	4.749	4.500	4.610
Log wage	0.936	0.674	0.665	0.541	1.442	0.651	1.272	0.677
Years of schooling	6.897	3.646	6.336	3.479	9.926	4.166	9.180	4.264
Experience	7.663	5.424	6.148	4.399	21.635	9.932	18.167	9.133
Father's education	3.742	3.807	3.715	3.546	5.734	4.631	5.950	4.652
Mother's education	1.989	3.419	1.992	2.779	3.137	4.073	3.588	4.222
Spouse's Education	7.158	2.847	8.228	2.572	10.032	3.373	10.896	3.302
Less than Primary school	0.202	0.402	0.242	0.429	0.020	0.140	0.046	0.209
Primary School	0.125	0.330	0.175	0.380	0.112	0.315	0.137	0.343
Middle School	0.441	0.497	0.421	0.494	0.262	0.440	0.268	0.443
High School	0.134	0.340	0.081	0.272	0.232	0.422	0.235	0.424
Technical School	0.029	0.168	0.027	0.162	0.090	0.286	0.103	0.303
Three Year or Community College	0.014	0.119	0.009	0.095	0.158	0.365	0.127	0.333
Four Year College and Above	0.006	0.080	0.002	0.049	0.095	0.293	0.053	0.224
Party Member	0.038	0.191	0.008	0.091	0.292	0.455	0.158	0.364
Married	0.651	0.477	0.686	0.464	0.676	0.468	0.669	0.471
Manager/ self employed	0.359	0.480	0.308	0.462	0.027	0.163	0.020	0.138
Director	0.005	0.068	0.001	0.034	0.084	0.277	0.021	0.143
Professionals	0.037	0.189	0.012	0.110	0.112	0.315	0.098	0.297
Staff	0.020	0.139	0.011	0.103	0.099	0.298	0.102	0.303
Workers	0.031	0.173	0.017	0.131	0.134	0.340	0.053	0.224
N	1,780		1,329		4,798		3,758	

Data source :Chinese Household Income Project. The sample only includes individuals who worked in 2002

Table 5 OLS and Heckman Model: Measuring Education As Total Years of Schooling

VARIABLES	(1) Male	(2) Female	(3) Male	(4) Female	(5) Heckman Female	(6) First stage select
Schooling	0.056***	0.065***	0.042***	0.045***	0.047***	-0.008
	(0.003)	(0.003)	(0.003)	(0.003)	(0.009)	(0.012)
Experience	0.022***	0.018***	0.021***	0.017***	-0.003	0.075***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.018)	(0.013)
Experience squared	-0.000***	-0.000	-0.000***	-0.000	0.000	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.073***	0.038	0.061**	0.031	0.069	-0.130
	(0.027)	(0.026)	(0.027)	(0.026)	(0.079)	(0.102)
Partymember	0.100***	0.085***	0.047**	0.026	0.021	0.020
	(0.017)	(0.022)	(0.018)	(0.022)	(0.066)	(0.105)
Nonmigrant	0.102***	0.146***	0.018	0.100***	0.104	-0.027
	(0.024)	(0.025)	(0.027)	(0.028)	(0.081)	(0.106)
Manager			0.099***	0.082***	-0.054	0.490***
			(0.025)	(0.026)	(0.127)	(0.106)
Director			0.401***	0.439***	0.324**	0.486**
			(0.032)	(0.044)	(0.157)	(0.226)
Professionals			0.382***	0.431***	0.314***	0.483***
			(0.028)	(0.026)	(0.116)	(0.118)
Staff			0.289***	0.292***	0.210**	0.307***
			(0.028)	(0.025)	(0.096)	(0.106)
Worker			0.262***	0.213***	0.172*	0.129
			(0.026)	(0.029)	(0.091)	(0.116)
Less than 6 years						0.019
						(0.086)
Older than 60 years						-0.114
						(0.098)
Lambda						-1.686
						(1.219)
Observations	7,398	5,812	7,398	5,812	6,061	6,061
R squared	0.262	0.321	0.287	0.357		

Note: Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotesp<0.1. The dependent variable is log hourly wage. Province dummies are also included in the model, but the estimates are not reported in the table. The reference group is the individuals who are in Gansu Province and work as servants. The last two columns are the Heckman model correct for sample selection bias for females only.

TABLE 6 OLS Model: Measuring Education As Discrete Levels

VARIABLES	(1) Male lwage	(2) Female lwage	(1) Male lwage	(2) Female lwage
Middle School	0.178***	0.170***	0.164***	0.159***
	(0.028)	(0.028)	(0.028)	(0.028)
High School	0.335***	0.330***	0.294***	0.281***
	(0.031)	(0.032)	(0.031)	(0.032)
Technical School	0.392***	0.540***	0.312***	0.415***
	(0.036)	(0.036)	(0.037)	(0.037)
Three-year or Community College	0.560***	0.668***	0.445***	0.504***
	(0.034)	(0.035)	(0.035)	(0.037)
Four year College and above	0.765***	0.911***	0.623***	0.697***
	(0.038)	(0.043)	(0.040)	(0.046)
Experience	0.021***	0.019***	0.020***	0.017***
	(0.003)	(0.003)	(0.003)	(0.003)
Experience squared	-0.000***	-0.000	-0.000***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.060**	0.044*	0.053**	0.034
	(0.027)	(0.026)	(0.026)	(0.025)
Party member	0.057***	0.033	0.025	0.005
	(0.018)	(0.022)	(0.018)	(0.022)
Non-migrant	0.079***	0.105***	-0.003	0.075***
	(0.024)	(0.026)	(0.027)	(0.028)
Manager			0.096***	0.078***
			(0.025)	(0.026)
Director			0.367***	0.367***
			(0.033)	(0.045)
Professional			0.350***	0.363***
			(0.028)	(0.027)
Staff			0.274***	0.256***
			(0.028)	(0.025)
Worker			0.270***	0.215***
			(0.026)	(0.029)
Observations	7,398	5,812	7,398	5,812
R-squared	0.272	0.341	0.292	0.364

Note: Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotesp<0.1. The dependent variable is log hourly wage. Province dummies are also included in the model, but the estimates are not reported in the table. Reference group are the individuals who are in Gansu Province and work as servant.

TABLE 7 Instrumental Variable Model

	IV		IV		IV		OLS[a]	
	Spouse's Education		Father's Education		Parents' Education			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Male	Female	Male	Female	Male	Female	Male	Female
Schooling	0.077***	0.073***	0.106***	0.090***	0.109***	0.098***	0.042***	0.045***
	(0.007)	(0.007)	(0.016)	(0.014)	(0.014)	(0.012)	(0.003)	(0.003)
Experience	0.018***	0.015***	0.020***	0.017***	0.020***	0.017***	0.017***	0.017***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
Experience squared	0.000**	0.000	0.000*	0.000	0.000*	0.000	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.045	0.014	-0.116**	-0.019	-0.123**	-0.04	0.070**	0.109***
	(0.038)	(0.037)	(0.055)	(0.049)	(0.052)	(0.046)	(0.030	(0.031)
Party member	0.014	-0.026	-0.019	-0.041	-0.021	-0.049*	0.047**	0.006
	(0.02)	(0.025)	(0.026)	(0.028)	(0.025)	(0.027)	(0.019)	(0.023)
Nonmigrant	0.053*	0.079***	0.085***	0.112***	0.085***	0.116***	0.093***	0.090***
	(0.029)	(0.028)	(0.029)	(0.028)	(0.029)	(0.028)	(0.026)	(0.026)
Manager	0.285***	0.375***	0.207***	0.334***	0.200***	0.313***	0.391***	0.459***
	(0.041)	(0.051)	(0.057)	(0.061)	(0.054)	(0.059)	(0.034)	(0.046)
Director	0.255***	0.367***	0.171***	0.309***	0.163***	0.285***	0.370***	0.449***
	(0.038)	(0.036)	(0.058)	(0.053)	(0.054)	(0.048)	(0.03)	(0.028)
Professional	0.220***	0.254***	0.166***	0.217***	0.161***	0.203***	0.286***	0.303***
	(0.035)	(0.031)	(0.044)	(0.04)	(0.042)	(0.037)	(0.031)	(0.027
Staff	0.268***	0.204***	0.271***	0.198***	0.271***	0.195***	0.276***	0.217***
	(0.03)	(0.031)	(0.030	(0.032)	(0.03)	(0.032)	(0.0280	(0.031)
Worker	-0.018	-0.121**	-0.295**	-0.288**	-0.314**	0.347***	0.241***	0.064
	(0.068)	(0.06)	(0.138)	(0.112)	(0.126)	(0.101)	(0.04)	(0.04)
Observations	6,191	4,757	6,443	5,019	6,443	5,019	6,453	5,026
R-squared	0.269	0.354	0.235	0.342	0.231	0.331	0.289	0.37

Note: Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotesp<0.1. The dependent variable is log hourly wage. Province dummies are also included in the model, but the estimates are not reported in the table. The reference group is the individuals who are in Gansu Province and work as servant.

[a] The last two columns are Ordinary Least Square estimates for sample of married couples for comparison.

Table 7.B First Stage Regression of Instrumental Variable (Extension of Table 7)

VARIABLES	Spouse's as IV		Father's as IV		Parents as IV	
Experience	-0.033*	0.021	-0.033*	0.017	-0.033*	0.016
	(0.014)	(0.017)	(0.015)	(0.019)	(0.015)	(0.018)
Experience squared	0.000***	-0.002***	-0.001***	-0.002***	-0.001***	-0.002***
	(0.000)	0.000	(0.000)	(0.000)	(0.000)	(0.000)
Married	1.383***	1.734***	2.54***	2.317***	2.494***	2.225***
	(0.132)	(0.142)	(0.135)	(0.153)	(0.134)	(0.152)
Partymember	0.898***	0.83***	1.06***	1.034***	1.063**	1.039***
	(0.077)	(0.092)	(0.084)	(0.1)	(0.084)	(0.100)
Nonmigrant	0.017	-0.193*	0.148	-0.456***	0.152	-0.412***
	(0.101)	(0.115)	(0.109)	(0.127)	(0.109)	(0.126)
Manager	2.135***	1.895**	2.756***	2.41***	2.739***	2.318***
	(0.134)	(0.191)	(0.142)	(0.200)	(0.142)	(0.198)
Director	2.259***	1.945**	2.966***	2.761***	2.943***	2.695***
	(0.122)	(0.115)	(0.128)	(0.12)	(0.128)	(0.119)
Professionals	1.332***	1.338***	1.786***	1.613	1.764***	1.561***
	(0.126)	(0.114)	(0.132)	0.12	(0.132)	(0.119)
Staff	-0.141	0.309*	0.097	0.312	0.075	0.323*
	(0.108)	(0.126)	(0.115)	0.135	(0.115)	(0.133)
worker	-0.287	-0.345*	-0.321*	-0.442	-0.305*	-0.399**
	(0.142)	(0.138)	(0.153)	0.142	(0.152)	(0.14)
Spouse's Education	0.402***	0.424***				
	(0.013)	(0.016)				
Father's Education			0.108***	0.138	0.078***	0.09***
			(0.007)	0.008	(0.008)	(0.01)
Mother's Education					0.058***	0.095***
					(0.009)	(0.011)
Observation	6191	4757	6443	5019	6443	5019
Adjusted R-square	0.536	0.553	0.436	0.449	0.439	0.458

[a] Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotes p<0.1. The dependent variable is log hourly wage. Ten Province dummies are also included in the model, but the estimates are not reported in the table. The reference group is the individuals who are in Gansu Province and work as servants.

Table 8 OLS Model:
Migrant workers and Urban Residents

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Migrant Workers		Urban Resients		Migrant Workers		Urban Resients	
	Male	Female	Male	Femal	Male	Female	Male 0	Female
VARIABLES								
Schooling	0.048***	0.043***	0.056***	0.073***	0.043***	0.041***	0.040***	0.046***
	(0.006)	(0.005)	(0.003)	(0.003)	(0.006)	(0.005)	(0.003)	(0.004)
Experience	0.040***	0.037***	0.007	0.018***	0.039***	0.029***	0.016***	0.016***
	(0.007)	(0.009)	(0.005)	(0.005)	(0.007)	(0.009)	(0.004)	(0.004)
Experience sq	-0.001**	-0.001**	0.000	-0.000	-0.001**	-0.001*	-0.000**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.031	0.030	0.012***	0.037	0.029	0.033	0.099***	0.035
	(0.050)	(0.046)	(0.030)	(0.031)	(0.052)	(0.046)	(0.033)	(0.031)
Party member	0.050	0.180	0.103***	0.052**	0.022	0.158	0.049***	0.018
	(0.070)	(0.122)	(0.019)	(0.024)	(0.068)	(0.118)	(0.019)	(0.023)
Manager					0.082**	0.133***	0.112***	-0.078*
					(0.033)	(0.030)	(0.043)	(0.045)
Director					0.585***	-0.223	0.420***	0.432***
					(0.193)	(0.290)	(0.035)	(0.047)
Professional					0.252***	0.281***	0.413***	0.415***
					(0.070)	(0.094)	(0.032)	(0.029)
Staff					0.178*	0.191*	0.313***	0.277***
					(0.094)	(0.102)	(0.032)	(0.027)
Worker					0.283***	0.112	0.276***	0.204***
					(0.075)	(0.085)	(0.029)	(0.032)
Observations	1,757	1,323	4,696	3,703	1,857	1,395	5,541	4,417
R-squared	0.123	0.142	0.189	0.233	0.140	0.160	0.241	0.284

Note: Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotes p<0.1. The dependent variable is log hourly wage. Ten Province dummies are also included in the model, the estimates are not reported in the table. The reference group is the individuals who are in Gansu Province and work as servants.

Table 9 OLS Estimates of Returning to different Education levels: Migrant workers and Urban Residents

	(1)	(2)	(3)	(4)
	Migrant Workers		Urban Residents	
	Female	Male	Female	Male
VARIABLES	lwage	lwage	lwage	lwage
Middle School	0.174***	0.153***	0.161***	0.189***
	(0.039)	(0.031)	(0.048)	(0.056)
High School	0.310***	0.238***	0.300***	0.305***
	(0.050)	(0.050)	(0.049)	(0.056)
Technical School	0.414***	0.425***	0.288***	0.432***
	(0.091)	(0.086)	(0.054)	(0.060)
Three year or Community College	0.444***	0.589***	0.436***	0.527***
	(0.131)	(0.123)	(0.052)	(0.060)
Four year College and above	0.772***	0.811***	0.586***	0.713***
	(0.180)	(0.312)	(0.056)	(0.068)
Experience	0.038***	0.033***	0.004	0.014***
	(0.007)	(0.009)	(0.005)	(0.005)
Experience squared	-0.001***	-0.001**	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.016	0.011	0.010	-0.088*
	(0.069)	(0.061)	(0.068)	(0.050)
Party member	-0.004	0.145	0.034*	-0.024
	(0.070)	(0.123)	(0.020)	(0.024)
Nonmigrant	0.073**	0.138***	0.109**	-0.072
	(0.034)	(0.031)	(0.047)	(0.047)
Manager	0.593***	-0.332	0.386***	0.384***
	(0.203)	(0.308)	(0.038)	(0.049)
Director	0.221***	0.259**	0.378***	0.364***
	(0.073)	(0.101)	(0.036)	(0.033)
Professional	0.245**	0.158	0.298***	0.252***
	(0.099)	(0.114)	(0.036)	(0.030)
Staff	0.274***	0.117	0.301***	0.209***
	(0.080)	(0.091)	(0.033)	(0.034)
Worker	0.339***	0.207***	0.559***	0.457***
	(0.085)	(0.074)	(0.096)	(0.083)
Observations	1,757	1,323	4,696	3,703
R-squared	0.142	0.157	0.227	0.291

Note: Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotesp<0.1. The dependent variable is log hourly wage. Ten Province dummies are also included in the model, but the estimates are not reported in the table. The reference group is the individuals who are in Gansu Province and work as servants.

Table 10 Instrumental Variable Model :
Migrant Workers and Urban Residents

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Migrant Workers		Urban Residents		Migrant Workers		Urban Residents	
	Male	Female	Male	Female	Male	Female	Male	Female
VARIABLES								
Schooling	0.082***	0.056***	0.087***	0.110***	0.074***	0.053***	0.076***	0.082***
	(0.011)	(0.009)	(0.007)	(0.007)	(0.011)	(0.009)	(0.009)	(0.009)
Experience	0.038***	0.035***	0.012**	0.015***	0.038***	0.031***	0.010**	0.012**
	(0.007)	(0.009)	(0.005)	(0.005)	(0.007)	(0.009)	(0.005)	(0.005)
Experience Sq	-0.00***	-0.00**	-0.000	0.000	-0.00***	-0.00**	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Party member	0.026	0.179	0.037	-0.022	-0.007	0.170	0.019	-0.044*
	(0.086)	(0.171)	(0.023)	(0.027)	(0.084)	(0.170)	(0.021)	(0.026)
Manager					0.014	0.108***	0.110**	-0.039
					(0.036)	(0.032)	(0.055)	(0.056)
Director					0.607**	-0.276***	0.310***	0.351***
					(0.286)	(0.071)	(0.047)	(0.054)
Professional					0.179**	0.217*	0.288***	0.329***
					(0.074)	(0.111)	(0.047)	(0.042)
Staff					0.191**	0.253**	0.248***	0.222***
					(0.097)	(0.129)	(0.041)	(0.034)
Worker					0.226***	0.101	0.297***	0.195***
					(0.077)	(0.076)	(0.036)	(0.034)
Observations	1,551	1,205	4,640	3,552	1,551	1,205	4,640	3,552
R-squared	0.111	0.135	0.171	0.206	0.130	0.149	0.202	0.263

Note: The instrumental Variables are spouse's education. Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotesp<0.1.

The dependent variable is log hourly wage. Province dummies are also included in the model, but the estimates are not reported in the table. The reference group is the individuals who are in Gansu Province and work as servants.

Table 10.B First Stage Regression of Instrumental Variable Model: Migrant and Urban Resident (Extension of Table 10)

	Migrant Workers		Urban Residents		Migrant workers		Urban Resident	
VARIABLES	Male	Female	Male	Female	Male	Female	Male	Female
Experience	-0.021	0.057	-0.116**	0.016	-0.023	0.052	-0.075**	0.017
	(0.03)	(0.041)	(0.023)	(0.024)	(0.029)	(0.042)	(0.022)	(0.023)
Experience squared	0.000	-0.003	0.001***	-0.001	0.000	-0.003	0.000	-0.002**
	(0.001)	(0.002)	(0.000)	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)
Party member	0.902***	1.571***	1.727***	1.325***	0.867***	1.294*	0.873***	0.849***
	(0.257)	(0.548)	(0.08)	(0.095)	(0.245)	(0.529)	(0.081)	(0.093)
Manager					0.209*	-0.01	-0.525**	-0.41*
					(0.12)	(0.145)	(0.192)	(0.208)
Director					-0.585	1.952***	2.2***	1.956***
					(0.87)	(0.58)	(0.153)	(0.195)
Professionals					1.095***	1.937	2.344***	2.042***
					(0.264)	(0.423)	(0.148)	(0.125)
Staff					0.697*	1.754***	1.348***	1.343***
					(0.412)	(0.592)	(0.148)	(0.121)
Worker					0.004**	0.633**	-0.191	0.231
					(0.245)	(0.323)	(0.132)	(0.137)
Spouse's Education	0.502***	0.638***	0.463***	0.468***	0.489***	0.621***	0.367	0.364
	(0.024)	(0.028)	(0.017)	(0.018)	(0.024)	(0.028)	0.016	0.019
R squared	1551	1205	4640	3552	0.382	0.386	0.468	3552
N	0.374	0.373	0.362	0.344	1551	1250	4640	0.426

Note: I use spouse's education as instrument. Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotesp<0.1. The dependent variable is log hourly wage. Ten Province dummies are also included in the model, but the estimates are not reported in the table. The reference group is the individuals who are in Gansu Province and work as servants.

Table 11 Instrument Variable Model:
Less than high school and at least high school education level groups

	(1)	(2)	(3)	(4)
	Less than High School		At least High school	
	Male	Female	Male	Female
VARIABLES				
Schooling	0.092***	0.081***	0.127***	0.110***
	(0.017)	(0.015)	(0.020)	(0.021)
Experience	0.019***	0.012**	0.018***	0.018***
	(0.005)	(0.005)	(0.006)	(0.006)
Experience squared	-0.000*	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Nonmigrant	-0.054	0.000	0.013	0.109
	(0.047)	(0.043)	(0.062)	(0.067)
Party Member	0.015	0.001	0.013	-0.035
	(0.031)	(0.044)	(0.028)	(0.031)
Manager	0.070**	0.085***	0.003	0.022
	(0.033)	(0.029)	(0.064)	(0.083)
Director	0.482***	0.555***	0.187***	0.313***
	(0.063)	(0.112)	(0.059)	(0.063)
Professionals	0.307***	0.400***	0.170***	0.329***
	(0.049)	(0.065)	(0.059)	(0.049)
Staff	0.324***	0.288***	0.140**	0.221***
	(0.046)	(0.045)	(0.054)	(0.044)
Skilled worker	0.301***	0.214***	0.211***	0.177***
	(0.037)	(0.040)	(0.054)	(0.052)
Constant	-0.080	-0.145	-0.755***	-0.708***
	(0.133)	(0.106)	(0.252)	(0.268)
Observations	3,185	2,533	3,006	2,224
R-squared	0.199	0.268	0.163	0.201

Note: Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotesp<0.1. The dependent variable is log hourly wage. Ten Province dummies are also included in the model, but the estimates are not reported in the table. The reference group is the individuals who are in Gansu Province and work as servants.

Table 11.B First Stage Regression of Instrumental Variables: Less than high school and at least high school (Extension of Table 11)

	Less than high school		High school or higher	
VARIABLES	Male	Female	Male	Female
Experience	0.015	0.064***	-0.073***	-0.05***
	(0.015)	(0.02)	(0.015)	(0.016)
Experience squared	-0.001	-0.001***	0.001***	0.000***
	(0.000)	(0.001)	(0.000)	(0.000)
Non-migrant	0.281*	0.691***	0.804***	0.662***
	(0.132)	(0.153)	(0.14)	(0.145)
Party Member	0.297***	0.217	0.567***	0.528***
	(0.09)	(0.14)	(0.071)	(0.08)
Manager	-0.019	0.041	-0.039	-0.075
	(0.092)	(0.115)	(0.137)	(0.147)
Director	0.336*	0.443	0.981***	0.901***
	(0.176)	(0.412)	(0.135)	(0.152)
Professional	0.366**	0.623***	1.217***	0.861***
	(0.145)	(0.136)	(0.125)	(0.098)
Staff	0.383***	0.5***	0.457***	0.526***
	(0.139)	(0.124)	(0.129)	(0.096)
Worker	0.139**	0.293*	-0.405***	0.026
	(0.099)	(0.126)	(0.125)	(0.117)
Spouse’s Education	0.26***	0.274***	0.200***	0.219***
	(0.018)	(0.022)	(0.014)	(0.016)
Constant	5.691***	4.239***	10.407***	9.705***
	(0.185)	(0.247)	(0.205)	(0.24)
Observation	3185	2533	3006	2224
R square	0.22	0.27	0.25	0.25

Note: Robust standard errors are in parentheses ***denotes p<0.01, ** denotes p<0.05, and *denotes p<0.1. The dependent variable is log hourly wage. Ten Province dummies are also included in the model, but the estimates are not reported in the table. The reference group includes individuals who are in Gansu Province and work as servants.