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Economic Returns to Schooling for China's Korean Minority

Vinod Mishra and Russell Smyth[1]

Abstract

This paper examines economic returns to schooling for China's Korean minority in the urban labour market using ordinary least squares (OLS) and two-stage least squares. The OLS estimates of the returns to schooling are similar to findings from recent studies for the Chinese urban labour market. We use father's education, mother's education and spouse's education to instrument for education. The two-stage least squares estimates are considerably higher than the OLS estimates for returns to schooling and slightly higher than existing two-stage least squares estimates of the returns to schooling for the Chinese urban labour market. The two stage least squares estimates of the returns to schooling for the Korean minority living in urban areas are high compared with the Asian average and world average. The economic returns to schooling reported in this study assists to explain why private demand for education among the Korean minority in China is strong and provides a justification for the Korean minority's focus on educational attainment.

[1] The data used in this study was collected as part of a joint project between Dalian Nationalities University, China and Monash University, Australia. We thank Ru Feng, Gang Song and Juyong Zhang for assistance with collecting the data and Wenshu Gao for locating some of the statistics cited in the paper.

1. Introduction

There is a large literature on economic returns to schooling in China. Estimates of the returns to schooling are important because of their effect on wages, income distribution and incentives to invest in human capital. The literature suggests that the returns to schooling in China have increased over time. There is, however, little research on economic returns to schooling among China's ethnic minorities (*minzu*), in spite of the fact that China's ethnic minorities constituted 104 million people, representing 8.4 per cent of the Chinese population, in 2000. Most studies examining the economic returns to schooling in China that have even considered ethnic minorities at all, have just included a dummy variable for ethnic minorities in the earnings function. These studies typically find that either ethnic minorities receive lower wages than Han Chinese (see eg. Johnson & Chow, 1997; Li, 2003) or that there is no statistically significant difference in earnings (Appleton *et al.*, 2005; Yang, 2005). Gustafsson & Li (2003) is one study that estimates an earnings function for China's minorities as a whole using China Household Income Project (CHIP) data from 1988 and 1995. These authors find a weak relationship between human capital and wages.

The economic returns to schooling among China's ethnic minorities is of interest for several reasons. The Chinese government has an explicit goal of promoting equal opportunity for all its citizens. It seeks to realize this objective through pursuit of affirmative action. Affirmative action policies include accepting considerably lower marks from minorities for college and university admission in a bid to improve the enrolment of minorities. The ethnic difference is usually between 10 and 30 points (or more), which makes a big difference, since a one-point difference in a competitive college entrance examination rules out a large number of students (Zang, 2008). Some universities have quotas for ethnic minorities. For example, the Central University for Nationalities in Beijing allocates places to ensure every ethnic minority is

represented each year, meaning that minimum entrance scores are often further lowered to ensure that the least represented ethnic groups are admitted (Hasmath, 2009).

However, despite the official rhetoric on affirmative action for ethnic minorities, it is uncertain how minority workers have fared in the reform area (Zang, 2008). Several authors have argued that China's market reforms have disadvantaged ethnic minorities, especially with regard to employment (see eg. Becquelin, 2000; Yee, 2003; Zang, 2008). Becquelin (2000) found that when state-owned firms downsized, workers from ethnic minorities were the first to lose their jobs. Yee (2003) and Zang (2008) found that ethnic minorities are marginalised in the Chinese labour market and have more difficulty finding jobs than Han Chinese. With certain exceptions, ethnic minorities have trailed the Han Chinese in terms of occupational and social attainment (Hannum & Xie, 1998). As a consequence, in the post-reform period, sizeable differences in income disparities (Gustafsson & Li, 2003), incidence of poverty (Gustafsson & Sai, 2009a) and living standards more generally (Gustafsson & Sai, 2009b) have emerged between ethnic minorities and the Han Chinese.

Differences in occupational attainment have been linked to variations in returns to schooling. The market reforms have increased the importance of human capital due to greater emphasis on performance. Thus, educational attainment has become an important determinant in labour market placement, which has increased the probability of the Han majority attaining jobs at the expense of ethnic minorities, due to ethnic variation in schooling. For example, Hannum and Xie (1998) found an enlarged ethnic difference in occupational attainment in Xinjiang during 1982 to 1990, which they attribute to a widened educational gap between Han Chinese and ethnic minorities over this period. Despite the government's affirmative action policies,

ethnic minorities generally have lower literacy levels and higher drop-out rates than children from the Han majority (Maslak *et al.,* 2010; UNICEF, 2009; UNESCO, 2009).

This said, returns to schooling can be expected to vary across ethnic minorities. Ethnic groups residing in the more developed North and Northeast regions of China typically have higher education achievement and perform better on a range of socioeconomic indicators than ethnic groups residing in the western interior region. Based on a survey administered in 1992, Hannum (2002) found that the Bai, Koreans, Manchus and Mongols had enrolment rates for both boys and girls that were close to, or exceeded, those of Han children. Koreans, in particular, have been portrayed as a model minority with a higher level of cultural, educational and social accomplishments than other minority groups (Gao, 2010). Korean Chinese place an especially high emphasis on education. Educational attainment of ethnic Koreans in China outstrips other minorities and the Han Chinese. The Korean minority has the highest level of college attendance and lowest illiteracy rate (Gao, 2009a).

This paper contributes to the literature on economic returns to schooling in China in the following ways. We provide the first estimates of the returns to schooling for China's ethnic Korean population, which is one of China's most successful ethnic minorities. Most existing studies for China have used ordinary least squares (OLS) to estimate the earnings function. The problem with using OLS is that education is endogenous. Relatively few studies of the returns to schooling in China have used instrumental variables to address the endogeneity of education (see Heckman & Li, 2004; Li & Luo, 2004; Fleisher *et al.*, 2005; Zhang *et al.*, 2007; Chen & Hamori, 2009). We instrument for own education using mother's education, father's education and spouse's education. We find returns to schooling that are higher than previous studies for China. The OLS estimates for the full sample suggest a rate of return of

10-11 per cent for each additional year of schooling, while the instrumental variable estimates suggest a rate of return in excess of 20 per cent for each additional year of schooling.

2. China's Ethnic Koreans

Of the 55 minority nationalities recognized by the Chinese central government, ethnic Koreans rank the tenth highest in terms of population size (Kim, 2010). There are approximately two million ethnic Koreans living in China. Of these, 98 per cent have settled in the three Northeast provinces (Liaoning, Jilin and Heilongjiang) along the Sino-North Korean border. Within the Northeast, about 60 per cent reside in Jilin with a heavy concentration in Yanji, the capital of the Yanbian Autonomous Prefecture (Kim, 2010). Koreans have lived in the Chinese Northeast in sizeable numbers since the early nineteenth century with the period of biggest inward migration being during the Japanese occupation of Korea between 1910 and 1945 (Lee *et al.*, 2007). Following the establishment of the Communist State in 1949, ethnic Koreans were designated a 'Korean nationality' (*chaoxian zu*) with official minority autonomous status (Gao, 2009a; 2009b). The majority of ethnic Koreans who are living in China's Northeast are now third and fourth generation.

Since the early 1950s, Koreans have been regarded as a model minority in official discourse in China with emphasis placed on their educational achievement (Gao, 2009a). The educational attainment of Koreans is the highest of all ethnic groups. Hannum (2002) found that the enrolment rate for Korean boys (98.5 per cent) and girls (98.7 per cent) aged 7-14 was the highest among the ethnic minorities and outpaced the corresponding percentages for the Han majority, which were 94.2 per cent and 88.9 per cent respectively. Based on the 2000 Chinese census, 15.9 per cent of ethnic Korean males and 12.8 per cent of ethnic Korean females in China had a Bachelor's degree or higher, while the corresponding figures for Han

Chinese were 9.8 per cent and 9.6 per cent respectively (YPCO, 2002). The success of Koreans in China, especially in terms of educational attainment, is attributed to their cultural predispositions, rooted in Confucianism, such as emphasising education and a strong work ethic (Gao, 2009b). The high level of education of ethnic Koreans has been achieved through Chinese and Korean bilingual education, with emphasis on Korean as the medium of instruction (Gao, 2009a). Hence, while almost all Chinese-Koreans speak Korean as their first language, many also speak fluent Mandarin and recognise the importance of speaking Mandarin well for success in the Chinese urban labour market (Gao, 2010).

Prior to the market reforms ethnic, Koreans were concentrated in the agricultural sector, cultivating rice paddies. Because rice was a relatively high value agricultural product, the Koreans enjoyed a relatively high standard of living for rural China. Outside of agriculture, their high level of education was reflected in their job structure. The share of specialist technician and administrative positions among ethnic Korean workers was about twice the national average in 1982 (Yun, 1993). Market reforms created many opportunities in the emerging private sector in the Northeast, particularly in the large cities.

In the post-reform period there has been an influx of ethnic Koreans into the large cities in China's Northeast and an increase in the proportion of self-employed ethnic Koreans working in the urban non-state sector. This reflects the decline in the state-owned sector and emergence of private opportunities in the Northeast. Ethnic Koreans are known for being entrepreneurial (Mackerras, 2005) although they lack the networks that Han Chinese have and, in this sense, are somewhat marginalised in the mainstream urban labour market (Gao, 2009a). However, compared with other minorities, Koreans have high occupational status. Relative to the size of their population, ethnic Koreans are over-represented in the Chinese Communist Party as cadres and in professional occupations such as the judiciary, police force

and management (Kim, 2010). The normalization of diplomatic relations between China and South Korea in 1992 hastened rural-urban migration among ethnic Koreans. Temporary migration of Chinese-Koreans to South Korea has increased since 1992. Few Chinese-Koreans who migrated to South Korea temporarily have returned to farming in China. Most move to big cities in which South Korean firms have set up branches, on returning to China.

3. Existing Studies

A stylized fact is that returns to schooling in the Chinese urban market in the 1980s and 1990s were extremely low. For example, Byron and Manaloto (1990), Johnson and Chow, (1997) and Liu (1998) all reported a rate of return in the range 3-4 per cent. Li (2003) controlled for heterogeneity in working hours and found a higher rate of return of 5.4 per cent. Other studies have found that returns to schooling in the mid-1990s in China were in the range 5-6 per cent (see eg. Bishop & Chiou, 2004). These estimates are low compared with the Asian average of 9.6 per cent and world average of 10.1 per cent (Psacharopoulos, 1994). A second stylised fact is that the rate of return to schooling has increased over time. Zhang *et al.* (2005) found that the rate of return was 10.2 per cent in 2001; Chen and Hamori (2009) found that the rate of return was 7-8 per cent in 2005-2006 and Qian and Smyth (2008) found that the rate of return in 2005 was 12 per cent. A third stylized fact is that those studies that have used an instrumental variables approach have found a higher rate of return than studies which have used OLS. Using data from 1995, Li and Luo (2004) found the rate of return to be 8 per cent using OLS and 15 per cent using instrumental variables. Heckman and Li (2004) estimate the mean return to four-year college attendance in 2000. The OLS estimates are 29 per cent and the instrumental variables estimates are 56 per cent (annualized: 7.25 per cent and 14 per cent). Chen and Hamori (2009) found that the rate of return for married men was 8.02 per cent using OLS, and 12.6 per cent using instrumental variables in 2005-2006.

Studies of the economic aspects of ethnic minorities are limited. Gustafsson & Sai (2009a) examine differences in the incidence of poverty between China's ethnic minorities and the majority Han Chinese. Gustafsson & Li (2003) study income disparities between ethnic minorities and the Han majority. Gustafsson & Sai (2009b) examine differences between ethnic minorities and the majority Han Chinese along a number of dimensions pertaining to economic status. Zang (2008) examines differences in employment rates in state-owned enterprises between Han Chinese and Hui Muslims. Hannum (2002) and Maslak *et al.* (2010) examine educational attainment of ethnic minorities. Hasmath (2007, 2008, 2009) shows that while ethnic minorities in Beijing have achieved greater educational attainment than their Han counterparts, when it comes to occupational outcomes in 'high status' and 'high wage' positions, minorities are still under-represented. The basic picture that emerges from these studies is that along a range of economic indicators, China's ethnic minorities do not perform as well as the Han majority and that market reforms have exacerbated the gap.

Given their emphasis on education and occupational status relative to other ethnic minorities, this observation need not be true for China's Korean minority. There are few studies specifically on ethnic Koreans in China. Some ethnographic research exists around what it means to be a 'model minority' (Gao, 2008, 2009a, 2009b, 2010). Other research has examined the role of intergroup contact between ethnic Koreans and Han Chinese in moderating the relationship between ethnic identity and discrimination (Lee *et al.,* 2007). There are, however, no studies that have studied this population group along economic dimensions, including studies that have estimated the economic returns to schooling.

4. Data

A survey was administered to Koreans living in Dalian, in Liaoning province, and Yanji, in the Yanbian Autonomous Prefecture, both in China's Northeast in 2009-2010. The survey

was administered in the main shopping district of Yanji as well as the shopping district and surrounding streets in Dalian in the geographical area in which a high concentration of Koreans live. Surveys were administered to 995 individuals in total (480 in Dalian and 515 in Yanji). Of these 995 surveys, valid responses on all of the variables needed for this study, including each of the instrumental variables, were received from 783 individuals.

Insert Tables 1 & 2

The characteristics of those respondents from which we received valid responses are reported in Table 1. Overall, 45.2 per cent were male, 57.7 per cent were married. Just over two-third of respondents reported speaking Mandarin ‘very well’ or ‘quite well’. Respondents were asked to report their average monthly earnings, as well as the number of work hours in an average day and the average number of days they worked in a week. The hourly wage rate was calculated from the monthly wage and hours worked. The natural log of the hourly wage rate for the sample was 2.5. Just under one quarter of respondents worked in the state-owned sector and just over one-fifth worked in foreign companies, most of which are Korean-owned firms. Over a quarter of respondents were self-employed. A common approach in the literature is to exclude self-employed from the sample. In the main set of results below we include the self-employed, given that a large number of Koreans in China are self-employed. Arabsheibani and Mussurov (2007) adopt a similar approach in their study of the returns to schooling in Kazakhstan, where the level of self-employment is also high. However, in robust checks we exclude the self-employed from the sample and the returns to schooling are similar. About one-third of respondents had completed senior middle school or a polytechnic degree and just under 60 per cent of participants had completed a Bachelor’s degree or above. Based on the convention in previous studies, education levels were converted to years of schooling as follows: Bachelor’s degree or above (15 years), senior secondary or polytechnic

(12 years), junior secondary (nine years) and primary (six years). Potential work experience is approximated by subtracting years of schooling plus six from age.

With the exception of education, the sample is representative of ethnic Koreans living in urban areas in China. Based on the Chinese census in 2000, 46 per cent of Koreans living in cities were male (YPCO, 2002). In 2008, 48.8 per cent of people living in Yanji, where a high proportion of the population is Korean, were male (SSB, 2009). In the 2000 census, approximately 30 per cent of Koreans reported being self-employed, 28 per cent worked in state-owned enterprises and 25 per cent worked in foreign-owned firms (YPCO, 2002). The average monthly income of respondents was 1750 RMB. The average monthly income of residents in Yanji in 2008 was 1924 RMB (SSB, 2009). Koreans in China are well-educated, relative to other ethnicities. Based on the 2000 Chinese census 43.3 per cent of males (43.2 per cent of females) had completed junior middle school; 24.7 per cent of males (23.2 per cent of females) had completed senior middle school or a polytechnic; and 15.9 per cent of males (12.8 per cent of females) had completed a Bachelor's degree or above (YPCO, 2002). These figures suggest that the education level of respondents in this sample is skewed to the right. Oversampling of better-educated individuals reflects the fact that the survey was administered in a public setting. Holbrook *et al.* (2003) found that respondents with a lower education level are generally reluctant to respond to surveys, particularly when asked to participate in a public setting, as they believe they may have more to lose. Studies comparing respondent education levels in various sorts of surveys have found fewer low-education respondents in telephone samples than in face-to-face samples (see eg. Groves, 1977).

However, the education distribution is not as skewed as it would seem at first blush. The above figures are for the Korean population in China as a whole. One would expect ethnic

Koreans living in urban areas to be younger and better educated than ethnic Koreans as a whole. The Chinese education system has been standardized since 1978. The economic reform began in the countryside in the late 1970s and industrial reforms did not spread to urban enterprises until the late 1980s. Since the late 1980s, large numbers of young Koreans have migrated to the cities in search of better education and job opportunities. Table 2 presents data on the age distribution of the sample. All of the respondents were aged between 16 (the minimum working age) and 55 for women or 60 for men (the state retirement age). The average age of respondents was 33.4. By way of comparison, the average age of Koreans living in cities was 34.8 in 2000 (YPCO, 2002). More than half of the respondents in this study were aged between 21 and 30 and almost 80 percent were less than 40 years of age.

5. Empirical Specification

We employ a Mincer earnings function in which the log of hourly wage earnings (measured in RMB) is regressed on years of schooling, post-school experience, post-school experience squared and a series of control variables. The specific control variables that we employ are gender, marital status, proficiency in Mandarin and ownership, sector and city dummy variables. Based on human capital theory, wages are determined by investment in human capital. Schooling and on-the-job training are major types of investment. Thus, we expect a positive relationship between years of schooling and wages. Post-school experience is a proxy for job-training investment. We expect the wage-experience profile to follow a parabolic shape in experience. Wages will initially increase, reach their peak when human capital is at a maximum and fall as human capital depreciation dominates accumulation.

Of the control variables we expect that individuals with better command of Mandarin will earn higher wages. We expect that males will earn more than females, given widespread evidence of gender discrimination in earnings in Chinese urban labour markets (Qian &

Smyth, 2008). The expected sign on marital status is *ex ante* unclear. Individuals who are married might, in a time allocation sense, have less time available for work tasks because of family commitments. However, marriage can also generate efficiencies through specialisation and the division of labour where tasks are divided between spouses, freeing up time (Baker & Jacobsen, 2007). There are also several studies showing that individuals who are married tend to be healthier (see eg. Gerdtham & Johanneson, 2004; Frijters *et al.*, 2005). Thus, married individuals might have better health and more energy and, as such, have higher productivity.

A problem with the OLS estimates of the earnings function is the omission of an individual's ability which may bias the OLS estimates of returns to schooling. The OLS estimator has two ability biases relative to the average marginal return to education: one attributable to the correlation between schooling and the intercept of the earnings function, the other attributable to the correlation between schooling and the slope of the earnings function (see Card, 1999 for a comprehensive review). OLS may overestimate returns to schooling due to positive correlation between schooling and ability. OLS estimates may underestimate rates of returns to education due to heterogeneity among individuals in returns to schooling.

Instrumental variables estimation methods should correct this bias. Thus, in addition to OLS, we also present two-stage least squares estimates in which we instrument for education. The practical difficulty with instrumental variables estimation is finding an instrument, or set of instruments, that are significantly correlated with education, but also orthogonal to the residuals of the main equation (in our case, wages during adulthood). We use three instruments for education; namely, spouse's education, father's education and mother's education. Spouse's education is correlated with schooling, but not with the wage rate due to the assortative nature of marriage: married couples share common interests and behavioural

traits, and they usually share a common level of schooling (Pencavel, 1998). Spouse's education has been used as an instrument for education in several previous studies including studies of the returns to schooling in China (Chen & Hamori, 2009) and other transition economies (Arabsheibani & Mussurov, 2007). Parents' education is a commonly used instrumental variable for education, which assumes that parents' education levels are not correlated with their children's inherent abilities, but are nonetheless influential on their children's educational achievements. It has been used as an instrument for education in several previous studies including studies for China (Heckman & Li, 2004; Li & Luo, 2004).

6. Results

Table 3 presents the OLS estimates of returns to schooling for the full sample. Findings from existing studies on returns to schooling in China suggest that factors such as the sector in which one works and the ownership of the firm play a significant role in the earnings function. However, one should be careful in deciding whether to include these variables in the earnings functions. For example, Schultz (1988) makes the point that wage and occupation are likely to be jointly determined because some portion of educational returns is attributable to occupational choice. Psacharopoulos and Patrinos (2002) also point out that including occupation in the regression model reduces part of the effect of education on earnings that comes from occupational mobility. Hence, in Table 3, we report results with and without employment and sector dummy variables. The findings are fairly robust to different combinations of employment and sector dummy variables. For the full sample, the returns to an additional year of schooling are in the range 10-11 per cent. This is higher than the estimates from previous studies applying OLS to 1990s data, but is midpoint between Chen and Hamori's (2009) and Qian and Smyth's (2008) OLS estimates for the urban labour market as a whole in 2005-2006, which were 7-8 per cent and 12 per cent respectively.

Insert Table 3

Table 3 also presents OLS estimates for men and women separately. The returns to an additional year of schooling for women are slightly higher than the returns to an additional year of schooling for men. Using CHIP data for 1988 and 1995, Gustafsson and Li (2001) and Li (2003) found a similar result for China as did Zhang *et al.,* (2005) using Chinese data over the period 1988 to 2001. This result is consistent with the argument made in previous studies that returns to education are generally higher for women in developing countries as a result of the scarcity of well-educated women (Psacharopoulos, 1994). Deolalikar (1993) argues that in developing countries, men have a comparative advantage in physical strength, so that schooling becomes more important to women who focus more on skill intensive jobs. Another possible explanation for the higher returns to female education is greater positive selection of women into the labour force relative to men, whose participation is near universal. Chen and Hamori (2009) and Zhang *et al.* (2005) test this hypothesis directly using Heckman selection-correction models of earnings and find some evidence of positive selection of better-educated women into the labor force, beginning with widespread state-owned enterprise restructuring in 1997. We, though, do not have data on women who are not in the labour force and, as such, cannot test this hypothesis directly in this study.

As predicted by human capital theory, the earnings-experience profile follows a parabolic shape. For the full sample, the earnings peak occurs at 23-24 years. For men, the earnings peak occurs at 25 years and for women the earnings peak occurs at 22 years. Thus, if an individual starts working at age 22, male earnings peak at age 47 and female wages peak at age 44. The estimated peak is similar to that found in previous studies for China where the peak is typically in the mid-to-late 40s. For example, Li (2003) found that male wages peak at

age 48 and female wages peak at age 43. Of the remaining variables, we find that earnings are higher in Dalian than Yanji, but the other controls are statistically insignificant.

Insert Table 4

The results for the two-stage least squares regression for the full sample, in which father's education, mother's education and spouse's education are treated as instruments for education, are reported in Table 4. Tests for whether education is endogenous and the validity of the instruments are considered at the bottom of Table 4. The Wu-Hausman F-test and Durbin-Wu-Hausman chi-square test confirm that education is endogenous and that the OLS estimates are biased. The first component of instrumental variable validity is relevance. We report the partial R-squared, which is the R-squared of the first-stage regression with the included instruments 'partialled out', the first stage F-statistic and the Anderson canon. corr. LM test. All three tests indicate that the instrumental variables are relevant. A simple rule of thumb is that the first stage F-statistic should exceed 10 (Staiger & Stock, 1997). The first stage F-statistic in Table 4 is 35 or above. The Anderson canon. corr. LM test is an under identification LM test of whether the excluded instruments are 'relevant', meaning correlated with the endogenous regressor. Rejection of the null hypothesis indicates that the model is identified. The second component of instrumental variable validity is that the instruments are exogenous. Since the number of exogenous instruments exceeds the number of endogenous variables, we compute the Basmann chi-square and Sargan chi-square statistics to test instrument exogeneity. The results of both tests, which are reported in Table 4, suggest that the instruments are exogenous. Overall, we conclude that each of the instruments satisfy the relevance and exogeneity conditions and, as such, are valid instruments.

The two-stage least squares estimates for the returns to schooling are considerably larger than the OLS estimates. This finding is consistent with attenuation bias, caused by error in measuring schooling, dominating omitted variable bias. For each specification denoting the inclusion of different combinations of employment and sector dummy variables, the two-stage least squares estimates are about double the OLS returns. Chen and Hamori (2009) – for married women - and Li and Luo (2004) - for their sample as a whole - found that the two-stage least squares estimates were about double the OLS estimates. The magnitude of the increase is also similar to some studies for countries other than China (see Ashenfelter & Krueger, 1994; Ashenfelter & Zimmerman, 1997; Butcher & Case, 1994). The two-stage least squares estimates of the returns to schooling, are in the range 21-23 per cent. This is higher than existing two-stage least squares estimates of the returns to schooling for the Chinese urban population as a whole, such as Li and Luo's (2004) estimate of 15 per cent.

Insert Table 5

Table 5 presents the results for the two-stage least squares regression for men and women separately. Tests for endogeneity of education and instrument validity, reported at the bottom of Table 5, suggest that education is endogenous and the instruments are valid. The returns to an additional year of schooling for women (24.1 per cent) are higher than the returns to an additional year of schooling for men (16.4 per cent). The result for women compares with Li and Luo's (2004) two-stage least squares estimates of 17.7 per cent for women using 1995 CHIP data, where parents' education was used as the instrument. Consistent with the OLS results, and much of the existing literature for developing countries, the returns to schooling are higher for women than men. With the two-stage least squares estimates, the differences are more pronounced than with the OLS results. The other variables are similar to Table 4.

Insert Tables 6 & 7

The results in Tables 3-5 include the self-employed in the sample. The rationale is that many Koreans in China's Northeast are self-employed as they seek to take advantage of opportunities in the informal non-state sector that have arisen with the decline of the state sector. However, it might be argued that inclusion of the self-employed potentially biases the results. In Tables 6 and 7, we present OLS and two-stage least squares estimates excluding the self-employed. The OLS estimates suggest that the return to schooling is 9-10 per cent and the two-stage least squares estimates suggest the return to schooling is 18-20 per cent, depending on the specification. These findings are similar to those reported in Tables 3 and 4, indicating that the inclusion of the self-employed in the full sample is not biasing the results.

Insert Table 8

Table 8 presents OLS results in which dummy variables for discrete levels of education are used to compare returns between levels of schooling. This captures the marginal return to completing each additional level of schooling and allows for potential non-linearities in the returns to schooling. The education attainment in the data consists of four categories: Bachelor degree and above, senior middle school/polytechnic, junior middle school and primary school. With the universalisation of compulsory education, the majority of urban residents have completed at least primary school. In the data, less than 1 per cent of people have obtained only primary (or less than primary) education. Hence, four dummy variables for education levels are used in the regressions, with primary education and below combined into one category. In each of the specifications in Table 8, primary school and below is

omitted so that the difference in the estimates between two successive levels of education gives the rate of return to the higher level of the two education categories.

For the whole sample, junior middle school graduates earned 13.6 per cent more than primary school graduates, but the coefficient is not significant. A senior middle school or polytechnic education provides the highest rate of return. Possessing a senior middle school, or polytechnic education, would earn 40.7 per cent more than just completing junior middle school. Finally, possessing a university degree would earn 31 per cent more than just completing senior middle school or having a polytechnic education. The returns to a university degree found here are similar to those reported by Zhang *et al.* (2005) and Qian and Smyth (2008) for the urban labour market as a whole, but the returns to senior middle school and polytechnic education are much higher. For men, the estimated rates of return are 27.7 per cent for junior middle school, 50.7 per cent for senior middle school or polytechnic and 24 per cent for a university degree. For women, the estimated rates of return are 12.1 per cent for junior middle school, 29.6 per cent for senior middle school or polytechnic and 34 per cent for a university degree. The higher return to a university degree for women is consistent with the relative scarcity of university educated women in the Chinese urban labour market. As Li (2003) argues, for urban China as a whole, fewer women achieve high levels of education, which reduces the relative supply of highly skilled women.

7. Discussion of Results

Overall, the findings for the returns to schooling in this study are higher than those found in previous studies for China. There are at least three factors which help explain this result. One factor is that most previous studies for China rely on monthly or annual earnings, instead of hourly wage rates, in estimating the returns to schooling. These earnings depend on individual hours worked and, where working hours are not available, omitted variable bias

results. Li and Zax (2000) found that the most educated in China tend to work the fewest hours on average; for example, graduates from lower middle school work about three more hours per week than those with a university degree. Thus, the omitted working-hour variable is negatively correlated with the level of education and estimates that rely on monthly or annual earnings will be underestimated. Moreover, although earnings in the private sector are generally higher than the state-owned sector, workers in the private sector work about 30 per cent more (Li, 2003). Hence, reliance on monthly or annual earnings will also overestimate sectoral differences in returns to schooling. Li (2003) found that when one uses the log of hourly wages as the dependent variable, estimates of the returns to schooling are higher.

Another factor is that we use data collected in 2009 and 2010. Most previous studies use data from the 1980s or 1990s or early 2000s. In the early reform period, the wages of educated workers were well below their marginal product because of the monopsony power of state employers (Fleisher & Wang, 2004). The returns to schooling have increased dramatically over time with the deepening of economic returns. Li (2003) suggests three reasons which help to explain the upward trend in the returns to education in urban China over time. The first is the much tighter connection between accomplishment and reward in the economic reform era that has accompanied more flexible wage setting. The second is the vintage effect of education, which refers to the notion that increased returns may in part reflect the higher quality of education in the latter years of economic reform. The third is the cost effect of education, which postulates that higher returns to schooling may partly result from increasing education costs. Costs for education, including both the direct costs and the indirect forgone earnings associated with schooling, have been rising rapidly in China.

A third factor that explains the results is that we have a young, well-educated, sample from a population that emphasises education. Previous studies for China observe that young people have higher rates of return to education, suggesting they have benefited from the spread of market forces (Maurer-Fazio, 1999; Li & Luo, 2004; Qian & Smyth, 2008). Almost 80 per cent of respondents in this study were aged 40 or less in 2010. Qian and Smyth (2008) found OLS estimates of returns to schooling of 17 per cent for people under 35 in the Chinese urban labour market in 2005. People aged 35 and below in 2005 (or 40 and below in 2010) were born in 1970 (or afterward), went to school around 1977 (or afterward), and started working around 1990 (or afterward). Hence, this group of people represent those who have received standardized public education and earned wages offered by more mature labour markets with more flexibility and less administrative control in the work place. In other words, analysis of returns to schooling for people within this age group may capture the effects of both the education reform and the marketization reform on the private returns to education. Koreans in this age group have also benefitted most from the investment and trade opportunities that have accompanied China's normalisation of diplomatic relations with South Korea in 1992.

At a broader level, these results suggest that at least one minority group is performing well. In this respect, the study differs from extant studies that have found minorities are economically disadvantaged relative to the Han majority and that market reforms have increased the gap. There are, however, provisos. One proviso is that the Koreans are a 'model minority' and have the highest education attainment and occupation status of any of the ethnic minorities. In this sense, they are not typical of ethnic minorities as a whole and certainly not typical of ethnic minorities living in the western interior region. A second proviso is that we focus on urban Koreans, who are a young, dynamic, subset of the Korean population in China. We say nothing about the Koreans living in rural areas, whose education levels and earnings can be

expected to be lower. Indeed, as documented by Kim (2010), the flight of young Koreans to the cities has, in many instances, decimated traditional Korean villages in the Yanbian Autonomous Prefecture and undermined the Korean minority's strong sense of ethnic identity. The third proviso is that there is a growing school of thought which emphasises the downside of the Korean minority's emphasis on educational attainment. Academic achievement among ethnic Koreans in China has come at a psychological and social cost and there is a widening educational achievement gap as Korean minority students are encouraged to live up to high, and sometimes unrealistic, expectations (Gao, 2008, 2010).

8. Conclusion

In this study we have estimated the economic returns to schooling for a sample of urbanites from the Korean minority living in two large cities in China's Northeast. Our OLS estimates of the returns to schooling are similar to findings from recent previous studies of the Chinese labour market as a whole. Because education is an endogenous variable, we have used father's education, mother's education and spouse's education to instrument for education. These variables are found to be valid instruments for education. Our two-stage least squares estimates are considerably higher than the OLS estimates for returns to schooling and slightly higher than existing two-stage least squares estimates of the returns to schooling for the urban labour market as a whole. Our two stage least squares estimates of the returns to schooling for the Korean minority living in urban areas are high compared with the Asian average and world average. Kim (2010) has emphasised that many young Koreans living in rural areas of Yanbian Autonomous Prefecture are desperate to get to the cities in search of better educational opportunities for their children. The economic returns to schooling reported in this study help to explain why the private demand for education among the Korean minority is so strong and provides a justification for the Korean focus on educational attainment.

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Table 1: Descriptive statistics

Variable	Full Sample	Males	Females
Log Wage	2.46	2.50	2.42
Education (Years of schooling)	13.67	13.74	13.62
Education (By attainment %)			
Primary or less	0.77	0.85	0.70
Junior Middle	3.96	4.24	3.73
Senior Middle or Polytechnic	33.84	30.79	36.36
Bachelor or above	61.43	64.12	59.21
Age (years)	33.42	34.02	32.92
Experience (years)	13.74	14.27	13.30
Male (%)	45.21	-	-
Married (%)	57.73	57.34	58.04
Mandarin Proficiency (%)			
Very Well	31.93	30.79	32.87
Quite Well	37.68	39.83	35.90
Average	23.12	21.47	24.48
Quite Poor	4.47	4.52	4.43
Not at all	2.81	3.39	2.33
Sector (%)			
Construction	3.32	5.08	1.86
Manufacturing	13.03	18.93	8.16
Services	69.86	64.41	74.36
Street Vendor	13.79	11.58	15.62
Employment			
State-Owned	24.78	24.86	24.71
Collective-Owned	12.13	12.71	11.66
Foreign-Owned	22.22	21.47	22.84
Private	13.03	13.28	12.82
Self-Employed	27.84	27.68	27.97
City (% living in Dalian)	51.98	50.85	52.91
No. of Observations	783	354	429

Table 2: Age distribution of the sample

Age group	Full Sample (%)	Males (%)	Females (%)
Less than 20 years	0.64	0.56	0.70
21-30 years	52.11	49.15	54.55
31-40 years	25.54	28.25	23.31
41-50 years	16.35	16.38	16.32
Above 50 years	5.36	5.65	5.13
Total	100	100	100

Table 3: Results of OLS regression

Variables	Full Sample	Full Sample	Full Sample	Full Sample	Men	Women
Education	0.108***	0.119***	0.108***	0.118***	0.102***	0.106***
	(10.36)	(11.50)	(10.34)	(11.41)	(7.294)	(6.918)
Experience	0.0618***	0.0631***	0.0622***	0.0636***	0.0657***	0.0643***
	(7.245)	(7.334)	(7.272)	(7.378)	(5.214)	(5.485)
$Experience^2$	-0.00132***	-0.00134***	-0.00133***	-0.00136***	-0.00131***	-0.00147***
	(-6.525)	(-6.571)	(-6.564)	(-6.634)	(-4.516)	(-5.166)
Male	0.0332	0.0283	0.0484	0.0448		
	(0.950)	(0.797)	(1.408)	(1.286)		
Married	0.0631	0.0422	0.0623	0.0408	0.0560	0.0635
	(1.261)	(0.834)	(1.242)	(0.805)	(0.806)	(0.883)
Mandarin Proficiency	0.0115	0.00560	0.0144	0.00817	0.0393	-0.0130
	(0.664)	(0.321)	(0.836)	(0.469)	(1.624)	(-0.532)
City Dummy	0.748***	0.808***	0.769***	0.834***	0.717***	0.800***
(1 for Dalian)	(16.06)	(19.82)	(16.71)	(21.27)	(10.75)	(12.31)
Constant	-0.0128	-0.106	-0.0897	-0.145	-0.0660	0.0928
	(-0.0737)	(-0.606)	(-0.533)	(-0.863)	(-0.273)	(0.368)
Sector Dummies?	YES	YES	NO	NO	YES	YES
Employment Dummies?	YES	NO	YES	NO	YES	YES
Observations	783	783	783	783	354	429
R-squared	0.497	0.478	0.491	0.472	0.527	0.496

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 4: Results of two-stage least squares regression for full sample

Variables	Full Sample	Full Sample	Full Sample	Full Sample
Education	0.214***	0.230***	0.215***	0.229***
	(6.717)	(7.776)	(6.786)	(7.762)
Experience	0.0756***	0.0778***	0.0761***	0.0782***
	(7.711)	(7.897)	(7.736)	(7.924)
Experience^2	-0.00144***	-0.00146***	-0.00145***	-0.00148***
	(-6.651)	(-6.668)	(-6.666)	(-6.714)
Male	0.00324	-0.00297	0.0213	0.0176
	(0.0856)	(-0.0771)	(0.573)	(0.467)
Married	-0.0245	-0.0478	-0.0257	-0.0480
	(-0.421)	(-0.821)	(-0.440)	(-0.825)
Mandarin Proficiency	0.0160	0.0137	0.0185	0.0158
	(0.878)	(0.732)	(1.009)	(0.847)
City Dummy	0.713***	0.764***	0.736***	0.796***
(1 for Dalian)	(14.21)	(17.09)	(14.84)	(18.58)
Constant	-1.543***	-1.732***	-1.624***	-1.756***
	(-3.292)	(-3.909)	(-3.526)	(-4.022)
Sector Dummies?	YES	YES	NO	NO
Employment Dummies?	YES	NO	YES	NO
Observations	783	783	783	783
R-squared	0.429	0.400	0.421	0.395
Diagnostic tests for IV estimation				
Tests of endogeneity of education				
Wu-Hausman F test	14.259***	18.951***	14.881***	19.003***
Durbin-Wu-Hausman chi-sq test	14.290***	18.784***	14.885***	18.764***
Tests of the relevance of the instruments				
Partial R-Squared	0.119	0.139	0.121	0.140
Anderson canon. corr.	93.13***	108.64***	94.80***	109.81***
LM test				
Tests of exogeneity of the instruments				
Sargan chi2 test	0.554	0.335	0.915	0.613
Basmann chi2 test	0.542	0.329	0.899	0.606

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 5: Results of two-stage least squares regression for males and females

Variables	Men	Women
Education	0.164***	0.241***
	(4.622)	(5.140)
Experience	0.0743***	0.0799***
	(5.511)	(5.895)
Experience^2	-0.00140***	-0.00157***
	(-4.715)	(-5.102)
Male		
Married	-0.0101	-0.0145
	(-0.129)	(-0.179)
Mandarin Proficiency	0.0384	-0.00128
	(1.577)	(-0.0483)
City Dummy	0.696***	0.753***
(1 for Dalian)	(10.22)	(10.55)
Constant	-0.961*	-1.882***
	(-1.809)	(-2.706)
Sector Dummies?	YES	YES
Employment Dummies?	YES	YES
Observations	354	429
R-squared	0.500	0.401
Diagnostic tests for IV estimation		
Tests of endogeneity of education		
Wu-Hausman F test	3.679*	11.206***
Durbin-Wu-Hausman chi-sq test	3.801*	11.306***
Tests of the relevance of the instruments		
Partial R-Squared	0.158	0.122
Anderson canon. corr.LM test	56.11***	52.29***
Tests of the exogeneity of the instruments		
Sargan chi2 test	0.823	1.597
Basmann chi2 test	0.788	1.543

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 6: Results of OLS regression (excluding self-employed)

Variables	Full Sample	Full Sample	Full Sample	Full Sample
Education	0.0926***	0.104***	0.0905***	0.102***
	(7.721)	(8.701)	(7.524)	(8.499)
Experience	0.0621***	0.0649***	0.0617***	0.0649***
	(6.589)	(6.813)	(6.514)	(6.791)
$Experience^2$	-0.00138***	-0.00145***	-0.00137***	-0.00145***
	(-6.082)	(-6.301)	(-6.033)	(-6.301)
Male	-0.00964	-0.0121	0.0124	0.00796
	(-0.257)	(-0.317)	(0.335)	(0.212)
Married	0.0756	0.0613	0.0738	0.0587
	(1.451)	(1.155)	(1.410)	(1.103)
Mandarin Proficiency	0.0205	0.0170	0.0214	0.0184
	(1.062)	(0.864)	(1.102)	(0.928)
City Dummy	0.742***	0.778***	0.768***	0.808***
(1 for Dalian)	(14.72)	(17.24)	(15.44)	(18.46)
Constant	0.223	0.0881	0.273	0.117
	(1.122)	(0.455)	(1.373)	(0.603)
Sector Dummies?	YES	YES	NO	NO
Employment Dummies?	YES	NO	YES	NO
Observations	526	526	526	526
R-squared	0.526	0.502	0.519	0.495

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 7: Results of two-stage least squares regression (excluding self-employed)

Variables	Full Sample	Full Sample	Full Sample	Full Sample
Education	0.185***	0.203***	0.182***	0.199***
	(6.166)	(7.143)	(6.055)	(7.023)
Experience	0.0764***	0.0799***	0.0757***	0.0797***
	(7.141)	(7.429)	(7.055)	(7.391)
$Experience^2$	-0.00158***	-0.00165***	-0.00157***	-0.00165***
	(-6.467)	(-6.656)	(-6.404)	(-6.644)
Male	-0.0354	-0.0396	-0.00891	-0.0136
	(-0.887)	(-0.967)	(-0.229)	(-0.340)
Married	0.0184	-0.000893	0.0177	-0.00187
	(0.323)	(-0.0153)	(0.310)	(-0.0321)
Mandarin Proficiency	0.0249	0.0242	0.0258	0.0256
	(1.230)	(1.159)	(1.268)	(1.224)
	(1.945)		(1.581)	
City Dummy	0.686***	0.723***	0.717***	0.762***
(1 for Dalian)	(12.44)	(14.57)	(13.28)	(16.00)
Constant	-1.110**	-1.364***	-1.037**	-1.303***
	(-2.499)	(-3.199)	(-2.342)	(-3.070)
Sector Dummies?	YES	YES	NO	NO
Employment Dummies?	YES	NO	YES	NO
Observations	526	526	526	526
R-squared	0.471	0.436	0.465	0.432
Diagnostic tests for IV estimation				
Tests of endogeneity of education				
Wu-Hausman F test	12.835***	17.242***	12.488***	16.649
Durbin-Wu-Hausman chi-sq test	12.863***	17.039***	12.476***	16.410
Tests of the relevance of the instruments				
Partial R-Squared	0.173	0.197	0.174	0.199
Anderson canon. corr. LM test	91.13***	103.72***	91.80***	104.95
Tests of the exogeneity of the instruments				
Sargan chi2 test	1.772	1.667	2.127	1.995
Basmann chi2 test	1.727	1.634	2.083	1.965

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 8: Results of OLS regression with education attainment dummies

Variables	Full Sample	Men	Women
Junior Middle	0.136	0.277	0.121
	(0.645)	(0.965)	(0.391)
Senior Middle or Polytechnic	0.543***	0.784***	0.417
	(2.742)	(2.919)	(1.415)
Bachelor's or Above	0.853***	1.024***	0.757**
	(4.307)	(3.813)	(2.579)
Experience	0.0616***	0.0664***	0.0660***
	(7.186)	(5.273)	(5.501)
Experience^2	-0.00132***	-0.00134***	-0.00151***
	(-6.486)	(-4.600)	(-5.189)
Male	0.0345		
	(0.981)		
Married	0.0642	0.0498	0.0563
	(1.282)	(0.714)	(0.775)
Mandarin Proficiency	0.0111	0.0398	-0.0135
	(0.640)	(1.645)	(-0.551)
City Dummy	0.752***	0.743***	0.793***
(1 for Dalian)	(15.78)	(10.82)	(11.91)
Constant	0.753***	0.428	0.916***
	(3.491)	(1.395)	(2.944)
Sector Dummies?	YES	YES	YES
Employment Dummies?	YES	YES	YES
Observations	783	354	429
R-squared	0.498	0.532	0.497

Notes: t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1