HEIGHT AND INCOME: EVIDENCE FROM CHINA

by

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A Thesis Submitted to the Faculty of the

DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

2022

THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

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Acknowledgements

This work would not have been possible without the unconditional help and support from my thesis advisors and committee, Dr. George Frisvold, Dr. Tauhidur Rahman, and Dr. Satheesh Aradhyula. I want to thank Dr. Frisvold, from whom I got detailed suggestions and inspiring guidance. It's also my honor to work as a research assistant on his project during my master's. I want to thank Dr. Rahman, who refreshed my understanding of Development Economics. I want to thank Dr. Aradhyula, who gave me a guiding light in applying math skills. I am lucky to learn from various students and faculty at the University of Arizona's Department of Agricultural and Resource Economics. These include Dr. Na Zuo, Dr. Daniel Scheitrum, Dr. Russ Tronstad, Dr. Jeffrey Michler, Dr. Anna Josephson, and Dr. Gary Thompson. As well as Danielle Buhrow, Ashley Kerna Bickel, and Dari Fae Duval. My classmates and dear friends, Ann Furbush, Brennan Bowman, Hannah Hansen, Laura Hernandez, Praneetha Yannam, Lina Benitez, Lorin Rudin-Rush, Jesus Felix, and his lovely family. Thank my parents, grandparents, and brother for your great love.

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Abstract

The height premium has been studied worldwide for years using evidence from countries such as the Netherlands, Denmark, UK, USA, Vietnam, etc. This paper links adult height and schooling to salary using the evidence from China. We use the data from three waves of the Chinese General Social Survey conducted in 2012, 2014, and 2016. Results suggest both significant returns to height and to schooling. We also found evidence of endogeneity in the education and schooling variables. Two stage least squares (2SLS) methods were used to correct for endogeneity bias. The 2SLS methods yielded even larger returns to schooling and to height. The first stage equations explaining height and years of schooling found that greater parental education was generally associated with both greater height and more schooling. Being in rural areas had negative effects on both schooling and height. Cohort effects were not significant in the income equation, while they were important in both schooling and height equations. People born farther back in time and in areas of lower economic development (as measured by regional per capita GDP at childhood) had shorter stature and less education. This suggests that current levels of economic development and parental education can positively influence height and education of children. This in turn can increase future earnings of children in China.

1 Introduction

The relation between adult height and personal earnings has been studied by economists, sociologists and anthropologists for decades using the data from a variety of regions and periods. Many of these have found strong evidence of a height premium. Based on previous studies, this paper aims to evaluate the relationships between height and income using data from China. This study analyzed data from more than 10,000 Chinese observations to assess the relationship between height and income separately for males and females. Control variables include personal, family, and regional attributes.

While much research pays more attention to children's or teenagers' stature, this paper focuses on adult height. The birth years of most observations in the data set is distributed across the late 20th century. This means that respondents' reported present heights are measures of adult height only. The key source of data come from three waves of the Chinese General Social Survey (CGSS), conducted in the years 2012, 2014 and 2016. These data were supplemented with other data sources including the China National Bureau of Statistics (for GDP and gender ratio), national and regional Yearbooks (for GDP), and the World Bank (for CPI).

Previous studies have found evidence that height is related to different measures of career success. Gowin (1917) compared the heights of persons in the religious professions and found that bishops were taller on average than preachers. According to Case and Paxson (2008), a one-inch increase in height is associated with a 1.4 percent to 2.9 percent increase in weekly earnings and a 1.0 percent to 2.3 percent increase in average hourly earnings, based on the sample from the US and the UK. As discussed more below, there is also evidence that greater height is also advantageous in dating and election outcomes.

Human height is codetermined by internal genotype and external environments during growth (Silventoinen 2003; Perkins et al. 2016; Case and Paxson 2008). The latter are often divided into socioeconomic, nutrition, and disease effects. For example, Perkins et al. (2016) divided the determinants of final height into intrauterine conditions, nutritional status and disease environment. During one's growth period, the situation of the individual's family and hometown contribute significantly to his or her socioeconomic environment. Important factors may include income and occupation of the household head, level of economic development where a child is raised, family social status, literacy, and rural vs. urban setting. Some studies considering the influence of nutrition and disease have examined the role of protein consumption and available sanitary information (Batty et al. 2009; Silventoinen 2003; Herzog et al. 2014). These also depend on social and economic status. In this study, we will see how factors such as parent's education, and the family's social class at the age of 14, affect adult height.

Height and the level of economic development in the respondent's home province (measured in terms of real GDP / capita) may be the measure of economic progress or the reflector of wealth distribution (Perkins et al. 2016; Silventoinen 2003). Strauss and Thomas (1998) posted line graphs to show the change in adult height for people born between 1910 and 1970 in countries at different stages of economic development. Their observations were from the United States, Brazil, Cote d'Ivoire, and Vietnam. From the cross-sections, it's suggested that American males born in 1950 were the tallest on average, nearly 177 cm. The Ivorian counterpart was about 170cm. Brazilian males were slightly shorter, and Vietnamese were the shortest, 162 cm, almost 15 cm shorter than Americans. Over time, for all four populations, there is growth between 0.75 cm and 1.5 cm per decade. Ivorian men born in 1950 were around 3 cm taller than their counterparts born in 1930.

Figure 1 shows the change in adult height for Chinese males (rural and urban) born between 1920 and 2000 alongside corresponding information from five European Countries (Denmark, France, Great Britain, Spain, and Sweden) for comparison. Removing the disturbance of the shrinking stature of people born before 1950, we can see the average height of Chinese males didn't increase appreciably until the birth year reached the 1970s. There was an increase of 1.88 cm between the 1950s and 1970s, and 3.62 cm between the 1970s and 1990s. Between rural males and urban males, there is a stable height gap of 2.5 cm to 3.5 cm. By observing the changes in five European countries between the 1850s and 1970s, we can see that 1) the average height of males kept increasing with fluctuations, slightly between 1850s and 1920s, quicker after the 1920s; 2) obvious height gaps exist among even neighboring countries such as France and Spain, with race[1] considered.

While one can see height climbing over time, coincident with economic growth, the rates of growth are uneven. China suffered from external invasion and domestic turmoil for decades before the 1950s, both reflected by the height change. Strauss and Thomas (1998) also used the Vietnamese case to compare the height difference

[1]The race of Europe can be divided into three main systems, the Latin race (France, Spain), the Germanic race (Germany, England, Sweden) and the Slavic race (Russia, Poland). Although these three systems differ in language, appearance, skin color and culture, they shared a common ancestor 4,000 years ago, the Aryans.

before and after the outbreak of the Vietnam War[2]. Between 1925 and 1955, the heights of Vietnamese grew by around 1.7 cm per decade. During the following 25 years of upheaval, their heights remained at standstills of 163 cm for males and 152 cm for females, with little volatility.

2 Background and Literature Review

2.1 Height Premiums

Historical evidence suggests there are a variety of ways favoritism has been shown to taller people. In the 11th century AD, Emperor Renzong of the Song Dynasty[3] paid the soldiers' wages according to their stature. For soldiers higher than 178.18 cm, the monthly payment was 1,000 Wen[4]; for those higher than 175.10 cm, it decreased to 700 Wen; for those higher than 172.03 cm, it fell to 500 Wen; for those under 159.74 cm, no salary. The journalist Xiangjie reported that a restaurant in Beijing set binary payment rules for security guards according to height. Monthly payments were 800 CNY[5] for those taller than 180 cm. Otherwise, payments were 600 CNY. Young and French (1996) used height information of 9 previous US presidents and observed that presidents perceived as "great" were significantly taller than those perceived as "failures". For those perceived as "great", the heights were Lincoln (76 inches), F. Roosevelt (74 inches), Washington (74 inches), and Jefferson (74.5 inches). For those perceived as "failures", the heights in inches were namely A. Jonson (70 inches), Buchanan (72 inches), Nixon (71.5 inches), Grant (68.5 inches), and Harding (72 inches). Similarly, Persico, Postlewaite, and Silverman (2004)'s study listed 13 US presidential elections, among which the taller candidate won 10 times, and suggested that presidents tend to be taller than the average population[6]. They also analyzed the data from Britain's National Child Development Survey (England, Scotland, and Wales) and the 1979 youth cohort of the National Longitudinal Survey of Youth (USA). They found that among white

[2] The Vietnam War from 1st November 1955 to 30th April 1975 was officially fought between North Vietnam and South Vietnam. https://en.wikipedia.org/wiki/Vietnam_War

[3] An imperial dynasty of China that began in 960 and lasted until 1279 (https://en.wikipedia.org/wiki/Song_dynasty).

[4] One of the chief units of currency in China in imperial times and was the denomination until the late 19th century.

[5] The official currency of the People's Republic of China.

[6] Their height information of U.S. presidents is taken from http://www.uvm.edu/~tshepard/tall.html and the average height of population is the adult height of white born in the United States around the year in which the president was in office (from Steckel (1995))

British men, every additional inch of adult height is associated with a 2.2 percent increase in wages and that among white American men, every additional inch of height as an adult is associated with a 1.8 percent increase in wages. The median wage of the tallest quartile was more than 13 percent higher than that of the shortest quartile.

2.1.1 Height and Labor Market Success

The existence of a statistically significant height premium, especially for males in the labor market and dating market, has been found by numerous researchers. One hundred years ago, Gowin mentioned that height might lend male economic and social advantages in his book, The Executive and His Control of Men: A Study in Personal Efficiency. Taller stature may signal better health and robust genotype against illnesses, which caters more to the "taste" of employers. Taller workers enjoy a wage premium, and highly skilled jobs attract taller workers (Case and Paxson 2008; Persico, Postlewaite, and Silverman 2004; Haddad 1991). Based on a survey of 448 rural households residing in Bukidnon province on the Mindanao Island in the Philippines, Haddad (1991) used weight-for-height as an explanatory variable in the wage equation estimation and found it an important determinant of wage achievement for the agricultural labor force. Children below the age of 18 constituted a significant proportion of the local labor force, whose weight-for-height, an indicator of labor productivity for farm work and piece work, is still subject to change. Their results implied that older children, also the taller children, earned substantially higher wages than younger and shorter ones. Using the information from National Longitudinal Survey Youth Cohort (1979), a panel survey of 12,686 individuals between 14 and 22 years old, Klein et al. (1972) found that there are systematic wage variations because of physical variety: a man who is 10 percent taller than the population average receives an hourly wage rate that is 6.6 percent higher, and women receive a 4.2 percent increase in hourly wages for every 10 percent increase beyond the average height.

Height exerts an influence on mate choice for both heterosexual and homosexual relationships, and there is substantial evidence that taller males enjoy a noticeable dating advantage (Hensley 1994; Pierce 1996; Shepperd and Strathman 1989; Courtiol et al. 2010; Bodenhorn, Moehling, and Price 2012; Stulp et al. 2014; Valentova et al. 2014). Both women and men prefer individuals who are significantly taller than the average (Courtiol et al. 2010). Taller males enjoy a noticeable dating advantage, but the height advantage seems to diminish for men taller than six feet, based on information from 596 volunteer students in communication classes (Hensley 1994). Shepperd and Strathman (1989) conducted a survey among 60 female and 50 male students (all unmarried) in lower-level psychology courses at the University of Missouri and Ohio State University, and found that females who are short in an absolute sense were rated as more attractive and were dated more frequently than tall females, while tall males were dated considerably more frequently than short and medium-height males. But there was no statistically significant relationship between height and the number of self-reported dates. The strength of the effect of body height on dating/mating preference was greater for females evaluating males than for males evaluating females (Pierce 1996; Valentova et al. 2014) collected information from 541 non-heterosexual men of Czech origin and found that within homosexual relationships, men that preferred a more dominant and more active sexual role preferred shorter partners. At the same time, those that preferred a more submissive and more passive sexual role preferred taller partners.

The study of height has also been extended to the analysis of criminal activity (Bodenhorn, Moehling, and Price 2012), a number of children (Nettle 2002), and offspring mortality (Allal et al. 2004). Bodenhorn, Moehling, and Price 2012 analyzed the state prison data (Pennsylvania Department of Justice 1829-69; Pennsylvania Department of Justice 1826-76) and found that shorter individuals were more likely to participate in criminal activity in early America and that short stature was a source of labor market disadvantage that increased the incentives and returns to criminal activity. Based on the information from the 1958 National Child Development Study (UK), Nettle (2002) found that taller men were less likely to be childless than shorter ones. Allal et al. (2004)'s study suggested that male stature had a significant effect on offspring mortality, based on data from Gambian villages between 1950 and 2000, with 10,147 observations in total.

2.1.2 Mechanisms Behind Height Premiums

One explanation for height effects on wages is employer discrimination (Loh 1993). Are shorter workers really penalized for their stature? There may be unobserved mechanisms that relate one's final height and his or her value to others, as (Persico, Postlewaite, and Silverman 2004) pointed out. Lechelt 1975 conducted a classroom survey and asked 53 volunteers to evaluate the physical height and esteem of males in ten different occupations. The occupations include accountant, aeronautical engineer, clergy, clerk, lawyer, plumber, radio announcer, reporter, salesman, and social worker. The results implied that better occupational roles lead to taller estimated physical height and better social perception. Mean ratings on a 7-point scale of physical height and personal esteem by occupational affiliation are relevant, as the height and esteem were rated highest simultaneously for aeronautical engineer and lawyer, while lowest simultaneous for clerk and salesman.

A number of studies have examined the relationship between height and early human capital formation. Human capital is associated with but not limited to self-perception (self-esteem), social perception, and cognitive ability. Greater stature may promote self-esteem by delivering a superior self-conception. For example, taller boys are more likely to participate in and play sports activities that build positive social perceptions (Persico, Postlewaite, and Silverman 2004). A politician's height is often associated with the attraction felt by voters (Berkowitz, Nebel, and Reitman 1971; Young and French 1996; Persico, Postlewaite, and Silverman 2004). Based on the Integrated Health Interview Series (IHIS) of the United States (N = 165,606), Stulp et al. (2014) found that shorter men scored lower than males with average or taller height. Women of a given height who scored lower on mate quality also had shorter partners; shorter men face a double disadvantage in view of their mate quality and that of their spouses. Persico, Postlewaite, and Silverman (2004) sort the influence from height into the development of human capital during the premarket stage. The height premium may be partially mediated through participation in sports and clubs since childhood and adolescence. Shorter children, stigmatized by others, perceived less positively, and placed at a disadvantage in negotiating interpersonal dealings, may exclude themselves from clubs fostering interpersonal skills (Martel and Biller 1987). The height premium in earnings is also associated with the development of cognitive ability (Case and Paxson 2008). Physical growth is related to psychological performance, and height difference contributes to the variation in cognitive functioning (Klein et al. 1972). Steckel (1995) recognized the influence of stature on one's functional characteristics such as cognitive ability, labor productivity and personality. He also implied these consequences might inversely affect stature.

2.2 Socioeconomic Determinants of Height

Height is widely measured in regional health evaluation (Fogel and Wimmer 1992; Fogel 1992; Fogel 1994a; Fogel 1994b) and is often used along with weight in the calculation of indexes such as Body Mass Index (BMI), Body Composition Analysis (BCA), Body Surface Area (BSA) and Body Fat Percentage (BFP). Height not only is an indicator of health but also reflects the socioeconomic class of a household and regional economic development during individual's childhood and adolescence.

The topic of how adult height is determined has been studied worldwide, using samples from countries in North America, West Europe, Southeast Asia, etc. Researchers represented by but not limited to Strauss and Thomas (1998), Steckel (1995), Silventoinen (2003), Case and Paxson (2008), and Allal et al. (2004) collected intergenerational information to dissect the mechanism of how final height is decided and how it exerts influence on one's fate. We will use data from China to analyze how adult height is determined by socioeconomic factors, which are divided into the family level and regional level. Before conducting such analysis, we first rely on the experience of previous research, then design our own empirical models based on available data, and finally obtain new empirical results for the case of China.

Determinants of final stature are more widely divided into socioeconomic environments, genetic factors, nutrition absorption and disease environment (Nicolas and Steckel 1992; Silventoinen 2003; Carson 2010; Perkins et al. 2016). The factors influencing height increase in adolescence should be specifically mentioned as maximum height is always attained before adulthood. Case and Paxson (2008) said that tall children are more likely to become tall adults. Steckel (1995)sorted the determinants of final height into the socioeconomic type and proximate type. The socioeconomic determinants include income, personal hygiene, disease environment, technology, labor organization, cultural values, etc. The proximate determinants he listed include diet, disease, work intensity, genetics, etc.

How much adult height is determined by socioeconomic factors needs more time-tracked, demonstrated, and verifiable research. But we accept the assumption that influence from socioeconomic environments is significant, based on previous discussions (Steckel 1995; Strauss and Thomas 1998; Perkins et al. 2016; Batty et al. 2009). The socioeconomic environment may reflect the economic situation of a family and a region, which may also measure the availability of food and medicine or resistance to malnutrition and disease. Two levels of socioeconomic factors, from the household side and the regional side, are often considered in stature analysis. Household characteristics often include direct indicators such as the family's social position, occupation of parents, family income, family's living conditions, and parents' education, as well as indirect indicators such as family size, number of rooms, migration status, military rank. Regional characteristics often include log GDP per capita, resident type (rural or urban), population density, mortality rate, industrial-agricultural distribution, illiteracy rate, etc.

Much research has considered the role of basic biological factors. Genetic factors play a key role but are not necessarily dominant ones. Strauss and Thomas (1998)'s study pointed out that it's unsuitable to attribute all height gaps merely to living standards or genotype. At the same time, the genetic factors remain a kind of unclear, untransparent, and abstract influence. I put three factors into the genetic consideration: gender, moving average of regional height, and race. There is a natural height gap between males and females. As Cotterill et al. (1996), Silventoinen (2003) mentioned, people's stature is highly related to the height of the last generation. Natural height differences exist between people from various nationalities (Strauss and Thomas 1998). Nutrition and disease can combine to affect final height. Nutrition such as protein, minerals, vitamins A and D, illnesses such as diarrhea, hookworm, intestinal parasites, Crohn's disease (CD), and chronic liver disease are often mentioned in height analysis (Silventoinen 2003; Batty et al. 2009; Perkins et al. 2016). Psychological disease has also been considered in height research (Batty et al. 2009). But it remains challenging to access childhood nutrition and disease data that may help to explain ultimate adult height. Researchers have tried using milk or egg consumption to indicate the protein absorption and measuring the length of the bone to indicate disease infection (Batty et al. 2009; Perkins et al. 2016).

So, while genetic factors, childhood nutrition and childhood disease may be important factors affecting height, such data are often not available for studies comparing adult height and earnings. Further, childhood nutrition and disease can be influenced by a variety of socioeconomic factors. For example, nutrition can depend on the distribution of resources (Floud 1994; Perkins et al. 2016). Factors such as family income (affecting a family's ability to achieve necessary nutrition) and parents' education (affecting a family's ability to effectively use nutrition information) can influence nutrition and health. The available socioeconomic household-level data for this study include the following: parents' education, subjectively evaluated social class when the respondent was 14 years old; regional level: GDP per capita of the respondent's province of birth.

3 Empirical Design

Persico, Postlewaite, and Silverman (2004)'s study shared evidence from the UK and the USA that an additional inch of adult height is associated with an increase in salary. Previous research conducted by Maluccio et al. (2009) and Alderman, Hoogeveen, and Rossi (2009) implied that higher height-for-age of children is positively related to better labor market outcomes. We will examine whether there is a statistically significant height premium in China's labor market. The Mincer (1974) equation, explaining wage as a function of schooling years and work experience, is a suitable benchmark, as the wage is crucial when turning to work performance. Its basic form is applied in the following design.

$$\text{In}(\text{wage})_i = \beta_0 + \beta_1 schooling_i + \beta_2 exp_i + \beta_3 exp_i^2 + \gamma' X_i + \varepsilon_i \quad (1)$$

$\text{In}(\text{wage})_i$is the logarithm of annual wage of individual i (i=1,. . . ,N). The number of schooling years is denoted by $schooling_i$. exp_i and exp_i^2 denote the work experience and squared work experience.

$$exp_i = age_i - schooling_i - 6$$

Where 6 accounts for pre-school years. The Mincer is a fixture in labor economics tested with many datasets(Björklund and Kjellström, 2002; Card, 1999; Heckman and Polachek, 1974; Palme and Wright, 1998).

3.1 Baseline Regression

We add height as an explanatory variable into the Mincer equation to see whether there is a height effect on income, using the pooled data stratified by gender.

$$\text{In}(\text{income})_i = \beta_0 + \beta_1 schooling_i + \beta_2 height_i + \beta_3 exp_i + \beta_4 exp_i^2 + \gamma' X_i + \mu_j + \mu_s + \varepsilon_{ijs} \quad (2)$$

$$X' = [rural, ethnicity, cohorts]$$

$\text{In}(\text{income})_i$ is the logarithm of annual income of individual i (i=1,. . . ,N), from hometown province j (j=1,. . . ,28), and participating in CGSS census s (s=2012, 2014, 2016). The vector X includes control variables, which include characteristics of resident type (rural or urban), ethnicity (Han Chinese or not), and four cohort dummies (the 1960s, 1970s, 1980s, and 1990s)[7]. The coefficient of cohort dummies accounts for the height change and schooling trend for four decades. All time in-variant characteristics of province and survey are captured by fixed effects $\mu_j$and μ_s. The province fixed effects to control for the unobserved determinants that are common in the same hometown province or municipalities. The survey fixed effects capture other differences across three waves of censuses. The error term ε_{ijs}, conditioned on explanatory variables, represents all remaining unobserved determinants of income.

3.2 Endogenous Variables and Instrument Strategy

When endogeneity occurs, the assumption that explanatory variables and error terms are not related is no longer valid. This means the assumption that the least square estimator is a linear unbiased estimator with minimum variance (Gauss Markov theorem) may also no longer be valid. Past research, for example (Angrist and Pischke, 2008), suggests that education may be correlated with the regression error term in earning equations.

We will discuss four endogenous concerns that may happen with height: omitted variables, self-selection bias, reverse causality, and measurement error. (1) omitted variables: In empirical studies, researchers cannot control for all the variables that affect the explained variables. The omitted variables about health will bias our coefficient if they relate to height and income simultaneously. If a person is born with a genetic disease, the process of absorbing nutrients and gaining education can be tougher than peers. Facing a similar situation as Case and Paxson (2008), we don't have enough access to data about respondents' health. According to Cotterill et al. (1996) and Silventoinen (2003), the stature of children is noticeably influenced by parental height. We couldn't get relevant data directly either. (2) self-selection bias: Heckman and Polachek (1974)observed the biased estimates when studying the effect of employee training on wages, as an employee's intelligence level may influence both training participation and salary. When we discussed the mechanism behind the height premia, we already suggested that taller people tend to form better human capital early in life (and before entering the labor market). Unobserved personal characteristics may include cognitive ability and self-esteem, which affect performance in the labor market. (3) reverse causality:

[7]We divide the birthyear into 10-year cohorts, 1960s, 1970s, 1980s, and 1990s. For example, the 1970s covers years from 1970 to 1979.

It's hard to say that adult height is affected by income as it is essentially fixed for adults. But the potential height can. Many people never reach their potential heights, especially in backward regions. The gap between real height and potential height is affected and reflected by the socioeconomic situation. For people with short stature, there may be sunk costs. Also, when considering regional effects, the dynamic average height is affected by changing income. (4) measurement error: Individual income data often come from questionnaires (surveys). Many researchers have pointed out inaccurate or false income reporting in the process of questionnaire collection. The data of individual incomes in questionnaires often have measurement errors.

The instrument variable (IV) method is one approach to address the first three endogenous issues. One of the preconditions for using IV is the existence of endogenous explanatory variables, which will be accessed by the Hausman-Durbin-Wu test. The null hypothesis H0 is that all explanatory variables are exogenous. The results reject the null hypothesis at a significance level of 1%[8].

The premise of Hausman's test is that IV is valid. First, we carried out an Under-identification test, whose null hypothesis H0 is that: IV was not correlated with endogenous variables. The results reject the null hypothesis at a significance level of 5%[9]. Second, the weak identification test gives Cragg-Donald Wald F statistics. The critical values are given by Stock and Yogo (2005). In the estimated results, the Cragg-Donald Wald F statistic doesn't exceed the minimum critical value[10]. Third, the premise of the over-identification test is that there are at least as many effective IVs as endogenous explanatory variables. The null hypothesis H0 is that: all IVs are exogenous, and the intuitive purpose is to test whether the estimators produced by the combination of different IVs converge to the same value. The result for female observations rejects the null hypothesis at a significance level of 10%[11].

We set up the two-stage least square regressions by gender to analyze height premia.

1st Stage :

[8] Durbin: 88.9362 (p = 0.0000) for males and 35.7833 (p = 0.0000) for females; Wu-Hausman: 44.84 (p = 0.0000) for males and 17.8746 (p = 0.0000) for females

[9] Anderson canon. corr. LM stat: 18.465 (p = 0.0004) for males and 8.521 (p = 0.0364) for females

[10] Cragg-Donald Wald F stat: 4.598 for males and 2.118 for females

[11] Sargan stat: 0.872 (p = 0.6465) for males and 5.456 (p = 0.0653) for females

$$height_i = \beta_0 + \gamma' Z_i + \gamma' X_i + \mu_j + \mu_s + \varepsilon_{ijs} \tag{3}$$

$$schooling_i = \beta + \gamma' Z_i + \gamma' X_i + \mu_j + \mu_s + \varepsilon_{ijs} \tag{4}$$

$$X' = [rural, ethinicity, cohorts]$$

$$Z' = [ln(GDP), familys' class, parents' education]$$

Both height and schooling years are correlated with factors that are likely to be determinants of annual income, which are denoted by vector X, as mentioned above. Exclusion variables are controlled in the vector Z, which contains characteristics of province GDP near birth year, family's social class at age 14 and separate schooling years of parents. Parents' education may affect both income and nutrition patterns. A family's socioeconomic situation during adolescence is directly reflected by variable social class (age of 14), a subjective evaluation of individuals themselves. Fields (1980) treated parents' wealth and education as the reasons why health may differ across areas. Strauss and Thomas (1995) suggest people growing up in wealthier and better-educated families will become healthier. The wealth of a family can affect child protein consumption. Province GDP around an individual's birth year is used to reflect regional development.

2nd Stage :

$$\text{In(income)}_i = \beta_0 + \beta_1 \widehat{schooling}_i + \beta_2 \widehat{height}_i + \gamma' X_i + \mu_j + \mu_s + \varepsilon_{ijs} \tag{5}$$

We use the predicted schooling years and height, denoted by $\widehat{schooling}_i$ and $\widehat{height}_i$to get the IV estimators.

Extreme poverty often comes along with malnutrition, retarded growth, and stunning. For the poor, higher-income permits a better diet and results in taller stature. With the increase in income, one's genetic potential keeps getting realized. Once the income is high enough or the potential is reached, an additional benefit from income may have no more effect on height. There may be a diminishing effect from height to income. Following Hübler (2009), we tried adding the height square into the wage equation for people from cohort 1980s and 1990s but found no significant relationship[12].

3.3 Height Gap and Socioeconomic Environment

We run the OLS and IV regressions separately by gender. There is a natural stature difference between males and females. Besides the influence of genotype, male preference or son preference may enlarge the height gap by deteriorating the female's environment during childhood and adolescence. Jayachandran (2017)mentioned that India's long history of strong son preference manifested in higher mortality for girls than boys. In China, some dark parts of traditional Confucian culture[13], such as foot-binding[14] , which weakens the power of females and infringes on their rights, misled older generations in some backward areas. Males and females often receive different treatment in under-developed periods because males were often the bread earner for a family and the major labor force in previous agricultural and industrial societies. Take the field of marriage for example, it was not until May 1st, 1,950, when the Marriage Law of the People's Republic of China came into effect, monogamy began to be legal, and both sides of marriage began to have equal rights. Bigamy and concubinage began to be prohibited. In our study, we care more about how adult height is decided and part of the height gap may originate from unequal resource distribution. Nicolas and Steckel (1992)studied the gender bias in the distribution of nutrients, and they found when employment opportunities for English women declined during industrialization, families tended to allocate more food to males and less to females.

We add the rural-urban dummy to every stage. The height difference between rural and urban areas is non-negligible in China, as implied by Figure1. Past research also indicated such gaps between rural and urban residents. Luo (2009) conducted research in the Hunan province and found an obvious height disparity between rural and urban youth. He also suggested an enlarging trend of the height gap over time. A newer study by Xu and Hang (2017) showed that apparent height inequality remains. Diane's study focused on children aged under five born in rural India, whose height is around two standard deviations shorter than the World

[12] $\text{In(income)}_i = \beta_0 + \beta_1 schooling_i + \beta_2 height_i + \beta_3 height_i^2 + \gamma' X_i + \mu_j + \mu_s + \varepsilon_{ijs}$

[13] One Confucian classic book, Ritual Records of Dai, exerting influence for thousands of years in traditional China, listed seven reasons that a man could reasonably kick out his wife, including not having any sons, suffering severe illness, and expressing opinions.

[14] A horrible custom of binding females' feet in ancient China. The cruel too used to circumspect women in the backyard, originated from the Song dynasty till 1912, firstly illegal when Sun Yat-Sen was in power. The last documented case of foot binding happened in 1957, in a village in Yunnan province, until then the torture aimed at women had faded from history.

Health Organization reference compared with those from urban areas(Coffey and Spears, 2019; Coffey, Deshpande, et al., 2019). Besides height, statistically significant rural-urban differences in stunting and mortality risk exist for children under-5 in over forty developing countries (Dye, 2008; Fotso, 2006; Fotso, 2007; Timaeus and Lush, 1995; Van de Poel, O'donnell, and Van Doorslaer, 2009). There are 509.79 million rural residents and 901.99 million urban residents in China, with rural per capita disposable income of 43,834 Yuan and urban per capita disposable income of 17,131 Yuan in the year 2020 (National Bureau of Statistics, 2020). We will add the rural dummy in two stages as rural-urban difference exists extensively.

We control for province-fixed effects at every stage. The difference among 24 provinces and 4 municipalities is captured by the 28 Province dummies. There is an undeniable development unbalance in the second half of the 20th century. Based on an unbalanced supply of natural resources, technology, labor, capital, etc., regions had various developed advantages and weaknesses. According to (Xu and Hang, 2017), height gaps among regions are related to various socioeconomic situations. In the 20th century, after the establishment of the People's Republic of China, the northeast provinces went through a flourish firstly because of the abundance of natural resources including coal and the old bases of heavy industry. Since the 1970s and 1980s, the period of Reform and Opening Up, south-east provinces have experienced booming periods and have become economical leaders.

4 Data

I use the information on individuals from 2012, 2014, and 2016 waves of the Chinese General Social Survey (CGSS)[15], a comprehensive database on households nationwide. They provide cross-section data taken from approximately 35,000 adults distributed in 24 provinces and 4 municipalities covering the majority of mainland China. For each of the three waves, over 10,000 respondents participated. Several other data sources are also put into use, including the National Bureau of Statistics of China (for GDP and gender ratio)[16], the National and Regional Yearbooks (for GDP), and the World Bank (for GDP and CPI)[17][18] . The 2012,

[15]The Chinese General Social Survey (CGSS) has been conducted every 2 or 3 years since 2003, geographically covering 24 provinces and 4 municipalities, including Beijing, Shanghai, Tianjin, and Chongqing, in mainland China. Link: http://cgss.ruc.edu.cn/English/Home.htm.

[16]National Bureau of Statistics of China: http://www.stats.gov.cn/english/

[17]GDP: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD

[18]CPI: https://data.worldbank.org/indicator/FP.CPI.TOTL

2014, 2016 CGSS census data are suitable for our height analysis, with most key variables included in. During our first part of the empirical design, exploring how height affects labor market income, information including the personal income, family income, height, and age was collected. During the second part, studying how final height is decided by socioeconomic determinants, personal level variables (race), and family level variables (parent's education, family social class) are also supplied. And regional level variables (average height, average education) can be calculated from them.

We conduct a study by gender with a dummy of resident type (rural or urban). It is standard practice in the estimation of Mincer equations to run separate estimations for males and females. The socioeconomic environments for rural residents and urban residents are different. For example, the urban areas entered the market economy earlier than the rural areas. Whether individuals come from rural China or urban China is suggested by his or her Hukou[19]. Among all CGSS survey observations, there are around 10,100 rural males, 6,500 urban males, 11,000 rural females and 6,700 urban females. The actual numbers of observations in regressions are only about a third of these because there are many missing responses for variables we ultimately use in regression analysis. For example, in Table 6, when we run the OLS regressions, the number of male observations decreases from 11,082 to 8,557 after including more control variables and fixed effects. It is primarily caused by missing information for some of the observations including resident type, ethnicity, birth year, etc.

To study the height premium in the job market and socioeconomic determinants of adult height, I use centimeter (cm) as the unit to gauge the height. The average adult height is 168.4 cm for rural males, 171.35 cm for urban males, 158.25 for rural females, and 159.93 for urban females, calculated from pooled cross-section data. The education from original data is sorted into 14 categories: No education; Traditional private school; Primary school; Middle school; Vocational High School; Ordinary High School; Technical secondary school; Technical School; College (part-time); College (full time); University (part-time); University (full time); Master or higher; Others. I translate the education levels into related schooling years, shown in Table 1. We use the adjusted schooling years to facilitate

[19]Hukou, a system of household registration used in mainland China, may imply whether the individual is rural resident or urban resident. In the original data, Hukou situation is divided more detailly, including 1) Agricultural; 2) Non-agricultural; 3) Resident; 4) Blue Printed; 5) Military Status; 6) others. We simplify them into two types 1) Agricultural 2) Urban (including all the other types)

our econometric design. The years of schooling estimates are also used (with age) to indirectly measure work experience years. More details are shown in Table 2.

Table 1: Education and Schooling Years (1)

Rank	Education	Schooling	Adjusted Schooling	Obs
01	No education	0	0	4,491
02	Traditional private school	[1,15]		309
03	Primary school	6	6	7,723
04	Middle school	9	9	9,921
05	Vocational High School	12	12	467
06	Ordinary High School	12	12	4,132
07	Technical secondary school	12	12	1,571
08	Technical School	12	12	215
09	College(part time)	14.5	14	967
10	College(full time)	15	15	1,796
11	University (part time)	[14.5,17]	15	731
12	University(full time)	16	16	2,239
13	Master or higher	[18,22]	19	370
14	Others			0

The first part of our study is about how height affects income. The income data from three waves 2012, 2014, and 2016 is modified into the real income of the year 2015 during pooled analysis, using the Consumer Price Index (CPI). We use the China Yuan (¥) as the unit. The average income is 215,031 for rural males, 378,475 for urban males, 140,907 for rural females, and 305,810 for urban females.

Parents' education, race, and family social class are also introduced to analyze determinants of final height. For all observations, the average fathers' education is 1.52 and the average mothers' education is 1.45, as calculated from the pooled data. The race[20] denotes whether observations are Han Chinese or not. About 92 percents of our observations are Han Chinese. There are 56 Chinese ethnic groups. But this percentage of Han in the total population matches the 91.11 percent from the 7th National Population Census of China[21]. Social class[22] is a result of subjective evaluation, ranked from 1 to 10, from bottom to top. The average family level for all observations is 3.13. The age is calculated by using the survey year minus

[20]In the original data, the race is a category variable with 8 selections included, 1 Han, 2 Mongolian, 3 Manchu, 4 Hui, 5 Tibetan, 6 Zhuang, 7 Uyghur, 8 others.

[21]The 7th National Population Census of the People's Republic of China, conducted by the National Bureau of Statistics, began on November 1, 2020, and continued through December 10, 2020.

[22]The social class data coms from subjective evaluation. The individual was asked to rank his or her family situation at the age of 14. The number of family's social classes is 10 in total, from 1 to 10, from bottom to top. The first 6 groups, from 1 to 6, take up over 90% of all.

the birth year. The average age for all observations is 50.96.

During the forty years following China's 1978th Reform and Opening up, the national economy has gone through booming periods. The GDP data implies enormous time-series variance, and we use the CPI to smooth the fluctuation stemming from inflation. The Nominal GDP is then modified into Real GDP. We analyze the influence from the regional level by introducing a five-year moving average of GDP per capita. We match the five-year cohort and birth years to get the province GDP near observations' birthyear[23], using the same data from CGSS.

For height-income studies, there are some frequently used data sources with a relative large sample such as the 1958 National Child Development Study (UK), the 1970 British Cohort Study (UK), the National Longitudinal Survey of Youth (USA), and the Integrated Health Interview Series (USA) (Case and Paxson 2008; Nettle 2002; Persico, Postlewaite, and Silverman 2004; Stulp et al. 2014). Courtiol et al. (2010)used a sample of 200 French to imply that both women and men prefer mates taller than average. For similar height research, Shepperd and Strathman (1989)used the information of 110 college students from psychology classes and Hensley (1994)used that of 596 volunteers from communication class.

5 Results

We investigated the effects of height on salary with the Mincer model, testing the education effects at the same time.

Table 5 presents results from the regression specification in Eq.(3) and Eq.(4). People in rural locations have, controlling for other factors, lower height and fewer years of schooling. The parental school (both the mother's and the father's) has a positive effect on respondent schooling. Mother's schooling also appears to have a positive effect on height of both males and females. Father's schooling appears to have a positive effect on the height of males only. Self-reported (higher) social class has a positive effect on schooling and for males, height as well. The level of economic development (measured by GDP per capita) where and when children grew up has a positive effect on the height. There is also evidence of cohort effects. With the 1990s as the default, in general the cohort effects (based on the regression coefficients) on education and height grow more negative as one goes farther back

[23]We create the variable five-year-cohort denoted by cohort_5 to facilitate the study, which is matched the birth year. Years from 1950 to 1999 are totally divided into 10 cohorts. For example, one five-year cohort contains years from 1960 to 1964, and another one contains years from 1995 to 1999.

in time. Persico, Postlewaite, and Silverman (2004) suggested that family and school resources explain little of the adult height disparity. But Case and Paxson (2008) suggested that men at age 33 with fathers in the highest occupational classes (professionals, executives, and managers) is 0.17 inch taller than those with fathers in medium occupation classes (semi-skilled or skilled workers), and that Women at age 33 with fathers in highest occupational classes are 0.127 inch taller than those with fathers in low occupational classes (unskilled workers).

Table 6 presents results from the regression specification in Eq. (2). Height and schooling are statistically significant ($p<0.01$) and have the expected positive effects on earnings under all three specifications for both males and females. We fail to reject the null hypothesis that race (i.e. being Han Chinese has no effect on earnings for males. However, this null hypothesis can be rejected for females ($p<0.01$). Living in rural areas has a negative effect on earnings for both males and females. Adding variables for the province and survey fixed effects and cohort effects greatly increases the predictive power of the models. Adding these variables increases R-squared from below 0.20 to above 0.75. Work experience has an overall positive effect for males, once survey and province fixed effects and cohort effects are accounted for. There is no evidence of such a positive effect on females. Despite our controlling a set of characteristics, OLS estimates may fail to yield the causal effects from height to annual income, because of endogeneity.

Table 7 presents results from the regression specification in Eq. (5). The IV strategy captures the positive effects from height and education to income as well as the heterogeneity by gender. We see a slightly larger coefficient of height for females than for males, 0.317 and 0.335 significant at 1 percent level, respectively (columns (3) and (6) in Table 7). In (Case and Paxson, 2008)'s study, for males, there is an 18.24 percent increase in hourly earnings per additional inch without extended controls, and for females, 5.11 with controls. Their study also shows a 6.34 percent increase in hourly earnings per additional inch without controlling for other variables for females and 0.73 with controlling. We also see a larger coefficient of height than of schooling year, 0.317 (height) vs. 0.068 (schooling) for males and 0.335 (height) vs. 0.068 (schooling) for females (columns (3) and (6) in Table 7).

The numbers of observations in 1st stage regressions (also OLS regression shown in Table 5) and 2SLS regressions (shown in Table 7) are different. We see 6,946 and 7,941 in Table 5, and 5,820 and 5,510 in Table 7. Because, all exogenous variables including work experience are added into the 1st stage during 2SLS. It's logically confusing because we don't need to add work experience into the 1st stage. But it's technically right to achieve the efficiency or consistency of the 2SLS estimators. The regression coefficients for height and for schooling are larger in the two-stage least squares (2SLS) estimates than in the earlier OLS estimates. The same is true for the coefficient for experience for males. There still are no positive and significant effects for females. Compared to the OLS results under 2SLS, being rural had a positive effect on male wages, while being Han Chinese had a negative effect. Cohort effects are not significant, even though they were significant in the first stage equations. This suggests that cohort effects affect wages, not directly, but indirectly, through how they affect schooling and height.

6 Conclusion

This study expands on the traditional Mincer model of returns to schooling by considering the additional effects of height on income. Results suggest both significant returns to height and to schooling. We also found evidence of endogeneity in the education and schooling variables. Two-stage least squares (2SLS) methods were used to correct for endogeneity bias. The 2SLS methods yielded even larger returns to schooling and to height. The first stage equations explaining height and years of schooling found that greater parental education was generally associated with both greater height and more schooling. Being in rural areas had negative effects on both schooling and height. Cohort effects were not significant in the income equation, while they were important in both schooling and height equations. People born farther back in time and in areas of lower economic development (as measured by regional per capita GDP at childhood) had shorter stature and less education. This suggests that current levels of economic development and parental education can positively influence the height and education of children. This in turn can increase the future earnings of children in China. We found that height is even more significant than education (columns (3) and (6) in Table 7). At the same time, we hope to draw parents' attention to children's growth and try shrinking the gap between potential height and real final height, in avoid of their next generation getting distinguished treatment given settled height. Before, height studies often focused more on males, and suggests height premia only for men. As females get more independent and become more active in labor markets, height premia also work for women. When we run our regression with cohort dummies, as the socioeconomic environment is dynamic in the late 20th century, we see that the height effect is most obvious for observations born in the 1970s and 1980s, whose ages distribute between 35 and 55 years old. Case and Paxson (2008) and Persico, Postlewaite, and Silverman (2004) observe adults at the age of 33, which age selection is shown to be less effective by our study.

People with higher education, for example, holding a bachelor's and master's degree, have a higher possibility of passing the career examination and finding stable jobs such as teacher, accountant, and government staff. While for those with limited schooling years, many earn their life by strength. For example, the group of porters called “Bang-Bang" in Chongqing, China, handle piecework every day but meet employers preferring tall workers quite often. More labor policies against such discrimination should come out as we confirm the existence of a height premium, which may depress those with shorter stature.

The surging economy emerged widely after the second war, short-lived or long abiding. Economic growth is often measured by income (GDP) and consumption per capita, but when measuring economic growth, they couldn't reflect poverty and inequality at the same time. These indexes have shortages and have raised debates. Up till today, no theory guarantees that economic growth can benefit most of the population. Our study gives a clue that adult height may compensate to evaluate development especially in developing countries. Firstly, the connection between physical stature and socioeconomic conditions is less obvious in developed regions, where teenagers have entirely reached their genetic potential with sufficient resources. In such countries, the socioeconomic environment no longer triggers or enlarges biological gaps such as height difference. But in the developing world, additional economic growth drives the increase in average height (Brundtland and Walløe, 1973; Lindgren, 1988; Cernerud and Lindgren, 1991). Secondly, the process of modernization is often accompanied by large-scale population movements and rapid urbanization, and with the population pouring from rural areas into urban areas and cities booming in both size and numbers, the income per capita may not cover the real situation of the poor.

Appendix

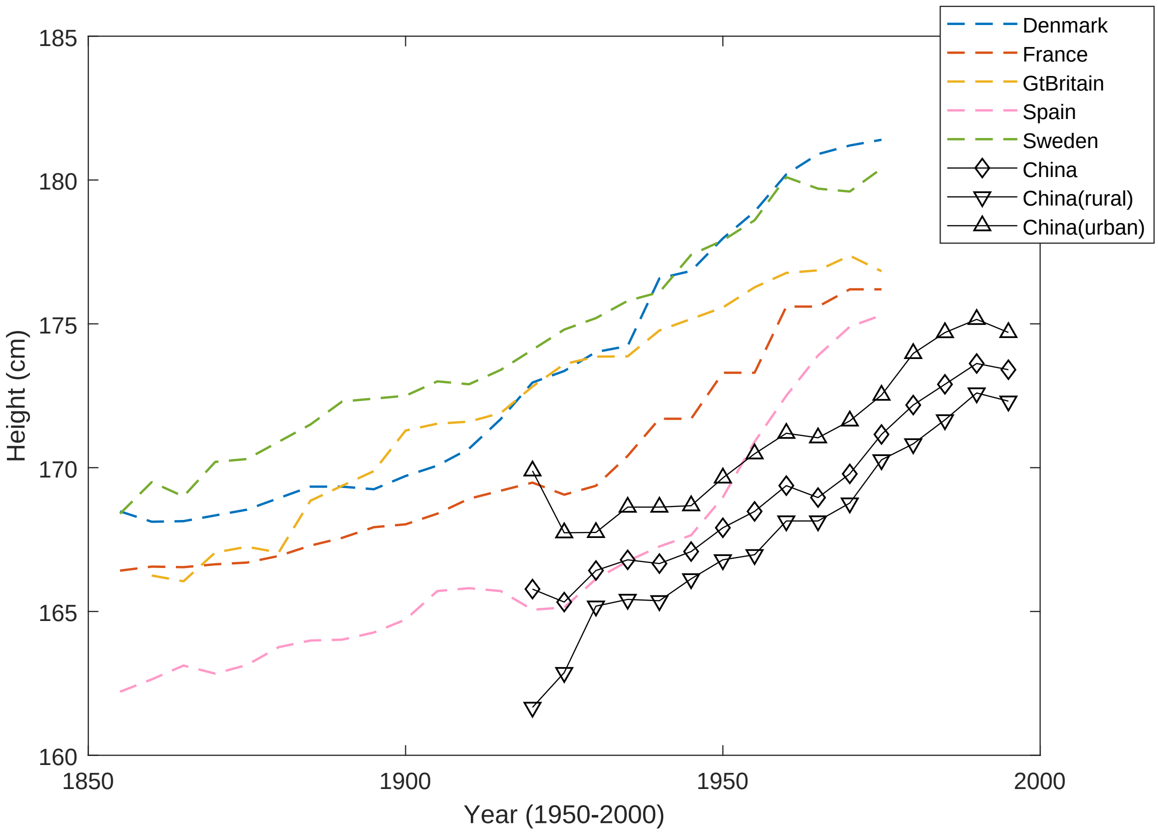

Figure 1: Height of Males in Six Countries (1850-2000)

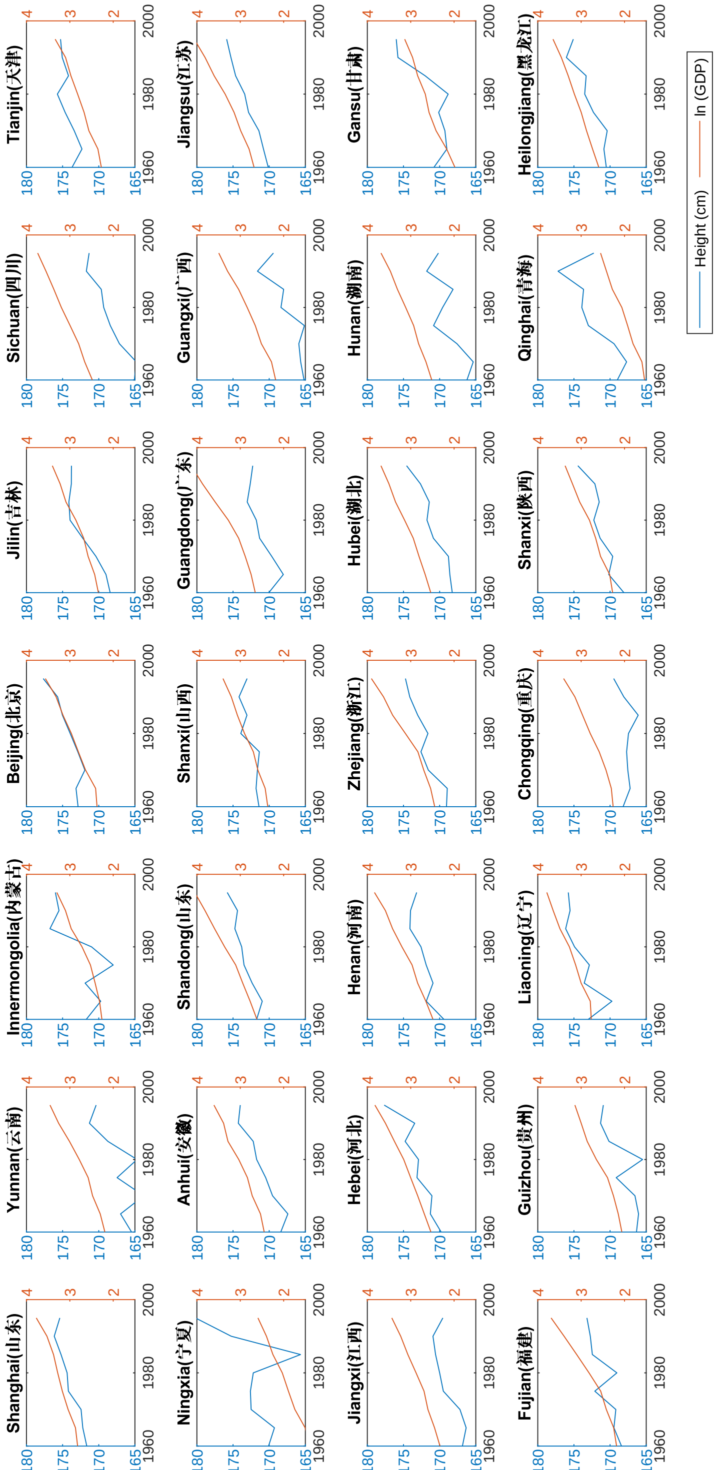

Figure 2: Height of Males & Ln (GDP) (China 1960-2000)

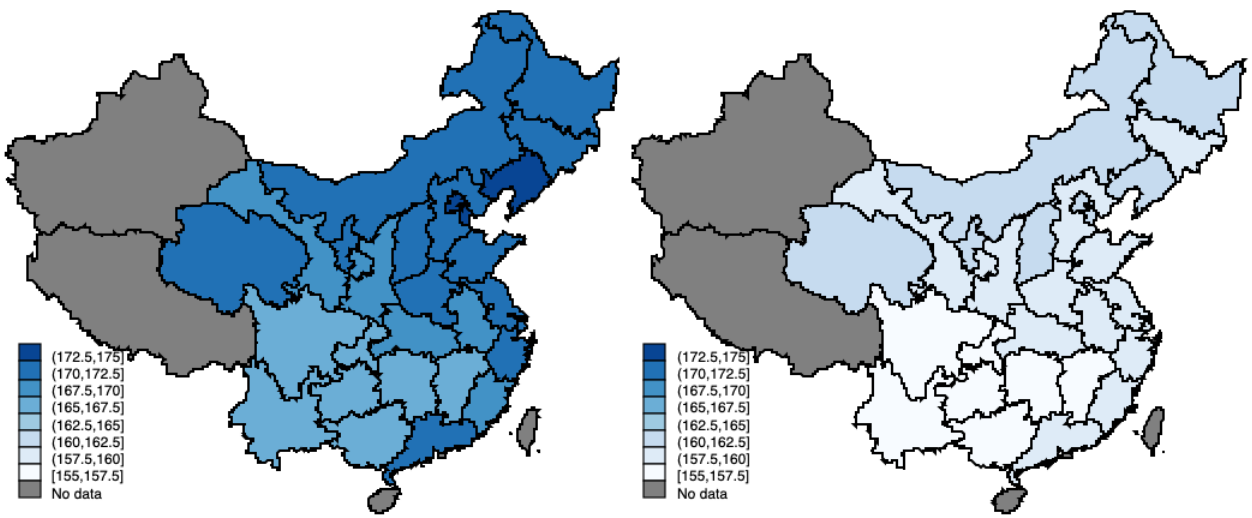

Figure 3: Distributon of Height in Mainland China (Males & Females)

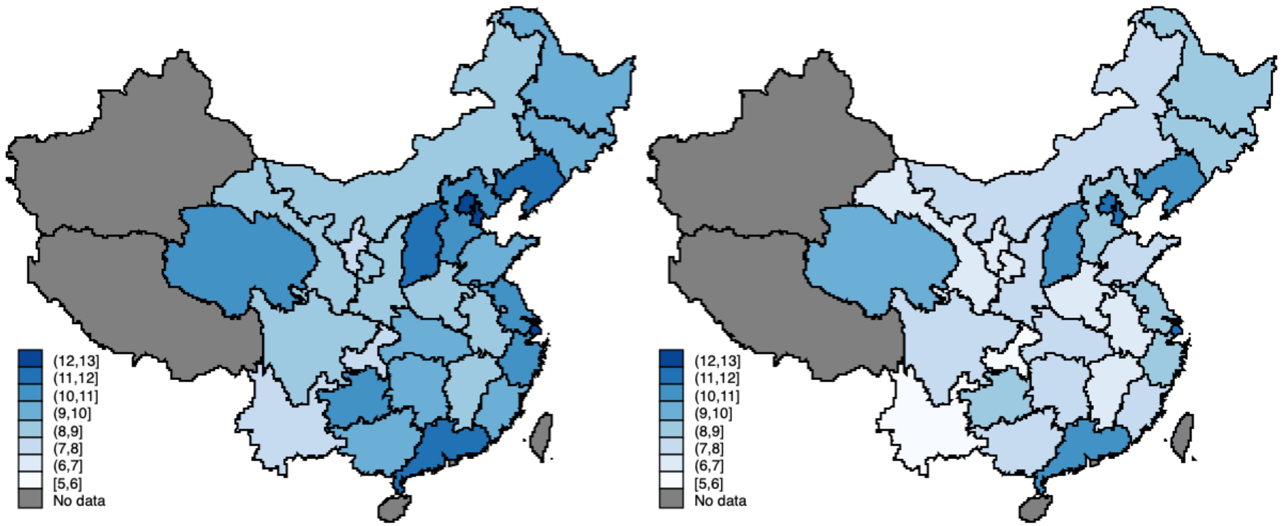

Figure 4: Distributon of Schooling Years in Mainland China (Males & Females)

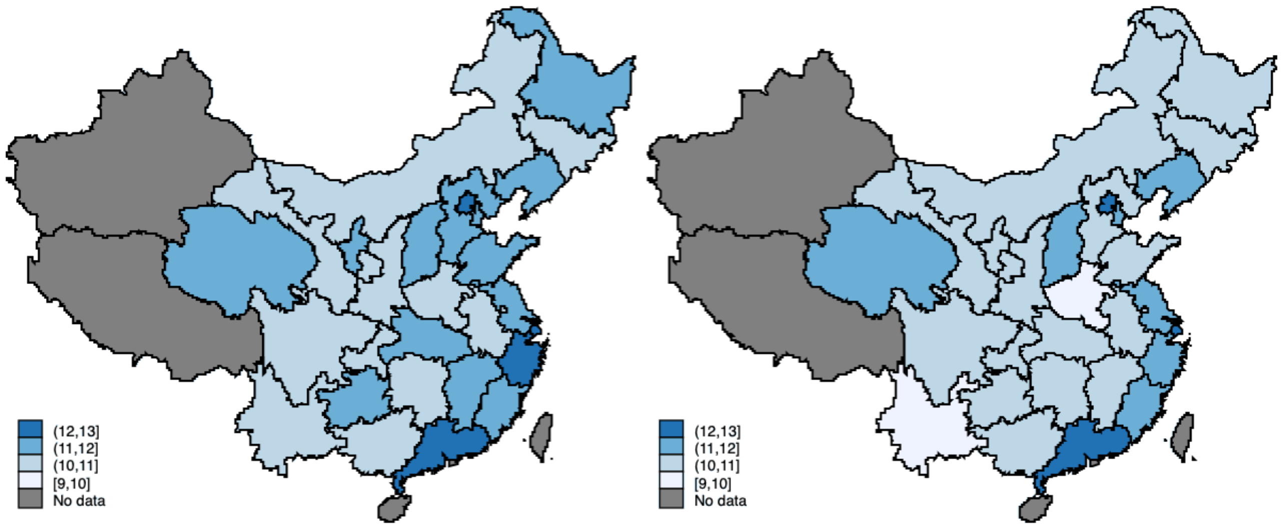

Figure 5: Distributon of Ln(income) in Mainland China (Males & Females)

Table 2: Education and Schooling Years (2)

Before 1950s	After 1950s
Traditional private school [1,15]	Master or higher[2,6]
	University(full time)(4); University (part time)[2.5,5]; College(full time)(4); College(part time)(2.5)
	Ordinary High School (3); Vocational High School (3); Technical secondary school (3); Technical School (3)
	Middle school (3)
	Primary school (6)
No education (0)	

Note: The education system of China, more details in https://en.wikipedia.org/wiki/Education_in_China. Traditional private school is suitable for those born before the 1950s. Schooling years in () or []. In the survey, education attainment is ranked into 14 levels: 01 No education, 02 Traditional private school, 03 Primary school, 04 Middle school, 05 Vocational High School, 06 Ordinary High School, 07 Technical secondary school, 08 Technical School, 09 College(part-time), 10 College(full time), 11 University (part-time), 11 University (part-time), 12 University(full time), 13 Master or higher, 14 Others.

Table 3: Variable and Definition

Variable	Definition
Height	Height measured in cm
Social class (age 14)	Family's socioeconomic level at age 14
Father's schooling	Father's schooling years
Mother's schooling	Mother's schooling years
Ln(GDP)	Log of province GDP per capita near birth year
Ln(income)	Log of personal income in survey year
Ln(family income)	Log of family income in survey year
Height Sq	Square of height (cm)
Schooling	Observation's schooling years
Work Exp	Year of work experience
Work Exp2	Square of work experience
GDP	Log of province GDP per capita near birth year
Resident Type	Rural or urban

Table 4: Descriptive Statistics

		2012			2014			2016			Pooled		
		Mean	St.dev	Obs	Mean	St.dev	Obs	Mean	St.dev	Obs	Mean	St.dev	Obs
A. Height (cm)													
Male	Rural	168.40	6.55	3,357	168.60	6.50	3,195	168.20	6.73	3,641	168.40	6.60	10,193
	Urban	171.45	5.83	2,384	171.15	6.13	1,936	171.43	6.10	2,248	171.35	6.01	6,568
Female	Rural	158.24	5.69	3,448	158.33	5.73	3,736	158.18	5.85	4,157	158.25	5.76	11,341
	Urban	159.70	5.48	2,190	159.96	5.63	2,089	160.12	5.41	2,418	159.93	5.51	6,697
B. Schooling													
Male	Rural	7.96	3.75	3,324	8.20	3.85	3,158	8.30	3.91	3,628	8.16	3.84	10,110
	Urban	11.75	3.55	2,357	11.60	3.65	1,916	12.14	3.55	2,237	11.84	3.59	6,510
Female	Rural	6.34	4.47	3,444	6.38	4.60	3,700	6.82	4.70	4,162	6.53	4.60	11,306
	Urban	10.73	4.35	2,162	10.77	4.37	2,066	11.26	4.29	2,398	10.93	4.34	6,626
C. Income (¥)													
Male	Rural	25,068	42,070	2,883	290,903	389,290	2,748	324,334	451,835	3,103	215,031	372,478	8,734
	Urban	43,467	45,750	2,066	499,269	541,527	1,691	628,662	614,611	1,950	378,475	531,969	5,707
Female	Rural	14,499	25,974	2,376	173,084	222,401	2,508	218,849	322,240	2,818	140,907	248,564	7,702
	Urban	31,408	32,668	1,738	377,292	372,312	1,729	479,602	491,846	2,033	305,810	412,139	5,500
D. Family income (¥)													
Male	Rural	45,716	61,465	2,921	462,302	498,805	2,900	523,801	637,373	3,244	350,074	520,412	9,065
	Urban	80,927	84,277	2,104	790,459	684,639	1,732	1,009,730	859,428	1,979	608,358	747,527	5,815
Female	Rural	43,419	59,382	2,929	441,701	495,067	3,259	495,318	575,169	3,587	342,034	492,733	9,775
	Urban	77,721	95,594	1,904	781,052	687,672	1,870	922,200	827,453	2,111	604,131	731,166	5,885
E. Others													
Father's education		1.46	0.62	11,165	1.53	0.70	10,746	1.55	0.69	12,334	1.52	0.67	34,245
Mother's education		1.41	0.56	11,354	1.48	0.64	10,895	1.47	0.61	12,517	1.45	0.61	34,766
Age		51.60	16.39	11,437	51.40	16.90	10,968	50.01	16.86	12,582	50.96	16.74	34,987
Race		0.91	0.28	11,438	0.92	0.27	10,968	0.92	0.26	12,582	0.92	0.27	34,988
Social class (age 14)		3.07	1.79	11,353	3.12	1.77	10,777	3.20	1.82	12,407	3.13	1.80	34,537

Table 5: OLS Regression (How Height and Schooling Years Are affected?)

	Height		Schooling	
	(1)	(2)	(3)	(4)
Rural	-1.536***	-1.005***	-2.238***	-2.623***
	(0.152)	(0.130)	(0.085)	(0.086)
Race	0.773***	0.115	-0.053	0.151
	(0.298)	(0.264)	(0.145)	(0.145)
Social Class (Age of 14)	0.190***	0.029	0.115***	0.188***
	(0.039)	(0.034)	(0.021)	(0.019)
Father's Schooling	0.040**	0.024	0.159***	0.183***
	(0.020)	(0.017)	(0.011)	(0.011)
Mother's Schooling	0.063***	0.059***	0.100***	0.144***
	(0.021)	(0.018)	(0.011)	(0.011)
Ln(GDP)	0.933***	0.461*	0.208	0.929***
	(0.282)	(0.245)	(0.146)	(0.153)
Cohort 1960s	-1.393**	-0.955	-1.140***	-0.958***
	(0.685)	(0.590)	(0.356)	(0.369)
Cohort 1970s	-0.999**	-0.907**	-0.950***	-0.807***
	(0.507)	(0.445)	(0.267)	(0.277)
Cohort 1980s	-0.429	-0.318	-0.344**	-0.344**
	(0.309)	(0.269)	(0.162)	(0.170)
Constant	165.890***	158.491***	10.326***	3.870***
	(2.466)	(2.127)	(1.281)	(1.331)
Observations	6,946	7,937	6,948	7,941
R-squared	0.227	0.140	0.440	0.519
Survey FE	YES	YES	YES	YES
Province FE	YES	YES	YES	YES

Note: OLS regression with survey and province fixed effects. In column (1) and column (2), the dependent variable is the height of males and females. In column (3) and column (4), the dependent variable is the schooling years of males and females. The coefficients of birth cohorts in the 1960s, 1970s, and 1980s are based on cohort 1990s. See the text and Appendix for definitions and details. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6: OLS Regression (How Income Is Affected by Height and Schooling Years?)

	Annual Income (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Height	0.026***	0.013***	0.011***	0.024***	0.016***	0.015***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Schooling	0.128***	0.087***	0.072***	0.162***	0.095***	0.070***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)
Work Exp	0.003	0.024***	0.024***	-0.011***	-0.001	-0.002
	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)
Work Exp2	-0.000	-0.001***	-0.001***	0.000***	-0.000**	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rural			-0.234***			-0.390***
			(0.022)			(0.024)
Race			0.035			0.111***
			(0.044)			(0.043)
Cohort 1960s		0.093*	0.088*		-0.029	-0.018
		(0.048)	(0.048)		(0.048)	(0.047)
Cohort 1970s		0.320***	0.297***		0.097	0.086
		(0.075)	(0.074)		(0.075)	(0.074)
Cohort 1980s		0.322***	0.306***		0.063	0.064
		(0.102)	(0.102)		(0.106)	(0.105)
Cohort 1990s		0.210	0.207		-0.074	-0.056
		(0.130)	(0.130)		(0.134)	(0.133)
Constant	5.967***	7.306***	7.833***	6.045***	7.045***	7.549***
	(0.419)	(0.340)	(0.350)	(0.445)	(0.364)	(0.362)
Observations	11,082	8,569	8,557	10,114	8,054	8,042
R-squared	0.127	0.753	0.756	0.184	0.754	0.762
Survey FE	NO	YES	YES	NO	YES	YES
Province FE	NO	YES	YES	NO	YES	YES
Cohort Dummy	No	YES	YES	No	YES	YES
Other Controls	NO	NO	YES	NO	NO	YES

Note: This part reports the OLS regressions. In column (1-3), the dependent variable is ln(income) of males. In column (4-6), the dependent variable is ln(income) of females. From column (1) to column (3), we add the cohort dummies, rural-urban dummy, and ethnicity dummy gradually. From column (4) to column (6), we add the cohort dummies, rural-urban dummy, and ethnicity dummy gradually. We include survey fix effect and province fixed effect in column (2), column (3), column (5), and column (6). See the text and Appendix for definitions and details. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 7: 2SLS Regression (How Income Is Affected by Height and Schooling Years?)

	Annual Income (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
Height	0.003	0.117***	0.317***	0.024*	0.429***	0.335***
	(0.010)	(0.021)	(0.080)	(0.014)	(0.107)	(0.124)
Schooling	0.557***	0.079***	0.068***	0.551***	0.065**	0.068***
	(0.012)	(0.013)	(0.024)	(0.011)	(0.030)	(0.024)
Work Exp	0.313***	0.048***	0.069***	0.271***	0.019	0.014
	(0.011)	(0.009)	(0.018)	(0.011)	(0.019)	(0.016)
Work Exp2	-0.000	-0.001***	-0.001**	0.001***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rural			0.349***			-0.092
			(0.126)			(0.094)
Race			-0.273**			0.096
			(0.129)			(0.102)
Cohort 1960s	-8.634***	-0.206	-0.201	-8.324***	-0.059	-0.044
	(0.197)	(0.190)	(0.360)	(0.214)	(0.437)	(0.355)
Cohort 1970s	-5.510***	0.049	0.138	-5.227***	0.274	0.238
	(0.149)	(0.136)	(0.258)	(0.161)	(0.322)	(0.262)
Cohort 1980s	-2.471***	0.089	0.160	-2.346***	0.138	0.132
	(0.096)	(0.078)	(0.148)	(0.105)	(0.180)	(0.146)
Constant	3.477**	-10.777***	-45.709***	0.198	-59.908***	-44.711**
	(1.624)	(3.588)	(13.834)	(2.160)	(17.140)	(19.981)
SW F(1st stage/ Height)	22.37	15.04	6.13	14.87	3.46	2.82
SW F(1st stage/ Schooling)	73.62	40.29	36.73	83.47	7.64	11.30
Observations	5,820	5,820	5,820	5,510	5,510	5,510
R-squared	0.204	0.637	-0.274	0.228	-0.621	-0.061
Survey FE	NO	YES	YES	NO	YES	YES
Province FE	NO	YES	YES	NO	YES	YES
Cohort Dummy	YES	YES	YES	YES	YES	YES
Other Controls	NO	NO	YES	NO	NO	YES

Note: This part reports the IV regressions. In column (1-3), the dependent variable is ln(income) of males. In column (4-6), the dependent variable is ln(income) of females. From column (1) to column (3), we add the cohort dummies, rural-urban dummy, and ethnicity dummy gradually. From column (4) to column (6), we add the cohort dummies, rural-urban dummy, and ethnicity dummy gradually. We include survey fix effect and province fixed effect in column (2), column (3), column (5), and column (6). The Sanderson-Windmeijer (SW) first-stage F statistics are test of individual endogenous regressors. See the text and Appendix for definitions and details. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

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