



# Investigating the Relationship Between Intergenerational Income Mobility and Higher Education: Comparison Among Urban, Rural and Migrants Groups in Contemporary China

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**Abstract:** Intergenerational income equality involves in the intergenerational mobility. Moreover, higher education is always considered as key elements to stimulate intergenerational mobility. Thus, the ultimate goal of this study is to examine the relationship between intergenerational income mobility and higher education for three major groups, including urban residents, rural residents, and rural-urban migrants from a political economic perspective. Theoretically speaking, interactive autonomy-based Political Economic Theory has been utilized to elaborate the rationales of social and education stratification and solidification that implicitly impact the intergenerational income mobility for rural, urban and migrants' families in contemporary China. Moreover, the findings from this study suggested that urban higher income group and rural higher income groups are significantly influenced by children's length of education. In addition, father's income has significantly impact on children's income for urban higher income group, urban low-income group, rural high-income group, and rural low-income group. Moreover, father's length of education has directly impact on children's length of education for most of groups. Furthermore, father's length of education has significant impact on father's income for all groups. Additionally, based on the results from this study, relevant policy recommendations and suggestions have been provided to eliminate the gaps between intergenerational mobility and inequality of education access.

**Keywords:** Intergenerational Income Mobility, Rural-Urban Migrants, Higher Education, Social Stratification

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## 1. Introduction

Generally speaking, intergenerational income equality is embedded in intergenerational mobility. In other words, the more impact of acquired factors is, including education on children's income, the more intergenerational income equity is. Hence, the relationship between education and intergenerational income can be illustrated by examining restrictive factors, such as education on children's incomes. In recent decades, in the market-oriented economy, the increasing gaps between rich and poor within different social classes and groups is essential to influence the overall development of Chinese society [1]. Enlarging income gaps offers families to get access to various means of obtaining job opportunities in order to guarantee their children receive a competitive edge in social economic status in terms of improving intergenerational income equity for next

generations. Hence, in this sense, higher education plays an important role in stimulating intergenerational income mobility and guarantee intergenerational equity. Moreover, from a human capital theory perspective, education is fundamental to the acquisition of knowledge, skill and experience. Specifically, in recent decades, Chinese economy has witnessed dramatic increased and has become the second-largest economy in the world. Since 1987, Chinese government started in a process of reforming agriculture, trade, investment, and financial markets [2]. However, Chinese economy is still faced with some barriers, such as income disparity, which has been serious during past two decades. In accordance with the trends of competitive labor market, within the advancement of technological and social development, more and more jobs or emerging occupations is closely related to rigorous demands of higher education levels. Therefore, the purpose of this research is to examine the

relationship between intergenerational income mobility and higher education for three social groups, including urban residents, rural residents, and rural-urban migrants in contemporary China. Thus, the research questions in this study are shown as follows:

- a. Does people's higher education background play a causal effect on whether they are in the high-income group for rural, urban and migrants groups?
- b. How does the length of higher education affect children's income for rural, urban and migrants groups?
- c. How does the length of education affect the father's income for rural, urban and rural-urban migrants groups?
- d. What is the relationship between father's income and children's income for these three groups?
- e. What are implications/suggestions for examining intergenerational income mobility and higher education?

## 2. Literature Review

### 2.1. Intergenerational Mobility

Defining the idea of intergenerational mobility is fundamental to get in-depth understanding of intergenerational income mobility. Specifically, the term of intergenerational mobility involves in urban-rural mobility, occupational mobility, and intergenerational income mobility [3]. Since 1990s, more and more researches focused on occupational intergenerational mobility for the study of intergenerational mobility. In this sense, many scholars suggested that income is an essential economic resource possession for social members in consistent with some assumption, including equal work does not get equal pay; job salary shows long-term income rather than short-term income; father and children hold identical jobs and their incomes might be different in terms of social and economic indicators. Hence, intergenerational mobility is deeply rooted in the economic and political transitions in a global context. Moreover, intergenerational mobility is closely associated with intergenerational income mobility.

### 2.2. Intergenerational Income Mobility

In recent decades, there existed lots of studies on intergenerational income mobility. Specifically, Solon (1992) applied Panel Study of Income Dynamics (PSID) of the USA to formulate regression model of parents' income and children's income for analyzing the major influence of father's income on children's income. In this research, the intergenerational income coefficient of elasticity was used to illustrate a strong transmission effect in intergenerational income [4]. Moreover, Elizabeth furthermore indicated that father's income has not much more effect on children's income after deducting factors of father's education and ethnic background [5]. Moreover, Couch and Lillard suggested that it is not reasonable to delete zero income samples and select father's one-year income as main variables to measure the intergenerational income [6]. In their research, within zero income samples, the intergenerational income mobility is

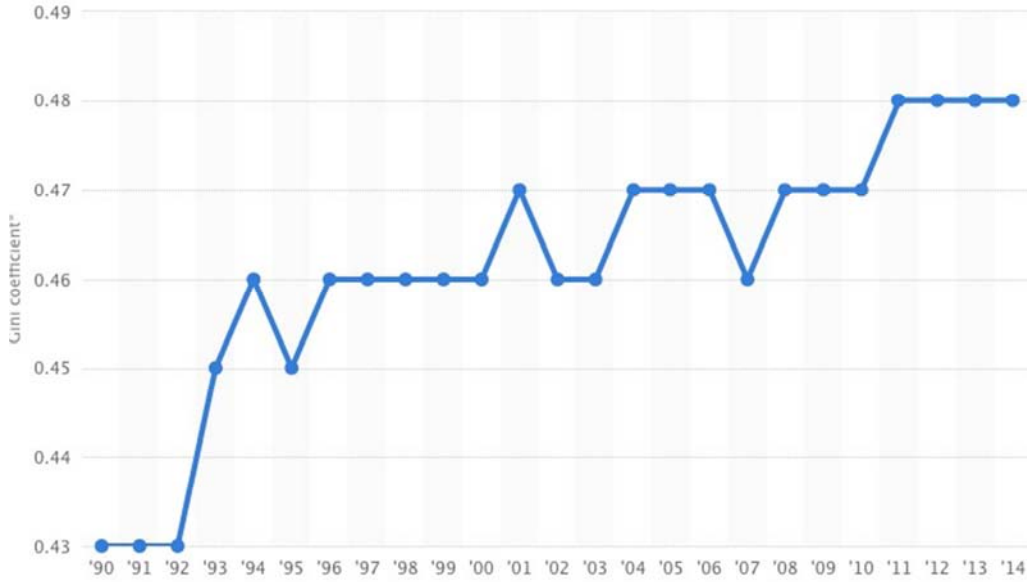
related to father's education and income in children's income. Besides, this research was shown that father's income has a great impact on children's short-term income. In this sense, Corak and Heisz argued that the influence of father's income on children's income might be different by various income groups [7]. Specifically, they used data of personal income and tax payment in Canada, by applying 11,001,000 and 10,000 US dollars as cut off points of father's average income within five years and divided the total samples into four sections. This research demonstrated that the intergenerational mobility has less effect on children's income in Canada. In addition, Aughinbaugh also adopted Solon research design by using PSID (1951-1956) survey to examine the intergenerational effect of income in the U. S. has changed significantly [8]. Specifically, the intergenerational income coefficient of elasticity increases from 0.413 to 0.397 in 1984.

Moreover, from an international perspective, lots of studies on intergenerational mobility focused on international comparison across countries. For instance, Bjorklund and Jantti conducted a survey in life quality in Sweden by using same econometric model of Solon to investigate intergenerational mobility of income in Sweden [9]. This study shows that father's income have less effect on children's income in Sweden with the intergenerational income coefficient of elasticity is 0.282, which is less than 0.386 in the U. S. Based on the comparison of intergenerational coefficients of elasticity in UK and U. S., Solon found that U. S. and UK are weaker than Canada and Sweden in terms of intergenerational income mobility [10]. Moreover, there also existed several studies on intergenerational income mobility between male and female. For example, Dearden and Mchin also compared gender differences in the impact of the father's income on children's income by using 1974 survey on development in the UK [11]. This research demonstrated that there is a strong intergenerational income impact on the U. S. and this impact of father's income on children's income varies slightly by sex. The father's income has less impact on son's income than on daughter's income with their coefficients of regression are 0.428 and 0.455 respectively. In addition, from a historical perspective, Levine and Mazumder established econometric model of intergenerational mobility for comparing intergenerational mobility in 1980 and 1993 [12]. This research suggested that the intergenerational income transmission has increased while the mobility is relevantly weak. Furthermore, Nam also argued that income unfairness was still serious in U. S. society [13]. In other words, children from high-income group are more likely to keep high income whereas those of low-income families are less likely to improve their chance of moving into high-income groups.

Therefore, based on the literature previously, the most of studies on the intergenerational income mobility mainly focused on exploring the relationship between father's income on children's income with less attention on the implicit relationship between higher education and intergenerational income mobility. Moreover, most of research related to intergenerational mobility more focused on developed countries by using empirical research on intergenerational

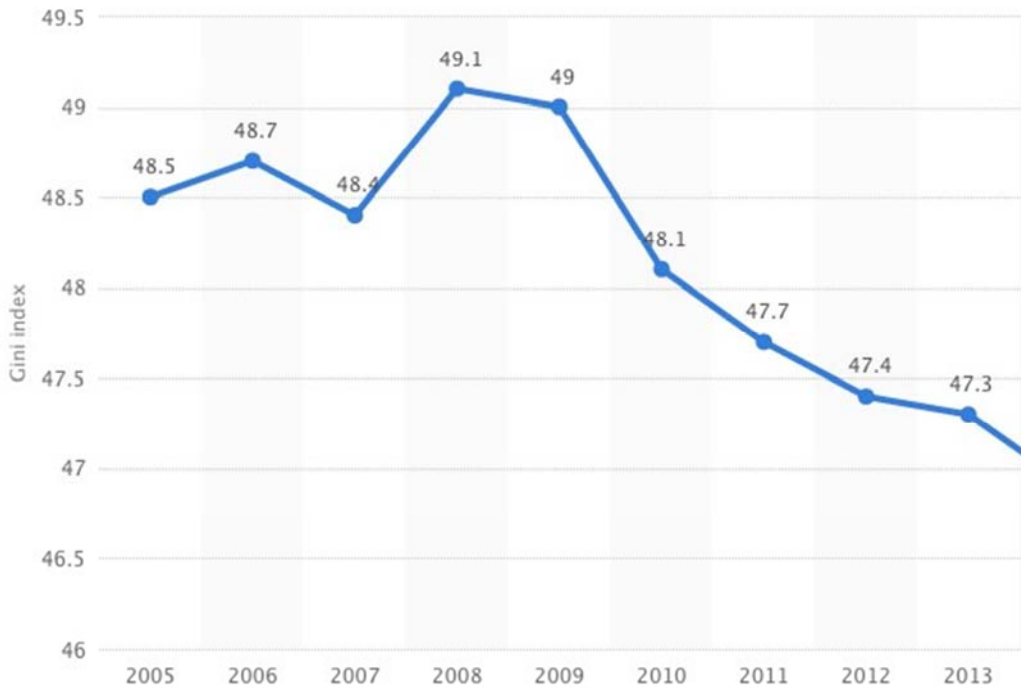
income mobility, such as U. S. Canada, and Sweden. Based on the results from international scholars in this field, this research focuses on intergenerational occupational mobility for different social group, including rural residents, urban residents, and rural and urban migrants. Practically speaking, compared with U. S. Gini coefficient from 1990 to 2014 (See Figure 1), Gini coefficient in China is rapidly increasing in recent years (2005- 2015) that approximately approach to U. S. Gini coefficient (See Figure2). This result demonstrates that

investigating intergenerational income mobility is becoming significant in contemporary Chinese society. In this sense, unfair income distribution becomes a major limitation of the development of social stability in contemporary China. Therefore, analyzing the relationship between intergenerational income mobility and education for major three social groups, including rural residents, urban residents, and rural and urban migrants is essential for contemporary society.



Resources: <https://www.statista.com/statistics/219643/gini-coefficient-for-us-individuals-families-and-households/>

**Figure 1.** U. S. household income distribution from 1990 to 2014 (by Gini-coefficient).



Resources: <https://www.statista.com/statistics/250400/inequality-of-income-distribution-in-china-based-on-the-gini-index/>

**Figure 2.** Gini coefficient in China: inequality of income distribution in China from 2005 to 2015.

### 2.3. *Income Mobility and Inequality in China*

From a policy perspective, large income disparity in contemporary China involved in a political transition from Egalitarianism to “Letting a Few People Get Rich First”. Since 1949, the income inequality was suppressed within its socialist egalitarian system [14]. In order to minimize income inequality, Chinese central government adopted different kinds of policies to balance income distribution. As egalitarianism gained increasing popularity, distinguishes between high-and low-income populations diminished in contemporary China. In other words, the egalitarianism led to low-income disparity in terms of inefficient political system that led to economic stagnation. Moreover, since 1978, Chinese government undertook a new economic development policy that allowed a small number of people to get rich first and used them to stimulate enthusiasm and imitative in the rest of the population. This policy focused on the influence of entrepreneurial competent and human capital in determining economic returns. In accordance with this policy, in urban areas, the reform of the state-owned enterprises (SOEs) and private industrial and service sectors significantly changed the economic returns to human capital offering higher inequality of earnings and incomes. Furthermore, in rural areas, the household responsibility system (HRS) has been adopted to keep a greater share of economic returns to their own labor and entrepreneurial skills in managing their farms. The process of liberalization of farm-related activities focuses on establishing family-run businesses that provided Potential Avenue for households to earn more than their neighbors. The township and village enterprises (TVEs) are established to offer households with an approach to earn a living off the farm, which generating greater differences in income between farmers and non-farm rural population [15]. Moreover, with the development of rural industrialization, increasing economic returns to human capital and skills leads to higher income inequality. From a neoclassical growth model perspective, income convergence model occurs in economic growth. Such income convergence involves in a relative homogeneity in technology, preferences and institutions. In China’s context, large disparity still occupied in different parts of China between rural and urban areas. In addition, rural and urban income inequality, regional inequality, intra-urban and intra-rural inequality all contributed to enlarging income disparity in contemporary China.

China’s income inequality is rooted in heavy-industry-oriented development strategy in terms of accelerating the pace of industrialization in contemporary China. The household registration system also plays a negative role to alleviating rural and urban income and education inequality [16]. Hence, relaxing China’s residential registration system is essential to stimulate more and more labor migration from rural to urban areas. Moreover, Chinese government has adopted a flawed sectorial development strategy among provinces [17]. Historically speaking, since

1949, the Great Leap Forward Strategy concentrated on developing capital-intensive heavy industries in the central and western China. However, the regional allocation of these high-priority industries is inconsistent with the comparative advantage of those provinces. In order to maintain the functions of these industries, Chinese government decreased some prices of natural resource that is equivalent to a tax imposed to these regions. In accordance with economic reform imitated in 1978 focusing on allowing some people and some regions to get rich first, the rural and urban income inequality is gradually enlarged by allocating promising growth regions with significant increase in investments in coastal regions [18]. In addition, regional based policies also led to the restriction on labor migration, which limited impact on spatial income distribution. There existed many explicit regulations on labor mobility, such as Hu Kou system, preferential employment opportunities for local residents, pension and health care arrangement, high costs of children care and education for migrant families. In other words, the institutional factors directly impacted on regionally biased policies on spatial disparity.

As a stakeholder of rural residents, providing sustainable incentives to farmers is important to boost their incomes in terms of providing low-cost capital and health insurance. For urban residents, the income inequality also began increasing in the mid-1980s in the early stage of urban economic reforms. Different kinds of welfare impacted on different residents. For example, Chinese government implemented the policy of profit sharing and decentralization by allocating local governments and state-owned enterprises to retain parts of their revenues or profits. Chinese government subsequently adopted the policy of privatizing small and medium-sized SOEs in the trend of the internal drive for more profits and external competitive tensions. Hence, many SOEs undertook structural reforms of cutting payrolls to enhance economic efficiency. As this result, hundreds of thousands of urban workers were laid off accounting for tightened pension of SOEs. Within this trend, urban labors were faced with booming economics and promising opportunities to increase their incomes, such as elite groups and young generation who can profit from the political and economic power. However, the income decreased for unemployed and laid-off workers also trigger a series of economic pressures in contemporary China. To be summarized, the strict central planning and restrictions on migration between rural and urban have generated serious inequality in income and education.

## 3. Conceptual Framework

### 3.1. *Interactive Autonomy-Based Political Economic Theory*

In this study, interactive autonomy-based political economic theory is unitized to examine the relationship between intergenerational income mobility and higher education from a political economic perspective.

Specifically, interactive autonomy-based political economic theory assumes that policy and economic are interacted with each other as one environment, which identified as the term of interactive autonomy. Interactive autonomy involves in self-organization theory focuses on a self-organizing system in consistent with an environment in a state of perpetual interaction with each other [19]. In other words, the autonomy of social system is related to their openness and interconnectedness with other social systems and their environment. This situation allows the emergence of differentiated systems, which governing laws or principles are different with dynamically interconnected. The emerging system is nested with others. The complexity of overall social system is the product of successive self-organization and resulting differentiation. The economic system and political system are interdependent. Specifically, traditional approaches for connecting economy and policy focus on economic reductionism and Orthodox Marxism. The emergence of New Social Movements is associated to relative autonomy of policy and economy. Regulation theory assumes that a capitalist model of development includes regime of economy and a mode of policy that both of them have their own specific antagonistic structure. Moreover, dualistic theory suggested that political and economic systems are interdependent and political intervention into economy has an unpredictable outcome.

### **3.2. Social System Theory and Self-Organization Model**

Furthermore, another dualistic approach is Niklas Luhmann's social system theory, concerning on logic and mode of self-organization. The complexity of modern society is related to a polycentric and decentralized characters. Luhmann argued that realizing self-constitution without continual intervening physical force plays significant role in politics. The liberalization of economic is central to the wealth and basic conditions of economy [20]. In other words, Luhmann did not focus on autonomous, self-regulating capacity of market force. Moreover, in accordance with Luhmann's concept of society theory, the society is inherently centerless, polycentric, and uncontrollable [21, 22, 23, 24, 25, 26]. In addition, Hayek's theory has been highly influential, having tremendous consequences for contemporary policy design. Hayek's reductionist misconception of society leads to the assumption that all deliberate intervention is harmful, hence humans should not intervene into social structures. However, this theory neglects the role of creative human agency in social development and self-organization society. Moreover, from a neoliberal ideological perspective, economy is closely independent from society, which market involved in organizing producing and distributing efficiently. Hayek and Luhmann suggested that the concept of Neoliberalism, focusing on the dominance of the economic systems in society as illustrated. Therefore, the dualistic separation of policy and economy has been questioned from the tradition of Marxist political perspective.

From a self-reproduction of the Economic System

perspective, economy, polity and culture are rooted in asymmetrical flows and accumulation of capital, power and hegemony. Moreover, the economic cycle of self-organization is also related to self-autonomy of policy. From self-reproduction of the political system, the state is the predominate unit of political self-organization. The state is a form of political self-organization that is based on asymmetrical distributions of power, domination, the permanent constitution of codified rules (laws) through legislation, sanctioning and controlling execution of these rules and punishment of disobedience and violation of these rules. Hence, the political relationship involves in how power is constituted, distributed, allocated and disposed. It is worth noting that economic value and political values are not entirely independent, though many economic processes and political processes can go on without any interaction with the other realm. Particularly, economic subsistence is demand for political security, and for most situations in modern society some wealth is required for most freedoms to be exercised. In relating economy and polity we do not want to automatically give primacy to one of the two systems because this can result in deterministic and simplistic arguments that derive the logic and functioning of one system from the logic of the other system. Economy and polity are relatively autonomous systems and they both have their own practical and structural logic that in modern society is one of accumulation and heteronomy, and they are connected to and based on social processes in other systems.

### **3.3. Self-Autonomy Based Conceptualized Framework**

Based on the elaboration previously, interactive autonomy-based political economic theory, Social System Theory and Self-organization Model all contributed to conceptualize the theoretical framework of investigating intergenerational income mobility and higher education. Moreover, examining the relationship of intergenerational income mobility and higher education is deeply embedded in political, social and economic systems in consistent with the complexity and ambiguity of this issue. Specifically, political, social and economic systems are systemically interacted with each other (See Figure 3): the social system as a mediator includes hierarchal sequences, such as social stratification, education stratification, class stratification, and cultural stratification; the political system serves as an input function plays implicitly impact on the economic system. In other words, the intergenerational income mobility is deeply rooted in the interaction of political system and economic system. For this study, the social system plays a mediator role to influence the development of economic system. Based on this conceptualized framework, political system can indirectly influence the income mobility by the mediator of education stratification inherently. The implicit relationship among politics, education, and income mobility can be vividly shown in the self-autonomy based conceptualized framework.

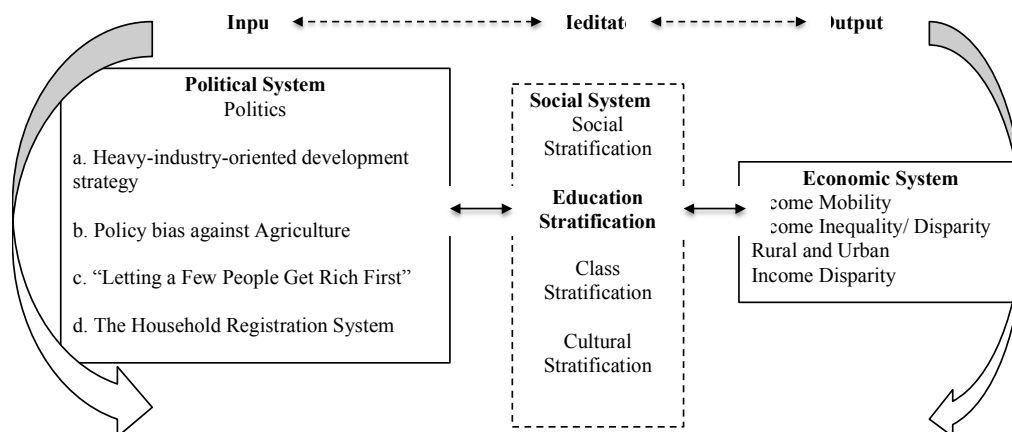


Figure 3. Conceptual the Framework of Intergenerational Income Mobility and Education.

## 4. Methodology

### 4.1. Descriptive Data Analysis

The Survey of Urban and Rural Residents Income Distribution and Living Conditions (2013) is utilized in this research and launched by China Economic Monitoring and Analysis Center of National Bureau of Statistics of China. Specifically, this survey covers 31 provinces and municipalities in mainland, China. This survey is divided into three sections—urban, rural and migrants. The total sample size is 72,333, which including urban residents (16,460), rural residents (35,845) and migrants from rural to urban areas (2,028). For this study, selected valid intergenerational pairs include 1010 urban families, 2040 rural families, and 107 migrants’ families. Specifically, for the urban income group, income of individual employees is averagely RMB 38,425.0; that of fathers is averagely RMB 37,778.58, that of children doesn’t exceed of fathers’ income, averaging RMB 32,372.12;

for rural income group, income of individual employees is averagely RMB 25,297.02; that of fathers averages RMB 24782.88; that of children exceeds that of fathers’ salary, averaging RMB 27,772.22; for migrants’ income group, income of individual employees is RMB 35,836.87; that of fathers’ income is averagely RMB 29,596.05 while that of children averages RMB 26,726.12. Moreover, for the length of education, in the urban group, the mean of length of education is 10.21 years; that of fathers’ education averages 9.35 years; that of children’s education higher than fathers’, averaging 13.02 years; for the rural group, the mean of length of education is 7.39 years; that of fathers’ averages 7.49 years; that of children higher than fathers’ education, averaging 10.48 years; for the migrant group, length of education averages 8.44 years; that of father’s education averages 8.21 years while that of children averages 9.68 years. The comparisons of the income distribution and the length of education for urban, rural, and migrants’ groups are shown in Table 1:

Table 1. The Comparison among Urban, Rural and Migrant Groups in Average Income and Average Length of Education.

	Father’s average income	Children’s average income	Individual’s average income	Father’s average length of education	Children’s average length of education	Individual’s average length of education
Urban	37,778.58	32,372.12	38,425.01	9.35	13.02	10.21
Rural	24,782.88	27,772.22	25,297.02	7.49	10.48	7.39
Migrant	29,596.05	26,726.12	35,836.87	8.44	8.21	9.68

In addition, in this study, besides comparing intergenerational pairs in different groups, urban, rural and migrants’ group also are divided into high income group and low income categories by the median of income for each group. The medians of each income group are described as follows,

Table 2. The Standards of High and Low Income Groups among Urban, Rural and Migrant residents.

	Low Income	High Income	Median Income	Average Income	Sample Size
Urban	<30,000	≥30,000	30,000	38,425.01	16,460
Rural	<22,000	≥22,000	22,000	25,297.02	35,845
Migrant	<30,000	≥30,000	30,000	35,836.87	2,028

Statistically speaking, for skewed distribution of data set,

we always utilize the median of data set to describe as the numeric value that separating the higher half and lower of a sample rather than applying mean of data set that is arithmetic average of a set of numbers or distribution [27]. In addition, the description of the pair intergeneration data among three groups is shown in Table 3.

Table 3. Frequency of Urban Respondents’ Background.

Variable	N	Percentage
Children’s Sex	1010	
Male	648	64.16%
Female	362	35.84%
Whether father is in the high income group	1010	
Yes	584	57.82%
No	426	42.18%
Whether children are in the high income group	1010	

Variable	N	Percentage
Yes	503	49.80%
No	507	50.20%
Father's education background	1010	
Not be educated	14	1.39%
Elementary School	139	13.76%
Middle School	410	40.59%
High School	254	25.15%
Secondary Vocational Technical School or Technical School	13	1.29%
Technical Secondary School	42	4.16%
Junior College	94	9.31%
University	40	3.96%
Graduate School (M. S. or Ph. D.)	4	0.40%
Children's education background	1010	
Not be educated	2	0.20%
Elementary School	7	0.69%
Middle School	171	16.93%
High School	125	12.38%
Secondary Vocational Technical School or Technical School	78	7.72%
Technical Secondary School	90	8.91%
Junior College	271	26.83%
University	245	24.26%
Graduate School (M. S. or Ph. D.)	21	2.08%

Notes: All the intergenerational pairs are adult and working. Their education background is the highest degree they obtained.

**Table 4.** Frequency of Rural Respondents' Background.

Variable	N	Percentage
Children's sex	2040	
Male	1566	76.76%
Female	474	23.24%
Whether father is in the high income group	2040	
Yes	953	46.72%
No	1087	53.28%
Whether children are in the high income group	2040	
Yes	1257	61.62%
No	783	38.38%
Father's education background	2040	
Not be educated	43	2.11%
Elementary School	577	28.28%
Middle School	1107	54.26%
High School	277	13.58%
Secondary Vocational Technical School or Technical School	2	0.10%
Technical Secondary School	17	0.83%
Junior College	15	0.74%
University	2	0.10%
Graduate School (Master or Ph. D.)	0	0.00%
Children's education background	2040	
Not be educated	3	0.15%
Elementary School	94	4.61%
Middle School	1021	50.05%
High School	266	13.04%
Secondary Vocational Technical School or Technical School	146	7.16%
Technical Secondary School	127	6.23%
Junior College	240	11.76%
University	139	6.81%
Graduate School (M. S. or Ph. D.)	4	0.20%

Notes: All the intergenerational pairs are adult and working. Their education background is the highest degree they obtained.

**Table 5.** Frequency of Migrant Respondents' Background.

Variable	N	Percentage
Children's sex	107	
Male	76	71.03%
Female	31	28.97%
Whether father is in the high income group	107	
Yes	52	48.60%
No	55	51.40%
Whether children are in the high income group	107	
Yes	40	37.38%
No	67	62.62%
Father's education background	107	
Not be educated	0	0.00%
Elementary School	28	26.17%
Middle School	58	54.21%
High School	19	17.76%
Secondary Vocational Technical School or Technical School	1	0.93%
Technical Secondary School	1	0.93%
Junior College	0	0.00%
University	0	0.00%
Graduate School (M. S. or Ph. D.)	0	0.00%
Children's education background	107	
Not be educated	0	0.00%
Elementary School	3	2.80%
Middle School	56	52.34%
High School	12	11.21%
Secondary Vocational Technical School or Technical School	8	7.48%
Technical Secondary School	8	7.48%
Junior College	13	12.15%
University	6	5.61%
Graduate School (M. S. or Ph. D.)	1	0.93%

Notes: All the intergenerational pairs are adult and working. Their education background is the highest degree they obtained.

## 4.2. Data Analysis

### 4.2.1. Intergenerational Income Coefficient of Elasticity

Generally speaking, the intergenerational income coefficient of elasticity is considered as one important indicator measuring intergenerational income mobility. Moreover, intergenerational income coefficient of elasticity mainly measures the impact of the father's income on children's income. In other words, a higher the coefficient is, a larger the impact of the father's income on children's income and a lower intergenerational income mobility of the society. On the contrary, the lower the coefficient is, the weaker the impact of the father's on children's income and the stronger intergenerational income mobility of society. In this study, intergenerational income mobility model of Solon is used for this model as follows,

$$y = \beta_0 + \rho q + \beta_{11}x_1 + \beta_{12}x_1^2 + \beta_{21}x_2 + \beta_{22}x_2^2 + \varepsilon \quad (1)$$

Where  $y$  represents the logarithm of children's income;  $q$  represents the logarithm of father's income;  $x_1$  represents children's length of work;  $x_2$  represents father's length of work and  $\varepsilon$  is the error term. Within this formula,  $\rho$  represents the intergenerational income coefficient of elasticity. To compute it, we set vector  $X$ ,  $B$  as below,

$$X = (1, q, x_1, x_1^2, x_2, x_2^2) \quad (2)$$



$$B = (b_i) = (\beta_0, \rho, \beta_{11}, \beta_{12}, \beta_{21}, \beta_{22}) \quad (3)$$

Then, the intergenerational income coefficient of elasticity can be computed as  $\rho = \hat{b}_2$ , where

$$\hat{B} = (\hat{b}_i) = (X^T X)^{-1} X^T y \quad (4)$$

Specifically, Intergenerational Income Coefficients of Elasticity for urban, rural and migrant groups are calculated separately. Based on the separated quadratic regression mentioned previously, the intergenerational income coefficients of elasticity for three groups are shown in Table 6.

**Table 6.** Intergenerational Income Coefficients of Elasticity for Three Group.

	Urban	Rural	Migrant
High income group	0.1297	0.0454	0.1242
Low income group	0.2893	0.1911	0.2840
Overall	0.3779	0.2218	0.4200

According to the outcome above, within these three groups, the migrants group has the largest value of intergenerational income coefficient of elasticity. For each sub group, high-income group of rural intergenerational pairs has the smallest value, while the low-income group from urban intergenerational families has the largest value. To explain the meaning of coefficient of elasticity, for instance, for urban intergenerational pairs with the value of intergenerational income coefficient of elasticity is 0.1297, which means one percent of increase in father’s income, the children’s income increases by 12.97%. This result also indicated that father’s income has a larger impact on children’s income in migrant group rather than rural group.

**4.2.2. Propensity Score Matching**

For this research, the major purpose is to test whether people’s higher education background has the causal effect on whether they are in the high-income group or not. In other words, we tend to examine whether the people have higher education background is major reason that they keep higher change for obtaining high-income group. Specifically, in the causal inference domain, the potential outcome of individual  $i$  is  $y_i^1$  and  $y_i^0$ , where 1 represents the individual is in the treatment group and 0 means the individual is in the control group. For each individual, both  $y_i^1$  and  $y_i^0$  exist in the same framework; an individual-level causal effect can be described as the difference  $y_i^1 - y_i^0$ . Moreover, the observed outcome variable  $Y$  by giving the definitions of  $Y^1$ ,  $Y^0$ , and  $D$ , the factor indicates whether in the treatment group are defined repeatedly.

$$Y = DY^1 + (1 - D) Y^0 \quad (5)$$

**Table 7.** Treatment-effects Estimation Model with Propensity-score Matching on Whole Intergenerational Pairs.

	Coef.	AI Robust Std. Err.	z-stat	95% C. I.	
Have Higher Education Background (ATT)	0.1698***	0.0346	4.91	0.1020	0.2375

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$  (two-tailed tests);  $N = 3,157$

According to the output previously, for the propensity score matching, since the ATT is significant to 0, it is suggested that

Average Treatment Effect (ATE) and Average Treatment Effect for the treated (ATT) are the indexes, which are usually used to measure the causal effect in causal inference analysis for the treat and control groups as follows:

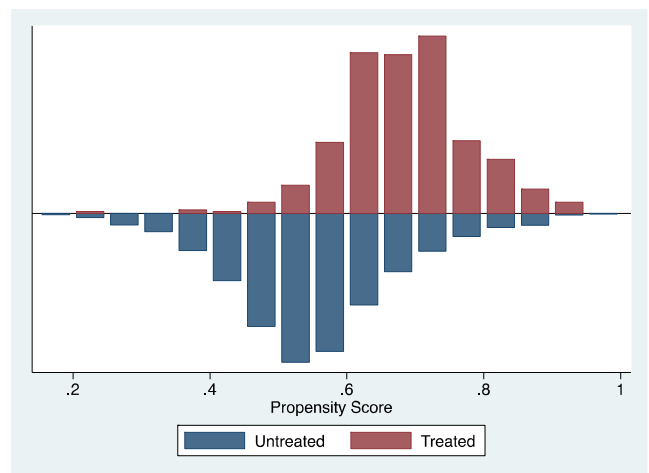
$$ATE = E [Y^1 - Y^0] = E [Y^1] - E [Y^0] \quad (6)$$

$$ATT = E [Y^1 | D = 1] - E [Y^0 | D = 1] \quad (7)$$

Controlled the bias for the estimation, Rosenbaum and Rubin (1983) proposed propensity score matching as an effective method. Propensity scores by logistic regression model are estimated by defaulting whether the children are in the high-income group, the dichotomous variable where high-income group equals 1 and low-income group equals to 0 as the dependent variable. This model is shown as below,

$$logit(P) = \alpha_0 + \gamma T + \alpha_1 M_1 + \alpha_2 M_2 + \alpha_3 M_3 + \tau \quad (8)$$

Where  $T$  represents the treatment group whether the children have the higher education background, value 1 means people are with bachelor degree or more while value 0 means people’s highest education is below to university,  $M_1$  represents the children’s length of working;  $M_2$  represents the logarithm of father’s income;  $M_3$  represents the length of father’s working and  $\tau$  is the error term. In this study, we can identify people who have the higher education background is the treatment group and who don’t have is the control group. The propensity score matching for the dataset is used to estimate ATT. In order to examine whether higher education background can let people come into the high-income group more easily within intergenerational-paired groups, the results for propensity score matching and the value of ATE are estimated as follows:



**Figure 4.** The Propensity Score Matching Graph For Intergenerational Pairs for three groups.



higher education background generally causes the people come into the high income group; more specifically, for the whole data, the chance for people who have the higher education background come into the high income group is 16.98% more than the people who don't have.

For the urban group, the results for propensity score matching and the value of ATE are shown as follows,

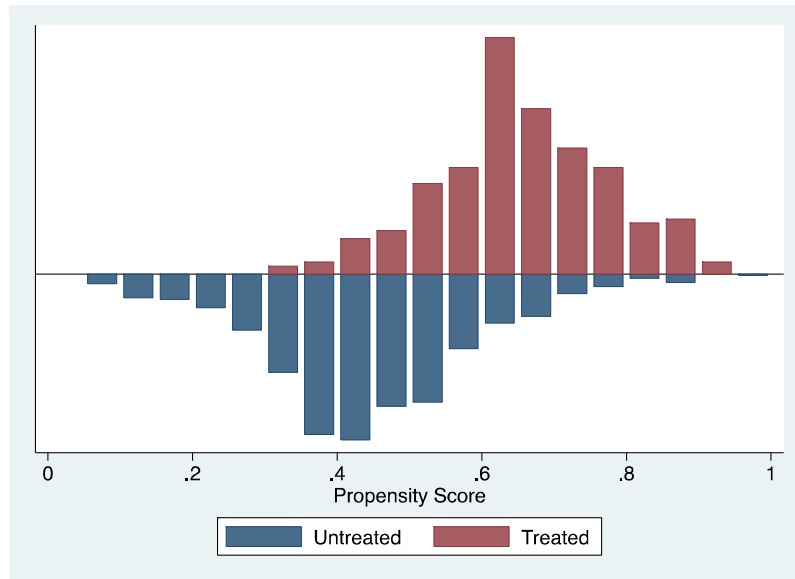


Figure 5. The Propensity Score Matching Graph For Urban Group.

Table 8. Treatment-effects Estimation Model with Propensity-score Matching on Urban Group.

	Coef.	AI Robust Std. Err.	z-stat	95% C. I.	
Have Higher Education Background (ATT)	0.1472**	0.0500	2.94	0.0492	0.2453

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$  (two-tailed tests);  $N = 1,010$

Specifically, based on the output previously, for the propensity score matching, since the ATT is significant to 0, it is proved that higher education background causes the people come into the high income group; more specifically, the chance for people who have the higher education background come into the high income group is 14.72% more than the people who don't have. For rural group, the result for propensity score matching and the value of ATE is as the figure and table below,

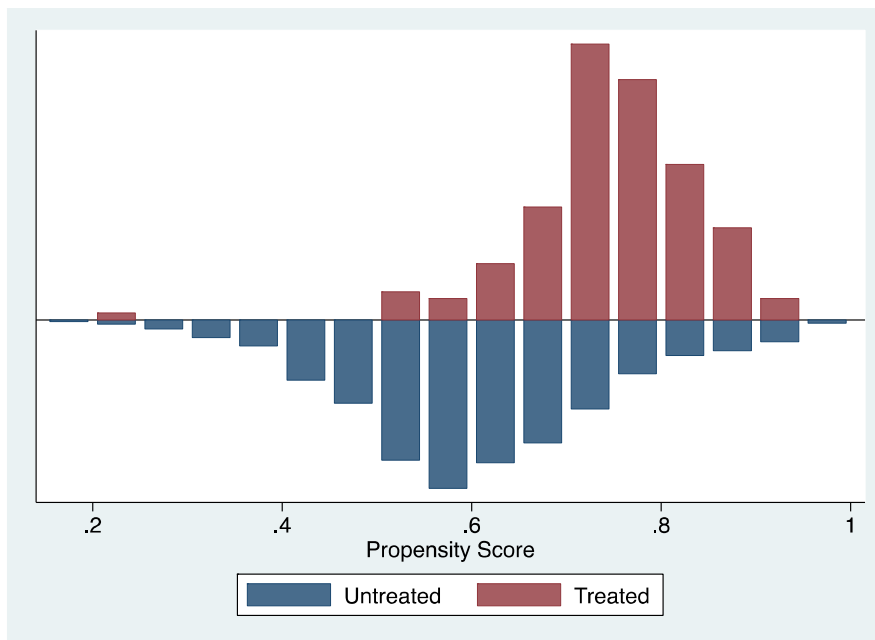


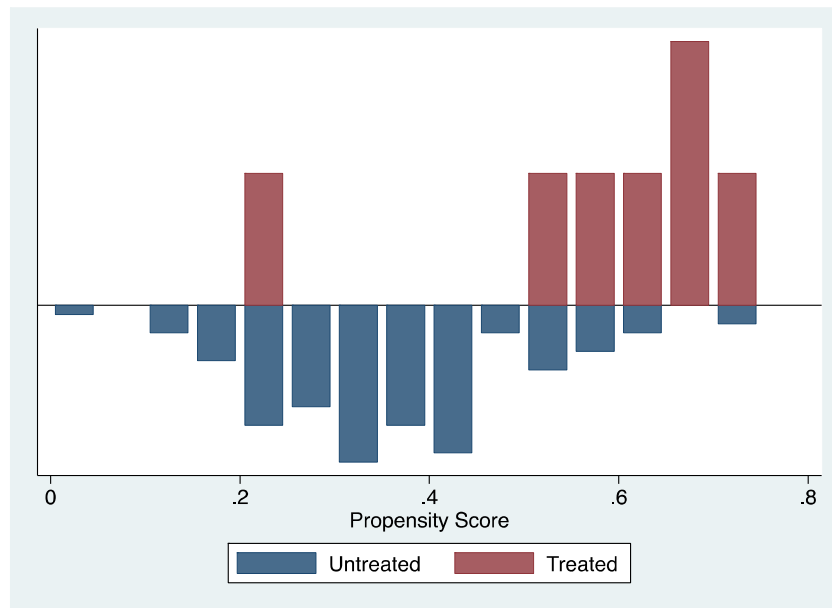
Figure 6. The Propensity Score Matching Graph For Rural Group.

**Table 9.** Treatment-effects Estimation Model with Propensity-score Matching on Rural Group.

	Coef.	AI Robust Std. Err.	z-stat	95% C. I.	
Have Higher Education Background (ATT)	0.2393***	0.0546	4.38	0.1322	0.3464

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$  (two-tailed tests);  $N = 2,040$

Specifically, for the propensity score matching, the ATT is significant to 0, which indicated that higher education background leads people to get high income. Moreover, the chance for people who have the higher education background come into the high-income group is 23.93% more than the people who don't have, which is larger than the urban group. For the migrant group, propensity score matching and the value of ATE also estimated as follows:



**Figure 7.** The Propensity Score Matching Graph For Migrant Group.

**Table 10.** Treatment-effects Estimation Model with Propensity-score Matching on Migrant Group.

	Coef.	AI Robust Std. Err.	z-stat	95% C. I.	
Have Higher Education Background (ATT)	0.2857	0.2124	1.35	-0.1306	0.7021

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$  (two-tailed tests);  $N = 107$

Based on the output previously, the value of ATT is not significant to 0, which denoted that higher education background is not the major reason that people are more easily come into the high income group, which is different from the urban and rural groups.

**4.2.3. Path Analysis**

For this study, path analysis is utilized to investigate how the length of education affects children's income. Hence, it is applied for examining the relationship between income and length of education. Specifically, path analysis is a statistically approach that describes the directed dependencies and cause effects among a set of variables in a system. This method introduces intermediate variables and decomposes effect of one variable on the other into direct effect between two or indirect effect through the intermediate variable, and may compare direct effect and indirect effect through standardized regression coefficient. The model of pathway analysis can be expressed as below,

$$m_2 = p_{21}m_1 \tag{9}$$

$$m_3 = p_{31}m_1 + p_{32}m_2 \tag{10}$$

$$m_4 = p_{42}m_2 + p_{43}m_3 \tag{11}$$

Where  $m_1$  represents father's education;  $m_2$  represents logarithm of father's income;  $m_3$  represents logarithm of children's education;  $m_4$  represents children's income and  $p_{21}, p_{31}, p_{32}, p_{42}, p_{43}$  are path coefficients of the path model, namely standardized regression coefficients of various variables. Moreover,  $p_{21}$  represents the impact of the father's education on father's income,  $p_{31}$  represents impact of father's education on children's education,  $p_{32}$  represents the impact of the father's income in children's education,  $p_{42}$  represents the impact of father's income on children's income and  $p_{43}$  represents the impact of children's education on children's income. In our model, father's education has indirect effect on children's income; father's income has direct effect and indirect effect through children's education on children's income.

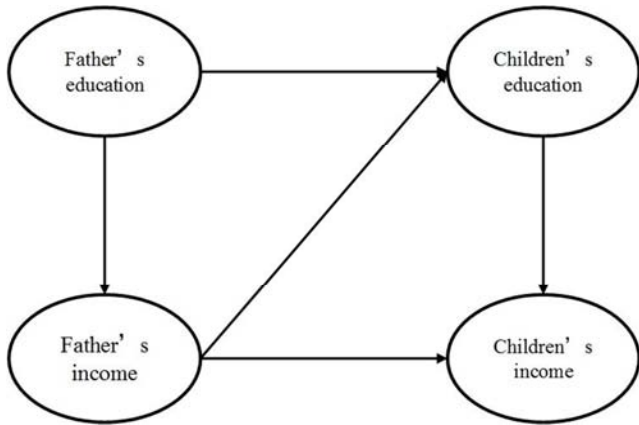


Figure 8. Conceptual Structure of Path Analysis.

*The Impact of Length of Education on Children's Income*

Especially, path analysis is utilized to examine urban high income group, urban low income group, rural high income group, rural low income group, migrant high income group and migrant low income group respectively, which aims to investigate the difference of education impacts on children's income within these groups. Specifically, the conceptual model of pathway analysis is shown in Figure 9.

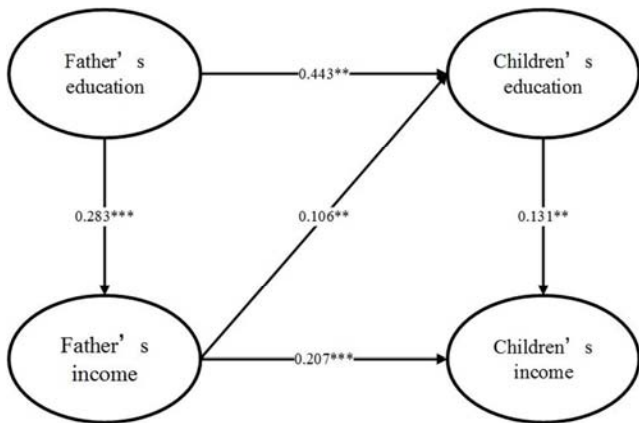


Figure 9. Path Analyses for High Income Group of Urban Intergenerational Pairs.

Specifically, for the high-income group of urban intergenerational pairs, all the estimated coefficients are significant to 0, which indicated, for both father and children, length of education affects their income and children's length of education also impacts on children's income.

Moreover, both father's education and father's income play indirectly effects on children's income. Specifically, each year of increases in children's length of education, the logarithm of children's income increases by 13.1%. Moreover, father's income also impacts in children's income. For low-income group of urban intergenerational pairs, the model can be expressed in Figure 10: the coefficient of children's education to children's income is not significant to 0 that indicated in this group, children's length of education doesn't affect children's income.

Moreover, for father's income, length of education also affects their income.

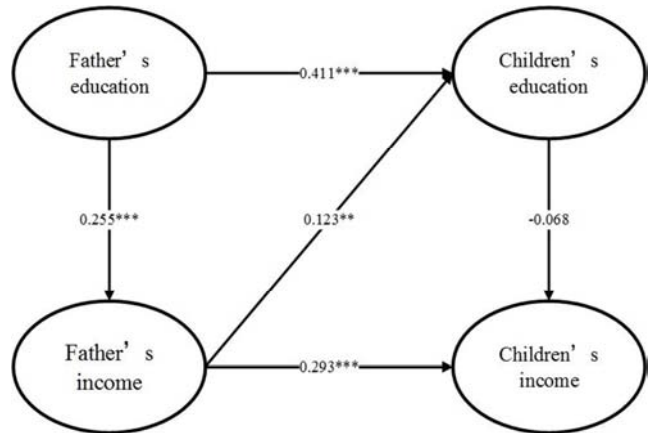


Figure 10. Path Analyses for Low Income Group of Urban Intergenerational Pairs.

For the high-income group of rural intergenerational pairs (See Figure 11), all the estimate coefficients are significant to 0, which conclude that, for both father and children, length of education affects their income and children's length of education also influences on children's income. In addition, both father's education and father's income play indirectly impacts on children's income, which suggested that each year of increases in children's length of education, the logarithm of children's income increases by 10.1%; Father's income will affect children's income.

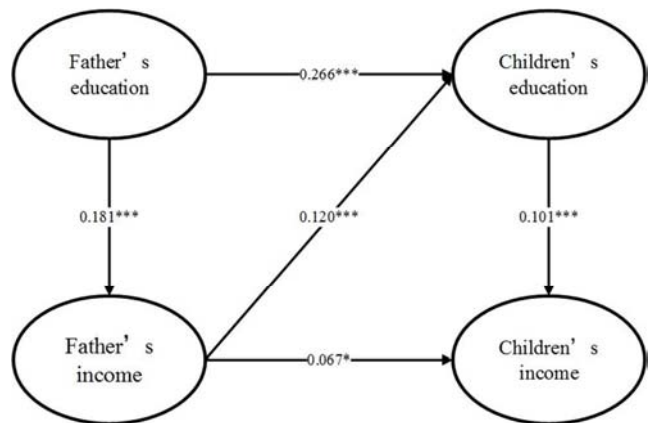


Figure 11. Path Analyses for High Income Group of Rural Intergenerational Pairs.

The model of low-income group of rural intergenerational pairs (See Figure 12) suggested that the coefficient of children's education to children's income is not significant to 0, which demonstrated that, in this group, children's length of education doesn't influence children's income. Furthermore, for father's income, the length of education also affects their income. And father's income significantly impacts on children's income statistically.

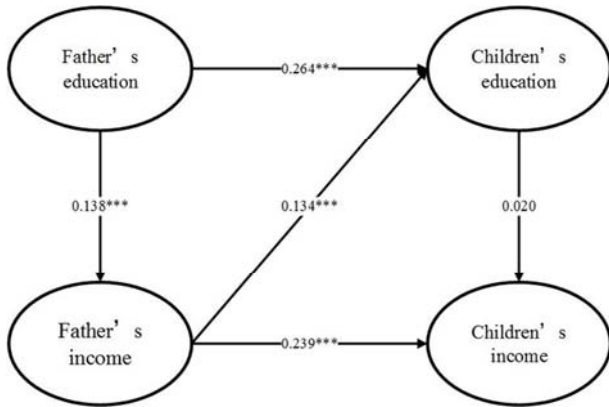


Figure 12. Path Analyses for Low Income Group of Rural Intergenerational Pairs.

The model of high-income group of migrant intergenerational pairs pointed out that the coefficients of children's education to children's income, father's income to children's education and father's income to children's income are not significant to 0, which suggested that, within this group, children's length of education doesn't affect on children's income, father's income does not affect children's education and father's income also has no impact on children's income. For father's income, length of education affects their income. What's more, father's length of education still affects father's income in high-income group of migrant intergenerational pairs.

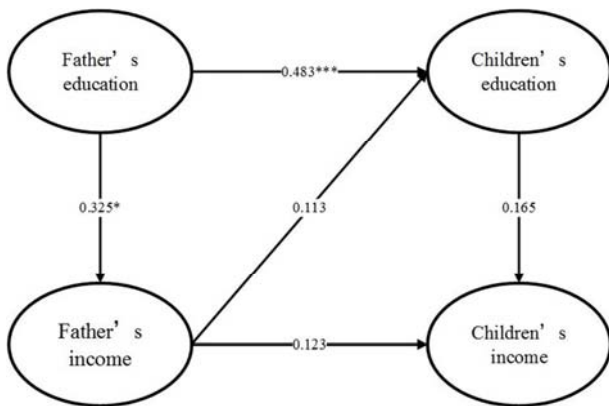


Figure 1. Path Analyses for High Income Group of Migrant Intergenerational Pairs.

For low-income group of migrant intergenerational pairs, the final model (See Figure 14) highlighted that the coefficients of children's education to children's income, father's income to children's education and father's length of education to children's length of education are not significant

to 0, which means they have no correlations. And for father's income, the length of education still significantly affects their income. In addition, father's income directly affects children's income in high-income group of migrant intergenerational pairs.

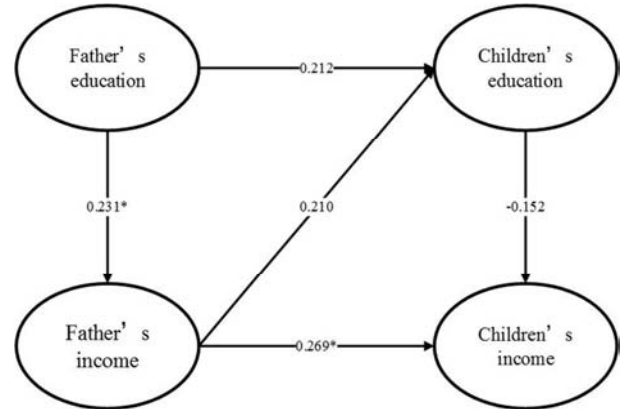


Figure 2. Path Analyses for Low Income Group of Migrant Intergenerational Pairs.

Summary of Groups Comparison

In the summary of groups comparison, the direct effect of children's length of education to children's income is identify as  $\delta_1$ , the direct effect of father's income to children's income is defined as  $\delta_2$ , the direct effect of father's length of education to children's length of education is denoted as  $\delta_3$ , the direct effect of father's income to children's length of education is represented as  $\delta_4$  and the direct effect of father's length of education to father's income is defined as  $\delta_5$  (See Figure 15).

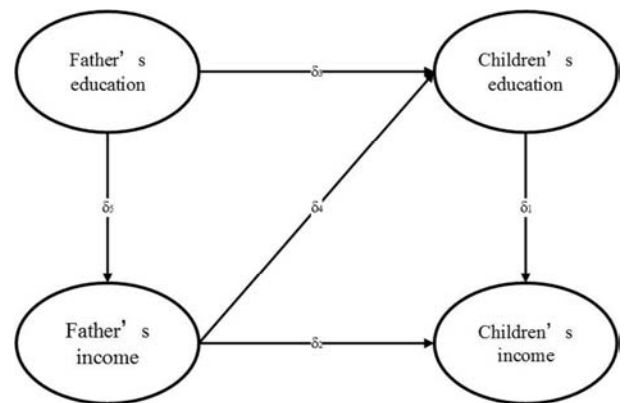


Figure 3. The Direct Effect Path Analysis in This Study.

Notes: the values of  $\delta_1$ ,  $\delta_2$ ,  $\delta_3$ ,  $\delta_4$  and  $\delta_5$  among six groups as the table below for comparison, which also verifies the result of causal inference analysis.

Table 11. Direct Effects in Path Analysis for Each Group.

	$\delta_1$	$\delta_2$	$\delta_3$	$\delta_4$	$\delta_5$
1.Urban High Income Group	0.131**	0.207***	0.443***	0.106**	0.283***
2.Urban Low Income Group	-0.068	0.293***	0.411***	0.123**	0.255***
3.Rural High Income Group	0.101***	0.067*	0.266***	0.120***	0.181***
4.Rural Low Income Group	0.020	0.239***	0.264***	0.134***	0.138***
5.Migrant High Income Group	0.165	0.123	0.483***	0.113	0.325*
6.Migrant Low Income Group	-0.152	0.269*	0.212	0.210	0.231*

Based on the summary of group comparison, overall speaking, for the direct effect of children's length of education to children's income ( $\delta_1$ ), urban higher income group and rural higher income groups are significantly influenced by children's length of education; For the direct effect of father's income to children's income ( $\delta_2$ ), father's income has significantly impact on children's income for urban higher income group, urban low income group, rural high income group, and rural low income group; For the direct effect of father's length of education to children's length of education ( $\delta_3$ ), father's length of education have directly impact on children's length of education for most of groups expect migrant low income group; the direct effect of father's income to children's length of education ( $\delta_4$ ), father income plays important influence on children's length of education for urban high income group, urban low income group, rural high income group, and rural low income group; for the direct effect of father's length of education to father's income ( $\delta_5$ ), father's length of education has significant impact on father's income for all six groups (See Table 11).

#### 4.2.4. Logistic Regression

In order to examine the major question concerning on how the length of higher education affects the children's income, investigating the question on whether the length of higher education impact on the children's income is identified by the method of logistic regression by defaulting the whether the children are in the high income group, the dichotomous

variable where high income group equals 1 and low income group equals to 0 as the dependent variable while the children's length of higher education, father's length of higher education and gender, 0 represents female while 1 represents male as the independent variable. The model is shown as below,

$$\text{logit}(P) = \beta_0 + \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 + \mu \quad (12)$$

where  $Z_1$  represents the children's length of higher education;  $Z_2$  represents the gender;  $Z_3$  represents whether the father in the high income group and  $\mu$  is the error term. Since we already assume that the father's length of higher education will affect the children's income indirectly, so we didn't put in into our basic model.

For the urban group, the result is shown in Table 12. The result from the logistic regression for urban group suggested that, every one year of increase in children's length of higher education, the weighted opportunity for them to move up into the high-income group increases by 13.99%. For sex, the chances of children who are male get into the high income group are 1.3412 times those of children who are female. The result also shows that if their father is in the high income group, the chances of children get into the high income group are 2.3727 times those of children whose father is in the low income group.

Table 12. Logistic Regression Model for Urban Group.

Whether the children in the high income group	Coef.	Std. Err.	t-stat	95% C. I.	
Length of education year	0.1309***	0.0245	5.34	0.0829	0.1790
Sex	0.2935*	0.1394	2.11	0.2026	0.5668
Whether the father in the high income group	0.8641***	0.1354	6.38	0.5988	1.1294
(Intercept)	-2.4072***	0.3535	-6.81	-3.1002	-1.7143

Note: \*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$  (two-tailed tests);  $N = 1,010$

Table 13. Exponential Transformation for Coefficients in Logistic Regression Model for Urban Group.

	Coefficient ( $\beta$ )	Exp ( $\beta$ )
Length of education year	0.1309***	1.1399
Sex	0.2935*	1.3412
Whether the father in the high income group	0.8641***	2.3729
(Intercept)	-2.4072***	0.0901

For rural group, the logistic regression for rural group shows that, every one year of increases in children's length of education, the weighted opportunity for them to move up into the high-income group increases by 10.98%. For sex, the chances of children who are male get into the high income group are 2.0606 times those of children who are female. The result also shows that if their father is in the high income group, the chances of children get into the high income group are 1.8236 times those of children whose father is in the low income group (See Table 14).

Table 14. Logistic Regression Model for Rural Group.

Whether the children in the high income group	Coef.	Std. Err.	t-stat	95% C. I.	
Length of education year	0.1042***	0.0178	5.87	0.0694	0.1390
Sex	0.7230***	0.1118	6.47	0.5039	0.9421
Whether the father in the high income group	0.6008***	0.0955	6.29	0.4136	0.7881
(Intercept)	-1.4263***	0.2239	-6.37	-1.8651	-0.9876

Note: \*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$  (two-tailed tests);  $N = 2,040$

**Table 15.** Exponential Transformation for Coefficients in Logistic Regression Model for Rural Group.

	Coefficient ( $\beta$ )	Exp ( $\beta$ )
Length of education year	0.1042***	1.1098
Sex	0.7230***	2.0606
Whether the father in the high income group	0.6008***	1.8236
(Intercept)	-1.4263***	0.2402

**Table 16.** Logistic Regression Model for Migrant Group.

Whether the children in the high income group	Coef.	Std. Err.	t-stat	95% C. I.	
Length of education year	0.3769***	0.0971	3.88	0.1866	0.5672
Sex	0.7666	0.5386	1.42	-0.2891	1.8222
Whether the father in the high income group	0.8873	0.4747	1.87	-0.0432	1.8178
(Intercept)	-5.2616***	1.1576	-4.55	-7.5305	-2.9928

Note: \*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$  (two-tailed tests);  $N = 107$

**Table 17.** Exponential Transformation for Coefficients in Logistic Regression Model for Migrant Group.

	Coefficient ( $\beta$ )	Exp ( $\beta$ )
Length of education year	0.3769***	1.4578
Sex	0.7666	2.1524
Whether the father in the high income group	0.8873	2.4286
(Intercept)	-5.2616***	0.0052

Moreover, the result from the logistic regression for migrate group suggested that, every one year of increase in children's length of education, the weighted opportunity for them to move up into the high income group increases by 45.78%. At the same time, since the estimate coefficient of sex and whether the father in the high income group are not significant to 0, we can say that there is no difference between high and low income in migrant group with the sex and whether the father in the high income group, that is, in migrant group, sex and whether the father in the high income group will not impact on whether the children in the high income group or not.

## 5. Conclusion

In this study, based on bundles of statistical approaches, we can get comprehensive results of examining the relationship between intergenerational income mobility and higher education. Firstly, in the pathway analysis, rural higher-income groups are significantly influenced by children's length of higher education; father's income has significantly impact on children's income for urban higher income group, urban low-income group, rural high-income group, and rural low-income group. Moreover, father's length of education has directly impact on children's length of education for the most of groups expect migrant low-income group. In addition, father income plays important influence on children's length of education for urban high income group, urban low income group, rural high income group, and rural low income group; father's length of education has significant impact on father's income for all six groups. In addition, in the logistic regression analysis, for the urban group, each one year of increase in children's length of education, the weighted opportunity for them to move up into the high-income group increases by 13.99%. For sex, the chances of children who are

male get into the high income group are 1.3412 times those of children who are female. The result also shows that if their father is in the high income group, the chances of children get into the high income group are 2.3727 times those of children whose father is in the low income group; for the rural group, each one year of increases in children's length of education, the weighted opportunity for them to move up into the high-income group increases by 10.98%. For sex, the chances of children who are male get into the high income group are 2.0606 times those of children who are female. The result also shows that if their father is in the high income group, the chances of children get into the high income group are 1.8236 times those of children whose father is in the low income group; for the rural-urban migrants' group, every one year of increase in children's length of education, the weighted opportunity for them to move up into the high income group increases by 45.78%. At the same time, since the estimate coefficient of sex and whether the father in the high income group are not significant to 0, we can say that there is no difference between high and low income in migrant group with the sex and whether the father in the high income group, that is, in migrant group, sex and whether the father in the high income group will not impact on whether the children in the high income group or not. Based on those results from the previous analysis, these findings suggested that, in contemporary China, education solidification and social class solidification is gradually becoming fundamental roles to reconstruct and reshape the social economic structures inherently. In addition, the intergenerational income inequality is increasingly enlarged by the educational solidification in current Chinese social system. In other words, higher income groups from urban areas obtained more higher education accessibility for higher income motivation while low-income groups from rural and migrants' families received less higher education opportunities and lower educational returns.

### *Policy Recommendations*

Specifically, the rising income and education inequality in China is considered as an important issue in contemporary China. Based on the results from this study, the social economic stratification and education class solidification is gradually becoming significant barriers in current China. Specifically, higher-income children in urban areas are more

likely to get access to higher education for higher income motivation while low-income children from rural and migrants' families are less likely to receive higher education opportunities and educational returns. Thus, how to eliminate these gaps for low-income students from rural and migrants' families is fundamentally essential to navigate the relationship between intergenerational income mobility and higher education in contemporary Chinese social context. There are some strategies and recommendations related to decrease the gaps between income and education inequality in current China as follows:

#### *Enhance Governmental Economic and Education Interventions*

Improving government intervention is fundamental to eliminate both income inequality and education class solidification. With the constraint of market mechanism, offering government intervention through income transfer programs is ultimately fundamental to narrow the gaps between rural and urban income and education inequality. In consistent with the idea of fiscal federalism, Chinese government should take inevitable responsibility to improving regional macroeconomic stabilization [28]. Specifically, building passive process of interregional risk sharing with automatic fiscal stabilizers is significant to address asymmetric shock among regions. In this sense, Chinese government should provide sufficient subsidies to regional governments to offer ample and flexible opportunities to increase income for rural and migrants groups. Moreover, enlarge enrollment number from both low SES families and low education accessibility is significant to encourage more and more students get access to higher education. Enhancing governmental intervention is beneficial to advocate sufficient approaches to eliminate the intergenerational income inequality and higher education disparity in current Chinese social context.

#### *Adopt Regional Sustainable Development Strategies*

Moreover, regional development strategies are crucial to reduce regional income and education inequality for the development of Chinese economic. Specifically, Chinese government should adopt a clear regional development strategy to both strengthen economic and education development in consistent with the trend of globalization and marketization from a neo-liberal perspective. For instance, in 2000, Western Development Strategy is considered as a good example to accelerate economic and education growth in western's regions. From a political strategy perspective, Chinese government should reconstruct their production structures to integrate with global markets. In other words, reducing unemployment rate in lagging western China is rooted in speeding up the development of non-state enterprises to provide more and more job opportunities [29]. Moreover, for regional development strategies, strong fiscal discipline of local governmental taxation is essential to improve the development of income and education.

#### *Develop Labor Market Capacity and Mobility*

Advocating labor market mobility and capacity is central to decrease income inequality and increase education

accessibility. Stimulating labor mobility is rooted in alleviating spatial disparity of income and education. Reconstructing and adjusting household registration system is important to encourage labor mobility. The urban and urban income and education gaps are associated with urbanization process. From a policy perspective, Chinese government should encourage different initiatives to stimulate labor market mobility, such as providing sufficient job positions for different kinds of employees from different classes; offering political and economic platforms to make collaborations with foreign countries. Therefore, in order to eliminate the intergenerational income disparity and higher education inequality in current China, improving governmental intervention, adopting regional sustainable development strategies, and developing labor market capacity and mobility all contribute to promoting the development of economic and education inherently.

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