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# Impact of Higher Education Expansion on the Urban-Rural Income Gap in China: An Empirical Analysis based on Provincial Panel Data

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**Abstract:** With selected provincial panel data from 2004-2018 and a fixed-effects model, this paper conducts an empirical study on the impact of higher education expansion on the urban-rural income gap in China, and examines the heterogeneity between the Eastern, Central and Western regions. Those empirical findings show that higher education expansion significantly reduces the urban-rural income gap. In addition, factors including the upgrading industrial structure, increased openness, higher investment in education, and stronger government support for agriculture also significantly reduce the gap. Finally, the results reached by this paper are robust, proven by replacing the explaining variables and robustness tests on those explained variables. Therefore, prioritizing higher education is an important policy option to help reduce the urban-rural income gap and increase awareness of higher education in rural areas.

**Keywords:** Higher education expansion; Urban-rural income gap; Fixed effects; Heterogeneity studies

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## 1. Introduction

The urban-rural income gap reflects, to a certain extent, the current income distribution in China, while the unequal income distribution has been affecting the expansion of domestic demand, economic and social development, and bringing about a series of negative economic and social effects. **Figure 1** shows that the urban-rural income gap in China from 2000 to 2019 was on a downward trend, but remained at a high level. The trends in urban-rural income disparity measured by trends in urban-rural per capita income ratios, which is not conducive to China's economy and society in the long run. As an important investment in human capital, education has always been highly valued by the state and society and promoted individual income growth. The level of educational attainment directly influences how hard and delicate the future work is. Individuals with higher education can engage in more complicated and delicate jobs, while the less educated tend to have relatively simple jobs with fewer options and are easy to be replaced, so they are more vulnerable to unemployment. Therefore, whether an individual receives higher education or not determines their future wage level to a certain extent. Will the narrowed education level gap of urban and rural residents bring a smaller urban-rural income gap? Literature reviews on education and the urban-rural income gap reveal no consistent conclusion on the relationship between the two dimensions in China. Therefore, by analyzing the impact of higher education expansion on the urban-rural income gap in China, this paper hopes to explore the relationship between higher education expansion and the urban-rural income

gap in China. If it is found through the study that the development of higher education helps to narrow the urban-rural income gap, then the urban-rural income gap can be narrowed by increased investment in education and higher education expansion, which also provides a new practical way to narrow the urban-rural income gap in China, and helps to formulate targeted policies to narrow the gap. Based on the above considerations, this paper will build a fixed-effects regression model based on provincial panel data from 2004-2018 from the perspective of higher education expansion to explore the effect of higher education expansion on the urban-rural income gap.

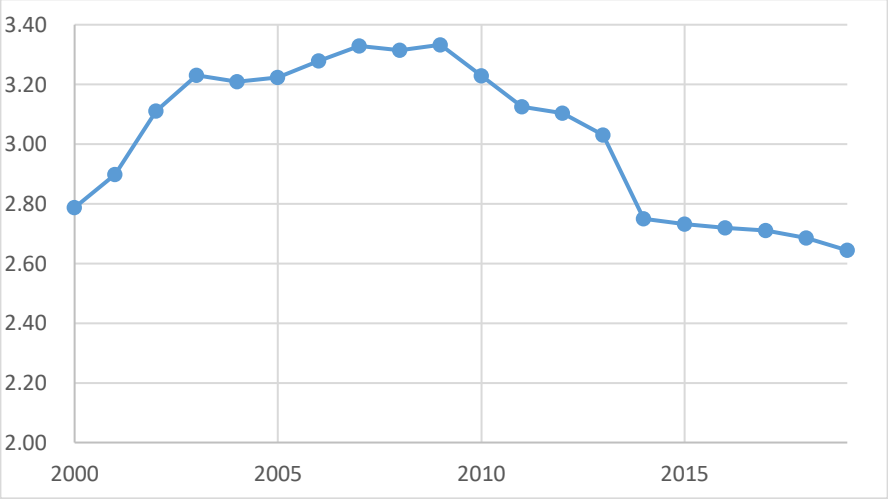


**Figure 1.** Trend of the urban-rural income gap in China from 2000 to 2019

## 2. Literature review

Research addressing the factors influencing the urban-rural income gap has been receiving attention from scholars both at home and abroad. Many scholars have found that China's unique urban-rural dual structure affects its urban-rural income gap. Studies by Afridi [1], Haiyuan Wan and Shi Li [2] found that China's unique household registration system widens its urban-rural income gap by affecting the social identity of rural residents. Foreign laborers may also suffer employment discrimination in the job market [3]. Other scholars have looked at China's policies and found that different policy preferences for urban and rural areas have a guiding effect on the urban-rural income gap [4]. Chunxian Li and Xiangju Li [5] found that raising the level of fiscal decentralization and strengthening local fiscal autonomy would significantly reduce the urban-rural income gap. Other scholars, standing from the perspective of labor mobility, found that labor mobility affects the urban-rural income gap [6], while there is regional heterogeneity in this effect [7].

A study by Guofu Zhou and Hanbin Chen [8] found that when the level of urbanization enters an intermediate stage, both rationalization and advanced industrial structure can significantly reduce the urban-rural income gap. Gaohui Nie et al. [9] pointed out that urbanization can narrow the urban-rural income gap in the short term, and that infrastructure investment has a long-term effect on curbing a widened urban-rural income gap. Based on provincial panel data from 1995 to 2018, Xiaoxi Zhang and Tongshan Liu [10] found through empirical analysis that the opening of trade and investment helps narrow the income gap, with the role of trade opening being more significant. Liu [11] found that foreign investment has a positive effect on narrowing the urban-rural income gap between local and neighboring areas, and the marginal contribution to narrowing the urban-rural income gap declines as the economy develops. He also found the growth of human capital inhibits, to a certain extent, the widening of the urban-rural income gap. Variables such as technological progress and infrastructure show significant geographical variability. The urban-rural

income gap in the region is influenced by that in neighboring regions in geography and economic space. The country and the Eastern region show a demonstration effect while the Central and Western regions show a competition effect. In addition, studies by domestic and foreign scholars have found that financial development also affects the urban-rural income gap [12, 13].

Qiang Zhao and Yaling Zhu [14] found that human capital significantly increases total and labor income and reduces the corresponding urban-rural income gap. A study by Psacharopoulos [15] pointed out that increased public expenditure on higher education increases the Gini coefficient of the income gap between global and less developed countries, while it does not significantly reduce the Gini coefficient of the income gap between developed countries. In other words, the impact of the scale and quality of higher education on the inequality of income distribution is also related to the level of economic development, i.e., there is an "economic threshold effect" on the impact of higher education on the unequal income distribution. As an important human capital, will education have an impact on narrowing the urban-rural income gap in China? Based on this question, this paper collates the literature of Chinese scholars on the impact of education on income disparity. However, there are different views in academia regarding this assumption. Some scholars believe that the development of education has the effect of narrowing the urban-rural income gap. For example, the empirical study by Xiqiang Gong [16] found that the government's increased financial investment in education can enhance the work skills of workers and improve the overall quality of workers in rural areas. This will improve the income level of workers in rural areas and narrow the income gap between urban and rural residents. Ju Yu [17] found that investment in education was negatively correlated with the urban-rural income gap, while establishing a mechanism for cities to feed rural areas in the field of science and technology research and development could narrow the urban-rural income gap and promote social equity. Daqian Shi and Weidong Zhang [18] used the multiplicative difference method to analyze the mechanism of the role of higher education expansion, and concluded that the expansion of higher education narrows the urban-rural income gap through the scale effect and further generates increased educational opportunities and the non-farm employment effect, among which the increased employment opportunity effect significantly suppresses urban-rural income gap the most. However, some scholars have also found that educational development fails to narrow the urban-rural income gap and even widens it. A study by Wenbo Cai and Jinsheng Huang [19] found that higher education investment has a significant promoting effect on widening the urban-rural income gap, and the relationship between the two is non-linear in regions with different economic growth rates, as the greatest effect is shown in provinces and regions with medium economic growth rates. at the same time, there is regional heterogeneity in the impact of higher education investment on urban-rural income gap, as the promoting effect of higher education investment on the gap exists in eastern and western regions but is not noticeable in central China.

In addition, some scholars point out a non-linear relationship between the development of education and the urban-rural income gap. For example, Xiaoqing Wang and Dong Liu [20] found that an "inverted U" relationship between the average years of educational attainment and urban-rural income gap with the critical point of the curve varies for different regions. Other scholars found a "positive U" relationship between the expansion of education and the income gap [21]. However, scholars have generally agreed that educational inequality widens the urban-rural income gap. Some even point out that there is a stable reinforcing interaction between urban-rural educational inequality and urban-rural income gap, i.e., the widening of the urban-rural income gap will aggravate urban-rural educational inequality and vice versa [22]. Reviewing both domestic and international literature, although some have studied the impact of human capital and education on the urban-rural income gap, few directly study the impact of higher education on the urban-rural income gap. And there is no clear conclusion yet in China on how the development of higher education affects the urban-rural income gap. Through actual social experience, we can analyze that, on one hand, rural people with higher education will be more likely to find higher-paid jobs compared to

workers with lower education, so the expansion of higher education can reduce the urban-rural income gap to a certain extent; but on the other hand, if the larger group of beneficiaries of higher education expansion is the urban population, then the impact will be less prominent as expected. Therefore, this paper focuses on the expansion of higher education and hopes to explore the effect of higher education expansion on the urban-rural income gap through empirical analysis.

## 3. Theoretical mechanisms of higher education expansion's effects on urban-rural income gap

Guohui Zhan and Xinwen Zhang [23] proposed that human capital stock is positively correlated with labor productivity according to the Chinese and Western human capital theoretical systems. Therefore, regional differences in human capital stock are the direct drivers of regional income disparities. Education and vocational training are the most direct way to increase human capital stock. Academic education directly reflects the stock and years of education, which in turn is reflected in the quality of the workforce of the educated, and through the endogenous transmission mechanism of human capital, ultimately realizing the weakening effect on the income gap. The exogenous effect of human capital lies in the return effect of education, and if the return to education shows regional differences, it will lead to income disparity. Therefore, the narrowed education gap between urban and rural areas in China will reduce regional differences in human capital and the urban-rural income gap to a certain extent.

Practically speaking, higher education expansion can increase the access of different groups, especially the rural class groups, to university. Improved education level of rural residents can increase their human capital accumulation, thus raising the income level and narrowing the income gap between urban and rural areas. For example, higher education expansion can lower the threshold for rural groups to attend university, bringing about a larger scale of university enrollment and a significantly increased proportion of rural students. The increased proportion of students from rural areas will improve the group's overall level of education, increase human capital accumulation and their labor productivity, thus enhancing the ability of the educated labor force from rural areas to obtain corresponding rewards and raising their incomes and reducing the income gap between rural and urban residents to a certain extent. In addition, the development of higher education can lead to the development of upper secondary education, which helps to improve the overall education level of the public. The increase in human capital investment can help improve the productivity and quality of the labor force and raise the probability of rural residents moving to cities. This may lead to a higher income level than farming income, thus reducing the urban-rural income gap. Thus, from a human capital perspective, higher education expansion plays an important role in reducing the urban-rural income gap.

However, given the unequal distribution of income between urban and rural residents, urban residents may be able to obtain more educational benefits than rural residents by taking advantage of educational resources. In this case, the benefits obtained by rural residents through higher education expansion may be "diluted" by the initial gap in educational resources. At the same time, the limited ability of rural residents to access social resources due to differences in the household registration system, etc., may affect their performance in the labor market and weaken the effect brought by their income growth, weakening the effect of higher education expansion in narrowing urban-rural income gap mentioned above.

## 4. Model construction and variable selection

### 4.1. Variable selection and data sources

#### 4.1.1. Explained variables

In this paper, the urban-rural income gap is regarded as the explained variable. Generally speaking, the urban-rural income gap includes the absolute gap, the difference between the income of urban and rural residents, and the relative gap, the ratio between the income of urban and rural residents [19]. According to

literature reviews on domestic scholars [24-26], considering the changes in the growth rate of urban and rural residents' income, this paper adopts the relative gap to reflect the income gap between urban and rural residents, measured by the ratio of urban residents' per capita disposable income to rural residents per capita net income, recorded as gap. The data come from the statistical yearbooks of various provinces and cities.

### 4.1.2. Explaining variables

In this paper, higher education expansion is used as the explaining variable. The number of higher education graduates per 10,000 people is used to measure the level of expansion of higher education expansion, denoted as high_edu. The data are obtained from the statistical yearbooks of provinces and cities.

### 4.1.3. Control variables

Based on literature review [19,21], the final control variables selected in this paper are the level of government investment in education (eduinv, measured by the share of education expenditure in that year's GDP). The industrial structure (indu, measured by the share of gross domestic product in the tertiary sector in that year's GDP). The level of openness (open, measured by exports as a proportion of GDP in that year). The level of infrastructure development (road, measured by the number of miles of roads open to traffic). The level of government support for agriculture (argi_finance, measured by the proportion of government fiscal expenditure on agriculture to general fiscal expenditure), with data obtained from the statistical yearbooks of provinces and cities and the statistical bulletins on national economic and social development.

This paper selects the panel data of 30 provinces and cities (except Tibet) across China from 2004-2018 for the empirical study. The descriptive statistics of all variables are shown in **Table 1**. Among them, the level of infrastructure construction ROAD is treated as logarithmic to reduce heteroskedasticity and improve the accuracy of model estimation.

**Table 1.** Descriptive statistics of variables

| Variable | Name of variable | Observation score | Average score | Standard deviation | Minimum score | Median score | Maximum score |
|---|---|---|---|---|---|---|---|
| gap | Urban-rural income gap | 450 | 2.87 | 0.569 | 1.845093 | 2.758453 | 4.758545 |
| high_edu | Higher education development | 450 | 57.85 | 23.407 | 16.89264 | 57.17158 | 150.7882 |
| edu | Government investment in education | 450 | 4.95 | 1.527 | 2.48 | 4.66 | 10.38 |
| indu | Industrial structure | 450 | 43.01 | 9.245 | 28.6 | 40.755 | 83.09 |
| open | Level of openness | 450 | 7.49 | 12.573 | 0.001920 | 1.896958 | 61.08105 |
| lroad | Infrastructure construction | 450 | 11.48 | 0.876 | 8.96252 | 11.75478 | 12.71166 |
| agri_finance | Government support for agriculture | 450 | 9.46 | 4.050 | 1.181056 | 10.39091 | 18.9663 |

## 4.2. Model construction

To investigate the impact of higher education expansion on the urban-rural income gap, this paper extends

the empirical model of human capital proposed by Becker, Chiswick [27], and the extended model is:

$$gap_{it} = \beta_0 + \beta_1 \cdot high\_edu_{it} + \beta_2 edu_{it} + \beta_3 indu_{it} + \beta_4 open_{it} + \beta_5 lroad_{it} + \beta_6 agri\_finance_{it} + \mu_{it}$$

## 5. Empirical research and result analysis

### 5.1. Tests on data stability and co-integration

In this paper, the LLC method is first applied to the panel data to conduct a unit root test to ensure the validity of the estimation results. The test finds that the original series shows no unit root phenomenon. This paper further applies the Kao test to this smooth series to demonstrate the co-integration between the variables. The test finds that the variables have a long-term co-integration relationship and could be analyzed subsequently.

### 5.2. Results of the empirical analysis with the national sample

The main panel data models are the mixed model, fixed-effects model, and random-effects model. This paper conducts simple OLS regression, fixed effects regression and random effects regression on panel data using stata16, and the results are shown in **Table 2**. As different provinces and the same province may have unmeasurable errors in data of different years, the Hausman test will be used in this paper to adopt the appropriate model. The Hausman test found that the p-value is equal to 0.0000, and the original hypothesis is rejected. Thus, this paper chooses the estimation results of the fixed effects model as the basis for the final empirical analysis. For comparative analysis, the results of the OLS regression and the regression results of the random-effects model are presented in **Table 2**.

**Table 2.** Regression results of the national level model

| Variable | (1) OLS | (2) FE | (3) RE |
|---|---|---|---|
| high_edu | -0.00837*** | -0.0114*** | -0.0117*** |
| | (0.001) | (0.001) | (0.001) |
| eduinv | 0.178*** | -0.0895*** | -0.0579*** |
| | (0.017) | (0.017) | (0.016) |
| indu | -0.00364 | -0.0183*** | -0.0173*** |
| | (0.003) | (0.002) | (0.002) |
| open | -0.00607*** | -0.00637** | -0.00691*** |
| | (0.001) | (0.002) | (0.002) |
| lroad | 0.0525* | -0.139* | -0.136** |
| | (0.025) | (0.056) | (0.045) |
| agri_finance | -0.0374*** | 0.0188*** | 0.0159*** |
| | (0.007) | (0.005) | (0.005) |
| _cons | 2.423*** | 6.218*** | 6.039*** |
| | (0.330) | (0.598) | (0.503) |
| N | 450 | 450 | 450 |

Note: Data in brackets are standard errors, with symbols of *, ** and *** indicating significance at the 10%, 5% and 1% levels, respectively.

The estimation results of the fixed effects model show that after controlling government investment in education, industrial structure, the level of openness and infrastructure construction, and government

support for agriculture, the increased number of higher education graduates per 10,000 population can significantly reduce the urban-rural income gap. In other words, higher education expansion has the effect of significantly reducing the urban-rural income gap. In terms of the effect of control variables, upgraded industrial structure and increased openness can significantly reduce the urban-rural income gap. The increased proportion of education expenditure to GDP and increased government support for agriculture also have the same effect. The empirical results are analyzed in the following way in this paper: Higher education expansion has improved the education level of the rural population, increased their human capital accumulation, assisted rural people in entering cities and obtaining better-paying employment, and to some extent, narrowed the urban-rural income gap. Furthermore, the expansion of the tertiary industry and increased openness can assist to lessen the urban-rural income gap by providing more job options for the rural people. Increased education investment, on the other hand, can help to lower the cost of higher education for rural people, lessen the financial burden of higher education for rural people, and encourage more rural people to pursue higher education. This can increase the educational level of the rural working population and promote their human capital accumulation, thus reducing the urban-rural income gap.

### 5.3. Heterogeneous analysis on the samples of the East, Central and West China

Due to different regional socio-economic development, higher education development is also characterized by significant heterogeneity between regions. Does the impact of higher education development on the urban-rural income gap differ across regions with different economic levels? According to the level of economic development, the 31 provinces in China can be divided into three regions: the East, the Central and the West. The western region includes 12 provinces, including Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang. This paper will analyze the heterogeneity of the three regions according to the above distribution structure. A fixed-effects model is chosen based on the Hausman test. The empirical results for the East, Central and West regions are shown in **Table 3**.

**Table 3.** Regression results of the East, Central and West model

| Variable | (1) East(FE) | (2) Central(FE) | (3) West(FE) |
|---|---|---|---|
| high_edu | -0.00240* | -0.0252*** | -0.0218*** |
| | (0.001) | (0.003) | (0.002) |
| eduinv | -0.0509* | 0.00252 | -0.142*** |
| | (0.021) | (0.041) | (0.024) |
| indu | -0.0138*** | -0.0166*** | -0.0179*** |
| | (0.003) | (0.004) | (0.004) |
| open | 0.00431* | 0.0327 | -0.0238* |
| | (0.002) | (0.023) | (0.012) |
| lroad | -0.0452 | 0.0791 | 0.0343 |
| | (0.070) | (0.096) | (0.088) |
| agri_finance | 0.0163** | 0.0466*** | 0.0237** |
| | (0.006) | (0.010) | (0.008) |
| _cons | 3.841*** | 3.303** | 5.364*** |
| | (0.707) | (1.093) | (0.961) |
| N | 165 | 120 | 165 |

Note: Data in brackets are standard errors, with symbols of *, ** and *** indicating significance at the 10%, 5% and 1% levels, respectively.

**Table 3** gives the results obtained from the regression analysis using stata16 based on the above fixed-effects model. From the results, the following conclusions can be drawn: in the Central and Western regions, higher education expansion can significantly reduce the urban-rural income gap. While the effect in the

Eastern region is not as significant as that in the Eastern and Western regions (the results for the Eastern region are only statistically significant at the 10% level). This result obtained from the empirical study is largely consistent with the findings obtained in the study by Daqian Shi and Weidong Zhang [18] on the heterogeneous effects of higher education expansion policies and urban-rural income gap. That is, higher education expansion significantly reduces urban-rural income gap in regions with lower levels of economic development while the reduction effect in regions with higher levels of economic development is not so significant.

From the perspective of control variables, the development of the tertiary industry can significantly reduce the urban-rural income gap in the East, Central and West regions, and the same effect can be found in the strength of government support for agriculture. However, the strength of government investment in education only significantly reduces the urban-rural income gap in the West region. This shows a certain regional difference in the impact of higher education expansion on the urban-rural income gap, and policymakers need to consider regional factors if they want to reduce the urban-rural income gap by improving the level of higher education development.

### 5.4. Test results of model robustness

In the study by Guanping Hou and Zibo Wang [28], the multiple of urban residents' per capita disposable income over rural residents' per capita net income is chosen to measure the urban-rural income gap, with the calculation formula: urban-rural income gap = (urban residents per capita disposable income - rural residents per capita net income) rural residents' per capita net income. Based on that, this paper uses the same method to re-measure the urban-rural income gap (denoted as gap1). An average number of students per 100,000 population (denoted as stu, data from the provincial and municipal statistical yearbooks) is chosen to measure the level of higher education development, and the robustness of the model is tested using the national sample. A comparison of the results in **Table 2** and **Table 4** shows no change in the sign and significance level of the core explaining variables after being replaced, which is generally consistent with the baseline regression results in the previous section, indicating that the model passed the robustness test.

**Table 4.** Test results of model robustness

| Variable | (1) OLS | (2) FE | (3) RE |
|---|---|---|---|
| stu | -0.570*** | -1.040*** | -0.903*** |
| | (0.089) | (0.086) | (0.072) |
| eduinv | 0.171*** | -0.0389* | -0.0307 |
| | (0.017) | (0.017) | (0.016) |
| indu | -0.00316 | -0.0208*** | -0.0180*** |
| | (0.003) | (0.002) | (0.002) |
| open | -0.00341* | -0.0024 | -0.00201 |
| | (0.002) | (0.002) | (0.002) |
| lroad | 0.0504* | 0.0939 | 0.0321 |
| | (0.024) | (0.060) | (0.045) |
| agri_finance | -0.0337*** | 0.0172*** | 0.0166*** |
| | (0.007) | (0.005) | (0.005) |
| _cons | 5.298*** | 9.715*** | 9.947*** |
| | (0.733) | (0.576) | (0.574) |
| N | 450 | 450 | 450 |

Note: Data in brackets are standard errors, with symbols of *, ** and *** indicating significance at the 10%, 5% and 1% levels, respectively.

## 6. Conclusion and policy suggestion

Using the provincial panel data of 30 provinces from 2004 - 2018, this paper conducts an empirical analysis with a fixed-effects model and performs robustness tests by replacing the explaining variables with the explained variables to investigate the impact of higher education expansion on the urban-rural income gap in China. With some control variables taken into account, this paper obtains conclusions that are not entirely consistent with those of previous studies. Based on the empirical results and the analysis of the current situation in China, the main conclusions and policy recommendations obtained from this paper, are as follows.

### 6.1. Conclusion

Higher education growth considerably lowers the urban-rural income gap in the fixed-effects model and national sample. Higher education expansion significantly reduces the urban-rural income gap in the central and western regions, but not in the eastern area. The growth of the tertiary sector, the rise in the degree of openness to the outside world, and government investment in education and agriculture all lessen the urban-rural income gap to some extent, according to the regression findings of control variables.

The development of higher education can increase the chance of different groups, especially those from rural areas, to enter universities. For example, the ability to lower the access barriers to universities for rural groups has empowered higher education expansion to increase the size of university enrolment and the proportion of rural students. As a result, rural residents' overall education levels will improve, as will their human capital accumulation and, as a result, their labor productivity. As a result, the capability of educated workers in rural areas to earn comparable returns and raise their income level can be increased, narrowing the income gap between rural and urban residents to a certain extent. On the other hand, other scholars suggest that expanding higher education not only expands rural communities' access to universities, but also to high schools [18], raising the average level of education of the rural work force, enhancing labor productivity, and narrowing the urban-rural income gap.

### 6.2. Policy suggestion

#### 6.2.1. Increasing investment in education and strengthening the support for higher education in rural areas

Some groups in rural areas, influenced by traditions and other factors, do not attach enough importance to education and cannot afford higher education. Therefore, some children have to get jobs to earn money once finishing junior high school or high school, losing the opportunity to receive higher education. At the same time, a number of issues in rural areas, including as a shortage of teachers and insufficient investment in education, have resulted in a substantially lower average level of education in rural areas than in metropolitan areas. As a result, China must adopt appropriate regulations and provide funds to assist the development of education in rural areas. For example, we may boost education's visibility and encourage citizens of remote places to value education from an early age. Alternatively, we may reduce the financial burden on poor students as much as possible by providing education funding subsidies to assist them in pursuing a higher degree of study. Paying attention to the education of students in rural areas will help alleviate the current situation of educational inequality in China and contribute to a fairer distribution of society in the future.

#### 6.2.2. Broadening financing channels and improving the financial credit system for rural education

Based on Guohui Zhan's et al. [23] recommendations, China should actively and effectively widen rural education financing channels and strengthen its financing credit system in order to successfully narrow the educational gap between urban and rural areas. The key is to create institutional arrangements and policy

systems that favor disadvantaged groups, such as low-income groups, to establish systematic education award systems at all levels of the education system, and to ensure that disadvantaged groups have access to education through multiple channels, in order to broaden the benefits of education services and, ultimately, to ensure education distribution equity. In terms of the influence of control variables on explanatory variables, on the other hand, our government should expand its support for agriculture, improve agricultural technology, and increase rural infrastructure investment. While carrying out rural development, it also has to stimulate rural building, enhance the living standards and income levels of rural inhabitants, and reduce the urban-rural income gap.


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## Disclosure statement

The author declares no conflict of interest.

## References


[1] Afridi F, Li SX, Ren Y, 2015, Social Identity and Inequality: The Impact of China's Hukou System. Journal of Public Economics, (123): 17-29.

[2] Wan HY, Li S, 2013, The impact of Household Registration Discrimination on the Urban-Rural Income Gap. Economic Research, 48(09): 43-55.

[3] Wang MY, 2005, Employment Opportunities and Wage Differentials in Urban Labor Markets: A Study of Employment and Compensation of Foreign Labor. China Social Science, (05): 36-46+205.

[4] Hou XS, Yang RD, 2017, Policy Bias, Population Mobility and Provincial Urban-Rural Income Gap: A Study based on Spatially Heterogeneous Interaction Effects. Nankai Economic Research, (06): 59-74.

[5] Li CX, Li XJ, 2021, An Empirical Test on the Impact of Fiscal Decentralization on Urban-Rural Income Gap. Statistics and Decision Making, (09): 160-163. https://doi.org/10.13546/j.cnki.tjyjc.2021.09.038

[6] Young A, 2013, Inequality, the Urban-Rural Gap, and Migration. The Quarterly Journal of Economics, 128(4): 1727-1785.

[7] Chen HL, Chen SK, 2021, Regional Convergence of Cross-Provincial Population Migration and Urban-Rural Income Gap. Technology Economics and Management Research, (04): 63-67.

[8] Zhou GF, Chen HB, 2021, Analysis of the Threshold Effect of Industrial Structure Upgrading on Urban-Rural Income Gap. Statistical Research, 38(02): 15-28.

[9] Nie GH, Song L, 2020, Urbanization, Infrastructure Investment and Urban-Rural Income Gap: An Empirical Analysis based on Provincial Panel Data. East China Economic Management, 34(02): 86-93.

[10] Zhang XX, Liu TS, 2020, Research on the Impact of Economic Opening on Urban-Rural Income Gap--An Empirical Analysis based on Provincial Panel Data. Chongqing Social Science, (11): 64-73.

[11] Liu XH, 2021, Foreign Investment and Urban-Rural Income Gap: An Analysis based on the Spatial Effect Perspective. Journal of Jiangxi University of Finance and Economics, (01): 16-28.

[12] Greenwood J, Jovanovic B, 1990, Financial Development, Growth, and the Distribution of Income. The Journal of Political Economy, 98(5 Part 1): 1076-1107.

[13] Zhang BQ, Wu ET, 2021, Digital Inclusive Finance, Entrepreneurship and Income Distribution - An

Empirical Study based on the Perspective of Urban-Rural Differences in China. Financial Review, 13(02): 31-44+124.

[14] Zhao Q, Zhu YL, 2021, Human Capital and Urban-Rural Income Gap in the Perspective of Factors. Modern Economic Inquiry, 2021(04): 19-32.

[15] Psacharopoulosg J, 1991, TIL-AK Schooling and Equity in George Sachar Poulos, Essays on Poverty, Equity and Growth. Pergamon Press, Inc., 53-78.

[16] Gong XQ, 2020, Research on the Impact of Financial Education Expenditure on Income Disparity between Urban and Rural Residents--Analysis of Stratified Provincial Data based on Decile Points. Journal of Yunnan University of Finance and Economics, 36(04): 64-71.

[17] Yu J, 2014, Scientific and Technological Progress, Educational Investment and Urban-Rural Income Gap: Empirical Evidence from Inter-Provincial Panel Data in China. Industrial Technology Economics, 33(01): 130-136.

[18] Shi DQ, Zhang WD, 2017, Has the Expansion of Higher Education Narrowed the Income Gap between Urban and Rural Areas?. Education and Economy, (05): 37-47+60.

[19] Cai WB, Huang JS, 2019, Higher Education Investment and Urban-Rural Income Gap: Inhibiting or Promoting. Heilongjiang Higher Education Research, 37(02): 74-79.

[20] Wang XQ, Liu D, 2012, Analysis of the Impact of Education on the Urban-Rural Income Gap between Regions. Economic and Management Research, (07): 59-65.

[21] Xu YH, Xiao ZL, Zhu JP, 2019, Does Education Alleviate Income Distribution Imbalance. Mathematical Statistics and Management, 38(04): 704-718.

[22] Jia L, 2018, A Study on the Relationship between Urban-Rural Education Inequality and Urban-Rural Income Gap in China. East China Normal University.

[23] Zhan GH, Zhang XW, 2017, The External Effects of Educational Capital on the Urban-Rural Income Gap. Financial and Trade Research, 28(06): 37-46.

[24] Chen Y, Wang LJ, 2018, The Relationship between Urban-Rural Education Inequality and Urban-Rural Income Gap in China: An Empirical Analysis of 31 Provinces (Cities) across China. Modern Education Management, (04): 31-36.

[25] Ding HF, Liu XY, 2017, Research on the Impact of the Urban-Rural Income Gap in the Process of New Urbanization in China. Contemporary Economic Science, 39(02): 11-20+124.

[26] Guo LL, Guo JX, 2017, The Impact of Duality in Human Capital Investment on Urban-Rural Income Gap. Technology Economics and Management Research, (01): 96-101.

[27] Becker GS, Chiswick BR, 1966, Education and the Distributions of Earnings. American Economic Reviews, 56(1): 358-369.

[28] Hou GP, Wang ZB, 2013, Study on the Relationship between Economic Growth, Education Development, Urbanization and Urban-Rural Income Gap. Business Times, (19): 8-9.