

The Impact of Secondary Vocational Education on the Disposable Income of Rural Residents

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Abstract: This paper investigates the impact of the scale and quality of secondary vocational education on the income of the middle and lower class in China, represented by rural residents, and the future career prospects of their children, using a double fixed effects multiple linear regression model on panel data from 31 provinces in China from 2008 to 2019, and further conducts a regional heterogeneity analysis. The results of the analysis will be used to make policy recommendations for the development of secondary vocational education after the implementation of the "double reduction" policy. The research results show that China's secondary vocational education is generally underdeveloped, can neither provide students with the same development prospects as ordinary high school education, nor become the main means of raising income for the middle and lower classes, especially rural residents. The research results provide a basis for further research on how to improve the quality of secondary vocational education under the background of "double reduction" policy, and also provide an empirical basis for the subsequent adjustment of relevant policies and measures.

Keywords: Vocational Education; "Double Reduction" Policy; Income of Rural Residents

1. Introduction

Education is an important social issue of general concern to the Chinese people. For the majority of the lower and middle classes, especially the rural poor, a good high school or university education is the only way for their children and grandchildren to change their fate and that of their families. However, education is not the same as going to high school or university. At a time of intense "inward volatility", the deepening of education is becoming more and more pronounced, and the structure of graduates' education and skills does not fully match the market demand for labour. The structural imbalance of the workforce in the epidemic-induced recession has led to an increasingly serious employment problem in China, especially for graduates, over the past three years. Against this backdrop, the Chinese government introduced a series of policies to support the development of vocational education over a 20-year period, notably the "double reduction" policy in 2021, which used the secondary school examinations as a boundary to divert students, strictly controlled the number of students enrolled in general high schools, and banned all types of extra-curricular classes related to the curriculum. This policy has indeed changed the structure of the future workforce from a macro perspective, but for families on a micro level, the big test to determine the fate of their children has changed from the college entrance examination to the secondary school entrance examination, and the current secondary school entrance examination is even more cruel than the former college entrance examination, because the level of development of vocational education in China, especially the secondary vocational education, is not high, and its teaching quality and employment prospects are not recognized by parents, while the remedial classes that help children to win in the competition. The availability and cost of remedial resources to help children excel in the competition has fallen sharply. This makes 'streaming' seem fairer and more 'gifted', but in reality it becomes a significant constraint on children's future lives and further reduces the overall competitiveness of children from lower and middle class families.

In recent decades, China has experienced rapid economic growth, but this growth has not been evenly distributed across all segments of the population, particularly in rural areas. Wan Guanghua et al. (2005), through regression decomposition using household data, revealed the harsh reality of income inequality in rural China [1]. Their research highlights the impact of widening income disparities on the socio-economic structure of rural society. Education and health are key factors in poverty reduction strategies. Cheng Mingwang et al. (2014) explored the roles of education and health in poverty alleviation from the

dual perspectives of income growth and gap reduction. They found that while education significantly improves the income levels of rural residents, health factors are equally critical, particularly in rural areas burdened by heavy disease [2]. Shi Qinghua (2002) focused on the saving and borrowing behaviors of rural households and their evolving trends. This research provides valuable insights into how rural households manage finances and respond to economic fluctuations. The saving and borrowing behaviors of households not only impact their economic security but also have profound implications for the stability and development of rural financial markets [3].

Education plays a crucial role in improving the employment quality and income levels of migrant workers. An empirical analysis by Xiao Xiaoyong et al. (2019) based on CHIP migrant household survey data indicates that education significantly enhances the employment quality of migrant workers [4]. Moreover, Wei Wanqing (2015) pointed out that secondary vocational education has a significant positive impact on increasing the income of migrant workers, especially in the Pearl River Delta and Yangtze River Delta regions [5]. Wang Jian (2017) further explored the roles of formal education and skills training in promoting formal employment among migrant workers. His findings suggest that skills training may be more effective than formal education in enhancing employment opportunities for migrant workers [6]. Liu Wanxia (2013), using national survey data on migrant workers, analyzed the impact of vocational education on their employment. Her study supports the positive role of vocational education in improving the employment rate and income levels of migrant workers [7].

In summary, these studies provide a deep understanding of income inequality in rural China, the impact of education and health on rural poverty alleviation, and the influence of education on the employment and income of migrant workers. These research findings are of great reference value for formulating effective rural development and poverty reduction strategies.

Based on existing research, this paper will examine the impact of secondary vocational education on the disposable income of rural residents, and examine whether secondary vocational education is better for the lower and middle classes, represented by rural residents, than high school. The paper will also discuss the heterogeneity of the performance of secondary vocational education in different regions, and explore the mechanisms through which secondary vocational education affects the disposable income of the population, in order to promote educational equity in the post-diversion era, promote vocational education to further boost the income growth of rural residents, and enhance the contribution of vocational education to the development of the micro- and macro-economy. This study will provide constructive suggestions for promoting educational equity, promoting vocational education to further enhance the income growth of rural residents, and enhancing the contribution of vocational education to micro- and macroeconomic development.

2. Data and Statistical Description

2.1. Data Sources and Processing

The data used in this paper are panel data provided by the National Bureau of Statistics for 31 provinces from 2008 to 2019. There were no major changes in the Chinese government's policies on secondary vocational education and general high school education during the study period, and there were no major events in the political economy that could affect the trend of economic growth. The core variables involved in the study were kept in a uniform statistical calibre and there were no statistical gaps, ensuring the reliability of the data analysis in this study. The explanatory variables in this paper are X1, X2 and X6, which are the ratio of secondary vocational school to general high school enrolment, the certificate rate of secondary vocational school graduates and the number of secondary vocational school enrolments respectively. Descriptive statistics for the data are shown in Table 1.

Table 1: Descriptive Statistics

Variable	N	Mean	p50	SD	Min	Max
Y	372	10430	9661	5257	2938	33195
X1	372	0.654	0.635	0.188	0.245	1.407
X2	372	0.675	0.679	0.161	0.0890	0.976
X3	372	810.0	597.1	771.4	29.50	5069
X4	372	515.8	435.9	373.6	20.30	2065
X5	372	26.48	24.05	17.77	1.390	77.75
X6	372	17.85	14.25	13.87	0.520	74.13

The basic treatment of the data in this paper is to generate panel data based on the corresponding

years and provinces of the data taking into account the actual context and data situation in China during the study period without outliers, to exclude variables where some of the survey statistics are inconsistent with other data or have too many missing values, to take longer study years where possible in the core variables involved in the study, and to calculate some of the variables based on the original data provided by the National Bureau of Statistics values. The final 372 observations applied in the empirical analysis of this paper were obtained, and this data is short panel data.

2.2. Data Situation

On the whole, the variance of variables such as disposable income of rural residents, admission ratio of secondary school to general high school and certificate rate of secondary school graduation is large in all provinces of the country, indicating that the development of secondary school education and economic development in different regions are different, so this study divides 31 provinces into eight groups based on the classification of eight national economic zones and conducts descriptive statistics separately. The results show that: (1) the disposable income of rural residents in the eastern coastal and northern coastal regions is much higher than the overall average, while it is relatively lower in the southwest and the great northwest regions and closer to the average in the other regions, which is consistent with the rural economic development of each region in practice; (2) the enrolment scale of general high schools during the study period is determined by a combination of local policies and the enrolment programmes of each high school, which ultimately depends on the local resources for general high school education, while secondary schools are likely to have under-enrollment. The core variables in this paper are not significantly positively or negatively correlated with the disposable income of rural residents, but there is a tendency for secondary school enrolment to decline over time or as the disposable income of rural residents rises, in contrast to the general high school enrolment scale which varies across provinces, with smaller and more stable changes overall. The statistical results of the data combined with the actual enrolment patterns reflect social attitudes and preferences towards general high school education and vocational secondary education: almost all families want their children to receive a general high school education, while a small number of families whose financial situation allows them to do so may choose to send their children abroad if they are unable to attend a general high school, and a significant proportion of families with relatively poor financial situations will choose between sending their children to a growing number of poorer families are choosing to stop their children from going to school to work or become farmers, and girls may also face the problem of being married off prematurely by their families, which can result in their children losing the opportunity to learn a professional skill and being forced to work in agriculture or in jobs that require little skill or study, with few opportunities for future development. The fact that they still choose to drop out of school despite the fact that secondary education is almost free in China shows that society has a low opinion of secondary education, even if it is better than dropping out. There is of course heterogeneity in the above situation across different provinces and regions, and this will be further examined below.

3. Empirical Analysis

3.1. Model Building and Variable Setting

The equations of the econometric model for this study were developed as follows.

$$y_{tp} = \beta_0 + \beta_{1,tp}x_{1,(t-3)p} + \beta_{2,tp}x_{6,(t-3)p} + \beta_{2,tp}x_{2,tp} + \sum_{k=1}^K \beta_{k,tp}CV_{k,tp} + \varepsilon_{tp} \quad (1)$$

The equations t and p represent time and province respectively. Because the range of values of different variables varies too much and there are values less than one in the variables, all of them are treated by adding one and taking the logarithm. The core explanatory variables of this paper, the ratio of secondary vocational to general high school enrollment and the certificate rate of secondary vocational graduates, represent the scale and quality of secondary vocational education in the region respectively. In order to avoid the problematic conclusion caused by not considering the decline of the ratio but the expansion of the scale, the number of regional secondary vocational enrollment is also added as the core explanatory variable in this study. In fact, the duration of secondary education in China is generally three years, although students will be recommended by the school to participate in long-term internship in their final year, the situation of the internship period and the destination after graduation cannot be equated, so this study adopts a three-period lag treatment for the ratio of secondary to general education enrollment and the number of secondary enrollment, and the final statistical sample is 279.

As the factors affecting the level of disposable income of rural residents are multiple, this paper sets

control variables based on existing research and economic theory: the number of urban units employed, the number of private and individual employment, year and province control variables. The considerations for selecting the control variables in this paper are as follows: (1) Previous studies have mainly used micro data to examine the income of individual farm households, and thus their influencing factors present complex characteristics, requiring consideration of factors such as household physical capital, financial assets and household characteristics, as well as macro factors such as time, region, economy and policy, etc. However, this paper takes a macro perspective on the study, and variables related to farm household heterogeneity need not be considered, some of the corresponding regional macro data are difficult to obtain, and there is often a correlation with regional economic development status, such as regional physical capital per capita, financial assets per capita, etc., which can be replaced by common macroeconomic data, and this paper selects employment data, which is sufficiently representative in reflecting macroeconomic conditions; (2) in order to overcome the effects of time variation and province heterogeneity on farm household income The year and province control variables are set in this paper, where the year mainly reflects the economic shocks brought about by technological progress and policy changes, and the province mainly reflects various types of endowments of different regions, such as natural and resource conditions, location factors and the degree of regional economic development. The model coefficients are all elasticities, i.e. a 1% change in the explanatory variable leads to a percentage change in the explained variable. ε is a random disturbance term.

3.2. Estimation Method and Description

This paper uses a two-way fixed effects model multiple linear regression method for estimation. As this paper uses short panel data, it is necessary to test whether a fixed-effects model or a random-effects model should be used. The results of the Hausman test indicate that a fixed-effects model should be used for all the econometric models in this paper. After determining the fixed effects model, it is still necessary to include a time dummy variable to examine whether there are significant time-dependent shocks. The results show that the coefficients on the time dummy variables are significant and therefore a two-way fixed effects model is adopted. As correlation and cointegration between the explanatory variables may affect the significance of the coefficients, correlation and cointegration analyses need to be conducted before the model is set up, and the results show that there is no high correlation and cointegration between the variables.

3.3. Regression Results and Analysis

The specific regression results are presented in Table 2 (neither this nor subsequent tables report on the control variables). In terms of reported significance, the core variables representing the size and quality of secondary vocational education do have a significant effect on rural residents' disposable income, with each 1% increase in the size of secondary vocational school enrolment relative to general secondary schools and the certified rate of secondary vocational school graduates leading to a decrease in rural residents' disposable income of approximately 0.18% and 0.046% respectively; while each 1% increase in secondary vocational enrolment disposable income of rural residents can increase by 0.097%.

Table 2: Baseline model regression results

	(1)	(2)	(3)	(4)
	y	y	y	y
L3.x1	0.688*** (0.127)	-0.267 (0.205)	1.280*** (0.092)	-0.181*** (0.034)
L3.x6	-0.515*** (0.024)	-0.159** (0.077)	-0.456*** (0.016)	0.097*** (0.013)
x2	0.255* (0.136)	0.102 (0.116)	-0.085 (0.100)	-0.046** (0.023)
cons	6.810*** (0.117)	4.370*** (0.435)	6.596*** (0.079)	8.132*** (0.093)
N	279.000	279.000	279.000	279.000
r2	0.750	0.827	0.893	0.996
r2_a	0.746	0.802	0.888	0.995
FE	-	YES		YES
TE	-		YES	YES

Standard errors in parentheses: * p < 0.1, ** p < 0.05, *** p < 0.01

The four regression results reported allow for a more specific and comprehensive analysis.

Firstly, in terms of the practical significance of the coefficients, although the coefficients of the explanatory variables are all significant, the magnitude of change in the level of disposable income of rural residents caused by changes in secondary vocational education enrolment and in the documented rate of graduates is relatively small in terms of their coefficient values. In terms of the scale of secondary vocational education, the simultaneous increase in the absolute and decrease in the relative value of enrolment can better raise the disposable income of rural residents, but the simultaneous achievement of these two requirements is difficult to achieve in the current Chinese context: on the one hand, the birth rate of China's population is decreasing as the economy continues to develop, and even with the country's "liberalisation of the second and third child". On the other hand, in order to promote long-term high-quality employment and economic development, it is an inevitable trend to vigorously develop secondary education and allow students to choose a path that suits them, and it is inevitable that the number and proportion of students enrolled in general secondary schools will be strictly controlled in the future. On the other hand, in order to promote long-term high-quality employment and economic development, it is an inevitable trend to vigorously develop secondary education and let students choose their own paths. It is clear that the current policy environment is not friendly to residents with relatively low income, especially those in rural areas.

Secondly, from the comparison of the results of the four regression models mentioned above, the results and conclusions obtained by taking different individual and time fixed combinations are significantly different, indicating that regional heterogeneity may have an impact on the relationship between the explanatory and explained variables. This possible influence will be discussed in the subsequent section.

Finally, regarding the result that the increase in the quality of secondary vocational education, as represented by the certificate rate of secondary vocational education graduates, has a negative impact on the decrease in the disposable income of rural residents, we believe that this result is anomalous, either because of regional disparities, or because the certificate rate of graduates is not sufficiently representative of the quality of secondary vocational education or because the increase in the quality of secondary vocational education does not translate into an increase in the human capital of students. It could also mean that students with vocational qualifications at the time of graduation are more studious and choose to pursue higher vocational education, resulting in a need for households to continue to invest in human capital and lower labour inputs for household production.

3.4. Robustness Tests

The robustness test of this paper adopts the method of replacing the explanatory variables by replacing the disposable income of rural residents with the regional per capita gross product. The per capita GDP can better reflect the value creation ability of secondary school graduates, and can also reflect the income level of local residents to a certain extent. The specific results are shown in Table 3.

Table 3: Robustness test results

	(1)	(2)
	y	y1
L3.x1	-0.181*** (0.034)	-0.314*** (0.088)
L3.x6	0.097*** (0.013)	0.166*** (0.033)
x2	-0.046**	-0.025
cons	8.132*** (0.093)	8.334*** (0.242)
N	279.000	279.000
r2	0.996	0.962
r2 a	0.995	0.954
FE	YES	YES
TE	YES	YES

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The results show that the model is generally robust and the direction of influence of the explanatory variables on the explained variables does not change as a result of changes in the explained variables.

Specifically, the ratio of secondary vocational education to general high school enrolment and the number of secondary vocational education enrolments have significant negative and positive effects on regional GDP per capita respectively, to a relatively greater extent than rural disposable income, while regional GDP per capita integrates the GDP of rural residents and the GDP of urban residents compared to rural disposable income, which means that even This means that even for graduates of secondary vocational education, the income they receive after production is more often counted as urban than rural income, again confirming the point made above that rural families may tend to drop their children out of school. In contrast, the coefficient on the variable secondary vocational education graduates with a certificate, which represents the quality of secondary vocational education, remained negative but was less significant. The number of vocational qualifications and vocational skills certificates held in the job market is an important indicator of human capital, and it is generally believed that those who hold certificates are more competitive in the job market, whereas the current results show that whether or not secondary vocational school graduates hold certificates has no significant effect on their actual value creation ability, which may imply that there is no significant difference in the social evaluation of human capital of secondary vocational school graduates, whether they hold certificates or not This may imply that there is no significant difference in the social valuation of human capital of secondary vocational school graduates with or without a certificate, and thus no significant difference in employment and salary, and may also be related to the choice of certificate holders to continue their studies as mentioned above.

4. Heterogeneity Analysis of the Effect of Secondary Vocational Education Regarding Regions

In the past 20 years, China's education has made tremendous progress, and society's understanding of and demand for education is constantly changing. As each region has a certain degree of autonomy over the allocation of local educational resources, and as different regions develop education for local development according to their own circumstances, the characteristics of education will inevitably tend to match the characteristics of the region. At the same time, the results of the regressions above show that the region factor has a key influence on the model. Therefore, it is necessary to discuss the influence of region on the effect of secondary vocational education. As there were no landmark changes in attitudes and policies towards secondary vocational education and general secondary education in China during the study period, no time-grouping analysis is conducted in this paper.

Table 4: Heterogeneity Analysis results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	y	y	y	y	y	y	y	y
L3.x1	-0.191	-1.366 **	0.456 ***	-0.073	1.433 ***	0.488	-0.023	0.810 ***
	(0.322)	(0.513)	(0.125)	(0.181)	(0.252)	(0.381)	(0.100)	(0.183)
L3.x6	0.163	-0.008	-0.323 ***	0.059	-0.448 ***	-0.186 *	-0.044	-0.365 ***
	(0.116)	(0.133)	(0.017)	(0.080)	(0.089)	(0.091)	(0.031)	(0.062)
x2	-0.074	2.424 ***	0.552 ***	0.534 ***	-0.609 ***	-0.206	-0.067	-0.822 ***
	(0.134)	(0.522)	(0.166)	(0.114)	(0.142)	(0.477)	(0.086)	(0.119)
_cons	8.635 ***	12.307 ***	8.006 ***	8.608 ***	6.828 ***	6.132 ***	8.361 ***	6.849 ***
	(0.264)	(1.760)	(0.265)	(0.222)	(0.345)	(0.312)	(0.138)	(0.301)
N	27.000	27.000	36.000	27.000	54.000	45.000	36.000	27.000
r2	0.996	0.989	0.990	0.995	0.933	0.938	0.996	0.998
r2_a	0.992	0.979	0.984	0.989	0.912	0.911	0.994	0.995
FE	-	-	-	-	-	-	-	-
TE	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In this paper, the 31 provinces are grouped into eight comprehensive economic regions according to the "Strategies and Policies for Coordinated Regional Development" published by the Development Research Centre of the State Council (2005). This way of dividing the regions is further subdivided on the basis of the traditional "East, Middle and West", so that the endowment structure, economic development level and social characteristics of the provinces in the same group are similar, which

facilitates a more detailed macro-regional study. The groups are, in order, the Northeast, the Eastern Coast, the Northern Coast, the Southern Coast, the Great Northwest, the Southwest, the Middle Yangtze and the Middle Yellow River. Considering that the grouping focuses on the overall regional level, the individual effects are not fixed, but only the time effects. The specific regression results are shown in Table 4.

The results show that in this study there is a large heterogeneity between regions, with the same variable varying in significance and direction of effect in different regions. Three of the explanatory variables are significant in the northern coastal, northwestern and mid-Yellow River regions, and the two variables capturing the scale of secondary vocational education in these three regions maintain the same direction and are opposite to the main regression, which may imply that secondary vocational education has a greater role in increasing the disposable income of rural residents in these three regions, and this role may originate from the level of economic and social development, the density of population, the This may stem from differences in the level of economic and social development, population density, per capita resource level and regional industries. As for the variable of the quality of secondary vocational education, the coefficient for the northern coastal region is in the opposite direction to the other two regions, and is also positive, contrary to the main regression results. It is worth noting that the eastern, northern and southern coasts, which are relatively more economically and socially developed among the eight regions, all have significantly positive coefficients for the variable graduate certification rate in secondary vocational schools, in contrast to the other regions. Combined with the regression results above, we can speculate that in the more economically developed regions, their enterprises value secondary vocational school graduates more highly and value their vocational skills more, and that students who choose to attend secondary vocational schools have better employment prospects and future development than in other regions.

5. Conclusions

Based on the findings of this paper, it is clear that secondary vocational education in China as a whole is not well developed and does not offer students the same prospects as general high school education, nor is it an important means of raising incomes for the lower and middle classes, especially rural residents. However, the "double reduction" policy has been enacted, which means that a significant number of children will be deprived of important development opportunities until China's vocational education system has developed to the point where it becomes a trade-off with general high school and university education for most children and families. Therefore, we should carefully adjust the size of secondary vocational education and general high school enrolment targets according to local conditions, and relax the number of general high school students as appropriate. More importantly, we should shorten the development time of secondary vocational education as much as possible, improve the interface between secondary vocational education and the labour market, train suitable vocational and technical talents for local needs, and ensure that the quality of teaching, learning style and the quality of employment channels in schools continue to improve, which in turn will continue to increase families' confidence in vocational education and students' motivation to study.

Due to space and some personal reasons, some parts of this study are not presented in the main text and there are still many unresolved issues and parts that deserve to be tried and improved. Firstly, the question of how to better represent the development of secondary vocational education and its impact on rural and lower income households has always been of interest to me, and the topic does lend itself more to micro research, mainly because micro surveys provide a much higher volume of data and dimensionality of variables that can be studied than macro data, yet I also believe that both macro and micro perspectives on the same issue have their own particular relevance Secondly, the results of this study are indeed difficult to interpret, and robustness tests, heterogeneity studies, possible mediating and moderating effects are worth exploring and improving, and different research methods such as instrumental variables and double difference methods based on policy changes are also worth trying; finally, this paper does not Finally, this paper does not conduct a more systematic literature review, which is in a way a shortcoming and a regret, and the literature studied and referred to during the research process will be included at the end of the paper.

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