Development Trend and Prospect of Personal Return Rate of Vocational Education in China

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Abstrsct: Vocational education is one of the important ways to form human capital, and human capital is an important factor of economic growth. Based on the data provided by CFPS, this paper uses the Mincer rate of return to empirically analyze the development of personal rate of return of vocational education in China from 2014 to 2020. The results show that the personal rate of return of vocational education is on the rise year by year, however, exacerbating the gap between the rich and the poor between regions and the unhealthy employment future of vocational education educated groups are still problems that need to be solved urgently.

1 INTRODUCTION

Vocational education is regarded as an important part of the national education system and human resources development. It shoulders the important responsibility of cultivating diversified talents, inheriting technical skills and promoting employment and entrepreneurship.

Since the 1960 s, research on the rate of return to education has been endless. Economist Jacob in 1974. Mincer 's income function derived from human capital theory has become the research method of most scholars. Regarding the research on the field of returns to education in China, Li Shi and Ding Sai found that the impact of education on income is directly and positively correlated through the sample survey data from 1990 to 1999 in ' the long-term trend of returns to education in urban China '(Li, Ding 2003); gao Xiaochun further drew a new conclusion in " Re-examining the Impact of Education on Income Growth and Distribution " : Although the rate of return to education in China showed a significant growth trend from 1988 to 2002, the income gap among people with different educational backgrounds also widened. In addition, Zhou Yunbo and Yu Yongze pointed out in the ' Main Factors Affecting the Income Gap of Urban Residents in China ' that the level of regional economic development, the level of education of residents, the employment industry, the nature of employment units and personal occupations are the main factors affecting the income gap between urban residents. It can be seen that although the economic benefits brought by China 's education are fruitful, the gap between the rich and the poor caused by different academic qualifications is expanding. The scale of vocational education is comparable to that of general education and higher education. As the main source of education for people in rural and remote areas in China, it is of great significance to study and analyze the current situation of vocational education in China in recent years (Xu 2014).

On October 12,2021, the General Office of the State Council issued the " Opinions on Promoting the High-quality Development of Modern Vocational Education, " emphasizing: " We should strengthen the characteristics of vocational education types, improve the school-running system of industry-education integration, innovate the school-enterprise cooperation mechanism, deepen the reform of education and teaching, and build a vocational education brand with Chinese characteristics. By 2025, the characteristics of vocational education types will be more distinct, the modern vocational education system will be basically completed, and the construction of a skilled society will be comprehensively promoted." (Xinhua News Agency 2021) Obviously, the economic benefits of vocational education are self-evident, and it is of

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great significance to explore the rate of return brought by vocational education investment.

This paper will use the data of 2014,2016,2018 and 2020 provided by China Family Panel Studies (CFPS) to conduct an empirical study on the individual return rate of vocational education in China. Through horizontal and vertical comparison, this paper examines the current situation of education return rate in China in the past ten years and provides suggestions for the future development of vocational education.

2 RESEARCH METHOD

2.1 The Calculation Method of the Rate of Return to Education

This paper uses the Mincerian earnings function to calculate returns on education. The Mincer income function method is an estimation method proposed by the American economist Mincer J in the 1970 s. The rate of return on education estimated by this method is called the Mincer yield. Its basic formula is :

$$Iny = a + bS + cEX + dEX^2 + u \tag{1}$$

Among them, y represents annual income, S represents years of education, EX represents the labor market experience, and the quadratic term of EX is used to describe the nonlinear relationship between labor market experience and income. A represents the intercept, b, c, d represent the regression coefficients of the variables, u is the random error term, where b is the individual rate of return on education.

2.2 Data Source

The data of this paper comes from China Family Panel Studies (CFPS), which is updated every two years. In view of the availability of data and the complexity of data processing, this paper selects data from 2014 to 2020 as samples for analysis.

The data processing rules of this paper are as follows : (1) The annual income unit is yuan, and the magnitude is large. In order to prevent heteroscedasticity, the annual income is logarithmically processed, and the logarithm of the annual income is used as a measure of the income level. Secondly, there is no direct working life index in the CFPS database, so the calculation of working years is : questionnaire year-start working time ; (2) Deleting samples with missing indicator data. There are three core variables in this paper : annual income, years of education, and working hours. (3) delete the abnormal data, data processing found that part of the working life of more than 100 years, because the data from the questionnaire, so this part of the data is considered invalid questionnaire, delete processing ; (4) The data with annual income less than 1000 are deleted. If the annual income is less than 1000, it is either a questionnaire quality problem or an income unit error. There is no way to verify the unit error and no way to correct it one by one. (5) Due to the existence of the maximum and minimum values that deviate significantly from the data distribution, the extreme values of this part will affect the accuracy of the model. In order to avoid the influence of extreme values on the regression results of the model, the first 1 % and the last 1 % of the indicator data are winsorized.

The original data is cleaned and analyzed to form a new index system, and the final modeling data index is obtained. The data processing and data analysis are completed by stata16.0.

Variable description is shown in Table 1.

Table 1: Variable description

Types of variables	Variable names	Variable symbols	Variable definitions
Explained variables	Income	In income	Logarithm of annual income
Explanatory variables	Years of education	edu	Current maximum years of education
	Work seniority	workl	Year of questionnaire-year of starting work
	Square of working years	workl2	Square of working years

3 DATA PROCESSING AND ANALYSIS

3.1 Variable Description Statistics

Before the analysis and modeling, descriptive statistics are carried out on the variables of the study to grasp the overall macro situation of the variables. The descriptive statistical results are shown in Table 2:

Table 2: Variable Description Statistics

Variables	sample size	mean value	standard deviation	minimum value	maximum value
Income	19,312	3.365	2.932	0.150	17.400
Years of education	19,312	10.256	4.095	0.000	18
Work seniority	19,312	3.426	5.069	0.000	31

Table 3: PVariable description statistics by year

Variables	Year 2014		Year 2016		Year 2018		Year 2020	
	Mean value	Standard deviation	Mean value	Standard deviation	Mean value	Standard deviation	Mean value	Standard deviation
Income(ten thousand yuan)	2.711	2.278	3.263	2.828	3.618	3.013	4.195	3.546
Years of education(years)	9.949	3.997	10.316	4.119	10.203	4.147	10.727	4.112
Work seniority(years)	4.763	6.521	2.505	3.548	2.849	4.310	3.117	4.378

It can be seen from Table 2 that there are 19312 remaining samples after data cleaning, of which the average income is CNY 3365 million, the minimum value is 0.150, and the maximum value is 17.4. The difference between the maximum value and the minimum value is large, indicating that there is a level between different individuals. Similarly, there are great differences in the years of education and working years of different individuals.

In order to understand whether there are differences in income, education level and working years between different years, the above three variables are described and counted according to different years. The results are shown in Table 3.

As can be seen from Table 3, from 2014 to 2020, the average income and the number of years of education have been increasing, indicating that over time, the income level of residents has steadily increased, the society has paid more and more attention to education, and more people have the ability to invest more time and money in education. At the same time, from 2014 to 2018, the standard deviation of income also increased year by year, indicating that the income of residents increased at the same time, the gap between rich and poor is also increasing. According to the data of the National Bureau of Statistics, the proportion of rural students in higher vocational colleges (51 % in 2017) is significantly higher than that of undergraduates (42 % in 2017). The monthly income of rural graduates in 2014 is 2117 yuan after half a year, which is slightly higher than that of migrant workers in the same period (2864 yuan). After 3 years of graduation, the income advantage was significantly expanded, (that is, in 2017) the monthly income of 5552 yuan, significantly higher than the same period of migrant workers (2017 average monthly income of 3485 yuan).(Wang, Ma 2020）This shows that higher vocational education has a significant role in promoting rural poverty alleviation. The widening gap between the rich and the poor from 2014 to 2018 shows that the impact of vocational education on the poverty alleviation effect of rural students is still not significant enough, and the society needs to pay more attention to the development of vocational education graduates ' workplace. However, it is worth mentioning that the standard deviation of income in 2020 has declined compared with 2018.This may be due to the huge impact of the epidemic in 2020 on the job hunting of undergraduate graduates and vocational education graduates, which is not directly related to the economic benefits brought by vocational education itself.

Overall, the number of years of education is also increasing, with the improvement of people 's living

standards, the importance of education is gradually increasing, so the overall level of education in society is steadily improving. From the working years, the overall social working years have a downward trend, due to the increase in the number of years of education, more and more young people into the work time delay, so this is normal.

According to the economic belt, the whole country

is divided into : eastern region, central region and western region. The economic development of the three regions is from strong to weak. In order to understand the differences of the three variables in different economic belts, the descriptive statistics based on the economic belt are carried out. The results are shown in table 4.

Table 4: Variable description statistics by region

Variables	Eastern region		Central region		Western region	
	Mean value	Standard deviation	Mean value	Standard deviation	Mean value	Standard deviation
Income (ten thousand yuan)	3.737	3.256	3.018	2.535	2.922	2.433
Years of education (years)	10.555	3.989	10.271	3.936	9.634	4.378
Work seniority (years)	3.464	5.022	3.455	5.191	3.312	5.024

As can be seen from Table 5, the annual income of the eastern region is greater than the central region is greater than the western region, indicating that the more economically developed regions, the higher the income level, the same gap between the rich and the poor is also greater ; years of education and years of work are the same, the eastern region is greater than the central region is greater than the western region.

3.2 Correlation Analysis

To understand the correlation between the variables and the explained variables, Pearson correlation test is needed. The test results are detailed in table 5 :

Table 5: Pearson correlation test of variables

	lnincome	edu	workl	workl2
lnincome	1			
edu	0.261***	1		
workl	0.110***	0.007	1	
workl2	0.052***	-0.013*	0.946***	1

Note : * * *, * *, * indicates significant at 1 %, 5 %, 10 % respectively

It can be seen from Table 7 that the years of education (edu) and income (lnincome) are significantly positively correlated at the level of 1 %, and the correlation coefficient is 0.261, which reflects that the investment in vocational education has a significant positive impact on personal income. The working hours (workl) and income (lnincome) are significantly positively correlated at the 1 % level,

and the correlation coefficient is 0.110 ; the square term of working hours (workl2) is significantly positively correlated with income (lnincome) at the level of 1 %, and the correlation coefficient is 0.052.

3.3 Regression Analysis

Based on the conclusions of the above data analysis, the benchmark regression analysis is performed on all variables :

Table 6: Benchmark regression analysis

Variables	lnincome
edu	0.060***
	(0.002)
workl	0.102***
	(0.004)
workl2	-0.003***
	(0.000)
Constant	9.206***
	(0.020)
Observations	19312
R-squared	0.101

Note : * * *, * *, * indicates significant at 1 %, 5 %, 10 % respectively, standard error in parentheses

From table 3, we can see that the regression coefficient of edu is 0.060, and it is significant at the significant level of 1 %, indicating that the years of education have a significant positive impact on the current income. The specific performance is that for

every additional unit of years of education, the annual income will increase by 0.06 units accordingly, that is, the Mincer yield of the total sample is 0.06 ; the regression coefficient of workl is significantly positive at the level of 1 %, and the regression coefficient of workl2 is significantly negative at the level of 1 %, indicating that there is an ' inverted U ' relationship between working years and income, that is, the annual income increases with the increase of working years, and when the working years reach a certain value, the income decreases with the increase of working years. This phenomenon may be related to the type of work unit and employment industry of vocational education graduates.
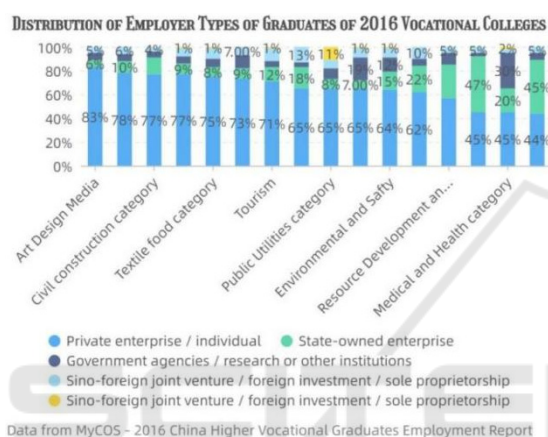

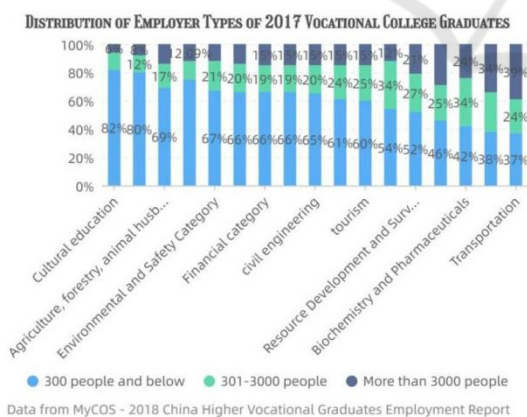Figure 1: Distribution of employer types of graduates of 2016 Vocational colleges

Figure 2: Distribution of emplyer types of 2017 vocational college graduates

From Figure 1, it can be seen that the main employment destinations of vocational education graduates are private enterprises or self-employed enterprises. The main characteristics of such employers are : 1.Inborn deficiency and difficulty in development. 2.Financing difficulties 3. Management

confusion 4.Insufficient training of talents. Such a working environment makes it impossible for vocational education graduates to achieve long-term development in a fixed employer, and their working ability cannot be improved. In addition, combined with Figure 1 and Figure 2, it is not difficult to see that the educated groups of vocational education are mainly engaged in the primary and secondary industries such as resource development, material energy, manufacturing, or the tertiary industry of transportation (Wang, Zhou 2018). The characteristics of this industry are : high physical labor, intellectual activity requirements small ; strong substitutability ; strong instability ; high risk. This also leads to the working income of the working group with the increase of working age, after the peak will decline.

3.4 Mincer Yield Comparison Based on Different Years

In order to show the development trend of the Mincer yield rate of China's vocational education from 2014 to 2020, the data are compared from both horizontal and vertical aspects. The following is the comparison results of the Mincer yield rate based on different years :

Table 7: Mincer yield comparison based on different years

Years	Mincerian rate of return
2014	0.048***
2016	0.057***
2018	0.060***
2020	0.068***

Note : * * *, * *, * indicates significant at 1 %, 5 %, 10 % respectively

As can be seen from Table 7, the Mincer yield in each year is significant at the 1 % level, from the numerical point of view, the Mincer yield increased year by year. This shows that since the 21 st century, the field of vocational education in China has created a great situation of reform and practice, fully serving the development of economy, society and people, and the development of socialist vocational education with Chinese characteristics has made brilliant achievements.

3.5 Mincer Yield Comparison Based on Different Regions

The following is a comparison of Mincer yields based on different regions :

Table 8: Comparison of Mincer yields based on different regions

Regions	Mincerian rate of return
Eastern region	0.070***
Central region	0.049***
Western region	0.047***

Note : * * *, * *, * indicates significant at 1 %, 5 %, 10 % respectively

From Table 8, it can be seen that the Mincer yield rate in each region is significant at the significant level of 1 %. From the numerical point of view, the Mincer yield rate in the eastern region is higher than that in the central region and higher than that in the western region, that is, the Mincer yield rate in the economically developed regions is higher than that in the economically underdeveloped regions. This may be due to the factors of many employment opportunities, large demand for talents, perfect infrastructure construction, good welfare treatment and high salary in developed areas. Even in 2020, when the whole country is seriously affected by the epidemic and industries in various regions are hit to varying degrees, developed regions also have stronger economic capital to promote economic recovery, minimize the resumption of work time, and thus reduce economic losses.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusion

Generally speaking, in recent years, the personal economic benefits brought by China 's vocational education have shown a gratifying growth trend, but through horizontal and vertical analysis and research, we can still find some problems in the development of socialist vocational education with Chinese characteristics. Firstly, the development of vocational education fails to conform to the goal of " common prosperity " of socialism, and the influence of vocational education on students in underdeveloped areas and rural areas needs to be further improved. Secondly, the graduates trained by vocational education cannot achieve long-term economic benefits after employment, which may be related to the insufficient skill level of vocational education graduates, the unbalanced distribution of human resources in the market, and the insufficient investment of the state in private enterprises and vocational education.

4.2 Recommendations

(1)To optimize the shortcomings of vocational education development mechanism. Strengthen the cooperation between schools and markets, establish a sound institutional guarantee, and eliminate the current phenomenon of some school-enterprise cooperation and relying on " human maintenance. " Continuously promote and improve the construction of vocational education system, so as to better cope with new contradictions and new problems with the development of the times and social changes(Li 2019).

(2)To build a modern vocational education system which can adapt to the current social needs and the development of productive forces. At present, the shortage of teachers in higher vocational colleges is serious, and some professional teachers in secondary vocational schools are seriously insufficient. In addition, the lack of direct access between secondary and higher vocational education, and the lack of synchronization between vocational education and general education are also the shortcomings of vocational education itself. However, it is gratifying that on February 23,2022, the press conference held by the Ministry of Education mentioned three major changes in the relevant situation of promoting the high-quality development of modern vocational education : the orientation of secondary vocational education has changed from employment-oriented to both employment and further education ; ' Vocational college entrance examination ' will become the main channel of higher vocational enrollment ; further expand vocational undergraduate education. This means that the change of national orientation of vocational education is likely to fundamentally solve the problem of vocational education graduates working conditions, so that the educated groups in the market to obtain more favorable competitiveness and longer-term economic guarantee.

(3)To strengthen the protection of vocational education funding. At present, the total amount of financial investment in China 's vocational education is insufficient, which is significantly lower than that of ordinary education at the same level, but its scale is comparable to that of high school education and higher education at the same level. Therefore, ensuring sufficient funds for vocational education is the basis for adhering to education development. It is necessary to update and improve the training equipment needed for vocational education, improve the financial allocation system, and adopt different allocation standards between urban and rural areas

and between different regions according to different levels of economic development, so as to promote the modernization of vocational education (Guangming daily 2022).

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