



The Factors Influencing Economic Development of Fresh Graduates: A Case Study of Guangxi Region

Yuyu Mao^{1,*}

International College, Nanning City, 530004, Chinese

1139426086@qq.com

Abstract. Over the years, Guangxi has highly developed the higher education industry, and the reform of the education industry has also made a qualitative leap. Based on this, studying different levels of education has special and practical significance for the current development of Guangxi's economic level. This paper takes the statistical data of Guangxi Zhuang Autonomous Region from 2011-2021 as the research sample, and uses STATA to analyze the data. Research has found that fresh graduates with higher education levels have a significant impact on the development and improvement of Guangxi's economy compared to fresh graduates with other education levels, while fresh graduates with secondary vocational education levels have a significant impact on Guangxi's economy.

Keywords: Fresh graduate, Educational benefits, GDP, STATA

1 Introduction

As we all know, education development is closely related to economic development, and with the reform of domestic education, Guangxi's education reform in all aspects has also been deepened. This paper takes graduates at different stages in Guangxi as the research object to analyze the impact of different education levels on the economy in Guangxi.

2 Literature Review

As is well known, the 21st century is a knowledge-based economy era centered on high-tech development. The achievements of economic development come from the full utilization of human capital and the advantages of high education levels [1]. The level of education resources for the population has always been an important factor in local economic development. The connotation of education is a process of human capital growth, and education is the process of transforming immature labor into labor that meets social needs [2]. The contribution rate of residents' education level to society has been mentioned in previous studies. In the 14th Five Year Plan of the Guangxi government and other policy plans, it has been emphasized multiple times to improve the per capita education quality level [3,4], which puts forward different requirements from

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primary and secondary schools to higher education. Wen Dandan believes that improving the education level of the population has positive effects on economic, industrial, and social development [5], which promote the development of policies, industries, and employment. To promote the high-quality development of modern vocational education, vocational education is also an important component of the national education system and human resource development [6]. Ke Shuxia pointed out that there are problems between the contribution of secondary vocational education to economic growth in Guangxi, and the contribution of secondary vocational education to economic growth in Guangxi is lower than that of higher education [7].

In this regard, this paper attempts to use an appropriate multiple linear regression model to summarize and organize historical data on the education level of fresh graduates in Guangxi Zhuang Autonomous Region. Through multiple linear regression statistical methods, it explores the impact of different levels of education on the regional economic development level, especially secondary vocational education and higher education, and proposes ways and methods to play the role of education on this basis.

3 Variables Selected for The Research Model and Sample Description

This paper selects statistical data from 2012 to 2021 as the sample for analysis. The core of this paper is fresh graduates with different levels of education each year and serves as the independent variable. Drawing on the literature of Li Qin and Yuan Na, the study will focus on the education level of different residents in China as the research object, use four types of graduating fresh graduates to reflect the level of education development, and use GDP to reflect the level of economic and social development. The number of graduating students is selected as the independent variable, with primary school, general secondary school, secondary vocational education, and higher education being the main indicators for measuring education level globally. GDP is the dependent variable that reflects the economic level of a region [7], and a multiple linear regression model is established between the four variables. The sample data presents a normal distribution, attempting to obtain a regression equation between the level of education development in Guangxi and the level of economic and social development in Guangxi through regression results.

4 The Process of Using the Obtained Data to Statistically Analyze Variables

4.1 Establish a Preliminary Regression Model

Each indicator type is shown in Figure 1. According to the regression principle in statistical analysis, the variable data shows a normal distribution, and a regression equation can be established.

$$Y = \alpha_1x_1 + \alpha_2x_2 + \alpha_3x_3 + \alpha_4x_4 + b \quad (1)$$

In equation (1), Y represents the GDP of Guangxi region, x1 represents the number of fresh graduates in primary education in Guangxi, x2 represents the number of fresh graduates in general secondary education in Guangxi, x3 represents the number of fresh graduates in secondary vocational education in Guangxi, x4 represents the number of fresh graduates in higher education in Guangxi, and b represents the correlation coefficient.

4.2 Solve Through STATA

The dependent variable is GDP, and the explanatory variables are PEL (primary education), SEL (general secondary education), SVE (secondary vocational education), and GHEL (higher education). Multiple regression tests are conducted to obtain the regression model.

Source	SS	df	MS	Number of obs	=	10
Model	1.8626551	4	.465663775	F(4, 5)	=	193.46
Residual	.012034898	5	.00240698	Prob > F	=	0.0000
				R-squared	=	0.9936
				Adj R-squared	=	0.9884
Total	1.87469	9	.208298889	Root MSE	=	.04906

GDP	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
PEL	-.0107349	.0107964	-0.99	0.366	-.0384879 .017018
SEL	.0247863	.0111397	2.23	0.077	-.0038492 .0534219
SVE	-.0294265	.0193241	-1.52	0.188	-.0791008 .0202477
GHEL	.0699575	.0218349	3.20	0.024	.013829 .126086
_cons	-.5165198	.6365191	-0.81	0.454	-2.152744 1.119705

Fig. 1. Regression Results

$$Y = -0.107349X_1 + 0.0247863X_2 - 0.0294285X_3 + 0.0699575X_4 - 0.5165198$$

$$R^2 = 0.9936 \text{ Adj } R^2 = 0.9884 \text{ F}(4, 5) = 193.46 \text{ n} = 10$$

5 Correction and Verification of The Model

5.1 Economic Significance Test

The regression coefficients corresponding to X_4 and X_2 are both greater than 0, showing a positive correlation with Y. X_4 and X_2 have economic significance. According to the estimation of regression parameters in the model, α_4 value is 0.0699575. Under other conditions remaining unchanged, for every 10000 fresh graduates receiving higher education, the GDP increases by approximately 0.0699575 billion yuan. Similarly, α_2 value is 0.0247863, and under other unchanged conditions, for every 10000 fresh graduates receiving regular secondary education, the GDP increases by approximately 0.0247863 billion yuan. X_4 and X_2 have economic significance.

In addition, the regression coefficients corresponding to X_1 and X_3 are less than 0, indicating that the GDP of Guangxi region is related to the number of fresh graduates receiving primary education and the number of fresh graduates receiving secondary vocational education α_1 and α_3 are -0.107349 and -0.0294285 respectively. When other variables remain unchanged, for every 10000 more fresh graduates receiving primary education, the GDP decreases by 1073.49 million yuan. Similarly, with other variables remaining unchanged, for every 10000 fresh graduates receiving secondary vocational education, the GDP decreases by 0.0294285 billion yuan. This is inconsistent with the practical economic theoretical significance, indicating that X_1 and X_3 don't have economic significance, and the above models need to be tested and corrected.

5.2 Statistical Significance

The significance of statistical testing lies in verifying the statistical reliability and accuracy of estimated values. Therefore, combined with regression parameter estimation, the statistical testing analysis is as follows.

5.2.1 Goodness-of-Fit Test(R^2).

From ①, it can be seen that $R^2=0.9936$, indicating that the regression model has a high degree of fitting to the sample observation values. At the same time, the corrected determinability coefficient $\text{Adj } R^2=0.9884$, and the explanatory degree of the variable to the population reaches 98.84%.

5.2.2 F-test.

For significance level $\alpha=0.05$, $H_0=\alpha_1=\alpha_2=\alpha_3=\alpha_4=0$, query the degrees of freedom $k-1=4$ and $n-k-1=5$ in the F distribution table, that $F(4,5)=193.46 > 5.192$, rejecting the original hypothesis $H_0=\alpha_1=\alpha_2=\alpha_3=\alpha_4=0$, and the corresponding P-value of X_4 is $0.024 < 0.05$, indicating that the number of people with higher education in X_4 has a significant impact on the GDP of Y Guangxi region. The corresponding P-values of X_1 , X_2 , and X_3 are all greater than 0.05, indicating that the impact of the number of fresh graduates receiving primary school, general secondary school, and secondary vocational education on Guangxi's GDP is not significant.

5.2.3 T test.

At the level of significance $\alpha=0.05$, the original assumption was $H_0=\alpha_1=\alpha_2=\alpha_3=\alpha_4$. Query the critical value $t_{0.025}(5)=2.57$ for $n-k-1=5$ degrees of freedom in the t-distribution table. From Figure 2, it can be seen that, the absolute value of t corresponding to α_4 is $3.20 > t_{0.025}(5)=2.57$, rejecting the original hypothesis, indicating a positive and significant impact between X_4 and Y. But the absolute values of the t statistical values corresponding to α_1 , α_2 and α_3 are all less than $t_{0.025}(5)=2.57$, so the original assumption is accepted, indicating that there is no significant impact between X_1 , X_2 , X_3 and Y.

5.3 Econometric Significance Test

Variable	VIF	1/VIF
GHEL	30.64	0.032632
SEL	20.88	0.047887
PEL	8.37	0.119434
SVE	6.55	0.152655
Mean VIF	16.61	

Fig. 2. Collinearity Diagnosis

Based on the multicollinearity diagnosis between Y, X₁, X₂, X₃ and X₄ mentioned above, the VIF values of X₃ and X₄ were 8.37 and 6.55 respectively, both less than 10. In addition, the VIF values of X₁ and X₂ are 30.64 and 20.88 respectively, both greater than 10, indicating that the explanatory variables X₁ and X₂ have a high degree of multicollinearity. By using STATA, the stepwise regression forward method is now adopted to modify the model, which involves gradually adding variables that make R² the highest and p-value pass, until all variables in the model are significant. The revised model excludes the explanatory variables and the remaining final variables are X₁ and X₄. The results are as Figure 3.

Source	SS	df	MS	Number of obs =	10
Model	1.84833967	2	.924169837	F(2, 7) =	245.51
Residual	.026350326	7	.003764332	Prob > F =	0.0000
				R-squared =	0.9859
				Adj R-squared =	0.9819
Total	1.87469	9	.208298889	Root MSE =	.06135

GDP	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
GHEL	.1217642	.0061631	19.76	0.000	.1071909 .1363375
PEL	-.0222381	.0058299	-3.81	0.007	-.0360237 -.0084525
_cons	.7144811	.3359284	2.13	0.071	-.0798634 1.508826

Fig. 3. Stepwise regression results

$$Y = -0.0222381X_1 + 0.1217642X_4 + 0.7144811$$

$$R^2=0.9859 \text{ Adj } R^2=0.9819 \text{ F (2, 7) =245.51 n=10}$$

According to the established multiple linear regression model Y, value of α₄ is 0.1217642, and under other unchanged conditions, for every 10000 fresh graduates receiving higher education, the GDP increases by approximately 0.1217642 billion yuan. Similarly, with other conditions remaining unchanged, for every 10000 more fresh graduates in primary education, the GDP decreases by approximately 0.02223.81 billion yuan.

5.4 Empirical Theoretical Test

Educational benefits have a certain degree of indirectness, while also having a delayed nature [8]. The economic benefits of education recipients and educators can't be demonstrated in reality. For general education investment, the benefits do not occur in the education process, nor do they occur within the education field and educators, but after the education process is completed. The process from the beginning to the completion of education is only an indirect process that generates economic benefits. The lag is mainly reflected in the essential intelligence in the work ability of the educated, which can generate spillover value over a long period of time, far exceeding the contributions made by workers in the first few years. The development of fresh graduates in the early stages of graduation is limited, and some of the achievements in work and labor come from experience, work, and social experience.

6 Based on the Results of Model Optimization, Measures Taken by the Region to Adjust the Education Structure

6.1 Adjusting the Education Structure in Guangxi Region

A reasonable education structure plays an important role in economic and social development, as well as the rationalization of economic structure. Adjusting the education structure is an important way to improve the economic benefits of education. In the analysis of this paper, we can also see the degree of impact of education on regional economic development. Therefore, we must attach importance to the role of education, increase investment in the education industry, closely follow the pace of economic structure adjustment, adjust the local education structure accordingly based on the education system, teaching levels, teaching types, teaching cores, and target areas, so as to synchronize the development of education with the economy.

6.2 Give Full Play to the Original Functions of Higher Education and Demonstrate the Expected Benefits

The knowledge and abilities possessed by higher education recipients are important factors in contemporary economic development and social transformation [9], but the talent structure and human capital stock cultivated by Guangxi's higher education can't play a role in promoting the upgrading of economic structure and industries [10]. Further analysis of the above data reveals that different levels of education also have varying degrees of impact on regional economic development. The level of primary and secondary education has a reduced impact on economic development and leads to side effects. It can be seen that higher education is highly correlated with the GDP of Guangxi region (secondary education is often associated with higher education). This fully demonstrates that in the current policy environment, Guangxi is of utmost importance for the development of students receiving higher education, and the contribution of talent reserves in higher education to the economy will be significant.

6.3 Implement Basic Professional Talent Standards

Continue to vigorously develop the cultivation and construction of secondary vocational education talents, and continue to implement relevant laws, regulations, and policies. In the current era of knowledge economy, high standards and higher education qualifications are still the criteria for assessing residents' abilities. It is undeniable that the standards for vocational education talents and vocational education skills cover both the secondary and tertiary industries. The main industries in Guangxi mainly involve the second and third industries, including agriculture, animal husbandry, industry, transportation, trade, and service industries. The knowledge, abilities, and qualities of secondary vocational education talents should also be improved, and the cultivation of such talents must be closely linked to the urgently needed talent structure in current society [11].

7 Conclusion

Through multiple linear regression analysis of the education level of fresh graduates in Guangxi Zhuang Autonomous Region and regional economic development, we know that the current development of primary and secondary vocational education in Guangxi is significantly insufficient, while higher education has the most prominent contribution to the economy. The number of fresh graduates in higher education is highly correlated with regional GDP. Therefore, Guangxi should pay more attention to the development of higher talent education, but at the same time, it can't give up on the development of primary and secondary vocational education. Guangxi should adjust the regional education structure, fully utilize the functions of various types of education, improve the efficiency of education, and contribute to the regional economic development and national economic takeoff. The drawback of this paper is that it does not take into account the delayed nature of educational benefits, as some fresh graduates may not have a certain impact on the economic situation in the early stages of graduation.

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