ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202207_5(7).0017

# Analysis of Factors Influencing the Number of Students in Colleges and Universities in China Based on OLS Method

Zhiyi Tian

School of Electrical and Information Engineering, Liaoning Institute of Science and Technology, Benxi, 117000, China

## Abstract

**Since reform and opening-up, China's higher education has made great progress, and remarkable achievements have been made in the reform. A socialist higher education system with various levels, forms and disciplines has been initially formed to meet the needs of national economic construction and social development. It has trained a large number of high-level professionals for socialist modernization and played an important role in the country's economic construction, scientific and technological progress and social development. Higher education plays an important role in a country's efficiency and technological progress and is the key to a country's core competitiveness. Since the reform and opening up, although China's higher education has developed rapidly, the quality and level of higher education are still significantly different from those of developed countries. Therefore, it is very important to study the factors that affect the quality of higher education.**

## Keywords

**The number of higher education; The number of education investment analysis.**

## 1. Introduction

### 1.1. Research Background

China is a developing country, and university education in the true sense has only a history of more than 100 years. The Chinese government has been accelerating the reform of higher education by expanding the enrollment of students, making higher education from scratch, from small to large, and making considerable progress especially in the 21st century. For example, by the end of 2013, the total number of universities including higher vocational schools in the country had reached more than 2,000, with more than 19 million students enrolled, more than three times the number of students enrolled in 2008. From this we can see that China's higher education has indeed developed very rapidly in the past five years. Let's look at the size of the school again. In 2008, five years ago, the average number of students in each university in China was 3,300. By 2013, the number had doubled to 6,700. Moreover, the gross enrollment rate of higher education increased from 9.8% in 2008 to 17% in 2013, which is a historic step towards the internationally recognized standard of mass higher education. This is about the scale of universities in China.

### 1.2. Significance of the Research

Higher education plays an important role in a country's efficiency and technological progress and is the key to a country's core competitiveness. Therefore, we should attach great importance to the development of higher education and increase the proportion of the population with higher education in the total population. In the 12th Five-Year Plan, the government proposed to comprehensively improve the quality of higher education, increase investment in education, and encourage and guide social forces to set up education. In view of the current situation and shortcomings of the development of higher education in China, this

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202207_5(7).0017

paper uses the data of 31 provinces and cities in China to investigate the influencing factors of the quality of higher education in each province and city expressed by the number of college students per ten thousand people, in order to reflect the regional education competitiveness or education carrying capacity. From the practice of our country's higher education reform, we can also see another shortcoming in the development of our country's higher education: the proportion of the government's expenditure on education growth lags far behind the proportion of the enrollment expansion in colleges and universities, which means that each student's financial support is decreasing day by day.

### 1.3. Significance of the Research

With the rise of economic level, people pay more attention to the cultivation of education. As a result, colleges and universities continue to expand and more and more people have received higher education. This paper mainly analyzes the number of students in ordinary colleges and universities in various provinces in China by multi-factor analysis, and collects relevant data, establishes a model, and carries out quantitative analysis on this. After obtaining the quantitative relationship between the total number of students in colleges and universities and the main factors, according to the coefficients of each factor in the model equation, the importance of each factor is analyzed and the factors that have the greatest impact on the total number of students in colleges and universities are found out.

## 2. Data Description of the Number of Students in Institutions of Higher Learning

### 2.1. Data Collection

The data used in this paper are cross-sectional data collected from 31 provinces and cities in China's official website in 2013. The reason for choosing the permanent population is that a city with a large number of permanent residents should have a large number of colleges and universities. The reason for choosing the forest area is that the forest area represents the surrounding environment of a city and the environment is also a factor affecting the number of colleges and universities. The number of ordinary colleges and universities and the number of students with a high number of colleges and universities are generally high. Education funds, indicating the importance the city attaches to education; The number of students in ordinary colleges and universities and the number of students in ordinary high schools can explain how many students there are in this place.

### 2.2. Statistical Description of Factors Affecting the Number of Higher Students

Do not number your paper: All manuscripts must be in English, also the table and figure texts, otherwise we cannot publish your paper. Please keep a second copy of your manuscript in your office. When receiving the paper, we assume that the corresponding authors grant us the copyright to use the paper for the book or journal in question. Should authors use tables or figures from other Publications, they must ask the corresponding publishers to grant them the right to publish this material in their paper. Use italic for emphasizing a word or phrase. Do not use boldface typing or capital letters except for section headings (cf. remarks on section headings, below).

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202207_5(7).0017

**Table 1.** Statistical Description of Each Variable

| | Number of students enrolled in ordinary institutions of higher learning | educational appropriations | Forest area | Number of schools in ordinary high schools | Resident population at year end | Number of colleges and universities |
|---|---|---|---|---|---|---|
| average/mean value | 79.6 | 8979260 | 738.0 | 78.5 | 4371.4 | 430.7 |
| median | 67.6 | 8284996 | 601.36 | 73.74 | 3774 | 440 |
| maximum | 170.99 | 24775503 | 2487.9 | 220.45 | 10644 | 1015 |
| minimum value | 3.36 | 1206744 | 6.81 | 5.3 | 312 | 29 |

The average number of students in colleges and universities is 796,000, with a maximum of 1.799 million and a minimum of 33,600, indicating that the number of students in colleges and universities in different regions is quite different. The average value of the edfund is 89,792.6 million yuan, with the maximum value of 24,775.03 million yuan and the minimum value of 12,067.44 million yuan, indicating that there is also a large gap in education investment between different regions. Popula (the resident population at the end of the year) has an average value of 43.71 million, with a maximum value of 2.245 million and a minimum value of 53.1 million, indicating that the resident population in different regions is also very different, which may affect the number of students in higher education institutions; The average value of the farea (forest area) is 7.38 million hectares, and the environment of different regions is also very different. The average number of school is 430, with a maximum of 1015 and a minimum of 29, indicating that there is also a large gap in educational level between different regions.

## 2.3. Statistical Description of Factors Affecting the Number of Higher Students

**Table 2** Correlation coefficient table

| Correlation | Inhabitant | Forest area | Number of schools | Educational appropriations | Number of high school students |
|---|---|---|---|---|---|
| Number of university students | 0.943 | -0.07 | 0.850 | 0.896 | 0.883 |

It can be seen from this table that the correlation coefficient between the number of permanent residents and the number of college students is 0.943, which is relatively high and the research value should be relatively high; The forest area is inversely proportional to the number of college students, and the correlation is low, indicating that the forest area is inversely related to the number of college students, and the research value is not significant. The correlation coefficient between the number of schools and the number of college students is 0.850, and the correlation is high. The correlation coefficient between education funds and the number of college students is 0.896, with a high correlation. The correlation between the number of high school students and the number of college students is 0.883, with a high correlation.

# 3. Regression Analysis of Influencing Factors on the Number of Higher Students

## 3.1. Modeling

The number of students in institutions of higher learning is chosen as the dependent variable, and the choice of resident population, forest area, number of schools, education funds and

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202207_5(7).0017

number of high school students is chosen as the independent variable to establish a model for regression analysis.

Suppose the model is

$$\cos tudent = \beta_0 + \beta_1 \log(edfund) + \beta_2 histudent + \beta_3 \log(popula) + \beta_4 school + \mu$$

## 3.2. Regression Analysis on Factors Affecting the Number of Higher Students

Using eviews software, estimated by OLS method

$$\cos \hat{tudent} = -525.0962 + 35.90948 \log(\hat{edfund}) + 0.675551 \hat{histudent}$$
$$(157.9713) \quad (35.90948) \quad (0.184663)$$
$$+1.459172 \log(popula) - 0.064799 school$$
$$(15.24969) \quad (0.051848)$$
$$R^2 = 0.866393 \quad \overline{R}^2 = 0.845838 \quad F = 42.15025$$

From this equation, we can see that the influences of edfund, hi student and popula on costudent are all positive, which is roughly consistent with the measurement, while the coefficient of school is negative, which is inconsistent with the conjecture and does not conform to the economic significance. Non-compliance Table 3 shows that the T values of log(edfund) and histudent are greater than 2, which indicates that they are significant, while the T values of log(popula) and school are both less than 2, which indicates that the influence of these two variables on costudent is not significant, and the coefficient of school is negative, which conflicts with the result of the above analysis, while the decision coefficient of the whole model is 0.866393, the adjusted decision coefficient is 0.845838, and the F value is 42.15025, which indicates that the overall linear fitting regression of this model is good.

## 3.3. The Model Is Tested for Multicollinearity

Using eviews to perform multicollinearity test on each variable, table 3.1 is obtained:

**Table 3.** Multicollinearity Test

| | Educational appropriations | Number of high school students | inhabitant | Number of schools |
|---|---|---|---|---|
| Educational Appropriations | one | 0.84 | 0.90 | 0.84 |
| Number of high school students | 0.84 | one | 0.95 | 0.92 |
| Inhabitant | 0.90 | 0.95 | one | 0.90 |
| Number of schools | 0.84 | 0.92 | 0.90 | one |

As can be seen from the above table, the multicollinearity among the four variables is very serious, and the stepwise regression method is applied to the four variables.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202207_5(7).0017

**Table4.** Stepwise Regression Test

| Variance ratio | Number of schools | Log (education funds) | Log (resident population) | Number of high school students |
|---|---|---|---|---|
| | 75.46 | 82.58 | 93.96 | 102.17 |

From the above table, it can be seen that the linear relationship of histudent is the strongest and the fitting degree is the best.

The final model for stepwise regression of each variable is

$$\cos\hat{tudent} = -441.7538 + 0.500544\hat{histudent} + 30.49101\log(\hat{edfund})$$

$$(115.5785) \quad (0.103555) \quad (7.697480)$$

$$T = -3.822111 \quad 4.833598 \quad 3.961167$$

$$\overline{R}^2 = 0.848201 \quad F = 84.815$$

## 3.4. The Model Is Tested for Heteroscedasticity

**Table 5.** White Test Variables

| | Standard error | T value | P value. |
|---|---|---|---|
| constant | 121116.8 | 0.114105 | 0.9101 |
| Number of high school students | 249.5740 | -0.431153 | 0.6701 |
| Number of high school students 2 | 0.084942 | -1.294351 | 0.2074 |
| Number of students in senior secondary schools *(LOG) | 16.22250 | 0.485125 | 0.6318 |
| LOG (education funds) | 16294.00 | -0.099668 | 0.9214 |
| (LOG (Education Fund)) 2 | 546.2984 | 0.084937 | 0.9330 |

From the above test, it can be seen that the values of T are all less than 2 and the values of P are all greater than 0.05, indicating that there is no heteroscedasticity and the results of this model are good.

# 4. Conclusion and Suggestions

The final regression equation derived from the above is

$$\cos\hat{tudent} = -441.7538 + 0.500544\hat{histudent} + 30.49101\log(\hat{edfund})$$

$$(115.5785) \quad (0.103555) \quad (7.697480)$$

$$T = -3.822111 \quad 4.833598 \quad 3.961167$$

$$\overline{R}^2 = 0.848201 \quad F = 84.815$$

It can be seen that for every increase in the number of students in ordinary high schools by 10, the number of students in ordinary institutions of higher learning will increase by about 5, while for education funds by 10 percentage points, the number of students in ordinary colleges and universities will increase by about 3. Histudent and log(edfund) are the two variables that explain 84.82% of costudent. Therefore, if the government wants to increase the number of students in institutions of higher learning, it must first start with the students in ordinary high schools and increase the investment in education funds, while reducing the drop-out rate of students, but it cannot simply increase the number of people with higher education by increasing the resident population. Although this regression equation satisfies various tests, it

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202207_5(7).0017

still has many defects, such as the collinearity among various variables and so on, which is not a good model.

The integration of scientific research, teaching and production is the product of the comprehensive development of higher education, science and economy in the world today. From a macro point of view, the establishment of a consortium led by higher education and closely combined with scientific research and production will be a common model for the reform and development of higher education implemented by all countries in the world. Its emergence has its objective necessity. The new technological revolution and the rapid development of modern social economy reflect the guiding role of scientific theory on new technology and the promoting role of science and technology on the development of modern social economy. The university has a large pool of talents and a dense intelligence. It is best able to generate new knowledge and develop new technologies. Cooperation with enterprises can transform the potential productivity of the university into the actual productivity. It can greatly promote the establishment of new industries and the development of new technologies. On the one hand, colleges and universities should firmly establish the consciousness of actively serving the society and provide all-round services. We will promote the combination of Industry-University-Research's scientific and technological achievements and standardize the development of the school-run industry. On the other hand, higher education must face the real social economy and serve the modern social economy, which has become the general trend of higher education reform in the world.

## References

[1] Wu Yuming, Li Jianxia, China's regional education competitiveness empirical study [J], education and economy, 2002.

[2] Zhang Ling, Feng Zongfeng, China's regional higher education resources allocation analysis of differences [J], higher education development and evaluation, 2006.

[3] Chen Zhao, Lu Ming, Jin Yu, China's regional differences in human capital and education development: an estimation of panel data [J], world economy, 2004.

[4] Hua Ping, the impact of different levels of education on total factor productivity growth-an empirical study from China's provinces [J], Economics (quarterly), 2005.

[5] Lu Ming, Chen Zhao, suffering from scarcity and inequality-the interplay of income disparity, investment, education and growth in China [J], Economic Research, 2005.

[6] Yao Xianguo, Zhang Haifeng, Education, Human Capital and Regional Economic Differences [J], Economic Research, 2008.