Research on the Factors of the Changes in the Number of Undergraduate Students

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Abstract: This article discusses a multi-factor econometric model of changes in the number of regular undergraduate students. A multi-factor analysis was made on the changes in the number of students in ordinary undergraduate schools. First, a stationary test was performed, and then a multiple linear regression model was established with the total number of students in the school as the explanatory variable and other quantifiable influencing factors as the independent variables. Use the OLS method to estimate the parameters, conduct economic analysis through economic significance test, statistical inference and econometric test, and then use the stepwise regression method to eliminate the impact of multicollinearity, and then perform autocorrelation test and correction to obtain the final model, and finally an economic analysis of the model results, and put forward related recommendations.

1. Introduction

Over the past 20 years, China's education has achieved two historic leaps. The first is to achieve the goal of universalizing compulsory education and basically eradicating illiteracy among young and middle-aged adults; the second is that China's higher education has begun to enter the popular stage, and the gross enrolment rate of higher education has reached 17%. China's higher education has entered a stage of popularization in accordance with the UNESCO's standard. As a pure consumer, the changes in the number of ordinary college students will directly or indirectly lead to the development of the entire economy. Especially in recent years, the number of undergraduates has continued to increase. The number of students is concerned about the impact of various economic indicators such as the overall economy and price index.

In recent years, many scholars have made in-depth research on education, economics and other aspects, and found that there is a close relationship between the total number of undergraduate students and the number of ordinary undergraduates and the total population of China. On the basis of the predecessors, this article uses the measurement method to combine the two and other factors to explore the impact of changes in the number of college students.

2. Model settings

X_1: Number of general undergraduates (ten).

The more schools established, the more diversified the types and majors of the school will be, providing students who want to go to college with more choice opportunities to meet their needs. With the continuous increase in the number of ordinary undergraduate students the number has also increased.

X_2: China's total population (10,000 people).

China is a country with a large population in the world. Our country has a large population base and the population continues to grow at an annual rate of about 8 million. In order to allow more people to receive higher education, the number of undergraduates is increasing.

X_3: General undergraduate enrollment (10,000 people).

This mainly depends on the country's education policy. The impact of national policies on all aspects is obvious. At the same time, the tightness of national policies can also show the attitude of national support and restraint. With the reform and opening up and the social with continuous development, more and more people are able to enter the university to receive a better education.

X_4: Per capita disposable income of residents in the country (100 yuan).

Higher-income families will value their children's education and may provide good conditions for their children to go to college.

Note: It is assumed that the effects of student transfers are not considered.

It is assumed that each statistic is calculated accurately.

In summary, the following econometric models are set:

$$Y = \beta_0 + \beta_1 \log(X_1) + \beta_2 X_2 + \beta_4 X_4 + \mu$$

3. Data collection

In order to estimate the model parameters, time series data from 1998 to 2018 were collected. Data source: China Statistical Yearbook 2019, 2010; Gabor Database.

4. Model Estimation and Testing

4.1. Stationarity test

The stationary test of the variables can be concluded at a significance level of 5%. Because the variables are non-stationary, a co-integration test is performed to test whether the above model can describe the general undergraduate Equilibrium relationship of changes in school student numbers. The test results show that the null hypothesis can be rejected at a significant level of 5%, and the residual sequence is considered stable, and the regression model passes the co-integration test.

Based on the data found, the model parameters were estimated using the OLS method, and the regression equation was obtained as:

$$Y = -431.6578 + 279.2299 \log(X_1) - 0.007170 X_2 + 2.817415 X_3 + 1.449421 X_4$$

$$(-0.221093) \quad (2.147077) \quad (-0.418477) \quad (5.483051) \quad (3.294151)$$

$$R^2 = 0.998054 \quad F = 2051.089 \quad DW = 0.933985$$

4.2. Economic significance test

The total number of students in ordinary colleges and universities is positively related to the number of ordinary colleges and universities, the number of undergraduate enrollment in ordinary colleges, and per capita disposable income, which is in line with practical significance. However, it has a negative correlation with the total population of our country, which is not in line with practical significance. It may be caused by the appearance of multicollinearity.

4.3. Statistical inference and econometric tests

4.3.1. Goodness-of-fit test

From the regression results, it can be seen that the determination coefficient R2 = 0.998054 is very close to 1, indicating that the model is he goodness of fit of the data as a whole.

4.3.2. T test

For H_0: β_j (j = 1, 2, 3, 4), given the significance level α = 0.05, the p-values of log (X_1), X_3, and X_4 are all less than 0.05, passing the significance test, and the X_2 p-value = 0.6812 > 0.05, failed the significance test.

4.3.3. F test

For H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$, given the significance level $\alpha = 0.05$, the value of the F statistic is quite large, greater than the critical value, and the p value is 0. The original hypothesis should be rejected, indicating that the general undergraduate The number of schools, the number of undergraduate enrollment and per capita disposable income of ordinary colleges and universities have a significant impact on the total number of students in ordinary colleges and universities.

4.4. Multicollinearity inspection and processing

4.4.1. Multicollinearity test

Preliminary observations show that the regression coefficient of β_2 is not consistent with the expectation, the regression equation has a good fit, and the F test statistic is very significant, but the t test does not pass the significance test, indicating that it is not statistically significant. There may be severe multicollinearity.

4.4.2. The model after multicollinearity correction by stepwise regression is:

$$Y = -1218.692 + 257.4867 \log(X_1) + 2.708881 X_3 + 1.288819 X_4$$

$$(-2.383650) \quad (2.214126) \quad (6.260575) \quad (6.139693)$$

$$R^2 = 0.998032 \quad F = 2874.189 \quad DW = 0.897464$$

As can be seen from the figure, the regression coefficient has a good fit, the F statistic test is quite significant, and each explanatory variable is alsopassed the t test, DW = 0.897464, and given the significance level $\alpha = 0.05$, check the DW table:n = 21, k = 3, the lower critical value is 1.03, and the upper critical value is 1.68. DW < 1.03, so the model has positive autocorrelation, and whether the model has heteroscedasticity needs further verification.

4.5. Correlation test

4.5.1. DW inspection

DW of the regression equation = 0.897464. Given the significance level $\alpha= 0.05$, check the DW table: n = 21, k = 3, the lower critical value is 1.03, and the upper critical value is 1.68. Because DW = 0.897464 < 1.03, it indicates that there is positive autocorrelation.

4.5.2. Autocorrelation correction

R2 = 0.998640, indicating that the goodness of fit is very high. Given the significance level a = 0.05, check the DW table: n = 21, k = 3, the lower critical value is 1.03, and the upper critical value is 1.67. Because du = 1.67 < DW = 2.086335 < 4- du = 2.33, the autocorrelation has been eliminated.

$$Y = -1100.663 + 234.0827 \log(X_1) + 2.720531 X_3 + 1.308806 X_4$$

$$(-2.708121) \quad (2.585746) \quad (7.378488) \quad (4.510082)$$

$$R^2 = 0.998640 \quad F = 1909.02 \quad DW = 2.086335$$

4.6. Heteroscedasticity test

The White test shows that the p-value is greater than 0.05, so there is no heteroscedasticity.

5. Conclusion

Therefore, the final model is:

$$Y = -1100.663 + 234.0827 \log(X_1) + 2.720531 X_3 + 1.308806 X_4$$

$$(-2.708121) \quad (2.585746) \quad (7.378488) \quad (4.510082)$$

$$R^2 = 0.998640 \quad F = 1909.02 \quad DW = 2.086335$$

Based on analysis above:
The continuous increase in the number of students enrolled in general colleges and universities is

the main factor contributing to the continuous increase in the total number of students in colleges and universities in China. When other factors remain the same, when the number of colleges and universities enrolled in colleges and universities increases by 10,000, students in colleges and universities Total increase of 2.720531 million

As per capita disposable income continues to rise, parents 'emphasis on education has gradually increased, and pthe willingness to spend in the education field is stronger, which will cause the total number of students in ordinary colleges and universities in China to continue to increase. When other factors remain the same, when per capita disposable income increases by 100 yuan, the total number of students in ordinary higher undergraduate schools increases130.8806 million people.

The increase in the number of ordinary higher undergraduate schools is also an important factor for the increasing number of ordinary higher undergraduate students in China. When other factors remain the same, when the number of regular higher undergraduate schools increases by 1%, the total number of regular higher undergraduate students increases by 234.0827%.

6. Policy recommendations

With the continuous opening of the admissions policy, the number of undergraduates has also increased, which has led to a very cruel status quo today that talents in all walks of life have reached relative saturation or even excessive. In this way, every year, thousands of graduates are in a state of unemployment and unemployment, which is undoubtedly a disadvantage of current higher education. Undergraduate enrollment is related to the quality of talent cultivation and the development of future careers. Therefore, we cannot blindly implement an open admissions policy. We must make great efforts to recruit undergraduates in the new situation and continuously improve the source and talent cultivation of undergraduates. quality.

Improving the standing, unifying the thinking, increasing the awareness of anxiety, and attaching great importance to the undergraduate admissions are related to the foundation of school development.

At present, many universities only use the test score as the sole criterion for enrolling students. This seems fair, and it is actually very harmful, which will greatly weaken the creativity of young people. The serious consequence of "examination-oriented" education is that it restricts the imagination of Chinese youths. The problem reflected in the college entrance examination is not only an education issue. From a deeper level, it is a reflection of the concept of social talents. Therefore, major colleges and universities should appropriately adjust their enrollment policies, not only in terms of performance, but also in their comprehensive capabilities in various aspects, in order to introduce better talents.

It is necessary to improve the scientific nature of educational decision-making, follow the development law of higher education, handle the relationship between higher education growth and economic growth, and strive to coordinate the relationship between the number of students enrolled, the quality of higher education, and the structure. While expanding the number, we avoid bubble growth and pay attention to improving the quality of education. The structure should be reasonable, the allocation of resources should be optimized, and the road of stable, coordinated and healthy development should be followed.

The increase in the number of ordinary undergraduate schools will also directly lead to an increase in the number of ordinary undergraduate schools. Looking back over the past ten years, China's undergraduate education has undergone tremendous changes, both in terms of size and structure. By 2018, there were 2,663 ordinary higher undergraduates in China. The number of ordinary undergraduate students has reached 16.97 million, and China has become a veritable one. , A major country in higher education, has made historic contributions to promoting higher education equity and sustainable economic and social development.

Not only to increase the number of undergraduate schools, but also to provide first-class learning environment and conditions for undergraduates. Major universities and colleges should substantially increase investment in education, guarantee the leading position of teaching construction, and ensure the basic operation of daily teaching. At the same time, colleges and universities also need first-class

faculty. Although China has made significant progress in the age structure, academic structure, and introduction of high-level talents, it can be said that the undergraduate college faculty in China has achieved rapid development and can basically meet the teaching requirements. However, from the perspective of future development, the teaching staff is still the main bottleneck restricting the improvement of the quality of undergraduate education. The task of teacher construction is still very arduous. It is necessary to continuously introduce high-education and high-level teachers to continuously optimize and improve the teaching level.

We must be good at drawing lessons from the experience of international higher education, discarding its dross. Because different national conditions and different political, economic, and cultural backgrounds show different rules and characteristics, and higher education in foreign countries has experienced a longer period of time compared with China, it is also necessary to review China's expansion policy In accordance with China's national conditions, comprehensive consideration of various factors, follow the law of educational development, so that everyone can share better quality higher education resources and more equal opportunities for higher education.

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