ISSN: 2288-2766 © 2018 EABEA. http://eajbe.jams.or.kr
doi: http://dx.doi.org/10.20498/eajbe.2018.6.4.35

A Study on the Dynamic Relationship between Education Input and Economic Growth

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Received: November 4, 2018. Revised: November 30, 2018. Accepted: December 7, 2018.

Abstract

Purpose – The operating mechanism between education input and economic growth is a mysterious proposition that has attracted a vast array of scholars' interests to study on it. Therefore, this paper sets China as an example to analyze the dynamic relationship between education input and economic growth.

Research design and methodology – The annual time series from 1990 to 2017 will be employed to conduct an empirical analysis under the vector autoregressive model. The education input is treated as an factor that impacts the economic growth such as labor input and capital input. Meanwhile, the education input will be added to the Cobb-Douglas production function to form a new one so as to explore the dynamic relationship between education input and economic growth.

Results – According to the results of empirical analysis, it can be found that the education input has an increasingly positive effect on economic growth. Simultaneously, the economic growth also has a positive effect on education input, but this kind of effect is not steady. Of course, the labor input and the capital input also can promote the economic growth to some degree.

Conclusions – The education input is one of most important inputs for a country. Based on the empirical analysis, this paper suggests that the China's government should put more emphasis on the education input so to make its economy develop well.

Keywords: Education Input, Economic Growth, Cobb-Douglas Production Function.

JEL Classification Code: C10, E29, I25, J01.

1. Introduction

With the deepening of globalization, students from all over the world employ all possible channels to go to the United States of America for academic study. The reason is that American academic qualifications are recognized by all countries. Incidentally, the total economic output of United States of America is the first in the world. Alternatively speaking, a greater economic output indicates a good education. Or maybe a good education leads to a greater economic output. However, China's academic qualifications are not recognized world-widely as that of United States of America, even through China's total economic output is the second in the world. These two phenomena mentioned above have inspired some countries to explore the relationship between education and economy. China is one of the typical representatives.

As China takes "revitalization of the country through science and education" as a strategic decision to strengthen the country and enrich the people, the position of education in economic and social development has become more and more important. Since the reform and opening up, China has increased the proportion of fiscal expenditure on education. It is obvious that China's education scale has been expanded and the education quality has been improved. The benefits which are generated by education are also playing a huge role in economic growth. Meanwhile, the issue of the relationship between education input and economic growth has also become a hottest focus in recent years in China. A large number of research results show that the education input not only plays an important role in China's economic development, but also it is an essential driving factor that realizes the transformation of economic growth and the sustainable economic development.

Education input refers to the monetary performance of the sum of human, material and financial resources which are needed to develop education industry and to cultivate different levels of reserve labor and specialized talents as well as to improve the knowledge and skills of existing labor. Education input is an essential input that uses the human wisdom and ability as a huge resource to develop and utilize itself. Moreover, it is the most important input to promote the human capital accumulation, and it is an input that creates spiritual wealth to coordinate and promote the economic development. From the perspective of modern economics, it is the modern scholar, Solow (1956) who really proposes to use the education as an exogenous variable to promote the economic development. When he uses the production function to analyze the relationship between input and output, he proposes to use the technological progress to explain the contribution of "surplus and indirectly proposes the contribution of education input to the economic development. Adam Smith believes that the usefulness of resident's education is a part of national wealth and an important factor in the development of production. Liszt points out that the social wealth consists of physical capital and spiritual capital. And the spiritual capital that an individual obtains through education will greatly promote the development of productivity. The most classic theory of education's role in promoting the economic development is the human capital theory which is founded by the famous American economist Schultz. He believes that the education input is to enable workers to acquire a productive input that has the potential to produce and that will contribute in the future. Schultz pioneers the margin method using investment incremental analysis. He points out that the education input can improve the quality of human capital, and the government should increase financial input to education at all levels to promote the economic development. When Schultz (1962) analyzes the root causes of US economic growth during the period from 1929 to 1957, he measures the contribution of the growth of education input to economic growth as high as 33%.

In this paper, we aim at exploring the dynamic relationship between education input and economic growth. One innovation of this paper is that the education input is regarded an input element that is added to the Cobb-Douglas function to form a new one. Another innovation is that we treat all these four variables as endogenous variable to form a system to explore how these variables affect each other. Then, according to this new production function, we will discuss the impact of these three inputs on economic growth, especially focusing on the impact of education input on economic growth. By employing the annual time series data from 1990 to 2017 and using some econometric approaches such as vector autoregressive model and impulse response function, the empirical analysis will be conducted to analyze the dynamic relationship between these variables and economic growth. The results of this paper indicate that the education input has an increasingly positive effect on economic growth. And the feedback effect of economic growth on education input is fluctuating, but keeping above the zero. At present, the labor input and the capital input still have a positive effect on economic growth. However, the impact of capital input on economic growth is relatively smaller than that of labor input and education input.

The structure of this paper includes five parts (introduction, literature review, methodology, empirical analysis and conclusion). These parts will be discussed separately to explore the dynamic relationship between education input and economic growth.

2. Literature Review

Rapid economic development provides a prerequisite for the education development. Namely, the greater the total economy is, the greater the share of input in education will be. Simultaneously, with the continuous improvement of education system, it will have a feedback effect on economic growth. In order to clarify the issue of education input and economic growth, a large number of scholars have studied this issue with different samples and different methods. Unfortunately, they have not reached a consensus on the relationship between education input and economic growth.

Yang (2006) analyzes the Granger causality between education input and economic growth. His findings show that there is an significant two-way causal relationship between economic growth and education input. From 1952 to 2002, the contribution rate of education input to China's economic growth is about 24.23%, which indicates that the education input has promoted China's economic growth to a certain extent. Tan (2006) uses the vector error correction model to study the relationship between education input and economic growth with a sample from 1952 to 2003. He finds that there is a long-run relationship between education input and economic growth. General speaking, 1% increase in the education input will lead to 0.88% increase in the economic growth. He also finds that there is an significant two-way causal relationship between economic growth and education input. Based on the Cross-Spectrum Analysis, Zhao and Chuan (2008) use the data from 1979 to 2006 to explore the effect of science and technology education input on economic growth. Their results of the study show that since the reform and opening up, the contribution rate of education investment to China's economic growth has been 16.19%. Ye, Yang and Wu (2009) use the Feder model to compare the data from 1997 to 2006 to measure the total effect and spillover effect of education input on economic growth. Their results show that the education input has made a huge contribution to economic growth and it has a high income and a strong spillover effect.

Zheng (2010) uses the panel data model to analyze the relationship between education input and regional economic growth. He divides China into there areas (eastern area, central area and western area) to perform an empirical analysis with a period of 1996 to 2009. He finds that there is a big difference in these three area about the impact of education input on per capita GDP. In the greatest developed area (eastern area), the impact of education input on per capita GDP is largest. Then, the central area and the western area follow behind the eastern area. Xiao (2010) selects the data from 1953 to 2008 to analyze the relationship between education input and economic growth in Guizhou province. Some econometric methods like cointegration test and Granger casualty test are employed to conduct an empirical analysis. His findings shows that the education input can promote the economic growth. Meanwhile, the economic growth also can foster the education development. Chen and Dang (2010) take Xinjiang province as an example to analyze the relationship between education input and economic growth. They use the grey correlation method to calculate the correlation coefficient which reflects the education input and economic growth. They find that an increase in the education input can result in an increase in the economic growth in Xinjiang province. Ganegodage and Rambaldi (2011) use the neoclassical and endogenous growth model to evaluate the contribution of investment on education to Sri Lanka's economic growth during the period from 1959 to 2008. Their results show that the education input can improve the economic growth. Afzal, Rehman, Farooq and Sarwar (2011) set Pakistan as an example to explore the cointegration and causality between education and economic growth. Their findings also indicate the existence of the feedback causality between education and all levels of education with economic growth. Among all levels of education, the general higher education causes economic growth highly and most significantly while the level of confidence of causing the economic growth to school education is found to be the highest.

Frini and Muller (2012) apply the Becker's theory to examine the relation between education and economic growth with a sample of Tunisia. Their results indicate that the education has relatively fostered economic growth. Jalil and Idrees (2013) use the non-linear two stage least square instrumental variable estimators to evaluate the level and growth effects of education on economic growth of Pakistan over the period of 1960 to 2010. Their findings show that the effect of different levels of education on economic growth is positive in Pakistan. Wu and Zhou (2012) use the cointegration test and vector error correction model as well as Granger causality to analyze the relationship between education input and economic growth with a sample from 1978 to 2009. They find that the elasticity of education input to GDP is 0.0879 and there is no Granger causality between education input and economic growth. However, they find that the education input has a positive effect on economic growth.

Benos and Zotou (2014) take the meta-regression analysis to examine the effect of education on economic growth. Their findings show that the education has a poitive effect on economic growth. Mercan and Sezer (2014) use the data from 1970 to 2012 to study the effect of education expenditure on economic growth with a sample of Turkey. They reach a conclusion that there is a positive effect of education expenses on economic growth. Hu and Guo (2014) set Sichuan province as an example to study the relationship between education input and economic growth.

Their results show that the education plays a vital role in promoting the economic development of Sichuan province. In the long run, the education input has a pulling effect on economic growth. 1% increase in education input can increase the economic growth by 0.667%. However, the short-run effect of education input on economic growth is not obvious. Hassan and Cooray (2015) apply the extreme bounds analysis to investigate the comparative growth impacts of gender disaggregated and level-specific enrolment ratios in a panel of Asian economies. Their findings show that more input in female education has a positive effect on Asian economies. Böhm, Grossmann and Steger (2015) puts forward a dynamic general equilibrium model to dynamically estimate whether the economic growth is triggered via an increase in the public education expenditure on terms of those with high learning ability finally trickles down to low-ability workers and serves them better than redistribution through labor income taxation or education policies targeted to the low-skilled.

Wang (2016) employs the data from 1985 to 2014 to analyze the contribution of education input to economic growth. Via the ordinary least squares estimates, He finds that the education input on economic growth is still very weak when compared with other factors. Based on the spatial econometric model, Du (2018) takes the relevant data of fiscal education input and regional GDP in various provinces and cities of China as the research object. Their results show that there is spatial dependence on China's economic growth mode. Meanwhile, the education input plays a significant role in promoting the economic growth. Donou-Adonsou (2018) employs the data from 1993 to 2015 to explore the impact of education on economic growth from the forty five Sub-Saharan African countries. With the fixed-effects GMM estimator, the impact of education on economic growth is significant.

These papers exhibited above have analyzed the relationship between education input and economic growth in different aspects such as science and technology education input and fiscal education. In order to make progress in this proposition, this paper sets China as an example to exploit the dynamic relationship between education input and economic growth under the vector autoregressive model. Meanwhile, this paper also treats the education input as a factor that is added to the Cobb-Douglas production function to create a new one to impact the economic growth. Without a doubt, this performance is also a greatest innovation in this paper.

3. Research Design

“Education is connected to economic success, Alvarez said. “When one person in a family has a college degree, the whole family benefits. Alvarez emphasizes the importance of education to the economic growth in microeconomy. However, how the education affects the economic growth in macroeconomy is still a heated question that needs to be solved. In this paper, we employ a famous function that discusses the relationship between input and output, called Cobb-Douglas production function that is firstly purposed by American mathematician C.W. Cobb and economist Paul Douglas. This function is the most widely used form of production function in economics. It plays an important role in the research and application of mathematical economics and econometrics.

The Cobb-Douglas production function gives:

$$Y = A(t) L^{\alpha} K^{\beta} \mu \tag{1}$$

Where $A(t)$ denotes the technology, which is treated as a constant in this paper; L denotes the labor input; K denotes the capital input; Y denotes the economic output; μ denotes the white noise; α denotes the elastic coefficient of labor output; β denotes the elastic coefficient of labor output.

In this paper, the education input is treated as an input factor that affects the economic growth like labor input and capital input. Therefore, the Cobb-Douglas production function by adding the education input gives:

$$Y = A(t) L^{\alpha} K^{\beta} ED^{\gamma} \mu \tag{2}$$

Where ED denotes the education input; γ denotes the elastic coefficient of education output.

Taking the logarithm for the both sides of equation (2) gives:

$$\log Y = \log A(t) + \alpha \log L + \beta \log K + \gamma \log ED + \log \mu \tag{3}$$

Rewriting equation (3) in a general form gives:

$$\log Y_t = C + \alpha \log L_t + \beta \log K_t + \gamma \log ED_t + \mu_t \quad (4)$$

Where C denotes the constant.

According to equation (4), there are three relations between education input and economic growth. The first relation ($\gamma > 0$) is that the education input can promote the economic growth. The second relation ($\gamma = 0$) is that the education input can not affect the change of economic growth. The third relation ($\gamma < 0$) is that the education input can prevents the economic growth.

4. Empirical Analysis

4.1. Unit Root Test

As an important tool of testing time series stationarity, the unit root test is always used. The unit root test refers to whether there is a unit root in the sequence, and if there is a unit root, it is a non-stationary time series. Otherwise, it is stationary. The reason is that the original sequence is directly used for the regression analysis, it will be easily resulted in the spurious regression. In this paper, the Augmented Dickey Fuller Test will be employed to testify the stationarity of all variables. Before the stationarity testifying, all these variables will be taken the logarithm so as to reduce the heteroscedasticity and to zoom the outliers out. The results of Augmented Dickey Fuller Test show in <Table 1>.

Table 1: Results of Augmented Dickey Fuller Test

Variable	Authentication type (C, T, L)	T-statistic	5% Test Critical Value	Prob.*	Result
$\log GDP$	(C, 0, 2)	-1.754	-2.986	0.393	Non-rejected
$\log K$	(C, T, 1)	-2.046	-3.595	0.550	Non-rejected
$\log L$	(C, T, 0)	0.278	-3.588	0.997	Non-rejected
$\log ED$	(0, T, 0)	-0.197	-3.588	0.990	Non-rejected
$\Delta \log GDP$	(C, 0, 1)	-5.193	-2.996	0.000	Rejected
$\Delta \log K$	(C, T, 0)	-4.661	-3.595	0.005	Rejected
$\Delta \log L$	(0, 0, 0)	-2.150	-1.954	0.044	Rejected
$\Delta \log ED$	(C, T, 0)	-3.644	-3.595	0.045	Rejected

Note: * indicates the MacKinnon (1996) one-sided p-values; Δ indicates the difference operator; C indicates the constant; L indicates the lag length; T indicates the trend.

As <Table 1> reports, these variables used to test are non-stationary at their own levels, because the values t-statistic are less than 5% test critical values. However, By conducting the first difference, these variables become stationary under 5% significant level due to that the values t-statistic are greater than 5% test critical values. In conclusion, according to the results of unit root test, it can be known that these variables are the process of $I(1)$.

4.2. Johansen System Cointegration

In this paper, the Johansen system cointegration test will be employed to verify the long-run relationship education input and these three variables. There are two types of Johansen test, either with trace or with eigenvalue. The results of trace test and maximum eigenvalue test show in <Table 2>.

Table 2: Johansen System Cointegration Test

Trace Test			Maximum Eigenvalue Test		
Hypothesized No. Of CE(s)	Trace Statistic	0.05 Critical Value	Hypothesized No. Of CE(s)	Max-Eigen Statistic	0.05 Critical Value
$r = 0$ *	104.829	47.856	$r = 0$ *	50.474	27.584
$r \leq 1$*	54.355	29.797	$r = 1$ *	41.341	21.132
$r \leq 2$ *	13.014	15.495	$r = 2$	8.287	14.265
$r \leq 3$*	4.728	3.841	$r = 3$ *	4.728	3.841

Note: * denotes rejection of the hypothesis at the 0.05 level.

<Table 2> reports the results of Johansen system cointegration test. When comparing the statistic values of trace test and maximum eigenvalue test with 0.05 critical value, respectively, it can be found that there two cointegrations among these variables. A normalized cointegrating equation with a dependent variable GDP gives:

$$\begin{aligned} &\log GDP_t = 1.663 \log ED_t + 0.392 \log K_t + 1.257 \log L_t \\ &..................(0.017).............(0.068)...........(0.189) \end{aligned} \quad (5)$$

Where the value in the parentheses is the standard error.

Equation (5) indicates the long-run relationship between education and these three variables. We can conclude that the education input, the labor input and the capital input have a positive effect on economic growth. Said differently, 1% increase in the education input will lead to 1.663% increase in the economic growth; 1% increase in the capital input will give a rise to 0.392% increase in the economic growth; 1% increase in the labor input will result in 1.257% increase in the economic growth. Said more deeply, in the long run, the education input can promote the economic growth. It means that the input of China's government to education has been obtained some achievements. Accordingly, China's government should increase the ratio of education input to GDP. However, the coefficient of capital input is relatively small. It mans that the impact of capital input on economic growth is relatively weak. This result also matches China's real situation where China's government has been transferred the capital surplus to foreign countries to search for more profits. The coefficient of labor input is still relatively bigger. It means that the products produced in China are still labor intensive. Even through China's government has been transferred the labor surplus to foreign countries, the impact of labor input on economic growth is still greater.

4.3. Vector Autoregressive Model

Before establishing the vector autoregressive model, we should confirm where the optimal lag is so as to keep the accuracy of modeling. The results of vector autoregressive lag order selection criteria show in <Table 3>.

Table 3: VAR Lag order Selection Criteria

Lag	Akaike information criterion	Schwarz information criterion
0	-14.323	-14.127
1	-25.786	-24.811
2	-28.318*	-26.563*
3	-28.293	-25.758

Note: * indicates lag order selected by the criterion.

Based on the Akaike information criterion and Schwarz information criterion, we can find that the second lag is optimal. Therefore, the vector autoregressive (2) model shows in <Table 4>.

Table 4: Vector Autoregressive Estimates

Model	Model(1)	Model(2)	Model(3)	Model(4)
Variable	$\Delta \log GDP_t$	$\Delta \log ED_t$	$\Delta \log K_t$	$\Delta \log L_t$
$\Delta \log GDP_{t-1}$	1.424 (0.182) [7.807]	0.903 (0.304) [2.967]	1.650 (0.215) [7.674]	0.011 (0.007) [1.538]
$\Delta \log GDP_{t-2}$	-0.603 (0.249) [-2.420]	0.091 (0.016) [5.688]	-1.525 (0.661) [-2.307]	0.0005 (0.010) [0.046]
$\Delta \log ED_{t-1}$	0.041 (0.012) [3.333]	-0.050 (0.024) [-2.083]	-1.164 (0.460) [-2.530]	-0.004 (0.006) [-0.612]
$\Delta \log ED_{t-2}$	0.145 (0.054) [2.685]	-0.375 (0.041) [-9.146]	2.163 (0.964) [2.243]	0.010 (0.006) [1.695]
$\Delta \log K_{t-1}$	0.039 (0.012) [3.417]	-0.056 (0.023) [-2.435]	0.068 (0.012) [5.667]	-0.002 (0.001) [-1.792]
$\Delta \log K_{t-2}$	0.082 (0.040) [2.083]	0.098 (0.026) [3.769]	-0.208 (0.264) [-0.789]	0.0001 (0.002) [0.066]
$\Delta \log L_{t-1}$	0.477 (0.121) [3.942]	0.864 (0.247) [3.498]	-0.247 (0.032) [-7.719]	0.669 (0.233) [2.870]
$\Delta \log L_{t-2}$	-0.826 (0.125) [-6.608]	-0.192 (0.021) [-9.143]	0.037 (36.822) [0.001]	0.206 (0.225) [0.913]
C	0.006 (0.010) [0.676]	0.021 (0.016) [1.320]	0.038 (0.064) [0.601]	-0.001 (0.0004) [-2.249]
R^2	0.888	0.727	0.741	0.953

Note: ( ) indicates the standard errors; [ ] indicates the t-statistics.

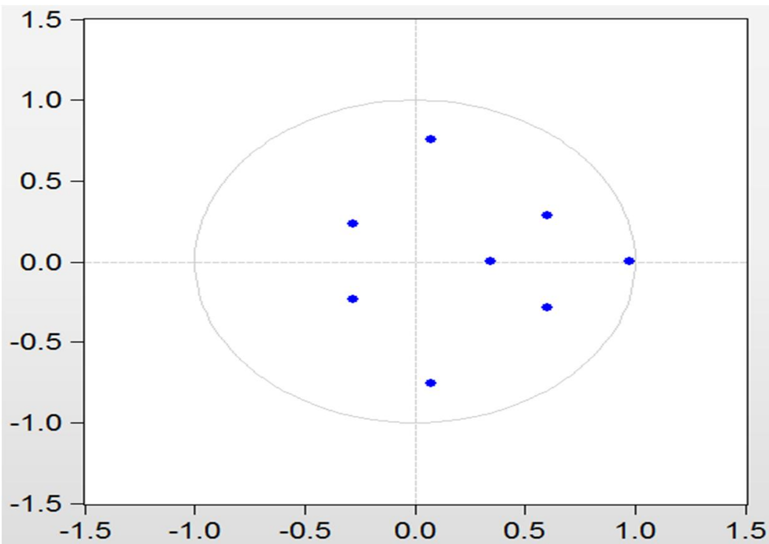

Figure 1: Inverse Roots of AR(2) Characteristic Polynomial

<Table 4> indicates the results of vector autoregressive (2) estimates. From the value of R^2, it can be found that the models have a good fitness. In order to confirm the stability of these models, all the values of inverse of AR(2) characteristic polynomial should be kept inside the unit circle. The results of inverse roots of AR(2) characteristic polynomial show in <Figure 1>.

According to the results of inverse roots of AR(2) characteristic polynomial, we find that all of them are located inside unit circle. Said differently, the vector autoregressive (2) is steady. These results form an empirical foundation for the next step to conduct the impulse response function.

4.4. Impulse Response Function

Impulse response functions are useful for exploring the interactions between variables in a vector autoregressive model. They represent the reactions of variables to shocks hitting the system. The results of impulse response functions about the education input and the economic growth show in <Figure 2>.

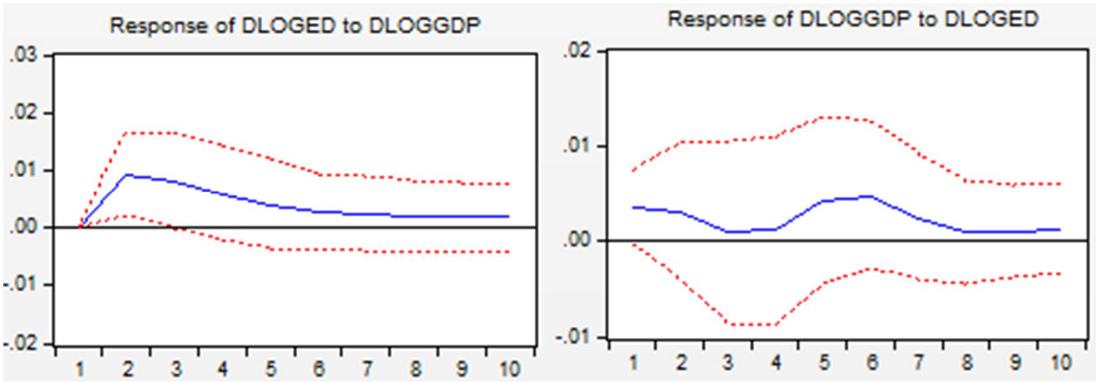

Figure 2: Impulse Response Function

<Figure 2> indicates the impulse response function between education input and economic growth. With regard to the response of education input to economic growth, the economic growth will increase from period one to period two while the economic growth suffers from a positive impulse of education input. Then, its effect will decrease from period two to period seven. after period seven, its effect will keep unchanged. With respect to the response of economic growth to education input, the education will decrease firstly and increase lately while the education input suffers from a positive impulse of economic growth. However, its effect will keep above the zero.

4.5. Variance Decomposition

Anderson (2003) points out that the variance decomposition is a classical statistical approach in multivariate analysis for uncovering simplifying structures in a large set of variables. In macroeconomic analysis the term ‘variance decomposition’ or, more precisely, ‘forecast error variance decomposition’ is used more narrowly for a specific tool for explaining the relations between variables demonstrated by vector autoregression models. These models are advocated by Sims (1980) and used since then by many economists and econometricians as alternatives to classical simultaneous equations models. Sims criticizes the way the latter models are specified, and questioned in particular the exogeneity assumptions common in simultaneous equations modelling. The results of variance decomposition about education input and economic growth show in <Table 5> and <Table 6>.

Table 5: Variance Decomposition of $\Delta \log ED$

Period	S.E.	$\Delta \log ED$	$\Delta \log GDP$	$\Delta \log K$	$\Delta \log L$
1	0.017	100.000	0.000	0.000	0.000
2	0.020	72.166	20.960	1.355	5.519

3	0.023	58.005	28.646	6.894	6.455
4	0.025	49.761	30.255	13.814	6.170
5	0.026	49.473	29.536	14.926	6.064
6	0.027	49.840	28.565	14.948	6.647
7	0.028	48.607	28.329	15.683	7.382
8	0.028	47.698	28.222	16.339	7.741
9	0.028	47.574	28.099	16.338	7.990
10	0.029	47.520	28.014	16.127	8.339

<Table 5> indicates the variance decomposition of education input. The education input makes a greatest contribution to itself. The contribution of economic growth to education input reaches 28.014%. The contribution of labor input to education input is 16.127%. The contribution of labor input to education input is 8.339%. Compared with impact of labor input and capital input on education input, the impact of economic growth on education input is relatively greater.

Table 6: Variance Decomposition of $\Delta \log GDP$

Period	S.E.	$\Delta \log ED$	$\Delta \log GDP$	$\Delta \log K$	$\Delta \log L$
1	0.010	11.476	88.524	0.000	0.000
2	0.016	7.820	89.035	1.347	1.798
3	0.020	5.326	78.150	13.752	2.771
4	0.023	4.443	67.542	25.272	2.743
5	0.050	6.895	61.211	29.257	2.637
6	0.025	10.053	57.631	29.560	2.757
7	0.025	10.752	56.424	29.800	3.023
8	0.025	10.782	56.001	30.032	3.195
9	0.025	10.910	55.795	30.022	3.273
10	0.025	11.126	55.603	29.898	3.372

<Table 6> indicates the variance decomposition of economic growth. The contribution of economic growth is itself 55.603%. The contribution of education input to economic growth reaches 11.126%. The contribution of labor input to economic growth is 3.372%. The contribution of labor input to economic growth is 29. 372%. Compared with impact of labor input and capital input on economic growth, the impact of education input on economic growth is relatively greater, but less than that of capital input.

5. Conclusion

The education development can benefit both individuals and economic development of a country. However, how they affect each other is still an interesting question that appeals to a large number of scholars to study on the relationship between them. Based on this background, this paper sets China as an example to analyze the dynamic relationship between education input and economic growth. Moreover, the education input is treated as an input element such as labor input and capital input to insert into the Cobb-Douglas production function to discuss its effect on economic growth. Meanwhile, the economic growth is an output, which also has a feedback effect on education input. In order to figure out the operating mechanism between them, the annual time series data from 1990 to 2017 will be employed and a great deal of econometric approaches will be used to conduct an empirical analysis under the vector autoregressive model. The findings of this paper indicate that the education input has a positive effect on economic growth. Conversely, the feedback effect of economic growth on education input is also positive. This kind of effect is fluctuating but keeping above the zero.

Furthermore, the findings of this paper also reveal that the capital input and the labor input have a positive effect on economic growth. Compared with the effect of labor input on economic growth, the effect of capital input on economic growth is relatively small. These empirical results also are in line with the real situation of China. At present, the large domestic capital surplus in China starts to transfer to the foreign countries to earn more extra interests. Even though the technology in China experiences a rapid development, the products in China are also labor-intensive. Due to these reasons, China’s government has taken a lot of measures such as carrying out the policy of One Road One Belt and establishing the Asian Infrastructure Investment Bank. The empirical analyses in this paper also provide some suggestions for China’s government. Just as the findings of this paper indicate, China’s government should increase the input more to the education, because the education input has an increasingly positive effect on economic growth. Meanwhile, China’s government should balance the labor input and capital input, because the excessive input of them may not increase the economic growth.

The limitation of this paper is that there a large number of factors that affect the economic growth in China. We only use these three variables to estimate the economic growth based on the Cobb-Douglas production function. Due to that the Cobb-Douglas production function is valid unless some assumptions hold. This performance may lead to an overestimation. In order to solve this problem, there are two approaches. One is to add more inputs to the Cobb-Douglas production function. Another is to release some assumptions of Cobb-Douglas production function to form a new production function. Both of them can help us reduce the overestimation.

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