

The Impact of Human Capital on the Beijing Economic Growth

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ABSTRACT: By regression analysis of relevant data in Beijing from 1993 to 2013, this article tries to figure out that the impact of Beijing's human capital investment growth for its economic growth. The empirical result shows that Beijing's economic growth based on the common growth of its physical capital and human capital. However, from the current development trend, it shows that investment in human capital of Beijing for its role in promoting Beijing's economic growth will be larger than physical capital investment. According to the empirical result, we finally make a few suggestion that maintain physical capital inputs of Beijing to ensure the steady growth of its economy in the foreseeable future years, at the same time, further increase human capital investment of Beijing to actively encourage its rapid economic growth.

KEYWORD: Beijing; Human Capital; Economic Growth; Empirical Analysis

1 INTRODUCTION

International research on the relationship between human capital and economic growth has experienced a continuous process of exploration, the new growth theory represented by Lucas and Romer created a new stage of economic growth research. The prospects for constructing a neoclassical theory of growth was considered by Lucas (1988), and three models of emphasizing physical capital accumulation, human capital accumulation through schooling and specialized human capital accumulation through learning by doing were compared to evidence. A theoretical framework for thinking about the role of human capital in a model of endogenous growth was outlined by Romer (1990), and it found that the initial level of human capital like literacy does help predict the subsequent rate of investment and the rate of growth. The impact of human capital on the process of economic growth was investigated by Savvides et al. (2006), through deriving estimates of the output elasticity and social return to human capital for 51 countries at various stages of economic development. The power of the human capital hypothesis to explain observed differences in long term growth dynamics across specific countries was illustrated by Ehrlich(2009), which is in the case that the emergence of the US as the world economic superpower, overtaking the UK and Europe in general.

For Chinese scholars, most of them were more focused on empirical research, and tried to find out the relationship between human capital and economic growth from the perspective of the country or region rather than city. The view hold by Tang (2006) was that the increasing of human capital marginal returns does promote the sustained economic growth. A model of endogenous growth was constructed by Yang (2006), and empirical analyzed the impact of human capital accumulation and formation elements of human capital on the economic growth. Compared with the east and western region of China, Wang & Zheng (2010) pointed out that human capital plays a specific role in economic growth in different regions, and could be the reason that the level of the economic development between different regions is different. Various human capital indexes were constructed by Li et al. (2010), which measured with modified Jorgenson-Fraumeni lifetime income approach, and made projections up to 2020.

Until now, there are still many scholars dedicated to study the relationship between human capital and economic growth using different approach and transforming different perspective. Due to Beijing, as the capital of China, possess the most abundant human capital, this article tries to concentrate on the impact of human capital on the Beijing economic growth, and expects to provide a reference for the development of relevant policies after compared with the impact of physical capital.

2 MODEL AND DATA

2.1 Model

In this article, Cobb-Douglas production function is used to analysis the impact of human capital on the Beijing economic growth. As follow:

$$Y = AK^\alpha L^\beta \quad (1)$$

Where Y =output; A =technological advances; K =physical capital investment; L =human capital investment; α =elasticity of physical capital; β =elasticity of human capital.

2.2 Index Selection

For index of output, real GDP is used to measure of economic growth in case that excluding the effect of inflation, which equals to nominal GDP divided by the GDP index. For index of physical capital investment, actual total investment in fixed assets is considered to reflect the scale of investment in fixed assets for eliminating the effect of inflation, which is equal to nominal total investment in fixed assets

divided by fixed assets investment value index. For index of human capital investment, actual human capital is think of reflecting long-term human capital that calculated by J-F approach, which is equivalent to nominal human capital divided by CPI index. In addition, J-F approach is come from the study of Jorgenson and Fraumeni, who are dedicated to the research of human capital accumulation.

2.3 Data Source

Based on the data released by the China's National Bureau of Statistics website, all relevant data from 1993 to 2013 is selected to be used, excluding the data of nominal human capital. In addition, the data of nominal human capital from 1993 to 2010 is cited from database of China Center for Human Capital and Labor Market Research. But for the data of nominal human capital from 2011 to 2013, which has not calculated, this article tries to superimpose the average growth rate of nominal human capital onto the nominal human capital of the last year. As Table 1 below.

Table 1. The Value of Index (Unit: 100 Million)

Year	Output	Physical Capital Investment	Human Capital Investment
1993	7.89	3.24	143.90
1994	10.07	5.58	155.54
1995	13.46	7.39	190.90
1996	16.41	8.10	235.82
1997	18.87	9.36	292.37
1998	21.71	11.16	356.29
1999	24.16	11.72	421.67
2000	28.28	12.68	489.72
2001	33.20	15.04	576.36
2002	38.70	17.89	721.25
2003	45.07	21.23	845.50
2004	52.88	24.24	997.79
2005	62.17	28.08	1143.15
2006	71.84	32.83	1501.21
2007	86.00	38.01	1868.55
2008	101.88	35.39	2266.03
2009	110.28	47.55	2987.61
2010	127.96	52.71	3402.34
2011	150.34	52.78	3941.45*
2012	166.01	60.34	4813.50*
2013	181.06	68.54	5750.45*

* Source: Author's calculation

3 EMPIRICAL ANALYSIS

3.1 The regression result

Before OLS regression, Augmented Dickey-Fuller test and Johansen test are carried out based on the

logarithmic transformed data, and indicates that there exist a stable equilibrium relationship between the variables so that OLS regression could be performed. As follow (t test values are in parentheses):

$$\ln Y = -0.737965 + 0.506130 \ln K + 0.445706 \ln L \quad (2)$$

(-4.69) (6.76) (8.10)

$$R^2 = 0.997772 \quad F = 4030.828 \quad D.W. = 2.224698$$

From the regression result, it is illustrated that the data is well fitted the model, and it is obviously that the model shows a significant linear relationship between variables.

3.2 Result analysis

Foremost, Beijing's economic growth based on the common growth of its physical capital and human capital. According to the regression result, under the significance level of 1%, t test values of $\ln K$ and $\ln L$ are more than 2.878 in case that the number of variables transformed freely is 18, moreover α and β are positive number, it is reasonable that investment growth of Beijing's physical capital and human capital promoted its economic growth at the same time and place.

Secondly, the impact of Beijing's physical capital investment growth on its economic growth is greater than human capital. On the basis of the regression result, α and β are 0.506130 and 0.445706 respectively, it means that each additional unit of physical capital investment brings about 0.506130 unit growth of economic, which is more than human capital by 0.060424 unit. It is considered that Beijing's physical capital investment growth plays an important role in creating its economic growth more than human capital.

Table 2. The Annual Average Growth Rate and Impact Rate on Real GDP.

	The Annual Average Growth Rate*	Impact Rate on Real GDP*
Physical Capital Investment	16.48%	8.34%
Human Capital Investment	20.25%	9.03%

* The annual average growth rate is equal to geometric growth rate, and multiplied with relevant output elasticity equals to the impact rate on real GDP.

4 CONCLUSION

This article tries to figure out that the impact of Beijing's human capital investment growth for its economic growth through empirical analysis. According to the result of empirical analysis based on the relevant data from 1993 to 2013, it is indicated that Beijing's economic growth based on the common growth of its physical capital and human capital. Even though the impact of physical capital investment growth on Beijing's economic growth is greater than human capital, but from the current development trend, investment in human capital of Beijing for its role in promoting Beijing's economic growth will be larger than physical capital. For the reason that, it is necessary to

Finally, from the current development trend, investment in human capital of Beijing for its role in promoting Beijing's economic growth will be larger than physical capital investment. According to Figure 1, the annual growth rate of Beijing's human capital investment is higher than physical capital investment in most of the years from 1993 to 2013, which is maintained rising trend continuously. And it can be seen from Table 2 that the annual average growth rate and the impact rate on real GDP of Beijing's human capital are 20.25% and 9.03% respectively, which is slightly larger than physical capital. With the current trend, there is no doubt that the investment of human capital for stimulating Beijing's economic growth will be more considerable than physical capital investment.

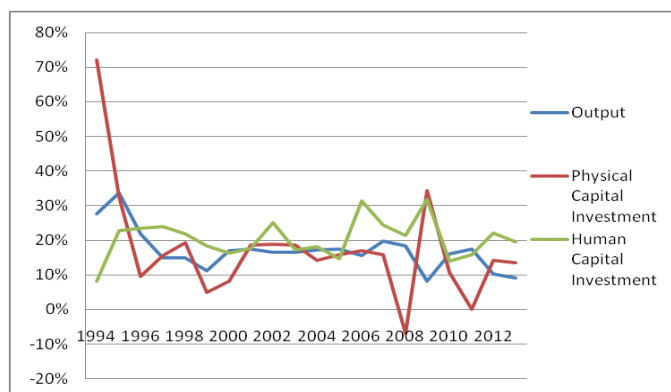


Figure 1 The Annual Growth Rate* from 1993 to 2013

* The annual growth rate is calculated by a formula, where X_n = the value; n = current year. As follow:
 $[(X_n - X_{n-1}) / X_{n-1}] \times 100\%$

maintain physical capital inputs and further increase human capital investment of Beijing, so as to ensure the steady of economic growth in the foreseeable future years and encourage rapid economic growth at the same time.

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