Research on the influence of human capital on economic growth

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Abstract. Economic growth has always been an economic phenomenon expected by the public, and it is also a hot topic studied by a wide range of scholars. So far, there have been a lot of domestic and foreign research literature on the phenomenon of economic growth, and it goes without saying why economic growth has always been such a hot topic. The purpose of this paper is to study the impact of human capital on economic growth by analyzing the data samples of China's 31 provinces (excluding Hong Kong, Macao and Taiwan) from 2009 to 2018 in the National Bureau of statistics and the China Statistical Yearbook. The main result of the analysis is that although educational human capital has a positive impact on China's real GDP growth, the correlation is not very significant. As for the health capital in human capital, the research shows that the relationship between health capital and economic growth is not significant. Overall, this study shows that China should reduce its dependence on physical capital investment, so as to improve the return on human capital investment and find a new path for economic growth, which can also help the economy avoid the middle-income trap.

Keywords: Human Capital; Economic growth; Data analysis.

1. Introduction

The discussion about economic growth never stopped, and many theoretical frameworks and empirical analyses have addressed economic development and its contributors. Among all previous outcomes of growth theories, Solow growth model, put forward by Solow in 1956, is the most famous and widely accepted theory. In classical Solow model, economic growth results from diminishing return of capital and sustains a stable rate which is decided by population, growth and technology. However, there is also a significant limitation of this classical growth model, which is absence of human capital. According to Mincer (1984), education and health, the two main factors of human capital are the basic driving force of workers' productivity [1]. Once the importance of human capital is put forward, some economic changes hardly explained by traditional capitals can be easily understood. Therefore, Mincer claims that the understanding of human capital successfully push the economics frontier beyond simple transactions. However, the majority of current researches failed to take into consideration the factor of human capital when studying economic growth.

This paper aims to determine the relationship between human capital and economic growth and selects China as the sample to be discussed. China's rapid economic growth has long been a popular topic in economics research. Numerous researchers attribute such high-quality and efficient growth to China's well operation of cheap labor and abundant resource. However, Chi (2008) warns that such labor- or resource- intensive economic growth may be not sustainable. China needs to transform its economy and find new pillars of economic growth.

The remaining of this study is organized as follows. Section II is the literature review in order for the readers to get a better understanding of the human capital and the studies around it. Section III proposes several hypotheses to be tested and analyzed the accountability of each of them. In section IV, by showing and reviewing the data this paper makes the point about the relationship between human capital and economic growth. The last part concludes the analysis and point of the direction for China's future development.

2. Literature Review

To understand how human capital affects economic growth, the definition of human capital should be clarified first. Schultz (1961)claims that human capital measures the quality of workers[2]. In Schultz's theory, workers use their time and money to improve themselves, and such improvement should be considered a capital which then contributes to increase of labor productivity. Shultz is the biggest but not the only contributor to human capital theory. On micro level, Mushkin (1984) claims that individual's payment in education brings them higher efficiency which then leads to a higher salary return [3].

The development of human capital theory provides new path for growth theory development[4-7]. However, too general description of human capital is meaningless in economic research. To obtain an accurate and plausible influence from human capital to economic development, the study requires a more accurate specification of human capital from every aspect. The discussion begins with education service, the well-known largest contributor of human capital. There is no doubt that education is important for economic growth, especially in developing countries. According to Nelson and Phelps (1966), educated watchmakers tend to be more efficient in understanding and adopting knowledge of new technology, which then brings them a higher productivity in agriculture activities[8]. Schultz (1988) extends the theory of income division with education attainment[9]. According to Schultz (1988) conclusion, it is the discrepancy in education that contributes to the income gap between workers. Furthermore, as those well-educated are better at understanding leading-edge inventions, new technologies can then be introduced to production. Therefore, education can be also seen as a driver of technology diffusion (Benhabib and Spiegel, 1994) [9].

However, several doubts on the positive influence of education on economic growth should also be considered. Education may bring inequalities. Shnarbekova (2021) found out that higher education increases social inequality in Kazakhstan's labour market [11]. Angrist (2021) explains Schultz's finding with different outcomes of different education[10]. According to Angrist (2021) theories, only the increase in quantity of education can benefit poor families, while government's promotion of quality of education will only benefits people from upper or middle- classes. In other words, high-quality education has little contribution in poverty reduction. Besides, there is doubt about whether education can really generate human capital. Barro (1996) provides a wealth of empirical evidence [12] [15]. From Barro's results, it appears that higher education in the US and other countries is not necessarily associated with higher growth rates. The negative correlation is not a result of measurement error. And the result can not explain why education definitely generates cognitive skills but can not really contributes to economic development.

Health is another significant part of human capital. As Grossman (1972) points out, people's stock of health capital determines the amount of time they can spend on their jobs. Ogundari(2018) the contribution of health is even larger than education in the grwoth of human capital. From this perspective, investment in health extends the possible working time of workers [13].

3. Hypothesis,, model, and data sample

3.1 Hypothesis

To determine the potential impact of human capital on economic growth, different hypotheses are made based on previous empirical research and theoretical framework.

Hypothesis 1. The two factors of educational human capital stock and educational human capital have a significant positive effect on China's economic growth.

It seems to be that educated workers tend to enjoy a higher marginal productivity (Fleisher, Li and Zhao, 2011) [14]. Therefore, it can be argued that economies with a well developed educational system have higher quality labour and thus generate greater economic output. According to Chi (2009), the positive effects of investment in education exist for both stock and growth in general [18].

So, there is a positive correlation between initial and cumulative education investment and China's economic growth.

Hypothesis 2. Healthy human capital stock and healthy human capital growth have significant positive effects on China's economic growth.

As Gyimah-Brempong and Wilson (2004) point out, healthy human capital cannot be ignored in economic assessments[16]. Despite educational components, this research will also include health components to assess the influence from health investment to economic development.

Hypothesis 3. The return of human capital stock is quadratic.

This hypothesis is mainly based on Gyimah-Brempong and Wilson's conclusions on the influence of human capital stock. It is now widely believed that the return on human capital is one quarter. With a high human capital stock level, human capital's marginal return will then decline.

3.2 Model Specification

Inspired by empirical analysis given by Becker(2009) and Mankiw, Romer, and Weil (1992), the model specifications are as follows[17] [18] [22]:

$$GROWTHRATE_{i,t} = \beta_0 + \beta_1 LPGDP_{i,t-1} + \beta_2 DH_{i,t} + +\beta_3 INVESTMENT_{i,t} + \beta_4 GOVEXPENDITURE_{i,t} + \beta_5 FERTILITY_{i,t} + u \quad (1)$$

$$GROWTHRATE_{i,t} = \beta_0 + \beta_1 LPGDP_{i,t-1} + \beta_2 HS_{i,t-1} + +\beta_3 INVESTMENT_{i,t} + \beta_4 GOVEXPENDITURE_{i,t} + \beta_5 FERTILITY_{i,t} + u \quad (2)$$

$$GROWTHRATE_{i,t} = \beta_0 + \beta_1 LPGDP_{i,t-1} + \beta_2 QH_{i,t-1} + +\beta_3 INVESTMENT_{i,t} + \beta_4 GOVEXPENDITURE_{i,t} + \beta_5 FERTILITY_{i,t} + u \quad (3)$$

In terms of human capital measurement, four indicators were selected for this study, drawing on previous theoretical frameworks and empirical studies. The first variable denotes basic education in China: general high school enrolment (H1). Most previous studies tended to choose primary school enrolment to indicate human capital in elementary education. However, this indicator has not been published in the China Statistical Yearbook since 2014 and high school enrolment was chosen alternatively. There are two reasons behind the choice. First, both primary and secondary schools are free to students and all families are obliged to send children to schools before 16. Therefore, the figure of primary school enrollment perhaps more indicates the government's force rather than family investment in human capital. Secondly, since entrance examination for high school is compulsory for all students, the high school enrolment can therefore be seen as a product of the nine years of basic education in the region. The second measure of education is enrolment in higher education (colleges and universities) (H2). Chinese colleges and universities are predominantly government-supported and provide substantial tuition subsidies for students. This particular feature reduces the potential endogeneity of education to a certain extent. As more and more low and middle income households are able to afford better education, income levels become less important in terms of educational attainment. Another variable that indicates educational attainment is the illiteracy rate. (H3) Both secondary school enrolment and tertiary education enrolment are flow concepts, while illiteracy is a universal concept, which may be more suitable to describe the human capital of developing countries (Mankiw, Romer, and Weil 1992) [17].

A common health capital measurement is life expectancy, which directly indicates a health stock of individuals. However, since this figure is not open to the public in China, the government health expenditure (H4) is used. It is believed that the more local government spend on health infrastructures, the more advanced health service local citizens can enjoy. That is why government health expenditure

can be an effective indicator of health capital in this study. Due to the difficulty of private capital participation in the healthcare system, health capital in China is highly correlated with local government spending [3].

According to Becker's (2009) research, all three versions of human capital are considered in this study: human capital change (DH), stock of human capital (HS) and squared stock of human capital (QH) [18] [22].

The model includes China's population growth and local government total expenditure as control variables. All the figures related to money value are discounted based on consumer price index which is published by China [18]. All measurements of the explanatory, dependent and control variables of interest are listed below.

Table 1. Proxies Summery Table

Concepts	Proxies	Effect
Economic development	GDP growth rate per ca pita (%)	
Education human capital	Regular high school new enrollment positive capital (10000persons) (H1)	Positive
	Enrollment of Freshmen in ordinary colleges and Universities (10000persons) (H2)	Positive
	The Illiterate rate (%) (H3) Negative	Negative
Health human capital	Local government medical and health expenditure (100 million yuan)(H4)	Positive
Health human capital	Local Governments Expenditure Medical and Health Care (100 million yuan) (H4)	Positive
Population development	Birthrate (%) (FERTILITY)	Negative
Government expenditure	Change in total temporary government expenditure (GOVEXPENDITURE)	Positive

3.3 Data Sample

The data sample covers 31 provinces in China (except Hong Kong, Macao and Taiwan). In order to make the data timely, the time range is shortened to the period from 2009 to 2018. All data are from the National Bureau of statistics of China and the China Statistical Yearbook.

4. Empirical results

The regression analysis will start with a mixed OLS model and the results are presented in Table 2. Only illiteracy rate reflects a significant effect from the result. The negative sign indicates that decreasing illiteracy has an important effect on China's economic development. The coefficient shows that every 1% decrease in the growth rate of the illiteracy rate leads to a 0.477% increase. This magnitude is significant and meaningful especially for provinces with the lowest levels of growth. Both Δinvestment and Δgovernment expenditure have a significant positive effect. In particular, government expenditure has a greater impact than fixed asset investment.

The combined OLS model generally describes the relationship between human capital measurements and economic growth, however, assuming all arguments in the model are fixed OLS model has bias on coefficient estimation. In other words, all year specification and province specification in China are ignored in OLS estimation. Such ignorance definitely has its limitation on estimation, because it is impossible to assume that the most advanced province in China, such as Guangdong, is the same as the a poor province, such as Tibet. This shortcoming leads to bias in the

aggregated OLS estimates as numerous economics research suggests that there are large differences between provinces and that the time period has an impact on the estimates.. In this way, models that consider possible heterogeneity across provinces and correlations across time periods should also be used.

Table 3 shows the results for the fixed effects robust model and Table 4 shows the results of random effects robust model. The variable DH3 shows a significant negative impact in both the FE robust model and the RE robust model, just as it does in the pooled OLS results. However, in the variable H4, FE and RE estimation indicates a various result. In the FE robust model, stock of health investment has a significant and negative influence on provinces' GDP growth. In the RE robust model, the two variables become insignificant.

In the FE robust model, DH2 shows a significant and positive influence on economic growth rate. Although the coefficients in the RE robust results change only slightly, the variable becomes not significant. Compared to the Pooled OLS model results, the control variable total investment becomes negligible and its is marginally reduced. However, the signs remain positive. The conditional convergence effect shows in the FE and RE results as well. The variable of government expenditure remains a positive influence, but the coefficient drops to around 33 in the FE robust model.

The difference between fixed effect model and random effect model is that the country components of the assumed error term in finite element estimation are fixed, while the country components of the assumed error term in RE estimation are random. Therefore, RE estimates are considered more efficient than FE estimates. However, the selection of random effect model must follow strict assumptions, so the model cannot use random effect estimation and can only accept the results of fixed effects.

Table 2. OLS model result - GROWTHRATE as dependent variable

	1	2	3	4	5	6	7	8	9	10	11	12
LPGDP	-0.000*	-0.000*	-0.000*	-0.000	-0.000*	-0.000*	-0.000	-0.000	-0.000*	-0.000*	-0.000*	-0.000*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
INVESTMENT	10.482*	10.342*	10.416*	10.229*	10.339*	10.402*	9.436	10.296*	10.411*	10.338*	10.444*	10.443*
	(6.14)	(6.04)	(6.03)	(6.00)	(6.05)	(6.04)	(6.08)	(6.06)	(6.03)	(6.06)	(6.03)	(6.03)
FERTILITY	0.128	0.143	0.144	0.138	0.147	0.143	0.161	0.114	0.147	0.137	0.144	0.141
	(0.17)	(0.16)	(0.16)	(0.16)	(0.17)	(0.16)	(0.16)	(0.17)	(0.17)	(0.16)	(0.17)	(0.16)
GOVEXPENDITURE	41.132***	41.696***	41.632***	41.489***	41.730***	41.623***	42.174***	41.690***	41.621***	40.215***	42.045***	42.038***
	(7.09)	(6.95)	(6.86)	(6.90)	(6.96)	(6.91)	(6.99)	(6.88)	(6.88)	(7.04)	(7.43)	(7.42)
_cons	2.796	2.286	2.604	2.363	2.271	2.577	2.075	2.621	2.543	2.426	1.708	2.144
	(2.98)	(3.15)	(3.02)	(2.99)	(3.12)	(3.00)	(2.98)	(3.00)	(3.03)	(3.02)	(4.31)	(3.47)
N	278	278	278	278	278	278	278	278	278	278	278	278
r2	0.352	0.352	0.351	0.353	0.353	0.351	0.365	0.352	0.351	0.350	0.351	0.351
r2_a	0.35	0.35	0.35	0.35	0.35	0.35	0.36	0.35	0.35	0.35	0.35	0.35

Table 3. Fixed-effect model result - GROWTHRATE as dependent variable

	1	2	3	4	5	6	7	8	9	10	11	12
LPGDP	-0.000**	-0.000**	-0.000**	-0.000**	-0.000	-0.000*	-0.000*	-0.000*	-0.000**	-0.000*	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
INVESTMENT	7.199	7.135	7.091	6.849	6.895	7.028	6.550	6.553	6.881	7.021	5.166	5.789
	(7.37)	(7.13)	(7.12)	(7.08)	(7.23)	(7.16)	(7.20)	(7.24)	(7.18)	(7.13)	(8.24)	(7.89)
FERTILITY	0.748	0.709	0.686	0.800	0.849	0.824	0.675	0.699	0.731	0.733	0.861	0.921
	(0.66)	(0.63)	(0.62)	(0.61)	(0.65)	(0.66)	(0.61)	(0.61)	(0.62)	(0.62)	(0.62)	(0.64)
GOVEXPENDITURE	32.553***	33.893***	33.652***	33.903***	34.051***	34.596***	36.022***	35.671***	34.876***	34.632***	30.766***	32.622***
	(6.22)	(6.84)	(6.79)	(6.50)	(6.16)	(6.45)	(6.50)	(6.56)	(6.53)	(6.30)	(5.78)	(5.79)
_cons	3.207	5.179	5.293	2.147	6.172	2.399	2.176	0.786	2.523	3.076	26.278**	6.381
	(6.93)	(9.03)	(7.73)	(6.62)	(6.85)	(6.88)	(6.48)	(6.65)	(6.61)	(7.05)	(12.05)	(6.65)
N	279	279	279	279	279	279	279	279	279	279	279	279
r2	0.342	0.336	0.338	0.340	0.341	0.337	0.346	0.340	0.337	0.336	0.361	0.352
r2_a	0.33	0.32	0.33	0.33	0.33	0.33	0.33	0.33	0.32	0.32	0.35	0.34

Table 4. Random-effect model result - GROWTHRATE as dependent variable

	1	2	3	4	5	6	7	8	9	10	11	12
LPGDP	-0.000*	-0.000*	-0.000*	-0.000*	-0.000*	-0.000*	-0.000	-0.000*	-0.000*	-0.000*	-0.000	-0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
INVESTMENT	10.043	9.874	9.926	9.783	9.873	9.914	9.073	9.803	9.922	9.904	9.910	9.931
	(6.52)	(6.41)	(6.40)	(6.36)	(6.41)	(6.40)	(6.46)	(6.44)	(6.40)	(6.42)	(6.40)	(6.39)
FERTILITY	0.127	0.146	0.148	0.142	0.149	0.147	0.165	0.115	0.149	0.143	0.146	0.147
	(0.19)	(0.19)	(0.20)	(0.19)	(0.19)	(0.19)	(0.19)	(0.20)	(0.20)	(0.19)	(0.19)	(0.19)
GOVEXPENDITURE	40.675***	41.378***	41.318***	41.184***	41.393***	41.306***	41.997***	41.395***	41.310***	40.169***	41.171***	41.237***
	(7.61)	(7.57)	(7.47)	(7.55)	(7.56)	(7.51)	(7.46)	(7.49)	(7.49)	(7.51)	(7.61)	(7.62)
_cons	3.097	2.561	2.865	2.609	2.571	2.829	2.205	2.865	2.804	2.639	3.140	2.908
	(3.24)	(3.34)	(3.27)	(3.13)	(3.31)	(3.25)	(3.19)	(3.24)	(3.28)	(3.27)	(3.99)	(3.34)
N	279	279	279	279	279	279	279	279	279	279	279	279
r2												
r2_a												

5. Discussion

Generally, it is hard to conclude that there is a strong relationship between human capital and economic development in China, since the results only suggest few significant influence from human capital variables. The largest effect comes from changes in illiteracy rates. In the combined OLS, FE and RE models, changes of illiteracy rates show significant negative effect on the growth rate. The results suggest that a reduction in the illiteracy rate may lead to an increase in local GDP. Although changes in illiteracy rates show a strong impact, existing education popularization level in the

province may not significantly affects GDP growth as current illiteracy rate is statistically insignificant in all models.

Another key indicator is changes in higher education enrolment rates. Contradicting the claims from previous empirical research, the level of higher education appears to be an important driver of China's GDP growth.

Higher education is also considered by Chang (2017) as an advanced form of human capital that motivates economic growth generally through the spillover effects of innovation[19]. The results reject Prichett's (1996) findings that education does not generate human capital and therefore does not contribute to real economic growth[20]. In China, the achievements of universities provide a highly qualified workforce for the local market and contribute to productivity growth.

The study for healthy human capital reject the hypothesis of a significant positive effect. For all models including the healthy human capital variable, HS4 and QH4 show a significant effect only in the FE robust model. However, the sign of both coefficients is negative. It rejects the conclusion of Zhang (2018) that the more investment in health and healthcare the faster economic growth in provinces of China[21]. The results of Fe robust model show that every 1% reduction in government health expenditure will lead to a 0.06% increase in real GDP. However, in fact, the value of this coefficient is not significant, because the annual GDP growth rate is less than 0.1%, which can be ignored, especially for those regions with high GDP growth rate.

The contribution of health is statistically insignificant, which perhaps can be explained by the failure of China’s healthcare system. Although local governments invest heavily in healthcare, very little of that investment translates into healthy human capital. Barriers to enter the healthcare and medical market limit private capital. People are provided with cheap but low-quality healthcare services and receive little return from healthcare investments. Another explanation of the insignificant impact may be the cross-regional varieties. Lu's (2011) study of 31 provinces in mainland China shows that the contribution of human capital to economic growth rates varies greatly by region [5]. In the western cities of China, health investment can bring huge returns to the urban economy. Therefore, the non significant or negative contribution of health human capital in the East offset the impact of the west, resulting in no significant overall change at the national level.

6. Conclusion

This study discusses the relation between human capital and economic growth, based on 10 years of aggregated data from 31 province in China mainland. Quantitative and qualitative analyses allow for the conclusion that educational human capital has a positive influence on real GDP growth in China, but the correlation is not strong enough. Among the three different educational human capital measurements, only few indicators reflect a significant influence on GDP growth. Various measures of education contribute to GDP growth in different ways. In the case of illiteracy rates, the decline in the annual change in local illiteracy rates contributes significantly to the rapid growth of GDP. For basic education, on the other hand, the stock of enrolment is positively associated with temporary GDP growth. The result indicates that higher education has a significant positive influence on GDP growth.

When it comes to the potential contribution of health investment, the result shows an insignificant relationship between health capital and economic growth. One of the reasons for the negligible return on health care investment is the inefficiency of the health care system.

Therefore, it can be concluded that human capital is an important factor in China's economic growth, but its influence is also limited, which is different from the previous research version. Physical capital investment can not greatly promote China's economic development. It is a contributor to GDP growth, but not a major contributor. Therefore, in the future development, China attaches importance to the development and development of human capital and reduces its dependence on physical capital. By reducing the dependence on physical capital investment, it is possible for China to explore new ways of economic growth by improving the rate of return on human capital.

7. Discussion

Generally, it is hard to conclude that there is a strong relationship between human capital and economic development in China, since the results only suggest few significant influence from human capital variables. The largest effect comes from changes in illiteracy rates. In the combined OLS, FE and RE models, changes of illiteracy rates show significant negative effect on the growth rate. The results suggest that a reduction in the illiteracy rate may lead to an increase in local GDP. Although changes in illiteracy rates show a strong impact, existing education popularization level in the province may not significantly affects GDP growth as current illiteracy rate is statistically insignificant in all models.

Another key indicator is changes in higher education enrolment rates. Contradicting the claims from previous empirical research, the level of higher education appears to be an important driver of China's GDP growth.

Higher education is also considered by Chang (2017) as an advanced form of human capital that motivates economic growth generally through the spillover effects of innovation [19]. The results reject Prichett's (1996) findings that education does not generate human capital and therefore does not contribute to real economic growth[20]. In China, the achievements of universities provide a highly qualified workforce for the local market and contribute to productivity growth.

The study for healthy human capital reject the hypothesis of a significant positive effect. For all models including the healthy human capital variable, HS4 and QH4 show a significant effect only in the FE robust model. However, the sign of both coefficients is negative. It rejects the conclusion of Zhang (2018) that the more investment in health and healthcare the faster economic growth in provinces of China [21]. The results of the FE robust model suggest that a 1% reduction in government health expenditure would lead to a 0.06% rise in real GDP growth. In practice, the size of the coefficient makes little difference overall, since changes in GDP growth of less than 0.1% are negligible in annual growth, especially in regions with higher GDP

The contribution of health is statistically insignificant, which perhaps can be explained by the failure of China’s healthcare system. Although local governments invest heavily in healthcare, very little of that investment translates into healthy human capital. Barriers to enter the healthcare and medical market limit private capital. People are provided with cheap but low-quality healthcare services and receive little return from healthcare investments. Another explanation of the insignificant impact may be the cross-regional varieties. Zhang's (2018) study of 31 provinces in mainland China shows that the contribution of human capital to economic growth rates varies greatly by region [21]. This study is based on square human capital stock to calculate whether the return on human capital investment is square. However, the results of the study deny the hypothesis that the impact of human capital stock on growth rate is secondary between human capital and economic growth rate is expected to be n-shaped. When the stock is high, the return rate of human capital stock will begin to decline. However, based on the data for China over the past 10 years, an inverted n-shaped curve is not found. there is no significant and negative growth in the squared human capital stock. The results are not consistent with the findings of Gyimah-Brempong and Wilson (2004), whose cross-sectional study suggests that the stock of healthy human capital has a strong positive effect and that this positive effect is quadratic.

8. Conclusion

The data summary of this study is based on the real data of 31 provinces in Chinese Mainland in the past 10 years. This paper aims to analyze the relationship between human capital and economic development through these data. Quantitative and qualitative analyses allow for the conclusion that educational human capital has an important impact on real GDP growth in China, but the correlation is not obvious enough. Among these three educational human capital measurements, only few indicators reflect a significant influence on GDP growth. Various measures of education contribute to GDP growth in different ways. In the case of illiteracy rates, the decline in the annual change in

local illiteracy rates contributes significantly to the rapid growth of GDP. In addition, the enrollment rate of basic education is positively correlated with the temporary GDP growth.The results show that higher education has an important impact on GDP growth.The number of students in the school is limited, and there is evidence that a city with a large number of people who have received a high level of education will increase its GDP.

When it comes to the potential contribution of health investment, the result shows an insignificant relationship between health capital and economic development. One of the reasons for the negligible return on health care investment is the inefficiency of the health care system.

In the future, China should strengthen the development of human capital and gradually weaken its dependence on physical capital. By decreasing its reliance on investment in physical capital,China may be able to raise the rate of return on human capital and find new growth paths, which may also contribute to economic growth for all

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