



# The Relationship Between Human Capital Index and Economic Development

## What is the Impact of Education Policy on China's GDP

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**Abstract.** Human capital index (HCI) quantifies the contribution of education and health to the productivity of the next generation of workers. (*World Bank*) The obvious presence of education in the definition of human capital index shows that these two points are key to economic development which cannot be ignored. It is worth mentioning that knowledge is the basis of innovation in any country and the embodiment of technological change that promotes all factors of production.

In this article, we mainly study the impact of the historical background of Education in China on China's GDP. We cover the popularization of simple historical background, and select relevant data from China from 1978 to 2020 for data analysis. The blind pursuit of socialism in China before, it only changed people's thinking, but it was not implemented in educational actions, which limited the subsequent development. And then we combine the financial crisis with education to discuss their impact on China's GDP.

In general, education needs to be tailored to the development of the society of country itself.

**Keywords:** China education policy · GDP growth rate · economic impact · China education history · health impact

## 1 Introduction

The origins of world culture have been passed down for thousands of years. What has not changed throughout the ages is that people rely on knowledge to change their destiny, and even change the development of the country. At the same time, in the process of continuous exploration, human beings have gained education, their minds are more open, and they gradually realize that health in the foundation of human beings and also find that in the process of human growth, they also need the nourishment of different education, so preschool and higher education are more and more popular and valued [1–3].

The number of illiterate Chinese still accounted for more than half in 1964. It was not until 1977 that China's higher education admissions work underwent major reforms [4]. Until 1998, the number of college students in China was only 7.8 million, but the total

population of China at that time had exceeded one billion. The gross enrollment rate of higher education was only 9.8%. (City development and construction need talents.) In 1999, the college entrance examination expanded the enrollment, and introduced young labor into the city in the name of education. China's GDP is rising rapidly [5–7].

However, in the process of huge enrollment expansion, the university itself is not ready for transformation, and education is out of touch with society, resulting in a large number of students who have received higher education becoming unemployed. Even so, because China's education and technology were 20 years behind the world at that time, even with college graduates unemployed, China's GDP is still increasing, until 2012, the Chinese government stopped enrolling in higher education reforms and pursued stable development [8].

This leads us to the theme of our research, how China's historical background in education has affected the development of its GDP [9].

## 2 Brief Historical Background

In order to let the reader know the historical background of China, we have deliberately selected the most representative period of the Cultural Revolution.

Between 1956 and 1966, China began to develop into a socialist country, but the left-wing elements who tended to protect Chinese labor influenced people to pay more attention to productive labor in education [10].

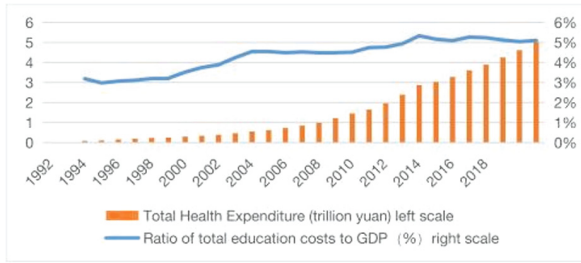
From 1966 to 1976, the Cultural Revolution in China broke out in order to rectify the bourgeoisie, and they believed that counter-revolutionaries had blended into the cultural field and other important fields. Because the government were too protective of the masses of the people, so they suppressed books and literati who transmitted advanced ideas and encouraged agricultural development. This dealt a fatal blow to the cause of education and the traditional culture of the nation, and the education in this period was mainly based on compulsory preaching and simple indoctrination as a method, which was seriously divorced from reality and had a great blow to the education of the country [11].

## 3 Current Status of Expenditure on Education

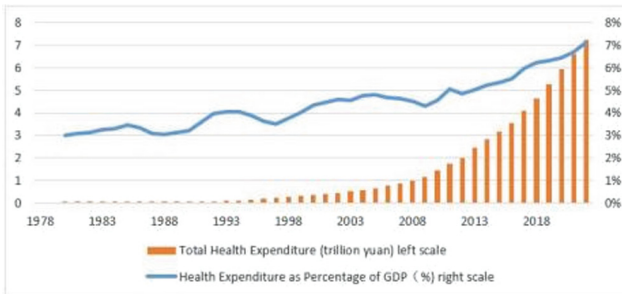
### 3.1 Educational Input

Investment in education can be measured by funding for education. In 1998, since the Chinese Finance Conference first put forward public finance requirements, the government's emphasis on investment in education has been increasing. Specifically, from 1998 to 2020, the overall scale of China's education investment has shown a steady increase, from 294.9 billion Chinese Yuan (CNY) to 5,017.8 billion CNY, and the scale of investment has increased by nearly 17 times, with economic growth. The quality education of workers also needs to be improved.

The proportion of China's investment in education showed an overall upward trend, but it declined slightly in 2013–2019, and then increased slightly in 2020, which shows that China has been emphasizing the importance of education for economic growth, but the attention is not enough (Fig. 1).



**Fig. 1.** Education expenditure and proportion in 1978–2020



**Fig. 2.** Health expenditure and proportion in 1978–2020

### 3.2 Health Input

Health spending can be measured by health expenditure. With the expansion of the economy and the increase in the people’s emphasis on health, China’s investment in health is also increasing year by year. Growth was slower before 2009 but has since shown a trend of rapid growth as the government has begun to place greater emphasis on investment in health, and government is increasing its investment efforts.

The share of health investment in China is on the rise overall, declining a little in 2009, but since then it has begun to grow rapidly, which is also related to the government’s emphasis (Fig. 2).

## 4 Modeling and Empirical Analysis

### 4.1 Model Building

Relevant research analysis shows that human capital is the main factor affecting GDP. Among them, education human capital is the key to affecting the high-quality development of the economy, and the level of healthy human capital as the foundation also plays a role that cannot be ignored. Therefore, considering two factors affecting GDP(Y): education human capital (EHC), healthy human capital (HHC) as representatives of related facilities. And, in order to make the model more perfect and clearer, we will also add capital (K) for comparison. Because the inclusion of the previous year’s value of GDP

**Table 1.** Variable selection

Metric name	variable	Variable interpretation
Output variables	Y	Choose China's GDP
Health Human Capital	HHC	Total Health Expenditure
Education Human Capital	EHC	Calculated by the weight of the number of years of education per capita (15 years of education for undergraduate, master's, doctoral, etc.; 9 years for high school and equivalent academic strength; 8 years for junior high school and equivalent academic strength; 5 years for primary school and equivalent academic strength; and 1 year for other academic qualifications, such as those without academic qualifications)
Past GDP	Y-1	The previous year's value of GDP.
Total Capital	K	Select the amount of Chinese fixed capital investment. In our research, we will discuss the situation with capital and without capital.

**Table 2.** Model ①

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	-3.336281	1.168912	2.854177	0.0105
LOG(EHC)	0.79654	0.120039	6.635653	0
LOG(HHC)	0.769767	0.01604	47.99057	0

R-squared: 0.997582 Adjusted R-squared: 0.997312 F-statistic: 3710.578

would cause multicollinearity, it is not included in the model. At the same time, in order to reduce the error in data analysis, all data are taken to the natural logarithm. Based on these variables, the following econometric model is established (Table 1):

$$\text{Model ①: } \ln(Y) = b_0 + b_1 \ln(HHC) + b_2 \ln(EHC) + e$$

$$\text{Model ②: } \ln(Y) = b_0 + b_1 \ln(HHC) + b_2 \ln(EHC) + b_3 \ln(K) + e$$

Y stands for GDP, HHC, EHC stand for healthy human capital and educational human capital, K represent total capital, e is a random error term,  $b_i$  is a regression coefficient.

## 4.2 Regression Analysis

New formulas can be obtained based on the regression results:

$$\begin{aligned} \ln(Y) = & -3.336281 + 0.79654 \\ & \ln EHC + 0.769767 \ln(HHC) \end{aligned}$$

**Table 3.** Model ②

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	-0.501537	0.926646	-0.541239	0.5954
LOG(EHC)	0.466096	0.09982	4.669371	0.0002
LOG(HHC)	0.463125	0.59995	7.719392	0
LOG(K)	0.312122	0.060166	5.187695	0.0001

R-squared: 0.999063 Adjusted R-squared: 0.998898 F-statistic: 6043.770

New formulas can be obtained based on the regression results

$$\ln(Y = -0.501537 + 0.466096\ln EHC + 0.463125 \ln)HHC + 0.312122\ln (K)$$

It can also be seen from the results of the regression analysis that the two models pass the test separately in the overall, and the result is significantly higher. The adjusted R-squared ( $\bar{R}_2$ ) of model ① is 0.997582 and the adjusted R-squared ( $\bar{R}_2$ ) of model ② is 0.999063 indicating that these two regression fits particularly well. At the significance level of 0.05, the F-statistic of model ① is 3710.578 and the F-statistic of model ② is 6043.770, which are both much higher than  $F_{3, 19} = 3.13$ , indicating that the linear relationship between the variables is significant, and at the significance level of 0.05, the critical value t-statistic is  $t_{0.025}(19) = 2.093$ . And compared with the coefficients of each explanatory variable, it is found that all exist ( $t > t_{0.025}(19)$ ), so the null hypothesis is rejected, indicating that each explanatory variable has a significant influence on GDP (Tables 2 and 3).

The formula without capital also shows that GDP increases by 0.80% when investment in human capital for education increases by 1%, and GDP increases by 0.77% when investment in healthy human capital increases by 1%.

And the formula with capital shows that GDP increases by 0.47% when investment in human capital for education increases by 1%, and GDP increases by 0.46% when investment in healthy human capital increases by 1%. GDP increases by 0.31% when total capital increases by 1%. These show that there is a positive correlation between China’s total GDP and these three variables. And when after considering the total capital, the positiv relationship between education, health and GDP is showing less. According to the historical brief above, we can find that during the period of cultural revolution and the data we have selected from 1978 to 2020, China’s capital investment in education and health policies has indeed not had a great impact on GDP, this is largely due to the fact that governments have adopted policy means that are less inclined to implement education and health, and they are much more inclined to the ways that are more directly enriching people, such as agriculture and so forth. So we believe that China’s policies have indeed affected the investment in education and health, and to a large extent.

### 5 The Impact of Financial Crisis

A financial crisis is a sharp, short-lived and hyper-cyclical deterioration of all or most financial indicators (short-term interest rates, asset prices, corporate bankruptcies and

financial institution failures). It is the concept of financial prosperity relative (Charles P. Kindleberger and Raymond W. Goldsmith, 1982). So in this time period, countries may not deliberately develop education that is already ahead of China, and they will be more inclined to invest in sectors with practical skills in order to reverse the dilemma brought by the financial crisis.

However, in the financial crisis in 2008, the consumption power was insufficient, production was relatively surplus, and corporate profits were difficult. At this time, China needs workers with high skills and low knowledge, so college students are more likely to be unemployed. So, education is less important in this regard. But according to the data and charts, China's education and GDP have not only not been affected, but have continued to rise. Because China's education and its own GDP lag has not been greatly affected by the financial crisis. Because they are backward in themselves, no matter how they are affected by negative factors, they cannot be lower than before. Therefore, Chinese education has become an alluring forbidden fruit in the Garden of Eden in the eyes of other countries. China's investment in education exceeded \$300 million in 2008 (Zhenzhen Wang, 2009).

Therefore, China's GDP has not decreased but has increased in financial crisis.

## 6 Conclusion

In conclusion, the relationship between education and GDP analysis is positive, but it can be seen in the diagram and regression that China's education only has a little positive impact on GDP, in part because of the lag in education development, resulting in a very obvious difference between China and other countries. Even if China's GDP is affected by the financial crisis, there is still an upward trend, and a little impact further indicates the backwardness of China's education. The education that was originally very backward was under the rectification of the country and the cooperation of the people, no matter how much it was affected by the outside world, he could not be more backward than before. So China's GDP trend looks better than other countries during this time, and even he has risen. This series of policy changes and trends continue to illustrate a truth, which is education must meet the needs of the current era, and the biggest purpose of education of China in the process of continuous reform is to meet the general requirements of social needs.

**Acknowledgement.** All the authors contributed equally to this work and should be considered co-first authors.

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