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The Relationship between Higher Education and Economic Growth in China

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Abstract: *With the rapid growth of social productivity and science and technology in China, education has received more and more attention. Higher education, as the leader of education, has an increasingly close relationship with economic growth. With the advent of the knowledge economy, education has a driving effect on economic flourish, while the development of the economy has a significant impact on higher education. This paper wants to explore how higher education and economic growth interact with each other. This paper refers to relevant literature at home and abroad, mainly using data analysis, case study, literature, and interdisciplinary research methods. Therefore, this paper concludes that higher education promotes economic prosperity by boosting science and technology, optimizing human resources, and contributing directly to economic growth. Economic prosperity promoted the development of higher education through the evening education system and quality.*

Keywords: *higher education; economic growth; China*

1. Introduction

The knowledge-based economy is the economy based on knowledge and its main body with mental labor. Higher education and scientific research are the main sectors of the knowledge economy. In 2009, China officially entered the era of the knowledge economy, so the degree of economic development has an inseparable relationship with higher education.

Higher education serves as a base for scientific research, so it plays a vital role in the economy's flourishing. Furthermore, after the Chinese government enacted the Higher Education Reform Act in 2009, higher education gradually gained attention between 2009 and 2019.

2. Effects on Economic Growth

Because higher education has provided people with a theoretical and practical knowledge system, the reform boosted people's quality and social skills effectively. The high-quality labor force is also a vital resource for economic development. Therefore, there are many ways that higher education can improve economic growth, but it can be mainly summarized in three ways. Higher education promoted economic prosperity in China between 2009 and 2019 by boosting science and technology, optimizing human resources, and contributing directly to economic growth.

2.1 Boosting Science and Technology

Higher education contributes to economic development by improving science and technology. Higher education has rich disciplines and an intense academic atmosphere, concentrating research forces to inherit scientific technology and promote new technology innovation. Thus, if science and technology are the first productive force, higher education is the engine of the first effective force, an essential means to produce science and technology. Science and technology have the characteristic of inheritance, so any science and technology is not the product of a particular historical era. It crystallizes human society's whole historical development process, including continuous accumulation, inheritance, and creation. In human social development, the heritage and expansion of science and technology are realized through higher education.

For example, Yuan Longping, the father of hybrid rice in China, received higher education at Jiangxi Agricultural University, studying biological science systems such as genetics and organic chemistry,

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promoting his trait separation and shape combination techniques. On this basis, he developed hybrid rice seed production technology and changed the natural properties of rice self-inoculation through what he learned at university. Additionally, technological progress can save natural resources and increase productivity, climbing the accumulation of social wealth. For instance, after mixed rice improved in 2009, the yield of hybrid rice was 16 times that of the same amount of regular rice. According to Guo (2019), in the ten years between 2009 and 2019, hybrid rice technology was exported to nearly 40 countries [4], dramatically promoting national income and economic prosperity.

2.2 Optimizing Human Resources

Higher education promotes economic prosperity by optimizing human resources. Human resources refer to the knowledge, skills, and abilities embodied in laborers. Schultz believes that the growth of the modern economy and the composition of national wealth is mainly the result of human capital, closely related to higher education. Higher education aims to improve students' quality and professional competence, transforming physical workers into mental workers and primary productivity into professional productivity. That is to say, as a complex activity to improve the quality of the labor force; higher education improves the spiritual quality, artistic quality, professional skill quality, and health quality of laborers. Education plays a vital role in optimizing human resources, mainly reflected in two aspects. First, people's moral standards can be improved, reducing social-economic crimes such as bank robberies and illegal possession of private property.

Consequently, chances are high to minimize the damage to people's property and social and economic foundation and ensure the stable development of the economy. Second, effectively raise labor productivity. According to Fan and Ye (2021), ten years from 2009 to 2019 witnessed that every additional year in the average number of years of higher education increases labor productivity by at least 2 percent [2]. Therefore, improving labor productivity can create more wealth for society and accelerate the accumulation of the economy.

2.3 Contributing Directly to Economic Growth

Higher education can directly boost economic growth. The number of higher education institutions can accurately reflect the development level of higher education, so the connotation and function of Chinese higher education institutions had undergone profound reform in 2009. In terms of scientific and technological achievements, higher education institutions have undertaken more than 70% of the projects funded by the National Natural Science Foundation of China and attracted a total of 29.7 billion yuan of social capital investment. For example, Higher education institutions are responsible for almost half of the country's space shuttle wave and space breeding programs from 2009 to 2019. Harbin Institute of Technology alone provides five key technologies, contributing directly to space and economic prosperity. Higher education institutions also have obtained 1934 patents, developed 4116 new products, and created about 10 million jobs.

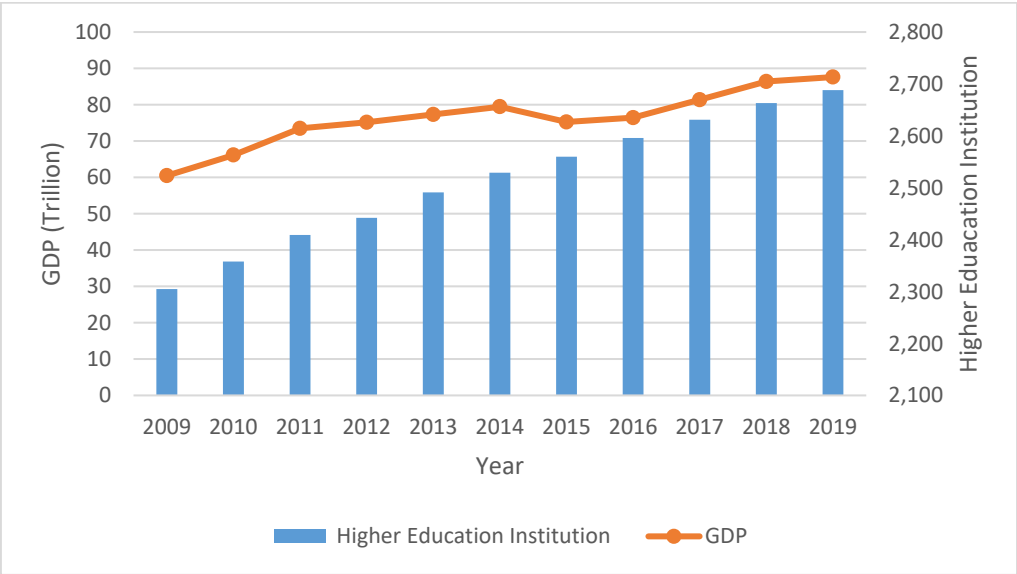

Figure 1: Higher Education Institution versus GDP from 2009 to 2019 in China

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Moreover, there were 2216 science and technology enterprises established by higher education institutions in China. Three or six of them have already gone public. Total assets amounted to 947.23 million yuan, sales revenue 720 billion yuan, net profit 25.37 million yuan. In China, GDP is an essential measure of economic development. Figure 1 also supports that higher education has a considerable positive impact on GDP. According to Gao (2019), in 10 years from 2009 to 2019, with 380 higher education institutions, GDP increased by about 27 Trillion yuan in China [3], illustrating that higher education directly promotes social welfare and economic development. Source: Ministry of Education (2020) How did the number of higher education institutions affects GDP in China between 2009 and 2019? National Bureau of Statistics of China. The original graph uses the term "higher Education Institution" for "Higher Education."

3. Effects on Higher Education

The development of education needs a specific material basis, so the impact of economic development on education is significant. The improvement of higher education by economic growth is mainly reflected in the following two aspects: education policy and education quality.

3.1 Education Policy

Confucius once said that a good fortune is known by good manners and a well-fed life by honor and disgrace. This statement reflects the need to develop higher education based on economic prosperity. That is to say; economic development sometimes restricts the development of higher education. When people's primary livelihood cannot be guaranteed, the government should first consider the necessities of life, which makes it a luxury to develop higher education.

During this decade from 2009 to 2019 of rapid economic growth in China, the subject catalog and specialty setting are more scientific. Chinese universities are constantly adjusting their subject catalogs and specialty Settings. According to Wang and Sun (2019), from 2009 to 2019, they formulated the Academic Degree-Granting and Talent Cultivation Subject Catalogs to guide discipline construction and educational statistical classification [6]. The Undergraduate Major Catalogs of Ordinary Institutions of Higher Learning specify undergraduate majors' division, name, and category. Establishing a dynamic adjustment mechanism and expanding degree-granting institutions' autonomy in running schools is significant for optimizing the discipline structure, improving the quality of talent training, and making higher education better adapt to economic and social development.

The number of colleges and universities increased significantly from 2009 to 2019. With the continuous development of the economy, the country has more funds to invest in colleges and universities. Policies from the expansion and enrollment of higher education institutions at the beginning to the protection law of private higher education institutions, and then to the growth of enrollment of graduate schools have extensively promoted the popularization and development of higher education.

3.2 Education Quality

From 2009 to 2019, the government invested a lot of money in higher education and successively set up some incentive programs to attract high-level talents and cultivate discipline leaders and young academic skills. Because of the general increase in people's income, many students choose to study abroad, so many universities have launched young science funds to encourage overseas scholars to work back home. Most of the overseas students are engaged in education and scientific research in institutions of higher learning after returning to China, which significantly increases the faculty strength of institutions of higher learning. For instance, according to the statistics of the Ministry of Education on People's Daily Online, among the universities directly under the Ministry of Education, returnees account for 78% of the presidents, 63% of the doctoral supervisors, and 72% of the directors of national, provincial and ministerial teaching and research bases (centers) and critical laboratories [5]. Therefore, as the country progresses economically, social welfare will increase, attracting high-level overseas talents to play a unique role in our country's scientific and technological development and higher education.

Since 2009, China has hired a large number of foreign professors to teach in China. According to Xiaoxiang Morning Post, the total number of foreign experts in Shandong province reached 12,000 in 2012. Meanwhile, an average of 10,000 foreign experts come to colleges and universities in Hebei province temporarily for cooperation, investigation, and academic exchanges every year [1]. Hiring

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foreign professors can significantly promote the cultural trade between China and the West, introduce advanced foreign culture, and encourage higher education quality

The educational equipment, laboratory equipment, etc., of the school, were brought up to date by economic progress. Figure 2 below shows a significant increase in public expenditure on tertiary education from 1011 billion yuan to 1399.9 billion yuan. The school's general funds are mainly from government fundings and are used for capital construction investment, personnel funds, and teacher training. Therefore, when the economy is more prosperous, the higher schools can invest more money in teaching staff and equipment, and the quality of higher education will improve accordingly [7]—source: C. Textor, July 6, 2021. In 2020, total public spending on college and university education in China amounted to approximately 1.4 trillion yuan. Compared to the previous year, spending grew by around four percent. The public expenditure per student in tertiary education amounted to about 37,241 yuan in 2020.

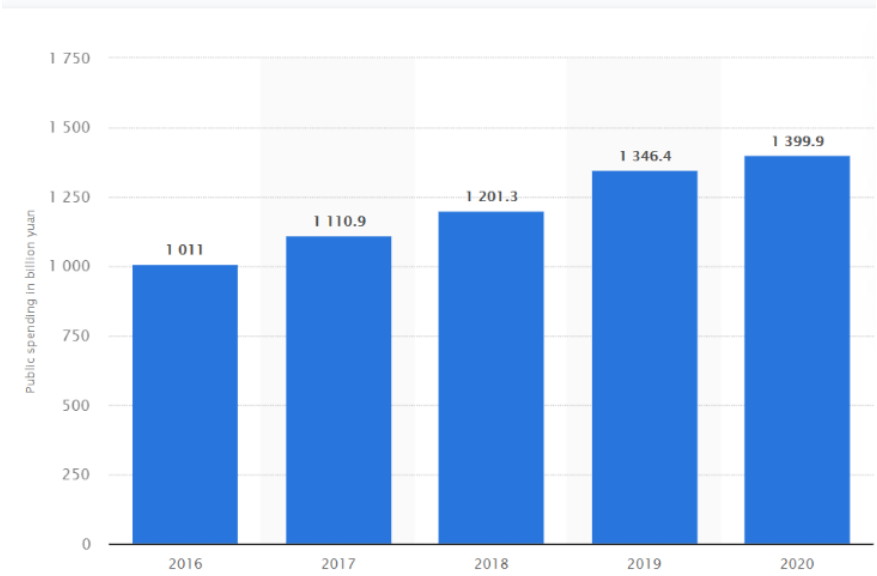

Figure 2: Total public expenditure on tertiary education in China from 2016 to 2020 (in billion yuan)

4. Conclusion

As discussed above, ten years between 2009 and 2019 witnessed higher education promoting economic prosperity in China by boosting science and technology, optimizing human resources, and contributing directly to economic growth. The Chinese government should introduce policies to encourage higher education, further expand the scale of higher education, and increase the number of colleges and universities to receive higher education. With the increasing number of people receiving higher education, the reserve strength in scientific research will also be gradually rich. The government should increase the incentive mechanism for scientific research achievements and introduce national technology projects into higher education to attract investment, promote scientific innovation, and boost economic flourish. Continuing this policy until higher education is widespread in China will eventually lead to the peak of economic ornament.

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