

The Impact of Financial Investment in Education on Economic Growth

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Abstract. Against the background of globalization and economic development, and transformation, the link between education, financial investment, and economic growth has been widely discussed. This research investigates how government expenditure on education influences economic growth, utilizing a two-way fixed effects model and panel data. The analysis indicates that fiscal investment in education has a positive role in promoting economic growth. Based on this, this paper outlines a series of well-thought-out recommendations designed to address key challenges and foster positive change in the field under discussion: First, further increase the financial investment in education, especially in the field of basic education and vocational education, to consolidate the "human capital foundation" of economic growth. Second, optimize the allocation of educational resources, establish a dynamic adjustment mechanism, adjust educational content in real time according to industrial needs, promote online education and short-term training projects, and improve the timeliness and pertinence of education investment. Third, pay attention to the improvement of education quality, improve the salary and welfare of teachers and attract high-quality talents to participate in the cause of education, and encourage society and enterprises to participate in the public welfare of education.

Keywords: Financial Investment, Education, Economic Growth.

1. Introduction

In the context of globalization and economic development, and transformation, the importance of education has become increasingly prominent. Education is not only the carrier of the inheritance and development of human civilization, but also the key factor to promote economic growth. For any country today, financial investment in education is the fundamental guarantee for maintaining high-speed and high-quality economic development. With the continuous development of high-tech and independent innovation, excellent talents, especially those with a high technical level, will play a great role in promoting the economic development of a region or even a country. At the same time, as the material basis of education development, the scale and structure of education financial investment directly affect the quality and fairness of education. In recent years, China has paid more attention to education, and the financial investment in education has continued to grow, and the allocation of educational resources has been gradually optimized. However, the relationship between educational financial investment and economic growth is not a simple linear correlation, which contains complex internal mechanisms and multiple influencing factors which need to be further explored [1]. Domestic literature have studied related issues from multiple perspectives. Martin divided the economic process into the supply side and demand side from the perspective of economic growth theory, and discussed the role of education in each link. Education affects economic growth mainly through: first, the accumulation of human capital directly affects production; Second, it promotes technological progress and product innovation; Third, it affects consumer demand [2]. Based on the panel data of 31 provinces in China from 2016 to 2020, Chen Shuo constructed an economic growth model of education financial investment, and found that education financial investment has a significant positive effect on regional economic growth, can effectively promote the accumulation of local human capital, and its marginal contribution rate is higher than that of capital and labor [3]. Barro, a scholar from abroad, examined education's effect on economic development, noting that education is a vital aspect of human capital and plays an important part in fostering economic growth. Based on the extended endogenous growth model, this paper uses the data of more

than 100 countries from 1960 to 1995 for empirical analysis, and finds that the level of education is positively correlated with the rate of economic growth. Education quality has a more significant effect on economic growth than the absolute level of educational spending [4]. In recent years, with the development of society, the extent of economic development is now being gauged by updated benchmarks, reflecting the new direction and connotation of economic development. In this context, as a key resource to enhance human capital and promote social development, the potential role of education financial investment in economic development should be given more attention. Therefore, this study focuses on the current new measurement standard of economic growth, adopts the recent annual panel data, selects the two-way fixed effect model, and explores whether the financial investment in education has new significance in the economic development under the new situation through empirical research.

This study holds significant theoretical value as it enriches our understanding of key concepts, additionally offering practical benefits by providing insights that guide real-world decisions and actions. From the theoretical level, this study meticulously explores the intricate pathways through which educational fiscal investments spur economic growth, thereby offering a more profound and comprehensive grasp of human capital theory. It elaborates on how education serves as a cornerstone in cultivating individual attributes and skills, which in turn form the bedrock for fostering a more dynamic, innovative, and economically vibrant society. In contrast, economic growth theory focuses on the contribution of various factors to economic growth. This study combines the two organically, reveals the role of educational financial investment in economic growth through empirical analysis, and provides a new perspective and evidence for the development and improvement of relevant theories. In reality, this study aims to provide a scientific basis for the formulation and optimization of educational fiscal policy. By clarifying the internal relationship between education, financial investment, and economic growth, the government can reasonably allocate education resources, enhance the efficiency and effectiveness of educational investments, and foster innovative economic development.

2. Method

2.1. Research Basis and Assumptions

In economic research, human capital theory and Keynes' theory provide important theoretical frameworks for analyzing the driving forces of economic growth in education and finance, respectively.

Human capital theory believes that improving the human capital stock of a country or region can significantly promote economic growth. Human capital refers to the abilities, knowledge, and skills related to individuals. These abilities, knowledge, and skills can be formed through education, training, and experience, and can create economic or social value for individuals and society. Schultz believes that human capital is the comprehensive ability of workers' knowledge, skills, and health accumulated through investment. Its level is determined by the number and quality of workers. It is the key force to promote social and economic development [5]. Becker believes that education investment is a powerful engine to advance the growth of human capital, which lays the foundation of microeconomic analysis of human capital theory [6]. This shows that education investment is the core way of human capital formation and accumulation, and it is crucial for economic growth.

Keynes' theory emphasizes the multiplier effect of investment on economic growth. Keynes believed that the increase in investment would lead to a multiple increase in national income through the multiplier effect. Specifically, when investment increases, it will drive the development of related industries, create more employment opportunities and income, and then stimulate consumption and further promote economic growth. Based on the above theories, this study puts forward the following assumptions: education financial investment notably contributes to economic expansion. As an important part of human capital investment, education financial investment can not only directly

improve the stock of human capital, but also drive the development of related industries through the multiplier effect, so as to promote economic growth.

2.2. Research Design

2.2.1 Model setting

In order to test the above hypothesis, this paper analyzes it by establishing an empirical model. As an integration of time series data and cross-sectional data, panel data can control individual heterogeneity, provide more degrees of freedom, and other information, so as to reduce the multicollinearity between regression variables and increase the effectiveness of parameter estimation. At the same time, Panel data allows for the evaluation of complex models. Based on the advantages of the above panel data, this paper analyzes the impact of fiscal investment in education on economic growth using provincial panel data.

As the data selected in this paper is the provincial panel data of 31 provinces (autonomous regions and municipalities directly under the central government) from 2014 to 2023, including 31 cross-sectional data, and the time series length is 10 years, which is short panel data. According to the empirical analysis, it should adopt the two-way fixed effect model of fixed individual and time. The specific setting model is as follows:

$$\text{Growth}_{it} = \alpha_0 + \alpha_1 \text{EduExp}_{it} + \alpha_2 \text{Controls}_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Among them, Growth_{it} represents the explained variable, economic growth. The core explanatory variable EduExp_{it} is the financial investment in education in the t year of the i region. Controls are a set of control variables. μ_i stands for individual fixed effect, and it is used to control the individual effect factors of provincial administrative regions that do not change with time. λ_t stands for time fixed effect, which is used to control various macroeconomic factors that affect provincial administrative regions in different years.

2.2.2 Main indicators

The initial sample of this paper is the panel data of 31 provinces, cities, and autonomous regions in China from 2014 to 2023. Among the variables involved in this paper, the data on economic growth, financial investment in education, fixed asset investment, import and export volume, industrialization rate, urbanization rate, and population growth rate are all from the China Statistical Yearbook, China Financial Yearbook, and regional statistical yearbooks, and the data are integrated and processed through Excel and Stata software.

This paper selects fiscal expenditure on education as the explanatory variable and fiscal expenditure on education as the index of fiscal investment in education. Financial investment in education refers to the part of education expenditure in China's total financial expenditure. Financial expenditure on education is an important part of government expenditure and the comprehensive summary of human, material and financial resources invested by governments at all levels, from the central government to villages and towns, for education [7]. It directly promotes the improvement of education infrastructure, the improvement of teachers' strength and the realization of education equity through reasonable capital allocation and resource support. As the core embodiment of fiscal investment in education, fiscal expenditure on education can effectively reflect the resource allocation and financial support of the government in the field of education, and has the characteristics of quantification and comparability. Therefore, this paper selects the fiscal education expenditure of each province (autonomous region, municipality directly under the central government) as the index of fiscal education investment.

At the same time, to eliminate the interference of other potential factors on the results, this study also introduced the per capita investment in fixed assets, the natural growth rate of population, the urbanization rate, the industrialization rate and the total import and export volume as control variables to accurately measure the independent effect of education financial investment on economic growth. With the help of the population agglomeration effect, urbanization promotes industrial division and technology diffusion, and directly promotes economic growth. Since the establishment of the People's

Republic of China, particularly during the post-reform and opening-up era, China's urbanization process has been advancing rapidly. Especially since the turn of the 21st century, China's urbanization rate has increased by more than 1 percentage point annually, which means that more than 10 million people from rural areas enter urban areas every year [8]. Its rapid development may mask the contribution of financial investment in education, so it is necessary to control the urbanization rate. Industrialization is a key stage to promote economic growth, especially in developing countries. The improvement of the industrialization level leads to the improvement of production efficiency, but it is necessary to distinguish its independent role from that of education investment in economic growth. As an indicator of economic openness, the total import and export volume reflects the contribution of international trade to economic growth, and its control can avoid the economic improvement brought by trade growth being wrongly attributed to education investment.

3. Result

The basic results of this paper take the overall sample of 31 provinces (autonomous regions and municipalities) from 2014 to 2023 as the research object, and the core explanatory variable is the financial investment in education. The results show that under the control of other factors, the impact of the actual local per capita fiscal expenditure on education on the actual per capita GDP is significantly positive, which indicates that an increase in educational expenditure can boost economic development.

As shown in Table 1, for every 1% increase in the actual local per capita fiscal expenditure on education, the actual per capita GDP increases significantly by 0.357%. R^2 reached 0.954, indicating that the fitting degree of the regression model was good.

Table 1. Regression analysis of the impact of financial investment in education on economic growth.

variable	Real per capita GDP(logarithm)
Actual local per capita fiscal expenditure on Education (logarithm)	0.357*** (0.037)
Actual per capita investment in fixed assets (logarithm)	0.046*** (0.016)
Industrialization rate (logarithm)	0.160*** (0.039)
Actual per capita import and export volume (logarithm)	0.080*** (0.010)
Urbanization rate of permanent residents (logarithm)	0.470*** (0.083)
Natural population growth rate	0.006** (0.002)
Constant term	8.780*** (0.322)
Regional fixed effect	control
Fixed year effect	control
Observed value	310
Number of provinces	31
Intra-group R^2	0.954

In addition to the significant positive coefficient of the actual local per capita fiscal expenditure on education, the coefficients of other variables also deserve attention. The impact of per capita fixed asset investment on per capita GDP is significantly positive, which means that the growth of per

capita fixed asset investment is usually accompanied by the growth of per capita GDP. From the demand side, fixed asset investment can directly stimulate total demand, drive economic activities, and promote GDP growth; From the supply side, fixed asset investment helps to improve production conditions, improve the level of technology and equipment, thereby improving production efficiency and promoting long-term economic growth. The industrialization rate has a positive role in promoting per capita GDP. With the increase in the industrialization rate, the proportion of industry in the economy becomes larger, and the industrial production efficiency is high, which can directly drive GDP growth. At the same time, industrialization drives the development of related industries, promotes technological progress and the optimization of employment structure, and further promotes economic growth. The impact of per capita import and export volume on economic growth is also significantly positive. The import and export volume reflects the openness of the economy. An open economy can more effectively allocate resources, promote technological exchanges, and industrial upgrading. The improvement of the urbanization rate can improve the efficiency of resource utilization, stimulate infrastructure investment, expand the consumer market, and then promote economic growth. Although the natural growth rate of population has little impact on economic development, it also shows a positive correlation at the significant level of 5%.

4. Suggestion

4.1. Increase Financial Investment

The results show that the financial investment in education significantly promotes economic growth. Therefore, the government departments should further increase the financial investment in education, continuously increase the stock of human capital, and replace the declining traditional demographic dividend with the emerging talent dividend to form the "second demographic dividend" [9]. Ensure the scale of investment and establish a stable growth mechanism. The proportion of education financial investment in GDP and the proportion of fiscal expenditure will be included in the statutory assessment indicators to ensure that the growth rate of investment is not lower than that of GDP and fiscal expenditure, and to avoid investment fluctuations from the institutional level. The new investment will focus on basic education, higher education, and vocational education, and consolidate the "human capital foundation" of economic growth.

4.2. Establish Dynamic Adjustment Mechanism

Open the data sharing channel between education policy and industrial policy, and adjust the education content in real time according to the changes in industrial demand. Promote online education and short-term training projects, quickly update the skills of employees, shorten the response time between the education system and industrial demand, improve the timeliness and pertinence of education investment, alleviate the structural contradiction of employment, and provide talent support for high-quality economic development.

4.3. Pay Attention to the Improvement of Education Quality

The issue of education quality is not only the focus of China's education policy. Looking at the world today, international organizations and countries all over the world place the issue of education quality in an important position [10]. Enhancing teachers' benefits and remuneration can effectively draw outstanding individuals to pursue careers in education, which in turn helps improve the quality of education. At the same time, society and enterprises are encouraged to participate in the public welfare of education, such as the establishment of a tax relief plan for education donations to provide diversified financial support for education development.

5. Conclusion

This study investigates how financial investment in education influences economic growth, utilizing a two-way fixed-effects model on a longitudinal dataset spanning 2014 to 2023 across China's 31 provinces. The analysis reveals that each 1% rise in local per capita education spending corresponds with a 0.357% increase in per capita GDP, substantiating the substantial positive contribution of educational fiscal investment to economic expansion. At the theoretical level, the article mainly analyzes based on human capital theory and Keynes' theory. Human capital theory emphasizes that investment is the key to improving human capital, and advancing human capital can directly contribute to economic growth. Keynes' theory highlights the multiplier effect of investment on economic growth, and believed that financial investment, as a part of investment, can drive the development of related industries and promote economic growth. The article also analyzes the synergistic effect of financial investment in education, urbanization, industrialization rate, and other variables, and finds that these variables can also promote economic growth to a certain extent, and play a role together with financial investment in education. Given the research outlined above, the paper proposes policy recommendations, such as increasing the financial investment in education, optimizing the allocation of resources, and improving the quality of education, in order to better play the key role of financial investment in education in economic growth.

Looking forward to the future, the research can be further expanded. On the one hand, we should deeply explore the differentiated impact of education financial investment in different education stages, to more accurately grasp its role in economic growth; On the other hand, we should pay attention to the regulatory effect of education financial investment on the balanced development of regional economy, and contribute to education to narrow the regional gap and achieve common prosperity.

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