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# Research on the Relationship between Education Service Equalization and Regional Economic Development

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**Abstract:** This study delves into the correlation between education service equalization and regional economic development by examining the theories of public goods, educational equity, and regional economic development. It uncovers the theoretical foundations and the current practice in China. The research indicates that the equalization of education services significantly impacts regional economic development, with these effects showing regional variability. Through both theoretical and empirical analyses, the equalization of education services has proven pivotal in enhancing labor quality, accelerating talent mobility, strengthening regional innovation capability, and optimizing economic structures. While China has achieved certain accomplishments in advancing the equalization of education services, the issue of uneven distribution of educational resources among regions remains prominent. In light of this, governments should formulate differentiated education policies based on regional characteristics and strengthen inter-regional educational cooperation and exchanges, aiming to promote coordinated regional economic development through balanced educational advancement.

**Keywords:** Education service equalization, regional economic development, theoretical foundations, current situation analysis, differentiated policies.

## 1. Introduction

Since the introduction of reform and opening-up in the late 1970s, China's education sector has witnessed rapid development, laying a solid foundation of talent and intelligence for the great rejuvenation of the Chinese nation and becoming an important driving force for modernization. As the cornerstone of economic and social modernization, education modernization plays a crucial role in alleviating regional development imbalances. However, the uneven distribution of educational resources among regions also hampers the process of education modernization, exacerbates the imbalance in regional talent supply, and affects economic coordination and social equity. With the deepening of economic structural reforms, people have come to realize that education and economic development complement each other. Imbalanced regional economic development reduces support for education, further affecting educational balance, while disparities in educational development widen economic gaps [1]. The report of the 19th National Congress of the Communist Party of China pointed out that the principal contradiction facing Chinese society has evolved into a contradiction between unbalanced and inadequate development and the people's ever-growing needs for a better life, which is also reflected in the field of education. Clarifying the relationship between educational equalization and regional economic development is of vital importance for coordinating the regional economic and educational development layout during the 14th Five-Year Plan period from a systematic perspective and exploring optimal paths to address regional educational imbalances.

## 2. Theoretical Foundations and Current Situation Analysis of Educational Service Equalization

### 2.1. Theoretical foundations of educational service equalization

Educational service equalization, as a core objective of modern educational policies, finds its theoretical foundation deeply rooted in the integrated insights of public goods theory, educational equity theory, and regional economic development theory. From an economic perspective, public goods theory emphasizes the non-excludability and non-rivalry of education as a quasi-public good. It points out that the government, as the provider of public goods, has the responsibility to ensure equitable distribution of educational resources and prevent excessive concentration of resources in specific regions or groups. This constitutes the economic foundation for promoting educational service equalization [2]. Educational equity theory further focuses on the equality of educational opportunities, viewing education as the cornerstone of individual development and social progress. It demands the elimination of constraints on educational opportunities imposed by geographical, economic, cultural, and other factors, ensuring that every citizen has equal access to education. This theory provides ethical and value-oriented guidance for the balanced allocation of educational resources. Regional economic development theory reveals the intrinsic link between educational service equalization and regional economic development, highlighting that education, as a critical factor in regional economic development, directly influences the balanced development of regional economies. It can provide human capital support for regional economic development by enhancing labor quality and promoting talent mobility, while also injecting new impetus into regional

economic development by stimulating regional innovation capabilities and promoting industrial structure optimization and upgrading. These theories mutually support each other, collectively providing a solid theoretical foundation for educational service equalization and offering theoretical guidance and practical pathways for the formulation of educational policies and the balanced development of regional economies.

## 2.2. Analysis of the current situation of educational service equalization in China

In recent years, China has made significant progress in the equalization of educational services, yet it still faces notable challenges in terms of regional disparities. In terms of educational resource investment, despite the increased financial support provided by the government to central and western regions, the eastern coastal areas, with their strong economic foundation, generally outperform central and western regions in terms of both the total amount and quality of educational investment. This results in more advanced school facilities and educational technologies in the eastern regions compared to the relatively lagging central and western regions. Similarly, significant differences exist in educational quality and outcomes. The eastern regions, with abundant resources and high-quality teachers, excel in the number of universities, international competitions, and technological innovation (see Figure 1). In contrast, due to resource scarcity and uneven distribution in central and western regions, the improvement of educational quality has been slow, and outcomes are relatively weaker. To promote equalization, the government has introduced various policies, such as improving compulsory education conditions in impoverished areas, to narrow the gap. However, constrained by geographical conditions, economic foundations, and other factors, some remote and rural areas still suffer from a lack of educational resources, facing numerous challenges in improving educational quality.

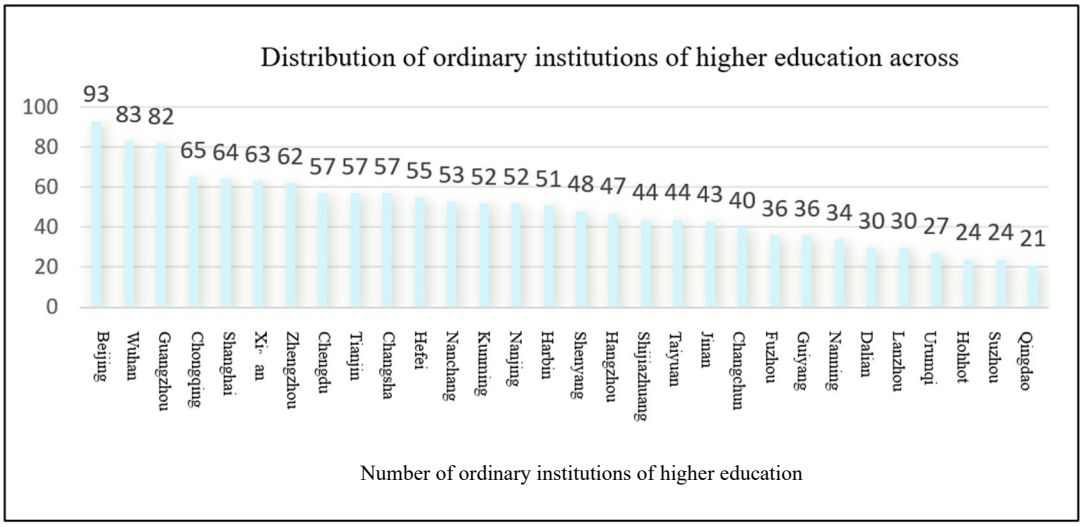


**Figure 1.** Distribution of ordinary institutions of higher education across cities
(Data source: https://xkpj.dlut.edu.cn)

# 3. The Influence Mechanism of Educational Service Equalization on Regional Economic Development

## 3.1. The impact of educational service equalization on human capital accumulation

### 3.1.1. Enhancing labor quality and skills

Through optimizing the allocation of educational resources, educational service equalization has significantly enhanced the overall quality and skill levels of the labor force. Taking rural compulsory education as an example, with the in-depth implementation of the policy to "comprehensively improve the basic educational conditions of underdeveloped schools in poverty-stricken areas", the quality of teachers, teaching facilities, and IT application in rural schools have been greatly improved. According to statistics, over the past five years, the average college entrance examination admission rate for rural students has increased by nearly 10 percentage points. This indicates that, driven by policies promoting educational service equalization, rural students have gained more opportunities to receive quality education, which in turn enhances their future employment competitiveness and professional skill levels. As an important component of educational service equalization, vocational education provides highly targeted and practical skills training for the labor force through school-enterprise cooperation, industry-education integration, and other models, effectively alleviating the shortage of highly skilled talent in the labor market [3].

### 3.1.2. Facilitating talent mobility and optimal allocation

Educational service equalization not only enhances the quality and skills of the labor force but also promotes talent mobility and optimal allocation. For one thing, with the balanced development of educational resources between urban and rural areas and across regions, talents are no longer confined to a specific region or industry but have more diversified options. For example, as the quality of education in central and western regions improves, an increasing number of college graduates choose to return to their hometowns for employment and entrepreneurship, injecting new vitality into local economic and social development (see Table 1). For another, educational service equalization promotes the openness and internationalization of the higher education system, enabling more students to have access to

overseas education or participate in international exchanges. This not only broadens students' international horizons but also facilitates the two-way flow of talents between domestic and foreign countries. In the context of globalization, such talent mobility contributes to knowledge sharing and technological innovation among countries, further promoting the optimal allocation of global human capital. Additionally, educational service equalization fosters social mobility by providing opportunities for children from low-income families to change their destinies through education, thereby helping to alleviate social inequality.

**Table 1.** Achievements in talent cultivation in western regions

| Indicators | Cumulative totals from 1999 to 2008 |
|---|---|
| Graduates with high school education and above (in millions) | 3275 |
| Including: High school graduates (in millions) | 2408 |
| Higher education graduates (in millions) | 867 |
| Illiteracy eliminated (in millions) | 1400 |
| Number of college students per 100,000 population | 1200 |

## 3.2. The promotion of innovation through educational service equalization

Educational service equalization significantly enhances regional innovation capacity and competitiveness, and provides a solid talent foundation for innovation activities by raising the overall education level of the population. The balanced allocation of educational resources enables all regions to enjoy high-quality educational services, nurturing young talents with innovative thinking and abilities. Taking Zhejiang Province as an example, its implemented "strategy for balanced educational development" has significantly narrowed the educational gap, providing talent support for innovation activities across the province and fostering the vigorous development of technology enterprises, thereby securing a favorable position in global innovation competition (see Figure 2). Educational service equalization facilitates the commercialization of scientific and technological achievements and industrial upgrading, as universities and research institutions, under a balanced education system, closely collaborate with enterprises to jointly promote the commercialization of scientific and technological achievements. Jiangsu province, by establishing industry-university-research cooperation platforms, has accelerated the transfer of scientific and technological achievements, promoted the development of emerging industries and the transformation and upgrading of traditional industries, injecting new vitality into the high-quality development of the regional economy. It also cultivates interdisciplinary talents with innovative capabilities, providing a talent guarantee for the commercialization of scientific and technological achievements and industrial upgrading.

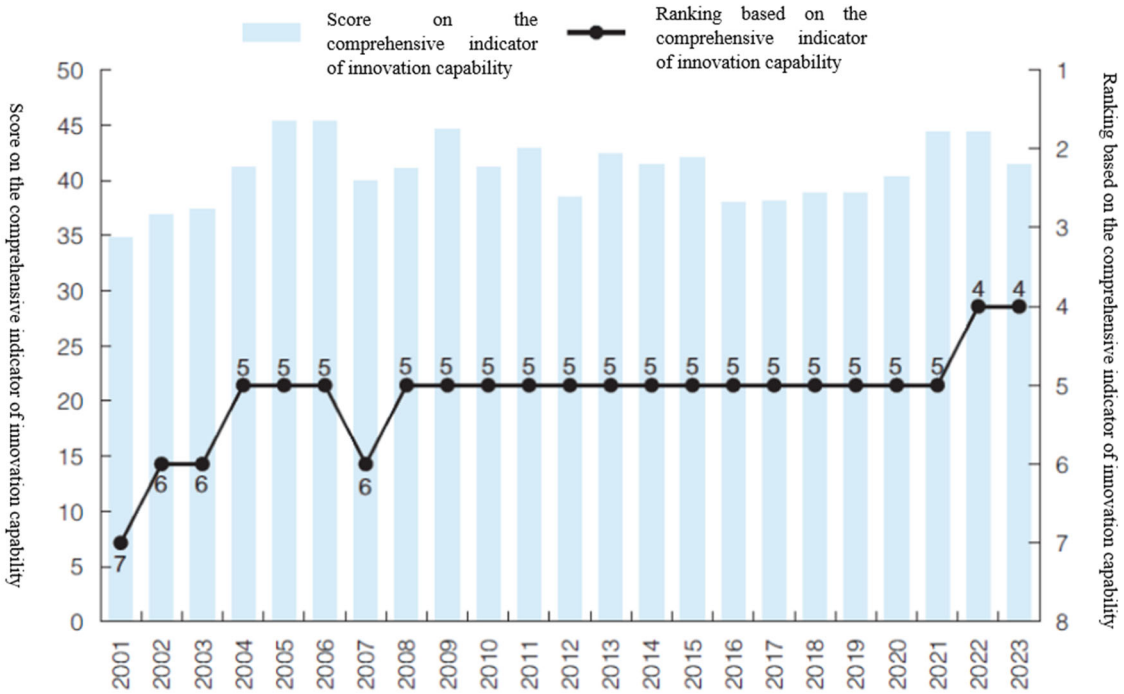


**Figure 2.** Trends in innovation capability in Zhejiang province from 2001 to 2023

## 3.3. The role of educational service equalization in optimizing regional economic structure

Educational service equalization, as an important means of optimizing regional economic structure, plays a crucial role in promoting industrial upgrading and transformation as well as fostering coordinated regional economic development. By balancing the allocation of educational resources, it enhances the quality of the labor force in various regions and provides a talent pool for the development of high-tech industries [4]. Taking Jiangsu province as an example, the implementation of the strategy for educational equalization has significantly promoted the rapid development of high-tech industries such

as information technology and biomedicine, achieving a transformation and upgrade of the industrial structure from low-end to high-end. Educational service equalization breaks the unbalanced pattern of geographical concentration of educational resources, enhancing the economic development capacity of less developed regions. Guizhou province serves as a case in point; by increasing investment in education and optimizing resource allocation, the province has significantly improved the education level in rural areas, supplying a large number of professionals for industries such as specialty agriculture and rural tourism. According to statistics, from 2016 to 2021, the average annual growth rate of per capita disposable income in rural areas of Guizhou Province exceeded 10% (see Figure 3), gradually narrowing the regional economic disparity.

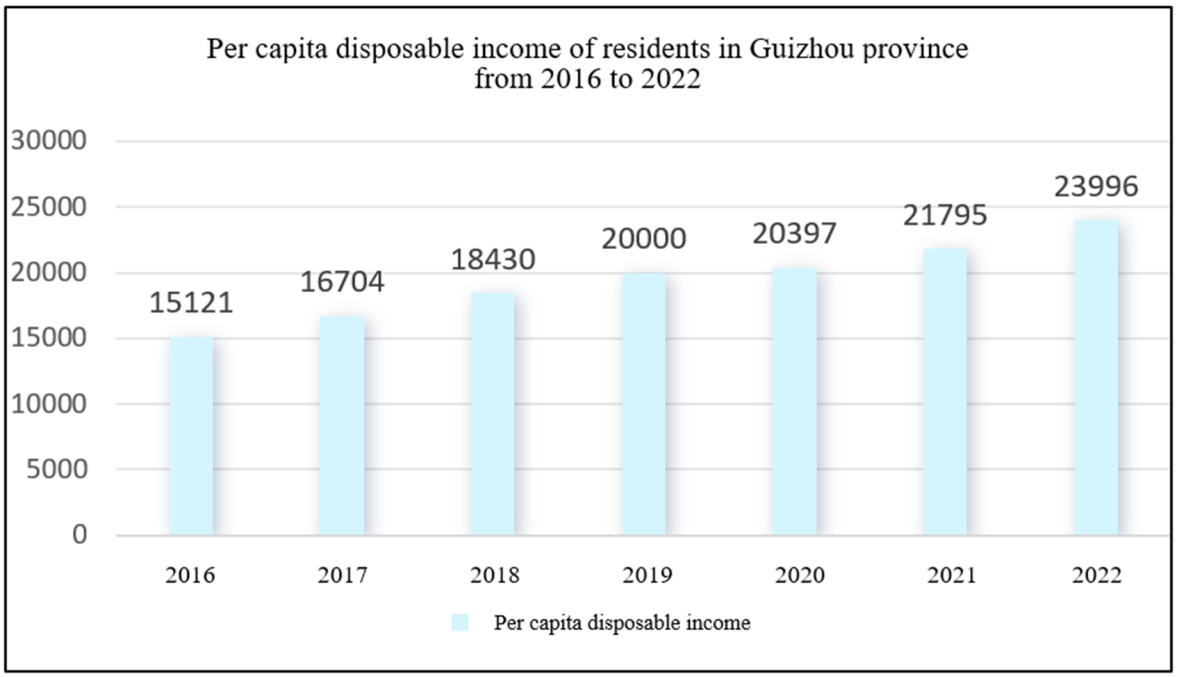


**Figure 3.** Per capita disposable income of residents in Guizhou province from 2016 to 2022
(Data source: https://www.huaon.com)

# 4. Empirical Analysis of Educational Service Equalization and Regional Economic Development

## 4.1. Variable selection and data description

This study focuses on the relationship between educational service equalization and regional economic development. It adopts the total GDP of each province in the current year as the indicator to measure the level of economic development (denoted as gdp), with a higher GDP representing a higher level of economic development. In terms of explanatory variables, educational funding investment considers the sum of per capita expenditure on educational undertakings and per capita public expenditure to reflect the true level of investment (denoted as edu); labor input is measured by the number of employed persons in all sectors of each region in the current year (denoted as labor); technological input is reflected by the R&D expenditure of enterprises above a certain size (denoted as tech); and capital input is measured by fixed asset investment across the society (denoted as invest). All indicators are log-transformed to eliminate heteroskedasticity. The data sources include the *China Statistical Yearbook (2007-2017)*, *China Population Statistics Yearbook (2007-2017)*, and the website of the National Bureau of Statistics, aiming to delve into the impact mechanism of educational service equalization on regional economic development.

## 4.2. Statistical description of variables

In the study of the relationship between educational service equalization and regional economic development, descriptive statistical analysis was conducted on the main variables using statistical data from 2006 to 2016. The results indicate that there are significant regional disparities in both the level of economic development (gdp) and educational funding investment (edu). The absolute difference in economic development levels is 5.628, and the absolute difference in educational funding investment is 4.724, with the standard deviations of both being close to 1. This significant regional imbalance not only reveals the complexity of the current status of education and economic development in China but also emphasizes the need to pay special attention to the impact of regional differences on economic development in the process of educational service equalization. Therefore, conducting in-depth research on the internal connection between educational service equalization and regional economic development is of great significance for promoting coordinated and sustainable regional economic development.

**Table 2.** Descriptive statistical indicators of variables

| Variables | Observations | Mean | Standard Deviation | Maximum | Minimum |
|---|---|---|---|---|---|
| Economic development level | 341 | 9.264 | 1.065 | 11.300 | 5.672 |
| Educational expenditure | 341 | 5.896 | 0.879 | 7.749 | 3.025 |
| Labor input | 341 | 5.871 | 0.894 | 7.587 | 2.902 |
| Technological input | 341 | 13.608 | 1.670 | 16.635 | 7.058 |
| Capital input | 341 | 8.852 | 1.052 | 10.884 | 5.443 |

## 4.3. Stationarity test of data

Prior to studying the relationship between educational service equalization and regional economic development, a stationarity test was conducted on the data. Among the original sequences, only technological input was significantly stationary, while the remaining variables exhibited unit roots. After first-order differencing, all variables became significantly stationary at the 1% level, meeting the requirements of being first-order integrated sequences I(1). This ensured the validity and robustness of subsequent system GMM model estimation, which is crucial for revealing the internal connection between educational investment and regional economic development.

**Table 3.** Stationarity test results

| Variables | LLC Method | | IPS Method | | Robustness |
|---|---|---|---|---|---|
| | t-value | p | t-value | p | |
| gdp | -10.198*** | 0.000 | -1.258 | 0.913 | Unstable |
| Δgdp | -9.229*** | 0.007 | -2.439*** | 0.000 | Stable |
| edu | -10.549*** | 0.000 | -1.601 | 0.293 | Unstable |
| Δedu | -16.329*** | 0.000 | -2.419*** | 0.000 | Stable |
| labor | -5.376 | 0.115 | -1.081 | 0.990 | Unstable |
| Δlabor | -13.383*** | 0.000 | -2.044*** | 0.003 | Stable |
| tech | -19.874*** | 0.000 | -3.052*** | 0.000 | Stable |
| Δtech | -33.735*** | 0.000 | -4.524*** | 0.000 | Stable |
| invest | -8.701*** | 0.000 | -1.442 | 0.631 | Unstable |
| Δinvest | -14.481*** | 0.000 | -11.500*** | 0.000 | Stable |

## 4.4. Inter-regional system GMM estimation and analysis of regional differences

China exhibits significant heterogeneity among regions, with notable differences in economic development levels, social environments, and historical conditions. Based on this, the country is divided into three major regions: East, Central, and West. Using a region-specific System GMM model for estimation, this section delves into the differences in the impact of educational funding investment on regional economic development.

**Table 4.** Inter-regional system GMM (SGMM) estimation results

| Variables | Eastern Regions | Z | Central Regions | Z | Western Regions | Z |
|---|---|---|---|---|---|---|
| gdpt-1 | 0.386*** | 2.96 | 0.487** | 2.29 | 0.691*** | 2.77 |
| edu | 0.216** | 2.51 | 0.043 | 0.42 | 0.149** | 2.37 |
| labor | 0.266*** | 2.82 | 0.164*** | 3.71 | 0.117** | 2.12 |
| tech | -0.011 | -0.30 | 0.055 | 1.64 | 0.183** | 2.46 |
| invest | 0.099* | 1.85 | 0.193** | 2.21 | 0.082** | 2.10 |
| Constant term C | 2.314*** | 3.44 | 1.113 | 1.41 | 1.073*** | 4.10 |
| Hansen-P | 0.995 | | 0.158 | | 0.265 | |
| AR(1)-P | 0.000 | | 0.000 | | 0.000 | |
| AR(2)-P | 0.400 | | 0.115 | | 0.933 | |

As can be seen from Table 4, the early economic development of the three major regions has a significant promoting effect on the current economy, and there is a gradual decreasing trend from the west to the east, which is closely related to the economic foundation of the three regions. The impact of educational expenditure on economic development varies by region; educational expenditures significantly promote economic development in the eastern and western regions, but not in the central region. The eastern region, with its developed economy and high demand for high-quality labor, experiences a strong economic growth effect from educational expenditures; the central region has a solid foundation in traditional industries but lower demand for labor quality, making excessive educational investment potentially detrimental to economic growth; the western region, with its latecomer advantage and high educational output elasticity, provides a foundation for rapid economic development. At the same time, the impact of labor input, technological input, and capital input on economic development also shows regional differences. These differences collectively reflect the complex mechanism of action of educational service equalization in promoting regional economic development, necessitating the formulation of differentiated educational policies to promote balanced regional economic growth.

# 5. Conclusion

Educational service equalization has a significant impact on regional economic development, but exhibits notable regional differences. In the eastern region, where the economy is developed and there is a high demand for highly skilled labor, educational funding investment plays a significant role in promoting economic growth. In contrast, the central region, despite having a strong industrial base, has a relatively low demand for skilled labor, and excessive educational investment may hinder economic growth. The western region demonstrates late-mover advantages with high educational output elasticity, providing a solid foundation for economic development. In response to these differences, it is recommended that the government adopt differentiated education policies. The eastern region should continue to increase educational investment, enhance the quality of education, and cultivate more innovative talents. The central region should optimize its educational structure, improve educational efficiency, and avoid resource wastage. The western region needs to intensify support for education, rapidly improve educational service equalization, and narrow the educational gap with the eastern and central regions. Additionally, regional cooperation and exchanges in education should be strengthened to promote the sharing of educational resources, thereby facilitating balanced educational development and coordinated regional economic development.

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