“Analysis of regional differences in government funding performance in higher education – A case study of China”

AUTHORS	Yanjun Fu Mykhaylo Heyenko

ARTICLE INFO	Yanjun Fu and Mykhaylo Heyenko (2022). Analysis of regional differences in government funding performance in higher education – A case study of China. *Investment Management and Financial Innovations*, *19*(1), 106-120. doi:10.21511/imfi.19(1).2022.08
DOI	http://dx.doi.org/10.21511/imfi.19(1).2022.08
RELEASED ON	Tuesday, 08 February 2022
RECEIVED ON	Friday, 24 December 2021
ACCEPTED ON	Tuesday, 01 February 2022

JOURNAL	"Investment Management and Financial Innovations"
ISSN PRINT	1810-4967
ISSN ONLINE	1812-9358
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
78	2	4

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Yanjun Fu (China), **Mykhaylo Heyenko** (Ukraine)

ANALYSIS OF REGIONAL DIFFERENCES IN GOVERNMENT FUNDING PERFORMANCE IN HIGHER EDUCATION – A CASE STUDY OF CHINA

Abstract

In recent years, although the total funding for higher education by the Chinese government has been increasing year by year, there are still some problems, such as the unreasonable allocation of regional resources and poor funding efficiency. Therefore, it is necessary to evaluate the performance management and analyze government funding in higher education (GFHE). Based on the data envelopment analysis (DEA) model, this paper evaluates the performance of GFHE in 29 provinces in eastern, central, and western areas of China. An empirical analysis is conducted on the influencing factors using the panel Tobit regression model. The results show that from 2008 to 2020, GFHE performance in China is generally high, but offers a "W-shaped" fluctuation rising state. There are significant differences in the performance of different areas, and the scale level of GFHE in the three areas is not wholly consistent with the performance level. In further studies, the performance level of the 29 provinces is divided into three degrees, which are distributed in all three areas. The study also found that the influencing factors of GFHE performance in central, eastern, and western China are also different, and analyzed the positive and negative effects of influencing factors in each area. Finally, the study tests the theoretical hypothesis, and the results are robust.

Keywords educational resources, management mechanism, efficiency, resource allocation, trend, funding, long-term effectiveness

JEL Classification H52, I22, I28

Received on: 24th of December, 2021
Accepted on: 1st of February, 2022
Published on: 8th of February, 2022

Yanjun Fu, Ph.D., Lecturer, Faculty of Economics and Management, Sumy National Agrarian University, Ukraine; Henan Institute of Science and Technology, China. (Corresponding author)

Mykhaylo Heyenko, Ph.D., Associate Professor, Faculty of Economics and Management, Sumy National Agrarian University, Ukraine.

Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

Government funding in higher education (hereinafter referred to as GFHE) is governments' funding at all levels in higher education institutions. It is the financial support provided by the state for colleges and universities. It provides essential guarantee for the comprehensive, coordinated, and sustainable development of higher education in material terms. Since China implemented the popularization policy of higher education, the spatial structure of higher education has changed significantly. First of all, from the perspective of the government, with the rapid development of China's economy in recent years and the implementation of the "world-class universities" (hereinafter referred to as double first-class) university construction strategy from 2015, the government continues to increase funding in higher education. However, the allocation of higher education resources in various areas is unreasonable, and the funding is insufficient. The problem of low funding efficiency still exists, which to a certain extent leads to the imbalance in regional economic development; secondly, from the perspective of higher education institutions, China's higher education institutions lack an effective management mechanism until now in

http://dx.doi.org/10.21511/imfi.19(1).2022.08

the use of higher education funding. Many institutions cannot take full advantage of government funding to develop and cultivate their advantageous disciplines, resulting in an improper use of education funds and low input-output efficiency, which seriously restricts the long-term development of colleges and universities. Therefore, given the above issues, further analysis of GFHE and performance evaluation management is critical.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

It is generally recognized that the connotation of higher education performance includes the efficiency of government financial funding, the output of higher education institutions to students' personal, social services and national construction under the comprehensive investment of various resources, as well as improving the internal structure management and construction of higher education institutions and the potential for long-term development in the future. Feng and Wang (2012) believe that higher education performance is more reflected in the multi-dimensional system construction of input, teaching process, and output of higher education system or institutions over time. Huang and Wang (2015) believe that the investment performance of higher education is diversified, lagging, and long-term. Guthrie (2007) analyzed the political environment for the development of higher education in Australia and the changes in the proportion of government monetary funds in the sources of higher education funds in recent years, emphasizing the importance of establishing performance and market-oriented university system in Australia. Xia D, Guo Liangdu (2017) revealed that the performance evaluation of higher education financial expenditure plays an essential role in optimizing resource allocation and ensuring the rational use of special funds for financial outlays. The article pointed out the necessity of investment performance evaluation of colleges and universities. It analyzed the current situation of the performance evaluation of higher education financial spending in China, put forward measures to optimize the performance evaluation of higher education investment. Furthermore, in addition to the above research content of overall investment, the study by Yang M. and Yang Y. (2013) has been specific to the performance evaluation of special funds invested in colleges and universities. Liu Xiaoyun (2014) studied the performance evaluation of special financial funds for university laboratories. Ge Yulin (2018) reviewed the performance evaluation of special monetary funds for university project construction.

After entering the 21st century, the research on the distribution of education funding by relevant scholars has been expanding and enriching, mainly involving education at all levels, from preschool education to higher education. Metcalfe (2009) believes that on the premise of the improvement of higher education level and the increase of higher education enrollment opportunities in the province, there is still a limited distribution of higher education investment, which is not conducive to improving the enrollment opportunities of indigenous residents and the lack of fairness of higher education through the research on the change of higher education investment distribution structure in Columbia Province, Canada. Using geographic image analysis and micro spatial simulation methods, Kavroudakis (2013) and others analyzed the social equity and spatial imbalance related to higher education investment. They studied the impact of students' enrollment opportunities, economic development, and geographical factors on the allocation and utilization of higher education resources in different economic conditions. The results show that the regional distribution of higher education resources is additional, and the opportunities for school-age youth to receive higher education are also various. Du and Gu (2016) made an empirical analysis on the panel data related to the average investment level of Chinese higher education students. They concluded that the average investment of Chinese college students is unbalanced among universities and areas. Wang et al. (2013) believe that the differences in the allocation of educational resources among provinces in China show a growing trend. Ye (2015) believes that the inter-provincial expenditure dif-

ference in China's higher education stage is expanding to a certain extent.

The establishment of an index system is the core of performance evaluation. Based on different research purposes and screening principles, the index data are combined in various ways to build the index system framework of performance evaluation. Jone (2016) believes that achievement indicators are the most difficult to obtain, and suggests that the government should pay attention to the setting of efficiency and effect indicators. Elias and Peter (2008) summarized and analyzed the research results of previous scholars. According to different classification methods of the index system, the research is divided into three groups. One group focuses on the construction of the performance evaluation index system of higher education financial expenditure; the second group focuses on the performance information and development monitoring result report of the annual inspection report of higher education. The last group focuses on the commercialization and marketization of higher education in the United States, Canada, and the United Kingdom. Fu Jianwen (2019), Wu et al. (2016), Mao Yinge (2007), and Tian Jingren (2012) divided the index system into six primary indicators based on result orientation, namely, investment, production, benefit, project arrangement, fund, project management, output and help. Most Chinese scholars use a result-oriented approach to divide the framework of the index system. Yuan and Lee (2011) introduced the questionnaire survey method from the perspective of practicability to verify the applicability of the excellent education performance evaluation criteria framework in the performance evaluation of financial expenditure on higher education. Hamihek (2013) also introduced a mature Balanced Scorecard for evaluating the performance of higher education government investment funds. Cunha Rocha (2017) established evaluation indicators from input and output levels and used them to evaluate the performance of public expenditure on higher education in Portugal. Tomchuk et al. (2021) revealed the formation of the higher education index system from the perspective of improving the higher education management system and encouraging efficient management talents according to the needs of higher education and the characteristics of higher education. Li et al. (2012) analyzed the investment benefits of higher education in various areas of China from two aspects of input and output, based on the data from 1997 to 2008. They found that the investment benefits of higher education in economically developed areas are generally higher. Zhang Wenyao (2012) took the provinces in western China as an example, established a relevant model to measure and analyze the relationship between the development efficiency of higher education and the level of regional economic development in relatively backward areas. The author found that there was a long-term significant cointegration relationship between the development of higher education in western China and the level of regional economic growth in China, and there was no significant short-term correlation. Based on the constructed index system, Gao Yao (2013) conducted an empirical analysis on the correlation between higher education and regional economy in 107 major cities in China using panel data from 2000 to 2010, and found that the overall correlation between higher education development and regional economy in 107 cities has weakened. Guo Hualin and Su Jie (2014) used the data envelopment analysis method to analyze the input-output efficiency of financial expenditure funds in key construction universities in Zhejiang province, and found the existence of non-DEA effective decision-making units. Finally, from the aspects of efficiency and effectiveness, Zhong Wuya (2014) constructed a neoclassical economic growth correction model based on the statistical data from Beijing, Shanghai, and Guangdong, Through the regional comparison of education investment and financial growth performance by using the Granger causality test and ECM model based on cointegration, the results show that there is no significant relationship between education investment in Beijing and economic growth performance. Education investment in Shanghai and Guangdong has a sustained and significant positive effect on economic growth. Guo Liqiang (2018) empirically analyzed the coordination relationship between higher education and economic development levels in 31 provinces and cities (districts) in China in 2005 and 2015 by establishing the coordination degree model. It was found that the coordination relationship between the two in 2015 was improved

http://dx.doi.org/10.21511/imfi.19(1).2022.08

to a certain extent compared with that in 2005. However, there is a noticeable "Matthew effect" in the higher education system and economic system.

There are relatively few studies in the literature on factors influencing the GFHE performance, most of which are still mainly based on the influencing factors of higher education development and university scale. Mao (2009) used the Granger causality test and cointegration test regression analysis methods to find a long-term stable and balanced relationship between the total population size, Engel coefficient, per capita GDP, and the proportion of tertiary industry output value and the scale of higher education. Wang Jianhong and Liu Yirong (2015) conducted an empirical study by using the cointegration test and one-time linear regression model, analyzed the impact of factors such as per capita GDP and the proportion of tertiary industry on the scale of higher education, and predicted the medium and long-term development of China's higher education scale. Zhang and Wang (2014) analyzed the impact of funding structure, higher education funding intensity, and economic development on higher education development using the logarithmic average Di's decomposition method. Zhang Shuhui and He Juanjuan (2015) conducted an empirical study on China's urbanization process on the scale of higher education from 2008 to 2011 using the panel data model. It was found that the urbanization process had a significant impact on the scale of higher education in China, and the regional differences of this impact were apparent.

Therefore, existing studies have outlined the concept of educational performance and the necessity of performance evaluation, and gradually began to carry out relevant research on performance evaluation. As far as China's GFHE is concerned, relevant studies in China have pointed out differences in GFHE scale among different areas, but did not analyze the relationship between GFHE scale and performance. In addition, as for the performance of GFHE, there is still a lack of long-term and overall research on performance differences and influencing factors nationwide.

The purpose of this study is to analyze regional differences in the scale and performance of GFHE in China, as well as the factors affecting the GFHE performance level in three areas of China (east, central and west).

This study puts forward the following four hypotheses:

H1: The increase in the GFHE scale in China is related to funding performance.

H2: The performance of GFHE in China varies according to different areas.

H3: The performance of GFHE in different provinces in the same area of China is also uneven.

H4: China's GFHE performance may be affected by factors such as total population size, Engel's coefficient, GDP per capita, urbanization process, and the proportion of tertiary industry output value.

2. METHODOLOGY

2.1. Methods and indicators selection

The paper uses Data Envelopment Analysis (DEA) to measure the performance of GFHE, and the comprehensive efficiency is divided into scale efficiency and pure technical efficiency through its variable return to scale DEA. The Decision Making Unites (DMU) efficiency value obtained by DEA is between 0-1, thus further analyzing the impact of different economic and social factors on GFHE performance in other areas. According to the impact of different economic and social factors on regional GFHE performance and combined with the existing literature, this paper uses the panel Tobit regression model for empirical analysis.

To measure and analyze the GFHE performance level comprehensively and accurately, this paper selected five indicators as input indicators, including educational fund allocation, infrastructure allocation, scientific research allocation, other funding allocation, and additional funding for education, based on the input-output analysis method. The output indices include the number of graduate students, the number of papers published by

teachers and students, the number of invention patents and fixed assets. The input and output indicators of the above GFHE are dimensionless, and the dimensionless treatment formula is:

$$k_i = \frac{x_i\text{-}\min x_i}{\max x_i\text{-}\min x_i},\ i = 1,2,3,\ldots,n \qquad (1)$$

where k_i represents the standardized value of index x_i, $k_i I$ [0,1]; min x_i represents the minimum value of index x_i in the overall evaluation object; *max* x_i represents the maximum value of index x_i in the whole evaluation object.

The basic idea of indicator weighting is to determine the objective weight of indicators, which is based on two basic concepts. One is contrast strength. It represents the value difference between each evaluation scheme of the same index in the form of standard deviation. That is, the size of the standardized difference indicates the size of the value difference between schemes within the same index. The larger the standard difference, the larger the value difference between schemes. The second is the conflict between evaluation indicators. The conflict between indicators is based on the correlation between indicators. If there is a strong positive correlation between the two indicators, the conflict between the two indicators is low. The quantitative indicator of the conflict between the *j*-th indicator and other indicators is

$$\sum_{t=1}^{n}\left(1-r_{tj}\right),$$

r_{tj} is the correlation coefficient between the evaluation indices *t* and *j*, and the objective weight of each index is determined by the comprehensive measurement of contrast intensity and conflict. Let C_j represent the amount of information contained in the *j*-th evaluation index, then C_j can be expressed as follows:

$$C_j = s_j \sum_{t=1}^{n}\left(1-r_{tj}\right),\ j = 1,2,3,\ldots,n \qquad (2)$$

The greater C_j, the greater the amount of information contained in the *j*-th evaluation index, and the greater the relative importance of the index, so the objective weight of the *j*-th indicator should be:

$$W_j = \frac{C_j}{\sum_{t=1}^{n} C_j},\ j = 1,2,3,\ldots,n \qquad (3)$$

2.2. Data sources

The study further uses DEAP 2.1 and STATA software to empirically analyze the GFHE performance of 29 provinces in China from 2008 to 2020. The data were obtained from the website of The National Bureau of Statistics of China, *China Educational Expenditure Statistical Yearbook* and *China Education Statistical Yearbook*, etc. Qinghai, Hainan, China Hongkong, China Macao, and China Taiwan's five areas lack data due to the lack of education supplemental funds, so this article is eliminated. Some missing data in other provinces are estimated using the linear estimation method.

3. RESULTS

3.1. Scale and characteristics of GFHE in eastern, central, and western China

In this paper, GFHE funds data are collected from the statistical yearbook of China's education funds by selecting five evaluation indicators: education cost funding, infrastructure funding, scientific research funds funding, other funds funding, and education additional funding. As shown in Figure 1, the average GFHE funds of each area showed an overall steady growth trend from 2008 to 2020. The average government funding per Province in the eastern part increased from RMB 6.092 billion in 2008 to RMB 30.796 billion in 2020, an increase of more than four times, with an average growth rate of 14.79%; The average provincial GFHE expenditure in central China increased from 2.959 billion yuan in 2008 to 19.651 billion yuan in 2020, an increase of 5.5 times, with an average growth rate of 18.22%; The average provincial GFHE expenditure in western China increased from RMB 1.554 billion in 2008 to RMB 11.403 billion in 2020, an increase of 6.3 times, with an average growth rate of 18.80%; The average provincial GFHE expenditure in China increased from RMB 3.524 billion in 2008 to RMB 20.616 billion in 2020, an increase of 4.8 times, with an average growth rate of 16.38%. From the perspective of interprovincial comparison, taking 2020 as an example, in eastern China,

http://dx.doi.org/10.21511/imfi.19(1).2022.08

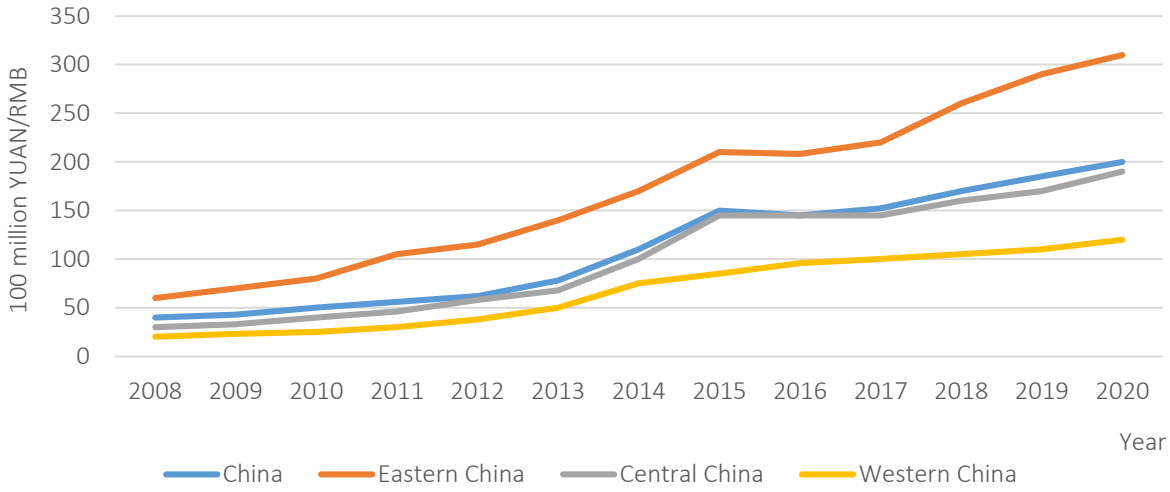

Figure 1. Average GFHE scale of each area in China by province (100 million yuan/RMB)

Beijing has the highest GFHE fund of 70.696 billion yuan, and Fujian has the lowest GFHE fund of 15.672 billion yuan. In central China, Hubei Province has the highest GFHE fund of 30.215 billion yuan, and Shanxi Province has the lowest GFHE fund of 11.098 billion yuan. In western China, Shaanxi Province has the highest GFHE fund of 25.225 billion yuan, and Tibet Autonomous area has the lowest GFHE fund of 1.719 billion yuan. The GFHE funds in eastern China are significantly higher than those in the central and western areas. GFHE funds in central China are higher than those in the west area, and the GFHE level in central China is not much different from that in the whole country. Overall, there are significant differences in the scale of GFHE between the eastern and western of China, and the difference has no narrowing trend (Figure 1).

3.2. GFHE performance analysis of eastern, central, and western China

3.2.1. *Comparative analysis of GFHE performance in China*

From 2008 to 2020, China's GFHE performance generally fluctuated and increased slightly, but maintained a high-efficiency level. From a regional perspective, there is a significant gap in GFHE performance among the three areas of eastern, central, and western China.

3.2.2. *Performance type analysis of GFHE in China*

Table 1 shows that the comprehensive efficiency of GFHE in individual provinces reaches more than 0.95. There are three in the eastern region,

Table 1. Average performance of government funding in higher education of each province from 2008 to 2020

Eastern China	Average
Beijing	0.871
Tianjin	0.803
Hebei	0.863
Liaoning	0.902
Shanghai	0.981
Jiangsu	0.965
Zhejiang	0.879
Fujian	0.798
Shandong	0.963
Guangdong	0.858

Central China	Average
Shanxi	0.928
Jilin	0.885
Heilongjiang	0.813
Anhui	0.938
Jiangxi	1.000
Henan	0.997
Hubei	0.998
Hunan	0.997

Western China	Average
Inner Mongolia	0.731
Guangxi	0.882
Chongqing	1.000
Sichuan	0.913
Guizhou	0.931
Yunnan	0.830
Xizang	0.514
Shanxi	0.961
Gansu	0.712
Ningxia	0.749
Xinjiang	0.818

Table 2. Types of government funding performance in higher education in China

Type	Class I "inefficient" areas	Class II "medium efficiency" area	Class III "high efficiency" areas
Province	Fujian, Tianjin, Heilongjiang, Inner Mongolia, Yunnan, Gansu, Tibet, Ningxia and Xinjiang	Beijing, Hebei, Liaoning, Guangdong, Zhejiang, Shanxi, Jilin, Anhui, Sichuan, Guangxi and Guizhou	Shanghai, Jiangsu, Shandong, Jiangxi, Henan, Hunan, Hubei, Chongqing, Shaanxi

Table 3. Chinese GFHE performance from 2008 to 2020 (comprehensive efficiency)

Years	Areas			
	Eastern China	Central China	Western China	Whole country
2008	0.836	0.970	0.811	0.872
2009	0.837	0.988	0.813	0.879
2010	0.826	0.946	0.806	0.859
2011	0.825	0.923	0.787	0.845
2012	0.872	0.928	0.779	0.860
2013	0.832	0.959	0.816	0.869
2014	0.894	0.943	0.835	0.891
2015	0.914	0.933	0.881	0.909
2016	0.920	0.936	0.824	0.909
2017	0.912	0.948	0.852	0.904
2018	0.917	0.997	0.906	0.940
2019	0.973	1.000	0.918	0.964
2020	0.947	0.970	0.913	0.943
Average	0.885	0.957	0.842	0.894

four in the central area, and two in the western region. This shows that the higher education funding allocation of the above provinces has reached a high level, and GFHE funds have been well utilized.

According to the statistics of the average value level of GFHE performance (comprehensive efficiency) of each province from 2008 to 2020 (see Table 1), the GFHE performance of each province is divided into three types: class I area "low efficiency" (performance value < 0.85), class II area "medium efficiency" (0.95 > performance value ≥ 0.85), and class III area "high efficiency" (performance value ≥ 0.95). Among the 29 provinces, there are 9 "low efficiency" in class I areas, 11 "medium efficiency" in class II areas, and 9 "high efficiency" in class III areas (Table 2).

3.2.3. Dynamic analysis of GFHE performance in China

Using the DEAP 2.1 software, the study makes a dynamic analysis of the performance of GFHE on the Input-output Performance of higher education in 29 provinces and three areas in China, to calculate the changing trend of China's GFHE performance from the perspective of area and time. The relevant results are shown in Table 3. From a regional perspective, China's GFHE performance (comprehensive efficiency) level is the highest in central China, followed by eastern China, which is not much different from the national average level, and the lowest in western China. From the perspective of time, from 2008 to 2020, the overall level of China's GFHE performance was in the range of more than 0.85, which shows that China's higher education funding has high utilization efficiency and substantial input-output solid benefits. There are significant differences in the scale of GFHE in eastern, central, and western China, with the highest in the east, the second in the mid, and the least in the west of China. Therefore, it further reflects the imbalance of GFHE performance in the three areas.

The study further decomposes the comprehensive efficiency of China's GFHE performance into pure technical efficiency and scale efficiency (Figure 2). Complete efficiency has been fluctuating and rising from 2008 to 2020. The complete efficiency increased sharply after falling to the lowest point of 0.845 in 2011, reaching the maximum point in 2015, and finally reaching the peak of 0.964 in 2019.

http://dx.doi.org/10.21511/imfi.19(1).2022.08

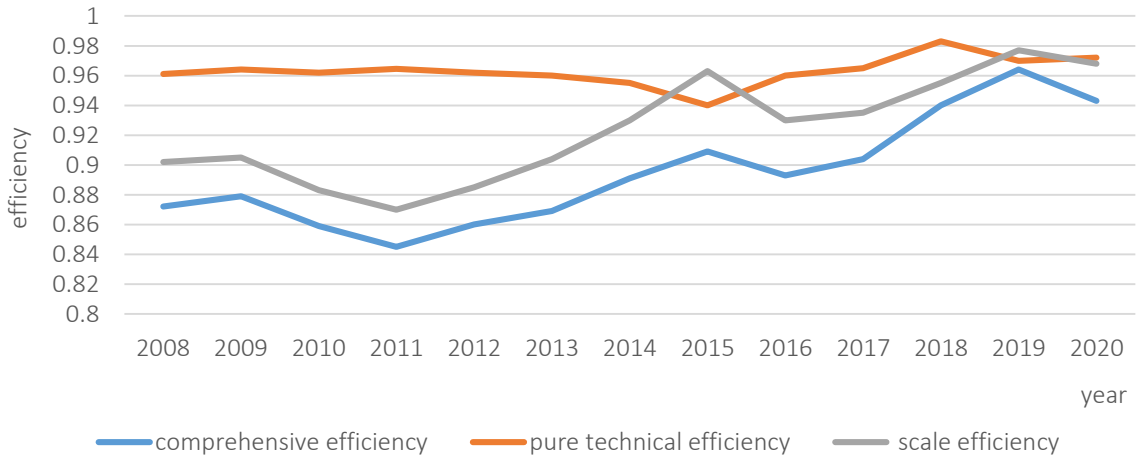

Figure 2. Change trend of government funding efficiency (funding efficiency refers to DMU efficiency, which is between 0-1) in higher education in China

3.2.4. Static analysis of GFHE performance in China

This paper selects the relevant indicators of 29 provinces in China in 2020 as the research sample, further decomposes their GFHE comprehensive efficiency into pure technical efficiency (PTE) and scale efficiency (SE) through the DEA model, and analyzes the return to scale. In 2020, the average PET value of GFHE in China's provinces was 0.973, namely, non-technical and compelling, which means that GFHE has the problems of insufficient management level, inefficient use, and low input-output conversion rate. There are 19 provinces with the PTE value of 1, which are distributed in eastern, central and western areas. For comparison, there are 16 provinces with an SE value of 1, which are mainly concentrated in eastern and central areas.

3.3. Analysis of factors influencing GFHE performance in China

3.3.1. Empirical model setting and variable description

It can be seen from the above that there are many differences in GFHE regional performance. According to the impact of different economic and social factors on regional GFHE performance and combined with the existing literature, this paper uses the panel Tobit regression model for empirical analysis. Based on the panel data of 29 provinces in China from 2008 to 2020, this study conducts a quantitative analysis. The specific indicators selected as explanatory variables and their meanings are as follows. First, per capita GDP (*lnrgdp*) reflects the degree of regional development. Second, the proportion of employees with a college education or above (PEC), which shows the level of the local labor force. Third, the degree of urbanization (UL), which reflects the degree of regional economic development. Fourth, the student-teacher ratio (TSD) of higher education institutions reflects the level of Regional Teacher Allocation. Fifth, the proportion of government financial expenditure in regional GDP (FE), which represents government financial resources. China's public higher education institutions mainly rely on government financial funding, so government financial resources have a specific impact on GFHE. Sixth, the proportion of tertiary industry output value in GDP (*ind*) of each province reflects the regional industrial development level.

3.3.2. Analysis of empirical results

Based on the panel Tobit regression model, the influence factors of GFHE performance in the country and the three areas are shown in Table 4.

The following is a one-by-one analysis of factors influencing GFHE performance in different areas.

The whole country. Among the influencing factors of national GFHE regional performance, per capita GDP (coefficient = 0.1807, $P < 0.01$), the proportion of employees with college education

Table 4. The influence factors of GFHE performance in the whole country and the eastern, central, and western areas

Model	I (whole Country)		II (eastern China)		III (central China)		IV (western China)	
Variable	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
lnrgdp	0.1807***	0.0898	0.4942*	0.3293	−0.3399	0.3165	−0.0024	0.0059
pec	1.3711***	1.0715	−1.0971	1.0506	1.1182	1.5614	−0.1185**	1.2546
ul	0.6913***	0.5911	0.4721**	0.3001	0.2551**	0.3202	0.0074	1.4318
tsd	−0.04661**	0.0255	−0.0738*	0.0443	−0.3346*	0.4158	0.7261	0.5859
fe	−0.84091**	0.2780	0.0229	2.7481	2.5678	1.7431	−0.3017*	0.1634
ind	−0.5652	0.5664	0.0988	0,277	−0.3762***	0.1383	−0.1590*	0.0931

Note: *** $P < 0.01$, ** $P < 0.05$, and * $P < 0.1$.

or above (coefficient = 1.3711, $P < 0.01$) and the degree of urbanization (coefficient = 0.6913, $P < 0.01$) are the favorable factors. The ratio of students to teachers in higher education institutions (coefficient = –0.04661, $P < 0.05$) and the proportion of government expenditure in regional GDP (coefficient = –0.84091, $P < 0.05$) were the adverse factors. The proportion of tertiary industry output value in GDP in each province has no significant impact on it.

Eastern China. In eastern China, per capita GDP (coefficient = 0.4942, $P < 0.1$) and the degree of urbanization (coefficient = 0.4721, $P < 0.05$) are the favorable factors affecting the performance of GFHE, while the student-teacher ratio of higher education institutions (coefficient = –0.0738, $P < 0.1$) is the unfavorable factor. The proportion of tertiary industry output value in GDP in each province has no significant impact on it.

Central China. In central China, the degree of urbanization (coefficient = 0.2551, $P < 0.05$) is the favorable factor affecting the performance of GFHE, while the ratio of students to teachers in higher education institutions (coefficient = –0.3346, $P < 0.1$) and the proportion of tertiary industry output value in GDP of each province (coefficient = –0.3762, $P < 0.01$) are the unfavorable factors. The ratio of employees with a college education or above and the proportion of government expenditure in regional GDP have no significant impact.

Western China. In western China, the proportion of employed persons with a college education or above (coefficient = –0.1185, $P < 0.05$), the balance of government expenditure in regional GDP (coefficient = -0.3017, $P < 0.1$), and the ratio of tertiary industry output value in GDP of each province (coefficient = –0.1590, $P < 0.1$) are unfavorable factors, and the per capita GDP, the degree of urbanization and the ratio of students to teachers in higher education institutions have no significant impact on it.

4. DISCUSSION

This study creatively analyzes the relationship between the scale of GFHE and the level of funding performance in China for the first time. This is consistent with the theoretical hypothesis *H1*. Therefore, the theoretical hypothesis *H1* is accepted. The analysis results show that the comprehensive efficiency has fluctuated and rose from 2008 to 2020. The total efficiency rose sharply after falling to the lowest point of 0.845 in 2011, reached the maximum point in 2015, and finally reached the peak of 0.964 in 2019, indicating that the comprehensive efficiency of China's GFHE performance is in the trend of overall fluctuation and rising, but presents the characteristics of "W-shaped" fluctuation and rising. This reflects that in the development process of China's GFHE system, with the continuous increase of funding, the corresponding management system is also constantly improved to keep up with the rise in funding, which promotes the improvement in the funding performance level to a certain extent. However, this performance level improvement is unstable. These results suggest that with the continuous expansion of the scale of GFHE, the government and colleges and universities should strengthen cooperation and actively improve the use efficiency and management level of funds, to reduce the ""W-shaped" fluctuation and improve the comprehensive efficiency of GFHE performance.

http://dx.doi.org/10.21511/imfi.19(1).2022.08

There are significant differences in GFHE performance among the three areas in China, which is consistent with the theoretical hypothesis *H2*. Therefore, the theoretical hypothesis *H2* is accepted. The performance level of government funding in the eastern area is in a stable upward stage from 2011 to 2019, the same as that of China in 2020. The funding performance level of the central area has always maintained the highest state from 2008 to 2019, and reached the highest point of comprehensive efficiency of 1.000 in 2019. As for the western area, the performance of government funding has always fluctuated at a low-efficiency level in all statistical years. The lowest point of 0.779 comprehensive efficiencies in the western area appeared in 2012 and the highest point of 0.918 appeared in 2019. There is a particular gap between the west and the national level, and the gap between the western and the eastern area is the largest. The results of this study are similar to those of Wang et al. (2013). The latter study shows that the differences in the allocation of educational resources among provinces in China are expanding, and the level of funding performance is also different. Moreover, the study also takes typical provinces in central, eastern, and western China as examples for empirical analysis. But it analyzes only distinct provinces, lacks a comprehensive study, and is not representative. This study makes up for the defects in this regard and makes a macro analysis from a regional perspective, and the results are more objective.

The results of this study also show an imbalance in the development of GFHE performance among different provinces in the same area of China, which is consistent with the theoretical hypothesis *H3*. Therefore, the theoretical hypothesis *H3* is accepted. Further analysis also shows that only 30% of the provinces have achieved efficient development in GFHE resource allocation and utilization. The rest of the provinces are still in the stage of low-efficiency operation. This is consistent with the research results of Wu Jiameng (2016) and Qin Zhifei (2014). But these two studies only analyze the uneven performance of GFHE in different provinces in an area as a whole. They do not divide and analyze other provinces according to the performance level. This paper makes a detailed analysis of this aspect. From a regional perspective, China's GFHE performance presents the basic characteristics of the first in the central area, the second in the eastern area, and the third in the western area. There are significant differences in the scale of GFHE funds in China, first in the east, second in the central, and third in the area of west. The results of regional scale and performance are inconsistent. Class III "high efficiency" is mainly concentrated in eastern and central China. Shanghai, Jiangsu, and Shandong are typical eastern educationally powerful and economically strong provinces, and their GFHE performance level is consistent with their strength. The high efficiency of GFHE performance in Jiangxi, Henan, Hunan, and Hubei provinces has a great relationship with implementing the central rise strategy. The guidance of national policies and the grasp of opportunities urge them to pay more attention to the funding in higher education and commit themselves to the efficient development of higher education quality, to cultivate more excellent talents to meet the needs of the rapid growth of the regional social economy. With the "Belt and Road" policy, Shanxi and Chongqing have gained considerable growth in higher education, and the quality level has been rapidly improved. Class II "medium efficiency" provinces and three areas have both. It is noteworthy that Beijing, as the center of China's politics, economy and culture, also belongs to class II "medium efficiency," which indicates that Beijing is insufficient in the allocation and utilization of GFHE resources, showing problems such as excessive input of resources and low input-output efficiency. Moreover, as economically strong provinces, Zhejiang Province and Guangdong Province also offer a low level of GFHE performance. The reason for its poor efficiency is that the expansion speed of the GFHE fund scale does not keep a good fit with the improvement of quality. Class I "low efficiency" is mainly concentrated in the western area. The main reasons for its low efficiency are an underdeveloped economy, common scale of GFHE, and imperfect development of the higher education system.

The average PTE value of GFHE in China's provinces is 0.973, which is non-technical and compelling, indicating that GFHE has the problems of insufficient management level, inefficient use, and low input-output conversion rate. The average SE value of GFHE is 0.969, which is non-scale effective and lower than PTE, indicating that GFHE has a series of problems such as too serious or too low input or

output, unreasonable funding allocation, etc. There are 19 provinces with a PTE value of 1, distributed in the eastern, central, and western areas. For comparison, there are 16 provinces with an SE value of 1, which are mainly concentrated in the central and east areas. The value of PTE is 1, which indicates that the province can make full use of GFHE funds. In contrast, the provinces with suboptimal PTE need to improve PTE by improving GFHE management level, promoting resource allocation, and effective utilization, and improving input-output transformation mechanism. The value of SE is 1, which indicates that the GFHE of this province has reached the optimal scale. At the same time, the provinces whose SE has not reached the optimal scale have the problems of mismatch and too much or too little funding in the configuration and development needs of GFHE.

Theoretical hypothesis *H4* suggests that China's GFHE performance may be affected by total population size, engel coefficient, per capita GDP, urbanization process, and the proportion of tertiary industry output value. However, this study shows that the performance of GFHE in the eastern area is mainly affected by the degree of regional development, the degree of urbanization, and the level of teacher allocation. The performance of GFHE in central China is mainly affected by the degree of urbanization, the level of teacher allocation and the level of regional industrial development. The performance of GFHE in the western area is mainly affected by the labor level, government financial resources, and regional industrial development level. The above results are not wholly consistent with the theoretical hypothesis *H4*. Therefore, the theoretical hypothesis *H4* is rejected. Due to the most developed economy and paying enough attention to the development of the higher education industry, the eastern area has rich educational resources and a high standard of teachers. However, the proportion of teachers to students is too high, resulting in surplus teacher resources, which affects the social benefits of GFHE. In the central area, the teacher allocation level and regional industrial development level in the central area hurt GFHE performance. The degree of urbanization and the scale of higher education will have a positive impact on the performance of GFHE. The performance of GFHE in the western area is mainly affected by the labor level, government financial resources, and regional industrial development level. The story of economic development in the area of west is relatively low. The industrial development mainly exists in the primary industry and the secondary sector. The growth of the tertiary sector lags obviously, which cannot effectively drive the local employment level, and the number of people with higher education is seriously lost. Mao (2009), Wang Jianhong and Liu Yirong (2015), Zhang and Wang (2014), Zhang Shuhui and He Juanjuan (2015) all explored the factors influencing higher education development and university scale and did not examined the factors influencing GFHE performance. This paper not only analyzes the factors that influence GFHE performance in different areas, but also further distinguishes between positive and negative elements.

CONCLUSION

This paper aims to analyze regional differences in the scale and performance of GFHE in China, as well as the factors affecting the performance level of GFHE in eastern, central, and western China. Based on the data on China's GFHE from 2008 to 2020, this paper finds that the comprehensive efficiency of China's GFHE performance shows an overall fluctuating upward trend with the scale growth of GFHE, but shows the characteristics of "W-shaped" fluctuating upward. The reason why this happens is that with the continuous expansion of the scale of funding, the corresponding management system of the government and colleges and universities is passively improved, which in a disguised form contributed to the improvement of performance level, but this improvement is unstable. Therefore, the government and universities should strengthen cooperation and actively improve the use efficiency and management level of funds, to reduce the "W-shaped" fluctuation.

The study also found that in addition to the uneven distribution of the GFHE scale and differences in performance level, there is also a situation where the GFHE scale level is not wholly consistent with

http://dx.doi.org/10.21511/imfi.19(1).2022.08

performance in the three areas of eastern, central, and western China. The ranking of funding size is eastern, central, and western areas. The order of performance level is central, eastern, and western areas. This situation occurs because GFHE has the problems with insufficient management level, inefficient use, and low input-output conversion rate. Based on this situation, it is necessary to further analyze the factors affecting the performance level of the three areas.

The empirical analysis is carried out using the panel Tobit regression model. The results show that the performance of GFHE in eastern China is mainly affected by the degree of regional development (positive), the degree of urbanization (positive), and the level of teacher allocation (negative). The performance of GFHE in central China is mainly affected by the degree of urbanization (positive), the level of teacher allocation (negative), and the level of regional industrial development (negative). The performance of GFHE in the western area is mainly affected by the level of the labor force (negative), government financial resources (negative), and regional industrial development level (negative). Therefore, appropriate countermeasures should be formulated in different areas according to other influencing factors and local conditions to promote the coordinated development of regional GFHE.

AUTHOR CONTRIBUTIONS

Conceptualization: Yanjun Fu, Mykhaylo Heyenko.
Data curation: Yanjun Fu, Mykhaylo Heyenko.
Formal analysis: Yanjun Fu, Mykhaylo Heyenko.
Investigation: Yanjun Fu.
Methodology: Yanjun Fu.
Project administration: Mykhaylo Heyenko.
Resources: Yanjun Fu.
Supervision: Mykhaylo Heyenko.
Validation: Yanjun Fu.
Writing – Yanjun Fu.
Writing – review & editing: Yanjun Fu.

REFERENCES

1. Acemoglu, D., & Johnson, S. (2007). Disease and Development: The Effect of Life Expectancy on Economic Growth. *Journal of Political Economy, 6,* 925-985. https://www.journals.uchicago.edu/doi/abs/10.1086/529000
2. Ajaga, E., & Nunnenkamp, P. (2008). *Inward FDI, value added and employment in US states: A panel cointegration approach* (No. 1420, Kiel Working Papers). Kiel Institute for the World Economy (IfW Kiel). https://EconPapers.repec.org/RePEc:zbw:ifwkwp:1420
3. Amiraslani, H., Iatridis, G. E., & Pope, P. (2013). *Accounting for asset impairment: a test for IFRS compliance across Europe.* Centre for Financial Analysis & Reporting Research. https://xueshu.baidu.com/usercenter/paper/show?paperid=ab8b6b85b5d6c687671c0aec499a0c46&site=xueshu_se
4. Biyase, M., & Kirsten, F. (2020). Education and Economic Growth in Cape and Natal Colonies Learning from History. *The Journal of Developing Areas, 01.* https://doi.org/10.1353/jda.2020.0007
5. Black, S. E., Devereux, P. J., & Salvanes, K. G. (2005). The More the Merrier? The Effect of Family Size and Birth Order on Children's Education. *The Quarterly Journal of Economics, 120*(2). https://doi.org/10.1093/qje/120.2.669
6. Cave, M., Kogan, M., & Hanney, S. (2009). Performance measurement in higher education. *Public Money and Management, 1989,* 11-16. https://doi.org/10.1080/09540968909387519
7. Cervellati, M., & Sunde, U. (2015). The effect of Life Expectancy on Education and Population Dynamics. *Empirical Economics, 4,* 1445-1478. http://dx.doi.org/10.1007/s00181-014-0830-x
8. Chen, H. J. (2010). Life expectancy, Fertility, and Educational Investment. *Journal of Population Economics, 1,* 37-56. http://dx.doi.org/10.1007/s00148-008-0202-y
9. Chen, S. (2020). Parental Investment after the Birth of a Sibling: The Effect of Family Size in Low-Fertility China. *Demography, 7.* https://doi.org/10.1007/s13524-020-00931-2

10. Chi, W., & Xiaoye, Qian. (2016). Human Capital Investment in Children: An Empirical Study of Household Child Education Expenditure in China, 2007 and 2011. *China Economic Review.* https://doi.org/10.1016/j.chieco.2015.11.008

11. Chu, C. Y. C., Yu Xie, & Ruoh-Rong Yu. (2007). Effects of Sibship Structure Revisited: Evidence from Intrafamily Resource Transfer in Taiwan. *Sociology of Education, 80*(2). https://doi.org/10.1177%2F003804070708000201

12. Di Prete, T. A., & Buchmann, C. (2013). *The Rise of Women: The Growing Gender Gap in Education and What it Means for American Schools*. New York: Russell Sage Foundation.

13. Dimitris, K., Dimitris, B., & Mark, B. (2013). Using Spatial Microsimulation to Model Social and Spatial Inequalities in Educational Attainment. *Applied Spatial Analysis and Policy, 1,* 7. http://dx.doi.org/10.1007/s12061-012-9075-2

14. Du, P., & Gu, X. (2016). Education expenditure per student in China's higher education: Low Level, Slow Growth and Imbalance. *China Higher Education Research, 5,* 46. https://wenku.baidu.com/view/9396efb658cfa1c7aa00b52acfc789eb162d9ef3?fr=xueshu_top

15. Du, X. Y., & Tian, J. (2007). Research status of performance evaluation of public education expenditure. *Financial Research, 10,* 37-39.

16. Ehrlich, I., & Lui, F. T. (1991). Intergenerational Trade, Longevity, and Economic Growth. *Journal of Political Economy, 1991*(5), 1029-1059. http://dx.doi.org/10.1086/261788

17. Elhorst, J. P. (2003). Specification and Estimation of Spatial Panel Data Models. *International Regional Science Review, 2003*(03). http://dx.doi.org/10.1177/0160017603253791

18. Feng, H., & Wang, Q. (2012). Research on Performance Management System of Higher Education. *China Higher Education, 7,* 18.

19. Ferreira, P. C., & Pessoa, S. (2007). The Effects of Longevity and Distortion and Retirement. *Review of Economic Dynamics, 3,* 472-365. https://doi.org/10.1016/j.red.2007.01.003

20. Fu, J. W. (2019). Discussion on the application of balanced Scorecard in performance management of colleges and universities – taking A Institute of Technology as an example. *Accountant's Friend, 8,* 191-195. https://doi.org/10.3969/j.issn.1004-5937.2019.08.026

21. Gao, Y., Zhang, L., & Gu, J. X. (2013). A two-level factor analysis and comprehensive evaluation of the coordination degree of graduate education competitiveness and economic competitiveness in China: On the possible path to promote the layout optimization of regional graduate education. *Fudan Education Forum, 11*(003), 20-29. https://doi.org/10.3969/j.issn.1672-0059.2013.03.005

22. Ge, Y. L. (2018). Investment business Accounting of public institutions under the government accounting system. *Economist, 12,* 107-108. https://doi.org/10.3969/j.issn.1004-4914.2018.12.048

23. Gerald, G. (1995). The Promises and Pitfalls of Performance Indicators in Higher Education. *Accountability, 1995,* 21-27.

24. Greenhalgh, S. (1985). Sexual Stratification: The Other Side of 'Growth with Equity' in East Asia. *Population and Development Review, 11*(2). http://dx.doi.org/10.2307/1973489

25. Guo, H. L., & Su, J. (2014). Performance evaluation of higher education financial investment based on DEA: a case study of ordinary undergraduate universities in Zhejiang Province in 2013. *Research on Educational Development. 17,* 8,43-50. https://doi.org/10.14121/j.cnki.1008-3855.2014.17.026

26. Guo, L. Q. (2018). *Did "985 Project "promote the development of local economy? – Analysis based on dual difference and synthetic control method.* https://kns.cnki.net/kcms/detail/detail.aspx?FileName=JYJI201905009&DbName=CJFQ2019

27. Guthrie, J. (2007). The establishment of a performance-driven system for Australian higher education. *Public Management Review, 2007,* 231-252. https://doi.org/10.1080/14719030701340390

28. Hannum, E. (2005). Market Transition, Educational Disparities, and Family Strategies in ural China: New Evidence on Gender Stratification and Development. *Demography, 42.* http://dx.doi.org/10.1353/dem.2005.0014

29. Hazan, M, & Zoabi, H. (2006). Does Longevity Cause Growth? A Theoretical Critique. *Journal of Economic Growth, 2006*(4), 363-376. http://dx.doi.org/10.1007/s10887-006-9008-5

30. Hoque, M. M., King, E. M., Montenegro, C. E., & Orazemet, P. F. (2019). Revisiting the Relationship between Longevity and Lifetime Education: Global Evidence from 919 Surveys. *Journal of Population Economics, 2,* 551-589. https://doi.org/10.1007/s00148-018-0717-9

31. Hout, M., & DiPrete, T. A. (2006). What We have Learned: RC28's Contributions to Knowledge about Social Stratification. *Research in Social Stratification and Mobility, 24*(1). http://dx.doi.org/10.1016/j.rssm.2005.10.001

32. Huang, J. Y., & Wang, J. M. (2015). Research on the Performance Evaluation mechanism of Higher Education Investment. *Jiangsu Higher Education, 6,* 62. https://doi.org/10.13236/j.cnki.jshe.2015.06.018

33. Jacobs, J. A. (1996). Gender Inequality and Higher Education. *Annual Review of Sociology, 22.* http://dx.doi.org/10.1146/annurev.soc.22.1.153

34. Jia, S. T., Wu, W. Q., & Lang, Y. J. (2009). Analysis on performance evaluation methods of colleges and universities jointly built by provinces and ministries. *Journal of Shanxi University (Philosophy and Social Sciences edition), 4,* 124-126. https://doi.org/10.3969/j.issn.1000-5935.2009.04.024

http://dx.doi.org/10.21511/imfi.19(1).2022.08

35. Jones, T. M., Donaldson, T., Freeman, R. E., Harrison, J. S., Leana, C. R., Mahoney, J. T., & Pearce, J. L. (2016). Management theory and social welfare: contributions and challenges. *The academy of management review, 41*(2), 216-228. https://doi.org/10.5465/amr.2016.0012

36. Kavroudakis, D., Ballas, D., & Birkin, M. (2013). Using Spatial Microsimulation to Model Social and Spatial Inequalities in Educational Attainment. *Applied Spatial Analysis and Policy, 6,* 1-23. https://doi.org/10.1007/s12061-012-9075-2

37. Korhonen, P., Risto, T., & Jyrki, W. (2001). Value efficiency analysis of academic research. *European Journal of Operational Research, 2001*(1), 121-132. http://dx.doi.org/10.1016/S0377-2217(00)00050-3

38. Laura, L., & Ponthiere, G. (2015). Education, Life Expectancy and Family Bargaining: the Ben-Porath Effect Revisited. *Education Economics, 4,* 481-513. https://doi.org/10.1080/09645292.2013.869557

39. Lavely, W., Xiao Zhenyu, Li Bohua, & Ronald Freedman. (1990). The Rise in Female Education in China: National and Regional Patterns. *The China Quarterly, 121.* http://dx.doi.org/10.1017/S0305741000013515

40. Lesage, J., & Pace, R. K. (2008). *An Introduction to Spatial Econometrics. Revue Déconomie Industrielle, 123.*

41. Li, P., Li, Y. P., & Zhang, H. P. (2012). Research on investment efficiency of higher education in Different regions of China: Based on dynamic Paneldata model. *Journal of Xi 'an University of Finance and Economics, 25*(2), 115-118. https://doi.org/10.19331/j.cnki.jxufe.2012.02.024

42. Li, Y. (2016). Academic support for government budget performance evaluation – a review of recent research literature. *Local Finance Research, 5,* 94-99.

43. Liu, G. B., Fang, H. M., Gong, X. X., & Wang, F. F. (2021). Inclusive finance, industrial structure upgrading and farmers' income: Empirical analysis based on provincial panel data in China. *PLoS ONE, 16*(10), e0258860. https://doi.org/10.1371/journal.pone.0258860

44. Liu, X. Y. (2014). Design and Application of Performance Evaluation Index of University Laboratory Special Fund. *Educational Accounting Research, 25*(2), 20-23. https://doi.org/10.3969/j.issn.1005-5827.2014.02.004

45. Liu, Y., Q. Jiang, & F. Chen. (2020). Children's Gender and Parental Educational Strategies in Rural and Urban China: The Moderating Roles of Sibship Size and Family Resources. *Chinese Sociological Review, 52*(3). https://doi.org/10.1080/21620555.2020.1717942

46. Lu, C., Zhou, X. M., & Zhou, W. T. (2013). Reform and impact of scientific research performance funding in Australian universities. *Foreign Education Research, 7,* 122-128.

47. Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A Contribution to the Empirics of Economic Growth. *The Quarterly Journal of Economics, 1992*(02). http://dx.doi.org/10.2307/2118477

48. Mao, J. Q. (2009). The Main Factors influencing the Scale of higher education and its Co-integration Relationship: An Analysis based on Time Series Data. *Journal of Beijing Normal University: Social Sciences, 2,* 114. https://doi.org/10.3969/j.issn.1002-0209.2009.02.017

49. Mao, Y. E. (2007). Construction of Performance Evaluation Index System for Local Government General Budget. *Essays on Finance and Economics, 5,* 31-36. https://doi.org/10.3969/j.issn.1004-4892.2007.05.006

50. Marquez-Ramos, L., & Mourelle, E. (2019). Education and Economic Growth: An Empirical Analysis of Nonlinearities. *Applied Economic Analysis, 2019*(79). https://doi.org/10.1108/AEA-06-2019-0005

51. Metcalfe, A. S. (2009). The geography of access and excellence: spatial diversity in higher education system design. *Higher Education, 2,* 215. https://doi.org/10.1007/s10734-008-9191-8

52. Nordblom, K. (2003). Is Increased Public Schooling Really a Policy for Equality? The Role of Within-the-Family Education. *Journal of Public Economics, 87*(9-10). https://doi.org/10.1016/S0047-2727(02)00043-9

53. Pedro, N. T., & Jung, C. S. (2020). *The International Encyclopedia of Higher Education Systems and Institutions.* Dordrecht: Springer. https://doi.org/10.1007/978-94-017-8905-9

54. Powell, B., & Steelman, L. C. (1993). The Educational Benefits of Being Spaced Out: Sibship Density and Educational Progress. *American Sociological Review, 58*(3). https://doi.org/10.2307/2095906

55. Qi, Y. G. (2019). On Educational Performance and Educational Performance Management. *Teacher Education Research, 5,* 1.

56. Qian, J. X., & Smyth, R. (2011). Educational Expenditure in Urban China: Income effects, Family Characteristics and the Demand for Domestic and Overseas Education. *Applied Economics, 43*(24). https://doi.org/10.1080/00036841003636292

57. Qin, Z. F., & Zhang, X. Y. (2014). Construction and improvement of financial investment mechanism for higher education in Hebei Province. *Journal of Shijiazhuang Tiedao University: Social Sciences, 8*(2), 11-14. https://doi.org/10.13319/j.cnki.sjztd-dxxb.2014.02.03

58. Rocha, L. C., & Stallivieri, L. (2017). Communication and internationalization of higher education: a literature review. *Revista Internacional de Educação Superior, 7,* e021033. https://doi.org/10.20396/riesup.v7i0.8660540

59. Schultz, T. P. (1993). Investments in the Schooling and Health of Women and Men: Quantities

and Returns. *Journal of Human Resources, 28*(4). https://doi.org/10.2307/146291

60. Steelman, L. C., Powell, B., Werum, R., & Carter, S. (2002). Reconsidering the Effects of Sibling Configuration: Recent Advances and Challenges. *Annual Review of Sociology, 28.* http://dx.doi.org/10.1146/annurev.soc.28.111301.093304

61. Tian, J. R., & Yuan, X. L. (2012). Exploration of university budget Performance Management system from multi-dimensional perspective. *Accounting Newsletter, 7,* 95-97.

62. Tomchuk, O., Tserklevych, V., Hurman, O., Petrenko, V., & Chymosh, K. (2021). The efficiency of higher education institutions: evaluation and management of managers. *Studies of Applied Economics, 38*(4). http://dx.doi.org/10.25115/eea.v38i4.4046

63. Wang, J. H., & Liu, Y. R. (2015). Regression analysis of national medium and long-term higher education scale development. *Jiangsu Higher Education, 4,* 42-45. https://doi.org/10.13236/j.cnki.jshe.2015.04.012

64. Wang, M. S., et al. (2013). Comparative Analysis of Educational Development level in Different Provinces of China. *Education Research, 6,* 29-41.

65. Wang, T. Y. (2000). Strengthening the financial budget management of higher education. *Financial Research, 5,* 52-53.

66. Wu, J. M. (2016). Performance evaluation of public education expenditure in Henan Province. *Journal of Henan College of Finance and Taxation, 30*(1), 14-17.

67. Wu, Z. S., Chang, Y. Z., & Liao, W. J. (2016). The Application of Balanced Scorecard and performance Indicators in public universities. *Research on the New Curriculum (mid-day), 420*(11), 8-10.

68. Xia, D., & Du, G. L. (2017). Research on Optimization of the Performance Evaluation System of Fiscal Expenditure in Colleges and Universities. *DEStech Transactions on Social Science, Education and Human Science.* https://doi.org/10.12783/dtssehs/icesd2017/11754

69. Xie, Y., & Zhu, H. (2009). Do Sons or Daughters Give More Money to Parents in Urban China? *Journal of Marriage and Family, 71*(1). https://doi.org/10.1111/j.1741-3737.2008.00588.x

70. Yang, M., & Yang, Y. (2016). Research on performance evaluation of special funds in Colleges and Universities Based on BSC and KPI theory. *Friends of Accounting, 12,* 98-102. https://doi.org/10.3969/j.issn.1004-5937.2016.12.022

71. Ye, J. (2015). Development Trend and Factor Decomposition: Equity in inter-provincial higher education expenditure in China – An analysis based on Gini coefficient and its Structural decomposition and variable decomposition Techniques. *China Higher Education Research, 10,* 54-61. https://doi.org/10.16298/j.cnki.1004-3667.2015.10.07

72. Yuan, C. K., & Lee, C. Y. (2011). Exploration of a construct model linking leadership types, organization culture, employees performance and leadership performance. *Procedia – Social and Behavioral Sciences, 25*(25), 123-136. https://doi.org/10.1016/j.sbspro.2011.10.534

73. Zhang, A. H. (2018). Research on performance evaluation of Private Colleges under the balanced scorecard. *Friends of Accounting, 22,* 140-145.

74. Zhang, Q. Q. (2016). *Research on performance evaluation of special financial expenditure for Discipline Construction in local universities in China.* Beijing: Central University of Finance and Economics. https://xueshu.baidu.com/usercenter/paper/show?paperid=16568820a631fd21b9c27ded9d1a02e8&site=xueshu_se&hitarticle=1

75. Zhang, S. H., & He, J. J. (2015). Urbanization, higher education scale and regional differences: An empirical analysis based on provincial panel data. *Northwest Population, 36*(3), 23-27. https://doi.org/10.3969/j.issn.1007-0672.2015.03.005

76. Zhang, W. Y. (2012). Research on the path of higher education development to promote the coordinated development of regional economy – taking the development of higher education in western China as an example. *Journal of Northwestern University: Philosophy and Social Sciences, 42*(6), 101-106.

77. Zhang, Y. X., & Wang, S. L. (2014). Factor Decomposition Model and Factor Analysis of Higher Education Development. *Heilongjiang Higher Education Research, 3,* 31. https://doi.org/10.3969/j.issn.1003-2614.2014.03.010

78. Zhong, W. Y. (2014). Education investment and economic performance: based on the regional comparison of Beijing, Shanghai and Guangdong. *Education and the Economy, 2*, (9), 64-72. https://doi.org/10.3969/j.issn.1003-4870.2014.02.011

http://dx.doi.org/10.21511/imfi.19(1).2022.08