

Research on the Influence of Fiscal Expenditure on Economic Growth in Shandong Province

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Abstract—As an important way for the government to carry out macro-control, fiscal expenditure has an important influence on national economic development. This work first theoretically analyzed the impact of fiscal expenditure scale and expenditure structure on economic growth, then used relevant data of Shandong Province from 1994 to 2018 to verify that increasing the scale of fiscal expenditure can promote economic growth in Shandong Province, and social security, employment expenditure, and expenditure on science, education, culture and health play a significant role in stimulating economic growth. Finally, this work discussed the countermeasures and suggestions to improve fiscal expenditure in Shandong Province from levels of expenditure scale and expenditure structure.

Keywords—Shandong Province; fiscal expenditure; economic growth

I. INTRODUCTION

Fiscal policy is one of the main means for the government to carry out macroeconomic intervention. In recent years, China has implemented active fiscal policy in order to promote economic growth. As an important tool of fiscal policy, reasonable fiscal expenditure can stimulate national economic growth. In 1994, China implemented the reform of tax-sharing system, and the local government gradually became the main body to distribute the local financial expenditure, and the proportion of the local financial expenditure to the total financial expenditure in 2018 was as high as 85.19%. The fiscal expenditure of local governments plays an increasingly important role in promoting economic growth, and the GDP and fiscal expenditure of Shandong Province remain in the forefront of the provinces in China. Studying the influence of fiscal expenditure on economic growth in Shandong Province can provide theoretical basis for adjusting fiscal expenditure in Shandong Province, which is of great practical significance for promoting regional economic development and improving regional economic strength.

Domestic and foreign studies on the impact of fiscal expenditure on economic growth are mainly carried out from the scale of fiscal expenditure and the structure of fiscal expenditure. Dipeitro and Anoruo (2012) believe that the increase in fiscal expenditure has a negative impact on economic development [1]. Xiao Anna (2017) found that fiscal expenditure in Zhejiang Province had no or less effect on GDP growth [2]. Sun Li (2019) also believes that the overall scale of public expenditure on real economic growth is not significant,

while the spatial test shows that most public spending has more to do with the province's real economic growth [3]. The study of Fawwaz (2016) found that the scale of fiscal spending had a positive effect on economic growth [4]. Zou et al. (2018) believe that increasing fiscal spending will boost economic growth [5]. Song Liying and Zhang Weiliang (2018) studied the spatial spillover effect of the two, and obtained that the total amount of fiscal expenditure in each province could significantly promote its economic growth by constructing the spatial measurement model [6]. Li Qiang and Li Shushu (2017) believe that fiscal expenditure has an "inverted U" relationship with economic growth, and the proportion of local fiscal expenditure in GDP needs to be controlled within 25% [7]. Greiner (1996) believes that productive fiscal expenditure is positively correlated with economic growth, while non-productive fiscal expenditure is the opposite [8]. Wahab (2011) divided the fiscal expenditure into consumer expenditure and investment expenditure, and concluded that investment expenditure could significantly stimulate economic growth, while the impact of consumer expenditure was not obvious [9]. Based on the inter-provincial data of China, through using the system GMM estimation method, Wu et al. (2017) concluded that productive expenditure has double influence on economic fluctuation, government maintenance expenditure will aggravate economic fluctuation, and social service expenditure can effectively restrain economic fluctuation [10]. Through dynamic panel system GMM model research, Gao Xinyu and Wang Yejun (2018) obtained that non-productive fiscal expenditure can significantly promote economic growth by attracting and accumulating human capital [11]. Sun et al. (2016) took Hebei Province as an example to study that the increase of social security and employment expenditure, national defense expenditure and general public service expenditure will hinder economic growth, and the increase of agricultural and forestry water affairs expenditure, urban and rural community service expenditure and science, education, culture and health expenditure will promote economic growth [12]. The research of Wen Xin (2017) believed that the increase of economic construction expenditure and administrative expenditure will hinder economic growth, while the increase of social culture and education expenditure will positively promote economic growth [13].

Through the above literature analysis, it can be seen that domestic and foreign scholars have drawn three conclusions of the impact of the fiscal expenditure scale on economic growth,

which are promotion, obstruction and irrelevance. There are different ways to divide the structure of fiscal expenditure, and the research is consistent. In addition, existing studies have focused mainly on the national or regional level, while the specific ones to the provinces are relatively few. However, local government finance at all levels is an important part of national finance, and provincial finance occupies a dominant position in the local financial system. Therefore, this work focused on the impact of fiscal expenditure on economic growth in Shandong Province, and the specific research contents are as follows: the second part, analyzing theoretically the impact of fiscal expenditure scale and expenditure structure on economic growth; the third part, using the relevant data of Shandong Province from 1994 to 2018 to build a measurement model for empirical testing; the fourth part, discussing the countermeasures and suggestions for improving the fiscal expenditure of Shandong Province from two aspects of expenditure scale and expenditure structure.

II. THEORETICAL ANALYSIS AND HYPOTHESIS PRESENTATION

A. Impact of fiscal expenditure scale on economic growth

The scale of fiscal expenditure reflects the amount of government's domination of social resources and the intervention of economic life in a certain period of time. Usually the growth rate of gross domestic product (GDP) is used as the main measure of economic growth. From the perspective of expenditure, GDP equals to the sum of consumption, investment, government purchase and net export. The portion of government expenditure that is used to purchase final goods and services is directly accounted for GDP. Although the government transfer payment is not directly accounted for GDP, it affects consumption expenditure by affecting personal disposable income, which means that transfer payments affect GDP indirectly. Keynes believes that fiscal expenditure has a multiplier effect on national income. Taking the three-sector economy as an example, the increase in government purchase expenditure Δg would play a multiplier role to increase $k_g \Delta g$ in GDP ($k_g = \frac{1}{1-\beta}$); the increase in transfer payments Δt_r increases $k_r \Delta t_r$ ($k_r = \frac{\beta}{1-\beta}$) in GDP, of which β ($0 < \beta < 1$) is marginal consumption tendency. Therefore, increasing fiscal expenditure can promote economic growth.

Hypothesis 1: Increasing fiscal expenditure can promote economic growth.

B. Ways in which the structure of fiscal expenditure affects economic growth

In the study of fiscal expenditure and economic growth, not only the scale of fiscal expenditure plays an important role in economic development, but also the different structure of fiscal expenditure has different effects on economic development. It reflects the proportion of government expenditure to total fiscal expenditure, and the optimization and adjustment of fiscal structure plays an indispensable role in the steady development of economy. In the theory of economic growth, economists have found that material, human capital and technological progress are the main drivers of economic growth, which can

be directly or indirectly influenced by the way of fiscal expenditure.

Through increasing expenditure on economic construction, social security, and employment, the government can promote the formation of material capital, such as the construction of infrastructure with large investment and long return cycle, including roads, railways, water and electricity, and public goods with strong externalities, including lighting and sewage. The government has increased the disposable income of individuals by providing more jobs to the society through investment construction, and it can also make up for the shortage of free market, improving social welfare and stimulating economic growth.

Hypothesis 2: Increasing economic construction expenditure promotes economic growth, and increasing social security and employment expenditure promotes economic growth.

The government realizes the improvement of human capital and technological progress through investment in science, education, culture and health and social security. The expenditure on science, education and culture in financial expenditure can improve people's intelligence and culture and greatly improve the quality of workers, at the same time; the health of workers will also affect human capital. The government can provide security for workers' health through health expenditure and social security expenditure, and improve work efficiency to achieve economic growth. The government can promote scientific and technological innovation, increase scientific and technological support, reduce the cost of enterprises, and promote the breakthrough progress of scientific and technological development through increasing subsidies, incentives, research and development funds, so as to improve the productivity of the whole industry and promote economic development.

Hypothesis 3: Increasing expenditure on science, education, culture and health can promote economic growth, and administrative expenditure has little or no significant effect on economic growth.

III. MODELING CONSTRUCTION AND EMPIRICAL TEST

A. Impact of fiscal expenditure scale on economic growth

In this part, labor, capital and financial expenditure are considered. Based on Cobb-Douglas production function, the total output (GDP) of Shandong Province is analyzed, as shown in Eq. (1).

$$gdp = Ak^\alpha l^\beta f^\gamma e^\epsilon \quad (1)$$

The gdp is Shandong Province GDP (Unit: RMB 100 Million Yuan), the k is Shandong Province capital investment total (Unit: CNY 100 million), the l is Shandong Province labor investment total (Unit: CNY 100 million), the f is Shandong Province finance expenditure total (Unit: CNY 100 million).

By converting the two ends of the upper formula into a linear form, model 1 of the effect of fiscal expenditure scale on economic growth is obtained, as shown in Eq. (2):

$$\ln gdp = c + \alpha \ln k + \beta \ln l + \gamma \ln f + \epsilon \quad (2)$$

where c, α, β, γ is the parameter to be estimated and ε is the random error term. Specific variable definitions are shown in Table I

TABLE I. VARIANT DEFINITION

Variables	Variable symbol	Variable definition
Dependent variable	lngdp	Logarithm of Shandong GDP
Explanatory variables	lnf	Logarithm of total fiscal expenditure in Shandong Province
Control variables	lnk	Logarithm of total capital investment in Shandong Province
	lnl	Logarithm of total labor input in Shandong Province

The data in this work mainly comes from the National Bureau of Statistics and Shandong Statistical Yearbook. The sample contains the data from 1994 to 2018. The total amount of fixed investment in Shandong Province is used to express the amount of capital investment in Shandong Province, and the total number of employed people in Shandong Province is used to express the amount of labor input in Shandong Province.

OLS regression of model 1 is carried out to obtain the regression results of the impact of fiscal expenditure scale on economic growth in Shandong Province (see Table II).

TABLE II. IMPACT OF FISCAL EXPENDITURE SCALE ON ECONOMIC GROWTH IN SHANDONG PROVINCE

Explanatory variables	Dependent variable (lngdp)
	Model 1
lnf	0.428*** (6.26)
lnk	0.293*** (4.95)
lnl	0.457* (1.95)
cons	0.5 (0.03)
Adj R-squared	0.9984
Prob>F	0.0000

From the above regression results, it can be seen that the whole equation is significant, the logarithm of financial expenditure of the core explanatory variable and the logarithm of capital input of the control variable pass the significance test at the significance level of 1%, and the logarithm of labor input of the control variable pass the significance test at the significance level of 10%. The coefficient of the logarithm of fiscal expenditure shows that the scale of fiscal expenditure in Shandong Province has played a significant role in promoting economic growth since the reform of the tax-sharing system in 1994, and each percentage point increase in government spending will add 0.428 percentage points to economic growth.

B. Impact of fiscal expenditure structure on economic growth

In order to further study the impact of fiscal expenditure on economic growth in different functions of Shandong Province, better allocate government spending and optimize its structure, this part studies the influence of fiscal expenditure structure on economic growth in Shandong Province. 11 main items of

fiscal expenditure after the reform of fiscal expenditure classification in 2007 are selected, and they are divided into administrative expenditure (xz, Unit: CNY 100 million), social security and employment expenditure (sb, Unit: CNY 100 million), expenditure on science, education, culture and health (kj, Unit: CNY 100 million), and economic construction expenditure (js, Unit: CNY 100 million) based on their functions. Combined with the reform of fiscal expenditure classification in 2007, this part integrates the fiscal expenditure data from 1999 to 2006 into administrative expenditure accordingly (including administrative fees and the expenditure of public security organs, procuratorial organs and people's courts), social security and employment expenditure (including pension and social welfare relief, social security subsidy expenditure, and funds for the support of underdeveloped areas), science, education, culture and health expenditure (including health funds, sports and broadcasting services, education and services), and economic construction expenditure (including basic construction expenditure, science and technology three items of funds, innovation funds of enterprises, support for agricultural production, agricultural expenditure, operating expenses of agriculture, forestry, water and meteorological departments, operating expenses of industrial and communications departments, and city maintenance fees).

TABLE III. VARIABLE DEFINITION

Variables	Variable symbol	Variable definition
Dependent variable	lngdp	Logarithm of the gross domestic product of Shandong Province
Explanatory variables	lnxz	Logarithm of the total administrative expenditure of Shandong Province
	lnsb	Logarithm of the total social security and employment expenditure of Shandong Province
	lnkj	Logarithm of the total expenditure on science, education, culture and health of Shandong Province
	lnjs	Logarithm of the total economic construction expenditure of Shandong Province
Control variables	lnk	Logarithm of the total capital investment of Shandong Province
	lnl	Logarithm of the total labor input of Shandong Province

Based on the model 1, the fiscal expenditure f is further divided into four categories: administration, social security and employment, science, education, culture and health, and economic construction. Model 2 of the influence of fiscal expenditure structure on economic growth is established, as shown in Eq. (3).

$$\ln y = c + \alpha \ln k + \beta \ln l + \gamma_1 \ln xz + \gamma_2 \ln sb + \gamma_3 \ln kj + \gamma_4 \ln js + \varepsilon \quad (3)$$

Among them, $c, \alpha, \beta, \gamma_1, \gamma_2, \gamma_3, \gamma_4$ are the parameters to be estimated, and the ε is the random error term.

OLS regression is performed on model 2 to obtain the regression results of the influence of fiscal expenditure structure on economic growth in Shandong Province.

TABLE IV. IMPACT OF FISCAL EXPENDITURE STRUCTURE ON ECONOMIC GROWTH IN SHANDONG PROVINCE

Explanatory variables	Dependent variable (lngdp)
	Model 2
lnk	0.2932 ^{***} (5.82)
lnl	0.0682 (0.22)
lnxz	0.0999 (1.21)
lnsb	0.1448 [*] (2.52)
lnkj	0.1849 [*] (1.87)
lnjs	-0.0184 (-0.18)
cons	4.3054 (1.7)
Adj R-squared	0.9989
Prob>F	0.0000

From the above regression results, it can be seen that the equation as a whole is significant. The logarithm of social security and employment expenditure and the logarithm of science, education, culture and health expenditure pass the significance test at the significance level of 10%, and their positive coefficients indicate that they have a significant promoting effect on economic growth. For every percentage point increase in spending on social security and employment, the economy will grow by 0.1448 percentage points, and for every percentage point increase in spending on science, education, culture and health, the economy will grow by 0.1849 percentage points. The logarithm of administrative expenditure and the logarithm of economic construction expenditure do not pass the significance test, which shows that the effect of these two kinds of expenditure on economic growth is not obvious.

IV. CONCLUSIONS AND COUNTERMEASURES

A. Research conclusions

As one of the important means of local government macro-control, the total amount and structure of fiscal expenditure will have a great impact on the economic growth of a province. This work analyzed the impact of fiscal expenditure on economic growth in Shandong Province from two aspects of fiscal expenditure scale and expenditure structure, and carried on the empirical test based on the corresponding data from 1994 to 2018. The following conclusions are drawn: first, the increase of fiscal expenditure scale in Shandong Province has a significant role in promoting economic growth; second, the increase of social security and employment expenditure, science, education, culture and health expenditure has a significant effect on economic growth in Shandong Province, but the effect of administrative expenditure and economic construction expenditure on economic growth is not obvious.

B. Countermeasures

According to the above analysis and verification conclusions, this work put forward the following policy recommendations: first, it is necessary to moderately increase the scale of fiscal expenditure in Shandong Province. After the reform of the tax-sharing system in 1994, the local government has more initiative in fiscal expenditure, and the local fiscal

expenditure plays an increasingly important role in the local economy. During recent years, the total fiscal expenditure of Shandong Province has shown a rapid growth trend and the proportion of the total fiscal expenditure in the GDP is also increasing. The increase of fiscal expenditure in Shandong Province has played a positive role in economic growth. Therefore, the current fiscal policy of Shandong Province is reasonable and efficient, and it can continue to expand the scale of fiscal expenditure appropriately, at the same time, it should be allocated reasonably to maximize its role. Second, it is necessary to allocate the fiscal expenditure structure in Shandong Province reasonably, and pay attention to increasing social security and employment expenditure and expenditure on science, education, culture and health. The proportion of social security and employment expenditure in Shandong Province has been maintained at more than 10% and has an upward trend. Increasing social security and employment expenditure can effectively deal with the problems of population aging and employment difficulties of college students in Shandong Province in recent years, and promote economic growth. At present, the proportion of expenditure on science and technology, culture, sports and communication in Shandong Province is relatively small, the proportion of medical and health expenditure has increased from 4.41% in 2007 to 8.76% in 2018, the proportion of education expenditure is relatively stable, which is maintained at about 20%, and the difference between urban and rural educational resources and medical level is large. The financial expenditure of the provincial government should pay attention to rational distribution in different fields.

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