An empirical study on the influence of fiscal expenditure structure on the level of rural revitalization: Evidence from China

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Abstract

In rural revitalization, as an essential supporting force, the fiscal agriculture-related expenditure has attracted more and more attention from the whole society, especially the expenditure structure. There are many methods to evaluate the level of rural revitalization. This paper selects the target method to build a comprehensive evaluation system, selects the panel data of eastern, central and western China from 2016 to 2020, and uses the fixed-effect regression model to empirically analyze the influence of the structure of fiscal agriculture-related expenditure on the level of rural vitalization. The study found that the level of rural revival varied considerably among the middle and western regions, consistent with its economic status and financial input. Among them, the structure of fiscal expenditure related to agriculture had different contributions to rural revitalization and development. The significance of the empirical analysis is obvious, which is necessary to prompt the government to optimize the expenditure structure based on increasing the financial investment related to agriculture. At the national level, we need to deepen regional cooperation in the eastern, central, and western regions to achieve shared prosperity on a broader scale.

Key Words: Rural revitalization, Fiscal agriculture-related funds, Expenditure structure

1. Introduction

The economic base determines the superstructure, and any public utility cannot do without financial support, including rural revitalization. The "hand of the market" often fails in issues relating to agriculture, rural areas, and rural people, and the "visible hand" of the government must regulate and protect them appropriately. The state has permanently attached great importance to issues related to agriculture, rural areas, and rural people. After determining the rural revitalization strategy, it has continued to increase government expenditure related to agriculture. At present, from the perspective of rural revitalization, many scholars have discussed the structure of fiscal standpoint, and they have formed distinct views. From the perspective of the role of finance in rural revitalization, Liu (2019) believes that finance has a vital tool and policy orientation, which can play a role in taxation, subsidies, and public services, and effectively activate the power of rural social development in the new era. Zhang and Ouyang (2021) believe that the fiscal expenditure on agriculture is significantly different in terms of the total spending and the regional effect in different periods.

However, there are still many problems in the process of financial support to help rural revitalization. Jiang et al. (2020) believed that there was a general tendency to emphasize expenditure over management and government over the market in fiscal costs related to agriculture. At the same time, some supportive policies are out of line with the actual demand, the performance of fund utilization is not high, many agricultural support projects have not formed advantages and financial withdrawal difficulties. To better support the financial support of rural revitalization construction, the researchers also put forward some countermeasures and suggestions. Wang (2020) believes that monetary funds related to agriculture should be "guaranteed under pressure ", focusing on providing primary, public welfare and significant agricultural projects. Chen and Sun (2021) believe that the critical factors in fiscal policy formulation are sound budgetary operation, scientific control, and effective implementation of fiscal policy.

Even today, there are specific differences between urban and rural areas, which is not only unbalanced in regional development but also vividly manifested in the rural areas. This gives us the "blank" place to study, that is, learn the differences in rural revitalization based on different regions. This paper is to check the reasons for the differences in rural revival among other areas. Regarding the phenomenon, natural attributes such as location, climate, and resources are important factors affecting rural development. In addition, the other structures of fiscal expenditure have also led to uneven rural revitalization and development. Based on this, this paper thoroughly considered the differences in rural revitalization levels under different regional backgrounds, focused on the in-depth analysis of the impact of fiscal agriculture-related expenditure structure on rural revitalization, took the structure of financial expenditure as the explanatory variable, constructed a measurement index system, and comprehensively evaluated the level of rural revival. Among them, the empirical study on the structure of fiscal agriculture-related expenditure highlights and also innovation points, and it puts forward countermeasures and suggestions to better support rural revitalization.

2. Comprehensive Evaluation of Rural Revitalization

We have mainly built an index system for rural revitalization from five aspects: thriving businesses, pleasant living environments, social etiquette and civility, effective governance, and prosperity, and have set up 12 corresponding second-level indicators to measure the first-level indicators accurately. The data calculated by the secondary index system are obtained from *China Rural Statistical Yearbook* (2016-2020) and *China Statistical Yearbook* (2016-2020). Due to different index units, we nondimensionalized indexes, and then used the entropy weight method to calculate the weight of each index. The results are shown in Table 1.

Table 1. Rural Revitalization Index System (2016-2020)

Level 1 Index	Level 1 Index Weight	Level 2 Index	Calculating Methods	Level 2 Index Weight	Attribute
Thriving businesses	0.414	Grain yield per unit area (kg/ha)	Total grain output/Food crop planting area	0.063	Positive
		Unit area value of agricultural machinery power (kW/ha)	Total power of agricultural machinery/Total crop planting area	0.054	Positive
		Per capita electricity consumption of rural residents (KWH/person)	Rural electricity consumption/Rural population number	0.297	Positive
Pleasant living environments	0.052	Personnel of the unit population clinic (person/ten thousand persons)	Rural health clinic staff/Rural population number	0.034	Positive
		Strength of chemical fertilizers (kg/ha)	Fertilizer usage/Crop planting area	0.018	Negative
Social etiquette and civility	0.145	The ratio of education, culture, and entertainment consumption expenditure (%)	Spending on education, culture, and entertainment/Total consumption expenditure	0.015	Positive
		Number of township cultural stations per unit population (one/ten thousand persons)	Number of township cultural stations/Number of the rural population	0.130	Positive
Effective Governance	0.068	The growth rate of farming, forestry, animal husbandry, side-line production, and fishery (%)	The added value of arming, forestry, animal husbandry, side-line production, and fishery/Gross agricultural product	0.026	Positive
		Governance degree of urban-rural integration (%)	Per capita disposable income of rural residents/Rural disposable income of urban residents	0.042	Positive
Prosperity	0.312	Consumption expenditure of rural residents	Total rural consumption expenditure/Rural population number	0.211	Positive
		Engel coefficient of rural residents	Total food expenditure of rural residents/Total consumption expenditure of rural residents	0.038	Negative
		The proportion of rural residents receiving subsistence allowances	Minimum living allowance for rural residents/Rural population	0.063	Negative

According to the division of eastern and western parts of our region, the above entropy weight method is used to get the weight. The total score of rural revitalization in three western and central areas of China was calculated. The conclusion is as follows: there are specific differences in the level of rural revival in eastern, central, and western China, with the high level of rural regeneration in the east, little difference in central-western China, and rapid growth rate of rural revival in the west of the region. The results are similar to that of Zhang et al. (2022).

3. Empirical Analysis of Fiscal Agriculture-related Expenditure Structure on Rural Revitalization

The level of rural revitalization is very different in various regions in China. One main reason is the differences in natural resources. The economy in North China, the Yangtze River Delta, and the Pearl River Delta are relatively developed. With population gathering, economic growth, and the trans-regional flow of human capital and technology, the economy

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of the eastern region will get better and better. However, the western areas, such as Yunnan and Guizhou, have relatively slow economic development: since the economic development level of rural areas is very different. Therefore, the government needs to adopt financial means to intervene and support. The structure of the government's agriculture-related fiscal expenditure leads to the inflow of capital, which affects the rural development structure, and then affects the development level of rural revitalization. Therefore, this section mainly discusses the impact of fiscal agriculture-related expenditure structure on rural revival in a practical way. It provides some reference for the improvement of rural revival.

We first gave the index variables of rural revitalization level and fiscal expenditure related to agriculture. The explanatory variable is the rural revitalization level (XCZX). The total rural revitalization score obtained in the previous section was used to indicate the rural revitalization level of each region. The explanatory variable is the variable of the structure of fiscal agriculture-related expenditure. We chose four variables from the two aspects of agricultural production expenditure and public service expenditure. Per capita fiscal expenditure on water affairs in agriculture and forestry (AP) was selected for rural productive spending, and the specific index was fiscal expenditure on agriculture, forestry, and water affairs/rural population. In terms of public service expenditure, we choose rural education expenditure (ES), urban-rural community integration expenditure (CE), and housing security expenditure (HE). The leading indicators are education expenditure, urban and rural community expenditure, and housing security expenditure. Residents' education level (EL) was taken as the control variable, and the main index was the population / total population with a junior college degree or above. The above index data are from *China Rural Statistical Yearbook* (2016-2020) and *China Statistical Yearbook* (2016-2020). Based on the actual economic significance of variables, we make the following hypothesis:

Hypothesis 1. The per capita fiscal expenditure on water affairs in agriculture and forestry (AP) not only has a positive impact on rural revitalization but also can affect the level of rural revitalization by influencing the expenditure of urban and rural communities.

Hypothesis 2. Education expenditure (ES) and housing security expenditure (HE) have a positive impact on rural revitalization, which is mediated by urban and rural community expenditure to affect the level of rural revitalization.

The empirical model of the study is as follows:

$$XCZX_{it} = \alpha_0 + \alpha_1 AP_{it} + \alpha_2 ES_{it} + \alpha_3 CE_{it} + \alpha_4 HE_{it} + \alpha_5 EL_{it} + \varepsilon_{it},$$

Where *"XCZX_{it}"* represents the total score of rural revitalization in the *"t"* year of Province *"i"* (autonomous region or municipality directly under the central government), *"a_0"* is the constant term, *"a_1, a_2, a_3, a_4, a_5"* are the coefficient that needs to be estimated, and *"ε_{it}"* is the random error term.

We first performed basic descriptive statistics on the data, and the results are shown in Table 2. The mean value of the total score of rural revitalization obtained from Table 2 is around 0.2419, and the score of all regions is between 0.7709 and 0.1439. The average per capita fiscal expenditure on water affairs in agriculture and forestry was around 0.5578, with a standard deviation of 0.4164, indicating no significant difference in the index value among different regions. The standard deviation of education expenditure, urban and rural community expenditure, and housing security expenditure is relatively large, indicating that the importance of these three indicators varies significantly from each region.

Table 2. Descriptive Statistics

	Sample Size	Minimum Value	Maximal Value	Mean Value	Standard Deviation
XCZX	155	.143997499	.770899548	.24192210103	.111199678856
AP	155	.164404156	2.022906574E0	.55779288874	.416441524615
ES	155	152.57	3510.56	9.8913E2	609.36367
CE	155	105.26	2413.84	6.8159E2	475.72152
HE	155	38.38	762.03	2.0071E2	119.62463
EL	155	4.69	86.70	15.1566	9.44835

There is some correlation between the explanatory variable between urban and rural community expenditure and education expenditure (ES), housing security expenditure (HE), and per capita fiscal expenditure on water affairs in agriculture and forestry (AP). To verify the proposed hypothesis, we first conducted a regression analysis of urban and rural community expenditure (CE) using the panel data as the explanatory variable, with education expenditure (ES),

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housing security expenditure (HE), and per capita fiscal expenditure on water affairs in agriculture and forestry (AP) as the explanatory variables. The regression results are shown in Table 3.

Table 3. Regression Results of the Fixed-effect Model of the Influencing Factors of Urban and Rural Community Expenditure (CE)

Estimation of Regression Coefficients					
		Unstandardized Coefficients		Standardized Regression Coefficient		
Model		B	Standard Error	Beta	t value	P value
1	(Constant)	4.532E-17	.032		.000	1.000
	Zscore(ES)	.462	.062	.462	7.428	.000
	Zscore(HE)	.221	.055	.221	4.000	.000
	Zscore(AP)	.246	.035	.246	7.120	.000
a. Dependent Variable: Zscore(CE)						

The regression coefficients of the explanatory variables available from the regression results were all significant at a significance level of 0.05, with a model-adjusted R2 of 0.7121, indicating a good model fit. It can be seen from the results that the influence coefficients of education expenditure, housing security expenditure, and per capita fiscal expenditure on water affairs in agriculture and forestry on urban and rural community expenditure are all positive. For example, the influence coefficient of education expenditure on urban and rural community expenditure is 0.462, indicating that for every additional unit of education expenditure, urban and rural expenditure increases by 0.462 units. At the same time, education expenditure has the most significant impact on urban and rural community spending.

With the level of rural revitalization (XCZX) as the explained variable, the per capita fiscal expenditure on water affairs in agriculture and forestry (AP), the urban and rural community expenditure (CE), and the control variable resident education level (EL) as the explanatory variable, the fixed effect model of panel data were used for regression analysis. The regression results are shown in Table 4.

Table 4. Regression Results of the Fixed-effect Model of the Influencing Factors of Rural Revitalization Level (XCZX)

Estimation of Regression Coefficients					
		Unstandardized Coefficients		Standardized Regression Coefficient		
Model		B	Standard Error	Beta	t value	P value
1	(Constant)	1.190E-15	.035		.000	1.000
	Zscore(AP)	.836	.041	.836	20.394	.000
	Zscore(CE)	.249	.036	.249	6.921	.000
	Zscore(EL)	.060	.042	.060	1.430	.155
a. Dependent Variable: Zscore(XCZX)						

The regression coefficients of the variable AP available from the regression results and CE are significant at a significance level of 0.05, with a model-adjusted R2 of 0.8325 and a good regression fit. From the results, the influence coefficient of per capita fiscal expenditure on water affairs in agriculture and forestry (AP) and urban and rural community expenditure (CE) and education level positively impact rural revitalization. The influence coefficient of per capita fiscal expenditure on water affairs in agriculture and forestry on rural revival is 0.836, indicating that for each additional unit, while other spending remains unchanged, rural revival will increase by 0.836 units. At the same time, the per capita fiscal expenditure on water affairs in agriculture and forestry has the most significant impact on rural revitalization, followed by urban and rural community expenditure.

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Based on the regression estimation of these two fixed effects, it can be concluded that education expenditure (ES) and housing security expenditure (HE) indirectly affect the level of rural vitalization through the expenditure on urban and rural communities, in which the level of education expenditure (ES) on rural vitalization is 0.249*0.462=0.115. The influence coefficient of housing security expenditure (HE) on the level of rural vitalization is 0.249*0.221=0.055. The influence coefficient of per capita fiscal spending on agriculture and forestry water affairs on the level of rural vitalization is 0.249*0.246=0.061. Both hypothesis 1 and hypothesis 2 are verified by the regression model analysis of two fixed effects.

4. Conclusion and Suggestion

4.1 Main Conclusions

Through the empirical analysis of the detailed data, the research results show that, on the whole, the most critical factor affecting rural revitalization is the total financial investment in agriculture, which is easy to understand. The larger the total amount of investment, the greater the impact on the level of rural revitalization. Based on this conclusion, compared with the central and western regions, the eastern part has the muscular financial strength and excellent natural conditions, mainly by climate, soil, and water resources, making the overall level of rural revitalization in the east area also relatively high.

To study the relationship between the structure of fiscal expenditure on agriculture and the effect and level of rural vitalization, this paper conducted an empirical analysis. It concluded that there was a positive correlation, but it should be noted that the correlation coefficients of each forecasting index were different. In terms of structure, different types of fiscal expenditure had other impacts on rural revitalization. Based on other regions, the conclusions can be drawn from the empirical results as follows: the per capita fiscal expenditure on agriculture, forestry, and water affairs (AP) has the most enormous impact on the rural vitalization level, with the impact coefficient of 0.897, followed by the rural-urban and rural community expenditure (CE) with the impact coefficient of 0.249. The influence coefficient of education expenditure (ES) on the level of rural revitalization is 0.115, and the influence coefficient of housing security expenditure (HE) on the level of rural revitalization is 0.055.

4.2 Policy Suggestion

Based on the previous conclusion, the development level of rural revitalization in the eastern and western areas is uneven, and the story of the eastern regions is much higher than that of the western and central regions. This paper proposes that the fiscal funds related to agriculture should exert force in the following aspects.

(1) Policy makers are suggested to give full consideration to the multiplier effect of input and output, and increase the intensity of financial information. This paper has concluded that there is a positive correlation between agriculture-related financial investment and the level of rural revitalization. And the development of rural finance has a significant and positive effect on the level of rural revitalization (Liu et. al. 2018). Then based on living a tight life on their own, governments at all levels should make overall fund-raising arrangements, increase the input of financial funds related to agriculture, and at the same time, scientifically promote the distribution of critical factors, strive to improve the efficiency of the use of funds, and earnestly reduce the burden on peasants, effectively reduce the cost of agricultural production, and earnestly raise the efficiency of the agricultural output (Yu, 2018). Relevant functional departments should pay attention to research and discovery, give full play to the leverage role of fiscal policies, integrate direct subsidies into project subsidies, and use policy-based financial tools scientifically and rationally. At the same time, policy makers need to remove various policy obstacles in agriculture, and actively guide private capital to participate in rural revitalization, so that private capital is willing to enter, can enter, and can go out, to dispel the concerns of private capital (Zhou, 2011). Agricultural technology innovation can improve productivity, sustainability and resilience in food production and agriculture. However, the number of scientific and technological patents owned by agricultural enterprises and the proportion of effective patents to the total number of patent applications is far lower than the average level for all enterprises(Xie and Mao, 2016). So in order to improve agricultural technology innovation to promote the development of rural revitalization, governments need to encourage enterprises to invest funds in agricultural innovation. At the same time, related departments should promote both material and spiritual progress. On the one hand, related departments should promote economic development and effectively enhance the effect of industrial revitalization. On the other hand, related departments should also carry out spiritual construction, give full play to the "hidden" role of cultural revitalization, and invest some funds to ensure the development of rural basic public services. Only when farmers are in good spirits can they be able to work hard, and related departments must gradually increase the coverage of rural infrastructure and public service construction.

(2) Agricultural structure and conditions have a large influence on regional rural development (Zasada et.al.2018). Then it motivates policy makers to improve agricultural structure and conditions. What's more, policy makers should fully consider the regional differences in the eastern, central, and western regions, and carry out extensive cooperation and win-win results. China will have completed building a moderately prosperous society in all respects by 2020. The next

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step is to achieve comprehensive rural revitalization. The eastern region has a high economic level, which is relatively easy to achieve. The central and western areas, on the other hand, have a weak financial foundation, and it won't be easy to achieve this goal. But rural revitalization is the real country and for the whole people. The hard "bones" must be cut down. This is the inevitable choice of our socialist government and the inevitable requirement of Chinese Modernization. The congress must face up to the fact that the level of rural revitalization and development in the eastern, central, and western regions is uneven. They must also see the powerful potential of the western and central areas. The success of the project to deliver electricity from the East to the West and the South-to-North Water Diversion Project has not only given us strong faith but also inspired us a lot. There is much to be done in coordination between the eastern, central, and western regions. At the national level, policy makers need to make sound national plans, make good use of all policy formulation, and transfer payment instruments scientifically and rationally. From the local government level, related departments must actively carry out cooperation, both at the provincial level and in regional cooperation, by relying on a "pairing" basis (Qu, 2012).

(3) Policy makers need to make a scientific study of the structure of government spending on agriculture and take a good combination of measures. The system of fiscal expenditure related to agriculture directly affects the improvement of rural revitalization. Related departments will focus on spending per capita fiscal expenditure on water affairs in agriculture and forestry, which have the most significant impact. Education expenditure is a long-term expenditure, which may not show benefits in the short term, but in the long run, it will be a "hard investment". The saying goes, "it takes ten years to grow a tree and a hundred years to bring up a generation of good men." If policy makers seize education, they will hold the internal driving force for long-term development. Housing security expenditure is also an essential factor in enabling farmers to live decent lives. At the same time, it is necessary to deepen the research on the demand of the "agriculture, rural areas and farmers" market, take the industry as the basis and rural revitalization as the goal, scientifically and reasonably supply productive public goods and public goods of citizen nature, make the optimization of the structure of public goods play the multiplier effect, and truly realize the rural revitalization with prosperous industry, livable ecology, rural civilization, effective governance and rich life.

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