Government Transfer Structure and Fiscal Expenditure Efficiency

Qiong Wu[1], Jia Li[2, *]

[1] School of Business Administration, Anhui University of Finance & Economics, Bengbu 233030, China

[2] School of Finance and Public Administration, Anhui University of Finance & Economics, Bengbu 233030, China

Abstract

Since the reform of tax-sharing system, the proportion of tax rebate to total transfer payment has been decreasing, while the proportion of general transfer payment has been increasing, and it has become the main way of transfer payment from central to local government. By using the stochastic frontier model to calculate the efficiency of local government financial expenditure, we find that the efficiency of local government financial expenditure in our country is on the rise. Based on the theoretical analysis of the impact of transfer payment structure on fiscal expenditure efficiency, this paper adopts fixed effect model and Tobit model based on the panel data of 185 prefecture-level cities from 2012 to 2018, the results show that the general transfer payment and tax rebate increase the efficiency of fiscal expenditure, while the special transfer payment reduces the effect of fiscal expenditure, and the effects are regionally heterogeneous. The mechanism test shows that the transfer payment structure is more likely to affect the efficiency of local government fiscal expenditure through the fiscal expenditure structure. The conclusion of this paper is of great significance to the construction of a fiscal system with the corresponding powers and expenditure responsibilities, the alleviation of the fiscal pressure faced by the governments at all levels, and the improvement of the modernization of the national governance system and governance capacity.

Keywords

Government Transfer Structure; Fiscal Expenditure Efficiency; Sub-Provincial Fiscal System Reform.

1. Introduction

The tax sharing reform, which began in 1994, divided taxes into central taxes, local taxes and central and local shared taxes, and established a transfer payment system that included tax rebates, general transfer payments and special transfer payments. Under a fiscal system that strengthens the central government's control over resources and its macro-control functions, transfer payments have, to a certain extent, replaced local tax revenues and become an important means to cover the cost of local public expenditure. In recent years, in the face of a complex and severe external economic environment and increased downward pressure on the domestic economy, the central government has implemented a proactive fiscal policy for many years, successively issuing and implementing a series of policies to reduce taxes and fees, such as personal income tax reform, inclusive tax relief for small and micro enterprises, deepening VAT reform and lowering social insurance premium rates, and requiring that "proactive fiscal policy should enhance its effectiveness It also requires that "active fiscal policies should be more effective, more precise and sustainable". The large-scale tax and fee reduction policies have lowered the operating costs of enterprises and promoted their investment, which in turn led to the transformation and upgrading of enterprises (Li Yongyou and Yan Cen, 2018; Liu

Qiren et al., 2019), but also slowed down the growth rate of government revenue. According to the Ministry of Finance, the accumulated tax cuts and fee reductions during the 13th Five-Year Plan period exceeded 7.6 trillion yuan, including 4.7 trillion yuan in tax cuts and 2.9 trillion yuan in fee reductions. Compared to the slowing revenue growth, fiscal expenditures are still showing rigid growth, and the treasury is facing the dilemma of double pressure to increase revenue and reduce expenditure, and the treasury is operating in a "tight balance". Given the target of tax cuts and the increasing fiscal pressure, how to improve the efficiency of the use of fiscal funds by adjusting the structure of transfer payments, avoiding a decline in the level of public service provision or an increase in the risk of debt due to tax cuts, and better meeting the public needs of members of society is an urgent issue in the process of modernising national governance. This is an urgent issue in the process of modernising national governance.

With regard to the relationship between transfers and fiscal efficiency, early public finance theory suggested that local governments would treat central transfers the same as local taxes and that the revenue structure of local governments would not affect the arrangement of local government expenditure, let alone fiscal efficiency (Wilde, 1968; Brandford and Oates, 1971). However, the "sticky-fly effect" found in the late 1970s suggests that the higher the share of transfers in the revenue structure of local governments, the larger their fiscal expenditures (Hines and Thaler, 1995; Brenan and Pincus, 1996). "Since the 1990s, the focus of foreign theoretical research has shifted to the question of the equity and efficiency of transfer payments, i.e. whether they can make local governments more equitable and The focus of foreign theoretical research since the 1990s has been on the equity and efficiency of transfers, i.e. whether transfers can make local governments deliver public services more equitably and efficiently (Gamkhar and Shah, 2007). In the literature on transfer payments and fiscal efficiency, recent empirical studies have generally concluded that transfer payments are less efficient than local own taxes. Oates (1994) argues that local governments do not value transfers from higher levels of government as much as they value the budgetary expenditures generated by increased local tax revenues, and that transfer payments are less efficient than local government local taxes. Baker et al. (1999) A study on the shift from an unlimited matching grant to a limited matching grant system in Canada found that the central government's change from an unlimited matching grant to a limited matching grant to local governments resulted in greater financial efficiency and savings for local governments. Borck and Owings (2003) argue that efficiency is not the main criterion for the allocation of government grants, as political reasons tend to play a more dominant role. Albouy (2010), by assessing efficiency and equity in federal fiscal equalisation in the US, argues that federal fiscal transfer policies are neither equitable nor efficient, but rather exacerbate pre-existing inefficiencies and under-subsidisation of minorities. Bhatt and Scaramozzino (2013) assessed the relationship between fiscal transfers and fiscal deficit in India through an empirical study and concluded that the fiscal transfer system in India distorts incentives and that there is a significant positive relationship between it and government fiscal deficit. Domestic studies have mainly focused on the fiscal equalisation effect of transfer payments (Liu Solcang and Jiao Guohua, 2002; Ma Sanyou and Yu Hongxia, 2003; Guo Qingwang et al. 2009; Jia Junxue et al. 2010), and there is less literature on the efficiency of transfer payments. An Tifu (2007) argues that the low efficiency of fiscal transfer payments in China is due to the unstandardised method of allocating funds, the lack of effective supervision and the non-transparent operation; Qiao Baoyun et al. (2006) argue that both general and special transfer payments are subject to moral hazard, which reduces the fiscal effort of local governments; Fan Ziying and Zhang Jun (2010) studied the relationship between transfer payments and economic growth and argued that transfer payment policies are inefficient and may reduce the potential for economic growth; Tang Qiming and Wang Biao (2012), however, argued that the higher the reliance of local governments on central fiscal transfers will make local governments invest more funds in more

rigid expenditures on science, education, culture and health and support for agriculture, which will help improve the efficiency of local government finance, and this view explains from another perspective that transfer payment efficiency may be higher than local governments' own revenue. Wu Yongqiu and Zhao Jing (2016) study the impact of transfer payment structure on local fiscal efficiency from the perspective of local government revenue sources. Theoretical and empirical studies show that the fiscal funding efficiency of tax rebates is higher than that of general and special transfers, and the funding efficiency of general transfers is not lower than that of special transfers. Based on Chinese municipal panel data from 1995 to 2009, Gu Cheng and Zhang Hongtao (2021) used panel fixed-effects models and Tobit models to examine the issue of financial efficiency of local fiscal own revenues, general transfers and special transfers due to cost differences under the framework of fiscal decentralisation. The results of the empirical analysis show that, compared with general transfers and tax rebates, special transfers significantly reduce the efficiency of the use of fiscal funds; local governments' general public budget revenues and tax rebates are more efficiently used compared to general transfers.

In general, although existing studies have examined the impact of the scale and structure of transfer payments on the efficiency of local financial resources, the analysis of the reasons why transfer payments and their structure affect the efficiency of financial resources still needs to be further explored, as well as the heterogeneity of the mechanisms of action of various types of transfer payments. Throughout the existing studies, although some of the literature has theoretically analysed the mechanism of the effect of transfer payments on the efficiency of fiscal expenditure, the empirical analysis uses data at the provincial level and fails to portray the effect of sub-provincial government transfer payments on the efficiency of fiscal expenditure. Although Gu Cheng and Zhang Hongtao (2021) used municipal-level data to empirically analyse the effect of transfer payment structure on fiscal expenditure efficiency and tested the mechanism between the two, the data used were before 2009, and China's transfer payment system underwent further adjustment in 2009, so the results of their empirical analysis do not have the ability to analyse the effect of the current transfer payment system. Based on this, this paper empirically examines the effect of different types of transfer payments on fiscal expenditure efficiency under the current transfer payment system using transfer payment data from 185 prefecture-level cities in China between 2012 and 2018, and explores the impact mechanism between the two in depth.

The rest of the paper is organized as follows. The second part analyzes the typical facts of transfer payment structure and fiscal expenditure efficiency in our country, and the third part analyzes the mechanism of transfer payment structure affecting fiscal expenditure efficiency. The fourth part introduces the model construction and data sources, and the fifth part empirically tests the effect of transfer payment structure on the efficiency of fiscal expenditure. The sixth part empirically tests the influence of transfer payment structure on the efficiency of fiscal expenditure from local government's own income, general public budget expenditure and fiscal expenditure structure. The seventh part summarizes the research conclusion of this paper.

2. Analysis of Typical Facts in China

2.1. Current Situation of the Scale and Structure of Transfer Payments in China

After the reform of the tax sharing system in 1994, China implemented a tax rebate and transfer payment system. In terms of the composition of local government revenue, the central government's transfer payments are an important source of revenue for local governments. in 1995, the local government's revenue at the local level was RMB 298.6 billion, and the central government's transfer payments to localities were RMB 253.3 billion, accounting for 45.9% of local government revenue; by 2020, the size of the central government's transfer payments to localities will reach RMB 832.18 billion, accounting for 45.4 per cent. Although the scale of

central transfers to localities has been expanding since 1995, with an average annual growth rate of 15%, the ratio of central transfers to local fiscal revenues has remained at around 45%.
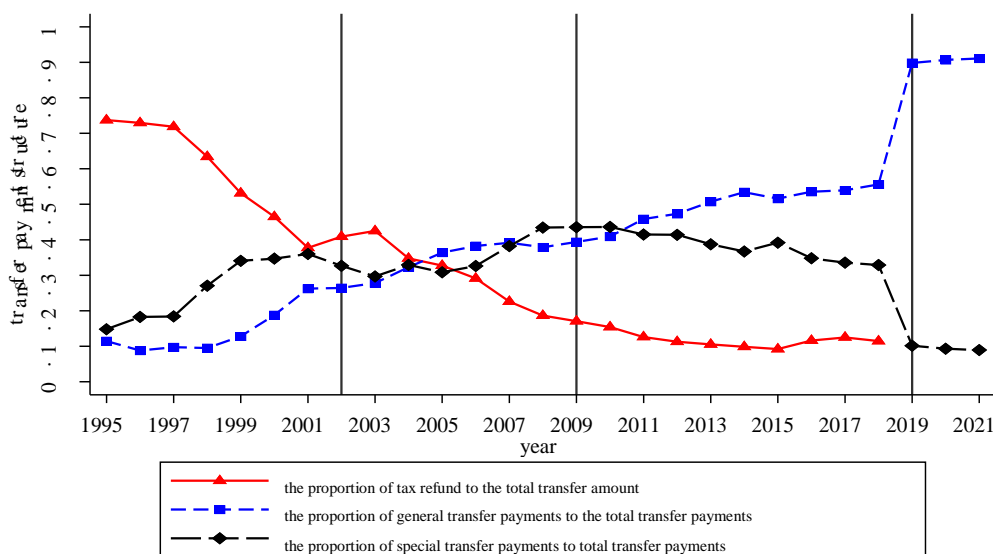

Figure 1. Changes in the structure of central government transfer payments to local governments (1995-2021)

Figure 1 shows the changes in the structure of central government transfers to local governments over the years. China's fiscal system has broadly evolved from a highly centralised system of fiscal "unified collection and expenditure" in the early years of liberation, to a more decentralised system of fiscal lump sums in the mid-1980s, and then to a tax-sharing fiscal system starting in 1994. It was not until the tax-sharing reform reshaped the mechanism for the distribution of benefits between the central government and the local government, and the Ministry of Finance formulated the Transitional Transfer Scheme (1995), that the concept of transfer payments was formally introduced in China. 1995 saw the implementation of a new unconditional transfer payment scheme, the Transitional Transfer Scheme, with RMB 2 billion from the central government's incremental revenue, followed by the introduction of an incentive mechanism to increase local revenue. incentive mechanism. It was until 2002 that the central government adopted general transfers to replace the Transitional Transfers. As a type of fiscal transfer, the general transfer differs from other fiscal transfers in that it calculates the amount of allocation based on the factor method and uses a standardised formulaic approach to allocation. Between 1995 and 2001, the proportion of tax rebates to total transfer payments fell from 73.7% in 1995 to 37.7% in 2001, the proportion of general transfer payments to total transfer payments rose from 11.5% to 26.2%, and the proportion of special transfer payments to general transfer payments rose from 14.8% to 36%. An overview of the changing trend of the structure of transfer payments in China during this period shows that the proportion of tax rebates has been decreasing, the proportion of general transfer payments and special transfer payments has been increasing, and tax rebates occupy the main position in transfer payments, while the proportion of general transfer payments is the lowest.

Before 2009, the content of transfer payments could be broadly divided into five categories: former institutional subsidies, tax rebates, financial transfers, settlement subsidies and special transfers. Among them, financial transfers included early general transfers, transfers to ethnic areas, transfers for rural tax reform, transfers for wage adjustment, transfers for county and township rewards and other financial transfers. Between 2002 and 2008, the proportion of tax

rebates fell from 40.9% in 2002 to 18.7% in 2008, the proportion of general transfers rose from 26.4% to 37.9%, and the proportion of special transfers rose from 32.7% to 43.4%. An overview of the trends in the structure of transfer payments over this period shows that the proportion of tax rebates has been decreasing, while the proportion of general and special transfers has increased.

After 2009, the calibre of fiscal transfers has undergone a new adjustment: the former financial transfers were all transferred to general transfers, and the former "general transfers" were renamed "balanced transfers" and included in the new calibre of general transfers. The former "general transfer payments" were renamed as "balanced transfer payments" and included in the new calibre of general transfers. In addition, some special transfers that require long-term subsidies and are relatively fixed in amount have also been gradually transferred to general transfers. Between 2009 and 2018, the proportion of tax rebates fell from 17.1% to 11.5%, the proportion of general transfers rose from 39.4% to 55.6% and the proportion of special transfers fell from 43.5% to 32.9%. A glance at the changing trend in the structure of transfer payments over this period reveals that the proportion of tax rebates and the proportion of special transfers has been decreasing, while the proportion of general transfers has continued to rise, and the proportion of general transfers has exceeded 50% and begun to dominate.

In 2019, the central government has made significant changes to transfer payments. Among the major categories of general transfer payments, a "common fiscal authority transfer" has been added, and 46 special transfers from the previous special transfers (for reference in 2018) have been divided into the current common fiscal authority transfer and are managed under the general transfer items. In addition, the previously separate tax rebates have been included in the general transfers for the first time. Between 2019 and 2021, the share of general transfers is maintained at around 90% with an upward trend, while the share of special transfers is around 10% with a downward trend.

2.2. Analysis of the Current Situation of Fiscal Expenditure Efficiency in China

2.2.1. Fiscal Expenditure Efficiency Measures

In recent years, most of the methods used to empirically study the efficiency of fiscal expenditure are frontier efficiency analysis methods, which can be divided into non-parametric methods and parametric methods. The more widely used non-parametric method is Data Envelopment Analysis (DEA), while the more widely used parametric method is Stochastic Frontier Analysis (SFA). However, as the method sets a deterministic boundary, there is no random error, which means that all deviations from the deterministic boundary are caused by inefficiencies, which is clearly not the case in practice. The stochastic frontier analysis analysis method takes into account both the effect of random errors on efficiency and the effect of inefficient factors on efficiency, and uses econometric methods to construct frontier functions whose estimates can be statistically tested and extrapolated. Given the relative advantages of stochastic frontier analysis methods, this paper draws on the ideas of studies such as Battese and Coelli (1995) and Xu Chao et al. (2020) to measure the efficiency of local government fiscal expenditure using a cost-based stochastic frontier model. The stochastic frontier cost function constructed takes the Cobb-Douglas form of:

$$\ln FE_{it} = \alpha + \beta \sum \ln X_{it} + \upsilon_{it} + \mu_{it}. \tag{1}$$

where FE represents the level of fiscal expenditure per capita and subscripts i and t represent the ith prefecture-level city and year t respectively; X_{it} denotes a series of output indicators; υ_{it} is a random error term and follows a standard normal distribution; μ_{it} is an inefficiency term and follows a broken-tailed normal distribution with a broken tail to the left of the origin.

In addition to the importance of the above-mentioned empirical method, another key factor in measuring the efficiency of fiscal expenditure is the construction of the input-output indicator system. Since it is difficult to directly observe all the 'production outcomes' of the government, and therefore not all the input-output indicators of the government expenditure process can be fully obtained, a common practice in China to measure the efficiency of fiscal expenditure is to select some of the government public outputs as representative output variables (Chen Shiyi and Zhang Jun 2008; Xu Chao et al. 2020; Liu, Shuxin and Yang, Senping 2021). Based on this, this paper draws on the research ideas of Xu Chao et al. (2020) and constructs the following output indicator system by combining the availability of indicator data.

The empirical estimation of the output indicator system based on Table 1 shows that the estimated value of parameter η is 0.0179 and is significant at the 1% level of significance, indicating that the efficiency of fiscal expenditure varies over time; the estimated value of parameter γ is 0.8793, indicating that the inefficiency term μ dominates the cost bias; further tests of "H0 : γ = 0 " test shows that the one-sided likelihood ratio statistic LR = 863.253 is greater than the critical value of 10.501 for the 1% significance level of the mixed chi-square distribution (Kodde and Palm, 1986), rejecting the original hypothesis, which implies that there is inefficiency in local government fiscal spending in China.

Table 1. A system of output indicators for measuring the efficiency of fiscal expenditure

Primary indicators	Secondary indicators	Primary indicators	Secondary indicators
Education	Number of university teachers per 10,000 people	Postal and Telecommunications Communications	Internet access per 10,000 people
	Number of secondary school teachers per 10,000 population		Total postal services per capita
	Number of primary school teachers per 10,000 population	Greening	Green space per capita
	Number of schools per 10,000 people	Infrastructure	Water supply per capita
Health	Number of hospitals per 10,000 population		Number of buses per 10,000 people
	Number of beds per 10,000 people		Urban road area per capita
	Number of doctors per 10,000 people	Culture	Book collections per 100 people

2.2.2. Analysis of the Current Situation of Fiscal Expenditure Efficiency in China

On a national scale, China's local government fiscal expenditure efficiency is on an increasing trend, but in general, there is still much room for progress in improving the quality and efficiency of China's local government fiscal funds, a finding consistent with the findings of Chen Shiyi and Zhang Jun (2008) and Xu Chao et al. (2020). At the same time, the difference between the maximum and minimum values of fiscal expenditure efficiency of local governments in China is too large, with the highest value of fiscal expenditure efficiency being 0.9099, while the lowest value is only 0.2215, the former being more than 4.1 times that of the latter, indicating that there are great differences in the efficiency of fiscal funds use among local governments in China. Further by region[25], there are significant differences in the efficiency of fiscal expenditure among regions, with the highest efficiency of fiscal expenditure in the western region, followed by the eastern region, and the lowest efficiency value in the central region, and the efficiency of fiscal expenditure of local governments among all regions shows an increasing

trend. In terms of the fluctuation of fiscal expenditure efficiency of local governments among regions, the fiscal expenditure efficiency gap among local governments in the central region is the smallest, followed by the western region, and the fiscal expenditure efficiency difference among local governments in the eastern region is the largest.

3. Theoretical Mechanism Analysis

Similar to the way the central government allocates funds to provincial governments, transfers to provincial and lower levels of government also take the form of tax rebates, general transfers and special transfers. As the target and percentage of tax rebates are determined and linked to the growth of local government tax revenue, there are no restrictions on the use of the funds by the higher levels of government, and there is no "sticky paper effect" due to the inability to budget accurately, so the lower levels of government receive tax rebates that are similar to their own revenues. Compared to transfer payments, local governments' own revenue avoids a series of institutional costs associated with the transfer of tax revenues from higher levels of government to lower levels of government, and makes it easier to internalise the costs and benefits of fiscal expenditure in the jurisdiction - in the case of own revenue, local governments are "spending their own money". "This helps local governments to adjust the quantity of public goods supplied to a point where marginal benefits equal marginal costs when making fiscal decisions, so that fiscal resources are spent where they are most needed and fiscal resources are allocated most efficiently. Therefore, it is generally accepted that tax rebates and the efficient use of fiscal funds are positively correlated.

The general transfer is based on the factor method, which allocates and distributes financial resources according to a set formula. It is less influenced by human factors, more transparent, more predictable and has relatively lower institutional costs, and therefore has less distorting effects on the behaviour of lower-level governments. At the same time, general transfer payments are allocated and then left to the local governments to make their own expenditure arrangements, which can more effectively meet the preferences and needs of the residents in their jurisdictions for public goods. Specific transfers use the project method to allocate fiscal funds, which is relatively less standardised and leaves more room for artificial manipulation, exposing lower-level governments to the incentive and incentive to communicate frequently with higher-level governments, who pay a higher cost for the transfer payments. Compared to general transfers, local governments face incentives to "run for money" in the process of obtaining special transfers, and local governments are willing to pay the costs and make up for them after receiving the transfer funds, thus reducing the effective amount of financial resources actually available to them. At the same time, in the entrustment-agency relationship formed by higher-level governments giving special transfers to lower-level governments to address the problem of local governments free-riding on public goods with regional spillovers, or subsidising lower-level governments in areas of common authority with higher-level governments, the existence of information asymmetries and the decentralisation of expenditure execution bodies makes it difficult for higher-level governments to effectively implement the transfer system through more links and levels of disbursement and longer chains. The effective allocation of financial resources is difficult to ensure due to the existence of information symmetry and the decentralisation of expenditure execution bodies. In addition, special transfers have a clear direction of use and require lower-level governments to earmark funds for specific purposes, which reduces the flexibility of local government spending. Moreover, some special transfers also require lower-level governments to match the corresponding funds, which has led some financially constrained lower-level governments to take the initiative of matching debts and false matching in order to obtain special transfers, resulting in a mismatch of financial resources. According to Gu Cheng and Zhang Hongtao

(2021), an increase of one standard deviation in general transfers leads to a decrease of 0.112 standard deviations in local fiscal revenues and an increase of 0.165 standard deviations in general public budget expenditures, while an increase of one standard deviation in special transfers leads to a decrease of 0.121 standard deviations in local fiscal revenues and an increase of 0.193 standard deviations in general public budget expenditures. The increase of one standard deviation in special transfers will lead to a decrease of 0.121 standard deviations in local fiscal revenue and an increase of 0.193 standard deviations in general public budget expenditure. However, due to the stability and predictability of general transfers, they have a less distorting effect on local governments' own revenues and fiscal expenditures compared to special transfers. Based on this, the paper argues that under the condition that the size of transfer payments and the total amount of tax rebates remain unchanged, an increase in general transfer payments and an equal decrease in special transfer payments will result in the use of fiscal funds at a level no less efficient than before.

4. Model Construction and Description of Variables

4.1. Empirical Model Construction

To empirically test the relationship between the structure of transfer payments and the efficiency of fiscal spending, the following empirical regression model is constructed:

$$TE_{it} = \alpha + \sum_{j=1}^{3} \beta_j \times Trans_{jit} + \gamma \sum Z_{it} + \varepsilon_{it}. \qquad (2)$$

The explanatory variable TE is the efficiency of fiscal expenditure, with subscript i denoting the ith prefecture-level city and subscript t denoting year t. Transj (j=1,2,3) denotes general transfer per capita, special transfer per capita and tax rebate per capita respectively, where general transfer per capita, special transfer per capita and tax rebate per capita are first divided by the total amount of each type of transfer by the population at the end of the year The average value is then logarithmically calculated. In addition to the two core indicators of fiscal expenditure efficiency and transfer payment structure, this paper also introduces the following control variables based on existing studies (Afonso et al. 2019; Hauner and Kyobe 2008; Antorelli and de Bonis 2019; Chan et al. 2017; Gabriel et al. 2019; Xu Chao et al. 2020; Chen Shi and Zhang Jun; 2008). (1) civil service capacity (admin), approximated by the share of "public administration, social security and social organisations" personnel per 1,000 people (2) local fiscal autonomy (gap), measured by the difference between general public budget revenue and expenditure as a share of general public budget expenditure; (3) level of openness to the outside world (open), measured by the share of total imports and exports in GDP. measured by total exports and imports as a share of GDP; (4) the level of education of the population (edu), approximated by the number of students in tertiary education per 10,000 people. To reduce the volatility of the data, the indicators are logarithmic; (5) Internet penetration rate (internet), measured by the number of broadband Internet access households per capita.

4.2. Description of Data

In order to break through the limitations of using only provincial-level panel data, such as insufficient sample size, difficulty in ensuring the accuracy of parameter estimation, and ignoring the heterogeneity of different prefecture-level cities within the province, this paper chooses prefecture-level city panel data. The output indicator system, control variables and fiscal expenditure structure used in this paper to measure the efficiency of fiscal expenditure are all original data obtained from the China Urban Statistical Yearbook, provincial and municipal statistical yearbooks, statistical bulletins on national economic and social development and provincial (municipal) budget execution reports in previous years. Due to the

serious lack of samples and the high reliance on transfer payments, the data of Xinjiang, Tibet and cities under the jurisdiction of Hong Kong, Macao and Taiwan were excluded from this paper; municipalities directly under the central government are equivalent to a province or autonomous region, and their economic laws are different from those of ordinary prefecture-level cities, so the relevant data were excluded. The sample spans from 2012 to 2018, with a total sample size of 1,295. The descriptive analysis of the main variables is as follows, see Table 2.

Table 2. Descriptive analysis of key variables

Variables	Sample size	Average	Standard deviation	Minimum value	Maximum value
Fiscal spending efficiency	1295	0.378	0.109	0.212	0.91
General transfers per capita	1295	7.38	0.642	4.359	9.183
Earmarked transfers per capita	1295	8.92	0.442	7.493	10.712
Tax rebate per capita	1285	5.422	0.789	1.842	8.114
Financial autonomy	1295	0.536	0.222	-0.116	0.928
Level of openness to the outside world	1295	0.167	0.3	0	6.021
Level of education	1295	4.684	1.058	2.14	7.179
Internet penetration	1295	0.208	0.154	0.021	1.489
Government management capacity	1295	11.993	4.677	3.885	36.031

5. Analysis of the Empirical Results

5.1. Analysis of Baseline Regression Results

In order to avoid the regression results relying on a certain estimation method and a specific model, this paper adopts a variety of methods to carry out the empirical analysis. p-value of the Hausman test is 0, which strongly rejects the original hypothesis of "individual effects and explanatory variables are not correlated", so the fixed efficiency model should be used, and the regression results are shown in column (1) of Table 3. From the regression results, the coefficients of general transfers per capita and tax rebates per capita are significantly positive, indicating that the more general transfers and tax rebates there are, the more efficient the local government's fiscal expenditure is; the coefficient of special transfers per capita is significantly negative, indicating that the more special transfers there are, the less efficient the local fiscal expenditure is. This is consistent with the theoretical analysis in the previous section. Considering that the measured value of the explanatory variable fiscal expenditure efficiency is between 0 and 1, this paper further adopts the Tobit model, and the regression results of the panel Tobit model are shown in column (2) of Table 3. From the regression results, the coefficients of general transfers per capita and tax rebates per capita are still significantly positive, while the coefficient of special transfers per capita is significantly negative. In other words, the effect of various types of transfers on fiscal expenditure efficiency does not change when the estimation method is changed, indicating that the results of the baseline regression model in this paper are plausible.

Table 3. Empirical regression results

	(1)	(2)	(3)	(4)	(5)
General transfers	0.0206***	0.0204***	0.0179***	0.0102***	0.00651***
	(0.00259)	(0.000896)	(0.00256)	(0.00162)	(0.00189)
Dedicated transfers	-0.00454*	-0.00416***	-0.00367**	-0.00238*	-0.00558*
	(0.00232)	(0.00122)	(0.00183)	(0.00125)	(0.00299)
Tax refunds	0.00374***	0.00374***	0.00335***	0.00292***	0.00355
	(0.00102)	(0.000610)	(0.000905)	(0.000706)	(0.0108)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant term	0.161***	0.159***	0.187***	0.259***	0.245***
	(0.0233)	(0.0114)	(0.0198)	(0.0149)	(0.0163)
N	1285	1285	1104	1285	1285
R^2	0.720		0.725	0.841	0.588

Note: Clustering robust standard errors in brackets; *, **, *** indicate significant at the 10%, 5%, 1% levels respectively;the following table is the same.

5.2. Robustness Analysis

Firstly, in general, a decrease in own revenue and an increase in general public budget expenditure will lead to an increase in the gap between local fiscal revenues and expenditures, which in turn will create positive incentives for local governments to seek transfer payments, distorting local governments' revenue and expenditure behaviour, and thus affecting the efficiency of the government's financial use. In other words, there is a causal relationship between transfer payments and local governments' own revenues, general public budget expenditures and fiscal expenditure efficiency. In order to solve the endogeneity problem caused by the mutual causality, the first-order lagged terms of general transfer per capita, special transfer per capita and tax rebate per capita are substituted into the model, and the regression results are presented in column (3) of Table 3. The empirical results show that the coefficients of general transfers per capita and tax rebates per capita are still significantly positive, while the coefficient of special transfers per capita is significantly negative, indicating that the effect of each type of transfer on the efficiency of fiscal expenditure remains unchanged under the consideration of endogeneity.

Second, the new Budget Law, which came into effect in 2015, has made significant reforms to China's budget system in terms of regulating the government's financial revenue and expenditure behavior, and has made important breakthroughs in implementing full-caliber budget management, strengthening budget constraints, increasing budget disclosure, and enhancing budget review and supervision by the National People's Congress (Zhu Daqi, 2014). The implementation of these initiatives will also have an impact on the efficiency of fiscal expenditure. In order to exclude the policy interference effects arising from the implementation of the new Budget Law, this paper constructs a dummy variable for the implementation of the new Budget Law[26], and adds it to the baseline regression model for regression, and the regression results are presented in column (4) of Table 3. The regression results show that the implementation of the new Budget Law did significantly improve the efficiency of fiscal expenditure, while the regression coefficients of different types of transfers remain consistent with the results of the benchmark regression, indicating that the impact effects of various types of transfers on the efficiency of fiscal expenditure remain unchanged.

Finally, in order to further test the robustness of the baseline regression, the paper uses the share of various types of transfers in general public budget revenue to replace general transfers per capita, special transfers per capita and tax rebates per capita, and the regression results are shown in column (5) of Table 3. From the regression results, it can be seen that the coefficient of general transfers is significantly positive, indicating that the more general transfers, the more

efficient the local government's fiscal expenditure; the coefficient of special transfers is significantly negative, indicating that the more special transfers, the less efficient the local fiscal expenditure; the coefficient of tax rebates is positive but insignificant, and in general, the baseline regression results remain basically unchanged when the core explanatory variables are replaced.

5.3. Analysis of Heterogeneous Results

As there are significant differences in economic development and different fiscal operating environments between regions in China, the structure of transfer payments allocated to local governments by higher-level governments also has its own characteristics. Therefore, it is necessary to further analyse the impact of transfer payments on fiscal expenditure efficiency between different regions, and the results of the heterogeneity regression are shown in Table 4. As shown in Table 4, for the eastern and central regions, the coefficients of general transfers and tax rebates are significantly positive in both the panel Tobit model and the endogeneity model, which means that for the eastern and central regions, the more general transfers and tax rebates, the more efficient local fiscal expenditure is, while the increase in specific transfers makes local fiscal expenditure less efficient; For the western region, the coefficient of only general transfers is significantly positive in both the panel Tobit model and the endogeneity model, which means that for the eastern region, increasing general transfers is conducive to the improvement of local fiscal expenditure efficiency. The coefficients of regressions for earmarked transfers and tax rebates are not significant, indicating that earmarked transfers and tax rebates do not have a significant impact on fiscal expenditure efficiency in the western region.

Table 4. Heterogeneity regression results

	Eastern Region		Central Region		Western Region	
	(1)	(2)	(3)	(4)	(5)	(6)
General transfers	0.0131***	0.0117***	0.0511***	0.0473***	0.0408***	0.0364***
	(0.00115)	(0.00261)	(0.00145)	(0.00277)	(0.00156)	(0.00437)
Dedicated transfers	-0.00377**	-0.00541**	-0.00269*	-0.00441*	0.00178	-0.000145
	(0.00189)	(0.00270)	(0.00142)	(0.00248)	(0.00152)	(0.00142)
Tax refunds	0.00255**	0.00209	0.00497***	0.00410***	-0.000994	0.000584
	(0.00122)	(0.00155)	(0.000606)	(0.000804)	(0.000661)	(0.00126)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant term	0.197***	0.250***	-0.0254	0.0148	0.0800***	0.0558*
	(0.0221)	(0.0245)	(0.0163)	(0.0241)	(0.0123)	(0.0303)
N	448	384	432	371	405	349
R^2		0.713		0.893		0.889

Note:(1)(3)(5)Regression results for panel Tobit model;(2)(4)(6)Core explanatory variables lagged by one period.

6. Mechanism of Action Test

In order to further test the effect mechanism of different types of transfer payments on the efficiency of fiscal expenditure, this paper analyzes and tests the effects of different types of transfer payments on local government's own fiscal revenue, general public budget expenditure and fiscal expenditure structure, to further explore the transfer payments affect the efficiency of the internal mechanism of fiscal expenditure. In order to solve the endogenous problem caused by the causal relationship between transfer payment, local fiscal self-income and general public budget expenditure, this paper uses different types of transfer payment with

a lag period, in which, using the per capita general public budget revenue and per capita general public budget expenditure respectively for self-owned fiscal revenue and general public budget expenditure, the structure of fiscal expenditure is measured by the proportion of expenditure on people's livelihood in fiscal expenditure. Drawing on the research of Li Yongyou et al. (2021), the expenditure on people's livelihood specifically includes expenditure on education, Social Security, employment and medical and health care, etc. , the results of the mechanism test are shown in Table 5. Column (1) shows that the coefficient for general transfer payments is significantly positive, indicating that with the increase in general transfer payments, the local government's own revenue also increases, this is in line with the reality that general transfer payment is mainly used to make up the gap between local government revenue and expenditure, and local governments have greater autonomy in the use of general transfer payment. But the coefficients of special transfer payment and tax return are not significant, which shows that the latter two have no significant impact on the local government's own fiscal revenue; Column (2) shows that the general public budget expenditure of local governments increases with the increase in general transfer payments, but neither transfer payments nor tax rebates have a significant impact on general public budget expenditure, this also means that only the general transfer payment has a"Flypaper effect", special transfer payment and tax returns have not found this effect. Combined with the effect of transfer payment on self-owned income, these two paths explain why different types of transfer payment have different effects on fiscal expenditure efficiency, but need further analysis Column (3) shows that with the increase of general transfer payments, the fiscal expenditure structure of local governments is more inclined to the area of people's livelihood, while the increase of special transfer payments is accompanied by, the local government's financial expenditure structure has shifted to the non-livelihood area. According to the existing research, in theory, local governments can invest limited fiscal funds into the field of people's livelihood to improve the efficiency of fiscal expenditure (Xu Chao et al., 2020). This also explains why the increase of general transfer payment will increase the efficiency of fiscal expenditure, while the increase of special transfer payment will reduce the efficiency of fiscal expenditure.

Table 5. Mechanism test regression results

	(1)	(2)	(3)
General transfers	0.163***	0.195***	0.0218***
	(0.0336)	(0.0453)	(0.00540)
Dedicated transfers	0.0312	0.0579	-0.0303***
	(0.0277)	(0.0414)	(0.00709)
Tax refunds	0.0211	0.0147	0.00222
	(0.0165)	(0.0174)	(0.00319)
Control variables	Yes	Yes	Yes
N	1104	1104	993
R^2	0.389	0.618	0.120

7. Conclusion

This paper focuses on the impact of the structure of transfer payments on the efficiency of local government fiscal expenditure. By analysing the data on the structure of fiscal transfers in China over the years, it can be found that since the 1994 tax sharing reform, the transfer payments and structure of the central government to local governments have undergone obvious changes. The proportion of general transfers has been increasing and has become the main method of transfer payments from the central government to local governments. Using stochastic frontier models to measure the efficiency of fiscal expenditure at the prefecture level,

we found that the efficiency of fiscal expenditure of local governments in China is generally on the rise, but there is still much room for improvement, and there are significant differences in the efficiency of fiscal expenditure between regions. Based on a theoretical analysis of how the structure of transfer payments affects fiscal expenditure efficiency, this paper empirically tested the effect of transfer payment structure on fiscal expenditure efficiency using panel data of 185 prefecture-level municipalities from 2012 to 2018, and the results showed that the coefficients of general transfer payments and tax rebates were significantly positive, indicating that the more general transfer payments and tax rebates, the more efficient the fiscal expenditure of local governments The heterogeneity analysis shows that the effect of transfer structure on fiscal expenditure efficiency varies across regions; the results of the mechanism test indicate that the differential effect of different types of transfers on fiscal expenditure efficiency is more likely to be caused by the mechanism path of fiscal expenditure structure. The findings of this paper may provide some policy insights for regulating the transfer payment system and promoting the reform of the sub-provincial fiscal system.

Acknowledgments

References

[1] An Tifu, "China's Transfer Payment System: Current Situation, Problems and Reform Proposals", Fiscal Studies, No. 1, 2007.

[2] Chen Shiyi and Zhang Jun, "A Study on the Efficiency of Local Government Fiscal Spending in China: 1978-2005", China Social Science, No. 4, 2008.

[3] Fan Ziying and Zhang Jun, "How China sacrificed efficiency in the balance: a perspective on transfer payments", World Economy, No. 11, 2010.

[4] Gu Cheng and Zhang Hongtao, "The structure of transfer payments and the efficiency of the use of fiscal funds", Studies in Financial Issues, No. 6, 2021.

[5] Li Yongyou and Yan Cen, "Can the "camp reform" of service industry drive the upgrading of manufacturing industry? , Economic Research, No. 4, 2018.

[6] Liu Qiren, Zhao Can and Huang Jianzhong, "Tax incentives, supply-side reform and corporate investment", Management World, Vol. 1, 2019.

[7] Tang Qiming and Wang Biao, "An empirical study on the efficiency of local government fiscal spending and the factors influencing it in China", Financial Studies, No. 2, 2012.

[8] Xu Chao, Pang Yumeng and Liu Di, "Local Fiscal Pressure and Government Spending Efficiency - A Quasi-Natural Experiment Analysis Based on Income Tax Sharing Reform", Economic Research, No. 6, 2020.

[9] Wu, Y. K. and Zhao, J., "Transfer payment structure and local fiscal efficiency - a quantile regression analysis based on panel data", Finance and Trade Economics, No. 2, 2016.

[10] Zhu Daqi, "Improving the NPC's all-round review and supervision system of the government budget", Journal of Law, No. 2, 2014.

[11] Afonso, A. J., João, T., & Venâncio, A., Taxation and Public Spending Efficiency: An International Comparison. EconPol Working Paper, No. 25. 2019.

[12] Antonelli, M., & de Bonis, V., The Efficiency of Social Public Expenditure in European Countries: a Two-stage Analysis. applied Economics. Vol. 51, No. 1, 2019, pp. 47-60.

[13] Albouy, D., Evaluating the Efficiency and Equity of Federal Fiscal Equalization, Journal of Pulic Economics, Vol. 96, No. 9, 2010, pp. 824 -839.

[14] Battese, G. E., & Coelli, T. J., A Model for Technical Inefficiency Effects in a Stochastic Frontier Production Function for Panel Data. Empirical Economics, 1995, pp. 325-332.

[15] Baker, M.A., Payne, A., & Smart, M., An Empirical Study of Matching Grants: The 'Gap on CPA'. Journal of Pulic Economics, Vol. 72, No. 2, 1999, pp. 269-288.

[16] Bradford, D.F., & Oates, W.E., Towards a Predictive Theory of Intergovermental Grants. Amercan Economics Reviews, Vol. 62, No. 2, 1971, pp440 -448.

[17] Brennan, G., & Pincus, J., A Minimalist Model of Federal Grants and Flypaper Effects. Journal of Pulic Economics, Vol. 61, No. 2, 1996, pp. 229 -246.

[18] Borck, R., & Owings, S., The Political Economy of Intergovermental Grants. Regional Science and Urban Ecomomics, Vol. 33, No. 2, 2003, pp. 139 -156.

[19] chan, S. G., Ramly, Z., & Karim, M., Government Spending Efficiency on Economic Growth: Roles of Value-added Tax. global Economic Review, Vol. 46 , No. 2, 2017, pp. 162-188.

[20] Gabriel, C. M., Júlio, C. A. B., & de Oliveira, A. J., Fiscal Transparency, Government Effectiveness and Government Spending Effifiency: Some International Evidence Based on Panel Data Approach. Economic Modelling, Vol. 79, 2019, pp. 211-225.

[21] Gamkhar, S., & Shah, A., The Impact of Intergoverment Fiscal Transfer: A Synthesis of the Conceptual and Empirical Literature in Boadway, R., & amp; Shah, A. (eds), Intergoverment Fiscal Transfers: Principles and Practice. amp; Shah, A. (eds), Intergoverment Fiscal Transfers: Principles and Practice. Word Bank Publications, 2007, pp. 225-258.

[22] Hauner, D., & Kyobe, A., Determinants of Government Efficiency. IMF Working Paper, No. 08/228, 2008.

[23] Oates, W.E., Federlism and Goverment Finance In Quigley, J.M., & Smolensky, E. (eds.), Modern public Finance, Massachusetts: Harvard University Press, 1994, pp. 126-164.

[24] Wilde, J.A., The Expenditure Effects of Grant-in-Aid Prorams. National Tax Journal, Vol. 21, No. 3, 1968, pp. 340-348.

[25] The eastern region includes Hebei, Jiangsu, Zhejiang, Shandong, Guangdong and Hainan; the central region includes Heilongjiang, Jilin, Shanxi, Anhui, Jiangxi and Henan; the western region includes Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia, Guangxi and Inner Mongolia.

[26] New Budget Act implementation dummy variable (D): for 2015 and beyond, D takes the value of 1; before 2015, D takes the value of 0.