

The Identification of the Financial Competition of Local Governments in Xia Zhang Quan Metropolitan Area: Does “the Horizontal Strategic Interaction” Coexist with “the Vertical Common Action”?

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Abstract

Using the spatial autoregressive model and spatial error correlation model, we have an empirical test on the financial competition of the 19 local governments in Xia Zhang Quan metropolitan area to identify the characteristics of “the horizontal strategic interaction” behavior and “the vertical common action” behavior. The results of our study show that the characteristics of interaction in the relative size of tax, the relative size of expenditure, the expenditure for capital construction and the expenditure on education of the 19 local governments are in the tactics of mutual mimicking. And in the characteristics of the vertical common action, the 19 local governments have followed the government of Fujian province in the tree policies of the relative size of tax, the relative size of expenditure and the expenditure on education. However, considering the endogeneity of the policy of Fujian province government, “the Horizontal Strategic Interaction” behaviors of financial policies are not robust and the policy of the province government has stronger impact on the ones of the 19 local governments.

Key words: Xia Zhang Quan metropolitan area; Financial competition; The horizontal strategic interaction; The vertical common action; Spatial panel models

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INTRODUCTION AND REVIEW

Economic decentralization and political centralization are the basic characteristics of the Chinese economy in the transitional period (ZHANG, GAO, FU & ZHANG, 2007). The competition relationship among the Chinese local governments occurs in the process of fiscal decentralization, the extent of competition is becoming more and more drastic since the tax sharing reform in 1994 (CHEN, 2010). There are not only the horizontal strategic interaction between the same level local government, but also the vertical common action among the supervisors and subordinates levels of government. Effective identification of the characteristics of these interactive behaviors between the local governments becomes an important angle of the empirical study in the public economics. There are three types of the formation mechanism of strategic interactive behavior of local governments in theory, financial policy spillover effect mechanism, fiscal competition mechanism and yardstick competition mechanism. Driven by the development of related theories, there are many foreign scholars who do the empirical test on the horizontal strategic interaction behavior. Revelli (2001, 2002) does the research on the decision of tax rate and expenditure level among the local governments. Brueckner (2000), Fredriksson and Millimet (2002) analyze on the same issue of standard formulation and regulatory way. As to the investigation of China, more scholars use game theory in theoretical research (ZHOU, 2003; GUO & JIA, 2006).

As for the empirical study, more and more scholars use the spatial econometric models in this sphere, such as in the study of strategic interaction behaviors of tax policy. SHEN and FU (2006) exam the tax competition between the Chinese provincial governments and game behavior based on the cross-sectional data of inter-provincial in 1992 and 2003. The results show that the slope of inter-provincial tax competition response function is negative, which indicating that differentiation is the characteristics in inter-provincial tax competition. In contrast to the conclusion, WANG and REN (2008) take empirical analysis of the instrumental variable method based on the 1978-2006 province level panel data. Their study shows that the financial strategic behavior among the provincial governments is significant, and strategic response function tilt to the right. In the study of strategic interaction behavior in aspects of fiscal expenditure, SHAO Jun's (2007) empirical studies, that based on the provincial fiscal expenditure data from 2001 to 2005, demonstrate that local fiscal expenditure have a significant positive external effects. Further analysis of the expenditure of construction and the expenditure on education and technology shows that there is not a significant strategic interaction in the expenditure on education and technology. LI and SHEN (2008) point out that the competitive strategy of provincial governments is extending from a simple extensive tax competition to the field of financial expenditure. LI and ZHOU (2009) take an empirical analysis of inter-provincial fiscal expenditure competitive behavior, using the provincial panel data from 1999 to 2005.

In the multi-layer of governments, scholars pay attention to the vertical common action among upper-tier authority and lower-tier authority. Using the spatial lag model, Esteller-Moré and Solé-Ollé (2001) estimate the reaction of U.S. state personal income and general sales taxes to federal tax rates, taking into account the special features of the U.S. tax system. The results show that when the federal government increases taxes, there is a significant positive response of state taxes. Revelli (2003) models horizontal and vertical fiscal externalities in a multi-tiered structure of government, and implements maximum likelihood and instrumental variables estimation techniques to identify the source of spatial dependence in English local government expenditures. The results show that when vertical fiscal externalities among upper-tier (County) authority and lower-tier (District) authority expenditures are explicitly taken into account, the estimated magnitude of inter-district fiscal interactions is substantially reduced. Devereux, Lockwood, and Redoano (2007) estimate equations informed by the theory on a panel of US state and federal excise taxes on cigarettes and gasoline. The results show that when the characteristics of the markets for the goods are taken into account, taxes in neighboring states have a significant and large effect in the case of cigarettes. In the

case of gasoline, taxes in neighboring states do not play a significant role; however, there is evidence in this case of vertical competition. Actually, because of the political centralization in China, the decision-making of upper-tier authority will have a potential and important effect on lower-tier authority. Based on Chinese provincial panel data during the period of 1985-2006, WANG, LIN, and YU (2010) have carried out the identification of the characteristics of the horizontal strategic interaction and the vertical common action of the local governments in financial competition.

So far, the literatures on the identification of the behavior characteristics of the horizontal and vertical competition for the provincial governments tend to be complete, but there is not enough empirical tests on the level of city and county local governments. The main significance of this study is to investigate into the depth of the Xia Zhang Quan metropolitan area, at the same time we use the spatial autoregressive model and spatial error correlation model to conduct in-depth observation of the strategic interaction behaviors of its 19 cities and counties local governments in fiscal competition. Identification and estimation of the competitive paradigm of the financial competition among the local governments in Xia Zhang Quan has important policy implications for the promotion of the integrated development of this region. This study attempts to solve the problems as follows: For the horizontal strategic interaction of the financial competition, do the local governments in Xia Zhang Quan imitate or differentiate from each other? Are they consistent in tax policy and expenditure policy? For the vertical common action, do the local governments follow the government of Fujian province or run in the opposite direction? The basic structure of the article is organized as follows: This section is introduction and literature review. The second section describes the spatial econometric models and the variables. The third part is the explanation of the empirical results and the discussion of the robustness tests. The last part will be the conclusion and the policy suggestion.

1. MODEL CONSTRUCTION AND VARIABLE DECLARATION

1.1 Model Selection and Construction

Following the existing literature, we choose the common spatial panel model which is used to identify the characteristics of local government finances competition's strategic interaction behavior. Elhorst (2003) extends this model to Spatial Autoregressive Model (SAR) and Spatial Error Model (SEM), both of which are used in this article. We determine which kind of model is more suitable to Xia Zhang Quan metropolitan area local government financial competition's strategic interaction by using the LM tests, goodness-of-fit and the Moran I test.

Spatial Panel Autoregressive Model is set as follows:

$$cz_{it} = \rho \sum_{j \neq i} w_{ij} cz_{jt} + \alpha_1 fc_t + X_{it}' \beta_1 + G_t' \eta_1 + e_{it} \quad (1)$$

Spatial Panel Error Model is set as follows:

$$\begin{aligned} cz_{it} &= \alpha_2 fc_t + X_{it}' \beta_2 + G_t' \eta_2 + v_{it} \\ v_{it} &= \lambda \sum_{j \neq i} w_{ij} v_{jt} + u_{it} \\ u_{it} &= \varepsilon_i + \delta_{it} \end{aligned} \quad (2)$$

Where cz_{it} represents the financial policy vector of Xia Zhang Quan metropolitan area's local governments i in year t , cz_{jt} represents the financial policy vector of Xia Zhang Quan metropolitan area's local governments j in year t , w_{ij} is the spatial weight matrix element, which can be treated as the relative importance in financial policy decisions of local government i with respect to local government j , based on geographical distance. According to Revelli's (2006) simple principle, when the local government i and local government j have a common geographic boundary, w_{ij} is 1, otherwise the value is 0.

Therefore $\sum_{j \neq i} w_{ij} cz_{jt}$ represents the horizontal strategic interaction of local government i with respect to various competitive local government j . fc_t is Fujian provincial government fiscal policy variables, which is used to describe the vertical common action of local government with respect to Fujian provincial government. X_{it} is a set of control variables which reflect the characteristics of cities in Xia Zhang Quan metropolitan area; G_t is a set of control variables which reflect the macroeconomic situation and the Chinese-style country's governance structure. G_t and fc_t only change over time rather than individual. e_{it} and v_{it} are random disturbance items, and v_{it} obeys spatial autocorrelation form. δ_{it} is typical random disturbance term. ε_{it} is individual effect and it can be manifested as random effects or fixed effects. ρ , α_1 , β_1 , η_1 , α_2 , β_2 , η_2 and λ are the parameters to be estimated, among which we concern most are ρ , α_1 , α_2 , and λ . ρ is horizontal strategic interaction parameter. If it is significant positive, that means, there are mutual imitative and comparable horizontal strategic interaction among the 19 local governments in Xia zhang Quan area. If it is significant negative, there is differentiation in horizontal strategic interaction among the 19 local governments. α_1 and α_2 are vertical common reaction parameters. If they are significant positive, it means that the 19 local governments are following the Fujian provincial government in fiscal policies-making, and vice versa. λ is the correlation coefficient of error space, the assumption of $\lambda \neq 0$ can be tested by the Moran I statistic. If it is significant non-zero, it indicates that the interference factor does exist which causing spatial correlation in the spatial error model.

1.2 Description of Data and Variables

Xia Zhang Quan metropolitan area 19 cities' data used in this paper are panel data which are collected after the reforming of tax system since 1994. The 19 cities are consist of Xiamen, Quanzhou, Shishi, Jinjiang, Nan'an, Hui'an, Anxi, Yongchun, Dehua, Zhangzhou, Longhai, Yunxiao, Zhangpu, Zhao'an, Changtai, Dongshan, Nanjing, Pinghe and Hua'an, in which Quanzhou and Zhangzhou are used of the municipal district data. Data are derived from the "Statistical Yearbook of Fujian", "Fujian Finance Yearbook", "Countrywide City and County Finance Statistics Yearbook", as well as China's economic and social development of the statistical yearbook of China database and web database.

In order to reflect the policy orientation of the 19 local governments in Xia Zhang Quan area, we use the proportion index to serve as local government fiscal policy variables cz_{it} , including four proportion indexes: the local finance income divided by GDP to measure the relative size of the local government tax, the local fiscal expenditure divided by GDP to measure the relative scale of local government expenditure, the Local expenditure for capital construction dividend by total local fiscal expenditure to measure the proportion of the expenditure of the local infrastructure, the last one is the local education spending divided by the total local fiscal expenditure to measure the proportion of education spending. According to the availability and comparability of the data, the sample periods are different. Models of the relative size of tax and the ones of the relative size of expenditure are from 1994 to 2010. Models of the proportion of construction expenditure are from 1994 to 2006. Models of the proportion of education expenditure are from 1998 to 2010.

The fiscal policy variable fc_t of Fujian provincial government and fiscal policy variable cz_{it} of local government are calculated with the same methods, including the relative scale of tax of Fujian province government and the relative scale of expenditure of Fujian province government, the proportion of basic construction expenditure of Fujian provincial government and the proportion of expenditure on education of Fujian provincial government.

Control variable group X_{it} , which reflects the economic and social characteristics of Xia Zhang Quan area, includes average wage of each city which reflects economic development level, and is in the natural logarithm. In addition, it also includes the population density of each city which calculated by total population divided by the total area, the population of pupils in total population which reflects the structural characteristics, the first industry increasing value proportion which reflects industrial structure characteristics and sources of richness of each city, the non-agricultural population proportion which reflects urbanization level, the proportion of staff

and workers in state-owned units which reflects the ownership structure characteristics and traffic density which considered by highway traffic mileage number divided by the total population.

Control variable group G_t , which reflects Chinese-style giant governance structure and macro economy situation, includes decentralized finance variable which measured by the proportion of the tax and expenditure of the local governments in the one of the provincial government. And it also includes political centralization of state variables which adopts dummy form, referring to Edmark and Agren (2008). Promotion tournament is the governance characteristics of Chinese government system. Local governments should be responsible to higher authorities, not lower. It is a top-down yardstick competition based on the evaluation of the higher level governments (ZHANG & GONG, 2005). What's more, major conference is an important moment during which the local officials are suffering appointment and removal, so the value of the dummy variable should be set as 1 in the year before major meeting: 1996, 1997, 2001, 2002, 2006 and 2007, in the other years the one should be set as 0. In addition, we use two indicators of natural logarithm: the GDP index and consumer price index (CPI), to reflect the macro economic situation of Fujian province.

2. EMPIRICAL RESULTS AND DISCUSSIONS ON ROBUSTNESS

Firstly, we identify the characteristics of “the horizontal strategic interaction” behavior and “the vertical common

action” behavior of the financial competition of the 19 local governments in Xia Zhang Quan metropolitan area. Secondly, we turn to analyze the estimation result of the other important control variables. Thirdly, we have a discussion on the results of the robustness tests. Table 1 provides the empirical results of relative size of tax and relative size of expenditure. Table 2 provides the empirical results of expenditure for capital construction and expenditure on education. How to dealing with the endogeneity of the policy of Fujian province government is the key problem for reliability and robustness of our results. The series of Model 1 that including Model 1-1 to Model 1-4 is different from the series of Model 2 which including Model 2-1 to Model 2-4. The series of Model 2 consider the policy of Fujian province government. Furthermore, the series of Model 3 which including Model 3-1, Model 3-2 and Model 3-4, introduce the dummy variable of centralized politics, the natural logarithm of GDP index of Fujian province and the natural logarithm of CPI of Fujian province to avoid the the endogeneity of the policy of Fujian province government by reference to Hayashi and Boadway (2001). In consideration of Moran I test, LM-sar test, robust LM-sar test, LM-sem test, robust LM-sem test and goodness of fit, the series of Model 2 fit the real form of the behaviors of financial competition among the the 19 local governments in Xia Zhang Quan metropolitan area. Therefore, most of our analysis below is based on the results of the series of Model 2. In addition, Table 1 and Table 2 just only present the estimation results of SAR models and coefficient of spatial error term in SEM models to save the space.

Table 1
Empirical Results of Relative Size of Tax and Relative Size of Expenditure

	Relative size of tax (1994–2010)			Relative size of expenditure (1994–2010)		
	Model 1-1	Model 2-1	Model 3-1	Model 1-2	Model 2-2	Model 3-2
Horizontal strategic interaction	0.648973 (17.61)***	0.590973 (14.27)***		0.737978 (24.05)***	0.643989 (16.57)***	
Vertical common action		0.42098 (3.96)***	0.995872 (4.57)***		0.606683 (5.47)***	0.865684 (3.37)***
Spatial error term	0.736017 (22.25)***	0.628982 (15.01)***	0.589986 (13.12)***	0.329995 (5.37)***	0.696954 (19.27)***	0.659991 (16.77)***
Average wage (Natural logarithm)	0.000125 -0.22	-0.003021 (-3.21)***	-0.006615 (-1.82)*	0.003107 (4.47)***	-0.002753 (-2.24)**	0.011499 (2.05)**
Population density	-0.00001 (-2.87)***	-0.000008 (-2.32)**	-0.000007 (-2.12)**	-0.00003 (-6.37)***	-0.000028 (-6.07)***	-0.000029 (-6.49)***
Proportion of pupils in total population	-0.001363 (-0.28)	-0.000655 (-0.13)	-0.003375 (-0.68)	-0.009076 (-1.35)	-0.006218 (-0.95)	-0.016465 (-2.47)***
Proportion of the increasing value of the first industry	0.00783 -1.03	0.003648 -0.48	-0.013924 (-1.44)	0.034482 (3.28)***	0.035089 (3.39)***	0.03242 (2.47)***
Rate of urbanization	0.004734 -0.9	0.006795 -1.27	0.006268 -1.11	0.003094 -0.42	0.000339 -0.04	0.008464 -1.09
Proportion of staff in State-owned Units	-0.001122 (-0.30)	0.00468 -1.16	0.007705 -1.53	-0.01398 (-2.69)***	-0.007058 (-1.30)	0.008946 -1.33

To be continued

Continued

	Relative size of tax (1994–2010)			Relative size of expenditure (1994–2010)		
	Model 1-1	Model 2-1	Model 3-1	Model 1-2	Model 2-2	Model 3-2
Traffic density	0.00568 (4.01)***	0.003273 (2.11)**	0.002015 -1.18	0.001873 -0.95	-0.000795 (-0.39)	-0.003156 (-1.36)
Decentralized finance	1.083509 (13.32)***	1.060189 (13.28)***	1.176121 (12.82)***	0.510777 (7.49)***	0.534305 (7.98)***	0.50333 (6.97)***
Centralized politics			-0.00329 (-1.79)*			-0.00431 (-1.44)
GDP index of Fujian province (natural logarithm)			0.101371 -1.55			0.261065 (2.44)***
CPI of Fujian province (natural logarithm)			0.001045 -0.03			-0.008414 (-0.17)
Moran I test	11.69***	9.34***	9.35***	12.22***	10.01***	9.24***
LM-sar test	64.39***	46.43***	Na	95.69***	38.06***	Na
Robust LM-sar test	51.86***	9.66***	Na	13.52***	6.48***	Na
LM-sem test	128.42***	79.73***	74.68***	140.66***	91.85***	72.72***
Robust LM-sem test	115.89***	42.96***	Na	58.49***	60.27***	Na
Hausman test	-7.92	-4.94	-17.82	-6.28	-15.64	-35.02***
R ²	0.94	0.94	0.94	0.92	0.92	0.87

Note. *, **, *** represent 10%, 5% and 1% level of significance respectively; t statistics are below the regression coefficients; Singnificant Hausman test means to use the fixed effects model, otherwise to use the random effects one; Na represents that the datum is not available. The notes above also apply to Table 2.

Table 2
Results of Expenditure for Capital Construction and Expenditure on Education

	Expenditure for capital construction (1994–2006)		Expenditure on education (1998–2010)		
	Model 1-3	Model 2-3	Model 1-4	Model 2-4	Model 3-4
Horizontal strategic interaction	-0.119985 (-1.57)	0.272961 (3.91)***	0.40595 (6.66)***	0.337947 (5.10)***	
Vertical common action		-0.081779 (-0.29)		0.985265 (3.09)***	1.536764 (3.31)***
Spatial error term	-0.252999 (-2.90)***	0.273996 (3.74)***	0.431983 (6.78)***	0.400314 (5.86)***	0.327995 (4.66)***
Average wage (Natural logarithm)	0.003056 -0.12	-0.023291 (-2.30)**	-0.010745 (-1.02)	-0.02281 (-2.07)**	-0.029094 (-2.20)**
Population density	0.000019 (2.98)***	-0.000125 (-6.73)***	0.000088 (2.91)***	0.000088 (2.96)***	0.000075 (2.76)***
Proportion of pupils in total population	-0.038883 (-1.20)	-0.015845 (-0.61)	-0.051269 (-1.95)**	-0.030149 (-1.11)	-0.018773 (-0.66)
Proportion of the increasing value of the first industry	-0.126097 (-4.15)***	-0.096859 (-2.37)***	0.002094 -0.03	0.042218 -0.68	0.085651 -1.16
Rate of urbanization	0.066284 (3.35)***	-0.055116 (-1.94)**	0.136909 (4.45)***	0.108985 (3.39)***	0.087528 (2.52)***
Proportion of staff in State-owned Units	-0.048914 (-2.27)**	-0.042669 (-1.75)*	0.164025 (4.33)***	0.143658 (3.79)***	0.137902 (3.76)***
Traffic density	-0.016079 (-1.83)*	0.015811 (2.28)**	-0.005551 (-0.63)	-0.000622 (-0.07)	0.00053 -0.05
Decentralized finance	0.154825 -1.57	0.553812 (1.95)**	-1.146127 (-2.63)***	-1.181615 (-2.74)***	-1.076281 (-2.51)***
Centralized politics					0.013579 (2.01)**
GDP index of Fujian province (Natural logarithm)					-0.263502 (-0.87)

To be continued

Continued

	Expenditure for capital construction (1994~2006)		Expenditure on education (1998~2010)		
	Model 1-3	Model 2-3	Model 1-4	Model 2-4	Model 3-4
CPI of Fujian province (Natural logarithm)					-0.126679 (-0.77)
Moran I test	0.52	0.56	6.13***	5.38***	5.37***
LM-sar test	0.26	0.16	26.43***	19.89***	Na
Robust LM-sar test	0.51	0.15	0.22	0.14	Na
LM-sem test	0.06	0.04	33.39***	24.43***	21.19***
Robust LM-sem test	0.32	0.03	7.18***	4.67**	Na
Hausman test	49.18***	51.36***	73.14***	46.07***	-20.24*
R ²	0.79	0.79	0.9	0.9	0.9

2.1 The Identification of the Financial Competition

It can be seen from the results of Model 2-1 in Table 1 that the coefficient of horizontal strategic interaction variable is significantly positive on the 1% level, which indicates that tax competition of the 19 local governments in Xia Zhang Quan is in the tactics of mutual mimicking since tax sharing reform. So do the relative size of expenditure and the expenditure on education, which can be seen from the results of Model 2-2 in Table 1 and Model 2-4 in Table 2. As for the expenditure for capital construction, although it also shows a significant mimicking characteristic, it does not pass the series of LM tests and it is not robust comparing with the results of Model 1-3. The coefficient of horizontal strategic interaction variable in the equation of the relative size of expenditure is about 0.64 which is the highest one. The coefficient of horizontal strategic interaction variable in the equation of the expenditure on education is about 0.34 which take the second place. The one of the expenditure for capital construction is about 0.27 which is the smallest one. Thus it can be seen that all of the local governments in Xia Zhang Quan area hope to expand the size of expenditure and the 19 local governments keep a low level of the proportion of the expenditure on education in GDP and elevate the one of the expenditure for capital construction after the example of each other. However, λ is different from the coefficient ρ , which does not have an intuitive and direct economic interpretation. All the spatial panel data pass the test of Moran I except the data of the expenditure for capital construction equation which means $\lambda \neq 0$. And λ in all equations except the expenditure for capital construction one are significantly positive on the 1% level, which demonstrates that the existence of indirect effect on spending of non-observable variables bring about the spatial correlation. In short, the 19 local governments in Xia Zhang Quan area mimic mutually in the relative size of tax, the relative size of expenditure, the expenditure for capital construction and the expenditure on education with convergent characteristic.

In case of the behavior of “vertical common action”, the results of Model 2-1 in Table 1 show that the coefficient of vertical common action variable is about 0.42 for the relative size of tax, and about 0.61 for the relative size of expenditure, both of which are significant on the 1% level. It indicates that the 19 local governments in Xia Zhang Quan follow the example of Fujian province in both of the tax policy and expenditure policy and the extent of following in the relative size of expenditure is larger. The coefficients of vertical common action for the expenditure for capital construction and the expenditure on education are -0.08 and 0.99 respectively, the former of which is not significant and the latter is significant on the 1% level. It shows that the 19 local governments in Xia Zhang Quan follow the example of the government of Fujian province in the expenditure on education but run counter to the province government in the expenditure for capital construction. In a word, the government of Fujian province exercises a great influence on the 19 local governments in Xia Zhang Quan in the making of policies of the relative size of tax, the relative size of expenditure and the expenditure on education.

2.2 Analysis of Results of Other Important Control Variables

Only the coefficient of the natural logarithm of average wage in the equation of expenditure on education is robust, and it is significantly negative on the 5% level in Model 2-4 of Table 2, indicating that the relative size of the expenditure on education would decrease when the level of average wage increases. The estimate coefficient of the variable of population density are negative significantly in the equations of the relative size of tax and the relative size of expenditure, and it is positive significantly in the equation of the expenditure on education, which suggesting that the local government with more population density prefers to put more favorable tax policy, smaller size of expenditure and larger proportion of the expenditure on education into effect. As for the variable of proportion of the increasing value of the first industry, it is not significant in the equation of the relative size of tax, which indicating that cities and

counties that give priority to agriculture make great efforts to increase the size of tax. And it is positive significantly in the equation of the relative size of expenditure. It is negative significantly on the 1% level in the equation of the expenditure for capital construction, that is to say that cities and counties with higher proportion of increasing value of the second industry and the third industry are active in expanding the size of the expenditure for capital construction. The estimates results of rate of urbanization in both of the expenditure for capital construction and the expenditure on education equations are positive significantly and robust, suggesting that cities and counties with higher rate of urbanization are willing to expand their expenditure for capital construction and expenditure on education. The proportion of staff in state-owned units has no significant effect on the relative size of tax and the relative size of expenditure, but it has a negative effect significantly on the expenditure for capital construction and a positive effect significantly on the expenditure on education. This result is not the same with the research of FU and ZHANG (2007) which exams the erroneous tendency in the structure of financial expenditure among the provincial governments in China, indicating that the increase of the proportion of state-owned units in Xia Zhang Quan area has rectified the erroneous tendency in the structure of financial expenditure since tax-separating system reform. The higher proportion of state-owned units, the lower proportion of the expenditure for capital construction and the higher proportion of the expenditure on education.

The variable of decentralized finance has a positive effect significantly on the relative size of tax, the relative size of expenditure and the expenditure for capital construction, indicating that cities and counties in Xia Zhang Quan area prefer to increase the targets of the financial policies when they take more responsibility in them. However, it is negative significantly in the expenditure on education equation on the 1% level, suggesting that cities and counties in Xia Zhang Quan area with more power to make decision of the size of the expenditure on education decrease the size of the expenditure on education. As to the regression results of the series of Model 3, it can be seen that the variable of centralized politics has a negative effect significantly with the 10% level on the relative size of tax, no significant effect on the relative size of expenditure, and a positive effect significantly with the 5% level on the expenditure on education. It is to say that the local governments in Xia Zhang Quan area would like to adopt tax preferential policy and increase the proportion of the expenditure on education in GDP the year before the important meetings.

2.3 Discussions on Robustness

More remarkable, it can be seen from the series of Model 1 and Model 2 in Table 1 and Table 2 that after considering the policy of Fujian province government, the

degree of horizontal strategic interaction among the local governments drops obviously, from 0.65 to 0.59 for the relative size of tax, from 0.74 to 0.64 for the relative size of expenditure, from 0.41 to 0.34 for the proportion of the expenditure on education, indicating that the positive spatial correlations on the three financial competitions above in Xia Zhang Quan area mainly stem from following the policy of the province government, not just from mutual mimicking from each other. Moreover, comparing Model 1-1 with Model 2-1, Model 1-4 with Model 2-4 respectively, it can be found that after considering the policy of Fujian province government, λ in these two equations decrease, but the one in the equation of the relative size of expenditure is the opposite. The regression results of the series of Model 3 which avoiding the endogeneity of the policy of Fujian province government, comparing to the series of Model 2, the degree of the Horizontal Strategic Interaction increases a lot, from 0.42 to 1.00 for the relative size of tax, from 0.61 to 0.87 for the relative size of expenditure, from 0.99 to 1.54 for the expenditure on education. The results of Moran I test and series of LM tests show that only SEM models for series of Model 3 is significant, indicating that “the horizontal strategic interaction” behaviors of financial policies are not robust and the policy of the province government has stronger impact on the ones of the 19 local governments.

CONCLUSION AND SUGGESTION

Using the spatial autoregressive model and spatial error correlation model, we have an empirical test on the financial competition of the 19 local governments in Xia Zhang Quan metropolitan area to identify the characteristics of “the horizontal strategic interaction” behavior and “the vertical common action” behavior. The results of our study show that the characteristics of interaction in the relative size of tax, the relative size of expenditure, the expenditure for capital construction and the expenditure on education of the 19 local governments are in the tactics of mutual mimicking. And in the characteristics of the vertical common action, the 19 local governments have followed the government of Fujian province in the tree policies of the relative size of tax, the relative size of expenditure and the expenditure on education. However, considering the endogeneity of the policy of Fujian province government, “the Horizontal Strategic Interaction” behaviors of financial policies are not robust and the policy of the province government has stronger impact on the ones of the 19 local governments. Moreover, our study also shows that the increase of the proportion of state-owned units in Xia Zhang Quan area has rectified the erroneous tendency in the structure of financial expenditure since tax-separating system reform. The higher proportion of state-owned units, the lower proportion of the expenditure for capital construction and the higher proportion of the expenditure

on education. And it is interesting that our empirical results indicate that the local governments in Xia Zhang Quan area would like to adopt tax preferential policy and increase the proportion of the expenditure on education in GDP the year before the important meetings.

Although the urban integrative construction of Xia Zhang Quan metropolitan area has been carried out, the restrictions of administrative divisions led many resources, policy hard to sharing, reaching an agreement and promoting. Based on the conclusion above, in order to redress Xia Zhang Quan metropolitan area’s local governments’ competition behavior, the process of urban integrative construction should be accelerated, the open cooperation platform should be built, adjacent cities and counties should break the limits of administrative division to realize competition and cooperation. More importantly, it is very obvious that Xia Zhang Quan metropolitan area’s local governments are following government in tax expenditure and education expenditure policies. So the Fujian province government should take the lead and correctly handle interest relationship of cities and counties governments in Xia Zhang Quan area, overcome the bottleneck caused by the regional imbalance of interests, handle the relationship between competition and cooperation, making a big cake and cutting the cake.

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