The spatial spillover effect of fiscal decentralization on local public provision: Mathematical application and empirical estimation☆

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A B S T R A C T

This paper examines the spillover effect of fiscal decentralization on the provision of local public goods. The paper's objectives are as follows. First, we seek to discuss whether fiscal decentralization can affect "Promotion Tournament Game" among local governments through spillover effect of local public goods supply. Second, we also examine the intrinsic mechanism of such decentralized spillover effect. Finally, we analyze, if the spillover effect is possible, how much influence of fiscal decentralization on local public provision from both expenditure and revenue perspectives. Our analysis is based on a user fee model. The panel data from 31 Chinese provinces for the period of 1994–2013 are estimated using the spatial econometric method. The results show that revenue decentralization is negatively related to the local public provision, which is consistent with the "Leviathan hypothesis". However, expenditure decentralization leads to an increase in the local public provision, which statistically proves the fierce competition in "Promotion Tournament Game" among Chinese governments.

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1. Introduction

Since 1979, China has been growing at an average annual rate of approximately 10%, doubling its gross domestic product (GDP) about every eight years and lasting for 3 decades, known for "growth miracle". If China's unsurpassed economic growth was to continue, it would become the world's largest economy in about a decade.[1] What create Chinese economic miracle? Theoretically, it could not be explained by the conventionally growth factors like physical and human capital as well as technological progress [1]. Regarding the resource endowment per capita and technology innovation, China is no unique, even at the lower stage, compared with other countries,[2] Nevertheless, North [2] lead us to a new thought of explaining economic growth that it is a country's institutional arrangements that provide the incentive structure of an economy; as that structure evolves, it shapes the direction of economic change towards growth, stagnation, or decline. Recent experiences of

transition and developing economies have also shown that a core barrier or assistor to economic development is from the governments, especially local governments, as their ability of local public provision may have either adverse or favorable effects on the entry and expansion of local business enterprises [3].

In Chinese reality, one of the most powerful institutional incentives is the "Promotion Tournament Game" (PTG) Pattern,[3] in the sense that it bonds centralized executive power together with strong stimulates,[4] thus the pursuit of the economic performance will never change no matter what transitions of the local leadership would be. Since 1980s, central government had set one and the only standard to evaluate local officials' performance: GDP. It is inevitable and even necessary for local governments to rely on more productive expenditures to maintain their economic achievements [4,5]. Therefore, it is also the pattern of utilizing its natural endowments to compete with fellow governments in public goods provision.

Chinese style federalism theory [3,6] holds that administrative decentralization and fiscal decentralization are the two basic reasons that deeply determine the local governments' behavior and create such powerful stimulates. In this paper, we intend to elaborate on the role of fiscal decentralization, one of the most economically associated institution elements, in the performance of local public provision from regionally spatial econometrics aspects. To clarify the spatial public provision, we first consider whether fiscal decentralization in jurisdiction i can affect the public provision in jurisdiction j by introducing a price mechanism. Second, based on different types of public goods and their corresponding costs, we establish an equilibrium model to illustrate how fiscal decentralization would influence the marginal change of spillover public goods. Finally, although many has been done in terms of public provision in the realm of statistical physics [7,8], however we develop a spatial econometric model to test the spillover effect of fiscal decentralization to public provision from the view of jurisdictions and to research the spatial distribution of the spillover effects in China. One point should be noted is that, in our analysis, fiscal decentralization would be considered from both the revenue and expenditure perspectives.

Our research endeavor is challenging because it is a complex task to theoretically and mathematically calculate the spillover effect in an equilibrium model. We combined the club theory[5] with the user-fee model to establish a consumer utility maximum problem, and use Standard Kuhn–Tucker techniques[6] in the FOC process to obtain the equilibrium result. Moreover, it is creative to introduce both expenditure and revenue decentralization into the theoretical model to provide a comprehensive view of decentralized spillover effect. The effect of the two alternative decentralizations is quite different, so we could not lump them together. There is also difficulty in spatial model estimation because setting the economical and geographical spatial weigh matrix is a trivial work. This paper is significant because it is, to our knowledge, the first attempt to theoretically and mathematically model the spillover effect of local public provision from both the revenue and expenditure perspectives of fiscal decentralization, and to empirically prove Chinese PTGs among local governments. Our approach contributes to the economic theory of decentralization because different perspectives of decentralization could exert different impacts on local behaviors, especially in our analysis, expenditure decentralization intensifies the PTG in local governments while revenue decentralization does oppositely. However, this does not mean that we have concluded an argument in favor of revenue decentralization. It is therefore a question of comparing the different perspectives of fiscal decentralization in order to determine the optimal fiscal structure among local governments.

This paper is organized as follows. Section 2 is a review of fiscal decentralization in China. Section 3 establishes a user fee model and researches the mechanism of decentralized spillover effect on local public provisions. Section 4 covers the empirical research on the topic using spatial econometrics method. Section 5 concludes the paper. All proofs are included in Appendices A, B and C.

2. Fiscal decentralization in China

Under a decentralized system, local governments have better access to local information, which allows them to provide public goods and services that better match local preferences than the central government [9]. Besides, the "foot voting"

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[3] In China, central government have the ability to design a promotion contest to motivate the performance of multiple subordinate governments, and the contest winners will get promoted. The standard for evaluating the achievements of local officials is the GDP growth rate alone. If the local officials want to remain their position or get promoted, it will be necessary to spend every budget on productive investment to meet the promotion requirements, for example, passing proposal on preferential tax breaks, land price subsidies and even special custom incentive packages to attract as much foreign investment as possible to achieve a better performance in PTG.

[4] Under Chinese PTG pattern, central government have the ability to design a promotion contest to motivate the performance of multiple subordinate governments, and the contest winners will get promoted. With the development of Reform and Opening up in 1978, economic reform and development has become a top priority of party committees and governments at all levels, therefore, economic performance has become one of the main indicators to evaluate the officials' promotion. Since then, local government officials are very keen on the competition for the ranking of local GDP growth rate and some other related economic indicators. If the local officials want to remain their position or get promoted, it will be necessary to spend every budget on productive investment to meet the promotion requirements, for example, passing proposal on preferential tax breaks, land price subsidies and even special custom incentive packages to attract as much foreign investment as possible in order to achieve a better performance in PTG. Therefore, PTG pattern is also the stimulation system of utilizing its natural endowments to compete with fellow governments in public goods provision.

[5] The club theory refers to the theory of supply, demand and equilibrium quantity of non-pure public goods. The club's economic theory dates back to the early 1920s, when A.C. Pigou and F. Knight talked about tolls on crowded roads. Club goods are a type of good in economics, sometimes classified as a subtype of public goods that are excludable but non-rival, at least until reaching a point where congestion occurs.

[6] In mathematical optimization, the Standard Kuhn–Tucker techniques, also known as the Kuhn–Tucker conditions, are first-order necessary conditions for a solution in nonlinear programming to be optimal, provided that some regularity conditions are satisfied. Allowing inequality constraints, this approach to nonlinear programming generalizes the method of Lagrange multipliers, which allows only equality constraints.