Municipal Merger and Tax Competition

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Abstract

This paper integrates the models of municipal consolidation and fiscal competition to examine governments' incentives for merging municipalities when countries engage in global tax competition. The result shows that the prospective tax competition leads to excessive municipal mergers.

Keywords: tax competition, municipal merger.

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1 Introduction

Nowadays, economic studies no longer consider jurisdictional borders as exogenously given. Following the pioneering work of Buchanan and Faith (1987), a series of studies by Bolton and Roland (1996, 1997) and Alesina and Spolaore (1997, 2005, 2006) adopted an innovative approach to study the endogenous determination of borders between nations. The key factor that affects the creation of national borders is the trade-off between heterogeneity in preferences and scale economies in providing public goods. Others focus on the borders at city and municipal levels in a country. Ellingsen (1998) models the trade-off between inter-regional externalities and heterogeneity in determining the design of jurisdictions. Dur and Staal (2008) presented a model to study public goods provision with spillovers, endogenous formation of municipalities, and the effects of transfers from higher-level governments. The most recent study of Breuille and Zanaj (2013) examine the impact of the regional merger on the tax rates of a two-tier territorial governments.

This paper shares the interests on the design of municipal borders with the latter and aims to provide further insight into the endogenous determination of municipal borders when countries face market integration in a global economy. To capture the effect of globalization, openness to trade has been incorporated in the analyses of (dis)integration (Alesina, Spolaore, and Wacziarg, 2000; Casella and Feinstein, 2002; Etro, 2006). In this paper, we use an alternative and more elaborate strategy to deal with the effect of globalization on mergers. While most of the models define openness to trade in an ad hoc manner by pushing aside the production sector, this paper incorporates more realistic production activities into the model, focusing on the interregional mobility of production factors. For this purpose, in this paper, we integrate the municipal merger model with the canonical model of tax competition, and the paper explicitly deals with production, capital mobility, and distorting taxation.[1] Integration of the two approaches is quite natural, and is useful for analyzing the effects of globalization on the design of domestic jurisdictions.

So far, two studies have analyzed the formation of jurisdictions under tax competition. The first, by Perroni and Scharf (2001), presents a highly sophisticated model and examines the effects of tax competition on the taxation level selected through majority voting within jurisdictions and the jurisdictional boundaries. It shows that a downward pressure on taxation associated with tax competition reduces the gap between the median voter's choice and the taxation level preferred by peripheral residents, which makes it more acceptable to be a resident in a larger jurisdiction than one in a peripheral location. The main argument is fairly close to ours, but the mechanism used is different. In our model, the borders of municipalities are determined by the central government of the country, so they choose a large jurisdiction in advance in order to prevent prospective tax-cutting competition. The second study, by Leite-Monteiro

[1] Studies on tax competition have a long history, at least since the established works of Gordon and Wilson (1986), Zodrow and Mieszkowski (1986), and Wilson (1986). See Wilson (1999) and Wildasin and Wilson (2004) for extensive reviews of tax competition models.

and Sato (2003), also discusses political (dis)integration using the tax competition model. However, the intended jurisdiction in our paper differs considerably from their analysis. While they follow mainstream analyses and examine the (dis)integration of a sovereign nation, our interest is with the endogenous determination of municipal borders within the country, and what we intend to argue is that countries have an incentive to promote consolidation or separation of municipalities and therefore change the number of municipalities in preparation for prospective tax competition.

Our interest on the borders of municipalities stems from the widely observed fact that while many countries have promoted the consolidation of municipalities, thereby drastically decreasing the number of municipalities, other countries have not taken such consolidation measures. Although care should be exercised when comparing the different definitions of municipalities among the countries, it leaves no doubt that, regardless of the type of sovereign state and size of country, most countries reduce the number of municipalities, while a few countries keep their municipal borders fairly stable.[2] The integration and consolidation of jurisdictions observed at the municipal level in many countries is quite in contrast to the disintegration and division of nations at the state level, observed in the same period of time.[3]

In the context of the conventional tax competition model based on endogenous determination of municipal borders, we show that a benevolent government, intending to maximize national welfare, has incentives to change the number of municipalities within a country when it faces the capital market integration. Specifically, we show that the critical externality which is involved by the choice of municipal borders leaves the size of municipality too large: When country i increases the size, and thereby decreases the number of jurisdiction, it avails of scale economy caused by promoting diversity in labor inputs. This makes capital investment attractive, and thus it induces capital inflow. This is a first-order positive aspect of controlling the size (number) of jurisdiction in a country. However, the first-order effect is fraught with standard fiscal externality; municipal mergers in country i attracts capital from abroad and reduces the tax base in country j, and that reduces the tax revenue in country j. The government in country i does not take into account this negative effect on the tax revenue of other countries and therefore tends to promote the excessive municipal mergers. On the other hand, the choice of size (number) of municipalities in a country has second-order effects. An increase in investment return accompanied by the increase in the size of municipality in country i puts the brakes to tax-cut incentive in country i, and accelerates the drive for cutting its tax rate in country j. This induces capital outflow from country i. The

[2]The number of municipalities in Denmark, England, Japan, Korea, Sweden, Belgium, and Germany has decreased, at least, by 50% or more over the last 50 years. Other countries, such as Finland, Norway, Netherlands, Spain, and Austria have also reduced the number of municipalities to significant degree. Contrastingly, some countries, such as France, Italy, Swiss, and Portugal, have kept their municipal borders stable, and the United States has exceptionally increased the number of municipalities due to the creation of school district.

[3]For instance, the number of countries in the United Nations was 60 in 1950, which was boosted to 154 in 1980 and 192 in 2010.

capital outflow from country i increases the tax bases and thus tax revenues of other countries. In this way, an increase in the size, and thereby a decrease in the number of jurisdiction positively affects the tax revenues of other countries through changing the tax rate in the tax competition stage. Since country i does not account for this second-order positive impacts on other countries of decrease in the number of jurisdiction, it sets the number of jurisdiction too large, and thus chooses deficient municipal merger. The change in the size of municipality produces the first-order negative and the second-order positive effect, but the former outweighs the latter, and thus the government promotes excessive municipal mergers in the global market. This result suggests not only a critical implication that countries find themselves plunged into a prisoner's dilemma in choosing municipal borders and the number of municipalities but also the efficient segmentation of municipalities limited by global competition in an integrated capital market.

This paper is organized as follows. Section 2 introduces the basic model and Section 3 presents the main results. Finally, Section 4 concludes the paper.

2 Model

Country. There are two symmetric countries in our model, denoted by i ($i = W, E$), and each country has a single central government. The population of each country, normalized to 1, is immobile and uniformly distributed over the interval $[0, 1]$. The geographical distribution coincides with the ideological distribution, indicating that geographical neighbors have similar preferences on the public policy enforced. Symmetric local jurisdictions (municipalities) are a segment of this interval. The (population) size of a local jurisdiction in country i is denoted by $s_i \in (0, 1]$, which indicates that the number of local jurisdictions is given by $1/s_i$. Since the population varies by ideology, s_i also stands for the diversity in population in a jurisdiction. The smaller s_i, the larger the number of municipalities and the smaller diversity in a jurisdiction in country i. The upper limit of $s_i = 1$ corresponds to complete consolidation, where all individuals in country i are forced to consume the uniform public good in a single municipality. Local jurisdiction j of country i provides a public good that is solely financed by capital taxation. The public good is non-rival, but excludable in the sense that an individual residing in jurisdiction j can benefit from the public good provided only in jurisdiction j.

Production. The production of private goods in a local jurisdiction requires capital and labor. The capital is perfectly mobile among the jurisdictions and countries. The total capital in this economy is assumed be fixed at K. Absentee capital ownership is assumed, so there is no capital return to the residents in countries, W and E.[4] The population in each jurisdiction of country i is s_i, and

[4]This assumption, which is also advanced by Hindriks et al. (2008) and Kempf and Rota-Graziosi (2010), is made just for simplification, so it is not crucial for our analysis of symmetric jurisdictions.

all residents supply a unit of labor in the jurisdiction of residence. In this case, the amount of labor in the jurisdiction is given by s_i. We assume the production function expressed as

$$Y_{ji} = \left(A_i - \frac{K_{ji}}{s_i} \right) K_{ji},$$

where Y_{ji} is the output level and K_{ji} the amount of capital used for production in jurisdiction j of country i, and $A_i \equiv a + s_i$ $(a > 0)$. This formulation assumes the scale economies in production associated with the labor diversity, and scale economies are modeled as arising through external increasing returns to diversity.[5] Taking notice that the firms face with the CRS technology when they treat A_i as exogenous parameter, an increase in labor diversity in a jurisdiction has a productivity effect on all firms in the jurisdiction even though each competitive firm believes that it is operating under constant returns to scale. Unlike firms, the government recognizes that a modification in jurisdictional boundaries changes in the jurisdiction's diversity in labor inputs which impacts on the firms' productivity.

The production per capita can be represented by

$$y_{ji} = f(\kappa_{ji}) = (A_i - \kappa_{ji})\kappa_{ji},$$

where $\kappa_{ji} \equiv K_{ji}/s_i$. A firm's profit in jurisdiction j of country i is given by

$$\pi_{ji} = (A_i - \kappa_{ji})\kappa_{ji} - r\kappa_{ji} - T_{ji}\kappa_{ji} - w_{ji}, \tag{1}$$

where r is the price of capital, T_{ji} is the (unit) tax rate imposed on capital, and w_{ji} is the wage rate. The profit maximization yields

$$r = A_i - 2\kappa_{ji} - T_{ji}. \tag{2}$$

Residents. Following Alesina and Spolaore (1997) and Etro (2006), a resident's preference in jurisdiction j of country i is assumed to be given by

$$u_{ji} = c_{ji} + g_{ji}(\lambda - \delta l_{ji}), \tag{3}$$

where c_{ji} denotes the consumption level of a private numeraire good, g_{ji} a public good, and l_{ji} is the preference distance from individuals in jurisdiction j of country i to the jurisdictional government; $\delta > 0$ reflects the cost of heterogeneity and $\lambda > 0$ denotes the native utility from public good consumption. Using (1) and (2), we have $w_{ji} = \kappa_{ji}^2$. Hence, the budget constraint of the resident requires

$$c_{ji} = \kappa_{ji}^2. \tag{4}$$

[5]This approach is based on the concept of (Marshallian) external economies which has been used frequently to explain scale economies of in production. See Chipman (1970) and Abdel-Rahman and Fujita (1990), among others.

Local Jurisdiction (Municipalities). To finance the public good, the jurisdiction can use only unit tax on mobile capital. To avoid horizontal fiscal externality due to wasteful tax competition between local jurisdictions in the country, the central government in country i controls the rate of tax and imposes a uniform (unit) tax rate for all jurisdictions in the country, $T_{ji} = T_i$. Thus, from (2),

$$\kappa_{ji} = \kappa_i \ \ \forall j. \tag{5}$$

The budget constraint of jurisdiction j of country i is given by $g_{ji} = T_i K_{ji}$. Using $\kappa_{ji} \equiv K_{ji}/s_i$ and (5), we can rewritten the budget constraint as

$$g_{ji} = T_i \kappa_i s_i. \tag{6}$$

Capital Allocation. All capital is allocated among two countries:

$$K = k_W + k_E, \tag{7}$$

where k_i is the amount of capital located in country i. Note that the capital located in country i is given by $k_i = \Sigma_{j=1}^{1/s_i} K_{ji} = \Sigma_{j=1}^{1/s_i} \kappa_{ji} s_i = \kappa_i$ since $\kappa_{ji} = \kappa_i$.[6] Hence, using (2) and (7), the capital located in country i is obtained as follows.

$$k_i = \frac{2K + s_i - s_m + T_m - T_i}{4}, \quad m \neq i. \tag{8}$$

Given s_i, the tax effects on capital allocation is given by

$$\frac{\partial k_i}{\partial T_i} = -\frac{1}{4} = -\frac{\partial k_m}{\partial T_i}, \quad m \neq i. \tag{9}$$

In a similar fachion, given T_i, the effect of change in the s_i on capital allocation is given by

$$\frac{\partial k_i}{\partial s_i} = \frac{1}{4} = -\frac{\partial k_m}{\partial s_i}, \quad m \neq i. \tag{10}$$

From (2) and (8), the price of capital is given by $r = a - K - 0.5(T_E + T_W - s_E - s_W)$.

Central Government. Each central government expects the country's choice on the number of jurisdictions to affect its capital allocation, at least in the long run, and so it has an incentive to control the size, and thereby the number of local jurisdiction in its country. We assume that the central government in country i maximizes the sum of utilities in its country, $U_i = \int_0^1 u_{ji} dj$. Given the symmetry of jurisdictions in the country and the assumption of uniformity of distribution of

[6]The amount of capital in jurisdiction j of country i, K_{ji}, can be obtained by dividing k_i with the number of jurisdiction, $1/s_i$ as $k_i/(1/s_i) = s_i k_i$.

the country's population, using (3) and (4), the central government i's problem is to maximize

$$U_i = g_i\left(\lambda - \frac{\delta s_i}{4}\right) + k_i^2, \tag{11}$$

subject to (6) and (8).[7] Substituting (6) into (11), the objective function can be given by

$$U_i = T_i k_i \Omega_i + k_i^2, \quad \text{where} \quad \Omega_i \equiv s_i\left(\lambda - \frac{\delta s_i}{4}\right). \tag{12}$$

At this stage, our approach to determine the tax levels and municipal borders is slightly different from the approach used in political (dis)integration models developed by Alesina and Spolaore (1997). The political (dis)integration models assume that they are determined as the stable equilibrium in which the individuals living within a jurisdictional border have no incentive to change their decision through majority voting. Different from this approach, we simply assume that the size of local jurisdictions and tax rates within a country are determined and enforced by the central government. This is, at least, partly justifiable as the central government can promote mergers of local jurisdictions indirectly through various policy instruments, such as grants and special tax and debt treatments associated with the municipal mergers.

The central governments' decisions are made in two stages. First, they decide simultaneously and independently the size of a jurisdiction, and thereby the number of local jurisdictions, (s_W, s_E). Once s_W and s_E are observed, it is not feasible to change the decision about s_i at this time. Thus, in the second-stage, given s_W and s_E, each central government simultaneously chooses its tax rate on mobile capital: (T_W, T_E). The reason why we model the process as a two-stage game is that decisions about municipal mergers/secession are long-run in nature, and are taken as fixed in the second stage. Tax rates, on the contrary, could be changed more easily in the short-run.

The structure of a model has important strategic effects on the number of jurisdiction. It not only affects the tax rate chosen by country i in the tax competition stage, but also impacts the tax rate chosen by the other country. Since the final outcome of this game can be derived as the subgame perfect equilibrium, we solve it by backward induction.

[7] Denoting the size of each municipality in country i by s_i, the sum of preference distance of individuals who resides in any municipality is given by $2\int_0^{0.5s_i} x dx = s_i^2/4$. Since the number of municipality in country i is $1/s_i$, the sum of preference distance of individuals in country i is given by $s_i/4$, which leads to (11).

3 Equilibrium

3.1 Second Stage

Given the size of local jurisdictions, s_W and s_E, the central government of country i chooses T_i to maximize (12). In choosing T_i, each government correctly anticipates the tax effects on capital allocation, which is given by (9). The maximization problem yields

$$\frac{\partial U_i}{\partial T_i} = \left(k_i + T_i \frac{\partial k_i}{\partial T_i} \right) \Omega_i + 2k_i \frac{\partial k_i}{\partial T_i} = 0. \tag{13}$$

Using (8) and (9), (13) yields the tax reaction function as $T_i = T_i(T_m; s_i, s_m)$ $(m \neq i)$:

$$T_i = \frac{2\Omega_i - 1}{4\Omega_i - 1} T_m + \frac{(2\Omega_i - 1)(2K - s_m + s_i)}{4\Omega_i - 1}, \qquad m \neq i. \tag{14}$$

To ensure strategic complementarity in tax competition, we make the following assumption, which ensures a unique and stable equilibrium in tax competition stage.

Assumption 1. $2\Omega_i > 1$.

Assumption 1 is likely to hold when λ/δ is sufficiently high. Notice that

$$\frac{\partial T_m}{\partial s_i}|_{given\ T_i} = -\frac{2\Omega_m - 1}{4\Omega_m - 1} < 0, \tag{15}$$

$$\frac{\partial T_i}{\partial s_i}|_{given\ T_m} = \frac{2\Omega_i - 1}{4\Omega_i - 1} + \frac{2(2K + T_m - s_m + s_i)}{(4\Omega_i - 1)^2} \frac{\partial \Omega_i}{\partial s_i}. \tag{16}$$

(15) implies that the increase in s_i in the first stage reduces the tax rate in other countries in the second stage, given T_i. This is because the increase in the size of municipality improves the productivity of capital through labor diversity effects, and thus the rival country has to reduce its tax rate to enhance the appeal of investment environment. The first term of (16) represents the positive effect of s_i on the tax rate; if s_i is large, the productivity of capital becomes high, and thereby the government has no need to engage in tax-cutting competition and tends to choose higher tax rate. The sign of second term depends on the sign of $\partial \Omega_W / \partial s_W$. If λ (benefit from public goods) is high enough (a is low enough) to make the sign of $\partial \Omega_W / \partial s_W$ positive, then the increase in s_i increases the tax rate. However, if λ (benefit from public goods) is low enough (a is high enough) to make the sign of $\partial \Omega_W / \partial s_W$ negative, then the increase in s_i is likely to reduce the tax rate. Solving (14) for $i = W, E$, we obtain the tax rates as $T_i(s_i, s_m)$:

$$T_i = \frac{2K(3\Omega_m - 1)(2\Omega_i - 1)}{6\Omega_m \Omega_i - \Omega_m - \Omega_i} + \frac{\Omega_m (s_i - s_m)(2\Omega_i - 1)}{6\Omega_m \Omega_i - \Omega_m - \Omega_i}. \tag{17}$$

Furthermore, using (8) and (17), we get the amount of capital in country i as $k_i(s_i, s_m, T_i(s_i, s_m), T_m(s_i, s_m))$.

3.2 First Stage

In the first stage, the central government in country i chooses the size of its local jurisdiction, s_i, by anticipating the direct effect of s_i on the utility and the strategic effect through the tax choice decided in the second stage. Expressing the objective function as $U_i = T_i k_i \Omega_i(s_i) + k_i^2$, where $T_i(s_i, s_m)$ and $k_i = k_i(s_i, s_m, T_i(s_i, s_m), T_m(s_i, s_m))$, the incentives for municipal merger are given by the derivative

$$\begin{aligned}\frac{\partial U_i}{\partial s_i} &= k_i \frac{\partial \Omega_i}{\partial s_i} T_i + (\Omega_i T_i + 2k_i)\frac{\partial k_i}{\partial s_i} + (\Omega_i T_i + 2k_i)\frac{\partial k_i}{\partial T_m}\frac{\partial T_m}{\partial s_i} \\ &\quad \left[\left(k_i + T_i \frac{\partial k_i}{\partial T_i}\right)\Omega_i + 2k_i \frac{\partial k_i}{\partial T_i}\right]\frac{\partial T_i}{\partial s_i} = 0, \quad m \neq i. \end{aligned} \tag{18}$$

The last element on the right-hand side is, from (13), equal to zero by the envelope theorem. Hence, the first three terms affect the equilibrium level of municipal merger.

3.3 Effects of Market Integration

We now study whether the government increases or decreases the number of municipalities when it face with the capital market integration. When the capital market is not integrated, and thus capital does not move over the jurisdictions and countries, $k_i = K/2$. In this case, reminding that the last term in (18) is zero, we have

$$\frac{\partial U_i}{\partial s_i} = k_i T_i \frac{\partial \Omega_i}{\partial s_i} = 0,$$

since $\partial k_i/\partial s_i = \partial k_i/\partial T_m = 0$. Hence, the government chooses the size of municipality in the closed market, s_{ic}, to satisfy

$$s_{ic} = \frac{2\lambda}{\delta}. \tag{19}$$

(19) shows that the central government expands the size of each municipality by promoting municipal merger as the public goods gain in importance, but it is reluctant to municipal mergers as the heterogeneity in individual preferences increases.

The size of municipality when the capital market is integrated is determined by (18), in which the last term is again zero. Evaluating (18) at s_{ic}, we have

$$\frac{\partial U_i}{\partial s_i}|_{s_{ic}} = (\Omega_i T_i + 2k_i)\left(\frac{\partial k_i}{\partial s_i} + \frac{\partial k_i}{\partial T_m}\frac{\partial T_m}{\partial s_i}\right). \tag{20}$$

From (17), we have

$$\frac{\partial T_m}{\partial s_i} = \frac{2K\left(3\Omega_m-1\right)\left(2\Omega_m-1\right)-\Omega_m\left(s_m-s_i\right)\left(2\Omega_m-1\right)}{\left(6\Omega_m\Omega_i-\Omega_m-\Omega_i\right)^2}\frac{\partial\Omega_i}{\partial s_i} - \frac{\Omega_i(2\Omega_m-1)}{6\Omega_m\Omega_i-\Omega_m-\Omega_i}. \tag{21}$$

Using (9), (10), and (21) with $\partial\Omega_i/\partial s_i = 0$ (since we evaluate at s_{ic}), (20) is rewritten as

$$\frac{\partial U_i}{\partial s_i}|_{s_{ic}} = \frac{\Omega_i T_i + K}{4}\frac{4\Omega_m\Omega_i-\Omega_m}{6\Omega_m\Omega_i-\Omega_m-\Omega_i} > 0, \tag{22}$$

in which the last inequality comes from Assumption 1. (22) suggests that the government promotes municipal merger when it faces with the capital market integration. Summarizing above discussion, we obtain the following result.

Proposition 1. *Capital market integration leads municipal merger.*

When the capital is fixed its location, the government simply chooses the size of municipality to balance the marginal cost associated with the heterogeneity and marginal benefit of non-rival public goods consumption. Once the market is opened, and capital is free to move across the borders, the government has an additional incentive to increase the size of municipality. By enlarging its size, each municipality is able to utilize the economies of scale in production, so that the capital inflow is promoted, which induces the government to promote municipal merger when the capital market is integrated.

4 Cooperative Outcome

We now refer to the cooperative policy choices in the integrated capital market. The cooperative policy choices can be found by maximizing the sum of utilities across the countries; $V = U_W + U_E$, where U_i is given by (12). With (8), the cooperative tax rate and the size of municipalities, T_{i*} and s_{i*} satisfy

$$\frac{\partial V}{\partial T_i} = \Omega_i(k_i + T_i\frac{\partial k_i}{\partial T_i}) + 2k_i\frac{\partial k_i}{\partial T_i} + (T_m\Omega_m + 2k_m)\frac{\partial k_m}{\partial T_i} = 0, \tag{23}$$

$$\frac{\partial V}{\partial s_i} = T_i k_i\frac{\partial\Omega_i}{\partial s_i} + (T_i\Omega_i + 2k_i)\frac{\partial k_i}{\partial s_i} + (T_m\Omega_m + 2k_m)\frac{\partial k_m}{\partial s_i} = 0. \tag{24}$$

Comparing equilibrium conditions with the conditions for cooperative outcome, we have the following results.

Proposition 2. *The equilibrium tax rate is lower than the cooperative tax rate in the tax competition stage.*

Proof. From (13) and (23), We have

$$\frac{\partial U_i}{\partial T_i}|_{T_{i*}} = -(T_m\Omega_m + 2k_m)\frac{\partial k_m}{\partial T_i} < 0. \tag{25}$$

The last inequality comes from (9). (Q.E.D.)

Proposition 2 replicates the standard argument in tax competition theory. (25) captures the conventional horizontal fiscal externality arising from the effect on tax revenues of capital movements between countries accompanied by the change in the tax rate. The central government in country i has incentives to reduce its tax rate from the cooperative level, by which it can attract mobile capital. However, the capital inflow into country i accompanied by a reduction in T_i reduces the tax base in other country, k_m, and thus, affects the other country's fiscal budget as $T_m(\partial k_m/\partial T_i)$. The central governments ignore this negative external effects of their reduction in reducing T_i on other jurisdictions.

The efficiency of municipal size (and the number of municipalities) is summarized as follows.

Proposition 3. *The equilibrium size of municipality is larger than the size of municipality in the cooperative outcome. Conversely, the equilibrium number of municipality is smaller than the number of municipality in the cooperative outcome.*

Proof. From (18) and (24), we have

$$\frac{\partial U_i}{\partial s_i}|_{s_{i*}} = (\Omega_i T_i + 2k_i)\frac{\partial k_i}{\partial T_m}\frac{\partial T_m}{\partial s_i} - (\Omega_m T_m + 2k_m)\frac{\partial k_m}{\partial s_i}. \tag{26}$$

Substituting (9), (10), and (21) into (26), and evaluating at the symmetric equilibrium, we have

$$\frac{\partial U_i}{\partial s_i}|_{s_{i*}} = \frac{(T\Omega + k)(4\Omega - 1)}{8(3\Omega - 1)} > 0. \tag{27}$$

The last inequality comes from Assumption 1. (Q.E.D.)

The second term in (26) represents the fiscal externality associated with the government choice on s_i. When the government i increases s_i, conversely, decreases the number of municipalities, based on (10), it induces the capital inflow into country i and capital outflow from country j. Government i does not account for the negative effects caused by an increase in s_i, and thus it tends to promote excessive municipal mergers. This is the fiscal externality associated with the first order effects of the choice on s_i. Instead, the government accounts for the second-order effect of changing s_i on capital allocation, which is expressed in the first element in (26). The sign of $\partial k_i/\partial T_m > 0$ is clear and is positive, but

the sign of $\partial T_m/\partial s_i$ is ambiguous as shown in (24). Suppose that the increase in s_i reduces the equilibrium tax rate of country m, $\partial T_m/\partial s_i < 0$. Then, the first and second element in (24) take opposite sign since $\partial k_i/\partial T_m > 0$. In contrast, when $\partial T_m/\partial s_i > 0$, then two terms take positive value and thus, the government has incentive to increase the size of municipality from the size that should be achieved as the cooperative solution. Proof of proposition shows that the first-order negative effects are greater than the second order effects at the symmetric equilibrium, implying that the government promotes excessive municipal mergers.

5 Concluding Remarks

In this paper, we extend the model of regional (dis)integration in three directions: (i) the single-country framework is extended to the two-country model; (ii) the production sector is explicitly incorporated; and (iii) capital as a production factor is mobile among the countries. This extension is positioned as the integration of the two analyses of fiscal competition and regional (dis)integration. Our first result shows that once the capital market is integrated, each country reduces the number of local jurisdiction. Our second result shows that fiscal competition caused by capital market integration leads the size (number) of jurisdiction in each country inefficient level, and leads to excessive municipal merger.

In concluding the paper, we point out some problems that remain unresolved. First, all outcomes are derived under specific function. These certainly weaken the generality of results. Second, we have only considered a case of capital mobility: geographical locations and preferences are assumed to coincide, with no migration. While this is a feature of the models of political geography, which differentiates the analyses from the model of economic geography with migration, it can also be justified by using the concept of Tiebout sorting. After the free choice of residential location, people who have similar preferences for public services locate side-by-side. Once they choose the location, household mobility may be relatively more difficult than capital mobility. Hence, the model can be interpreted as if it started from the stage that households have chosen their location points. Owing to the assumption of no migration, this model can be presented as a simple one-dimension model. To eliminate the coincidence of geographical and preference distribution, it should be reconstructed as a two-dimension model, which is one of the remaining tasks.

Third, one can easily realize that multi-level governments are assigned with different types of public policies. Our model does not consider issues such as variety of public good, intergovernmental transfers, congestion in public good consumption, and benefit spillovers. Overall, no substantial role is assigned to municipalities. Extensions to analyze fiscal devolution and equalization are certainly important and can be related to the models of fiscal federalism literature. These issues are potential topics for future research.

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