The effect of fiscal disparities on yardstick competition and municipal cooperation

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Abstract

This paper addresses the issue of inter-jurisdictional cooperation when incumbents are pure rent seekers. Our analysis considers municipalities that differ in their spending needs, which leads to asymmetric yardstick competition. We study the impact of the yardstick bias on both the quality of local policies and the rent seeking equilibria with and without municipal cooperation.

Keywords: Decentralization; expenditure needs disparities; municipal cooperation; political economy.

JEL Classification: D72; H77.

1. Introduction

Empirical evidence (Warner and Bel, 2008; Bel, Fageda and Warner, 2010; Gradus, Dijkgraaf and Wassenaar, 2014) shows that, in the European context, inter-municipal cooperation in the provision of local public goods and services is very scarce.

The main idea for this paper is that a possible reason for which inter-municipal cooperation is scarcely diffused may be related to the rent extraction process by incumbent administrators. Therefore, we focus on the conditions under which cooperation may or may not become an advantage for the incumbents, in terms of rent extraction.

In the model under consideration, municipalities can choose whether to provide a local policy either jointly or independently without any form of local cooperation. Differently from Giuranno (2010), where incumbents use the subsidiarity principle to improve their net welfare produced by the joint provision, here, they rather decide to voluntary cooperate in order to increase rent extraction. In this set-up, we study how cooperation determines both the quality of the joint provision and the share of rent extracted by each incumbent.

A question that arises is why should rent-seekers incumbents cooperate? Incumbents are concerned about their probability of being re-elected. Voters cannot observe both the rent extracted by incumbents and the inter-municipal cost (or fiscal) disparities. However, voters can compare the quality of services

observed in their municipality with the quality observed in the neighbour municipality and infer, in this way, the behaviour of the incumbent. Incumbents can influence voting behaviour by cooperating, as the joint provision of public goods and services mitigates the yardstick competition effects.

To the best of our knowledge, this paper provides the first attempt to relate the problem of the yardstick bias to the inter-municipal cooperation.

Most works find that cooperation is related to spending needs of public service (Bel and Costas, 2006; Bel and Mur, 2009; Dijkgraaf and Gradus, 2013; and Bel, Fageda and Mur, 2014, Sørensen 2007, and Garrone, Grilli and Rousseau (2013). Difference in spending needs are due to demographic factors or to territorial factors. For example, spending needs of solid waste services and urban water services depends on the area and the morphology of the municipal territory (Bel and Warner, 2008; Bel, Fageda and Warner, 2010).

2. The model

Consider two identical municipalities, A and B. For simplicity, we normalize the municipal population to one and assume that, in each jurisdiction, voters are all alike.

Jurisdictions provide a certain quality of a public service, S_i, given the budget constraint and under constant return to scale.

Furthermore, we assume that the only difference between jurisdiction is in their expenditure needs or cost of provision the local public service. Administrators know the entity of the cost (fiscal) disparity, voters do not.

Incumbents may decide whether they want to provide the service by themselves or jointly with the other municipality. In the latter case, they constitute a consortium of municipalities. The consortium will decide both the provision of a uniform quality of the local service and the amount of rent to be distributed between incumbents. The common quality and the rent share will be the result of a bargaining process between the two incumbents.

We suppose that, as in many local electoral systems (Italian municipalities, UK districts, etc.), incumbents can be in office for a max of two mandates. Therefore, we can model the choice problem in two periods. During the mandate $t \in \{I, II\}$, the incumbent administrator of the jurisdiction i extracts a rent R_i^t, which is equal to:

$$R_i^t = \theta y_i - e_i S_i^t, \quad i \in \{A, B\}, \tag{1}$$

where, $\theta \in [0, 1[$ is the tax rate, y_i is the tax base (for example, income) and e_i is a parameter that captures the spending needs of jurisdictions. In order to model the spending needs disparity between jurisdictions, we assume that $e_A = 1 - d$ and $e_B = 1 + d$, with $d \in [0, 1[$. Furthermore, we also assume, for simplicity, that the common tax rate is set exogenously by the central government. In this way, we can focus the analysis on the cost disparities and incumbents' rent seeking behaviour without losing generality.

Since the jurisdictions have the same tax base and tax rate, we can normalize the revenues to one and express R_A^t and R_B^t as, respectively:

$$R_A^t = 1 - (1 - d) S_A^t \tag{2}$$

and

$$R_B^t = 1 - (1+d)S_B^t \tag{3}$$

Given the budget constraints, the service levels theoretically available for the incumbents are:

$$S_A^t \in \left[\underline{S}, \frac{1}{1-d}\right] \tag{4}$$

and

$$S_B^t \in \left[\underline{S}, \frac{1}{1+d}\right]. \tag{5}$$

Note that the following relation holds: $0 \leq \underline{S} \leq \dfrac{1}{1+d}$, where $\underline{S}$ is a minimum required standard.[1]

Voters cannot observe the amount of rent extracted by the incumbent, R_i^t. What they can observe is the quality of the service, S_i^t.

The re-election probability of incumbent i is assumed to be $P_i\left(S_i^I, S_j^I\right)$, with $\frac{\partial P_i}{\partial S_i^I} > 0$, $\frac{\partial^2 P_i}{\partial S_i^I} < 0$ and $\frac{\partial P_i}{\partial S_j^I} < 0$.

We use an explicit form of the re-election probability, the "contest success function", first proposed by Tullock (1980).[2] It follows that, the re-election probability of an incumbent i is

$$P_i\left(S_i^I, S_j^I\right) = \frac{S_i^I}{S_i^I + S_j^I}, \tag{6}$$

where, S_i^I and S_j^I are the observed service qualities in jurisdictions i and j in the first period. It follows that, in the case of perfect service-mimicking behaviour ($S_i^I = S_j^I$) the re-election probability would be equal to 1/2; instead, when $S_i^I > S_j^I$, then $P_i > P_j$.

Furthermore, we are considering a simple two-period rent-seeking game with career concerns and yardstick competition between the incumbents of two jurisdictions[3]. Both incumbents care enough for re-election and have the same discount factor δ, with $0 \leq \delta \leq 1$. Furthermore, in the first period of the game, both incumbents are in their first mandate.

In the next sections, we will look at rents in the non-cooperative equilibrium and compare this to rents in the cooperative solution. The extent of cooperation then depends on which situation is better for rent seekers.

3. Non-cooperative equilibrium

When incumbents don't cooperate, they maximize their expected rent over the two mandates in a classical yardstick competition framework; that is, they choose the service levels that maximize the total rent over the two mandates, $R_i = R_i^I + E\left[R_i^{II}\right]$, given the choice of the rival incumbent.

[1] A lower quality of provision will trigger immediate investigation by the judicial authority, which will lead to no rent to the incumbent.

[2] See also Van Long (2015).

[3] As in Persson and Tabellini (2000), chapter 9.

During the second mandate, both incumbents set the minimum service's quality $S_A^{II*} = S_B^{II*} = \underline{S}$ and extract a rent equal to $1 - \underline{S}$.

The service quality set in the first period by incumbent i is then chosen in order to maximize the expected total rent over the two mandates (R_i):

$$\max_{S_i^I} \left(1 - e_i S_i^I + P_i\left(S_i^I, S_j^I\right)\delta(1-\underline{S})\right), \quad with \quad i,j \in \{A,R\} \quad and \quad i \neq j. \tag{7}$$

The first order condition is given by

$$\frac{\partial P_i}{\partial S_i^I}\delta(1-\underline{S}) = e_i, \quad with \quad i \in \{A,R\} \tag{8}$$

and the second order condition is

$$\frac{\partial^2 P_i}{\partial^2 S_i^I} < 0, \quad with \quad i \in \{A,R\}. \tag{9}$$

The left-hand side of (8) measures the discounted marginal gain of the second period expected payoff due to a marginal increase in the service level of the first period. The right-hand term measures the first period loss due to the marginal increase in the service quality.

Using the probability function (6), the Nash equilibria of the game are given by

$$\left(S_A^{I*}; S_B^{I*}\right) = \left(\frac{\delta(1+d)(1-\underline{S})}{4}; \frac{\delta(1-d)(1-\underline{S})}{4}\right). \tag{10}$$

Equation (10) leads to the following proposition.

Proposition 1. *Under the Nash non-cooperative equilibrium, higher unobserved expenditure needs disparities increase total expected rent and increase (decrease) both the expected rent and the quality of local services of the advantaged (disadvantaged) incumbent. Furthermore, the quality of the local services is lower in the disadvantaged jurisdiction.*

In equilibrium, the incumbent with a spending need advantage sets a higher level of the local public service; i.e., $S_A^{I*} \geq S_B^{I*}$. Only in the absence of horizontal disparities both jurisdictions set the same service level, which is equal to $\frac{\delta(1-\underline{S})}{4}$.

The intuition is that higher disparities attenuate the level of competition between jurisdictions. As d tends to zero, jurisdictions become identical and, therefore, converge to the same service level $\frac{\delta(1-\underline{S})}{4}$. Instead, when d increases, the incumbent with a higher cost has the incentive to increase the rent in the first mandate because the disadvantage in the re-election probability declines the expected pay-off of the second period. Therefore, since incumbent B has the incentive to decrease the service quality as d increases, incumbent A has an incentive to increase the service quality in response to the incumbent B behaviour. As a result, cost disparities increase the quality gap between local jurisdictions.

The resulting probability to be re-elected is greater for incumbent A compared to incumbent B; that is,

$$P_A = \frac{1+d}{2} \tag{11}$$

and

$$P_B = \frac{1-d}{2}. \tag{12}$$

The yardstick bias caused by the unobserved disparities gives an electoral advantage to incumbent A, which is re-elected with a greater probability.

It follows that the discounted value of total rent over the two mandates, $R_i^* = R_i^{I*} + R_i^{II*}$, is greater for incumbent A; that is, the biased yardstick competition leads to a higher expected rent for the fiscal advantaged incumbent. In fact, the total rents of incumbent A and B in equilibrium are, respectively, equal to:

$$R_A^* = 1 + \delta \left(\frac{1+d}{2}\right)^2 (1 - \underline{S}); \tag{13}$$

$$R_B^* = 1 + \delta \left(\frac{1-d}{2}\right)^2 (1 - \underline{S}). \tag{14}$$

It is easy to verify that equations (13) and (14) lead to $R_A^* \geq R_B^*$ for any weakly positive value of d.

Furthermore, notice that:

$$\frac{\partial R_A^*}{\partial d} = \delta \frac{d+1}{2}(1 - \underline{S}) > 0 \tag{15}$$

and

$$\frac{\partial R_B^*}{\partial d} = \delta \frac{d-1}{2}(1 - \underline{S}) < 0. \tag{16}$$

It follows that higher spending needs disparity increases the expected rent of incumbent A and decrease the expected rent of incumbent B. Furthermore, it is easy to verify that the total non-cooperative expected rent increases in d; that is,

$$\frac{\partial (R_A^* + R_B^*)}{\partial d} = d\delta(1 - \underline{S}) > 0. \tag{17}$$

The role played by the discount factor δ is also interesting. A higher concern about the future payoff decreases the first period rent, but increases the total expected rent either individually and jointly.

4. Rent seeking under cooperation

In this section, we study the determinants of rents under cooperation. In order to do this, we allow incumbents to voluntary cooperate and constitute an inter-municipal consortium where they can jointly provide the local service by choosing a common and uniformly provided service quality S.

The set $\Omega \equiv \{\omega_A^t, \omega_B^t\}$ of possible payoff pairs obtainable through agreement in the mandate by incumbents is given by:

$$\Omega \equiv \left\{q^t R^t, (1-q^t)R^t\right\}, \qquad q^t \in [0,1] \tag{18}$$

where, $R^t = \omega_A^t + \omega_B^t$ is the discounted expected total amount of resources available for the consortium's rent extraction; $\omega_A^t = q^t R^t$ is the agreement payoff

of incumbent A and $\omega_P^t = (1-q^t)R^t$ is the agreement payoff of incumbent B; the share of the rent assigned to incumbent A and B in a period t are respectively q^t and $1-q^t$.

Following Muthoo (1999), the net gains of equilibrium must satisfy the following necessary and sufficient conditions:

$$R^t \geq R_A^{t*} + R_P^{t*} \tag{19}$$

and

$$\omega_A^{t*} \geq R_A^{t*} \cup \omega_B^{t*} \geq R_P^{t*}. \tag{20}$$

The necessary condition (19) states that cooperation may take place when total expected rent under cooperation exceeds total expected rent without cooperation. Instead, the sufficient condition (20) states that the net gain of negotiation must be greater or equal than zero for each incumbent in each mandate.

Incumbents cannot commit on future provision, as they cannot know whether they will be reappointed. Therefore, in each period, there will be a different bargaining round between the administrators in office in the two jurisdictions at that period. As a result, the joint production S and the rent share q is decided mandate after mandate too and the conditions (19) and (20) must be satisfied in each mandate.

During the second and last mandate, in order to maximize the extracted rent, the re-elected incumbent(s) will certainly set the minimum quality of the service either with or without cooperation. This is true either whether both incumbents or only one of them will be reappointed.[4]

4.1. The bargaining equilibrium during the first mandate

Given the second period's outcome, during the first mandate, the expected total amount of the jointly extracted rent is $R = R^I + E[R^{II}]$, where $E[R^{II}]$ is the discounted value of the expected rent extracted in the second period, since incumbents don't know if they will be re-elected, and R^I is the rent extracted by the consortium in the first mandate. Therefore, the expected rent of the consortium over the two periods is:

$$R = 2 - 2S^I + 2\,\frac{S^I}{S^I + S^I}\,\delta(1-\underline{S}) = 2(1-S^I) + \delta(1-\underline{S}). \tag{21}$$

The agreement payoffs ω_A and ω_B, with $R = \omega_A + \omega_B$, of incumbents A and B will be

$$\omega_A(S^I, q) = q\left(2(1-S^I) + \delta(1-\underline{S})\right); \tag{22}$$

$$\omega_B(S^I, q) = (1-q)(2(1-S^I) + \delta(1-\underline{S})). \tag{23}$$

[4]In the second period, three possible scenarios are possible. In the first scenario, none is re-elected. In the second scenario, both incumbents have been re-elected, but an agreement on an $S > \underline{S}$ will lead to negative net gains for both incumbents, as rent creation declines. In the third case, only one incumbent is re-elected. However, agreement on an $S > \underline{S}$ will reduce rent creation in both jurisdictions, as the probability of being re-appointed for the first mandate incumbent cannot increase with respect to the non-cooperative outcome.

The disagreement payoffs are given by equations (13) and (14).

Following Muthoo (1999), the values of S^I and q^I that constitutes the Nash bargaining solution are:

$$(S^{I*}, q^{I*}) = \underset{S^I, q^I}{\arg\max}((\omega_A(S^I, q^I) - R_A^*)(\omega_B(S^I, q^I) - R_B^*)). \tag{24}$$

After, substituting equations (22-23) and (13-14) into equation (24), we obtain that the Nash bargaining solution is:

$$\begin{aligned}(S^{I*}, q^{I*}) = \underset{S^I, q^I}{\arg\max} &\left(q^I \left(2(1 - S^I) + \delta(1 - \underline{S})\right) - 1 - \delta \left(\frac{1+d}{2}\right)^2 (1 - \underline{S}) \right) \\ &\left((1 - q^I) \left(2(1 - S^I) + \delta(1 - \underline{S})\right) - 1 - \delta \left(\frac{1-d}{2}\right)^2 (1 - \underline{S}) \right).\end{aligned} \tag{25}$$

It is interesting to note that the service quality that maximizes the consortium rent, independently from the rent quota q^I, is $S^{I*} = \underline{S}$.[5] In fact, there is no conflict of interest on the service quality; i.e. both incumbent have interest to maximize the total consortium rent.

It follows that the unique admissible Nash bargaining solution is:

$$S^{I*} = \underline{S} \tag{26}$$

and

$$q^{I*} = \frac{1}{2}\left(\frac{2 + \delta + \delta\, d}{2 + \delta}\right). \tag{27}$$

Equilibrium solution (26) leads to the following proposition.

Proposition 2. *The joint provision of the local service is equal to the minimum quality allowed in both mandates, $S^{I*} = S^{II*} = \underline{S}$, and is independent from the ex-ante disparities in expenditure needs.*

Equilibrium condition (27) leads to the following proposition.

Proposition 3. *Incumbents equally split the total rent produced by the consortium either when there is no cost disparity, or the discount factor is zero. When both δ and d are not zero, then $q^{I*} > \frac{1}{2}$. Furthermore, q^{I*} increases in d.*

Accordingly, since the first derivative of q^{I*} with respect to d is greater than zero, an increase in the ex-ante heterogeneity will lead to an increase in the rent quota assigned to the fiscal advantaged administrator.

It is also easy to verify that the consortium sets q^{I*} in order to equalise incumbents' net rent; that is,

$$\omega_A(S^{I*}, q^*) - R_A^* = \omega_B(S^{I*}, q^*) - R_B^* = \frac{1}{4}\left(1 - d^2\right)\delta(1 - \underline{S}). \tag{28}$$

[5]The proof is straightforward after verifying that the Nash bargaining objective function is the product of incumbents' net gains, which are both decreasing in S^{I*}.

The above equalities show that, in equilibrium, net gains from cooperating are greater than zero. This, in turn, implies that the expected rent of cooperation is greater than the expected rent of non-cooperation. As a result, incumbents have incentive to cooperate during the first mandate.

Given that incumbents cooperate in their fist mandates and have no incentive to do so after re-election might provide a possible theoretical explanation to the scarce presence of municipal cooperation across Europe and to the scarce performance, in terms of local service quality, of municipal consortia in Italy. In fact, if the local administrators are pure rent-seekers, they have incentives to cooperate only for short periods, providing lower service qualities with respect to the non-cooperative outcome.

5. Final remarks

The joint provision of local public goods and services is a central issue in the agenda of many local and central governments. To the best of our knowledge, there does not exist economic literature studying the interplay among voluntary centralisation, yardstick competition and rent seeking.

Recent research on yardstick competition (Allers, 2012) shows that, if voters base their voting decision on the value-for-money of local public services, then horizontal fiscal imbalances attenuate the political competition between administrators. In fact, the yardstick bias due to unobserved fiscal disparities generates a strategic advantage for the incumbent of the jurisdiction with a better revenue/cost profile.

There are only a few papers (Kotsogiannis and Schwager, 2008; Allers, 2012) that investigate the effect that horizontal fiscal imbalances[6] may have on the political yardstick competition and, to our knowledge, there is no research on the effect of the horizontal fiscal imbalance on the incentives for cooperation between sub-national governments.

The model shows that, in the non cooperative Nash equilibrium with unobserved fiscal (cost) disparities, the administrators of the fiscal advantaged jurisdictions extract a larger amount of the expected rent compared to fiscal disadvantaged ones even if they provide a higher quality of local services. Besides, the fiscal advantaged incumbents have a greater probability to be re-elected. This result is in line with the existing literature (Allers, 2012; Kotsogiannis and Schwager, 2008). It confirms that unobserved fiscal disparities bias yardstick competition and reduces the accountability of local governments.

Local policy changes substantially under inter-municipal cooperation. Local administrators find cooperation appealing as they can gain control over the yardstick competition mechanism. They may use this control to increase rent extraction by lowering the quality of the provision of local public goods and services. As a result, inter-municipal cooperation declines political accountability.

On the other hand, fiscal disparities do not affect policy outcome under inter-municipal cooperation, they only affect the rent sharing between incumbent administrators. The fiscal advantaged administrators gain more bargaining leverage and a larger rent the higher the fiscal disparities.

[6] A horizontal fiscal imbalance emerges when sub-national governments have different fiscal capacities and expenditure needs (standard cost of provision).

Cooperation is also intrinsically unstable as administrators loose their interest to gain control over the yardstick competition mechanism in their last mandate, which may explain the lack of cooperation usually found in empirical studies.

In order to observe cooperation in all mandates incumbents must find other kinds of incentives, such as efficiency gains due, for instance, to economies of scale, or transfers from the upper level of government, such as matching grants. However, these incentives might enhance cooperation as they increase rent extraction, but fail to increase the quality of local policies.

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