

ON THE SIZE OF LOCAL JURISDICTIONS

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***On the Size of Local Jurisdictions*^(*)**

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Abstract

This paper aims at analysing the population size of local jurisdictions with respect to the characteristics of the goods they provide to their citizens. The economic analysis on the size of government units is mainly founded on the classical fiscal federalism literature (Tiebout, 1956; Buchanan, 1965; Olson, 1969; Oates, 1972) and on the more recent stream on the breaking-up of nations (Alesina and Spolaore, 1997; Bolton and Roland, 1997; Spolaore, 2005). We propose a theoretical framework to further develop the analyses accomplished in the mentioned studies. In particular, we build a model that takes into account the possibly different characteristics of local public expenditures, in terms of both the mix of cash and in-kind components and the degree of “rivalness” of the goods and services supplied by local governments. We show that these factors may influence the optimal size of local units. Some conclusions about which level of government should perform any specific mix of public functions, in order to maximize individuals’ welfare, are also drawn.

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1. Introduction

The aim of this paper is to determine the optimal population size of local jurisdictions, according to the characteristics of the goods they provide.

The preliminary issue is to identify the meaning of size. Indeed, size can be measured in terms of geographical area or population (King, 1984), but in the literature on this topic (Buchanan, 1965; Oates, 1972) it is almost invariably measured in terms of population. Our model is based on the same issue.

Secondly, local governments normally implement public functions through both cash transfers and in-kind services, while the latter may differ in their degree of “rivalness”¹. The proportion of cash and in-kind components of total expenditures and the more or less rival consumption of the goods supplied may influence the efficient number of people living in a local jurisdiction.

The traditional theory of fiscal federalism and local government size (Tiebout, 1956; Buchanan, 1965; Olson, 1969; Oates, 1972) does not consider these two aspects together. Indeed, Buchanan introduces the notion of “club” as a voluntary association of individuals, where the consumption of “club goods” is subject to partial rivalry due to congestion. Individual welfare depends on the number of people belonging to a jurisdiction both positively – since a greater number of members paying for it decreases the per capita cost of providing it – and negatively – since an increasing number of individuals sharing the benefit of the same public good, may cause crowding problems. Therefore, the optimal size of clubs is determined by these two conflicting forces: the reduction of per capita costs and the increase of congestion effect. In particular, the latter requires a restriction of group size. For sufficiently large groups, the crowding costs or increased cost of provision dominate the benefits of sharing the costs of public services (Scotchmer, 2002) and membership size is an endogenous variable (Sandler and Tschirhart, 1997).

Crowding is not so unusual in the case of in-kind provision at the local level (e.g. health and education services). In practice, sub-national governments usually provide goods (like school districts, libraries, universities, hospitals, health services, public transports and roads), which may suffer from congestion.

The basic assumption of this paper is that local governments offer a “composite” good formed by two components: one in cash and the other in-kind – with the latter constituted by

¹ There is a full recognition in the literature that only a few goods qualify as purely private or purely public (Samuelson, 1954). Many have mixed properties. We focus our analysis on partially rival goods and services by considering an index of “rivalness”, similar to the index of “privateness” or “publicness” proposed by Boadway and Hobson (1993), and Boadway (2006).

services possibly characterized by different degrees of “rivalness”². The proportion of local resources devoted to either tool may influence the efficient number of individuals belonging to a local unit. Actually, different shares of cash transfers and in-kind provision appear to characterize the public policy at local level.

The different provision of the public policy and the presence of rival and non-rival goods and services are jointly treated in the model. The analysis which follows will focus on whether the optimal size of local governments depends on the policy mix and whether there exists a relationship between government activities and the optimal number of individuals receiving public goods and services. In the latter case, we may draw some conclusions concerning the proper size of local jurisdictions according to the public functions they perform, in order to maximize individuals’ welfare.

The paper is organized as follows: a brief review of the literature concerning the factors determining government size at local level is supplied in section 2. Section 3 collects some data on the composition of local expenditures in Italy. A model which includes both the proportion of resources devoted by local units to the two main components of the “composite” good and the degree of “rivalness” of the in-kind services is provided in section 4. Some conclusions on the optimal size of local governments are finally drawn in section 5.

2. The existing literature

The economic analysis of the size of local jurisdictions is mainly founded on the traditional theory of fiscal federalism (Tiebout, 1956; Buchanan, 1965; Olson, 1969; Oates, 1972) and on more recent contributions (Casella and Frey, 1992; Boyne, 1995; Sandler and Tschirhart, 1997; Conley and Dix, 1999; King and Ma, 2000; Byrnes and Dollery, 2002) where a variety of economic, political, social and cultural factors potentially influencing the size of local governments is considered. The recent stream on the breaking-up of nations (Alesina and Spolaore, 1997; Bolton and Roland, 1997; Goyal and Staal, 2004; Spolaore, 2005) adds the analysis of the optimal aggregation of individuals at national levels and of their convenience to separate in smaller entities or to join in bigger ones³. Nevertheless, a unified picture is still missing and the application of this literature to local jurisdictions requires some adjustments to the specific problems of intra-national fiscal relationships.

² Health care, for example, is implemented through the provision of services, facilities, hospitals, medical structures - all partially rival - as well as through subsidies to buy health products or exemptions from payments for health services.

³ Two conflicting factors appear to be at work: heterogeneity in population preferences and the economies of scale in the provision of public goods and services.

2.1 Club theory and other factors influencing the size of local governments

Most papers on the optimal size of jurisdictions assume that sub-central governments provide a single local public good. In fact, local authorities provide a variety of services, and most of them are intermediate public goods. Buchanan (1965) describes a good whose consumption is not wholly rival (congestible good)⁴, so there are gains for consumers who associate together to provide the necessary facilities, by sharing the cost of (excludable) public goods. The key advantage to join together is to reduce the per capita cost (King and Ma, 2000). However, since consumption is not wholly non rival, the consumers are wary of admitting too many members for fear of crowding. Therefore, the optimal size of club is determined as a balance between provision costs and congestion effect⁵.

Olson (1969) suggests that the optimal architecture of local governments should ensure a perfect correspondence between the (political) boundaries of the jurisdiction and the (economic) area where local public goods produce their beneficial effects – the principle of “fiscal equivalence”⁶.

More recently, Conley and Dix (1999) consider an economy in which clubs impose positive or negative externalities. Both spillovers in congestible goods and crowding are analysed. In particular, by incorporating crowding as an explicit variable in the agents’ utility, they analyse how positive and negative spillovers affect the equilibrium size and public goods provision in clubs.

In some way, to analyse the optimal size of local jurisdictions means to identify the factors that influence the optimal size of the provision of any local public good (Dafflon, 2006). In reference to this, another issue concerns the economies of scale. The existence of scale economies in the production of local government services is increasingly questioned by policy makers and academics.

⁴ For more details about congestible public goods, see also Rothenberg (1970), Oakland (1972), Haveman (1973) and Bulckaen (1994).

⁵ Club theory has been applied to many fields including macroeconomics (Barro and Romer 1987), roads (Newberry, 1988), more frequently, local governments (for example, Musgrave and Musgrave, 1989) and also to a wide range of problems concerning military alliances, international organizations, recreations facilities, infrastructure and national park. In relation to local authorities, it seems an appropriate concept since they are often characterized as providing local public goods having many features of club goods. However, a fundamental difference between clubs and local governments is that the former is a voluntary group deriving mutual benefits from sharing production costs of goods with excludable benefits (Sandler and Tschirhart, 1997), while individuals are obliged to join the local authority covering the area where they live (King and Ma, 2000). In such a way, the issue of the optimal size of local jurisdictions is strictly related to the government activities, say what kind of public goods and services they supply to citizens. To survey the wide literature on the theory of clubs: Sandler and Tschirhart (1980), Cornes and Sandler (1986) and Starrett (1988).

⁶ More recently, Casella and Frey (1992) propose the theory of “functional federalism” according to which the political jurisdictions do not coincide with the economic ones, but there exist overlapping (“functional”) jurisdictions without explicit ranking, and each jurisdiction is responsible for the provision of a specific class of public goods.

If in the provision of local public goods there are economies of scale that extend beyond the limits of the jurisdiction, larger service structures imply lower cost of production. This favours a large population size in the jurisdiction. However, scale economies may differ according to the services provided (e.g. the optimal scale for library services might differ from that for fire protection), and so different population sizes would be efficient.

On the other hand, Boyne (1995) suggests that scale economies in local services relate to the output of service plants, not to the size of population. It is also a matter of fact that population size cannot perfectly correlate with the costs of service provision (i.e. population size is not a good proxy for economies of scale). In relation to this, King and Ma (2000) show that the presence of economies of scale is not the right criterion for determining the optimal size of local authority, as the economies of scale in the production of local public service are different from economies of scale arising from joint consumption.

More recently, Byrnes and Dollery (2002) provide a review of the international evidence on economies of scale in local jurisdictions and they conclude that there is a great deal of uncertainty about whether economies of scale exist in the provision of local services⁷. As Newton (1982) has observed: “we can conclude that, under certain not well understood circumstances, it may, or may not, be more, or less, economical to have larger, or smaller, local authorities”.

As regards the alternative tool used by local governments – monetary transfers – the traditional economic literature (Thurow, 1974) suggests that in a federal system an ideal mechanism would consist of unrestricted cash transfers to individuals from the federal and local governments - but nothing is said about the optimal population size of the jurisdiction that would make and receive such transfers. On the other hand, more recently Barr (2004) argues that local governments should suitably provide in-kind services (as canteen for the poor, housing, etc.) and not monetary transfers to individuals. Again, no reference is made to the number of individuals that should belong to local units.

2.2 The size of nations and the formation of countries

The literature on clubs and local public goods and the recent political economy literature on nations show some points of contact, as from a global perspective nations provide “local” public goods (Spolaore, 2005).

⁷ Most studies use population as a measure of scale, while just few measure scale in terms of “client group” size for a service (such as the number of school children in a local government area).

According to Bolton and Roland (1997), on efficiency grounds, separations of nations are never desirable for individuals' welfare, as their final wealth will be reduced⁸. On the other hand, differences in income distribution across regions are considered as the key element in favouring separation of nations: different preferences over fiscal policy at regional level come from different income distributions – and different income inequality degrees – and influence the decision of a country to separate in order to obtain redistributive policies closer to individual preferences.

In Alesina and Spolaore (1997) the focus is on the trade-off between the benefits of large countries and the cost of preference heterogeneity of large population. The benefits come from the provision of public goods since the per capita cost of many public goods is lower in larger countries, where many taxpayers pay for them, and economies of scale in the provision of “pure” public goods can be expected. However, this efficiency gain may be offset by the political costs of having a larger number of individuals (with a variety of preferences)⁹. Two opposite effects determine the optimal size of nations: economies of scale favour unification (say, fewer and larger countries), whereas dis-homogeneity in population preferences may contribute to smaller nations, with governments closer to individuals' different tastes and needs.

The trade-off, from which the optimal size of a country emerges, is summarized by Barro (1991): “a large country can spread the cost of public goods over many taxpayers, but a large country is also likely to have a diverse population that it is difficult for the central government to satisfy”.

More recently, Goyal and Staal (2004) consider the advantage of conditioning the political decision-making in several small regions compared with the possibility of exploiting economies of scale by few big regions. They examine the incentives of regions to unite and separate in terms of a basic trade-off: separation allows for greater influence over the nature of political decision making, while unification allows regions to exploit economies of scale in the provision of government. They assume that the public good/government is indivisible and has fixed level and costs. This leads to a trade-off between the efficiency gains due to a reduced number of governments and the political costs of a greater “distance” from the government.

⁸ Indeed “a unified nation is always more efficient since free trades among regions are guaranteed, duplication costs in defence and law enforcement are avoided and local public goods provision (such as transportation and communication networks) can be coordinated”.

⁹ Bolton and Roland (1997) stress that the heterogeneity of individual preferences is likely positively correlated with the country size.

Also Alesina and Spolaore (1997) consider a single public good which identifies each nation. This non-rival public good is called the “government”: this term indicates a bundle of administrative, judicial, economic services and public policies. Using this “public good” or “government” to identify a country is clearly a strong simplification, since a government usually accomplishes a variety of functions.

Finally, another potentially important aspect is ignored in the existing literature: the composition of public expenditures. While Alesina and Spolaore (1997), Goyal and Staal (2004) and Spolaore (2005) assume that only in-kind goods are supplied by governments, only cash transfers are considered in Bolton and Roland (1997). In fact, both forms of intervention are normally used by central and local governments.

3. Expenditures in cash and in-kind at local level: the Italian case

Some data on public spending provided by local governments in Italy are here presented. Italian government structure is composed by the State (i.e. the central government), Regions, Provinces and Municipalities. Our data concern the two lower levels of local jurisdictions. We focus the attention on public spending for social welfare purposes¹⁰: it is an important task of local governments and it can be normally implemented through both the in-kind and the cash forms. Our calculations on available data are shown in Table 1.

Table 1 - Expenditures in-kind and in cash in Italian local governments¹¹

Local Governments	In-kind expenditures over total expenditures	Cash transfers over total expenditures
Municipalities	77.2 %	22.8 %
Big Municipalities (inhabitants > 250000)	82.1 %	17.9 %
Provinces	91.6 %	8.4 %

Sources: own elaborations on Istat data

We find a common behaviour for both levels of government: in-kind expenditures are systematically higher than monetary transfers (77% versus 23% for municipalities; 92%

¹⁰ Social welfare function of provinces concerns: child and maternity care, disabled, elderly, poverty and social exclusion, immigrants. The same areas are considered in the case of municipalities.

¹¹ Data refer to 2003 (Provinces) and 2005 (Municipalities). Unfortunately, more recent data are not available.

versus 8% for provinces), even if the population size of these different local jurisdictions varies a lot. In other words, it seems that the expenditure mix at local level shows that the in-kind component is always greater than in cash provision, and this trend is independent of the population size since provinces and municipalities serve communities very different in size, but they implement an analogous policy mix.

As regards provinces, cash transfers are 8.4% of total expenditures for welfare purposes, with some variability across geographical areas. What is striking, however, is that the population size of provinces varies a lot: the smallest provinces (2% of total) have less than 100000 inhabitants, while the largest ones (10% of total) serve more than 1 million people each – with one peak of 3.6 millions (ISAE, 2008).

This extreme variability in province population is questioned on efficiency grounds: higher average per capita expenditure is found for both the smallest and the largest provinces (ISAE, 2008).

Some geographical variability is found also for municipalities, but in general municipalities show higher proportions of monetary transfers to total expenditures than provinces (22.8%), and the share decreases with the number of inhabitants (see Table 1). In reference to this, we can observe that as the population increases (say, from municipalities to provinces)¹², the in-kind component tends to increase (from 77.2% to 91.6%), while the cash one tends to decrease (from 22.8% to 8.4%).

4. The model

4.1 The expenditure mix

The aim of the model is to determine the optimal population size of local jurisdictions with respect to the public policy mix they supply. The mix concerns both the in cash and in-kind forms of intervention and the degree of “rivalness” of the goods and services provided. The benefit obtained by individuals from the goods and services supplied by the local government may therefore depend on the number of people consuming them, and congestion problems may arise. On the other hand, the effects of such goods are hypothesized not to spill-over outside the jurisdiction boundaries.

The total expenditures (G) of a local government are assumed to be composed by cash transfers (C) as well as by the cost for the in-kind provision (K) to citizens:

¹² We know that in Italy some provinces are smaller than some municipalities, but only 2% of provinces have less than 100000 inhabitants.

$$G = C + K \quad (1)$$

Indeed, we assume that each public function can (and will) be implemented through either instrument. The two expenditure components will be expressed, therefore, as a fraction of G :

$$C = \alpha G \quad (1a)$$

and

$$K = (1 - \alpha)G \quad (1b)$$

where α is an exogenous parameter satisfying the condition: $0 \leq \alpha < 1$ ¹³.

The local government collects revenues to finance the total expenditures, by taxing members of its community, and no other financial sources are hypothesized. A balanced budget is therefore assumed:

$$nT = G \quad (2)$$

The variable n represents the number of identical individuals¹⁴ living in the local unit and T is a lump-sum tax levied on each person by the local government¹⁵. For any given amount of G , T decreases when n increases and vice versa. The cost of financing the public policy is assumed to be equally shared by all citizens belonging to the local jurisdiction¹⁶. Thus:

$$T = \frac{G}{n} \quad (2a)$$

¹³ We are interested in analysing different policy mix, so we allow different values of α . However, we exclude the extreme case of the in-kind component equals to zero (which means $\alpha = 1$). Actually, it is quite difficult to think of public function promoted only through cash subsidies to individuals. Indeed, it usually exists a minimum level of structures and services offered by governments to individuals (for example, a lighthouse structure at local level). In addition, also data presented in section 3 show that the in-kind component always prevails over the monetary transfers. Therefore, the total absence of expenditures in-kind may not be considered realistic.

¹⁴ We assume immobile individuals with homogenous preferences within any local jurisdiction, as in Buchanan (1965) and Oates (1972). Moreover, we do not consider other aspects as individual mobility and possible spillover effects. These are quite strict assumptions, but they seem to be justified by the aim of investigating whether the optimal size may be affected by the mix between cash and in-kind expenditures.

¹⁵ As the financing sources of local governments may be hypothesized to be property taxes and users' taxes, their effects may be reasonably considered, in our model, to approximate those of the lump-sum taxes.

¹⁶ This is the same assumption as in Spolaore (2005), where the costs of producing the "government" good are equally shared by all citizens in the nation: individuals' taxes are therefore obtained from dividing the total costs by the size of the country's population.

Equation (2a) captures the benefits from belonging to a larger jurisdiction, since the cost of financing the public policy can be spread on a larger population, and thus reducing per capita taxes. Nevertheless, the benefit of having a larger number of individuals to share the cost of public functions may be counterbalanced by the congestion effect - which increases with the degree of rivalry of the goods and services supplied.

4.2 The individual welfare

The representative individual's utility (U) is assumed to be a positive linear function of both disposable income ($Y - T$) and the benefit (g) obtained from the local public policy:

$$U = (Y - T) + g \quad (3)$$

We now introduce the issue of the optimal number of individuals in a local jurisdiction by considering goods and services characterized by a different degree of "rivalness". The basic idea is that individuals can obtain different benefits from the public policy, depending on whether the goods supplied by the local government (the K component) are more or less rival. Indeed, we assume that such goods (e.g. health or education services) are mostly subject to partial rivalry due to congestion effect, and then that the beneficial effect for any individual is conditional on the number of people consuming the good.

We describe the benefit each individual receives from the "composite" good supplied by local authority as:

$$g = \ln\left(\frac{K}{n^\beta}\right) + \theta\left(\frac{C}{n}\right) \quad (4)$$

where β ($0 \leq \beta \leq 1$) is the index of "rivalness" of the K variable¹⁷. Transfer payments are typically a fully rival good and then the amount received by each individual is a fraction ($1/n$) of the total amount C ¹⁸. The cash component has no redistributive aims but it is just a mean of efficient implementation of public functions (examples are vouchers for the school in the case of education; money to buy medical products in the case of health), as, for instance, it

¹⁷ The logarithmic form for the in-kind component tries to catch with the welfare theory (Thurow, 1974; Stiglitz, 1999; Rosen and Gayer, 2008), which tends to support the sub-optimality of the in-kind provision rather than cash transfers: in-kind expenditure therefore increases the individual welfare less than monetary transfer. In addition, we assume that: $K > 1$. In reference to this, see also note 13.

¹⁸ As regards the cash component, we only assume: $C \geq 0$.

gives to individuals a wider choice among goods providers. As such cash transfers may be constrained to specific uses, their effects on individual welfare are supposed to be lower than those of unconstrained disposable income. The parameter θ ($0 < \theta < 1$) is intended to represent such an effect of transfer payment.

Both cash and in-kind provisions of the local public policy contribute to increase the individual benefit obtained from the “composite” good¹⁹, and thus to increase the individual welfare. On the other hand, g is a decreasing function of the population size, n ²⁰. The idea is that when the population size grows, individuals suffer a double loss: firstly, they receive a lower per capita monetary transfer; secondly, they may obtain a lower benefit from the in-kind goods, due to congestion.

By substituting equations (1a) and (1b) to the corresponding terms in equation (4), g can be rewritten as a function of n , the total expenditures G , and the parameters α , β and θ only:

$$g = \ln\left[\frac{(1-\alpha)G}{n^\beta}\right] + \theta\left(\frac{\alpha G}{n}\right) \quad (4a)$$

Different values of β correspond to different types of goods. In particular, the extreme case of $\beta = 1$ implies perfectly rival goods and services, while if $\beta = 0$, the in-kind component represents fully non-rival public goods. The individual benefit arising from the local public policy in the two extreme cases is now analysed:

a) if the K component is characterized by only non-rival goods ($\beta = 0$), equation (4a) becomes:

$$g = \ln[(1-\alpha)G] + \theta\left(\frac{\alpha G}{n}\right) \quad (4a.1)$$

and the individual benefit from the in-kind provision does not depend on the number of consumers.

b) if the K component is constituted by only rival goods ($\beta = 1$), equation (4a) becomes:

¹⁹ Indeed, the signs of the first derivative of g with respect to C and K , respectively, are both positive:

$\frac{\partial g}{\partial C} = \frac{\theta}{n} > 0$ and $\frac{\partial g}{\partial K} = \frac{1}{K} > 0$.

²⁰ The first derivative of g with respect to n is negative: $\frac{\partial g}{\partial n} = -\frac{\beta}{n} - \frac{\theta C}{n^2} < 0$

$$g = \ln\left[\frac{(1-\alpha)G}{n}\right] + \theta\left(\frac{\alpha G}{n}\right) \quad (4a.2)$$

In this case, the individual benefit derives from both components: the in-kind expenditures and the monetary transfers in per capita terms. Indeed, when goods and services are rival, their consumption by one individual automatically reduces the potential consumption by other individuals.

Finally, by substituting equations (2a) and (4a) for the corresponding terms in equation (3), the individual utility function becomes:

$$U = \left(Y - \frac{G}{n}\right) + \ln\left[\frac{(1-\alpha)G}{n^\beta}\right] + \theta\left(\frac{\alpha G}{n}\right) \quad (5)$$

This expression describes the individual welfare depending on the number of individuals living in the jurisdiction (n), the degree of “rivalness” (β) of in-kind goods and services and the different policy mix (represented by the parameter α). The effect of the population size on the individual welfare is ambiguous. Indeed, the first derivative may be positive or negative, according to the relationship among all parameters:

$$\frac{\partial U}{\partial n} = \frac{(1-\theta\alpha)G}{n^2} - \frac{\beta}{n} \quad (5a)$$

This is mainly due to two conflicting factors: when n increases, the individual tax - paid to finance the expenditures G - decreases, and so individual welfare increases; at the same time, the crowding effect, strictly linked to the supply of rival goods, contributes to reduce the benefit of the in-kind component, and thus the individual welfare. The same happens for monetary transfers, given their nature of rival goods. In order to determine the optimal size of local jurisdiction (n^*), we consider the standard maximization problem of the representative individual’s utility function, by solving the first order condition: $\frac{\partial U}{\partial n} = 0$.

4.3 Results

The solution of the maximization process shows the effect of the exogenous variables (G , α , β , θ) on the optimal population size of jurisdictions:

$$n^* = \frac{(1-\theta\alpha)G}{\beta} \quad (6)$$

Firstly, the efficient number of individuals living in a local jurisdiction depends positively on the amount of the total expenditures (G) needed to perform the public policy²¹: if G increases – regardless of its allocation between the two components – the number of taxpayers has to increase (unless the individual tax (T) is raised).

Secondly, n^* is a decreasing function of α ²². Not surprisingly, when the public policy is implemented mostly through monetary transfers, individuals would benefit from a smaller population size: as α rises, the optimal number of recipients decreases since cash transfers are a rival good. On the other hand, when the share of resources devoted to in-kind services increases (i.e., α shows a lower value), the optimal population size of jurisdiction becomes larger. This result can be explained by the existence of economies of scale due to fixed costs (as stressed by Spolaore, 2005)²³. As a matter of fact, the production of goods supplied by local jurisdictions, independently of their degree of “rivalness” in consumption, requires large investment expenditures. Therefore, individual’s welfare rises as the number of people sharing the fixed costs of producing the goods increases.

Also cash expenditures may imply fixed costs (for example, administrative costs), but we may reasonably expect that they are relatively small and so we may ignore them. Indeed, cash transfers are more like variable costs.

The optimal population size is also a decreasing function of θ ²⁴. The negative effect of this parameter on n^* is strictly related to the nature of (restricted) cash transfers, which are typically rival goods.

Finally, n^* depends negatively²⁵ on the coefficient of “rivalness” (β) of the in-kind component. With more rival goods and services ($\beta \rightarrow 1$), the number of individuals using them should be smaller; on the contrary, with less rival in-kind provision ($\beta \rightarrow 0$), the size of population can be bigger at least up to the congestion level, if it exists.

²¹ Indeed, we have: $\frac{\partial n^*}{\partial G} = \frac{(1-\theta\alpha)}{\beta} > 0$ (since $\theta\alpha$ is always less than 1).

²² The first derivative of n^* with respect to α is: $\frac{\partial n^*}{\partial \alpha} = -\frac{\theta G}{\beta} < 0$.

²³ Spolaore (2005) assumes that the cost function to produce the government good is formed by a fixed part and a variable part, proportional to the population size of the nation. As a consequence, the per capita fixed cost is negatively related to the number of individuals sharing the total financing of the good.

²⁴ $\frac{\partial n^*}{\partial \theta} = -\frac{\alpha G}{\beta} < 0$

²⁵ $\frac{\partial n^*}{\partial \beta} = -\frac{(1-\theta\alpha)G}{\beta^2} < 0$

We now consider the two extreme cases concerning the β coefficient.

If $\beta = 0$ (fully non-rival goods and services), equation (6) becomes:

$$n^* \rightarrow \infty \quad (6a)$$

This means that the optimal population size of local government is as large as possible and this is independent of all the other variables. As the optimal number of individuals receiving fully non-rival goods tends to infinite, the largest political and juridical aggregation – that is the central government – should provide them. This result is consistent with Buchanan’s (1965) opinion according to which the issue of the optimal size would not arise in the case of “pure” public goods, where congestion costs are zero.

If $\beta = 1$ (perfectly rival goods), equation (6) becomes:

$$n^* = (1 - \theta\alpha)G \quad (6b)$$

In this case, n^* assumes a positive and finite value, depending on the policy mix chosen by the local authority. The optimal population size depends negatively on the proportion of expenditure in cash (α) – as for non-rival goods. The efficient size of jurisdictions rises with the share of public spending on goods and services, and decreases with the share of monetary transfers over total expenditures. Cash transfers should be provided by smaller local units, while rival in-kind provision should be performed by larger ones, because of the presence of fixed costs.

We may conclude that the efficient provision of the “composite” local good requires that the jurisdiction is formed by a lower and lower number of individuals as the cash component rises. This result seems roughly consistent with the stylized picture of local expenditures in Italy shown in section 3.

5. Concluding remarks

In this paper the main issues of the traditional theory of fiscal federalism and local governments size (Tiebout, 1956; Buchanan, 1965; Oates, 1972) with those of the more recent stream on the breaking-up of nations (Alesina and Spolaore, 1997; Bolton and Roland, 1997; Spolaore, 2005) are considered together, and building on both approaches we have tried to

determine the optimal population size of a local jurisdiction. A model that includes the characteristics of the goods provided by local governments is proposed.

The main result appears to be that the efficient community size depends on the public policy implemented.

The basic trade-off – a large membership reduces the per capita fixed costs of financing public services but increases crowding – appears to be true only for goods characterized by a certain degree of “rivalness”.

It is shown that the efficient provision of more rival goods – such as those usually supplied by local jurisdictions – may depend on the local policy mix. It results that when cash transfers tend to prevail over the in-kind component, the most suitable provision is from smaller local units, while if the in-kind component prevails, goods and services should be provided by larger local units. The economic literature is quite controversial on whether cash or in-kind provision is the best tool for local governments²⁶.

Moreover, while in the existing literature on the functions of local governments nothing is said about the population size of local jurisdictions, a result of our model is that the optimal size of local units may differ, depending on both the degree of “rivalness” of the in-kind services and the proportion of public resources devoted to these services with respect to the cash component of the “composite” good supplied by local governments.

With non-rival goods, we find the conventional result (Buchanan, 1965): the optimal size is represented by the largest aggregation of individuals. As the degree of “rivalness” increases, the efficient supplier of the public policy is represented by local units gradually smaller.

The model proposed in this paper is highly stylized. Further analysis will be in the direction of endogenizing both kinds of expenditures of the “composite” local good as well as of including individual preferences for different configurations of the local public policy (say, the fraction of in-kind to cash provision).

Empirical analyses, concerning Italy as well as other countries, should be also performed in order to test the results of the model.

Finally, we think that the results here reached – and those that further research would produce – may be useful in designing the proper size of local jurisdictions, according to the characteristics of the composite good they provide.

²⁶ See Thurow (1974) and Barr (2004).

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