A MODEL ON INTERESTS REPRESENTATION AND ACCOUNTABILITY IN SMALL LOCAL GOVERNMENTS

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Abstract

Second generation theory of fiscal federalism do not consider two questions.
1) In small councils the relation between citizens and administrators is stronger
than the one depicted in accountability models: in a small councils, citizens
know directly and personally the administrators and they control them daily,
not only in the electoral dates. 2) Local governments interpret and represent
the local citizens' wishes to central government. Thus, they bargain with
central government in order to represent local interests at central level. In
this paper, even if governments are non benevolent both at local and central
level, the accuracy in interpreting citizens' wishes is higher in small councils
than in big ones, because citizens' control is higher in the former. On the
contrary, the capacity of a council to make its requests be satisfied by central
government is higher for a big council than for a small one. Thus, when the
dimension of local government increases, the effectiveness of representation
activity increases, but the objectives of citizens diverge from administrators'
ones. Citizens face a trade-off between the strength of their local council in
representing their interests at central level and the accuracy (accountability)
in representing them. In this paper we propose a model which can tackle
these two issues, we investigate on advantages of a territorial reform and we
empirically validate the model.

Keywords: Intergovernmental Grants, Accountability, Interests Representation, Territorial Reform, Fiscal Federalism.

JEL: H71, H77

1 Introduction

In many countries, small local governments are inefficient in public services provision. Small councils can neither exploit scale and scope economies, nor internalize externalities. Moreover, they have little fiscal capacity to provide services. For these reasons, Boadway and Hobson (1993) propose a system of intergovernmental grants towards small size local governments. The issue of optimal transfers to local governments is common in the literature and in political debate. Summing up, the prescription is to grant intergovernmental transfers to small size councils in order to compensate them for not achieving scale economies. Alternatively the dimension of councils should be increased. In effect, many countries are trying to design a territorial reform pushing local councils to compulsory amalgamation or to voluntary association in order to efficiently provide local public services to citizens.

Regardless economic advantages deriving from these proposals, citizens and politicians in small councils often refuse the reform and prefer to preserve their territorial identity. This resistance to territorial reform is stronger when it is compulsory (Dollery and Robotti, 2008), while a reform can be more easily adopted if it is based on voluntary association and if a correct system of incentives is set up (Fiorillo and Pola, 2008).

In this paper we assume a positive perspective, investigating on reasons for assigning intergovernmental grants to small municipalities. From this perspective we have to describe both the relation among different tiers of governments and the one between citizens and their goverment.

From a political economics perspective, the relation between a local government and its citizens is widely analyzed by evoking the issue of accountability (Seabright, 1996; Lockwood, 2002; Hindriks and Lockwood, 2005). This literature investigates on which level of government (local or central) can provide public services in the most efficent way. Since governments are not benevolent, but rent-seeking, these studies try to determine which level of government permits the highest accountability, or which is the best way to minimize governments' rents. The optimal choice between local and central government depends on the cost of not being re-elected and on the importance of each local community on re-election of the government. Depending on these two parameter citizens' reservation utility can be calculated in order to make incumbent politicians re-elected. The optimal level of government (the most accountable) which should provide public services is the one which gives the highest reservation utility to citizens.

Actually, these accountability models in fiscal federalism theory do not apply a big effort in defining what accountability consists on. In effect these models neither describe the mechanism of accountability, nor analyse the re-

lation between local councils and their stakeholders. It must be note that the concept of accountability is "a comprehensive one, since it embraces three different ways of preventing and redressing the abuse of political power. It implies subjecting powers to the threat of sanctions; obliging it to be exercised in trasparent ways; and forcing it to justify its acts"(Schedler, 1999). Each of these issues encompasses multifaced aspects. Regarding this paper, we can summarize that a local council is accountable towards its citizens through two channels. The first one is informal and depends on direct and personnel knowledge among citizens and their administrators. The second channel is the existence of formal institutions, such as media, political parties, unions and so on, which can collect the citizens needs and present them to councils. This second channel can be important in a big council, not in a small one where the behavior of the government cannot be verified by these institutions. Actually, in very small councils, what grants accountability is the first channel: citizens know directly and personally the administrators and thus they can daily control them, not only in the electoral dates. Since we are focusing on small councils we will analyze the informal channel and not the formal one[1]. For very small municipalities, the informal channel of accountability is important: the claims and the pressure of citizens on public administrators is stronger and administrators have to consider not only costs depending on non re-election but the costs of everyday claims[2]. Clearly this channel disappears when the municipality is too big to permit personnel knowledge of administrators[3].

If we try to consider these aspects, two issues would emerge. The first is that, in small councils, the accountable relation between administrators and citizens is stronger than the one suggested by the idea that the control of citizens on politicians depends on voting as in models of fiscal federalism theory

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[1]Moreover, Besley and Prat (2006) affirm that big councils can "capture"media and political parties do not represent citizens' needs, so when the councils are big the relations between dimension and accountability cannot be easily defined. A similar unclear link between formal institutions and the size of goverments can be found in the literature of corruption: also in this literature the linkages between the size of governments and corruption is unclear: Goel and Nelson (1998); Alesina and Angeletos (2005) provide empirical and theoretical support to a positive link between corruption and the size of governments; on the contrary La Porta and al. (1999); Billger and Goel (2009) give the opposite empirical evidence.

[2]In other words, in a small council if snow should be removed, citizens do not contact an office in the council claiming for snow remotion and threatening not to re-elect the mayor in case of inefficiency, they directly go to the mayor with a shovel.

[3]An indirect proof of the importance of informal knowledge is supplied by Hart, Haughton and Peck (1996) which affirm that in small councils many stakeholders seeing accountability an exercise in public relations with administrators.

where accountability problem collapse in electoral decision and promises.

The second issue is the functions of local governments. Traditional theories on fiscal federalism consider only the problem of functions assignment to the right level of government. In this paper, we recognize a different task to local governments which is not the provision of services. In effect a local council is an institution devoted to collect the local requests of its own citizens to be presented to central government; hence, a local government interprets and represents the local citizens' wishes to central government. Thus, they bargain with central government[4] in order to represent local interests at central level. In any case, when local councils ask for resources from central governments they do on the behalf of their citizens. Clearly, when the government is benevolent, the objective functions of citizens and of administrators coincide, and the representation of citizens' requests is consistent. On the contrary, a non benevolent government does not perfectly represent citizens' objectives.

In this paper, even if governments are non benevolent both at local and central level, the accuracy in interpreting citizens' wishes is higher in small councils than in big ones, because of the citizens' control is higher in the former; on the contrary, the strength of representation is higher for a big council than for a small one. The strength of representation power consists in the capacity of a council to make its requests be satisfied by central government. Thus, when the dimension of a local government increases, the importance of representation activity (lobbying activity) increases, but the objectives of citizens diverge from administrators' ones. In other words, increasing dimension of local governments, lobbying increases while accountability decreases. For citizens there is a trade-off between the strength of local councils in representing their interests at central level and the accuracy (accountability) in representing them.

In the next section we propose a model which can tackle these two issues. In the third section we investigate on gains and possibilities of a territorial reform. Finally in the forth section we empirically validate some propositions of the model.

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[4]Bargaining among different tiers of governments is evident when intergovernmental grants are discretionary, but also when they are not. A bargain among different tiers of governments is important in defining formulas which assign grants to local governments and in all democratic nations there are some places where bargaining, i.e. lobbying activity, are institutionalized, German Bundestag, Usa's Senate, Italian Conferenza Stato-Regioni-EELL... A review on how different tiers of government can bargain on grants is in Feld and Schaltegger (2005).

2 The model

2.1 The objective functions

We assume J local councils having N_i population, national population is $N = \sum_i N_i$. Let us assume that per capita income is equal everywhere[5] and let us normalize it ($Y_i = 1$). In each local council i citizens have the following utility function:

$$U_i^C = \beta_i \frac{G_i}{1 + \alpha(N_i - 1)} + \beta_N G_N + (1 - t_N - t_i) \tag{2.1}$$

where G_i and G_N are, respectively, local and national public expenses, t_i and t_N are local and national tax rates. $0 < \alpha \le 1$ is a rivalry parameter, the higher is α the higher is the rivalry of local public expenses[6]. Local public goods often are club goods (Buchanan, 1965) or generally impure public goods (Cornes and Sandler, 1994) and thus we can consider them partially rival. On the contrary let us assume that national public expenses is non rival[7]. $0 < \beta_N < \beta_i \le 1$ are parameters which represent how the national and local public expenses enter in the citizens' utility. In this case, we assume that one euro in private consumption has an higher marginal utility than one euro in national public expenses which has an higher marginal utility than one euro in local one. This assumption means that only a quote of public expenses go to citizens, and this quote is lower for national expenses because national government can not perfectly fit citizens' preference (Oates, 1972) due to lack of information or fly paper effect. For simplicity, we assume that local expenses are efficient[8] ($\beta_i = 1$) Thus β_N is a measure of the inefficiency of national public expenses[9].

Public expenses equal the tax revenues plus/minus the intergovernmental grants, minus the costs to raise taxes, such costs are both administrative, compliance and avoidance costs[10].

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[5]Thus local councils differ only for population.

[6]A not so different rivalry parameter is presented in Boadway and Hobson (1993).

[7]The same results come from the assumption of local expenses more rival than national one.

[8]This does not change the results of the paper.

[9]Note that, with $\beta_i = 1$, if the local public expenses are completely rival ($\alpha = 1$), these are equivalent to private consumption, that is to say citizens are obviously indifferent to consume rival goods provided by local government or private consumption. What make citizens prefer public expenses is their non rivalry.

[10]We model these costs in a standard way, they increase with taxes more than proportionally. This is also the simplest way to have concave objective function for government. For a survey on the costs of raising taxes see Slemrod and Yitzhaki (2002), or Chat-

Local expenses are:

$$G_i = N_i t_i + N_i s_i - C_i(t_i) \qquad (2.2)$$

where s_i is the ratio of per capita transfer on per capita income; the cost for raising taxes is

$$C_i(t_i) = N_i c(t_i), \quad \frac{\partial}{\partial t_i} c(t_i) > 0, \quad \frac{\partial^2}{\partial t_i^2} c(t_i) > 0$$

National public expenses are:

$$G_N = \sum_i^R \left(N_i t_N - N_i s_i \right) - C_N(t_N, s_i) \qquad (2.3)$$

For the central government, the costs to raise national taxes $C_N(t_N, s_i)$ depend positively on national tax rate t_N, in fact the higher it is, the higher the citizens' voice is, the higher evasion and tax avoidance are. Moreover, these costs negatively depend on the grants which the national government assigns to local ones. Since we assume that citizens are interested in public expenses and that local governments fit better citizens' preferences (Oates, 1972), the central government which transfers money to local one increases citizens' utility and hence it reduces compliance[11].

$$C_N(t_N, s_i) = c_N(t_N) \sum_i \left(N_i \right) - \sum_i \left(N_i a(s_i) \right),$$

$$\frac{\partial}{\partial t_N} c_N(t_N) > 0 \quad , \quad \frac{\partial^2}{\partial t_N^2} c_N(t_N) > 0$$

$$\frac{\partial}{\partial s_i} a(s_i) > 0 \quad , \quad \frac{\partial^2}{\partial s_i^2} a(s_i) < 0$$

2.1.1 Citizens' optimality

From citizens' point of view, tax rates and grants should be set in this way:

topadhyay and Dasgupta (2002). Moreover an interesting view on cost of tax compliance is proposed by Feld and Frey (2006) which stress the compliance as a psychological tax contract. From this point of view, when taxes increase over what citizens consider fair compliance costs increase, on the contrary if the government provides fair level of public goods to citizens, these costs will be reduced.

[11]This assumption captures Frey and Fels's idea (2005). For these authors an increase in public good provision reduces compliance costs. Here we assume that citizens knows that central government transfers grants to local councils in order to make them provide local public goods.

$$\frac{\partial}{\partial t_N} c_N \left(t_N^C \right) = 1 - \frac{1}{\beta_N N} \tag{2.4}$$

t_N^C decreases with fly paper effect (high $\frac{1}{\beta}$) and increases with scale effect due to non rivalry (high $N = \Sigma_i N_i$).

$$\frac{\partial}{\partial s_i} a \left(s_i^C \right) = 1 - \frac{1}{\beta} \frac{1}{1 + \alpha(N_i - 1)} \quad \text{with } \alpha > \left(\frac{1}{\beta} - 1 \right) \frac{1}{N_i - 1} \tag{2.5}$$

the higher is fly paper effect ($\frac{1}{\beta}$), the higher is the per capita transfer s_i^C; moreover, the higher the rivalry of local public expenses (α) and the scale of local jurisdiction (N_i), the lower is the optimal transfer.

Finally the optimal local tax rate is:

$$\frac{\partial}{\partial t_i} c_i \left(t_i^C \right) = (1 - \alpha) - \frac{1}{N_i}(1 - \alpha) = 1 - \frac{1 + \alpha(N_i - 1)}{N_i} \tag{2.6}$$

the lower is the rivalry of local public expenses (α) and the higher the scale effect (N_i), the higher is the optimal local tax rate t_i^C.

Note that, even if the marginal utility of an euro in national public goods is lower than the one in private consumption and in local public goods, the scale effect in public good (due to non rivalry) implies that the optimal solution for citizens comprises private goods and both public expenses[12].

2.1.2 Non benevolent government's optimality

We assume that governments are non benevolent and that they maximize their expenses (Niskanen, 1975), thus

$$U_N = G_N \tag{2.7}$$
$$U_i = G_i \tag{2.8}$$

When central government sets its tax rate and transfers without considering local governments, the optimal setting is:

$$t_N = \overline{t_N} \quad \text{such that} \quad \frac{\partial}{\partial t_N} c_N(\overline{t_N}) = 1 \tag{2.9}$$

$$s_i = \overline{s_i} \quad \text{such that} \quad \frac{\partial}{\partial s_i} a(\overline{s_i}) = 1 \tag{2.10}$$

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[12]In this case the scale effect due to non rivalry implies that the marginal cost for producing public services can be shared among citizens.

because of convexity of c_N and of concavity of a, $t_N^C < \overline{t_N}$ and $s_i^C > \overline{s_i}$,

A local government sets its tax rate:

$$t_i = \overline{t_i} \quad \text{such that} \quad \frac{\partial}{\partial t_i} c(\overline{t_i}) = 1 \tag{2.11}$$

$$\tag{2.12}$$

because the convexity of c_i, $t_i^C < \overline{t_i}$,

2.2 Citizens' control on local governments

Let us assume that citizens can express their preference to central government only through votes. For this reason, the central government acts as a Leviathan which has to assure a reservation utility to its citizens[13]. On the contrary, it is not realistic that the local governments are perfect leviathans. In local councils, citizens control their own local governments not only by voting, but through daily contact with administrators. Such direct control could be the only accountability channel for small councils and it decreases when the population of the local government increases, since the frequency of daily contact with administrators decreases. Hence, even if local administrators are not benevolent, it is easy to think that citizens can obtain higher utility than reservation one. Thus the appropriate way to model this control is a Nash's bargaining between citizens and their local governments.

$$W_i = \lambda\left(N_i\right) N_i U_i^C + \left(1 - \lambda\left(Ni\right)\right) U_i \tag{2.13}$$

where $\lambda(N_i)$ (with $0 \leq \lambda(N_i) \leq 1$, $\lambda(1) = 1$ and $\lambda(N_i > \hat{N}) = 0$) is the weight of the sum of citizens' utility and depends on daily controls on administrators (voice strength), let us assume that voice strength decreases when local population increases $\left(\frac{\partial \lambda(N_i)}{\partial N_i} < 0\right)$ because the daily contact are no more possible and the voice has to be express using more formal instruments (political parties, union, ...)[14].

Hence, with a large population $(N_i > \hat{N})$, $\lambda = 0$, the local government sets its tax rate paying only the reservation utility to citizens. When the number of citizens decreases, the control on administrators increases, and local politicians provide an higher utility than reservation one.

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[13]For simplicity, the reservation utility is equal to 0, thus the constraint is not binding.

[14]In this case there are no conclusive results on the impact of municipality size on citizens' control (Besley and Prat, 2006)

Re-writing the equation 2.13

$$W_i = \left[\lambda\left(N_i\right) \frac{(N_i-1)(1-\alpha)}{1+\alpha(N_i-1)} + 1 \right] G_i$$

$$+ \quad \lambda\left(N_i\right) N_i \beta_N G_N \qquad (2.14)$$

$$+ \quad \lambda\left(N_i\right) N_i (1 - t_N - t_i)$$

we can note that $\left[\lambda\left(N_i\right) \frac{(N_i-1)(1-\alpha)}{1+\alpha(N_i-1)} + 1 \right] G_i$ represents the importance of the local expenditure in the Nash's bargain solution, $\lambda\left(N_i\right) N_i (1 - t_N - t_i) Y_i$ is the importance of private per capita consumption, $\lambda\left(N_i\right) N_i \beta_N G_N$ is the importance of modifying central government decision on national expenses. We have to stress that, without the possibility of bargaining between local and central goverments, a local government sets its tax rate independently from central government, even if when citizens pressure is strong, local governments know that if they could push towards an increase of national expenses, the utility of its own citizens would increase.

Since in this section we assume that local and central governments act independently, a local government maximizes W_i considering the grants s_i and the national tax rate t_N as constant, hence:

$$\frac{\partial}{\partial t_i} c\left(t_i^W\right) = 1 - \Lambda\left(N_i\right) \qquad (2.15)$$

the local tax rate is $t_i^C < t_i^W < \overline{t_i}$ lower than leviathan tax rate, but higher than the tax rate optimal for citizens[15].

3 Political bargaining and territorial reform

3.1 Bargaining

In the previous sections, we assume that each level of government sets its tax rate independently. Now we relax this assumption. Actually, governments commit themselves in political bargaining in order to define the amount of intergovernmental grants[16]. In effect local governments make lobbying activity in order to gain high intergovernmental grants. In this paper, let us

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[15]With $0 < \Lambda\left(N_i\right) = \frac{\lambda(N_i)[1+\alpha(N_i-1)]}{\lambda(N_i)N_i+[1-\lambda(N_i)][1+\alpha(N_i-1)]} < \frac{1+\alpha(N_i-1)}{N_i}$, moreover it is possible to demonstrate that $\frac{\partial \Lambda(N_i)}{\partial N_i} < 0$.

[16]Political bargaining also define local and national tax rates.

assume that central government contracts with all local ones jointly, $\mu(N_i)$ is the weight of local government i in the bargaining. Intergovernmental grants and national and local tax rates are set maximizing the following function:

$$\Omega = \left[1 - \sum_j \mu(N_j)\right] U_N + \left[\sum_j \mu(N_j) W_j\right] \tag{3.1}$$

the weight of each local government ($\mu(N_i)$) increases with population. For simplicity sake[17], let us assume that $\mu(N_i) = 0.5\frac{N_i}{\sum_i N_i}$, thus the cumulate weight of local governments is 0.5.

Because of our assumptions, there is no bargaining on local tax rate, thus $t_i^\Omega = t_i^W$.

Moreover, if national population is large enough, we may assume that national tax rate remains constant[18]. Furthermore, small local governments have no power to force national government to reduce its tax rate, big local governments have no interest. Thus $t_N^\Omega \approx \overline{t_N}$.

The intergovernmental grant resulting from bargaining is:

$$\frac{d}{ds_i} a\left(s_i^\Omega\right) = 1 - \frac{N_i}{N} \frac{\lambda(N_i) \frac{(N_i-1)(1-\alpha)}{1+\alpha(N_i-1)} + 1}{1 + \beta_N N \sum_j \left(\frac{N_j}{N}\right)^2 \lambda(N_j)} \tag{3.2}$$

In this case $s_i^\Omega \geq \overline{s_i}$ because of concavity in $a(s_i)$.

Let us analyze equation 3.2. The expression $H = \sum_j \left(\frac{N_j}{N}\right)^2 \lambda(N_j)$ is a sort of weighed Herfindal's concentration index. When concentration is high, voice parameter is low, when concentration is low voice parameter is high, thus for intermediate concentration H has a maximum [19]. The term $1 + \beta_N N H$ is the cumulate ability of local citizens' voice to be considered by central government.

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[17]Different assumptions complicate the algebra but do not change qualitative results.

[18]Nash bargain sets national tax rate at a level t_N such that:

$$\frac{\partial}{\partial t_N} c\left(t_N^\Omega\right) = 1 - \frac{\sum_j \left(\frac{N_j}{N}\right)^2 \lambda(N_j)}{1 + \beta_N N \sum_j \left(\frac{N_j}{N}\right)^2 \lambda(N_j)}$$

numerical simulations with $N \geq 100000$ and $\beta > .4$ show that $\frac{\sum_j \left(\frac{N_j}{N}\right)^2 \lambda(N_j)}{1 + \beta_N N \sum_j \left(\frac{N_j}{N}\right)^2 \lambda(N_j)} \approx 10^{-5}$. Greater N and β make t_N^Ω and $\overline{t_N}$ more similar.

[19]In particular, because of concavity of $\left(\frac{N_i}{N}\right) \lambda(N_i)$ it can be demonstrated that $0 \leq h \leq \frac{1}{J} \lambda\left(\frac{N}{J}\right)$.

From equation 2.14, the term $\left[\lambda\left(N_i\right)\frac{(N_i-1)(1-\alpha)}{1+\alpha(N_i-1)}+1\right]$ is the weight of local expenditure when citizens can control their local governments, it also represents the strength of local citizens' voice in council i to be considered by central government. This strength is low when local councils are small, because the local government has no representative power, then it increases to a maximum and finally it decreases since the citizens' control on local government i decrease[20].

If the dimension of a single local government is small enough, it cannot affect the concentration index, thus we may consider H as a constant. In this case:

Proposition 3.1 *Increasing the dimension of a local government, its per capita transfers coming from Nash's bargain increase.*

Proof. We have to demonstrate that $\frac{\partial}{\partial N_i}s_i^\Omega > 0$, using the theorem of implicit function. The function $F(s_i^\Omega, N_i)$ can be define from equation 3.2,

$$F(s_i^\Omega, N_i) = \frac{d}{ds_i}a\left(s_i^\Omega\right) + \frac{N_i}{N}\frac{\frac{N_i}{1+\alpha(N_i-1)}\lambda(N_i)+1-\lambda(N_i)}{1+\beta_N N\sum_j\left(\frac{N_j}{N}\right)^2\lambda(N_j)} - 1$$

since $\frac{\partial F(s_i^\Omega, N_i)}{\partial s_i^\Omega} = \frac{\partial^2 a(s_i^\Omega)}{\partial s_i^2} < 0$, thus

$$\frac{\partial}{\partial N_i}s_i^\Omega = -\frac{\frac{\partial F(s_i^\Omega, N_i)}{\partial N_i}}{\frac{\partial F(s_i^\Omega, N_i)}{\partial s_i^\Omega}} > 0 \text{ if } \frac{\partial F(s_i^\Omega, N_i)}{\partial N_i} > 0 \ .$$

Calculating the derivative for N_i

$$\frac{\partial F(s_i^\Omega, N_i)}{\partial N_i} = \frac{1}{N(1+\beta_N NH)}\left[1+\epsilon_{\lambda, N_i}\frac{\lambda(N_i)(N_i-1)}{1+\alpha(N_i-1)} + \frac{2N_i-1+\alpha(N_i-1)^2}{(1+\alpha(N_i-1))^2}\lambda(N_i)\right]$$

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[20]It is easy to demonstrate that with $N = 1$,

$$\left[\lambda\left(N_i\right)\frac{(N_i-1)(1-\alpha)}{1+\alpha(N_i-1)}+1\right]=1 \ ,$$

moreover

$$\lim_{N\to\infty}\left[\lambda\left(N_i\right)\frac{(N_i-1)(1-\alpha)}{1+\alpha(N_i-1)}+1\right]=1$$

too. Hence,

$$\left[\lambda\left(N_i\right)\frac{(N_i-1)(1-\alpha)}{1+\alpha(N_i-1)}+1\right]\geq 1 \ ,$$

for continuity it has one internal global maximum.

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it should be greater than zero. This is true if the elasticity

$$\epsilon_{\lambda,N_i} = \frac{\partial \lambda(N_i)}{\partial N_i} \frac{N_i}{\lambda(N_i)} > A = -1 - \frac{N_i}{(N_i-1)(1+\alpha(N_i-1))} - \frac{1+\alpha(N_i-1)}{\lambda(N_i)(N_i-1)}$$

For N_i small enough, the strength of citizens' voice in council i increases in N_i, thus the elasticity should be $\epsilon_{\lambda,N_i} > B = -\frac{N_i}{(N_i-1)(1+\alpha(N_i-1))}$, since $B > A$, if N_i is small enough $\frac{\partial F(s_i^\Omega, N_i)}{\partial N_i} > 0$. Moreover for N_i greater enough $\lambda(N_i) = 0$, thus $B = -\infty$, thus $\frac{\partial F(s_i^\Omega, N_i)}{\partial N_i} > 0$, too[21]. ∎

Proposition 3.2 *When the local government is small, per capita intergovernmental grants are lower than the optimal ones for citizens, when the local government is big enough, transfers are bigger than optimal.*

Proof. Demonstration is based on concavity of $a(s_i)$ and on proposition 3.1 ∎

Since citizens assign a positive marginal utility to national expenses, when local council increases, also the scale effect due to non rivalry does, the marginal cost to provide a further unit of local public goods decreases. For this reason, citizens consider optimal a lower transfer for financing local public expenses. Thus s_i^C decreases with N_i. At the same time the bargaining power of local governments increases, thus s_i^Ω increases. Local governments are going to receive higher grants than citizens' optimal ones.

In other words, up to the citizens' control on their own local governments is strong enough, the requests that local councils present to national government reflect the wishes of citizens. When the dimension of a council i increases, the bargaining power of the local government increases, thus intergovernmental grants to council i do, but accountability decreases. When a local government has big dimension it has no interest to correctly act for citizens' requests in front of central government and it will bargain for bigger grants than the citizens' optimal one.

3.2 The territorial reform of a nation

It is clear that citizens in small councils have a low welfare levels, in effect, small councils have little scale economy, due to non rivalry, and have not enough bargaining power with central government. Then they have lower intergovernmental grants than citizens' optimal one. For a very small council,

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[21]Nothing can be said for intermediate dimension of N_i, but numerical simulation suggest that $\frac{\partial F(s_i^\Omega, N_i)}{\partial N_i}$ is always greater than zero.

a territorial reform which enlarges its dimension, through council amalgamation or voluntary association, increases citizens' welfare, because both scale economy and intergovernmental grants increase.

Thus the model suggests a way to design a territorial reform. Since it is a simplified model, local governments always push for an increase in intergovernmental grants[22]. Analyzing equations 2.3, 2.5 and 3.2 we can study gains and losses of national governments and of citizens.

From propositions 3.1 and 3.2, when the dimension of local government increases (for instance because of a territorial reform), intergovernmental grants increase and citizens increase their welfare if they live in a small council. If they live in large council, an increase of council dimension increases grants but decrease citizens' welfare.

From the point of view of national government, a territorial reform which increases the dimensions of local council (reducing their number) reduces the number of councils which receives transfers but it increases the sum due to each councils.

Proposition 3.3 *The higher is the cumulative effect of local citizens' voice on governments bargaining, the lower are the grants that each council receive.*

Proof. Proof based on implicit function theorem $\frac{ds_i^\Omega}{dH} < 0$. ∎

The intuition of proposition 3.3 is that when local instances are correctly represented low resources are necessary. Clearly bigger councils will receive more than smaller ones. From proposition 3.3 the next proposition follows:

Proposition 3.4 *When there are many small local councils (low concentration), a territorial reform which push towards amalgamation makes H increase and thus the transfers to the local government i which does not participate to amalgamation decrease. In this case, the way to receive more resources is to be involved in an association of councils, while it is possible to reduce the grants to councils that do not merge. In this case also councils not involved in the reform will have an incentive to merge.*

When the distribution of a country is very concentrated (few big cities dominates the territory), a territorial reform makes H decrease. Thus it determines an increases in transfers also for the countries which do not enter in the reform. The incentives to merge decreases.

Proof. For continuity theorems, it is always possible to find $\hat{J}$ such that $\frac{\lambda\left(\frac{N}{\hat{J}}\right)}{\hat{J}} = H(J)$ where J is the actual number of councils. The proposition

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[22]The result does not consider transaction costs due to the loss of local identity following territorial reform.

is proved using the implicit function theorem and calculating the derivative $\frac{\partial}{\partial \hat{J}} s_i^{\Omega}$. ∎

4 Empirical Analysis

The theoretical model suggests two testable propositions. Ceteris paribus, the per capita transfers to local governments should increase with population and should present a minimum for a certain concentration (or for a certain number of councils).

The first proposition (proposition 3.1) just suggest the opposite of the normative prescription of Boadway and Hobson (1993). In their normative paper, higher governments tiers should pay higher per capita transfers to small size local governments in order to compensate the small scale. Actually, in many countries laws actually assign bigger per capita grants to small councils in order to compensate the small scale[23]. On the contrary, in this paper, completely non benevolent public central and local governments (leviathans) which bargain among them and which are stimulated from citizens' claims should assign lower intergovernmental grants to small population local governments.

The second testable proposition (proposition 3.4) affirms that per capita grants is influences by structural parameters. In particular it has a minimum in concentration index (or in number of councils).

4.1 The data

In order to test both propositions, we cannot analyze the national grants to lower tiers of government in only one country. We should compare the capita grants from higher tiers of governments to lower ones in different countries or regions. Obviously, the legal framework and other structural differences should not be to high in order to not introducing too much heteroskedasticity. The data of "Ministero dell'Interno" on councils budgets can be considered a good dataset for our exercise. In particular we study the regional transfers received by the 8116 Italian councils from their own regions in the 2004[24]. We exclude from the database 44 councils bigger than 100000 inhabitants, since national law provide them with higher per capita national transfer and they behave as outlier. Moreover we omit the case of zero regional grants to

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[23]For instance this is true in Italy, which is the country we choose for testing our hypothesis.

[24]In this paper we propose not a panel but a cross section analyses since the dataset presents lots of errors of transcription and data should be check almost manually.

councils. Our database so considers 7043 councils (5825 councils belong to ordinary law regions or "Regioni a Statuto Ordinario".)

From this database we obtain the transfers from the central government (T_STAT), the regional transfers (T_REG) to councils not paid for the delegated functions, and the regional transfers paid for delegated functions (T_RDF) since municipalities act on the behalf of regions. From those, we calculate the per capita grants to councils and we normalized them for per capita regional GDP (ts, tr and tfd, respectively).

Moreover we consider the altitude (ALT) of councils since in Italy, both national and regional laws assign positive per capita grants to mountain areas, councils population (POP) and the regional number of councils (N) taking them from "Annuario Statistico Italiano".

From councils population, we calculate the value of regional population (POPREG) and the herfindal's index (HF100), without considering the councils bigger than 100000 inhabitans[25].

Finally from regional accounts we take the per capita regional GDP (MPIL).

4.2 Empirical strategy

The strategy to confirm (or to refuse) the propositions is to estimate the following rescricted model:

$$
\begin{aligned}
tr_i & = \sum_r \left(\gamma_0^r D^r + \gamma_1^r D^r \Delta ALT_i + \gamma_2^r D^r \Delta ts_i + \gamma_3^r D^r \Delta tfd_i \right) + \quad (4.1) \\
& + \eta_1 POPREG + \eta_2 MPIL + \eta_3 MALT + \eta_4 Mts + \eta_5 Mtfd + \\
& + \sum_r \mu^r D^r \Delta POP_i + \\
& + f(C^r)
\end{aligned}
$$

where $\Delta X_i = X_i - MX_i$ is the deviation of the variable X from its own regional average (MX).

---

[25]We calculate the Herfindal's index excluding the biggest cities, since they can distort the concetration index of a region and can lead to misleading results. In effect, proposition 3.4 states that the structure of a region, number of councils or concentration index, determines regional transfers. The presence of the biggest cities when we calculate concentration index give a bad measure of the actual structure of a region (for instance, Piemonte, Lombardia, Lazio concentration change drammatically when we exclude Turin, Milan and Rome). Moreover, in many case the biggest cities receive higher transfers from central state and they probably contract with their own regions not in monetary terms but in order to obtain infrastructure or general services.

Proposition 3.1 is confirmed if the parameter of population is positive ($\mu^r > 0$), while proposition 3.4 is confirmed when the function of concentration index ($f(C^r)$) has a minimum.

We expect that the dependent variable tr, the per capita regional transfer to councils normalized for per capita income, should depend on regional dummies D^r and on regional controls such as population ($POPREG$), average regional altitude ($MALT$), average national transfer to councils of its own region (Mts), average regional transfers for delegated function ($Mtfd$), regional per capita GDP ($MPIL$) and from a non linear formula which depends on a concentration index ($f(C)$, where C is the regional concentration proxy, alternatively[26] N or $HF100$). We can test the presence of a minimum using the logs $f(C) = \theta_1^r C^r - \theta_2^r ln(C^r)$ or the square $f(C^r) = -\phi_1^r C^r + \phi_2^r (C^r)^2$, with $\phi_1^r, \phi_2^r, \theta_1^r, \theta_2^r > 0$.

Moreover we expect that each region transfers higher sums to councils with higher altidude than regional average (thus $\gamma_1^r > 0$). We also expect a positive relation with per capita GDP (MPIL, thus we expect $\eta_2 > 0$), since regions in this case have higher fiscal revenues and their grans should be higher.

Finally the regional decision of assigning transfers to councils depends on the normalized transfers for the delegated functions (Δtdf) and from the normalized transfers of central government (Δts) to councils. This transfers can be substitute or complementary to regional one. In any case, the setting of transfers to councils can be described as a Stackelberg game between regions and central government, where central government is the Stackelberg's leader[27].

On this model we would test these constraints:

$$\gamma_0^r = \gamma_0; \ \gamma_1^r = \gamma_1; \ \gamma_2^r = \gamma_2; \ \gamma_3^r = \gamma_3; \ \mu^r = \mu \tag{4.2}$$

The idea behind these constraints is that within a very similar legal framework, after we take in account regional differences, each region sets the same rule for providing its own councils with normalised transfers.

The problem with the model (equation 4.1) is that it cannot be estimated since the regional dummies D_r are perfectly collinear with regional control $POPREG$, $MPIL$, $MALT$, $MALT$, Mts, $Mtfd$ and with concentration index C. Thus if we consider regional dummies we can neither take into account regional controls, nor we are able to explain regional transfers to council with regional structure. Since the goal is to estimate each structural

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[26]These two variables are negatively correlated.

[27]This permits to rule out endogeneity problems.

effecton regional transfers, we actually estimate the following heteroskedasticity corrected model

$$
\begin{aligned}
tr_i \;=\;& \gamma_0 + && (4.3)\\
+\;& \sum_{rss}(\gamma_0^{rss}D^{rss} + \gamma_1^{rss}D^{rss}\Delta ALT_i + \gamma_2^{rss}D^{rss}\Delta ts_i + \gamma_3^{rss}D^{rss}\Delta tfd_i) + \\
+\;& \gamma_1\Delta ALT_i + \gamma_2\Delta ts_i + \gamma_3\Delta tfd_i + \\
+\;& \eta_1 POPREG + \eta_2 MPIL + \eta_3 MALT + \eta_4 Mts + \eta_5 Mtfd + \\
+\;& \mu\Delta POP_i + f(C_i)
\end{aligned}
$$

where we consider dummies and interactions only for "Regioni a statuto speciale[28]"(rss).

For robustness we estimate a model with regional dummies and interaction but without structural regional controls.

$$
\begin{aligned}
tr_i \;=\;& \sum_r (D^r + \gamma_1^r D^r \Delta ALT_i + \gamma_2^r D^r \Delta ts_i + \gamma_3^r D^r \Delta tfd_i) + && (4.4)\\
+\;& \sum_r \mu^r D^r \Delta POP_i
\end{aligned}
$$

Then we test three restrictions. In the first test we keep all the regional dummies D^r, and we test the following restrictions: $\gamma_0^r = \gamma_0$; $\gamma_1^r = \gamma_1$; $\gamma_2^r = \gamma_2$; $\gamma_3^r = \gamma_3$; $\mu^r = \mu$. As it can be expected the restrictions are refused. Then we test the same restrictions only for "Regioni a statuto ordinario" maintaining the interaction (γ^{rss}) for "Regioni a Statuto Speciale", in this case the restrictions are accepted. These dummies are justified because of their different legislative rules for fiscal revenue. Finally we test the restrictions for "Regioni a statuto ordinario" of both regional dummies and interaction, without adding structural control, these restrictions are actually rejected, since regional dummies explain regional transfers[29].

Then we test the alternative structural models (4.3) maintain only "Regioni a statuto speciale" dummies. The null hypothesis of non significative structural variables is rejected. Each model differs for the specification of function $f(C)$:

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[28]The coefficients which refer to "Regioni a Statuto Speciale" are always significative.
[29]The robustness analysis is available from the author.

Table 1: Models comparison

	Regional dummies	Structural control models			
		(1)	(2)	(3)	(4)
number of obs.	7043	7043	7043	7043	7043
R^2	0,383014	0,6672	0,6671	0,6740	0,6726
Log-likelihood	-18832,91	-18462,53	-18478,66	-18361,51	-18380,42
Akaike criterion	37865,83	36989,06	37021,33	36787,02	36824,84
Schwarz criterion	38551,81	37208,57	37240,84	37006,54	37044,36
Hannan–Quinn	38102,13	37064,68	37096,95	36862,64	36900,46
Condition number		27,3821	27,6942	24,9002	12,1056

$$\text{Model 1} \quad f(C) = \theta_1 N + \theta_2 ln(N)$$

$$\text{Model 2} \quad f(C) = \phi_1 N + \phi_2 (N)^2$$

$$\text{Model 3} \quad f(C) = \theta_1 HF100 + \theta_2 ln(HF100)$$

$$\text{Model 4} \quad f(C) = \phi_1 HF100 + \phi_2 (HF100)^2$$

Looking at information criterions and at maximum likehood, we find that, when we consider dummies for "Regioni a statuto speciale", the initial model with regional dummies, interaction and no structural variables, is less explicative than model with structural variables[30]. This is true for all the specifications of the structural model (Table 1).

Since models with structural variables (4.3) are more informative than model with regional dummies and interactions, we test propositions 3.1 and 3.4 on these ones. For testing proposition 3.2 we have to verify that $\mu > 0$. For testing proposition 3.4, we test $\phi_1 < 0$, $\phi_2 > 0$, $\theta_1 > 0$, $\theta_2 < 0$.

---

[30]Since conditions numbers on models with structural variables are less than 30, we have no collinearity problems.

4.3 Results

Due to heteroskedasticity problems we estimate four Heteroskedasticity-corrected models, each model adopts a different specification of the function $f(C)$ in order to test proposition 3.4.

Table 2: Constant and dummies for "Regioni a Statuto Speciale"
Heteroskedasticity-corrected estimates. Dependent variable: t_r

	(1)	(2)	(3)	(4)
const	1,241	−1,504**	−4,026**	−2,233**
	(1,000)	(0,5080)	(0,7069)	(0,4084)
D02	53,37**	53,81**	51,95**	51,07**
	(7,828)	(7,843)	(7,727)	(7,828)
D04	23,68**	23,55**	23,33**	23,39**
	(1,115)	(1,117)	(1,097)	(1,100)
D06	16,70**	16,64**	16,57**	16,64**
	(0,8832)	(0,8852)	(0,8678)	(0,8707)
D19	9,620**	9,640**	9,573**	9,374**
	(0,6563)	(0,6497)	(0,6407)	(0,6360)
D20	7,522**	7,372**	7,301**	7,065**
	(0,8256)	(0,8169)	(0,7717)	(0,7652)

Standard errors in parentheses
* indicates significance at the 10 percent level
** indicates significance at the 5 percent level

As we can expect (table 2), regional transfers to councils in "Regioni a Statuto Speciale" are higher than in other regions. Actually, because of different laws, councils in "Regioni a Statuto Speciale" directly receive tranfers from their own regions and not from Italian State, this is true expecially for Valle d'Aosta ($D2$), Trentino Alto Adige ($D4$) and Friuli Venezia Giulia ($D6$), but also for Sardegna ($D19$) and Sicilia ($D20$). Note that coefficients are robust when we change specification.

Also the impact of altitude has the expected sign (table 3, ΔALT). Each region gives higher tranfers to councils which altidute is higher than the regional average. This impact is significatively higher for northern "Regioni a Statuto Speciale" ($\Delta ALT02$, $\Delta ALT04$ and $\Delta ALT06$). A little caution is necessary to explain negative impact of the average regional altitude on

Table 3: Altidute
Heteroskedasticity-corrected estimates. Dependent variable: t_r
MALT, ΔALT and interaction dummies for "Regioni a Statuto Speciale"

	(1)	(2)	(3)	(4)
ΔALT02	0,03550*	0,03545*	0,03541*	0,03541*
	(0,01919)	(0,01923)	(0,01892)	(0,01897)
ΔALT04	0,01108**	0,01110**	0,01106**	0,01107**
	(0,002025)	(0,002031)	(0,001997)	(0,002003)
ΔALT06	0,01974**	0,01976**	0,01974**	0,01974**
	(0,004010)	(0,004020)	(0,003954)	(0,003964)
ΔALT19	−0,002590	−0,002628	−0,002672	−0,002672
	(0,002030)	(0,002031)	(0,001996)	(0,002001)
ΔALT20	0,001014	0,001011	0,0009811	0,0009807
	(0,002408)	(0,002412)	(0,002371)	(0,002377)
ΔALT	0,0001925**	0,0001908**	0,0002164**	0,0002130**
	(9,534e-05)	(9,527e-05)	(9,318e-05)	(9,146e-05)
MALT	−0,0001943	−0,0002261	−0,0006147**	−0,0006258**
	(0,0003810)	(0,0003884)	(0,0002072)	(0,0002091)

Standard errors in parentheses
* indicates significance at the 10 percent level
** indicates significance at the 5 percent level

regional transfers ($MALT$). Actually, since law states that national transfers to councils should increase for mountain areas, we can interpret this negative sign as a crowding out effect. Since regions know that State will transfers to mountain regions, they can reduce their own grants.

The impact of national transfers to councils on the regional ones is always positive (table 4), this suggests that national and regional transfers are complementary and not substitute.

On the contrary (table 5), the impact of tranfers that regions make to councils for the functions that councils do on regional behalf is negative (Δtfd), if the councils receive higher sum for the functions they exert on the behalf of regions, they receive less for their own ordinary functions. Friuly Venezia Giulia ($\Delta tfd04$) seems to be an exception. Clearly if regions can transfer more for delegate functions, they can transfer more also for ordinary

Table 4: National grants

Heteroskedasticity-corrected estimates. Dependent variable: t_r

Mts, Δts and interaction dummies for "Regioni a Statuto Speciale"

	(1)	(2)	(3)	(4)
Δts02	20,82	20,89	20,91	20,91
	(12,92)	(12,95)	(12,74)	(12,77)
Δts04	1,374	1,370	1,393	1,391
	(15,04)	(15,07)	(14,82)	(14,86)
Δts06	10,85**	10,86**	10,84**	10,86**
	(3,141)	(3,147)	(3,092)	(3,105)
Δts19	0,8016**	0,8044**	0,8005**	0,8007**
	(0,1059)	(0,1060)	(0,1042)	(0,1044)
Δts20	1,116**	1,116**	1,112**	1,111**
	(0,1054)	(0,1055)	(0,1037)	(0,1040)
Δts	0,03960**	0,03804**	0,04191**	0,04192**
	(0,005971)	(0,005919)	(0,005917)	(0,005857)
Mts	0,1737**	0,1609**	0,1765**	0,1628**
	(0,02382)	(0,02376)	(0,02203)	(0,02107)

Standard errors in parentheses
* indicates significance at the 10 percent level
** indicates significance at the 5 percent level

one and the sign of the coefficient $Mtfd$ confirms this.

Looking at table 6 we can read the impact of the other control variables and test the propositions of theoretical model. As we can expect richer regions, in terms of higher per capita GDP ($MPIL$), can pay higher per capita grants to their own councils. While bigger regions can give low per capita transfers (the sign of $POPREG$ is negative).

The coefficient of ΔPOP confirms the proposition 3.1, councils smaller than the average receive higher per capita grants from their own regions. This result is robust and significative. The importance of this result in confirming theoretical proposition is very strong, since in theoretical model we suggest just the contrary on respect to prescriptions of many regional laws which state additional grants for small municipalities. The results confirm theoretical model not law prescriptions. Moreover the results are robust when we change

Table 5: Transfers for delegated functions
Heteroskedasticity-corrected estimates. Dependent variable: t_r
Mtfd, Δtfd and interaction dummies for "Regioni a Statuto Speciale"

	(1)	(2)	(3)	(4)
Dtfd02	0,8358	0,8256	0,8297	0,8261
	(2,476)	(2,481)	(2,440)	(2,446)
Dtfd04	0,4131**	0,4157**	0,4238**	0,4224**
	(0,07242)	(0,07246)	(0,07081)	(0,07068)
Dtfd06	−0,2987	−0,2954	−0,2870	−0,2887
	(0,3123)	(0,3130)	(0,3077)	(0,3085)
Dtfd19	−0,6359**	−0,6348**	−0,6273**	−0,6292**
	(0,08854)	(0,08854)	(0,08665)	(0,08660)
Dtfd20	−0,5395**	−0,5372**	−0,5292**	−0,5307**
	(0,1189)	(0,1190)	(0,1168)	(0,1169)
Dtfd	−0,1462**	−0,1491**	−0,1574**	−0,1560**
	(0,03982)	(0,03970)	(0,03822)	(0,03771)
Mtfd	0,6655**	0,6935**	0,7252**	0,8231**
	(0,1917)	(0,1883)	(0,1766)	(0,1707)

Standard errors in parentheses
* indicates significance at the 10 percent level
** indicates significance at the 5 percent level

model specification.

Finally, the proposition 3.4 is confirmed by model 1, 2 and 3. Moreover model 4 cannot reject the existence of a minimum. It seems to exists a level of concentration (a number of councils) which permits regions to pay lower per capita grants to their own councils. Thus a territorial reform which wants to reduce the number of municipalities (or to increase concentration) could reduce regional grants if councils are not concentrated. It would increase grants if they are.

5 Concluding remarks

The literature on accountability does not consider all the relevant elements of the complex relation between citizens and governments. In effect, even if

the assignment of various tasks to local governments permits to better account citizens for public expenses, it does not mean that citizens will actually receives better services. When public goods are provided by different levels of governments, the possibility to control local governments is not sufficient for having better services. It is very important that local governments could act correctly on the behalf of their own citizens in front of central government. From this point of view citizens in small municipalities have to face a trade-off between the possibility to personnelly and direcly control their administrators and the strength of their administration in representing their interests to higher level of governments. Small municipalities can permit informal and direct control of citizens but have low political power in front of higher governments. Local administrators involved in councils associations actually stress that the importance of the association is the possibility to bargain with more power with regional and national governments. By this way citizens could prefer to reduce some direct controls on local governments and to increase local requests at central level. The paper focus on small councils and try to model theoretically this trade-off. The first two proposition are coeherent with the trade-off described.

Moreover, the unattended result of the theoretical part of this paper (proposition 3.4) is that if a territorial reform pushes for a reduction of the number of councils in a low concentrated region, a virtous circle can appear, because of the relative reduction of contractual power of not associated councils. On the contrary, when the concentration is sufficiently high, a territorial reform can generate some national budget problems, since transfers to not associated councils increases too.

Both theorical suggestion can be empirically tested and seems correct[31].

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[31]A next paper will propose further empirical investigation based on panel analysis. Because of the difficults on build a verified database, we are not able to produce such analysis at the moment.

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Table 6: Other structural control and test of propositions

Heteroskedasticity-corrected estimates. Dependent variable: t_r

	(1)	(2)	(3)	(4)
MPIL and POPREG				
MPIL	0,0001065**	9,451e-05**	9,944e-05**	9,096e-05**
	(1,786e-05)	(1,753e-05)	(1,534e-05)	(1,492e-05)
POPREG	−2,567e-08	−5,959e-08**	−3,808e-08**	−1,724e-08
	(2,215e-08)	(2,420e-08)	(1,497e-08)	(1,166e-08)
Proposition 3.1				
ΔPOP	1,103e-05**	1,090e-05**	9,683e-06**	9,561e-06**
	(2,440e-06)	(2,463e-06)	(2,359e-06)	(2,325e-06)
Proposition 3.4				
N	0,0006679**	−0,001753**		
	(0,0002333)	(0,0002903)		
ln_N	−0,6792**			
	(0,1471)			
sq_N		9,226e-07**		
		(1,652e-07)		
HF100			41,55**	5,042
			(8,510)	(9,157)
ln_HF100			−0,2790**	
			(0,09509)	
sq_HF100				400,0*
				(220,4)

Standard errors in parentheses
* indicates significance at the 10 percent level
** indicates significance at the 5 percent level