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The Politics of Intergovernmental Transfers and Local
Government Deficits: Theory and Evidence*

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The Politics of Intergovernmental Transfers and Local
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1. Introduction.

It has long been recognized that fiscal policies, and in particular public deficits, are partly associated with redistributive measures carried out by the government¹. Nevertheless, it is only recently that formal models have been developed where redistributive issues play a major role in determining government fiscal policies. A crucial methodological change that allowed the mentioned development was the abandonment by this literature of the "representative individual" paradigm², and its replacement by heterogeneous-type and/or decentralized-policy-making frameworks where fiscal policies are derived from the solution to a noncooperative game, describing a conflict of interest among various majorities or constituencies.

¹ See, for example, Hirsh and Goldthorpe (1978) and Hirschman (1980), (1985). Also, Lindert (1989) uses long-term data for Great Britain and USA in order to highlight the closed association between the size of the public sector and distributive policies carried out by the government.

²As it is well-known, in representative-agent models, fiscal policies and, in particular, government deficits arise as a consequence of a tax smoothing behavior from the part of the representative individual/government. See, for example, Barro (1979), (1986) and (1989), Lucas (1986) and Lucas and Stokey (1983).

The Political Economy literature, on one hand, emphasizes that the introduction of explicit political institutions like elections (or just the recognition of a possible future government change), induces an "intertemporal myopia" on the part of the incumbent government such that the latter does not fully internalize all future cost of its present fiscal decisions³. An appealing prediction derived from this analysis is that political instability-- loosely defined as frequency of government change-- and political polarization-- a measure of the degree of preference disagreement among individuals/groups---, make fiscal policies become more unstable and socially inefficient. For example, a tendency toward a too high level of public sector deficits, and rising inflation for the case of developing countries, develops⁴.

On the other hand, other papers have emphasized that the decentralized character of many fiscal decisions coupled with a bad institutional design, may constitute a very important cause of bad fiscal performance⁵. In this sense, the presence of externalities caused by the closed interdependence among different government jurisdictions, may generate a "coordination failure" problem in which welfare gains accruing to all the interested parts cannot be

³ See, for example, Alesina- Tabellini (1990), Tabellini and Alesina (1990) , Cukierman et al. (1991), Persson and Svensson (1989) and Cukierman and Meltzer (1989).

⁴ Applications of this political approach to the case of developing countries can be found in Edwards and Tabellini (1991a,b).

⁵ See, for example, Aizenman (1989), Aizenman and Izard (1990a,b) and Sanguinetti (1990).

realized due to the impossibility of the central authorities (or other political institutions, i.e. legislatures) to impose a cooperative arrangement.

A general problem with this coordination-failure literature is that the supposed weakness that the central authorities are subject to is often left unexplained. Moreover, in most of these papers the fiscal regimes that are at least theoretically possible are just two: either the economy is in its PO cooperative equilibrium, or in the non-cooperative inefficient one⁶. But, of course, real world experiences do not picture such an extreme dichotomy character.

The purpose of this paper is twofold. First, we present a simple model of decentralized fiscal policy-making where a "coordination failure" problem arises. Second, we make an effort in order to empirically test this approach by developing an empirical investigation based on the recent experience of two countries: Argentina and England.

With respect to the model, we go an step further with respect to the existing literature by providing an explanation of why, and under what circumstances, the central authorities may find themselves in a "weak" position, not being able to impose a Pareto-improving policy. In developing this extension we borrow from the political economy literature the idea of preference (political) polarization. In the case of our model, this polarization takes places between the constituencies ruling, contemporaneously, at the

⁶In Sanguinetti (1990) an intermediate regime is presented in which the central government is able to partially precommit its policy.

federal and local levels of government. It is found that differences in the composition of the political coalitions ruling at each government jurisdictions (Local and Central) give local authorities incentives to behave in an opportunistic way, trying to extract transfer payments from the Federal Government. At the same time, with greater polarization the federal authorities find more costly to resist to the indicated "free raider" behavior from the part of the local governments. Overall then, public sector fiscal performance worsened with inter-jurisdictional political polarization.

This approach seems to contradict the common-sense idea that central government authorities will tend to favor those local governments with similar preferences (political affiliation) of its own, and try to penalized those of opposite political orientation. This idea seems especially appealing for those periods in which the proximity of local elections make the Federal authorities willing to support its politically-closed local governments in order to improve their reelection chances⁷. Though this intuition may be enough to explain the experience of certain countries in some periods, the case of the countries we describe below teaches that this is not the only "politics" that intergovernmental transfers are subject to. In particular, the regressions that we present below indicate that both in Argentina and England, local governments ruled by opposition parties have received on average higher

⁷This "office" motivated approach is emphasized in Weingast et al. (1981) and Iman (1988), (1990).

transfers per capita from the federal government than those run by the party ruling at the federal level. Thus, without neglecting the importance of the indicated "office motivated" approach, we think it could be interesting to explore this other polarization idea.

The rest of the paper is organized as follows. Section 2 presents the basic structure of the model. In Section 3 we solve it for the case of extreme political polarization where the local and federal governments are identified with a particular (and opposite) constituency. Section 4 derives the results for the general case in which more "balanced" political coalitions are allowed to form both at the local and federal levels of government. Section 5 presents the empirical analysis for the cases of Argentina and England. Finally, section 6 concludes with some general comments.

2. The Structure of the Model.

We are going to work with a two-period model economy composed by N regions each of them inhabited by two types of individuals: n_P P-type and n_R R-type. For simplicity, we normalize total population in each region to one, so that $n_P + n_R = 1$ ⁸. Preferences for both types of household are given by,

$$U^i = c^i + \beta d^i \quad i = P, R. \quad (1)$$

⁸Migration across regions is assumed away.

where c^i and d^i denote consumption in period 1 and 2, respectively, by type i individual. Households are assumed to be risk neutral (linear utility function)⁹. Individuals are different only in terms of the share of total regional output that are entitled to in each period. Thus, we are going to assume that the R-type receives a greater share of the local output than the P-type¹⁰. In addition to the fixed output level, disposable income in period 1 comprises a transfer payment (gift) received from the local government (LG). In the second period, disposable income includes the endowed level of output net of an income tax charged by the Federal government (FG), plus the receipts from saving which are also subject to a capital tax charged by the local authorities. We assume both taxes are distortionary. Hence, the budget constraints for both types of households who, say, live in region j , are given by,

$$b^i + c^i = e^i Y_j + g^i \quad (2.a)$$

$$d^i = e^i Y_j (1-t) - f(te^i Y_j) + b^i R_b(1-\sigma_j) - \alpha_j \sigma_j b_j R_b \quad (2.b)$$

where:

$i=P,R$

e^i = share of total local output owned by the

⁹The reason for this assumption is that it rules out the possibility that public borrowing emerges as a consequence of differences between the intertemporal elasticity of substitution and the interest rate.

¹⁰The proposed heterogeneity scheme is similar to the one presented in Prati (1990b). Also, in Alesina and Tabellini (1989) an heterogeneity-type model along similar lines the one presented here is developed to study issues in taxation and capital flight.

representative individual of type i . In particular, $e^P = a^P/n^P$ and $e^R = (1-a^P)/(1-n^P)$ where a^P is the share of local output owned by all P -type households together¹¹.

Y_j = total output of region j .

b^i = debt purchases by type i individual.

g^i = transfer payment (gift) received by type i individual from the local government of region j .

t = proportional income tax charged by the federal government.

$f(.)$ = convex function that reflects the distortionary cost of federal income taxation.

b_j = total debt issue by the j local government.

$R_b = (1+r_b)$ = real interest factor on local public debt.

σ_j = local tax on capital (or tax on savings).

α_j = Inefficiency parameter measuring the dead-weight cost of the local tax on capital in region j .

There is a two-tier governmental system with a Federal and N Local jurisdictions. Preferences of both types of governments will differ depending on the weight that each individual-type receives in the respective preference function . These weights try to capture the representation of each constituency at the two

¹¹ The assumption of an uneven distribution of income implies that $0 < e^P < 1 < e^R$.

government jurisdictions (the composition of the "political coalition"). Thus, preferences of the local (L) and Federal (F) governments are given by,

$$U^L = w^L U^P + (1-w^L) U^R \quad (3.a)$$

$$U^F = w^F U^P + (1-w^F) U^R \quad (3.b)$$

Local governments' expenditure consist of a gift g^i to each type of household. To finance these expenditures the authorities of region j issues debt, b_j , which is sold in the local market¹². In the second period the debt is repaid using either a transfer from the federal government, T_j , or using resources from a local capital tax. Hence, the budget constraints of the j LG in period 1 and 2 are given by,

$$n^P g^P + (1-n^P) g^R = b_j \quad (4.a)$$

$$b_j R_b = T_j + \sigma_j b_j R_b \quad (4.b)$$

The Federal authorities in the second period finances the transfers to all regions by charging a uniform country-wide income tax,

¹² We are thinking of short term debt which need not be bond with a well established market. Credit from local government suppliers could do as well.

$$\sum_{j=1}^N T_j = \sum_{j=1}^N tY_j \quad (5)$$

3. Equilibrium in the extreme polarization case.

Let's study first the case of complete preference (political) polarization in which we have an extreme "P" local government that cares only about the welfare of the P-type household ($w^L=1$), and an extreme "R" federal government who cares only about the R-type individual ($w^F = 0$)¹³.

Before analyzing the optimization problem encountered by each government jurisdiction, let's solve the consumption/saving decision faced by the representative household. Maximizing (1) subject to (2a) and (2b) we obtain an equation defining the ex-ante real interest rate as a function of the expected capital tax rate (assuming an interior optimum),

$$\frac{1}{\beta} = R^b (1 - \sigma^e_j) \quad (6)$$

Given the linear form of the preference function, the saving function is not well define. The individual will demand whatever (feasible) amount of debt, including zero, with the only condition

¹³ In section 4 we discuss the extended version of the model in which the preference weights take values strictly between zero and one.

that the ex-ante real return equals his rate of time preference¹⁴¹⁵.

The equilibrium concept to be used in the solution of the model is that of "Sequentially Rational Nash Equilibrium" (SRNE)¹⁶. This implies that for each period and for all sequences of previous aggregate histories:

- a) Both types of individuals maximize utility given the expected future equilibrium policy followed either by the local or federal government.
- b) The policies chosen by both, the local and the federal government, are optimal given the expectations held by consumers and the expected future equilibrium outcomes.
- c) private expectations are fulfilled.

A very important assumption that will drive the results to be derived below refers to the timing of movements of each player. The following sketch illustrates the order in which the LG, consumers and the FG are assumed to move,

¹⁴Nevertheless, the requirement that the interest rate be bounded from above, $R_b < \infty$, implies (using the Khun-Tacker conditions) that the demand for debt from the consumer equals zero if $\sigma^e = 1$.

¹⁵Thus, we leave in the hands of the local government the decisions regarding the "optimal" amount of debt and its distribution among the two group of individuals (R and P). This assumption allows us to isolate the distributive motive as the main determinant of local government deficits.

¹⁶For a detailed account, see Persson and Tabellini (1991).

	period one		period two
I	-----+	-----+	I
0	LG	consumers	1
	issues	determine in-	FG determines
	debt	terest rate	t and T (actual
		(expected ca-	capital tax rate)
		pital tax rate)	2

The timing framework implies that the LG is a Stackelberg leader player with respect to both, the consumers and the FG. Notice two consequences of this assumption. First, the FG is not able to precommit its policy. Instead, it is forced to choose its optimal policy after observing the action chosen by the LG and the real interest rate determined by consumers as a whole. The results would be very different if it is assumed that the FG can credibly pre-determine its policy. In particular, the emergence of local deficits and of federal government's transfers as a consequence of this type of redistributive game can eventually be avoided^{17,18}. Secondly, the LG issues debt before consumers (the market) determine the real interest rate. As we discuss below, the possibility that the LG can make commitments of this sort simplifies substantially the solution of the model¹⁹. Besides, there are financial mechanisms

¹⁷ For a model in which the FG is able to precommit its policy see Sanguinetti (1990).

¹⁸ The possibility exists that a repeated-game version of this model may succeed in generating equilibria that resembles that of a precommitment regime.

¹⁹ Specifically, it allows us to sort out the multiple equilibria problem that is a common feature of this type of game-theoretic, forward-looking models of public debt management. The seminal work in which this multiplicity of equilibria is identified is Calvo (1988). Also, in Alesina et. al. (1990) a game-theoretic model of public debt management is developed to account for the

through which public debt is auctioned that resembles this sort of commitment capacity²⁰.

3.1 The problem of the Federal Government.

The SRNE equilibrium requires a backward solution of the model. Hence, in period 2, the FG faces the decision of whether or not to make the transfer payment to the LGs and, if it does make the transfer, it has to choose the optimal level for the income tax rate. Formally, the FG solves the following problem²¹,

$$\max_{T_j, t} \sum_{j=1}^N (e^R Y_j (1-t) - f(te^R Y_j) + b^R R_b (1-\sigma_j) - \alpha_j \sigma_j b_j R_b)$$

s.t.

$$\sum_{j=1}^N T_j = t \sum_{j=1}^N Y_j$$

$$b_j R_b = T_j + \sigma_j b_j R_b$$

Notice that in the second period both the amount of local debt,

recent Italian experience. Finally, Prati (1990b) emphasizes the commitment issue as crucial for the multiple equilibria feature.

²⁰For example, the case of a government that, having a monetary control objective, announces a given amount of bonds to be sold and ask for interest rate offers.

²¹Recall that in this simplified scenario the FG cares only about the R-type household.

b_j , and the interest rate, R_b , are given from the point of view of the FG, since they were determined in period 1. Also, it is clear that by choosing t and T_i , the FG is actually forcing the local government of region i to set a particular capital tax rate σ_i . The following FOC is obtained by replacing the constraints into the objective function and solving the resulting concave problem (assuming an interior optimum)²²,

$$R_b b_i \sum_{j=1}^N e^{R} \frac{Y_j}{\sum Y_j} (1+f'(\frac{\sum b_j R_b (1-\sigma_j)}{\sum Y_j})) = R_b b_i (\frac{\theta}{(1-n^P)} + \alpha_i) \quad (7)$$

where $\theta/(1-n^P)$ is the portion of local government debt b_i purchased by the type-R representative individual²³. Equation (7) has a straightforward economic interpretation. Faced with a given amount of debt issued by the LG i in period 1, the FG can adopt two alternative (though not exclusive) policies. First, it can collect tax revenues throughout the country and transfer the resulting resources to the indicated LG, so the latter may pay off the debt. Second, it can decide not to make the transfer and let the local government of region i charge the capital tax to pay off the

²² The Khun-Tucker conditions also established that in the case of a corner solutions, (7) will be satisfied as an inequality ($<$ in the case that $\sigma = 0$ and $>$ for $\sigma = 1$).

²³This is given from the point of view of the FG in period 2. Below we see how this debt-composition parameter θ is determined by the local government in period 1.

debt²⁴. The above condition says that the FG would choose a combination of the two policies such that, at the margin, the cost of using both taxes are equalized. In this sense, the term on the left hand side of (7) measures the cost suffer, all across the country, by type-R individuals (the only group the FG cares about), as a consequence of a small increase in the federal tax t . Similarly, the term on the right hand side represents the marginal cost borne by the FG (again, in term of the consumption-loss suffer by individual R) of increasing the local capital tax rate in region i .

From the solution of the consumer problem we know that $R_b = 1/\beta(1-\sigma^e)$. Thus, R_b in (7) already incorporates the capital tax expectations formed by individuals in period 1. It can now be asked what is the level of LG debt such that private expectations are always fulfilled, meaning that ex-post the FG finds optimal to set $\sigma_i = \sigma^e_i$. Replacing (6) in (7) such a level of debt, b^*_i $i=1, \dots, N$, would be given by,

$$\sum_{j=1}^N e^R \frac{Y_j}{\sum Y_j} (1+f'(e^R \frac{Y_j}{\sum Y_j} \frac{1}{\beta} \sum b_j^*)) = \frac{\theta}{(1-n^p)} + \alpha_i \quad i=1, \dots, N(8)$$

At this level of debt b^*_i , we encounter a multiple equilibria situation in the sense that if the authorities of, say, region i in

²⁴Given that there is no other capital asset but LG debt, this capital tax can be interpreted as an outright default from the part of the LG.

period 1 were to issue this amount of debt, the federal government will validated whatever capital tax expectation the market (all consumers together) chooses²⁵.

However, it is seen that if $b_i \neq b_i^*$, the above multiple equilibria feature disappears. For example, if $b_i > b_i^*$ the only way in which condition (7) can be satisfied is if $\sigma_i > \sigma_i^e$, i.e. the actual capital tax rate exceeds the expected one. But, if people anticipate this behavior, they will revise up their initial expectations which, in turn, will lead the FG to ex-post increase σ even more. Of course, this process will imply that the only consistent expectation that households will form about σ_i when $b_i > b_i^*$, is $\sigma_i^e = \sigma_i = 1$, for which (7) is satisfied as an inequality²⁶. But if this is the case people will not demand any debt in the first place²⁷. Therefore, $b_i > b_i^*$ can not be an equilibrium that LG i would choose in the event that he actually wants to spend²⁸. In other words, b_i^* represents the maximum level of local government deficit that, given private sector expectations about the local

²⁵ We are being loose here when we mention the word "equilibrium". We did not yet showed that b_i^* is the overall SRNE equilibrium level of debt. Thus, this multiplicity result and the static comparative outcome derived below should be taken as preliminary results to be useful once we established that b_i^* is the overall solution to the model.

²⁶ See note 22.

²⁷ See note 14.

²⁸ We prove this statement below, when we show that the welfare of the LG is monotonically increasing with respect to the level of debt.

capital tax, the FG is willing to "bail out" through a transfer.

On the other hand, if $b_i < b_i^*$, condition (7) implies that $\sigma_i < \sigma_i^e$, i.e. the FG would "force" the LG to set the local tax rate below the expected one. Applying a similar reasoning, it is concluded that the only expectation that the FG will ex-post fulfill when $b_i < b_i^*$ is $\sigma_i^e = \sigma_i = 0$ ²⁹.

In order to find an explicit expression for b_i^* it will be convenient to make two additional assumptions. First, let's postulate $f(x) = 1/2 x^2$ and second, assume all regions are identical. Under this circumstances, b^* takes the following form,

$$b^* = \beta \frac{(1-n^p)}{(1-a^p)} \left[\frac{\theta + (1-n^p)\alpha}{(1-a^p)} - 1 \right] \quad (9)$$

The above expression is positive under very general conditions³⁰. Moreover it easy to see that the more inefficient the local tax system becomes (α increases), the higher will be the indicated upper limit for the local debt³¹.

The analysis developed so far seems to suggest that the maximum amount of local debt that the FG is willing to "bail-out" through a transfer, b^* , is a natural candidate for an overall equilibrium

²⁹ Again, in this case condition (7) will be satisfied as an inequality.

³⁰ A sufficient condition is given by $\theta \geq (1-a^p)$, which implies that all R-type individuals together should hold a proportion of the local debt at least equal to their share in local output. As it will turn out, in equilibrium $\theta=1$.

³¹ Formally, $\delta b^* / \delta \alpha = \beta (e^R)^2 \geq 0$

of the model. This level of debt (transfer) satisfies two of the indicated conditions for a SRNE equilibrium. The FG choose its policy optimally (condition (7) is satisfied), and private expectations are fulfilled. Nevertheless, we are yet far from establish this fact. Importantly, we must prove that issuing that amount of debt is optimal from the point of view of the local government in period 1.

3.2 The Problem of the Local Government.

In order to see whether the local authorities find in their own interest to issue debt up to the level the federal government is ex-post willing to sustain, let's study how the welfare of the local government varies with the level of debt. The following indirect utility function depicts the welfare of the P-type household who lives, say, in region i (the only group the LG of region i cares about)³²,

$$V(b_i, b_{i+j}) = e^{PY_i} + \frac{b_i}{n^p} + \beta \left[e^{PY_i} \left(1 - \frac{1}{\beta} \frac{\sum b_j}{\sum Y_j} \right) - f \left(e^{PY_i} \frac{1}{\beta} \frac{\sum b_j}{\sum Y_j} \right) \right] \quad (10)$$

$$0 \leq b_i < b^*$$

Two issues arises from the above function. First, the noncooperative game played among local governments implies negative external-

³²For expositional purposes, let's assume again that regions are not identical.

ities that they impose on each other ($\delta V_i / \delta b_j < 0$ for $j \neq i$). The basic problem being that the transfer to one region is financed with taxes charged all across the country³³. Hence, an attempt at a redistributive policy within a given locality (a gift to the preferred constituency) generates also redistributive payments across regions. Second, it is seen that if the local government is interested in maximizing the welfare of its constituency (P-type), it may not be optimal to reach b_i^* since at that level of debt, and depending on market expectations, the representative individual may be subject to dead-weight costs of local taxation in the case the local government decides to charge the capital tax (in period 2). But, as the analysis of the last section showed, if the LG offers for sell an amount of debt just a little lower than b_i^* , say $b_i^* - \xi$, it will be possible to coordinate individuals expectations such that the aggregate (market) level for σ^{e1} equals zero. Now, even if the local government sells debt for amount equal to b_i^* , the possibility exists for market expectation to behave in such a way as to make $\sigma_i^e = 0$. Imposing an equal probability value to each possible realization of the aggregate (market) capital tax expectation σ^e , it is concluded that setting $b_i = b_i^* - \xi$ is welfare improving (in expected utility terms) whenever $\xi < \alpha b_i^* / 2$.

In the analysis that follows we assume this condition is satisfied,

³³ The presence of these externalities is at the core of the "Coordination Failure" issue.

justifying the indicated inequality restriction in (10)³⁴.

Maximizing (10) over b_i and imposing the symmetry assumption (all regions are identical), we obtain an expression for b^{**} , the level of debt that the local government finds optimal to issue assuming no local tax is charged,

$$b^{**} = \beta \frac{n^P}{a^P} \left[\frac{N}{a^P} - 1 \right] \geq 0 \quad (11)$$

Comparing (9) and (11) it is easy to show that $b^{**} > b^*$ for $N \geq 2$. Therefore, the local authorities will do find optimal to set $b = b^* - \xi$, given that their bliss point (b^{**}) is located to the right of this latter value. Moreover, as we see from equation (9), b^* raise with θ , the share of local debt in the hands of type-R individuals. Hence, the local government of region i will tend to set this parameter equal to one, increasing in this way the equilibrium level of transfer (gift) to its preferred P-type constituency (recall that $g^P = b^* - \xi/n^P$). The reason for this result is clear. By raising the amount of debt in the hands of the R-type individuals, it increases the ex-post cost for the FG of not "bailing out" the local government, forcing the federal government to deliver the appropriate transfer that allows the local authorities to pay off the debt without using their distortionary local tax.

³⁴ Alternative, zero capital tax expectations, $\sigma^e = 0$, may constitute a "focal point" on which individuals expectations would coordinate.

Summarizing the results obtained for this extreme political polarization scenario, it is seen that the local governments will tend to sell debt to their opposite political constituencies (R-type) with the purpose of finance a gift to their most preferred group (P-type). The amount of debt will be just ξ -less the maximum amount the FG is ex-post willing to support through a transfer payment. This amount assures the LG that it will not need to use its distortionary capital tax when the debt falls due.

In addition, this level of debt (transfer) is positively associated with the degree of inefficiency of the local tax system. Thus, local debt and transfers from the FG arises in equilibrium both as a way of supporting inefficient local tax systems and also, out off a purely distributive origin; the linear form of the preference function implies that consumption in period 1 and 2 are perfect substitutes, therefore there is no special role for debt as a consumption smoothing devise.

4. Equilibrium in the extended Model.

This section tries to assert the way in which the results derived before change when local and federal governments care about both constituencies. In particular, we want to investigate whether or not the level of the FG transfer to region i (T_i) and the associated local government deficit (b_i) are affected when the "mix" defining government preferences (at the local and federal level) changes. In other words, we want to obtain some static comparative

results regarding the "political coalition" parameters w^L and w^F , which were assumed to be fixed (at 1 and 0 value, respectively) in the analysis carried out in the last section. The questions we want to address are the following : Does preference (political) polarization of the opposite kind the one analyzed in section 3 (so that now $w^L=0$ and $w^F=1$) support and equilibrium with positive FG's transfers and local government deficits?. Will local government deficit and transfers from the FG be zero if both Federal and Local governments have, loosening speaking, no distributive bias?.

The problem faced by the FG in the second period takes the following form,

$$\text{Max} \sum_{j=1}^N (w^F d^P + (1-w^F) d^R)$$

s.t

$$d^i = Y_j e^i (1-t) - f(te^i Y_j) + b^i R_b (1-\sigma_j) - \alpha_j \sigma_j b_j R_b \quad i=P, R$$

$$b_j R_b = T_j + \sigma_j R_b \quad j=1, \dots, N$$

$$\sum_{j=1}^N T_j = \sum_{j=1}^N t Y_j$$

Solving the above problem using a procedure similar to the one employed in section 3, we find the expression for the maximum level of local debt the FG is willing to bail out through a transfer T

(analogous to equation (9))³⁵,

$$b_E^* = \frac{\beta}{(1-a^P) \frac{(1-a^P)}{(1-n^P)} \frac{(1-w^F)}{(1-n^P)} + a^P \frac{a^P}{n^P} \frac{w^F}{n^P}} \left(\alpha + \frac{w^F}{n^P} ((1-\theta) - \right. \\ \left. -a^P) + \frac{(1-w^F)}{(1-n^P)} (\theta - (1-a^P)) \right) \geq 0 \quad (12)$$

where the above equation is non-negative under very mild assumptions³⁶. Equation (14) shows that in this extended version of the model, the maximum FG-backed level of local debt b_E^* depends, as in the case of the last section, on the local tax efficiency parameter α and on the income distribution ratios $(1-a^P)/(1-n^P)$, a^P/n^P . The novelty is that now the "distributive bias" ratios, w^F/n^P and $1-w^F/1-n^P$, are also added as determinants of b_E^* . We say there is a distributive bias whenever the preference weights coefficients (w^F, w^L) do not coincide with the population coefficients of the corresponding constituency. For example, if $w^F > n^P$ we say that the FG has a redistributive bias towards the P constituency (or, alternatively, the P-constituency is "over-represented" in the federal government).

As in the previous section, in order to determine the actual level of debt (transfers from the FG) that is going to prevail in equilibrium, it is necessary to solve the problem of the local

³⁵The sub-indices E stands for "extended" model.

³⁶A sufficient condition is, again, that $\theta \geq (1-a^P)$.

government. Formally, the local authorities of, say, region s solve³⁷,

$$\text{Max}_{b_s, g^R, g^P} w^L(c^P + \beta d^P) + (1-w^L)(c^R + \beta d^R)$$

s.t

$$b^i + c^i = e^i Y_s + g^i \quad (13.a)$$

$$d^i = e^i Y_s + b^i(1-\sigma_s)R_b - f(e^i Y_s t) - \alpha_s \sigma_s b_s R_b \quad i=P, R \quad (13.b)$$

$$R_b(1-\sigma_s) = \frac{1}{\beta} \quad (13.c)$$

$$\sum_{j=1}^N T_j = \sum_{j=1}^N t Y_j \quad (13.d)$$

$$b_s R_b = T_s + \sigma_s b_s R_b \quad (13.e)$$

$$b_s = n^P g^P + (1-n^P) g^R \quad (13.f)$$

$$0 < b_s < b^* \quad (13.g)$$

From the set up of the problem it is clear the leader-player role the LG has in the policy game. When choosing its optimal policy, the LG already takes into account both the private sector and the Federal government reaction functions (condition (13.c) and (13.g), respectively) to the selected policy. In particular, as we discuss in section 3, under certain conditions, the local government will not find optimal to issue debt such that the upper limit b_s^* is

³⁷Recall that sub-indices indicates region and supra-indices indicates type of individual.

reached. By selling, say, $b_g^* - \xi$, it can avoid the possibility the market coordinate in a "bad" equilibrium in which the local government is "forced" to use its distortionary capital tax. Thus, the range of positive values that local debt b_g can take in equilibrium should be properly adjusted to reflect the indicated circumstances (condition (13.g)).

Replacing all but the last restrictions into the objective function, we can rewrite the problem of the local government as follows,

$$\begin{aligned} \text{Max}_{b_s, g^R} \quad & w^L (e^{Y_s} + \beta [e^{PY_s} (1 - \frac{\sum b_j \frac{1}{\beta}}{\sum Y_j}) - f(e^{PY_s} \frac{\sum b_j \frac{1}{\beta}}{\sum Y_j})]) + (1 - w^L) (e^{RY_s} + \beta [e^{RY_s} \\ & (1 - \frac{\sum b_j \frac{1}{\beta}}{\sum Y_j}) - f(e^{RY_s} \frac{\sum b_j \frac{1}{\beta}}{\sum Y_j})]) + b_s \frac{w^L}{n^P} + g^R \frac{n^P (1 - w^L) - w^L (1 - n^P)}{n^P} \\ \text{s.t.} \quad & 0 \leq b_g < b^* \end{aligned}$$

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Solving the above maximization problem we find the following FOCs,

$$\begin{aligned} & \frac{w^L}{n^P} - w^L \left(\frac{e^{PY_s}}{\sum Y_j} + e^{PY_s} \frac{\sum \frac{1}{\beta} b_j}{\sum Y_j} \left(e^P \frac{Y_s}{\sum Y_j} \right) \right) - \quad (14.a) \\ & - (1 - w^L) \left(e^R \frac{Y_s}{\sum Y_j} + e^{RY_s} \frac{\sum \frac{1}{\beta} b_j}{\sum Y_j} \left(e^R \frac{Y_s}{\sum Y_j} \right) \right) = 0 \end{aligned}$$

$$g^R (n^P (1 - w^L) - w^L (1 - n^P)) \leq 0 \quad (14.b)$$

From (14.b) it is concluded that unless the local authorities

have no distributive bias, i.e. $w^L/n^P = 1-w^L/1-n^P$ (which, in turn, implies that $w^L = n^P$), the LG will always make transfer payments only to its most preferred constituency. In particular, if the LG has a distributive bias toward the P-type constituency, i.e. $w^L/n^P > (1-w^L)/(1-n^P)$, then $g^P = b_g/n^P$ and $g^R = 0$. Exactly the inverse result will be found when the LG has a distributive bias toward the R-type constituency³⁸.

Yet, we have to determine the level of debt that will prevail in equilibrium. Imposing the symmetry assumption on (14.a) we can solve explicitly for b_E^{**} , the level of debt the local authorities find optimal to issue assuming it will be entirely pay off by a transfer from the FG in period 2 (analogous to expression (11) of section 3),

$$b_E^{**} = \frac{\beta}{(1-a^P) \frac{(1-a^P)}{(1-n^P)} \frac{(1-w^L)}{(1-n^P)} + a^P \frac{a^P}{n^P} \frac{w^L}{n^P}} \left\{ N \left(\frac{w^L}{n^P} - \right. \right. \quad (15)$$

$$\left. \left. - \left((1-a^P) \frac{(1-w^L)}{(1-n^P)} + a^P \frac{w^L}{n^P} \right) \right\} \geq 0$$

Similar to what was found in the case of the FG problem, it is seen that both, the income distribution and the distributive bias ratios help to determine b_E^{**} ³⁹. Comparing (12) and (15) it is easy to establish that $b_E^{**} \geq b_E^{**}$ for $N \geq 2$. Thus, given that the bliss

³⁸This is the consequence of the linear form of the social (LG) preferences. In more general set ups we should expect that both constituencies get positive transfers.

³⁹Of course, as the above condition was derived under the assumption that no capital tax is charged, the efficiency parameter related to the local tax system (α) does not enter in the solution for b^{**} .

point of the LG is to the right of b_E^* , again $b_E^{**}-\xi$ constitutes the (SRNE) equilibrium level of debt (transfer) in this extended version of the model.

We are going to use the general solution of the model given by expression (12) to study two other special cases (besides the one presented in section 3). First, the case of complete political polarization which is exactly the opposite of that we analyze in the last section. Second, the situation in which there is no distributive bias, neither at the federal nor at the local level of government.

With respect to the first case, the "political" configuration implies that now we have an extreme P-type government at the Federal level ($w^F=1$) and extreme R-type administration at the local level ($w^L=0$). Under these assumptions equation (12) can be rewritten as,

$$b^*|_{w^F=1} = \beta \left(\frac{n^P}{a^P} \right)^2 \left(\alpha + \frac{(1-\theta-a^P)}{n^P} \right) \quad (16)$$

Which again is positive as gifts to the R-type constituency will be maximized (recall that now the LG cares only about the R-type group so that $g^P=0$ and $g^R = b^*-\xi/(1-n^P)$) when the LG in period 1 sets $\theta=0$. This means that now the local government will take debts only with the P-constituency in order to make transfer payments (gifts) to the R-type group. Thus, we see that even a political configuration of the opposite nature of that study in section 3 supports a positive level of debt and of transfers from the Federal govern-

ment.

Finally, we want to analyze the case where no distributive bias exists. In this scenario the preference weights encounter at both levels of government are just equal to the population shares (i.e. $w^L = w^F = n^P$). In other words, each constituency has just the "right" representation at each level of government. Under this assumption expression (14) can be written as,

$$b^* |_{w^F = n^P} = \frac{\beta \alpha}{(1-a^P) \frac{(1-a^P)}{(1-n^P)} + a^P \frac{a^P}{n^P}} \geq 0 \quad (17)$$

Looking at the above expression it is concluded that in this "non-politically" biased regime the local government has no incentives in trying to "exploit" its advantage as a first mover in the policy game. The only reason for the existence of debt and of transfers from the federal government is related to the inefficiency of the local capital tax ($b^* = 0$ if $\alpha = 0$). Under this circumstances regions with less efficient tax system tend to receive higher transfers from the federal government independently of political considerations.

From the overall comparison of the three special cases that we have analyzed (equation (17) vis a vis equations (9) and (14)), we conclude that the equilibrium level of transfers from the FG to the LG is greater under the two extreme political polarization regimes. Thus, it can be established that political polarization across government jurisdictions increases the equilibrium level of local government deficit and of FG's transfers regardless of which way

polarization goes.

5. Empirical Analysis.

In this section an effort is made in order to provide an empirical investigation on the determinants of intergovernmental transfers. From the outset we should indicate that, though the empirical investigation is inspired in, and tries to be consistent with, the theoretical analysis developed in the previous sections, it is far from being a thoroughly test of the model presented earlier.

In the statistical analysis that follows we are going to use data corresponding to two countries : Argentina and England. The reason behind the selection of the two mentioned nations lies partly in the availability of data, and partly in an priori presumption that political economy considerations of the type emphasized in the paper have played an important role in explaining intergovernmental transfers in those countries⁴⁰. Besides, it seems interesting to compare the experience of a developing country with that of a developed nation in this area of intergovernmental fiscal relationships.

The main emphasis will be to try to assess the empirical content of two hypothesis that were advanced in the theoretical analysis. First, the positive association between the inefficiency of the

⁴⁰For the case of England, Bayoumi and Gordon (1991) already found that political considerations of the type emphasize here are an important determinant of local authority spending.

local tax system and transfers from the federal government. Second, the idea that political polarization between the federal and local levels of government raises the amount of transfers received by local authorities beyond the level justified by indicated local tax efficiency criterium.

Table 1 and 2 present the regression results for the cases of England and Argentina respectively. In both tables the dependent variable is defined as central government's transfer to local jurisdictions (Counties in the case of England and Provinces in the case of Argentina) in per capita terms. One type of regressor we have included is given by different variables measuring the relative degree of development of the various regions. The hope is that these variables can, at least indirectly, tell something about the degree of efficiency of the local tax system. In particular, we will assume that more developed regions have a more efficient tax system. In any case, the inclusion of these variables has also the objective of controlling for the well-known purpose of most intergovernmental transfer systems, which is, to help local governments of low income regions to provide a minimum level of public services and other public goods.

The regressions also include political-economy variables that try to measure the degree of political polarization across level of governments. In general these variables will take the form of a dummy-type parameter that takes the value of 1 for that region in which the local government is dominated by a political constituency different from that ruling at the federal level.

Table 1
 England 1983-84
 Dependent variable: transfers per capita*

	1	2	3
Constant	6.4 (36.9)	314.9 (20.2)	352 (22.1)
Ratval	-0.011 (-9.12)	-1.46 (-13.8)	-1.28 (-9.14)
Dumlab	0.12 (2.11)		
Shlabor		0.69 (5.87)	
Shcons			-0.77 (-4.14)
R-squared	0.78	0.88	0.84
R-Bar Squared	0.77	0.87	0.84
F-Stat	67	139.9	101.1
N	39	39	39

*t-statistics in parenthesis.

Transfers per capita=Block Grant Claim per Capita in 1983-84.

Ratval= Actual Rateable Value in 1982 per head.

Dumlab= Dummy variable: 1 when Labor party has more than 50 % of the seats in the Local Assembly.

Shlabor=Labor Party's share of total seats in the Local Legislature.

Shcons=Conservative Party's share of total seats in the Local Legislature.

Source: Finance and General Statistics 1983/84, CIPFA, Statistical Information Service and Municipal Yearbook, 1984.

Table 2
 Argentina: 1986
 Dependent Variable: Transfes per capita*.

	1	2	3	4
Const	159.3 (3.06)	23.24 (2.99)	21.72 (4.79)	122.89 (3.02)
Develop1	-1.15 (-3.01)			-1.05 (-3.61)
Develop2	-1017.3 (-2.50)			-734.6 (-2.31)
GDP		-5.67 (-1.47)	-14.13 (-5.48)	
Dumpol	15.03 (2.85)	14.55 (2.61)		6.16 (1.32)
Repeca			0.12 (7.00)	0.08 (3.77)
R-Squared	0.52	0.34	0.75	0.74
R-Bar-Squ	0.44	0.27	0.72	0.67
F-Stat	6.59	5.03	28.7	12.14
N	22	22	22	22

*t-statistics in parenthesis.

GDP= GDP per capita in 1985.

Develop1 = Development Index calculated by weighting quality of housing, number of cars per capita and educational skills, in 1980.

Repeca=Provinces' Representatives (per capita) in the National Congress.

Dumpol=Dummy variable: 1 if local government's party is different from that ruling at the federal level.

Sources: A. Porto (1990) and World Bank (1989).

Table 1 shows that the regression results for the case of England in 1983-84 seem to conform with the theoretical hypotheses. In equation 1, the negative and significant coefficient for the RATVAL variable, measuring the total taxable value (in per capita terms) in each region, indicates that central government transfer followed a strong distributive pattern where poor counties received higher transfers per capita than rich ones. As long as this taxable-value variable is positively correlated with the degree of efficiency of the local tax system, something that is not difficult to imagine, this result is consistent with the efficiency hypothesis indicated above. On the other hand, the positive and significant coefficient for the variable DUMLAB, which takes the value of 1 for those counties where Labor-party representation in the local assembly is equal or higher than 50%, indicates that, other things constant, Labor-dominated counties on average received higher transfer per capita than Conservative-dominated ones during this period.

The above results do not change if instead of a dummy variable, we use directly the Labor party share of seats in the local assembly, SHLABOR, as independent variable (see equation 2) . Moreover, the expected negative coefficient is obtained in the case we replace SHLABOR by SHCONS, the Conservative party share of seats in the local legislature (see equation 3).

Table 2 shows that for the case of Argentina, similarly to that of England, transfer from the FG have also had a clear redistributive purpose. This is indicated by the negative and significant

coefficients for DEVELOP1 and DEVELOP2 in equation 1. Both variables constitute alternative measures of the degree of development of different provinces. Interestingly, the indicated redistributive pattern is reinforced once political economy variables are included into the regressions. Both the significance level of the above development variables and the overall explicative power of the regression increase when the DUMPOL variable, which takes the value of 1 for those provinces governed by political parties other than the one ruling at the federal level, is added in the regression.

The strong positive and significant level of this DUMPOL variable suggest, again, that in Argentina during this period political polarization across government jurisdictions played an important role in the allocation of federal transfers.

Equation 2 of table 2 shows the regression results when provincial GDP per capita is used as a measure of relative level of development. Though the GDP variable has the expect sign, it fails to pass the significance test. On the other hand, DUMPOL continues to have a positive and significant coefficient. Nevertheless, when the number of representatives to the National Congress (in per capita terms) to the national Congress, REPECA, is added in the regressions (see equation 3), the GDP variable become strongly significant and negatively associated with transfers per capita. Though the mentioned REPECA variable does not constitute a measure of political polarization, it nevertheless indicates that other political factors, related to a strong Province's representation at

the National Assembly, also affected the allocation of transfer during this period.

Finally, when both political variables, DUMPOL and REPECA, are combined into a joint regression (equation 4), the overall explicative power of the equation increases, though the presumably colinearity between the two political variables affects the significance level of DUMPOL.

Summarizing the empirical results found in the regressions, we conclude that the system of intergovernmental transfers both in England and Argentina has had a clear redistributive pattern where poor endowed localities received on average higher level of transfer per capita than richer ones. This result does not seem to be surprising as the very purposes of these transfers is to try to equalized across regions the quality and quantity of public goods supplied by local governments.

What seems to be surprising is that political polarization have also affected the allocation of these transfers. In particular, in both countries regions that have local government dominated by political parties different from that at the federal level have received, on average, higher levels of transfers per capita than those of the same political affiliation.

6. Concluding Remarks.

This paper tries to show that political polarization between

constituencies ruling at the local and federal levels of government can, under certain circumstances, raise the level of intergovernmental transfers beyond what can be justified by efficiency criteria. Theory and empirical evidence seems to support the proposition that this polarization effect can be important in explaining the behavior of Federal government transfers to local jurisdictions.

Is there any policy or normative implication that can be derived from the above analysis? As we stated earlier in the study, the basic issue behind the policy game is the lack of commitment from the part of the FG in the determination of transfers to local governments. Thus, policies or enforceable rules that somehow establish limits and specific criteria for the allocation of FG's transfers (give the FG the advantage of "first mover") can, in principle, moderate the opportunistic behavior of the LG. But, even if this is so, the evidence corresponding to the English case showed that the problem could not be completely eradicated. Contrasting with the experience of Argentina in 1986, England in 1983-84 had tough regulations which explicitly penalized those counties which expend beyond a pre-established target levels set by the Central authorities. This penalization took the form of a reduced amount of transfers (rate support Grant) to be allocated to the corresponding local government. Still, we saw that this scheme could not stop local authorities to behave in an opportunistic way.

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