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Comments welcome

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CAUSES AND CONSEQUENCES OF BAILING OUT EXPECTATIONS OF LOCAL GOVERNMENTS: EVIDENCE FROM ITALIAN REGIONS

ABSTRACT

This paper examines the strategic interactions among the central and a lower tiered government where incomplete information forces both to form expectations about the other's behaviour, especially the probability that the central government will bail out the local one. Various determinants and outcomes of the strategic interaction are explored. The model generates empirical restrictions about the central government's transfer decisions and the lower government's spending behaviour. These restrictions are tested on a sample of 20 Italian Regions. Data show that bailing out expectations are a quantitatively important component of local government spending.

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1. Introduction and literature review

When and why may a local government rationally expect to be bailed out by the central government? How do these expectations affect its spending behaviour? And when and why, instead, the strategic interactions between two government levels produce equilibrium in the public finances of the local government? At which budget size? These are the questions addressed in this paper, both on theoretical and empirical grounds.

The literature has so far concentrated on the first two issues. The standard response is that local governments rationally form bailing out expectations whenever soft budget constraints characterize their relationship with the central government (Kornai et al. 2003). This enables local governments to engage in excessive spending *ex ante*. Research then focused on the causes of soft budget constraints to understand the formation of bailing out expectations and excessive spending: political expediencies, negative externalities associated with the failure of the organization in crisis, reputational incentives for the supporting organization, its need to recoup past investments, paternalism, corruption (Kornai et al., 2003; Maskin, 1999; Quian and Roland, 1998; Rodden and Eskeland, 2003). All these motives, however, presuppose an inability of rescuers to commit to no bail out *ex ante* (Dewatripont and Maskin, 1995). This framework of analysis has lead to the development of models of soft budget constraints and bailing out from the point of view of the supporting agency (Dewatripont and Maskin, 1995; Qian and Roland, 1998; Maskin, 1999; Kornai et al. 2003; Goodspeed, 2002): because these models have to explain the motives of a bailing out outcome, they concentrate on the behaviour of the organization that actually bails out, the central government.

There are, however, two closely related issues that this class of models finds difficult to address. First, these models treat bailing out as a dichotomous choice: either the supporting organization bails out or refuses. Yet, especially in intergovernmental relations, bailing out is only one of the possible outcomes of the strategic relationship between the central and lower tiered governments. The central government may refuse to bail out, or do so with delay, and/or be selective of which local government to relieve from trouble and which to abandon to self financing through a fiscal crunch. Moreover, there might also be forms of "implicit bailing out", where the central government's inability to commit is so severe that it immediately surrenders to the profligacy of the local government and sets a high level of transfers *ex ante*[2] A more complete illustration of the various outcomes of the relationship

[2] Examples of implicit bailing outs are incremental rules that entitle local governments to an incremental level of transfers with respect to the previous years' levels of spending (Stein, 1999; Kornai et al. 2003).

allows answering also to the third and fourth question posed in the introduction, namely, under which conditions that strategic relationship produces equilibrium in local public finances and at which level of expenditures. Secondly, this larger variety of courses of action for the central government increases uncertainty for the local government and makes it harder to form expectations. The larger set of alternative strategies that the central government may follow expands also the set of the possible responses by the local government, which in turn triggers a larger variety of possible further reactions by the central government.

The greater complexity requires a change of the modelling structure concentrated on the central government in favour of a multi-centred one, where the decision-making processes of both actors are equally important matters of inquiry. The recent literature witnesses an increasing number of papers that adopt such a modelling strategy. Inman (2003) proposes a multi-centered model of the institutional framework where the relationships between the U.S. States and the Federal government take place. Rodden adopts a multi-centred perspective in his studies of the fiscal interactions within the EU (Rodden, 2006) and between the German Federal government and the Länder (Rodden, 2005). Bordignon and Turati (2009) formalize the analysis of the role played by uncertainty in fiscal relationships within a multi-tiered government structure and apply it to the case of health care financing and spending. All these models find their theoretical structure in Harsanyi's (1967-68) models of games with incomplete information.

The present paper illustrates a variant of these models that features a payoff structure compatible with a fairly large set of institutional frameworks where the strategic interactions between central and local governments take place. An important feature of the theory is that it leads to a variety of financial outcomes – immediate bailing outs, deferred bailing outs, *ex ante* and deferred fiscal responsibility by the local government, as well as "failure" of the local government[3] – with respect to which the local government has to generate rational expectations. Interestingly, the model also shows that in certain cases soft budget constraints exist even if no bail out operations are put in place, for example when the central government avoids a deferred bail out by giving in immediately. Notwithstanding this variety of theoretical equilibria, it can be shown that some empirical restrictions remain invariant. These empirical restrictions are then tested on data about the relationships between the Italian central and regional governments for the time interval between 1996 and 2007.

[3] Insolvent local governments generally do not go bankrupt like private corporations. Their "failure" is therefore to be intended as a refusal by the central government to bail them out that forces the local government to implement a tight fiscal policy and/or to face political consequences, depending on the institutional features of the country.

The key issue of the empirical analysis is the representation of the bailing out expectations, as they are in principle unobservable. The empirical literature offers a set of alternative techniques for the purpose; they are all adopted here to verify the robustness of the estimated results. In particular, expectations are specified both through an autoregressive forecasting procedure, as in Holtz-Eakin and Rosen (1993), Rattsø (1999) and Rodden (2005), as well as through the IV strategy proposed by Pettersson-Lidblom and Dahlberg (2003) and Pettersson-Lidblom (2008).

The rest of the paper is organized as follows. Part 2 illustrates the equilibria generated by the theoretical model under different information and payoff structures and discusses the testable empirical restrictions that the model generates. The empirical strategy is described in part 3, and the econometric results are discussed in part 4. Part 5 draws the main conclusions of the analysis. Appendix A presents the theoretical model in full, appendix B provides information about the main features of the Italian system of intergovernmental relations, while appendix C describes the data sources.

2. A synthesis of the theoretical model

2.1. Game theoretic structures. There are two alternative ways to represent the strategic interactions between a central and a regional government. In the first case, no government level enjoys an informational advantage over the other, so there is no uncertainty in this setting (Inman, 2003; Rodden, 2006). This game theoretic structure well describes real world situations where the relationship between the central and the regional governments is tightly regulated, e.g., by a formula and/or a set of institutions that provide the central government with a credible commitment technology. The lack of uncertainty and of possibilities of discretionary behaviour make it impossible to represent bailing out expectations in this theoretical context: still this structure is a useful first step to the more complex setting where information is asymmetric and bailing out expectations are made.

In the second case, uncertainty is introduced to examine how central and regional governments form expectations about each other’s behaviour. To this end, the hypothesis of common knowledge must be replaced by another assumption, that there are two “types” of central government, a “tough” one that bails out and a “weak” one that does not. The information about the type of central government is its private and exogenous. Everything else may remains common knowledge. Such uncertainty expands the set of possible decisions of the central government, and forces the regional ones to form expectations about the central government type in order to select their optimal response functions. Models of this kind (e.g., Bordignon and Turati, 2009) refer to Harsanyi (1967-68) game theoretic models of incomplete information.

2. 2. Strategic interactions with complete information. Consider a simple economy with two governments, a central and a regional one. The central government moves first and sets the level of resources to be given to the regional government for the next period, **r**, which can be either high (R) or low (r), so that vector $\mathbf{r}=\{r,R\}$, where $R>r>0$. These revenues can be thought of as transfers or revenue sharing schemes; for simplicity, the region is supposed to have no fiscal autonomy. Upon observing **r**, the regional government selects an expenditure level from vector **e**. Again for simplicity it is supposed that also the regional government can only choose between two levels of expenditure, low or high, $\mathbf{e}=\{e, E\}$, where $E>e>0$. With no loss of generality, the funding and expenditure levels are assumed to be symmetric and equal, so that when both government levels play "high" or "low", the regional government budget is in balanced. Furthermore, if the central government is "generous", i.e., it sets R at the beginning of the game (upper branch at M1 in figure 1), it is assumed that the regional government can only decide an expenditure level equal to E, as the budget rules forbid the rollover of unused funds[4]. In this case (squared ending nod of the upper branch) the payoff for the central and the regional government are, respectively, $U^C(R, E)$ and $U^L(R, E)$. If, instead, the central government is "stingy", it will set r at the first stage of the game (lower branch at M1) and the regional government may choose between a) setting e (lower branch at M2), a move that ends the game with payoffs for the two agents of $U^C(r,e)$ and $U^L(r,e)$, respectively; and b) selecting E thus running a deficit (upper branch at M2). If so, it is again the central government's turn to choose among two alternative courses of action: a) it may be "tough" and impose a hard budget constraint on the regional government (lower branch at M3); b) it may be "weak" and creating a soft budget constraint (upper branch at M3). By imposing a hard budget constraint, the central government refuses to accommodate the increased expenditure by the regional government, forcing it to take care of the deficit through increased local taxation; in this case the utility levels of the two agents are respectively $U^C(r, E)$ and $U^L(r, E)$. If, alternatively, the central government places a soft budget constraint on the regional one, at M3 it will accommodate the increased local spending by increasing transfers, with the utility levels of the two agents being $U^{Cb}(R,E)$ and $U^{Lb}(R,E)$, where the superscript b stands for "bailing out".

[4] In the light of the literature on the flypaper effect, the case where the local government actually runs a surplus or lowers other revenues (excluded from the model), beside being factually irrelevant, adds nothing to the present analysis.

FIGURE 1 ABOUT HERE

To characterize the equilibria, the following assumptions on payoffs for each government level are made throughout the model:

A1) $U^C(r,e)>U^C(R,E)$;

A2) $U^C(r,e)>U^{Cb}(r,E)$;

A3) $U^L(R,E)\geq U^{Lb}(R,E)>U^L(r,e)>U^L(r,E)$;

A4) $U^C(r,e)+U^L(r,e)>max\,[U^C(R,E)+U^L(R,E);\,U^{Cb}(R,E)+U^{Lb}(R,E)]$.

Assumptions A1) and A2) say that the central government is essentially prefers low financing and low expenditure to high financing and high expenditure, both when the bailing out occurs and when it does not. Assumption A3) asserts that the regional government prefers high expenditure and high financing (and the earlier the better), but that if it had to finance itself the deficit in the case of low financing, it would prefer to cut expenditure immediately. Assumption A4) guarantees that it is indeed Pareto efficient to constrain financing and expenditure at the low level. In light of the positive literature on the politics of transfers from central to local governments (Padovano, 2010 provides a survey) all these assumptions seem plausible. In particular, A1) and A2) mimic institutions that impose a hard budget constraint and spending limits on the central government, such as strict budgetary rules and/or international financial treaties such as the Growth and Stability Pact. A3) instead represent the quite general case where local governments have the option to finance local expenditure via revenue sharing schemes or any form of common pool situation. The setup of the model is therefore quite general.

The payoffs of the central government determine the equilibria of this game. In particular, it can be easily shown that, in this case of perfect information, the only subgame perfect equilibria of this game are:

E1) If $U^C(r,E)>U^{Cb}(R,E)$, i.e., the central government is stingy and places a hard budget constraint, it then plays r at M1, the regional government selects e because of A3 and the game ends.

E2) If $U^C(R,E)>U^{Cb}(R,E)>U^C(r,E)$, i.e., the central government is generous, it plays R at M1, the regional government reacts by selecting E at M2 and the game ends.

E3) If $U^{Cb}(R,E)>U^C(R,E)>U^C(r,E)$, i.e., the central government is possibly stingy but can place only a soft budget constraint on the regional one, then it plays r at M1, the regional government knows the payoff structure of the central government and reacts by selecting E at M2. The central government ends by bailing out the deficit of the regional government at M3.

Assumption A4) ensures that the first best equilibrium is E1, when the central government can credibly commit not to bail out regional deficits. If it cannot, it gives in either immediately, setting a high financing level (equilibrium E2), or later, deciding for a low level of financing in the first period and then bailing out the regional deficits later (equilibrium E3). Although second bests, E2 and E3 are both interesting cases. E2 shows that, contrary to what the literature generally maintains, soft budget constraints problems may appear in the form of excessive funding and expenditure, with no formal bailing out. In that case, the central government knows *ex ante* that it cannot be tough on regional government spending, and gives in immediately. E3 instead shows that the central government may actually find it convenient to initially underfund the regional government and still end up with a bailing out. Delaying an inevitable bailout helps the central government in discriminating between the regional governments to save, e.g., between aligned and unaligned (Arulampalam et al. 2009) or between more and less politically rewarding ones (e.g., the "swing" regional governments, as in Dixit and Londregan, 1998). Else, the central government may simply wait for the least costly period to bail out the regional governments in trouble. The empirical literature (Padovano, 2010; Rodden, 2005; Bordignon and Turati, 2009) shows that both scenarios are factually relevant.

2.2. Strategic interactions with incomplete information. To examine how central and regional governments form expectations about each other's behaviour, uncertainty must be introduced in the strategic relationship just described; the payoff functions of the regional government and the timing of the game remain unchanged.

Now it is the regional government to move first, by creating some *a priori* on the "type" of central government it is facing. Suppose that the regional government now expects the central government to be "tough" with some exogenous probability π (Figure 2-4, upper branch at M1) and to be "weak" with probability $1-\pi$ (Figure 2-4, lower branch at M1).

FIGURES 2-4 ABOUT HERE

A "tough" central government, denoted by the superscript T, prefers not to bail out the regional government in the event of a deficit: $U^{CT}(r,E)>U^{CbT}(R,E)$. Instead, a "weak" central government, denoted as W, always prefers to bail out the regional government in the case of a deficit: $U^{CbW}(R,E)>U^{CW}(r,E)$. Both types of government still prefer low expenditure and low financing to high expenditure and high financing.

Figure 2 illustrates the outcomes common to all payoff structures, solved by backward induction. The upper branches at M2 and M3 describe the situation where the central government sets R, then the regional government can only set E by assumption and the game ends (Figure 2). If the central government sets r in the first period, and the regional government reacts by setting e, the game is also over (lower branches at M2 and M3). The new interactions that uncertainty generates involve the case where the central government sets r at M2, and the region reacts by setting E (upper branches departing the second and forth nod from the top at M3). In the final period, given our assumptions about the payoffs of both governments, the best strategy for the tough government is to play "not bailing out", while the weak government plays "bailing out". The final outcome will then be (r,E) in the first case and (R,E) in the second, with the associated payoffs of agents (squared nods at M4). Moving backward to the first period, the optimal strategies of the two types of central government are easily characterized. Consider first the tough type. For this type, setting R at M2 is a dominated strategy (dotted line); whatever the beliefs of the regional government, if the central government sets R, the regional government can only respond with E and for the tough type this outcome is worse with respect to any other alternatives: $U^{CT}(r,e)>U^{CT}(r,E)>U^{CT}(R,E)>U^{CbT}(R, E)$. Hence, the tough type certainly plays r in the first period. Consider now the weak type. There are two alternatives, A) the case where the central government prefers bailing out later to giving in immediately ($U^{CbW}(R,E)>U^{CW}(R,E)$ in Figure 2); and B) the case where the central government prefers giving in immediately ($U^{CW}(R,E)>U^{CbW}(R,E)$ in Figure 3-4). In case A) setting R at M2 is a dominated strategy for the weak type too (upper branch starting from the lower nod at M2); for if the central government sets R, the regional government can only respond with E, and whatever beliefs the regional government holds upon observing r, even in the worst possible case where the regional government reacts by setting up E (upper branch starting from bottom nod at M3), the weak government is better off by bailing out later than giving in immediately: $U^{CbW}(R,E)>U^{CW}(R, E)$. In other words, as r is the dominant strategy for both the tough and weak government, the regional government will learn nothing about the type of government by observing r in the first period; it will still assume that this move comes from a tough government with probability π. π can therefore be interpreted as the *ex ante* probability of the central government being "tough" or, likewise, the *ex ante* credibility of the central government's threat not to bail out in the future the regional governments in deficit. The regional government will choose E if it expects the central government to be a tough one with a probability equal or above a threshold level, and e if its expectations are for a weak type. Appendix B provides the proof of this statement and defines the threshold probability level.

Consider next the case B), represented in figure 3, where the weak central government prefers to give in immediately to bailing out later ($U^{CW}(R,E)>U^{CbW}(R,E)$). In this situation, under complete information, the central government would simply give in immediately, setting up a high level of financing. Under incomplete information, however, the weak government can try to take advantage of regional government's uncertainty and pose as the "tough" type. If the central government manages to convince the regional government that it is "tough", it might attain the first best equilibrium. The eventual success of this strategy again depends on the regional government's expectations about the central government type. If the *ex ante* credibility of the central government's threat not to bail out future local deficits is high enough, the optimal reaction of the regional government is to set e at M3; although the regional government expects this, the probability that the government be in fact tough is too large for the regional government to be willing to run the risk of selecting a high level of expenditure, as it would then face the risk of failure with a large deficit to self finance. Hence, uncertainty creates the possibility for a weak central government to mimic a tough one, be believed, thus avoiding a bailing out outcome and forcing the regional government to keep expenditures at a low level.

In the case where the weak central government cannot credibly mimic a tough one, the regional government would expect the choice of a low level of transfers r to come from a weak government. It would then rationally react by setting a high level of spending, expecting to be bailed out, which in turn forces the central government to set a high level of transfers R immediately, again because $U^{CW}(R,E)>U^{CbW}(R,E)$. This is another case of "immediate surrender".

Finally, the less factually relevant, but theoretically possible, case that the central government randomizes between strategies is described in figure 4 and demonstrated in appendix B.

2.3. Empirical restrictions. The incomplete information version of the model offers a number of interesting empirical restrictions. Quite importantly, these predictions are common to all the different payoff structures, used to represent different institutional scenarios, as they all revolve around the key theoretical variable π, the *ex ante* credibility of the central government's threat not to bail out future local deficits. Three are the main predictions:

H1) *Coeteris paribus*, it should be more likely to observe a low level of *ex ante* financing when π is high. For instance, under perfect information in case E2 the central government immediately gives in and sets a high level of financing. Conversely, in the same case under incomplete information, the central government sets a low level of *ex ante* financing with at least some positive probability, and this probability is increasing in π.

H2) Having observed a low level of *ex ante* financing, the regional government is more likely to react with a low level of expenditure when π is high. At high values of π, a low level of financing is a more reliable signal that the government is indeed "tough"; the regional government therefore reacts by choosing a low level of expenditures. For example, under perfect information in case E3 the government sets r at the beginning of the game, but the regional government does not believe the implied threat, and reacts by choosing a high level of expenditure. On the contrary, in the same case under incomplete information, upon observing r the regional government reacts by choosing a low level of expenditure if π is sufficiently high.

H3) Another implication of the model can be found by further modifying the structure of the game. In the above model, if the regional government chooses the high level of expenditure E, the weak central government would always reveal itself by bailing out regional deficits. But this feature is simply the result of having analysed a single shot of the financing-expenditure game. If the game is repeated several times, we would find equilibria where at least in the early stages, even the weak government would find it convenient not to bail out the regional government in the event of a deficit, in order to build a reputation of being "tough" for future periods (as in the reputation models *à la* Kreps and Wilson, 1982). This extension of the game is not worked out in appendix B. But there is an obvious prediction of the repeated version of the model that seems nonetheless worth exploring empirically; if the regional government has observed a large amount of bailing out in the past, it should rationally predict that the same government is weak with larger probability. That is, a history of bail outs reduces the central government's *ex ante* credibility of its threats of no further bailouts (π in the model above). This also implies that one should observe higher level of *ex ante* financing and current expenditure.

3. The empirical analysis

<u>3.1. Data sources.</u> The dataset draws from the strategic interactions between the Italian central government and the regions. It spans across 21 cross section units (19 Regions, plus the two autonomous provinces of Trento and Bolzano) in the time interval between 1996 and 2007, for which consistent financial data about transfers are available, as explained in appendix C, which also describes the data sources of the dependent and independent variables.

<u>3.2. Modelling expectations.</u> A crucial problem for the analysis is to link the theoretical model with observable variables, to ensure consistency between the theory and its empirical test. In this respect, the crucial role is played by the variable π, i.e., the assessment

that regional governments make about the "toughness" of the central government. There are basically two kinds of proxies of π: time varying (vector **TPROXY**) and region specific ones (vector **RPROXY**). Bordignon and Turati (2009) follow a similar strategy in their examination of health care expenditures of Italian regions, but consider a quite limited set of determinants and proxies for expectations. Their approximation of bailing out expectations is possibly misspecified, as Padovano (2010) shows that a much larger set of factors in fact affects the central government's transfers decisions and the regional government spending levels. The present analysis fully exploits the relevant literature to provide a characterization of expectations as careful and detailed as possible.

Being time-varying only, the elements of the vector **TPROXY** affect all regions in the same way. Proxies of this kind are indexes of the tightness of the central government budget, such as the ratio between the consolidated deficit of the Italian central government and the average EU15 deficit (*DDPIL*)[5]. Another candidate is the presence of national elections, *ELN*, which takes the value of 1 in year *t* if national elections are held in the second half of that year, or 1 in year *t* and *t-1* if elections fall in the first half of the year *t*, and 0 otherwise. This variable captures political budget cycle effects that could potentially ease the budget constraint of all regions. To make sure that we are actually finding a cycle, i.e. that the budget expands before the elections and contracts in the year after, we have also included a one forward lag of *ELN*. Outside the electoral periods, the electoral strength of the national government conditions its need to use transfers to acquire votes locally. We proxy the electoral strength by the vote margin between the government majority and the opposition, *NDIF*; it should be negatively related with the amount of transfers distributed. For equal margins of majority, the homogeneity of the government coalition may also affect transfers decisions. More fragmented governments are more likely to be weakened by internal wars of attrition that reduce their expected life and force them to buy votes in local constituencies distributing transfers (Alesina and Drazen, 1991; Padovano and Venturi, 2001).We measure government fragmentation by the Herfindhal index of the parliamentary seats of the government majority, *HM*. Finally, we include also a linear trend (variable *TREND*) common to all regions that mimics the so-called "historical expenditure" rule, an incremental value mechanism *à la* Wildavsky (1964) by which Italian regions could expect to receive every year an incremental value of the previous year's current transfers.

[5] We have also explored the impact of the loosening of the Growth and Stability Pact in 2005 by means of a dummy centred on that year (*EASE95*), but it never showed a significant explanatory power due to its proximity to the end of the sample.

The second set of proxies shows variability also across regions, and represents changes of expectations due to region specific events (vector **RPROXY**). Variables of this kind are the alignment effect between the central and the regional government, which summarises the comparatively lower political cost for the central government to bail out a "friendly" regional government – and the expectations that regional governments attach to such a fact. Another relevant factor is the vote margin of the regional government over the opposition; although this variable, *RDIF*, is constructed in the same way as the national counterpart, the underlying relationship with the distribution of grants is more difficult to interpret. On the one hand, probabilistic voting models *à la* Dixit and Londregan (1996) predict that central government directs grants to marginal or "swing" regions, which should result in an inverse U-shaped relationship between regional vote differences and transfers. Alternatively, as Cox and McCubbins (1987) first suggested, risk adverse politicians in the central government might use grants to reward local politicians for electoral success and consolidate their local constituencies. In this case we should observe a positive linear coefficient on *RDIF*. The statistical significance of the coefficient on the square of the *RDIF* variable discriminates among these two competing theories. The distribution of grants by the central government may also be modelled as a rent seeking game, with the various regions characterized by different lobbying skills. Efficient lobbying requires that regional politicians (often the governors themselves) establish connections with the central government politicians and top bureaucrats, chiefly in the Ministry of Economics and Finance, build personal prestige and political weight. As these endeavours require time, it is plausible that regional governments that are in charge since longer time (variable *YEARS*) are likely to be more effective at lobbying and will thus obtain more transfers (Padovano, 2010). Finally, Pettersson-Lidbom (2008) and Pettersson-Lidbom and Dahlberg (2003) refer to the dynamic structure implicit in any soft budget constraint problems and argue that the history of past bailing out should be the best predictor for expectations of future bailing out. We account for this argument by means of a $i \times t$ matrix of dummy variables *FBOUT* that takes the value of 1 when region i in year t is the beneficiary of a special transfer of resources from the central government, reported in the financial bill (*Legge Finanziaria*).

3.3. The empirical strategy. The first test is related to the empirical restriction H1, namely, that a low level of financing is more likely observed when π is high. To this end, we first check that all the time- and regional-varying proxies for bailing out expectations affect the financing decision of the central government. According to the model "weak" central government are also tempted to reduce financing in the first place, as they can anticipate the shift in expectations held by regional governments. Furthermore, to verify the generality of the model, financing is measured in three alternative ways: real total transfers per capita from the central to the regional government, *TR*/*POP*, and their disaggregation between transfers earmarked to current spending (*TRC/POP*) and capital spending (*TRK/POP*). We then test restriction H2, namely that, having observed a low level of financing, a regional government is more likely to react with a low level of expenditure when π is high. We thus verify how the proxies for bailout expectations, conditional on financing, affect regional expenditure levels. The theoretical model in fact implies that regional expenditure should be more tightly constrained by financing when the probability of having a tough central government is high, as the regional government should expect less bailing out in the future. To this end, we introduce our estimates for expected financing, the fitted values of the best performing model in terms of information criteria, into the expenditure regression and check that the estimated coefficients are consistent with the predictions of the theoretical model. The basic idea is that it is financing conditional on regional expectations about π that affects regional expenditure, rather than observed transfers.

4. Estimates

4.1. Financing equations. The empirical analysis is based on Italian regional expenditure and funding over the years 1995–2007[6]. The estimation method used throughout is a pooled EGLS with cross section weights.

The first step is the definition of a model for ordinary (ex-ante) financing, which does not take into account the proxies for expectations listed above. There only the variables suggested in the welfare economics literature, which appear in formulas for equalization transfers (Brosio et al., 2003), are considered. The first covariate is a general indicator of the state of the regional economy, i.e., the regional unemployment rate *U*, lagged once due to the slow-adjustment nature of the variable, which should be associated with higher per capita transfers ($\beta_1>0$ is expected)[7]. We also consider the size of the regional population *POP*, to

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[6] Since we have only a short time series (t = 12), testing for the presence of unit root and cointegration is impossible. Moreover, cointegration implies the idea of a long-run relationship between the variables under scrutiny, which is clearly inappropriate in our case. Expectations are indeed influenced by short-run variations in the proxies for π.

[7] Alternative indicators that have been considered are the difference between region *i*'s per capita output growth and the national average (*DGGDP*) and the region's output per capita (*GDP/POP*). As it is often found in this sample (Padovano, 2010), the unemployment rate carries the greatest explanatory variable among these indicators of fiscal capacity; only the results with this variable are therefore reported. The estimates with the *DGGDP* and *GDP/POP* covariates are available upon request.

capture scale effects in redistribution of resources, which may determine lower per capita transfers (β_2<0). Finally, we include regional fixed effects a_i, aimed at capturing historical differences in the level of expenditure across the regions, and year fixed effects δ. The model then is specified as follows:

$$\mathbf{F_{it}} = \sum_i a_i + \sum_t \delta_t + \beta_1 U_{it-1} + \beta_2 POP_{it} + \varepsilon_{1,it} \tag{1}$$

Table 1 reports the results, for total transfers (model 1), current transfers (model 2) and capital transfers (model 3), respectively. In model 1, the estimated coefficient for lagged unemployment is positive and statistically significant at the 1% level, remains positive and loses over-dispersion when the correlated with transfers earmarked for current spending (model 2) and turns to negative while remaining significant at the 1% level when transfers earmarked for capital spending are examined (model 3). This pattern of results is quite plausible, as current transfers finance spending in social security programs, the most sensitive to employment conditions, which are administered by regional governments and mandated by the central government. Capital transfers, to finance infrastructures and similar projects, are instead concentrated in more developed regions where unemployment is lower. The negative coefficient β_2 on the size of the population reflect economies of scale in the distribution of the transfers, which again are concentrated in current transfers and absent in capital transfers. The diagnostics reveal a high precision of the estimates, but a rather low explanatory power, with an adjusted R^2 ranging from 0.38 in model 1 to 0.54 in model 3. Clearly, there are some important explanatory factors omitted here.

The next step is augmenting equation (1) with the proxies for changes in expectations. To verify the stability of the coefficients only the time-varying proxies are introduced first, then the region-varying ones are considered as well.

$$\mathbf{F_{it}} = \sum_i a_i + \sum_t \delta_t + \beta_1 U_{t-1} + \beta_2 POP_{it} + \beta_3 \mathbf{TPROXY}_{it} + \varepsilon_{2,it} \tag{2}$$

$$\mathbf{F_{it}} = \sum_i a_i + \sum_t \delta_t + \beta_1 U_{t-1} + \beta_2 POP_{it} + \beta_3 \mathbf{TPROXY}_{it} + \beta_4 \mathbf{RPROXY}_{it} + \varepsilon_{3,it} \tag{3}$$

Table 2 reports the results of the estimates. The *TREND* variable reveals the importance of the historical expenditure in determining the level of transfers allotted to the regions. It must be stressed the “historical expenditure” is a general criterion related to current expenditures (capital expenditures are financed according to different criteria) that was embedded (until quite recently) in all the yearly financial bills of the general government; as such it should affect the funds distributed to all regions in the same way. This institutional arrangement is reflected in the estimates, as the coefficient on *TREND* is statistically significant only in funds for current expenditures (model 5), not in those for capital expenditures (model 6). The stringency of the budget constraint is captured by the *DDPIL* variable, and the positive estimated coefficient reveals that when the Italian deficit was large relative to the EU15 average, transfers to regions – effectively, a central government outlay – increase, with the one year lag that separates the moments when resources are appropriated and spent. The coefficient is, however, barely significant, probably due to the contrasting relationship between the two types of grants (positive for current expenditures, negative for capital ones, both highly significant), which again reflects the different time pattern of these expenditures. The political time varying proxies are generally consistent with the hypotheses. Stronger central governments, denoted by larger parliamentary majorities (variable *NDIF*) are less needful to buy votes by distributing grants to regional constituencies, especially those earmarked to current expenditures of redistributive nature (model 5). These governments, on the other hand, feel more confident about their re-election and are more prone to distribute funds for long-time projects like capital spending, as shown by the positive estimated coefficient on *TRK* (model 6). The same pattern of results is found for government cohesion, *HM*; in both cases, the estimated coefficients are always significant at the 1% level[8]. Finally, transfers to regions appear sensitive to the timing of national elections, as they increase in the pre-electoral year and are contracted in the year after – albeit not to the same extent. Contrary to what predicted in signalling models *à la* Rogoff (1990), no evidence of a cycle is found in capital transfers, whose dynamics seems quite steady (model 6). The variables already considered in equation (1) generally retain their signs and significance levels; the overall precision of the estimates are quite high (F statistics significant at the 1% level), while the explanatory power of the estimates are higher than in equation 1, ranging from 58% in model 5 to 78% in model 6.

We then proceed to the estimate of equation (3), which includes also the region-specific proxies of the vector **RPROXY**. The results are reported in Table 3. A widely held view is that, because in Italy transfers to subcentral governments are dictated by a formula (Brosio et al., 2003), expectations concerning them should not be sensitive to anything that is not included in the formula (Bordignon and Turati, 2009), especially lobbying activities. We

[8] Two other variables have been tried to test the same war of attritions hypothesis: the number of days in which each government was in charge (*GOVDUR*) and the overall duration of consecutive governments with the same Prime Minister (*PRIMI*), to focus on effective government changes. The results, available upon request, are basically the same as with the *HM* variable. We report those on the index of concentration of the government majority because it is an *ex ante* measure of government duration, thus more in line with the war of attrition theory (Padovano and Venturi, 2001).

challenge that view (Padovano, 2010) and verify whether the years in power of the regional governor – variable *YEARS*, a proxy for lobbying efficiency in the spirit of Olson's (1982) theories on lobbies' penetration – affect the region's ability to obtain funds. The simultaneous consideration of the linear trend ensures that the variable *YEARS* is not capturing incremental processes like the historical expenditure rule. The positive and statistically significant coefficients in models 7 and 8 reveal that there is more in the distribution of transfers than just the formula and that lobbying is particularly important in the domain of current grants. The estimated coefficient on *YEARS* in the regression for capital grants has also a positive sign but is not significant, possibly because of the longer time lags of these types of financing instruments (model 9). There is no sign that regional elections affect the distribution of transfers, possibly because they are often held in the same year as the national elections. Once the *ELN* variable is removed from the right hand side of the equation, *ELR* picks up some significance. The vote margin between the party of the governor and the largest one of the opposing coalition (covariate *RDIF*) confirms, however, that regional electoral politics does play a role in the distribution of grants. This estimated coefficient is positive and statistically significant in a linear specification, whilst its squared value, when added in, is never significant. This pattern of results supports the prediction of the "core supporters" model of Cox and McCubbins (1986) over the "swing voters" model of Dixit and Londregan (1996). This result confirms in the electoral domain what has been found for lobbying, namely that strength and endurance at the local level is what matters to obtain funds from the central government. As in the majority of the political regressors, this effect is detected only for total and current transfers, as theory itself suggests (models 7 and 8). Finally, we fail to find evidence of an alignment effect (Arhulampalan et al., 2009), although the covariate *SAME* comes close to borderline significant in model 8 for current transfers. This lack of significance may be due to multicollinearity with the regional fixed effects, or with other variables explicitly included in the model. Another possible explanation is that, insofar as *SAME* approximates phenomena such as party cohesiveness or trust in politics, these seem to be low in the strategic interactions under inquiry. As for the regressors already included in equations (1) and (2), they retain their signs and significance levels, with the only exception of the rate of unemployment, which now appears to be positively and significantly correlated with funds for current expenditures, as their nature suggests.

Equation (4) augments equation (3) with the proxy *FBOUT*, to test Pettersson-Lidbom's (2008) and Pettersson-Lidbom and Dahlberg's (2003) hypothesis that the history of past bailing out should be the best predictor for expectations of future formal bailing out.

$$\mathbf{F_{it}} = \sum_i a_i + \sum_t \delta_t + \beta_1 U_{t-1} + \beta_2 POP_{it} + \beta_3 \mathbf{TPROXY}_{it} + \beta_4 \mathbf{RPROXY}_{it} + \beta_5 FBOUT_{it} + \varepsilon_{4,it} \quad (4)$$

The estimates of this model, illustrated in Table 4, are unsatisfactory, because the frequency and pervasiveness of formal bailing out episodes in our sample make the *FBOUT* regressor almost a scale matrix, with very few 0 values[9]. Given the implications of the Pettersson-Lidbom's (2008) and Pettersson-Lidbom and Dahlberg's (2003) hypothesis, the lack of significance of the dummy that represent history of past bailing outs suggest that our other explanatory variables provide a satisfactory model of the determinants of how regional governments form expectations about transfers to their favour. Possibly, Italian regional governments have a stable expectation that the central government will deliver something in their favour, because of the historical expenditure mechanism; what they are concerned about, the phenomenon that the other covariates capture, is their expectations about the change of funding above this incremental value.

5.2. Expenditure. The next phase of the analysis is the examination of regional expenditures. The analysis can be divided in two steps: the first considers "structural" variables that previous theoretical and empirical studies reckon as important determinants of expenditures; as explained in the empirical strategy, the goal is to obtain a specification of the baseline behavioural equations of regional governments as complete and precise as possible, short of expectations about the central government toughness. The second step verifies the empirical restriction H2, by considering the role of funding and regional bailout expectations in the spending decisions of the regional governments. The selection of the explanatory variables takes into account that about 60% of total expenditures of Italian regions are related with the provision of health care services, as explained in appendix B.

Beginning with the structural variables, and taking into account the result of the previous literature (Mueller, 2003; Bordignon and Turati, 2009), we consider five possible types of effects on expenditure: (a) a "demand effect", proxied by the proportion of the population over age 65 and below age 16 (*POP65* and *POP15*), i.e., the cohorts of the population – especially the first - who might be high demanders of health care; (b) a "demand induction effect", determined by the number of physicians per 1000 inhabitants (*PHYS*) and the number of top regional bureaucrats (directors of the public administration of class 5 and 6, according to the classification of the Ministry of the Interior) normalized by the size population, to account for expansionary effects of the budget *à la* Niskanen; (c) a "supply

[9] On the other hand, it is quite difficult to gauge the financial amount of the bailing out from the text of the financial bill. In many cases this information is referred to other administrative decrees. Only the measure of transfers, the dependent variable, includes, but does not single out, the size of the formal bailing out

effect”, measured by the average number of beds per hospital (*AVBEDS*), which essentially serves as a proxy for the economies of scale in the provision of health care services; (d) an “income effect”, indicated by GDP per capita (*GDP/POP*), to control for phenomena associated with the so-called Wagner’s law; (e) a “partisan effect”, to reflect the assumed greater parsimony in government spending of right wing regional governments over left wing ones (dummy variable *RIGHT*). Hence, the general equation to be estimated is:

$$\begin{aligned}\mathbf{E_{it}} = \sum_i a_i + \sum_i \delta_t + \beta_1 \mathbf{POPx}_{it} + \beta_2 PHYS_{it} + \beta_3 NBUR_{it} + \beta_4 AVGBED_{it} + \beta_5 GDP/POP_{it} + \\ + \beta_6 RIGHT_{it} + \varepsilon_{5,it}\end{aligned} \tag{5}$$

where the vector **POPx** includes the two potential high demanders of regional spending, ε_5 is a disturbance term, and a and δ are regional fixed effects and year effects, respectively. As in the case of the funding equations, regional expenditures $\mathbf{E_{it}}$ are first examined in their (real per capita) total value, then are disaggregated between current and capital expenditures. The results are reported in Table 5. Among the demand effect indicators, the estimated coefficients on the *POP65* covariate are consistently positive and significant at the 1% level and slightly larger in the case of current expenditures (model 14) than of capital ones (model 15). The elderly appear in fact the only high demanders of regional expenditures, chiefly health care; the younger cohort of population *POP15* never carries any significant explanatory power and was therefore excluded from the reported estimates. Demand induced effects are found, as more doctors and regional administrators are positively correlated with the size of the regional budget. The covariate *PHYS* indicates that this effect is stronger in current expenditures (that includes the salaries of health care employees) than in the case of capital spending[10]. The number of top bureaucrats is positively correlated with aggregate spending but at the 10% level only, and loses significance (still retaining a positive sign) when the two components of spending are examined separately. This is most likely due to the low frequency of this indicator: the Minister of Interior censed the administrators only three times, in 1990, 1995 and 2001. The number of hospital beds per capita has generally a positive sign (in total and in capital spending, while the coefficient on current spending is borderline not significant), indicating that economies of scale are not being exploited. This inefficiency is consistent with the presence of demand induced effects in regional spending: the two results

[10] Another specification that has been tried included the doctors working in public hospitals only (*PUBPHYS*). The results are somewhat less significant, possibly because in Italy hospital doctors are allowed to exercise also in the private sector - and the majority of them actually do so (Turati, 2008). The variable *PHYS*, private doctors, seems therefore the most appropriate to capture demand induced effects in health care expenditures.

reinforce the plausibility of each. The regressor capturing income per capita confirms the presence of Wagner's Law type effects, but not in capital expenditures (model 15). This result is consistent with the literature on the growth of government (Mueller, 2003), but may also be due to the Italian policy of mandating public investment projects in the *Mezzogiorno* regions, where income per capita is lower and grows less rapidly. Finally, the covariate on the ideology of regional governments reveals no significant correlation with any type of government spending[11]. The diagnostics reveal a high precision of the estimates (the F statistics are significant at the 1% level in all models); even more importantly, given our goal to have a specification of the behavioural equation as complete and as precise as possible, the adjusted R^2 grimps to values between 0.83 and 0.97.

5.3. Expectations. The specification of equation (5) may be spurious, however, as it does not account for expectations. Only the year fixed effects act as a loose proxy for the shift in expectations. To test if bailing out expectations are the missing determinants of the expenditure equation a different expenditure equation must be estimated. The theoretical claim H3 is that – after having observed a low level of funding – regions should react with a low level of expenditure the higher is π, the expectation that the central government be of the tough type. To investigate this hypothesis, equation (5) is augmented by considering the explained component of transfers $\hat{F}$ from equation (3), the best fitting one in terms of information criteria. Notice that $\hat{F}$ can be thought of as representing the "expected" financing by regions given changes in π, and this provides us with a further test of the H2 theoretical prediction: when π is larger, conditional on expected funding, regions should be more likely to react with a low level of expenditure. This approach is close to Rodden (2005) that examines the impact of "expected" and "unexpected" revenues from the federal government on the regional expenditure in Germany, using an autoregressive forecasting model to estimate yearly expected values for revenues. The equation to be estimated then becomes:

$$\mathbf{E_{it}} = \sum_i a_i + \sum_i \delta_t + \sum_k \beta_k \mathbf{X}_{kit} + \beta_5 \hat{F}_{it} + \varepsilon_{6,it} \qquad (7)$$

where the vector $\mathbf{X}$ includes all the covariates of equation (5) and ε_6 is a disturbance term. Table 6 reports the results. The data lend empirical support to the empirical restriction H3, viz., that regions tend to react with a low level of expenditure the higher is the expectation that the central government be tough. The estimated coefficient on the $\hat{F}$, lagged one period

[11] When regional politics is examined in greater detail, for instance by distinguishing between ordinary statute and special statute regions and between national and regional party lists, some evidence of greater parsimony of right wing governments emerges (Padovano, 2010).

to account for the delay between appropriation and spending, is positive and significant at the 5% level, in the model with total and capital spending (models 16 and 18). The estimated coefficient on current expenditures is borderline significant, possibly because of the higher variability of this component of government spending, inherently more difficult to predict. The lack of significance of the simultaneous $\hat{F}$ value corroborates the impression that the autoregressive forecasting method reflects the institutional features of the financial relationships between the Italian central government and the regions, thus reinforcing the plausibility of the analysis. The other covariates of vector **X** keep their sign and, by and large, levels of statistical significance. Quite importantly in these estimates that include the contemporaneous and lagged fitted value of transfers $\hat{F}$ there is still no sign of serial correlation. The null hypothesis of zero value coefficient is rejected at the 1% level, the adjusted R^2 are between 0.96 and 0.98.

To check the robustness of this result, we have resorted to a second estimation strategy, based on a IV methodology. This also allows to take into account the critique, raised by Pettersson-Lidblom and Dahlberg (2003), that an incorrect specification of the funding equation precludes a correct specification of the casual relationship between expenditures and financing. Our time varying and regional specific proxies for expectations and their lagged values represent the instruments for the 2SLS estimates of Equation (7), reported in table 7. The estimates of the $\hat{F}$ coefficient are very similar to those obtained with the autoregressive model: only lagged expected transfers affect current spending, consistent with the one year delay with which this funds are cashed in, capital transfers are more predictable than current ones. The other covariate loose some significance level, but the correlations remain unchanged. This further confirms the correctness and completeness of the specification of the funding equation.

6. Conclusions

The present analysis shows that bailing out expectations play an important role in the determination of different types of spending of regional governments in Italy. First, financing is influenced by variables that capture changes in bailing out expectations, and all these variables turn out to have the expected sign. Second, the link between ex-ante funding and expenditure is shown to be stronger when regional expectations of future bailing out are lower. Our results are somewhat less precise than those found by Bordignon and Turati (2009), whose sample period contoured a "natural experiment" of a shift of expectations coinciding with Italy's adhesion to the EMU and was limited to the domain of health care. When a larger time series and a larger variety of regional expenditures are considered, as in this paper, with a more detailed set of proxies for changes of expectations, the expectations of future bailing outs appears less precisely estimated, probably because the financing processes about which expectations are to be formed are more complex and their outcomes are more difficult to predict. In this sense the findings of this analysis and of Bordignon and Turati (2009) reinforce each other; moreover, as the theoretical structures underlying the empirical tests of the two studies are quite similar, the present analysis shows that the generality of the explanatory power of the theory is greater than what suggested by Bordignon and Turati (2009). Conversely, Inman (2003) finds little role for bailing out expectations in the U.S. because the underlying theory does not feature uncertainty on the side of the States about the decisions of the Federal government. Starting from a model similar to Inman (2003), Rodden (2005) does find that expectations play an important role in the German history of bailing outs of Landër, but as an out-of-theory prediction. Expectations of bailing out can only be modelled by considering the intergovernmental relationships where each government unit is uncertain about the behaviour of the counterpart; and by fully specifying the evolution of the key determinants of public transfers and expenditure programs, when these are the result of the interaction of different levels of government.

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Figure 1. Game with complete information

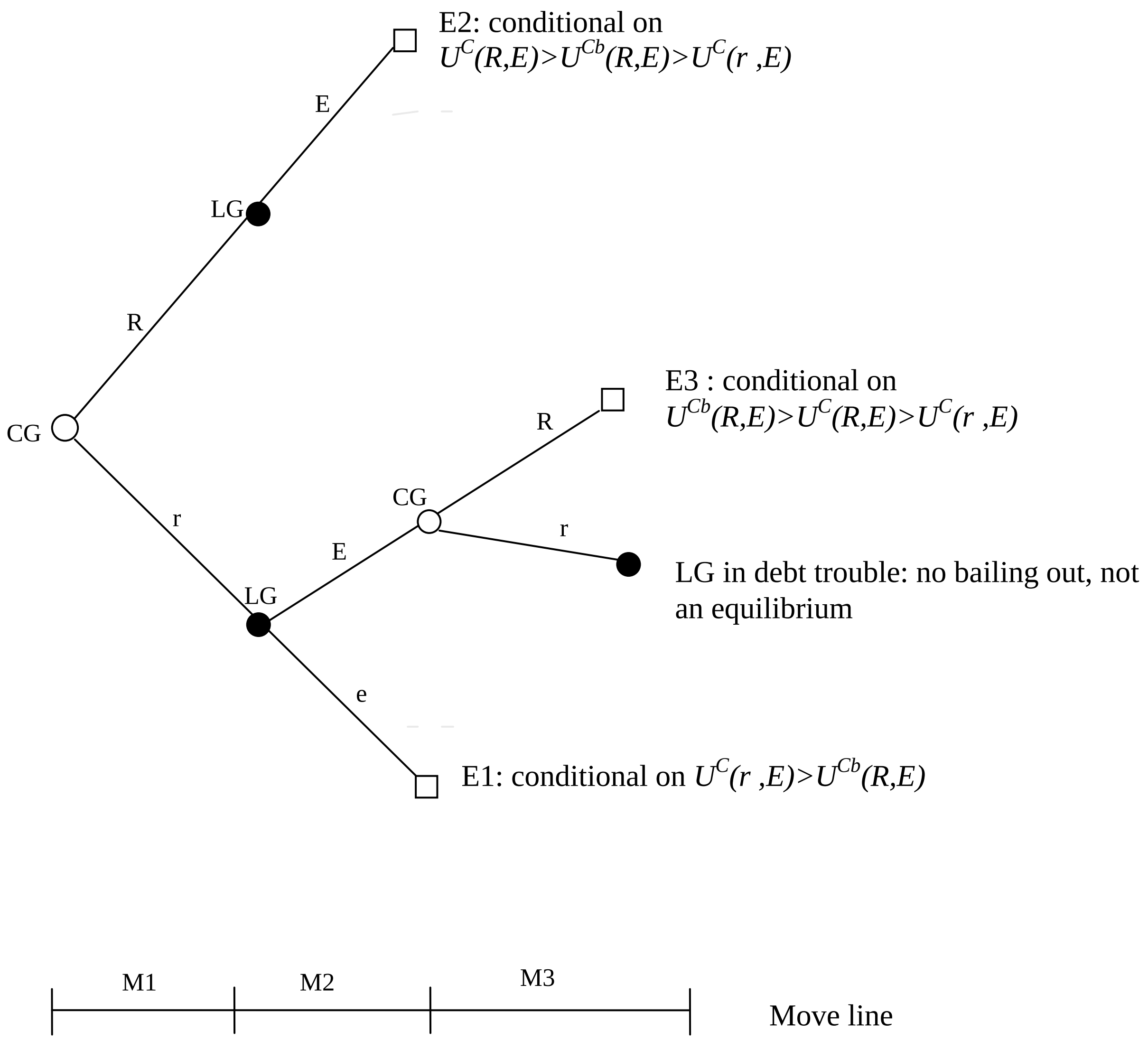


Figure 2. Game with incomplete information. Common solutions and case A).

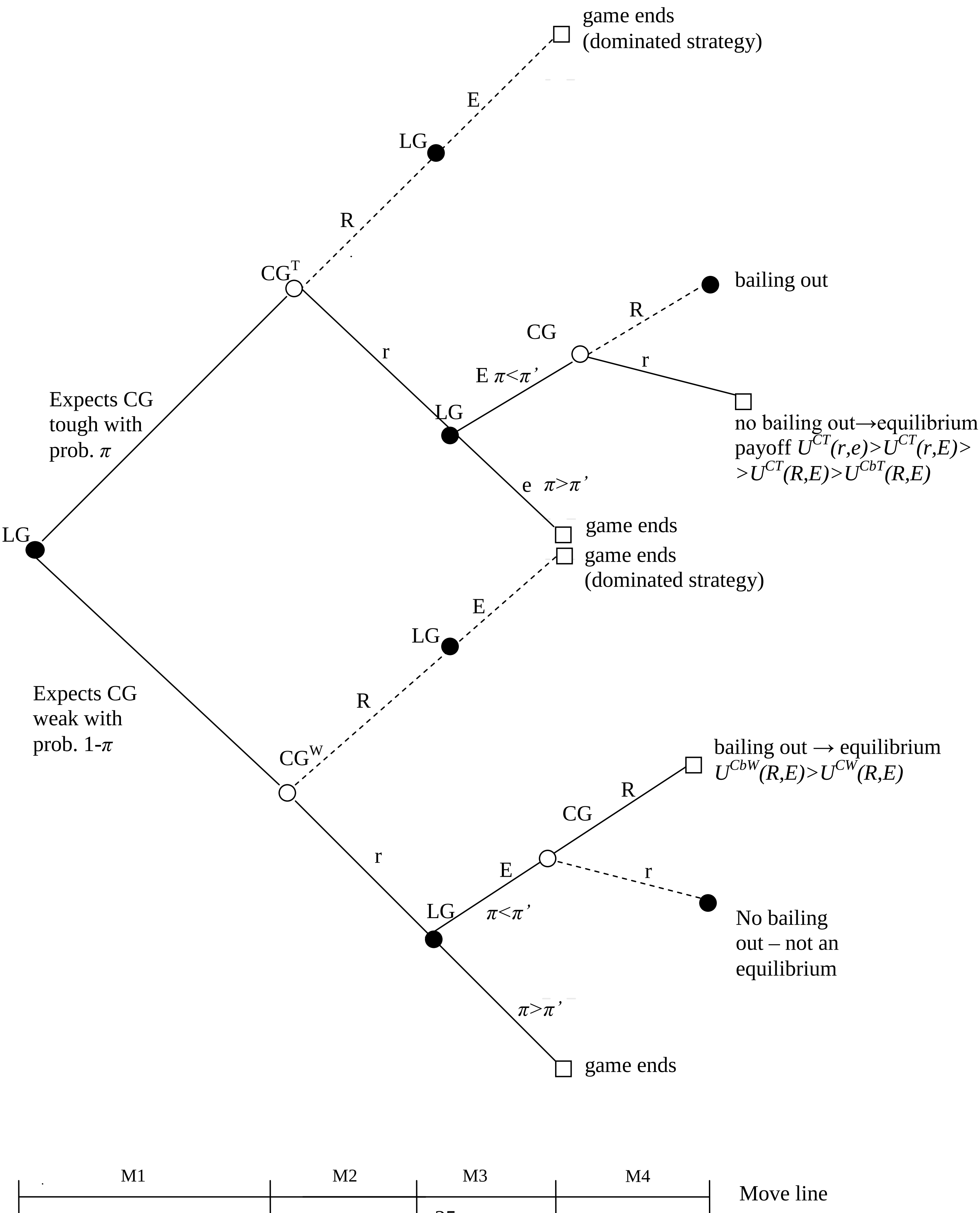


Figure 3. Game with incomplete information in pure strategies. CaseB) $U^{CbW}(R,E) > U^{CW}(R,E)$ and $\pi > \pi'$

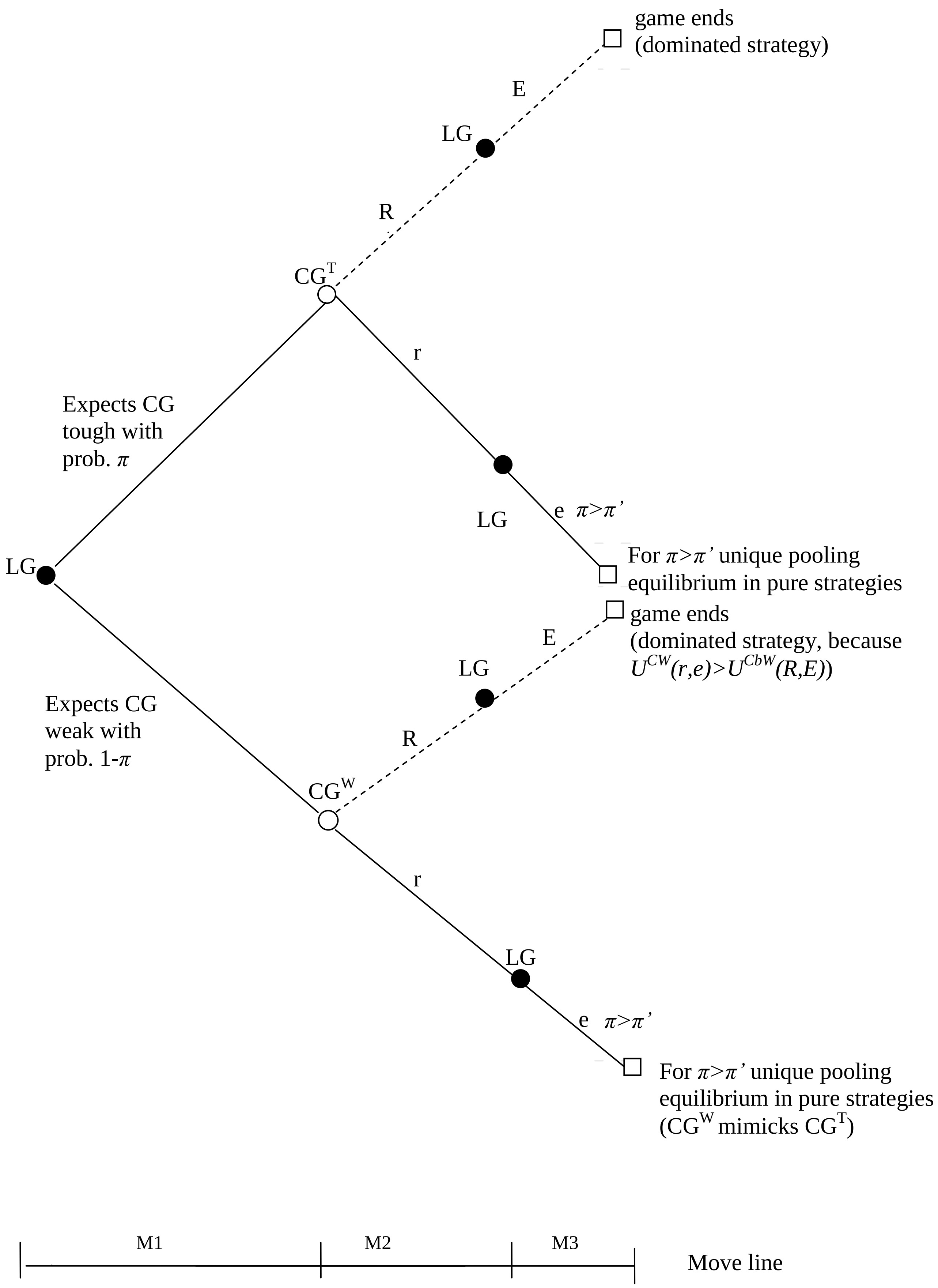


Figure 4. Game with incomplete information in mixed strategies. Case where $U^{CW}(R,E)>U^{CbW}(R,E)$ and $\pi<\pi'$

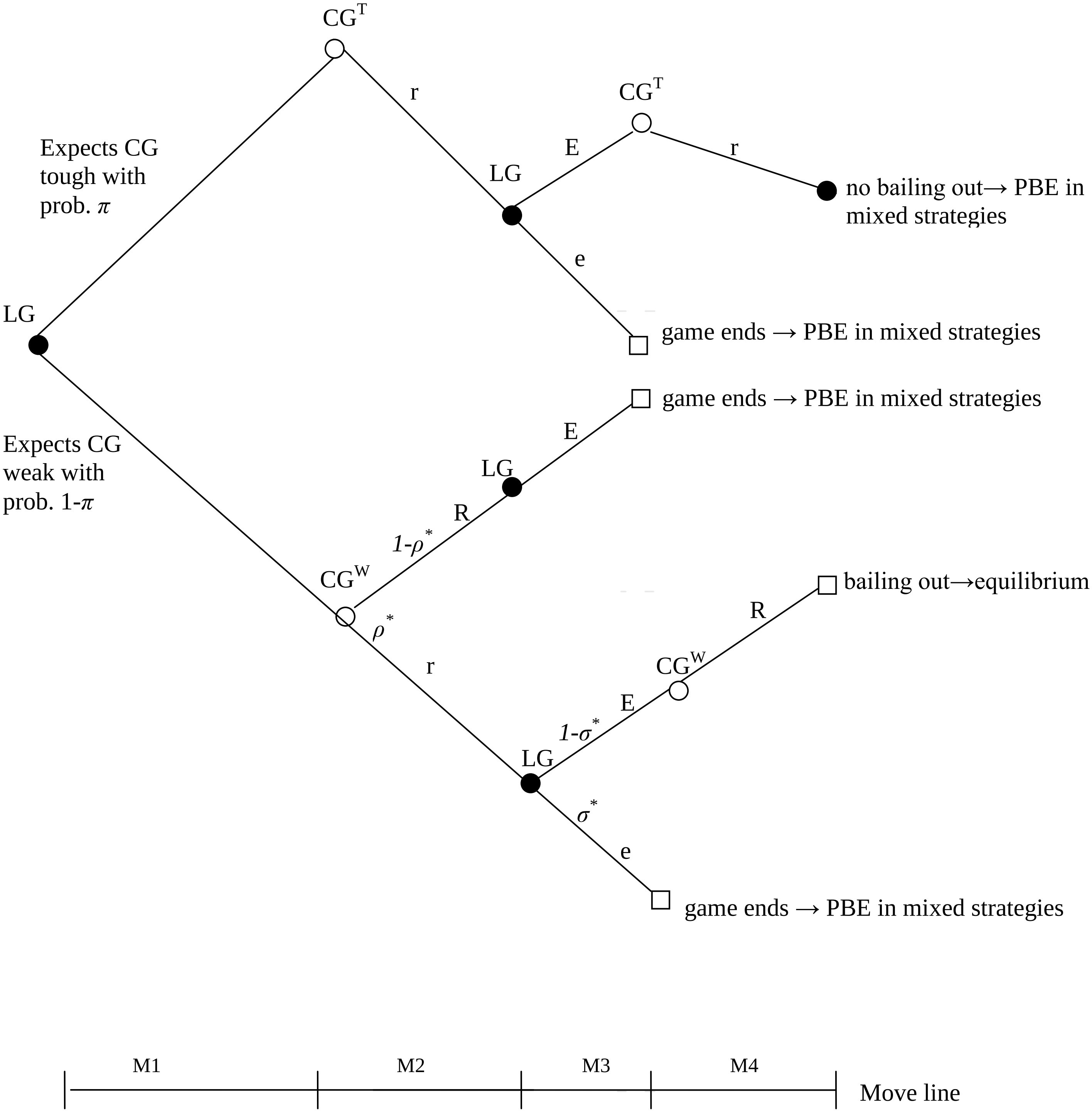


Table 1. Estimates of Equation 1

	Model 1	Model 2	Model 3
Dependent variable	*TR/POP*	*TCC/POP*	*TCK/POP*
U_{t-1}	0.002^{***} (2.79)	0.003^{***} (3.25)	-0.0008^{***} (-3.67)
POP_t	-5.69^{-10***} (-4.49)	-4.97^{-10***} (-3.88)	-4.02^{-11} (-1.39)
C	0.002^{***} (5.54)	0.002^{***} (4.31)	0.0004^{***} (4.45)
Fixed effects	Yes	Yes	Yes
Estimator	EGLS	EGLS	EGLS
Adj. R^2	0.53	0.38	0.54
S.E.R.	0.000242	0.000239	7.6-05
F statistics	11.19^{***}	6.66^{***}	11.87^{***}
D.W.	1.9	1.86	2.19
Sample period	1998-2007	1998-2007	1998-2007
N.	210	210	210

Note : *t*-statstics in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

Table 2. Estimates of Equation 2

	Model 4	Model 5	Model 6
Dependent variable	*TR/POP*	*TCC/POP*	*TCK/POP*
U_{t-1}	0.001 (1.01)	0.002^{*} (1.66)	-2.39^{-05} (-0.13)
POP_t	-6.68^{-10***} (-2.68)	-5.53^{-10***} (-2.42)	-1.27^{-10***} (-4.46)
$DDEF_t$	-4.9^{-05} (-0.75)	-5.6^{-06} (-0.09)	-6.53^{-05***} (-6.86)
$DDEF_{t-1}$	7.3^{*} (1.73)	5.71^{-05} (-1.29)	6.25^{-06} (-0.65)
$TREND_t$	7.72^{-05***} (2.99)	5.8^{-05***} (2.26)	7.24^{-07} (0.14)
$NDIF_t$	-0.027^{***} (-3.31)	-0.024^{***} (-2.8)	0.0038^{***} (2.61)
HM_t	-0.0004^{***} (-2.65)	-0.0005^{***} (3.43)	0.0001^{***} (5.47)
ELN_t	0.000246^{***} (3.39)	0.00014^{***} (2.19)	7.64^{-05***} (5.77)
ELN_{t+1}	-5.68^{-05} (-0.63)	-9.88^{-05} (-1.13)	7.88^{-05***} (5.7)
C	0.003^{***} (4.36)	0.002^{***} (3.94)	-0.0004^{***} (-5.28)
Fixed effects	Yes	Yes	Yes
Estimator	EGLS	EGLS	EGLS
Adj. R^2	0.63	0.58	0.78
S.E.R.	0.0002	0.00023	6.83^{-05}
F statistics	11.86^{***}	9.8^{***}	23.23^{***}
D.W.	1.98	1.98	2.04
Sample period	1998-2006	1998-2006	1998-2006
N.	189	189	189

Note : *t*-statstics in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

Table 3. Estimates of Equation 3

	Model 7	Model 8	Model 9
Dependent variable	*TR/POP*	*TCC/POP*	*TCK/POP*
U_{t-1}	0.001 (1.16)	0.002* (1.66)	-6.47^{-05} (-0.36)
POP_t	-5.56^{-10}* (-1.86)	-4.05^{-10} (-1.49)	-1.41^{-10***} (-4.77)
$DDEF_t$	4.16^{-05} (-0.6)	6.49^{-06} (0.1)	-7.11^{-05***} (-6.39)
$DDEF_{t-1}$	7.76^{-05**} (1.89)	6.49^{-05} (1.52)	5.32^{-06} (-0.58)
$TREND_t$	4.73^{-05} (1.57)	3.5^{-05} (1.24)	2.2^{-07} (0.03)
$NDIF_t$	-0.02** (-2.3)	-0.019*** (-2.27)	0.004** (1.94)
HM_t	-0.0003** (-1.77)	-0.0004*** (-2.67)	0.0002*** (4.35)
ELN_t	0.0003*** (3.35)	0.00015*** (2.15)	8.77^{-05***} (5.58)
ELN_{t+1}	3.7^{-05} (0.63)	-1.98^{-05} (-0.18)	7.74^{-05***} (2.83)
$YEARS_t$	4.54^{-05**} (2.3)	4.53^{-05***} (2.67)	3.61^{-05} (0.53)
ELR_t	7.4^{-05} (1.11)	6.56^{-05} (1.09)	2.06^{-05} (0.9)
$RDIF_t$	0.0003** (1.83)	0.0003** (1.77)	-4.08^{-05*} (-1.57)
$SAME_t$	5.18^{-07} (0.02)	1.86^{-05} (0.76)	2.11^{-06} (-0.44)
C	0.002*** (2.82)	0.0017*** (2.36)	0.0004*** (4.76)
Fixed effects	Yes	Yes	Yes
Estimator	EGLS	EGLS	EGLS
Adj. R^2	0.63	0.57	0.78
S.E.R.	0.0002	0.0002	6.78^{-05}
F statistics	10.39***	8.35***	20.05***
D.W.	2.03	2.03	2.03
Sample period	1998-2006	1998-2006	1998-2006
N.	189	189	189

Note : *t*-statstics in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

Table 4. Estimates of Equation 4

	Model 10	Model 11	Model 12
Dependent variable	*TR/POP*	*TCC/POP*	*TCK/POP*
U_{t-1}	0.0009 (0.89)	0.0014 (1.3)	-5.35^{-05} (-0.3)
POP_t	-4.66^{-10*} (-1.7)	-2.95^{-10} (-1.23)	-1.43^{-10***} (-4.82)
$DDEF_t$	0.0002** (2.07)	0.0003*** (3.27)	-8.15^{-05***} (-4.16)
$DDEF_{t-1}$	0.0001*** (2.45)	0.0001** (2.14)	-7.49^{-06} (-0.76)
TREND	5.2^{-05**} (1.94)	3.61^{-05} (1.46)	2.91^{-07} (0.04)
$NDIF_t$	-0.029*** (-3.29)	-0.028*** (-3.36)	0.005** (2.07)
HM_t	4.99^{-05} (0.25)	-7.71^{-05} (-0.42)	0.00012*** (3.11)
ELN_t	3.72^{-05} (0.41)	-0.0001 (-1.27)	9.69^{-05***} (4.58)
ELN_{t+1}	-0.0004*** (2.29)	-0.0004*** (-3.26)	9.42^{-05***} (2.49)
$YEARS_t$	1.92^{-05**} (1.05)	1.59^{-05***} (1.06)	4.75^{-05} (0.69)
ELR_t	1.88^{-05} (0.34)	2.29^{-06} (0.05)	2.31^{-05} (1.04)
$RDIF_t$	0.0003* (1.58)	0.0003* (1.57)	-3.9^{-05} (-1.55)
$SAME_t$	1.97^{-05} (0.73)	3.45^{-05} (1.44)	2.7^{-06} (-0.56)
$BOUT_{t-1}$	-0.0003*** (-3.74)	-0.0003*** (-4.56)	1.32^{-05} (0.67)
C	0.0024*** (3.33)	0.0017*** (2.99)	0.0004*** (4.76)
Fixed effects	Yes	Yes	Yes
Estimator	EGLS	EGLS	EGLS
Adj. R^2	0.6	0.56	0.78
S.E.R.	0.0002	0.0002	6.8^{-05}
F statistics	9.01***	7.94***	19.53***
D.W.	2.12	2.13	2.03
Sample period	1998-2007	1998-2006	1998-2006
N.	189	189	189

Note : *t*-statstics in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

Table 5. Estimates of Equation 5

	Model 13	Model 14	Model 15
Dependent variable	*EXP/POP*	*EXPC/POP*	*EXPK/POP*
$POP65_t$	0.037*** (3.94)	0.0218*** (2.85)	0.007*** (3.02)
$PHYS_t$	1.05*** (3.64)	0.683*** (2.46)	0.1588** (1.84)
$NBUR_t$	13.76* (1.64)	10.811 (1.33)	1.804 (0.87)
BED_{t-1}	3.7^{-08}* (1.87)	2.43^{-08} (1.37)	9.95^{-09}** (2.17)
GDP/POP_t	0.045** (1.95)	0.074*** (3.55)	0.001 (0.17)
$RIGHT_t$	-2.99^{-05} (-0.52)	-8.16^{-05} (-1.49)	-2.17^{-05} (-1.47)
C	-0.008*** (-4.9)	-0.005*** (-3.41)	-0.0001*** (-3.1)
Fixed effects	Yes	Yes	Yes
Estimator	EGLS	EGLS	EGLS
Adj. R^2	0.94	0.93	0.83
S.E.R.	0.0007	0.0006	0.0002
F statistics	136.15***	122.5***	43.01***
D.W.	1.76	1.72	1.87
Sample period	1997-2007	1997-2007	1997-2007
N.	231	231	231

Note : *t*-statstics in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

Table 6. Estimates of Equation 6 – autoregressive model

	Model 16	Model 17	Model 18
Dependent variable	*EXP/POP*	*EXPC/POP*	*EXPK/POP*
$POP65_t$	0.041^{***} (3.35)	0.019^{**} (2.05)	0.01^{***} (3.01)
$PRPHY_t$	0.884^{***} (2.4)	0.411 (1.4)	0.165 (0.87)
$NBUR_t$	-0.465 (-0.06)	3.333 (0.5)	-3.378 (-0.83)
BED_{t-1}	4.14^{-08**} (1.84)	3.38^{-08*} (1.62)	-9.89^{-09} (-1.2)
GDP/POP_t	-0.013 (-0.34)	0.071^{***} (2.22)	-0.031^{***} (-2.49)
$RIGHT_t$	3.31^{-05} (0.56)	-4.20^{-05} (-0.8)	-7.85^{-06} (-0.32)
$\hat{F}_t$	0.052 (0.73)	-0.036 (-0.65)	0.033 (1.09)
$\hat{F}_{t-1}$	0.125^{**} (1.87)	0.064 (1.07)	0.044^{**} (1.72)
C	-0.006^{***} (-3.14)	-0.004^{***} (-2.38)	-0.0005 (-0.87)
Fixed effects	Yes	Yes	Yes
Estimator	EGLS	EGLS	EGLS
Adj. R^2	0.97	0.98	0.96
S.E.R.	0.0006	0.0003	0.0002
F statistics	218.06^{***}	238.67^{***}	112.38^{***}
D.W.	2.17	2.16	2.02
Sample period	2000-2007	2000-2007	2000-2007
N.	147	147	147

Note : *t*-statstics in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

Table 7. Estimates of Equation 6 – IV model

	Model 19	Model 20	Model 21
Dependent variable	*EXP/POP*	*EXPC/POP*	*EXPK/POP*
$POP65_t$	0.044^{**} (1.79)	0.929^{***} (2.36)	0.82 (0.65)
$PRPHY_t$	0.079 (0.11)	0.186^{**} (1.72)	-0.386^{*} (-1.15)
$NBUR_t$	12.27^{*} (1.44)	8.06 (0.45)	3.434 (0.51)
BED_{t-1}	9.58^{-08*} (1.27)	0.38^{***} (1.72)	-0.002 (-0.38)
GDP/POP_t	0.03 (0.67)	1.742 (1.12)	0.862 (0.23)
$RIGHT_t$	-1.45^{-05} (-0.12)	-0.196 (-0.71)	-0.176^{***} (-2.2)
$\hat{F}_t$	0.016 (0.13)	0.042 (0.62)	0.122 (0.2)
$\hat{F}_{t-1}$	0.186^{***} (2.05)	0.064 (1.07)	0.072^{**} (1.72)
C	-0.009^{***} (-2.24)	-0.234^{**} (-1.71)	-0.0081 (-0.35)
Fixed effects	Yes	Yes	Yes
Estimator	Pooled IV/2 stages EGLS	Pooled IV/2 stages EGLS	Pooled IV/2 stages EGLS
Adj. R^2	0.96	0.98	0.89
S.E.R.	0.0004	0.0003	182.09
F statistics	103.88^{***}	333.73^{***}	41.88^{***}
D.W.	2.16	9.8	2.25
Sample period	2000-2007	2000-2007	2000-2007
N.	147	147	147

Note : *t*-statstics in parentheses. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.
Instruments used: $DDEF_t$, $DDEF_{t-1}$, TREND, $NDIF_t$, HM_t, ELN_t, $YEARS_t$, ELR_t, $RDIF_t$, $SAME_t$

Table 8. Financing and expenditures of government levels, year 2001 (percentages of total expenditures).

	Taxes	*Social security contributions*	*Transfers from*						*Other Revenues*	*Deficit*
			(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*		
Central government (1)	78,3	0,2	0,0	0,5	0,0	0,0	0,0	0,1	10,7	10,2
Social security institutions (2)	0,0	70,1	27,4	0,0	0,0	0,0	0,0	0,4	2,0	0,0
Regions (3)	40,9	0,0	53,0	0,0	0,0	0,0	0,2	0,3	4,9	0,8
Local Health Units (4)	0,0	0,0	0,0	0,0	90,2	0,0	0,2	0,3	4,9	0,8
Provinces and municipalities (5)0	28,5	0,0	21,9	0,0	13,2	0,0	0,0	1,3	33,5	1,6
Other public institutions (6)	3,6	0,2	52,0	4,7	12,6	0,0	3,4	5,1	18,6	-0,2
Duplications	0,0	0,0	57,7	1,2	33,5	0,0	0,6	1,6	5,5	-0,1
Public sector	58,3	23,6	24,2	0,5	14,0	0,0	0,2	0,7	11,5	6,6

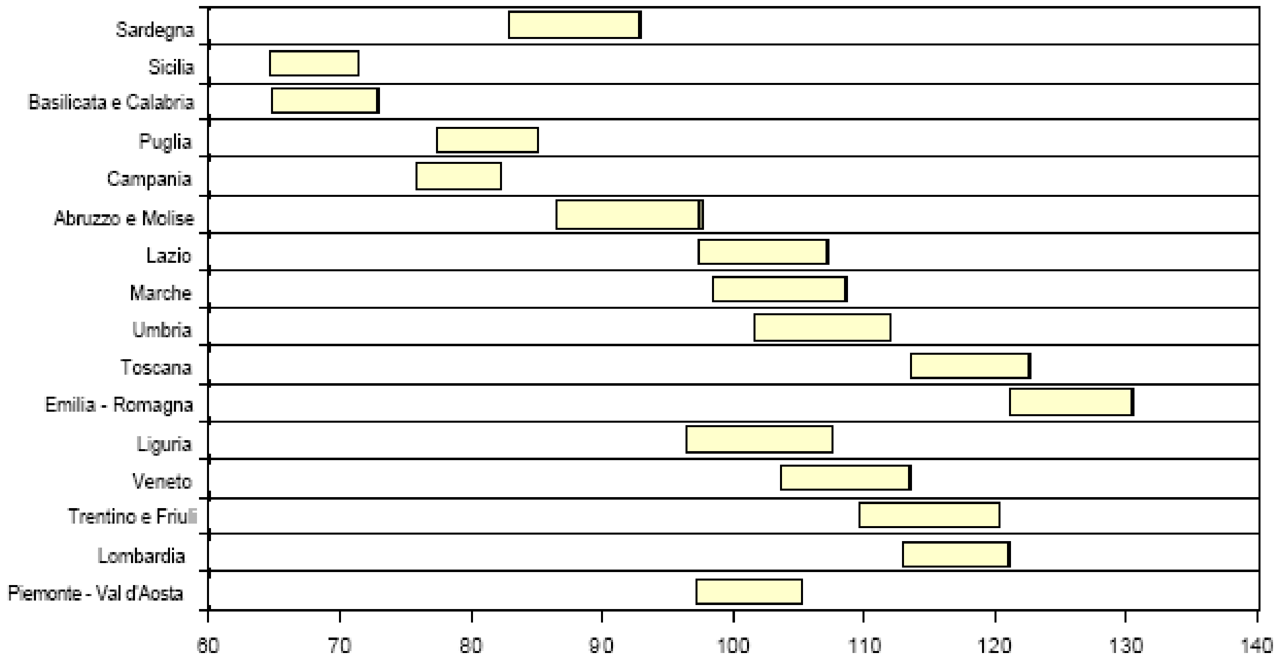
Source: Ministero dell'Economia e delle Finanze (2001), Vol. III, Appendix SP1.

Table 9. Socio-economic indicators for the Italian Regions, year 2002.

Regions	*Statute type*	*Area Km^2*	*Population N*	*Population density (n/km^2)*	*Population by age*		*GDP (million €)*	*GDP per capita (thousands €)*	*Incidence of poverty) (%)*	*Employment rate (14-65, %)*
					0-15 (%)	*>65 (%)*				
Piedmont	RSO	25.399	4330172	168	12,4	22,4	106200	24,9	7,1	64
Valle d'Aosta	RSS	3.263	122868	37	13,2	20,2	3374	27,6	6,8	66,3
Lombardy	RSO	23.861	9393092	388	13,6	19,4	255086	27,6	3,7	65,5
Trentino Alto Adige	RSS	13.607	974613	71	16,1	17,7	27284	28,3	5,1	67,1
Veneto	RSO	18.391	4699950	253	13,9	19,2	112520	24,2	4,5	64,6
Friuli Venezia Giulia	RSO	7.855	1204718	153	12	22,6	29683	24,8	7,2	63,1
Liguria	RSO	5.421	1592309	291	11,1	26,5	37855	24,0	5,2	61,1
Emilia Romagna	RSO	22.124	4151369	184	12,5	22,7	110659	27,1	2,5	68,4
Tuscany	RSO	22.997	3598269	155	12,1	23,2	84952	23,8	4,6	63,8
Umbria	RSO	8.456	858938	100	12,5	23,3	17458	20,6	7,3	61,6
Marche	RSO	9.694	1518780	155	13,1	22,6	32364	21,5	5,4	63,5
Lazio	RSO	17.207	5269972	303	13,9	19,1	130012	25,0	6,8	58,4
Abruzzo	RSO	10.798	1299272	119	13,4	21,3	23753	18,5	11,8	57,2
Molise	RSO	4.438	321953	72	13,4	22	5512	17,1	21,5	51,1
Campania	RSO	13.595	5788986	424	17,5	15,3	84597	14,7	27	44,1
Puglia	RSO	19.362	4068167	209	15,7	17,3	60057	14,9	19,4	44,4
Basilicata	RSO	9.992	596546	60	14,5	19,9	9261	15,5	24,5	49,3
Calabria	RSO	15.080	2009268	133	15,3	18,3	27752	13,8	23,3	44,6
Sicily	RSS	25.708	5013081	195	16,2	18	73475	14,7	30,8	44
Sardinia	RSS	24.090	1650052	68	12,9	17,6	27594	16,8	15,9	51,4
Italy		301.338	58462375	192	14,1	19,7	1259437	21,8	11,1	57,5

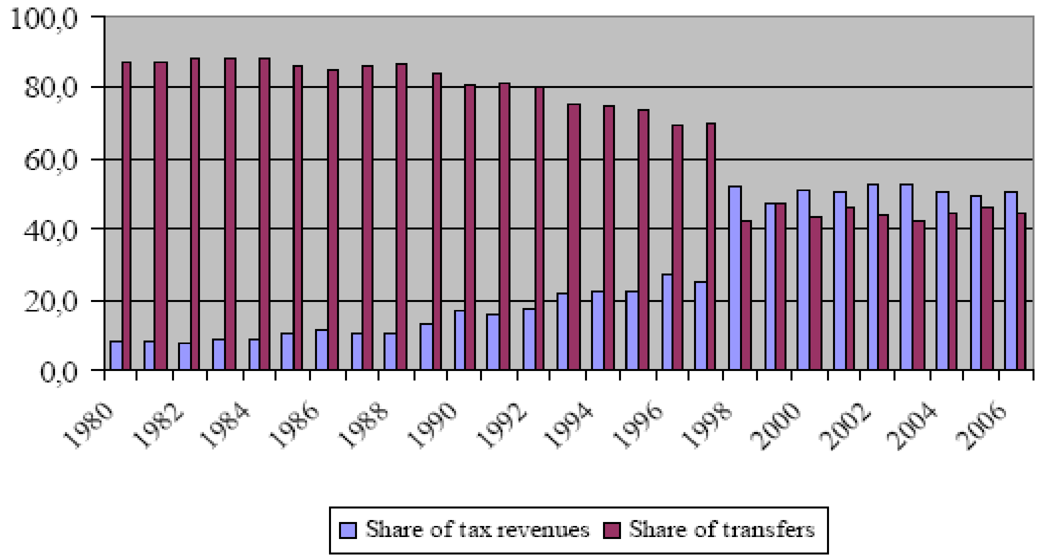
Source: ISTAT.

Figure 5. Regional distribution of per family income, 1995-2000 averages, 95% confidence intervals.



Source: Cannari and D'Alessio, (2003).

Figure 6. Fiscal autonomy of the Regions



Source: Ambosianio, Bordignon and Cerniglia (2008).

Appendix A. Proof of the model

The proof is limited to the case of incomplete information, since the case of common knowledge is already demonstrated in section 2. Under incomplete information, the cases of the tough central government and of the weak one that prefers bailing out later to giving in immediately ($U^{CbW}(R, E)>U^{CW}(R,E)$) can be summarized in

PROPOSITION 1 Suppose it is common knowledge that $U^{CbW}(R,E)>U^{CW}(R,E)$. Then, there is a *pooling* perfect Bayesian equilibrium in pure strategies of the game. In this equilibrium, both types of government set *r* in the first period, the local government's posterior beliefs coincide with its *a priori* beliefs, and the local government chooses *E* if $\pi<\pi'$, and *e* if $\pi>\pi'$ (it is indifferent if $\pi=\pi'$), where $\pi'=[(U^{Lb}(R,E)-U^{L}(r\ e))/(U^{Lb}(R,E)-U^{L}(r,E))]<1$.

In the case where it prefers giving in immediately ($U^{CW}(R,E)>U^{CbW}(R,E)$), the weak government can try to take advantage of regional government's uncertainty and mimic the "tough" type. Formally, let us then define a *separating equilibrium* in pure strategies as one where each central government type plays in the first period a different optimal strategy; and a *pooling equilibrium* as an equilibrium where both central government types play the same strategy in the first period. We begin by establishing the following:

LEMMA 1 Suppose it is commonly known that $U^{CW}(R,E)>U^{CbW}(R,E)$. Then, there is no separating equilibrium in pure strategies in the game.

In a separating equilibrium, the weak government plays *R* and the tough type plays *r* at M2. Given these equilibrium strategies, the regional government concludes that if the central government plays *R* is of the weak type and reacts by setting *E* at M3, while if the government plays *r* is of the tough type, and reacts by setting *e*. But the latter cannot be equilibrium. Given these posterior beliefs of the regional government, at the stage of considering the optimal strategies for the two types, the weak government would always be better off by playing *r* at M2 and having the regional government answer with *e* at M3, since $U^{CW}(r,e)>U^{CW}(R,E)$. This is an optimal deviation for the weak type, which breaks the separating equilibrium. In this kind of game the weak government always finds it convenient to mimic the tough government. To see when this pooling behaviour can be supported in equilibrium, the following assumption about the regional government's out-of-equilibrium beliefs with respect to the pooling equilibrium strategies must be introduced. Since the tough type will never play *R* at M2 out of dominance, while the weak type could play *R* under some solutions of the game, we assume that if the regional government observes *R* at M2, it rationally concludes that this move can only come from a weak government. This assumption made, one can state the following:

LEMMA 2 Suppose it is commonly known that $U^{CW}(R,E)>U^{CbW}(R,E)$. Then, under the above assumption about the out-of-equilibrium beliefs, for $\pi\geq \pi'$ there exists a unique pooling equilibrium in pure strategies. At this equilibrium, both types of government choose *r* at M2, and the regional government optimally selects *e* at M3.

At the pooling equilibrium strategies for the two types, both types of central government play *r* at M2. Hence, the posterior belief of the regional government equals the *a priori* and, for $\pi\geq\pi'$, the optimal reaction of the regional government is to set *e* at M3. This is an equilibrium; the tough government always plays *r* by dominance, and under the out-of-equilibrium beliefs assumption, if the weak central government deviates and sets *R* at M2, the regional government selects E at M3, and this outcome is worse for the weak government than the equilibrium outcome, because in case B) $U^{CW}(r,e)>U^{CbW}(R,E)$ still holds. Hence, if π is sufficiently high, the weak government can successfully imitate the tough government. This proves the lemma.

When $\pi<\pi'$, the pooling equilibrium in pure strategies of lemma 2 cannot be sustained. The regional government would expect the choice of r to come from a weak government with higher probability and would then rationally react by choosing E at M3. Expecting this, the weak government would then be better off by choosing R immediately, because $U^{CW}(R,E)>U^{CbW}(R,E)$. Neither could the resulting separating equilibrium in pure strategies be sustainable, as lemma 1 proves, since at the separating posterior equilibrium beliefs the weak government would always be better off by mimicking the tough type. The solution is then to look for mixed strategies equilibria, where the weak government plays r with some equilibrium probability and the regional government reacts by selecting e with some other equilibrium probability. The next lemma describe this equilibrium.

LEMMA 3 Suppose that it is commonly known that $U^{CW}(R,E)>U^{CbW}(R,E)$. Then, under our assumption above on out-of-equilibrium beliefs, for $\pi<\pi'$ there exists a unique pooling equilibrium in mixed strategies. At this equilibrium, at M2 the tough government always chooses r, and the weak government chooses r with probability ρ^* and R with probability $1-\rho^*$. The regional government, upon observing R, always chooses E, and upon observing r selects e in the second period with probability σ^* and E with probability $1-\sigma^*$. The equilibrium beliefs of the regional government are such that, upon observing R, it assigns zero probability to the central government being of the tough type, and upon observing r it assigns probability $\pi^{\circ}(\rho^*)\equiv\pi/[\pi+(1-\pi)\rho^*]$ to the government being tough. Finally,
$\rho^*=\{\pi[U^L(r,e)-U^L(r,E)]/(1-\pi)[U^{Lb}(R,E)-U^L(r,e)]\}$ and
$\sigma^*=\{[U^{CW}(R,E)-U^{CbW}(R,E)]/[U^{CW}(r,e)-U^{CbW}(R,E)]\}$.

Suppose the regional government expects the weak government to play r at M2 with probability ρ. The tough government always plays r by dominance. By Bayes rule, upon observing r at M2, the regional government concludes that, with probability $\pi^{\circ}(\rho^*)\equiv\pi/[\pi+(1-\pi)\rho^*]$, the government is tough. The regional government will then be indifferent between playing e or E upon observing r iff $\pi^{\circ}(\rho^*)\times U^L(r,E)+(1-\pi^{\circ}(\rho^*))\times U^{Lb}(R,E)=U^L(r,e)$. Substituting for $\pi^{\circ}(\rho^*)$ and then solving for ρ, this gives ρ^*. In turn, for the weak government to be willing to randomise between playing r and R in the first period, it must also be indifferent in expected terms between the two strategies. This occurs if the regional government, upon observing r in the first period, plays e with probability σ^*, where σ^* is implicitly defined by the equation: $U^{CW}(R,E)=(1-\sigma^*)U^{CbW}(R,E)+\sigma^*U^{CW}(r,e)$. Note that the proposed strategies and beliefs indeed constitute a perfect Bayesian equilibrium. By construction, no other strategies would make any agent better off, given the strategies played by the other agents, and the beliefs of regional government are derived by using Bayes rule, given the equilibrium strategies of the two types of government. Finally, this equilibrium is also unique, as we have shown that, for $\pi<\pi'$, there is neither a separating nor a pooling equilibrium in pure strategies.

Finally, combining Lemma 1, 2 and 3, we get the following Proposition 2.

PROPOSITION 2 Suppose it is common knowledge that $U^{CbW}(R,E)<U^{CW}(R,E)$. Then:
1) for $\pi\geq\pi'$ there exists a *pooling* perfect Bayesian equilibrium in pure strategies, where both the tough and the weak type of government choose r at M2, the regional government's posterior beliefs coincide with *a priori* beliefs, and the regional government optimally responds with e at M3;

2) for $\pi<\pi'$ there exists a unique perfect Bayesian equilibrium in mixed strategies. At this equilibrium, at M2 the tough government always chooses *r*, and the weak government chooses *r* with probability ρ^*, and *R* with probability $1-\rho^*$. The regional government, upon observing *R* chooses *E* and upon observing *r* selects *e* at M3 with probability σ^* and *E* with probability $1-\sigma^*$. The equilibrium beliefs of the regional government are such that, upon observing *R*, it assigns zero probability to the government being tough, and upon observing *r*, it assigns probability
$\pi^{\circ}(\rho^*)\equiv\pi/[\pi+(1-\pi)\rho^*]$ to the government being tough. Finally one can define:
$\rho^*=\{\pi[U^L(r,e)-U^L(r,E)]/(1-\pi)[U^{Lb}(R,E)-U^L(r,e)]\}$ and
$\sigma^*=\{[U^{CW}(R,E)-U^{CbW}(R,E)]/[U^{CW}(r,e)-U^{CbW}(R,E)]\}$.

Appendix B. The Italian institutional framework

The vertical organization of the Italian public sector features three main tiers of government: central, regional (which includes the regions and the local health units, the so called ASL, *Aziende Sanitarie Locali*), and local (including provinces and municipalities), plus the nationwide social security system (pensions and unemployment insurance). There are 15 ordinary statute regions (*Regioni a Statuto Ordinario*, RSO), five special statute regions (*Regioni a Statuto Speciale*, RSS), 109 provinces, and more than 8100 municipalities ranging in size from some 30 inhabitants (Morterone in Lombardy) to more than 2,5 million (Rome). The most important "horizontal" institutional difference is between the RSO and the RSS. Geographical, cultural, and economic lead to the establishment, recognized at the Constitutional level, of five autonomous regions (Valle d'Aosta, Trentino Alto Adige and Friuli Venezia Giulia in the North; Sicily and Sardinia in the South) with special statutes. They have broader spending powers than the ordinary statute regions and correspondingly larger financial transfers from the central government (Brosio et al., 2003). The RSO, though foreseen by the Constitution, were implemented only in 1970.

Table 9 reports the composition of the financing of public expenditure (gross of transfers) by the various fiscal instruments (taxes, social security contributions, transfers, other revenues, deficit) for each level of government. Even after the massive decentralization process of the 1990s (Arachi and Zanardi, 2004), grants from other levels of government still provide a very substantial share of total revenues of sub-national governments and social security institutions.

The organization and size of the Italian public sector find an important motivation in the stark and persistent structural and economic disparities between the regions that have characterized the country since its unification in 1861. The traditional strong centralization of the Italian public finances is grounded in the idea that the central government is better positioned to direct the fluxes of redistribution needed to reduce the differences in levels of economic development among the regions (Brosio et. al. 2003). Table 9 present some of the main features of these regional disparities as they are today. The Italian regions differ widely in surface area (a relevant feature for economies of scale in public production), in population density and age structure: the population is substantially younger in the South than in the North, with obvious impacts on healthcare and pension expenditures. Moving from the northern to the southern regions, the probability for an individual of being poor increases four times and per-capita GDP is cut in half, with the inevitable impact on fiscal capacity. Recent analyses by the Bank of Italy confirm this result for average family income and wealth for the 1995-2000 time interval (Cannari and D'Alessio, 2003; Figure 5). This geographical dualism explains the particular emphasis on inter-regional redistribution in the Italian political debate.

The regions have the main responsibility of health care provision, plus some spending programs related with education, transport, social assistance and culture. In quantitative terms, health care expenditures represent more than 50% of all regional outlays in RSOs and almost 40% in RSSs, making for a national average around 50% (Turati, 2003). While health care provisions are decided at the regional level, funding is mandated by the central government. The Italian National Health Service (*Servizio Sanitario Nazionale*, SSN) was instituted in 1979 and, until 1998, expenditures were decided by the regional government and deficits were covered through grants by the central government, with the predictable problems of soft budget constraints. Following the political and economic turmoil of the beginning of the 1990s, a number of reforms were implemented to harden the local budget constraints and improve accountability and responsibility of local governments. Regions in particular moved from being financed by tax revenue for only about 15% in 1990 to over 50% of their budget, as Figure 6 shows. Of course, these numbers have to be taken with care, as they mix up own taxes (where local governments can at least vary the rates) with local shares of central taxes (where autonomy is none). But the main jump in Figure 6 does coincide with the introduction of a major tax on value added (net of depreciations) raised at the firm level, the IRAP (*Imposta Regionale sulle Attività Produttive*) entrusted to the regions and, until 2001, earmarked to finance health expenditures (since then regions can freely dispose of the revenues). The central government has also tried to progressively substitute transfers to the RSOs with a participation to the revenues from the value added tax (IVA, *Imposta sul Valore Aggiunto*), a process that should be completed in 2013. Both measures may be interpreted as an increase of the tax autonomy of the regional governments; yet it is always the central government that regulates the tax bases, the tax rates and the special provisions of the fiscal instruments attributed to the regions. Finally, since the year 2000 the distribution of grants to RSOs was explicitly restricted to purposes of income equalization, according to a specific formula that takes into consideration each region's per capita fiscal capacity and health care spending needs relative to the national average (Brosio et al., 2003). Although the implementation of this stricter regime is phased out in 13 years, already in 2002 and 2005 the central government was forced to accept derogations to the transfers foreseen by the formula.

Appedix C. Data sources

ISTAT and the Ministry of Economic Development started to collect financial data about the decentralized government levels (except municipalities) since 1996; consistent data about the financial and economic relationships between the central government and the regions are thus available from 1996 to 2007. Economic and financial data, specifically those for the variables *TR*, *TCC*, *TCK*, *EXP*, *EXPCC* and *EXPCK*, are from *Ragioneria Generale dello Stato, Ministero dell'Economia e Finanze*, www.rgs.mef.gov.it/. Data about formal bailing out operations (*BOUT*) are collected from the financial bills (*Legge Finanziairia*) of the years 1999-2007, especially laws 129/2001, 312/2004 and DL 23/2007. *DDEF* is from Eurostat. Political variables, precisely *ELN*, *ELR*, *NDIF*, *RDIF*, *SAME*, *RIGHT* and *YEAR* are from Ministero dell'Interno. Finally, sociodemographic and health care variables are from ISTAT, respectively from www.demo.istat.it, (*POP*, *POP15*, *POP65*) www.istat.it/conti/territoriali/ (*GDP*, *U*, *RPIL*) and www.istat.it/sanita/Health/ (*AVGBED*, *PHYS*, *PUBPHYS*).