Municipal capitalism, regulatory federalism and politics*

Margherita Boggio†

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Abstract

The phenomenon of capital municipalism, which characterizes many local governments in Italy and Europe has been subject to many studies, but none of them has still tried to model what this would imply for the choice of the optimal regulatory rule, nor for the vertical allocation of regulatory tasks among levels of government.

I will first consider the case in which a benevolent regulator -who can be central or local- has to choose the cost reimbursement rule. Then, I will expand the model in order to analyze the effects that a partisan planner has on regulation.

1 Introduction

In recent years, in order to rationalize and reduce public expenditures, many local services which were previously owned by the public sector have been privatized. This trend started in UK in the 1980s and diffused in the European continent (but also all over the world) ten years later. As pointed out by Bortolotti and Milella (2006), the greatest number of privatizations in the 1977-2004 period has been implemented in Western Europe (the 29% of total deals), with the UK at the first place. In Bortolotti and Milella, the data analysis provides evidence that governments still control (through voting rights and/or golden shares) a large portion of these privatized firms, particularly in strategic sectors, which are characterized by bigger and more valuable companies.

Even if in general privatization seems to have been reached, since the average of capital sold attains the 60%, looking at the deals through public offers (which involve the largest

*Very Preliminary and Comments Welcome. Please Do Not Quote without the Author’s Permission.
†Doctorate School in Economics and Finance of Public Administration, Università Cattolica del Sacro Cuore and Università Bicocca, Milano. Email: margherita.boggio@unicatt.it.
and more profitable firms), it is striking that the average capital sold lowers to the 35%, with the majority of stakes being abandoned only in the 21% of cases.

The agents involved can be national governments, governmental agencies, but also local authorities: this means that different levels of governments are involved, and they tend to still retain the property of relevant shares in these firms.

Bortolotti and Faccio (2004) show that not only governmental shares have not changed over time, but also that this phenomenon -that they define as reluctant privatization- does not seem to have decreased the firms’ market value nor their performance.

This phenomenon is particularly relevant for Italy at municipal level, with the comune\(^1\) as the main shareholder in the majority of cases. A spontaneous question is why this form of ‘capitalism’ is mainly a municipal phenomenon.

In one of its latest publications on the topic, Unioncamere found out that in March 2009 the number of firms participated by local jurisdictions were around 5,100: nearly 3,000 of them are municipal-only participations, while municipal participations together with other local governments raise to 4,300, with each comune participating on average in seven firms.

The fact that this phenomenon is more relevant at the highest levels of decentralization highlights the importance of implementing a federalist approach in this study.

As privatization, fiscal federalism has been implemented in many countries all over the world in an attempt to restructure the public sector, increasing the autonomy and efficiency of the lower levels of government, thanks to the distribution of tasks and responsibilities to them. It has always been argued that local governments, being closer to the citizens in their districts, have better knowledge of their preferences, and can provide a combination of services and taxes more coherent with local needs. Many scholars in fiscal federalism have shown that local governments can be more accountable for their policies, and this can also limit their discretion. Furthermore, how to deal with the exploitation of economies of scale and to get better access to information are a very important matter in both regulation and federalism.

Traditionally, the main concern in regulation has been the choice of the optimal regulatory rule. However, these general statements of fiscal federalism can be applied also to the regulatory policies: it is important not only to choose the best regulatory rule, but also to study which is the most appropriate level for its implementation.

This reflects what is happening in many countries in the world. Indeed, all the countries in the UE27 have started an evolution towards the decentralization of local finance (and

\(^1\)What in Italy is defined as ‘comune’, is the elemental and more restricted territorial entity.
functions), particularly at regional and municipal level. The reason behind this process is the fact that the responsibility of a given public good should be assigned to the administrative entity which is the nearest to the citizens. Choosing the optimal vertical allocation of regulatory powers and tasks requires to take into account many elements, as political accountability, local characteristics, but also distributional concerns, especially in presence of spillover effects (which are highly likely to emerge in case of presence of a network). This is what is happening for example in the European Union with the subsidiarity principle.

Starting from these considerations, it can be said that the vertical allocation of powers can increase the efficiency of regulation; nevertheless, the fact that the local government is a shareholder as well is likely to modify the effect of the use of a federalist approach to regulation.

From the latest data contained in the research by Mediobanca for the Fondazione Civicum of Milan, related to the balance sheets and the performance indicators of the 35 firms controlled by six of the biggest comuni in Italy, it is apparent that the firms operating in some sectors (i.e. gas, electricity, water) are highly profitable, and this allows local administrators not only to counterbalance the negative results of the firms operating in other (costly) sectors, but also to increase their resources through the dividends, and to use them for other purposes. This helps the local governments to somehow elude the budget constraints imposed by the central government, and in particular the so-called the Patto di Stabilità e Crescita Interno.

This gives rise to a twofold issue. On the one hand, in case of decentralization of regulation, the fact that the local government is also a shareholder casts doubts on the regulation implemented by it: a regulator can generate and distribute rents across players, and in this case it is one of this players as well, which can gain some money from the dividends distributed by the firm. Nevertheless, the fact that it is a shareholder in the private firm gives the local regulator a better access to the private information in the hands of the firm’s manager. On the other hand, adding the political dimension can alter the outcomes: the fact that the local government’s political orientation is pro-shareholder or pro-consumer can reinforce or reduce the mentioned effect on outcomes, since the political agenda is aligned/disaligned with its objectives as shareholder.

Indeed, when the hypothesis of a benevolent government is removed, in the sense that the politician/regulator can be captured or can favour a particular group of the population in order to gain political support, additional problems arise for the search of the optimal

\[2\] Available in 2009, relative to the years 2006 and 2007.
regulatory rule. Moreover, it should be taken into account that the level of (de)centralization can have different implications for the degree of influence that citizens can have on the politicians’ actions. This is why this last element should be added to the envisioned framework: both the literature on fiscal federalism and on regulation have been starting to use political mechanisms.

In the phenomenon under analysis, the fact that municipal governments still retain high shares in the firm they should have privatized and they still regulate, decreases the transparency of their relation with the firm’s manager, but also the transparency of their commitment with their political mandate (and so with their electorate).

In my model, under decentralization, the local government, retaining some stakes in the firm, can influence the operative, economic and financial (i.e. imposing the distribution of dividends when it needs it) choices of the firm, but it also regulates it: so the local government still retains the control of the firm which provides the service in the area in which it exerts its power. This can also raise some doubts on the efficacy of the process of privatization and consequently of the externalization of the local services’ provision: the objectives of cost reduction and simplification, given the present situation, are unlikely to be reached.

So, the fact that local politicians are eager to acquire and retain stakes in the firms lessens the transparency in the relationship between the private and the public sector, in the implementation of the regulatory rules, and finally in the democratic representation of the citizens’ interests.

In summary, to get a complete picture of the phenomenon, both the enterprise and governmental sides should be considered. On the one hand, there are the participated firms (and their managers), which receive incentives by the shareholders: the amount of these incentives will be also determined by the choice expressed by the local government and by the weight this choice will have, depending on the distribution of shares between the citizens and the local government. Given that the participated firm’s performance influences the well-being of the different citizens living in the territory in which they operate, the regulator should give incentives to the managers in order to lead him to behave in a good way. When the regulator is central, the information at his disposal is less than that of the local regulator, since he is not in the shareholders’ board; moreover, the fact that the manager has to respond to two principals (i.e. the regulator and the shareholders) further distorts his response, but this problem is mitigated when the regulator is local, thanks to its twofold role. On the other hand, the fact that the government is a shareholder has an effect not only on its own budget constraint (dividends from privatized firms are an of income for governmental entities, so
localities can soften their budget constraints), but also on the consideration (i.e. the weight in the social welfare function) it gives to the utilities of all the agents.

Adding partisanship to this framework, it could be pointed out that the political party to which the politician in charge is affiliated can change his behaviour: he can favour one specific agent, altering the final result. It is also interesting to see how this interacts with the fact that a regulator is local, and consequently how this modifies the mentioned behaviour.

The phenomenon of ownership and control of private firms from local governments has been defined as *municipal capitalism*. Up to now, the existence of municipal capitalism - especially in Italy- has been demonstrated and many questions on its causes and effects have risen. The debate is still growing, but -as far as I know- there are no theoretical contributions on the topic. In particular, there is no regulatory model which shows what municipal capitalism would entail for the regulatory process: this is why I adopt a traditional regulatory framework (as in Laffont and Tirole, 1993) to compare what happens when regulation is implemented by a central or a local politician, under the assumption that the first has no share in the firm it regulates, while the second is also a shareholder. This difference is visible not only in terms of budget constraint, but also of welfare maximization, since the fact of being a shareholder changes the local government’s attitude towards the agents in the economic system. In one sense, in the environment I just described, when the regulator is central it is like having complete privatization, and the regulator can exert the external control only, while when he is local, even if formally the firm has been privatized, the locality has also (some) internal control in the firm. With a local regulator there is a trade-off between the advantage of the better knowledge of the local conditions versus the drawback of the presence of an obscure relation between the firm and the regulator. This trade-off can be somehow exacerbated when the politician is partisan, depending on which is the category of citizens favoured by the political party in power. In order to implement political issues in a typical regulatory environment characterized by asymmetric information, I will follow the methodology in Laffont (1996) and Martimort (2006).

Since what I have in mind is to apply a framework connecting regulation and federalism, in my model I adopt a structure which is similar to the one in Laffont and Pouyet (2003). There is a federation composed by two regions, with a firm monopolistically producing a local service in each of them, which is related to the other through a network, so that also spillovers arise. In this way also the trade-off between the internalization of the spillovers provided by the central regulator and the more focused policies implemented by the local planner is added.
Note that up to now I have emphasized the importance of the model to compare the central level with municipal one; however, the model could be applied also to the European Union, comparing the regulation provided by the center, with the one by the single countries, in order to investigate the efficacy and the reasonableness of the subsidiarity principle.

The next Section gives an overview on the few papers on the municipal capitalism and resumes the literature on federalism, regulation and political economy, highlighting the points they have in common or which can be linked in order to explain the mentioned problems. In Section 3 the basic model is presented. In Section 4 the model will be extended allowing for a non-benevolent government. Section 6 concludes.

2 Literature review

The failure of State ownership in providing a better way to deal with the problems of natural monopoly and externalities has led to the wave of privatization that has started nearly thirty years ago in the UK and has diffused all over Europe and in the United States, with the purpose of reaching gains in efficiency, avoiding wastes, improving performance, and relieving the State budget; parallel to this, the academic debate on the ownership structure has flourished.

Sappington and Stiglitz, in their privatization theorem (1987), claim that private and public production are both characterized by the delegation of authority and responsibility to managers and that, under some assumptions, ownership does not matter; moreover, when this is not true, privatization is justified on efficiency grounds.

The theoretical literature has extensively used the principal-agent theory to deal with ownership issues (for example, see Shapiro and Willig, 1990; Laffont and Tirole, 1993), since the firm’s objective, profit maximization, is different and usually at odds with the government’s objective of welfare maximization, and the shareholders are typically more informed than the bureaucrats.

The role for privatization can also be explained by the presence of contract incompleteness, which impedes the possibility of a credible commitment (Grossman and Hart, 1986; Schmidt, 1996).

However, the government has often its own objectives, such as obtaining and maintaining its political support, which lead to behaviors very different from welfare maximization; this means that the inefficiencies can come not only from the lack of incentives for the managers, but also to the fact that politicians apply policies which are meant to win the support of
their voters.

Indeed, the fact that regulators can not only generate, but also distribute rents raises one of the most important problems for scholars: if a politician is not benevolent, on one hand he can use his power in order to increase or maintain his political support, while on the other hand interest groups may try to corrupt him to get higher rents.

The importance of the problem of political connections per se and their bidirectionality (Shleifer and Vishny, 1994; Faccio, 2006), and also the fact that this can entail many forms of preferential treatment, have led economists to study the problem, using different kinds of approaches. Starting from the 1970s and 1980s, the Chicago and Virginia schools were the first to give a theoretical treatment of the problem of lobbying, which later on has been modeled through the principal-agent approach (Laffont and Tirole, 1993) and the contract incompleteness approach (Grossman and Helpman, 1994). Only recently the topic has been integrated with political economy issues such as voting (Faulhaber, 2003; Mu, 2009) and political accountability (Besley and Coate, 2003; Guerriero, 2008).

Thus, it is apparent that a regulatory issue as the choice of ownership structure, cannot be analyzed without taking into consideration also the nature of the link between politicians and firms, and its causes. As pointed out by Laffont (1996) and Martimort (2006), the regulatory process is not only characterized by economic inefficiencies (i.e. asymmetric information), but also by some form of contractual incompleteness (e.g. non-benevolent politician, limited commitment) influencing the way the information is distributed and consequently also the trade-off between efficiency and rent extraction. Thus, while traditionally the two approaches have been used in alternative, an interaction of the two can be useful to study the regulatory problems taking also into account political economy issues.

Laffont studied the choice of a cost-reimbursement rule compared for different ownership structures, modelling economic inefficiencies (asymmetric information on the efficiency parameter of the firm) together with political inefficiencies (benevolent versus partisan regulator). What emerges in his model is that, when the type of majority changes, the strength of the firm’s incentives, the rent given to the efficient firm and so the kind of regulation, will change.

The use of asymmetric information alone (i.e. under the hypothesis of benevolent planner) compared to its use together with some contractual incompleteness (political issues) could help us to understand which is the better way to represent reality. I will use this approach to study the phenomenon of reluctant privatization, in order to understand which are the consequences on the regulatory environment of the fact that, even after the wave of privatization,
governments still retain relevant stakes in the previously State Owned Enterprises, and how this anomaly in the economic environment is affected not only by asymmetric information, but also by political issues.

Laffont used it to model how a (unique) regulator would deal with two different types of consumers, depending also on which of the two formed the majority of the population. I will divide the population in ‘consumers only’ and ‘consumers-shareholders’: in this way the fact that the regulator would favour a group or the other would assume a not only an ideological (left or right politician), but also a distributional connotation.

As I pointed out, reluctant privatization is the way the transfer of ownership rights but not of control rights that characterized State-Owned Enterprises, has been defined. This topic has been treated in theory, with a focus on political motivations by Perotti (1996). The Author noted that the sales to private investors of the shares of an SOE are incredibly gradual: governments retain large stakes, and sales tend to be underpriced. In this model, when private investors have limited information on the government’s preferences, a partial sale (meaning that the government is willing to bear the residual risk, given that this reduces the gain from later interference) and its underpricing are signals of a committed government. However, the focus of Perotti’s model is on the motivations behind the behavior of the government, while he does not investigate what this implies for his role of regulator or for the firm’s efficiency, which were the first reasons for privatization.

In this sense my model is more orientated on the regulatory side (or, better, on the side of regulatory federalism): I will try to show what municipal capitalism would entail not only for the regulated firm (comparing the results coming from the different behaviors of the central and local regulator, taking into account the fact that the latter is a shareholder as well), but also for the local government (in terms of budget constraints but also of welfare maximization) with respect to its central counterpart. The main point is to compare the outcomes of local regulation with those coming from the regulation of a central planner with no stakes in the regulated firm, for both the regulated and the regulating entities, and the consequences this has on the two categories of citizens.

Bortolotti, Pellizzola and Scarpa (2007) hypothesize that, since in Italy dividends from privatized firms are an important source of income for governmental entities, municipalities can soften their budget constraints and retain control shares in the firm. A question is why capitalism is mainly a local phenomenon; this is why a comparison of local and central regulation taking into account of this fact is a relevant point that seems to be missing in the existing literature.
Starting from Oates’ decentralization theorem (1972), a central question in fiscal federalism has been which are the tasks and responsibilities to be decentralized, and to which degree. Decentralization is seen as a way to increase the autonomy and the efficiency of lower levels, to better respond to local specific problems and preferences, but also to limit the government’s (the Leviathan) power through the competition between jurisdictions (Buchanan, 1980). Finally, a local government can be useful when a better knowledge of local costs and demand is needed. However, decentralization entails the problems of the limited exploitation of economies of scale and scope and of the inability to internalize the possible presence of spillover effects.

The second generation of scholars in fiscal federalism have started introducing not only asymmetric information in their models, but also political mechanisms. This is why more recently the problem of lobbying (Bardhan and Mookherjee, 2000; Bordignon, Galmarini and Colombo, 2005) and political accountability (Seabright, 1996; Laffont and Pouyet, 2003) have been dealt with a federalist approach: an important question is which is the better level to deal with capture and which provides the best political accountability.

With decentralization, local politicians are more accountable for the policies they implement, but this can also result in a limited discretion. Thus, dealing with the choice of optimal vertical allocation of regulatory powers and competencies, with the addition of the political element, is a very demanding task. Many elements concur to the decision of the best regulatory level, and centripetal and centrifugal forces seems to coexist. Local regulators have a better knowledge of local conditions, but cooperation between vertical levels and redistribution between horizontal levels is still needed. Moreover, while it is easier for interest groups to organize and capture the local regulator and the interest to do that is also greater, given that the stakes involved are higher, decentralization can also be the only way to limit the power of the Leviathan (i.e. the central government).

In conclusion, we can ask if is a central or a local politician more suitable to deal with the regulated firm: this cooperation between the traditional topics of regulation and the federalist approach has given start to what has been defined as ‘regulatory federalism’ (Trillas, 2008). This can be useful not only to find out which is the best level to deal with the policy distortions coming from lobbies, but also to understand if the subsidiarity principle is always effective, or there should be a stronger role for the regulator at European level.

Moreover, given the local nature of municipal capitalism, the phenomenon is expected to influence the regulatory process, given the difference between a central and a local politician in their regulatory relation with the firm. This necessitates the implementation of a federalist
approach, in order to check which is the best decentralized level for regulation: on one hand
the central regulator has no (or less) involvement in the firm, and could make the firms
internalize the spillovers that may occur, while on the other hand the role of shareholder of
the local government could entail more commitment, even if accompanied with a regain of
part of the internal control that privatization was meant to clear away.

A very interesting step towards the link between decentralization, regulation and political
accountability has been taken in the mentioned paper by Laffont and Pouyet. However, in
their model they study what happens while having a unique central regulator or two local
regulators when there is a unique firm in the federation. Here the focus is more on the
competition and externalities that are generated by the fact that the firm is the only provider
of the service for the citizens in the two districts, who also have a portion of shares in it. The
latter element also allows the Authors to add political partisanship in the model. I will apply
a similar methodology to study what happens when there is a firm in each region, which are
related to the other through a network, and whose shares are owned by the citizens of their
own region only: in this way the spillover would not be informational or on the rent received
by the shareholders (as in the mentioned model), but related to the network. In this case
the focus would be on the trade-off between the internalization of the spillovers provided by
the central regulator and the special link between the local planner and the firm’s manager.
I will also analyze how the final outcomes from different levels of regulation are influenced
by the political orientation of the government.

All the mentioned elements should be put together to analyse the phenomenon of reluctant
privatization. The fact that the government still retains high shares in the firms it should have
privatized casts some doubt on the effectiveness of the privatization process, and on the nature
and the outcomes of the link between the government and the firm’s manager, influencing
the incentives for the latter. Finally, given the fact that the intensity of this phenomenon
changes depending on the level of decentralization, the federalist approach should be used to
study the problem.

In summary, my model will approach a very common problem in regulation: the choice of
cost reimbursement rule under incomplete information on the efficiency of the firm. This is
used to compare how the central and local level perform in giving incentives to the manager,
so that the exerted level of effort is made as close as possible to the optimal one, taking into
account the fact that the local government has a special link with the manager, since it is
a member of the shareholders’ board as well. Finally, the element of political inefficiency is
added: regulators have a private agenda, and they can use the regulatory policy to favour
the group of citizens which supports them. Also in this case it is interesting to compare central and local regulation, since the fact that the local government is a shareholder as well can make him coherent with its political objectives when pro-shareholders, but at odds with them when pro-consumer.

3 The basic model

To present the regulatory problem, I will use the regulatory structure in Laffont and Tirole (1993), which has been adopted by both Laffont (1996) and Laffont and Pouyet (2003). These are the models I will refer to: the model by Laffont and Tirole is the basic framework, that deals with the choice of cost reimbursement rule under asymmetric information, to which Laffont adds the element of malevolent regulator and, later on, together with Pouyet, the elements of regional competition and regulatory federalism.

As in the model by Laffont and Pouyet, I will consider a federation (or a country) composed by two regions, denoted by \( i = 1, 2 \), with the same number of citizens with a mass unity and whose preferences are homogeneous. However, while in the mentioned model there is a unique firm realizing a project for each of the two regions (creating competition between local regulators), in the present model there is a (monopolist) firm realizing an indivisible project in each of the two areas.

The regulator fully reimburses to the firm its observable production costs \( C_i = (\beta_i - e_i)q_i \). The cost of the project depends on the efficiency in production \( \beta_i \), the level of effort of the firm’s manager \( e_i \), and the quantities produced \( q_i \). When asymmetric information is introduced, the efficiency parameter \( \beta_i \) is the manager’s private information. For simplicity, I assume that \( \beta_i \) can take two values (high or low): \( \overline{\beta} \) and \( \underline{\beta} \), with probability \( \nu \) and \( 1 - \nu \), respectively. Naturally, \( \overline{\beta} > \underline{\beta} \), and we can define \( \Delta \beta = \overline{\beta} - \underline{\beta} \).

The manager can exert a (positive) effort \( e_i \) in order to reduce the marginal cost of the project, but this effort generates a disutility \( \psi(e_i) \) for him. This disutility of effort is increasing and convex in effort (i.e. it increases at an increasing rate), so that \( \psi' > 0 \) and \( \psi'' > 0 \).

The firm is run by a manager, who responds to the shareholders, so his utility is given by \( U_i = t_i - \psi(e_i) - z_i \). The transfer \( t_i \) is given to the firm by the regulator, and is financed through a tax on citizens, which implies a distortionary effect for each monetary unity levied, represented by \( \lambda \), the so-called shadow cost of public funds. The dividends to the shareholders are denoted by \( z_i \). The reservation utility of the manager is normalized to zero.
The regulator and the shareholders offer simultaneously and non cooperatively a contract to the firm’s manager, so that he accepts to work: the regulator offers the manager the transfer $t_i$, while the shareholders design the dividend scheme $z_i$.

The consumers’ net surplus generated by the project is equal to $V_i^C = \delta S(q_i) - (1 + \lambda) [t_i + C_i]$ in case of regulation by the central government, while it is $V_i^D = S(q_i) - (1 + \lambda) [t_i + C_i]$ under decentralization of the regulatory function. The difference is that the central government can fully internalize the effects the project which entail some spillover $\delta$ (which can be less or greater than 1, depending whether they are negative or positive) on the gross surplus $S(q_i)$, while the local government is not able to do that. I decided to add the spillover element into the model, since these kind of services are usually provided through a network, and this implicates the presence of some kind of externalities between the jurisdictions.

Notice that, as in Laffont (1996), a portion $\alpha \in [0, 1]$ of these citizens-consumers-taxpayers also owns some shares in the firm in their district; therefore, they are also shareholders. As we will see later on in this paper, with this assumption it’s like dividing the population between rich and poor, and the partisanship has not only an opportunistic connotation, but also an ideological one: the politician favouring those who are consumers only is a leftist, viceversa if he favours citizens-shareholders.

However, in my model, in order to represent the phenomenon under study, local governments also have some dividends $(1 - \alpha) z_i$ from the $(1 - \alpha)$ shares they own in the local firm; they use them in order to increase their budget, so they can use this money in excess to finance, for example, a local public good, or to increase the quality of the network used by the firm. Thus, this portion of dividends appears as an additional component in the social welfare function when the regulatory function is in the hands of the local government.

Note that the (im)possibility of spillovers’ internalization and the additional component in the maximization process are not the only differences in the regulatory levels: if the government is not owner (i.e. in case of central regulation), it will weigh the shareholders’ utility $z_i$ using the parameter $\alpha$, while if it is owner of the residual shares (i.e. in case of local regulation), shareholders’ profits would be fully weighed (since it will weigh the part owned by the citizens plus its own shares, summing up to one). In the latter case it will also choose the retention rate (defined as the percentage of present earnings which is held back by the firm) $r \in [0, 1]$ on the dividends to be distributed.

Assuming, as in Laffont and Tirole (1993) and Martimort (2006), that ownership structure allows or not the regulator to control communication channels between the manager and the outsiders, this has a slightly different implication for our model.
The central government has no shares in the firms, so it has the external control only, then it is as if privatization is full: thus, the regulator weighs the shareholders’ net dividends only on the basis of their ‘voting’ portion in the population. With centralization, privatization is as if ‘full’, since the manager faces two principals: the shareholders (internal control) and the regulator (external control).

Under decentralization, the local government can exert both types of control, but just proportionally to its shares (we can think that internal control is exerted through representatives in a board).

Notice that in the present model the central and the local government do not communicate, so the local government gives no access to the center to its privileged information.

### 3.1 Complete information

In this section, symmetric information is assumed: the value of the efficiency parameter for each of the two firms, $\beta_i$, is known, so the manager’s effort level $e_i$ is observable. I will compare the outcomes obtained under central and local regulation in the full information benchmark.

#### 3.1.1 Central government

When regulation is implemented by the central government, spillover effects on consumers’ surplus are taken into account, but the utility of the shareholders is only considered for that portion of firm’s shares that are owned by citizens, while the utility related to the shares still owned by the local governments is not taken into consideration.

\[
\text{Max } \sum_{i=1}^{2} \left\{ \delta S(q_i) - (1 + \lambda)(t_i + C_i) + \alpha z_i + U_i \right\}
\]

s.t. $V_i \geq 0$, $U_i \geq 0$, $z_i \geq 0$, with $i = 1, 2$.

The central politician maximizes a utilitarian social welfare function, consisting of the weighted sum of the utilities of citizens, manager and shareholders, under the participation constraints of these three groups. The participation constraints for the citizens are needed so they don’t move in another area (voting with their feet\(^3\)).

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\(^3\)Tiebout (1956) envisaged the possibility that citizens, through interjurisdictional mobility, could choose the locality with the preferred combination of tax and local good, imposing in this way additional restraints to the central government’s powers.
\[
W = \sum_{i=1}^{2} \left\{ \delta S(q_i) - (1 + \lambda) \left[ (\beta_i - e_i)q_i + \psi(e_i) + (1 - \alpha) z_i \right] - \lambda \alpha z_i - \lambda U_i \right\}
\] (2)

Maximization leads the following results:

1. No rent to the firms’ managers, since it is costly: \( U_1 = U_2 = 0 \). Thus, \( t_i = \psi(e_i) + z_i \), for \( i = 1, 2 \).

2. Marginal disutility equal to marginal cost savings of effort: \( \psi'(e_i) = q_i \). As a result, \( e_1 = e_2 = e^* \): effort is equal in the two areas and attains the socially optimal level.

3. \( \frac{S'(q_i)}{1 + \lambda} = \frac{\beta_i - e_i}{\delta} \): in both regions the marginal utility of the public good equates its marginal cost, and spillovers are internalized.

4. The project is realized and the citizens’ participation constraints in both areas are satisfied if and only if: \( \delta S(q_i) - (1 + \lambda) \left[ (\beta_i - e_i)q_i + \psi(e_i) + (1 - \alpha) z_i \right] \geq 0 \).

### 3.1.2 Local government

The local regulator takes only into account the welfare of the players in his area, so he does not internalize the spillovers on the citizens’ gross surplus. However, given that he still retains some shares in the local firm, not only he fully weighs the shareholders’ utility, but he also adds an additional element to his social welfare function that represents the monetary value he receives from the shares. This last element depends on the level of the retention rate \( r \): that is, the portion of present earnings of the firm that the board of shareholders decides not to distribute as dividends. Being the local government a shareholder as well, it has an optimal retention rate, which is obtained from the maximization problem.

\[
\text{Max} \quad S(q_i) - (1 + \lambda)(t_i + C_i) + z_i + U_i + (1 - \alpha)(1 - r) z_i
\]
\[
\text{s.t.} \quad V_i \geq 0, \quad U_i \geq 0, \quad z_i \geq 0, \text{ with } i = 1, 2.
\]

\[
W_i = S(q_i) - (1 + \lambda) \left[ (\beta_i - e_i)q_i + \psi(e_i) \right] - \lambda U_i - \lambda z_i + (1 - \alpha)(1 - r) z_i
\] (4)

The managers’ zero rent and optimal effort results are the same described above, except for the fact that now \( \frac{S'(q_i)}{1 + \lambda} = \beta_i - e_i \): spillovers cannot be internalized by local government.
Furthermore, now the government (being also a shareholder), has control on the additional variable of dividends, and chooses the retention rate $r$, so that $r = 1 - \frac{\lambda}{1 - \alpha}$. The selected retention rate decreases with that second component on the right hand side of the equation, which can be seen as the savings in term of social cost of public fund that can be achieved if governmental dividends instead that (socially costly) taxes are used to finance local public goods. In other words, the higher the social cost of public funds $\lambda$, the more costly is the use of taxes, so for the benevolent local government becomes more convenient to use its portion of dividends in order to finance the transfer to the firm, and consequently the retention rate decreases.

**Proposition 1.** Under full information centralization is equivalent to decentralization, except for the fact that spillovers cannot be internalized. The level of efforts are symmetric and equal to the socially optimal effort, and its marginal disutility is equalized to its marginal cost savings in both cases. Moreover, the firms’ managers never get any rent.

### 3.2 Incomplete information

In this section asymmetric information on the efficiency parameter $\beta$ is introduced, so the regulator only observes the realized cost $C_i$, and bases its net transfer on it. The rent for the efficient type -necessary in order to avoid he would mimic the inefficient one- is denoted by $\Phi(e_i) = \psi(e_i) - \psi(e_i - \Delta \beta_i)$, and depends on the level of effort required by the manager in the inefficient firm. For notational simplicity, $\bar{t}_i \equiv t_i(\bar{\beta}_i)$, $\bar{C}_i \equiv C_i(\bar{\beta}_i)$, etc.

#### 3.2.1 Central government

Now the planner (for the details of the solution see Appendix B) should maximize the expected social welfare under the aggregate veto constraints:

$$
\max_{(q, \bar{q})} \sum_{i=1}^{2} \left\{ \delta \left[ \nu S(q_i) + (1 - \nu)S(\bar{q}_i) \right] + \\
- (1 + \lambda)\nu((\beta_i - e_i)q_i + \psi(e_i)) + (1 - \nu)((\beta_i - e_i)\bar{q}_i + \psi(e_i)) \right\} - \lambda \nu \Phi(e_i) 
$$

(5)

---

4Under the assumption that $\lambda \leq 1 - \alpha$, so that financing the project with taxes is less/equally costly than financing it through dividends.
\[
\delta S(q_i) - (1 + \lambda) \left[ (\beta_i - e_i)q_i + \psi(e_i) \right] \geq \delta S(\bar{q}_i) - (1 + \lambda) \left[ (\beta_i - \bar{e}_i)\bar{q}_i + \psi(\bar{e}_i) \right] \tag{6}
\]

\[
\delta S(\bar{q}_i) - (1 + \lambda) \left[ (\beta_i - \bar{e}_i)\bar{q}_i + \psi(\bar{e}_i) \right] - \frac{\nu [2\lambda + (1 - \alpha)]}{1 - \nu} \Phi(\bar{e}_i) \geq 0 \tag{7}
\]

Maximizing expected social welfare we obtain:

1. \( \frac{\partial L}{\partial q_i} = 0 : \frac{S'(\bar{q}_i)}{1 + \lambda} = \frac{\beta_i - \bar{e}_i}{\lambda} \iff \bar{q}_i = q^*(\beta_i - \bar{e}_i) \).
2. \( \frac{\partial L}{\partial \bar{q}_i} = 0 : \frac{S'(q_i)}{1 + \lambda} = \frac{\beta_i - e_i}{\lambda} \iff q_i = q^*(\beta_i - e_i) \).
3. \( \frac{\partial L}{\partial \bar{e}_i} = 0 : \bar{q}_i = \psi'(e_i) \iff e_i = e^* \).
4. \( \frac{\partial L}{\partial e_i} = 0 : \psi'(e_i) = \bar{q}_i - \frac{\lambda(1 + \mu)}{(1 + \lambda)(1 + \mu)} \frac{\nu}{1 - \nu} \Phi'(e_i) - \frac{(1 - \alpha)(1)}{(1 + \lambda)(1 + \mu)} \frac{\nu}{1 - \nu} \Phi'(e_i) \iff \bar{e}_i < e^* \).
5. \( U_i = \Phi(\bar{e}_i) > 0, \quad t_i = \psi(e_i^*) + z_i + \Phi(\bar{e}_i) \).
6. \( \bar{U}_i = 0, \quad \bar{t}_i = \psi(\bar{e}_i^*) + z_i \).

Given the fact that the expected cost of the informational rent given to the efficient firm, \( \nu \lambda \Phi(\bar{e}_i) \), depends only on \( \bar{e}_i \), the levels of \( \bar{q}_i \) and \( e_i \) are equal to those obtained under full information, while \( \bar{q}_i = q^*(\beta_i - e_i) \). Thus, quantities are not distorted in order to give the right incentives to the manager of the efficient firm. The level of effort and output for the efficient firm are the same as under symmetric information, even if it now enjoys the informational rent; in order to limit the amount of this rent, the incentive scheme given to the inefficient type is low-powered, so that the level of effort is distorted downwards.

The level of distortion is greater than in the classical case of cost-reimbursement (see Laffont and Tirole (1993)): part of the additional distortion is visible in the second element of the right hand side and is due to the presence of multiprincipal problem (following the results obtained by Martimort (2006)), given that internal and external control of the firm are split between shareholders and regulator. In order not to have any of the two principals to veto production to the inefficient firm, this increased distortion is needed, and this also means that when the firm is inefficient its budget constraints is harder, since it has to respond to the requirements of two principals. Thus, while on the one hand there are additional distortions, on the other hand the budget constraint for the inefficient firm is enforced.

\(^{5}\text{The aggregate veto constraint (7) is binding with } \mu(1 - \nu) \text{ as multiplier.}\)
However, the distortion is even greater than in Martimort’s model, since the central government does not weigh the residual shares in its social welfare function, and this distortion is represented by the last element on the right hand side of the equation. Notice that the residual shares are those owned by the local government, so not taking them into account further distorts the results. In practice, the central government discards the possibility of cooperation with the lower level of government, which could somehow help to solve the multiprincipal problem. Instead, not only the local government is treated by the central planner as a normal shareholder, but also its utility is not taken into account: this is why an additional element of distortion arises.

**Proposition 2.** Under asymmetric information and central regulation, spillovers are internalized and outputs are chosen so that the marginal disutility of effort is equalized to its marginal cost savings either with an efficient or an inefficient firm. The level of effort is socially optimal in case of efficient firm, while it is lower than optimal if the firm is inefficient. In the first case the firm gets an informational rent.

### 3.2.2 Local government

As already pointed out in the complete information case, the local planner, in contrast to the central regulator, fully weighs the shareholders’ utility, and has an additional element in the social welfare function representing the monetary value of its shares of dividends distributed.

Thus, the problem (for details see Appendix B) he must solve is:

\[
\begin{align*}
\max_{(q_i, \bar{q}_i)} & \quad \nu S(q_i) + (1 - \nu)S(\bar{q}_i) - (1 + \lambda)\nu[\beta_i - \epsilon_i]q_i + \psi(\epsilon_i) + \\
& \quad + (1 - \nu)(\beta_i - \epsilon_i)\bar{q}_i + \psi(\epsilon_i)) - \lambda \nu \Phi(\epsilon_i) \\
\text{s.t.} & \quad S(q_i) - (1 + \lambda)\left[\beta_i - \epsilon_i\right]q_i + \psi(\epsilon_i) \geq S(\bar{q}_i) - (1 + \lambda)\left[\beta_i - \epsilon_i\right]\bar{q}_i + \psi(\epsilon_i) 
\end{align*}
\]

(8)

(10) is binding with \(\mu(1 - \nu)\) as multiplier.
\[ S(q_i) - (1 + \lambda) [(\bar{\beta}_i - \bar{e}_i)q_i + \psi(\bar{e}_i)] - \frac{\nu^2}{1 - \nu} \Phi(\bar{e}_i) + (1 - \alpha)(1 - r) \frac{\nu}{1 - \nu} \Phi(\bar{e}_i) \geq 0 \quad (10) \]

The results of the maximization process are the following:

1. \( \frac{\partial L}{\partial q_i} = 0 : \frac{S(q_i)}{1 + \lambda} = \bar{\beta}_i - \bar{e}_i \Leftrightarrow q_i = q^*(\bar{\beta}_i - \bar{e}_i). \)

2. \( \frac{\partial L}{\partial q_i} = 0 : \frac{S(q_i)}{1 + \lambda} = \beta_i - e_i \Leftrightarrow q_i = q^*(\beta_i - e_i). \)

3. \( \frac{\partial L}{\partial e_i} = 0 : q_i = \psi'(e_i) \Leftrightarrow e_i = e^*. \)

4. \( \frac{\partial L}{\partial e_i} = 0 : \psi'(\bar{e}_i) = \bar{q}_i - \frac{\lambda(1 + 2\mu)}{(1 + \lambda)(1 + \mu)} \frac{\nu}{1 - \nu} \Phi'(\bar{e}_i) + \frac{(1 - \alpha)(1 - r)\mu}{(1 + \lambda)(1 + \mu)} \frac{\nu}{1 - \nu} \Phi'(\bar{e}_i) \Leftrightarrow e^C_i < e^L_i < e^*. \)

5. \( U_i = \Phi(e_i) > 0, \quad t_i = \psi(e^*_i) + z_i + \Phi(e_i). \)

6. \( U_i = 0, \quad \bar{t} = \psi(\bar{e}_i) + \bar{z}_i. \)

As for the rent given to the efficient firm, the levels of output, and the level of effort for the efficient firm, the results are the same obtained by the central planner.

As for the inefficient type’s effort, there is still the higher distortion due to the multi-principal problem, but the second distortion of the centralized case is eliminated, since now the dividends are fully weighed in the social welfare function. Finally, if the inefficient firm is not vetoed production, some dividends could be distributed to the local government, and so it has a more ‘balanced’ behavior towards the shareholders, mitigating the multi-principal problem. This is visible in the third element on the right hand side of the equation at point 4. The optimal retention rate does not changes.

**Proposition 3.** Under asymmetric information and local regulation, outputs are chosen so that the marginal disutility of effort is equalized to its marginal cost savings either with an efficient or an inefficient firm. The level of effort is socially optimal in case of efficient firm (and the firm gets an informational rent), while it is lower than optimal (but higher than in the centralized case) if the firm is inefficient: the fact that the politician takes into consideration the values of his dividends in the social welfare function mitigates the distortion created by the multi-principal problem under asymmetric information. As usual, spillovers cannot be internalized.

Under asymmetric information and benevolent government, the central regulator can internalize the spillover effects, while the local regulator can obtain a higher level of effort.
from the inefficient firm thanks to its privileged access to information (given by the fact that the local government is in the shareholders’ board).

3.3 Decentralization and the shadow costs of public funds

In this Section, I will assume that $\lambda$ is higher at local level. There can be many ways to justify this assumption. This can be due, for example, to the fact that even if the tax is decided by the local regulator, it is then collected by the central government, which imposes some constraint or retains a little portion of the collected tax, increasing the distortion necessary to achieve the same results than under central regulation. As for the Italian case, the increase in $\lambda$ could represent the tightness imposed by the so-called *Patto di Stabilità e Crescita*.

In this case the fact that the local government owns shares in the firm and is willing to use the revenues coming from them is further justified: the more the shadow costs of public funds are high at local level, the less is the retention rate chosen by the local government.

An other way to see the problem can be adopted from the fiscal federalism literature (Keen and Kotsogiannis, 2004; Wigger and Wharta, 2004). It has been shown that introducing an additional level of government can generate the so-called ‘vertical tax externality’: when the tax power is divided between different levels of government, each of them does not fully take into account the erosion of the tax base of other level when imposing taxes, and the related welfare effects associated with it. In other words, we can imagine that, giving the local government the power to regulate and tax (while some powers should still remain to the central government), the vertical tax externality reduces the tax revenue collected by each level of government, given the presence of the tax base eroding effect of the other level’s taxes. This is why the local government, to collect the same amount of taxes, imposes a greater distortion to the citizens in order to collect the same amount of taxes as the central government. This would not happen when all the regulation and taxation instruments are in the hands of the central government.

Notice that here I abstracted from the horizontal tax externality, which moves in the opposite direction, since I assumed (see Section 3.1) that citizens cannot vote with their feet.

Consider first our environment under complete information. In this case, the increase in

---

7For example, public goods as national defense should still be in the hands of the central planner, and consequently the central government should also impose some kind of taxes to finance it.

8With horizontal externalities the various jurisdictions decrease their tax rates to attract the mobile tax base, and this often leads to a race to the bottom, as each area neglects the harm it does to the others.
\( \lambda \) we have with a local regulator has effect only on \( S'(q_i) = \frac{\beta_i - e_i}{\sigma} \): producing the local public good has an increased cost. On the basis of this result, if we ask if it is better a central or a local regulator (under symmetric information), centralization is justified not only by the possibility of internalizing spillovers mentioned in Proposition 1, but also by the fact that the use of taxation is less distorting than under local regulation. This effect remains unchanged also when asymmetric information is introduced.

However, adding asymmetric information to the model, a different level of \( \lambda \) has now an effect also on the levels of effort and on the distortion for the less efficient firm. To calculate the change imposed by an increase in \( \lambda \) to the marginal disutility of effort at local level, I use total differentiation and obtain:

\[
\frac{\partial L}{\partial \lambda} = -\frac{1}{(1+\lambda)^2} \frac{1+2\mu}{1+\mu} \frac{\nu}{1-\nu} \Phi'(\tau_i) - \frac{1}{(1+\lambda)^2} (1-\alpha)(1-\rho) \frac{\nu}{1-\nu} \Phi'(\tau_i).
\]

Thus, the fact that the shadow costs of public funds are higher at local level decreases the beneficial effect of having a local regulator which is also in the shareholders’ board, and the distance between the effort levels of the inefficient firm’s manager with central and local regulator is diminished (i.e. \( \tau_i^L \) decreases).

### 4 Partisan politicians

Politicians can be biased toward a special group of the population, since it gives them political support. Thus, in this Section I will abstract from the hypothesis that the planner is well-intentioned, assuming that he is interested in the outcome of the electoral process: he can be pro-shareholders or pro-consumers, favouring the group that supports him.

In the present model, consumers in each area are randomly split into two groups: those who are consumers only, and those who also own some shares in the regional firm, in portion \( 1-\alpha \) and \( \alpha \), respectively. Given the fact that part of the population is classified as ‘consumers only’, while another part is also owner of the firm’s shares (so they can benefit also from the shareholders’ utility, \( z_i \)), this can be seen as a way to divide the population between poor and rich, and thus the fact that the government is pro-consumer or pro-shareholder can be seen also as an ideological positioning (i.e. in the left or the right party).

Before the government is elected, the level of (de)centralization of regulation is chosen. Depending whether \( \alpha_i > 1/2 \) or not, the government is committed to govern favouring consumer-shareholders or consumers only, and it will care only about the well-being of the citizens which are represented by the majority.

In Laffont (1996) the same democratic process is assumed, but it is not used -as in the
present model- to compare the different behaviours and outcomes coming from the various levels of government. Laffont introduces the election stage to check whether this affects or not the choice of ownership structure. The influence of partisanship on the decentralization of regulatory functions is instead studied -using the same democratic framework- in Laffont and Pouyet (2003).

4.1 Complete information

Consider first the complete information benchmark under partisan planner, for both the central and the local government. Under symmetric information, pricing discrimination is possible (i.e. the tax payed by the poor citizens is different from that payed by the rich ones). This will be impossible under asymmetric information, because of ex-post incentive compatibility.

In Laffont (1996) it is shown that, under complete information and partisan planner, the solution is the same than under normative analysis (i.e. benevolent planner), except for the fact the citizens in the majority appropriates all the surplus. Moreover, in this context, ownership structure is neutral. In this Section I will demonstrate that similar results are obtained in the present model: the citizens represented by the politician in power capture all the welfare, and the federalist structure (decentralized versus centralized) does not matter.

4.1.1 Central government

I firstly consider partisanship under central informed regulator: for the procedure used to solve the model, see Appendix C.

Pro-shareholder

A pro-shareholder central planner will maximize the weighted sum of the net surplus (internalizing the spillovers) for the portion of ‘rich’ (R) consumers, together with the utility they get from being shareholders of the firm, and the manager’s utility. As for the ‘poor’ (P) citizens, only their participation constraint is considered.

Note that in this case the weight that the central planner gives to the shareholders’ utility $z_i$ is the same as if he is benevolent. This is due to different motivations: in the present case, he uses the weight $\alpha$, because it represents the portion of its electorate he wants to favour (i.e. citizens-shareholders), while in the benevolent planner case this behavior was due to
the fact that he did not want to fully weigh the shareholders’ utility, but at the same time he recognized the importance of this element for part of the population.

\[
\begin{align*}
\text{Max} & \sum_{i=1}^{2} \left\{ \delta \alpha S(q_i) - (1 + \lambda) \alpha (t_i^R + C_i) + \alpha z_i + U_i \right\} \\
\text{s.t.} & \quad (1 - \alpha)V_i = (1 - \alpha) \left[ \delta S(q_i) - (1 + \lambda)(t_i^P + C_i) \right] \geq 0, \\
& \quad U_i = \alpha t_i^R + (1 - \alpha)t_i^P - \psi(e_i) - z_i \geq 0, \\
& \quad z_i \geq 0, \text{ for } i=1,2.
\end{align*}
\]

Maximizing the social welfare function under the participation constraints of the poor citizens, the manager and all the shareholders, I obtain the expected welfare as:

\[
W = \sum_{i=1}^{2} \left\{ \delta \alpha S(q_i) - (1 + \lambda) \left[ (\beta_i - e_i)q_i + \psi(e_i) - (1 - \alpha)z_i - \frac{1 - \alpha}{1 + \lambda} \delta S(q_i) \right] - \lambda \alpha z_i - \lambda U_i \right\}
\]

As a result, the conclusions are very similar to those obtained under normative analysis:

1. No rent to the firms’ managers: \( U_1 = U_2 = 0 \). Thus, \( (1 - \alpha)t_i^P + \alpha t_i^R = \psi(e_i) + z_i \), for \( i = 1,2 \).

2. Marginal utility of effort equal to its marginal cost savings: \( \psi'(e_i) = q_i \iff e_1 = e_2 = e^* \), implying that the effort is equal in the two regions, and attains its optimal level.

3. Marginal utility and marginal costs of the public good are equalized, and spillovers are internalized: \( S'(q_i) = \frac{\beta_i - e_i}{\delta} \).

4. Notice that here the condition for ‘poor’ consumers is satisfied with the binding constraint, while before it was slack, as is it is still for the ‘rich’ consumers (who appropriate all the benefits): this is due to the presence of price discrimination, Thus, \( \delta(1 - \alpha)S(q_i) - (1 + \lambda)(1 - \alpha) [(\beta_i - e_i)q_i + \psi(e_i) + (1 - \alpha)z_i] = 0 \).

**Pro-consumers**

Since the population is composed by citizens which are all consumers (even though different categories of them, that is, rich and poor), the net consumer surplus is fully weighed, as the manager’s utility. Instead, being the politician pro-consumers, the shareholders’ utility
has no weight in the social welfare function, and only their participation constraint will be satisfied. Here price discrimination is not implemented, given that all citizens are consumers.

\[
\begin{align*}
\text{Max} & \quad \sum_{i=1}^{2} \left\{ \delta S(q_i) - (1 + \lambda)(t_i + C_i) + U_i \right\} \\
\text{s.t.} & \quad V_i = \delta S(q_i) - (1 + \lambda)(t_i + C_i) \geq 0, \\
& \quad U_i = \alpha t_i^R + (1 - \alpha)t_i^P - \psi(e_i) - z_i \geq 0, \\
& \quad z_i \geq 0, \text{ for } i=1,2.
\end{align*}
\]

The expected welfare in this case becomes:

\[
W = \sum_{i=1}^{2} \left\{ \delta S(q_i) - (1 + \lambda)[C_i + z_i + \psi(e_i)] - \lambda U_i \right\}
\]

Yielding results which are, as for points 1, 2 and 3, the same as under pro-shareholder central government, and are also the results obtained under benevolent central planner with complete information. Thus, no rent is left to the firm, the levels of effort are optimal and the spillovers are internalized.

The difference here with respect to the solution with a pro-shareholder politician is the fact that price discrimination is not implemented, and the citizens’ participation constraints (for both rich and poor citizens) are slack: \( \delta S(q_i) - (1 + \lambda) [(\beta_i - e_i)q_i + \psi(e_i) + (1 - \alpha)z_i] \geq 0 \). This result is exactly the one obtained under benevolent central planner with complete information.

**Proposition 4.** With a central government, under positive analysis and complete information nothing changes with respect to the normative analysis, except for the fact that with a pro-shareholder planner the rich citizens capture all the welfare.

### 4.1.2 Local government

In case of local government, the regulator will only take into account the well-being of the agents in its region. However, things change slightly in the maximization process, since he is a shareholder as well. Thus, not only \( z_i \) is weighed differently with respect to the central government, but also an additional element representing the local government’s revenue from the dividends is present in the social welfare function.
Pro-shareholder

With a pro-shareholder local government, as in case of central government, the net surplus is taken into account only proportionally to the rich part of the population, and the manager’s utility is fully taken into account. However, shareholders’ utility is fully considered, since the shares not owned by the citizens are property of the local government. Moreover, the value of dividends distributed that is accrued by the government is an additional element in the social welfare function.

\[
\max \quad \alpha S(q_i) - (1 + \lambda)\alpha(t_i^R + C_i) + z_i + U_i + (1 - \alpha)(1 - r)z_i
\]

s.t. \( (1 - \alpha)V_i = (1 - \alpha)\left[\delta S(q_i) - (1 + \lambda)(t_i^P + C_i)\right] \geq 0, \)

\( U_i = \alpha t_i^R + (1 - \alpha)t_i^P - \psi(e_i) - z_i \geq 0, \)

\( z_i \geq 0, \text{ for } i=1,2. \)

This yields to:

\[
W = \alpha S(q_i) - (1 + \lambda)\left[\beta_i - e_i\right]q_i + \psi(e_i) - \frac{1 - \alpha}{1 + \lambda}S(q_i) - \lambda U_i - \lambda z_i + (1 - \alpha)(1 - r)z_i
\]

whose maximization leads to the same results as those obtained with a central planner under symmetric information. Thus, no rent is left to the firm and the transfer are designed so that in each region \( \alpha t_i^R + (1 - \alpha)t_i^P = \psi(e_i) + z_i. \) Moreover, the level of effort is optimal and equates its marginal disutility with its marginal cost savings. The poor citizens’ participation constraint is binding, so that \( \delta(1 - \alpha)S(q_i) - (1 + \lambda)(1 - \alpha)\left[\beta_i - e_i\right]q_i + \psi(e_i) + (1 - \alpha)z_i = 0, \) given that price discrimination in possible. The only difference with respect to the pro-shareholder central regulator is the fact that in the equalization between marginal utility and marginal cost of the public good, spillovers are not internalized.

Nothing changes with respect to the solution obtained under decentralization and benevolent planner; even the retention rate is the same, since the government is a shareholder as well. This is due to the fact that the committment of the local government to the shareholders is visible only in the weight it assigns to the consumers’ net surplus, while the weight given to the shareholders’ utility is the same as if the planner would be benevolent, given the fact that he owns the residual shares not owned by the citizens.
**Pro-consumer**

When the local government is pro-consumer, it fully counts for the consumers’ net surplus (i.e. for both rich and poor citizens) and the manager’s utility, while it ignores completely the shareholders’ utility, as for the central pro-consumers government; nevertheless, being a shareholder as well, the government’s portion of distributed dividends is considered in the social welfare function. The fact that the local government does not include the shareholders’ utility in the social welfare function, even if it takes into account its income from the dividends distributed, is due to the attempt to balance between its commitment toward its voters (i.e. poor citizens) and its position of shareholder in the firm.

\[
\begin{align*}
\text{Max} \quad & S(q_i) - (1 + \lambda)(t_i + C_i) + U_i + (1 - \alpha)(1 - r)z_i \\
\text{s.t.} \quad & V_i = \delta S(q_i) - (1 + \lambda)(t_i + C_i) \geq 0, \\
& U_i = \alpha t_i^R + (1 - \alpha)t_i^P - \psi(e_i) - z_i \geq 0, \\
& z_i \geq 0, \text{ for } i=1,2, \\
& W = S(q_i) - (1 + \lambda)[(\beta_i - e_i)q_i + \psi(e_i) + z_i] - \lambda U_i + (1 - \alpha)(1 - r)z_i
\end{align*}
\]

The results are the same obtained under the benevolent local regulator, since there is no price discrimination (so the participation constraints for both kind of citizens are slack). However, now \( r = 1 - \frac{1 + \lambda}{1 - \alpha} \). Since the government is pro-consumer, the rate at which dividends are distributed decreases with the shares owned by the local government, which is a shareholder. This is again due to the mentioned necessity of the regulator to balance its commitment to voters to that to the shareholders’ board. As a result: \( r_{PC} > r_{PS} = r_B \) (the retention rate under pro-consumer planner is greater than that one under pro-shareholder planner, which is the same as under benevolent planner).

**Proposition 5.** Under the local government, the maximization under symmetric information and partisan planner leads the same results of the benevolent planner setting, so that no inefficiencies are introduced. As in the case of a pro-shareholder central planner, poor citizens are taxed away all their surplus. Moreover, the optimal retention rate under pro-consumer local planner changes, since he has to balance between being a shareholder and being also a leftist politician.

\footnote{Under the assumption that \((1 + \lambda)(1 - \alpha) < 1\).}
4.2 Incomplete information

Assuming that politicians which are in power are elected by citizens which vote for the candidate who represents their own category, different results arise, depending whether the politician is pro-shareholder or pro-consumer. This is due to the fact that political inefficiencies (partisan planner) interact with the economic inefficiencies (asymmetric information on the efficiency parameter of the firm), affecting the distribution of information, and consequently the trade-off between efficiency and rent extraction.

In this Section, as I already mentioned, discriminatory taxes are not feasible, otherwise social welfare maximization would be achieved through the extraction of all the surplus to the minority of the citizens, and the orientation of the political party in power would not entail any effect for the regulatory policy.

The regulator chooses the level of transfers \( t_i(\beta_i(e_i)) \), while the shareholders simultaneously and non cooperatively choose the level of dividends \( z_i(\beta_i(e_i)) \): these are their contractual offers to the firm’s manager. For the procedure used to get the main equations of this extension to the model see Appendices D (asymmetric information, central government) and E (asymmetric information, local government).

4.2.1 Central government

**Pro-shareholder**

A politician who favors shareholders maximizes the net surplus of that part of the population; moreover, the shareholders’ and the manager’s utility are fully weighed.

Now, the planner must solve:

\[
\max_{(\bar{q}_i, \bar{\alpha}_i)} \sum_{i=1}^{2} \left\{ \delta \alpha \left[ \nu S(q_i) + (1 - \nu)S(\bar{q}_i) \right] - (1 + \lambda)\alpha [\nu((\beta_i - e_i)\bar{q}_i + \psi(e_i))] + (1 - \nu)((\beta_i - e_i)\bar{q}_i + \psi(e_i))] - [\alpha \lambda - (1 - \alpha)] \nu \Phi(e_i) \right\}
\]

s.t. \(^{10}\)

\(^{10}\) (19) is binding with \( \mu(1 - \nu) \) as multiplier.
\[
\delta \alpha S(q_i) - (1 + \lambda) \alpha \left[ (\beta_i - \varepsilon_i) q_i + \psi(\varphi_i) \right] \geq \delta \alpha S(\overline{q}_i) - (1 + \lambda) \alpha \left[ (\overline{\beta}_i - \overline{\varepsilon}_i) \overline{q}_i + \psi(\overline{\varphi}_i) \right]
\]

(20)

\[
\frac{\delta \alpha S(\overline{q}_i) - (1 + \lambda) \alpha \left[ (\overline{\beta}_i - \overline{\varepsilon}_i) \overline{q}_i + \psi(\overline{\varphi}_i) \right]}{1 - \nu} \geq 0
\]

(21)

Maximizing expected social welfare I obtain:

1. \( \frac{\partial L}{\partial \overline{q}_i} = 0 : \overline{q}_i = \frac{\overline{\beta}_i - \overline{\varepsilon}_i}{\delta} \iff \overline{q}_i = q^*(\overline{\beta}_i - \overline{\varepsilon}_i) \).

2. \( \frac{\partial L}{\partial q_i} = 0 : q_i = \frac{\beta_i - \varepsilon_i}{\delta} \iff q_i = q^*(\beta_i - \varepsilon_i) \).

3. \( \frac{\partial L}{\partial e_i} = 0 : q_i = \psi'(\varepsilon_i) \iff e_i = e^* \).

4. \( \frac{\partial L}{\partial \varepsilon_i} = 0 : \psi_i'(\varepsilon_i) = q_i - \frac{1}{\alpha(1+\lambda)} \frac{\nu}{1-\nu} \Phi'(\varepsilon_i) + \frac{1-\alpha}{\alpha(1+\lambda)} \frac{\mu}{1-\nu} \Phi'(\varepsilon_i) \iff e^* > e_C^S > e_C^B \).

5. \( \overline{U}_i = \Phi(\overline{\varphi}_i) > 0, \overline{t}_i = \psi(e_i^*) + \overline{z}_i + \Phi(\overline{\varphi}_i) \).

6. \( \overline{U}_i = 0, \overline{t}_i = \psi(\overline{\varphi}_i) + \overline{z}_i \).

As in the case of asymmetric information with a benevolent central politician (see Subsection 3.2.1), the multiprincipal problem induces the first of the two distortions visible at point 4.

Moreover, when the central government is pro-shareholder, only a part of the population appropriates the rent of the firm, and given that price discrimination is not possible, this creates a second kind of distortion, which has a positive sign, since a part of the firm is still owned by the local government. This positive distortion decreases with the strength of the majority (i.e. the higher is \( \alpha \)) and the shadow costs of public funds. Thus, with a pro-shareholder central government, the fact that the local government still owns some shares has a positive effect on the distortionary effect of asymmetric information, protecting somehow the poor citizens from the partisan behavior of the government. Point 4 can also be written as: \( \psi_i'(\varphi_i) = \overline{q}_i - \frac{\lambda}{\alpha(1+\lambda)} \frac{\nu}{1-\nu} \left[ \alpha - \frac{1-\alpha}{\lambda} \right] \Phi'(\varphi_i) - \frac{\lambda}{1+\lambda} \frac{\mu}{1-\nu} \Phi'(\varphi_i) \). Now is more apparent that the distortion is a combination of the multiprincipal problem, together with the impossibility of implementing price discrimination, as in Laffont (1996).

Notice that the distortion of effort for the inefficient firm is less than that one under benevolent planner, given that the government is pro-shareholder: this fact mitigates the multiprincipal problem, since the government (partly) works in the same direction of the shareholders.
**Pro-consumer**

The planner in this case favors all the citizens, but completely avoids to account for the shareholders’ utility. So he must solve:

$$\max_{(\tilde{q}, \tilde{e})} \sum_{i=1}^{2} \left\{ \delta \left[ \nu S(q_i) + (1 - \nu)S(\tilde{q}_i) \right] - (1 + \lambda)\nu((\beta_i - e_i)q_i + \psi(e_i)) + (1 - \nu)((\beta_i - \tilde{e}_i)\tilde{q}_i + \psi(\tilde{e}_i)) - \lambda \nu \Phi(\tilde{e}_i) \right\} \tag{22}$$

s.t.\(^{11}\):

$$\delta S(q_i) - (1 + \lambda)\left[ (\beta_i - e_i)q_i + \psi(e_i) \right] \geq \delta S(\tilde{q}_i) - (1 + \lambda)\left[ (\beta_i - \tilde{e}_i)\tilde{q}_i + \psi(\tilde{e}_i) \right] \tag{23}$$

$$\delta S(\tilde{q}_i) - (1 + \lambda)\left[ (\beta_i - \tilde{e}_i)\tilde{q}_i + \psi(\tilde{e}_i) \right] - \frac{\nu(1 + 2\lambda)}{1 - \nu} \Phi(\tilde{e}_i) \geq 0 \tag{24}$$

Yielding:

1. \(\frac{\partial L}{\partial q_i} = 0 : \frac{S'(q_i)}{1 + \lambda} = \beta_i - e_i \iff q_i = q^*(\beta_i - e_i).\)

2. \(\frac{\partial L}{\partial q_i} = 0 : \frac{S'(q_i)}{1 + \lambda} = \beta_i - e_i \iff q_i = q^*(\beta_i - e_i).\)

3. \(\frac{\partial L}{\partial e_i} = 0 : q_i = \psi'(e_i) \iff e_i = e^*.\)

4. \(\frac{\partial L}{\partial e_i} = 0 : \psi'(e_i) = q_i = \frac{\frac{\lambda(1 + 2\mu)}{1 + \lambda(1 + \mu)} + \nu}{1 - \nu} \Phi'(\tilde{e}_i) - \frac{\mu}{1 + \lambda} \Phi'(\tilde{e}_i) \iff e^* > e^C_P > e^C_B > e^C_{PC}.\)

5. \(U_i = \Phi(\tilde{e}_i) > 0, \quad t_i = \psi(e^*_i) + z_i + \Phi(\tilde{e}_i).\)

6. \(U_i = 0, \quad t_i = \psi(e^*_i) + z_i.\)

In this case, the second element of distortion at point 4 is due to the fact that the effort of the manager is reduced if the government does not take into account the effect that the shareholders’ no shut down condition has on the manager’s utility; notice that this element is also present in the basic model for the central government, but is weighed by \((1 - \alpha)\), since the government in that case gives a (reduced) weight to the shareholder’s utility (equal to \(\alpha\))

\(^{11}\)(22) is binding with \(\mu(1 - \nu)\) as multiplier.
in his social welfare function, while now its weight in the social welfare function is equal to 
zero (so the distortion’s weight is one).

As a result, the level of effort for the inefficient firm’s manager is even lower than under 
benevolent planner. Given that the government ignores completely the shareholders’ utility, 
this exacerbates the multiprincipal problem: central regulator and shareholders’ board move in 
opposite directions when giving the incentives, and this increases the measure of the 
distortion.

Thus, even if the government tries to favour its citizens by ignoring the shareholders’ 
utility, the fact that it does not consider the system as a whole results in lower incentives for 
the manager and lower level of effort than under benevolent planner.

**Proposition 6.** Under central partisan planner and asymmetric information, the level 
of effort is further downward distorted if the politician is pro-consumer, while the distortion 
is mitigated when he is pro-shareholder. This is due to the fact that, while under benevolent 
planner the no shut-down condition imposed by the shareholders in weighed only for their 
voting portion in the population ($\alpha$), now the partisan planner oscillates between no weight 
(when pro-consumer) and full weigh (when pro-shareholder) to their utility.

4.2.2 Local government

**Pro-shareholder**

Recalling that the local government cannot internalize the spillovers but it is a shareholder 
as well, the planner must now solve:

$$
\max_{(q_i, \bar{q}_i)} \left[ \nu S(q_i) + (1 - \nu)S(\bar{q}_i) \right] - (1 + \lambda)\alpha \left[ \nu ((\beta_i - e_i)q_i + \psi(e_i)) + 
(1 - \nu)((\beta_i - \bar{e}_i)\bar{q}_i + \psi(\bar{e}_i)) \right] - [\alpha \lambda - (1 - \alpha)] \nu \Phi(e_i) 
$$

s.t. $^{12}$

$$
\alpha S(q_i) - (1 + \lambda)\alpha \left[ (\beta_i - e_i)q_i + \psi(e_i) \right] \geq \alpha S(\bar{q}_i) - (1 + \lambda)\alpha \left[ (\beta_i - \bar{e}_i)\bar{q}_i + \psi(\bar{e}_i) \right] 
$$

$^{12}$(25) is binding with $\mu(1 - \nu)$ as multiplier.
\[ \alpha S(\bar{q}_i) - (1 + \lambda) \alpha \left[ (\beta_i - \bar{e}_i)\bar{q}_i + \psi(\bar{e}_i) \right] + \frac{\nu(1 - \alpha)(1 - r)}{1 - \nu} \Phi(\bar{e}_i) \geq 0 \] 

(27)

The solution of the maximization problem leads to the following results:

1. \[ \frac{\partial L}{\partial q_i} = 0 : \frac{S'(q_i)}{1 + \lambda} = \beta_i - e_i \Leftrightarrow q_i = q^*(\beta_i - e_i). \]

2. \[ \frac{\partial L}{\partial q_i} = 0 : \frac{S'(q_i)}{1 + \lambda} = \beta_i - e_i \Leftrightarrow q_i = q^*(\beta_i - e_i). \]

3. \[ \frac{\partial L}{\partial e_i} = 0 : q_i = \psi'(e_i) \Leftrightarrow e_i = e^*. \]

4. \[ \frac{\partial L}{\partial e_i} = 0 : q_i = \psi'(e_i) \Leftrightarrow e_i = e^*. \]

Looking at the result 4, the second element on the right hand side is the distortion in Laffont (1996): it is generated by the government’s inability to use price discrimination. In this case there is also an additional weight \( \frac{1}{\alpha(1+\mu)} \), which represents the importance of the satisfaction of the aggregate veto constraint for the shareholders.

However, in the occurrence case the distortion also depends on the presence of the aggregate veto constraint, given the presence of a multiprincipal problem, which was absent in Laffont’s model. The third element on the right hand side, which mitigates the distortion, measures the effect on the aggregate veto constraint of the fact that the local government is also a shareholder: recall that the local government is not only a regulator, but also a member of the shareholders’ board in the firm, whose power depends on the shares owned.

Thus, when he maximizes, his objectives are not so much at odds with those of shareholders (in the present case he is also pro-shareholder by election), and this helps to solve, at least partly, the multiprincipal problem.

However, given that the government is pro-shareholder, \( \alpha \in [1/2; 1] \), meaning that the shareholders’ board is dominated by citizens-shareholders (who also voted for the present local government), so the government has the minoritarian portion of shares, and this beneficial effect is not so high.

Now the level of effort is higher with respect to the benevolent framework, since price discrimination is not possible, but the fact that the regulator is a pro-shareholder dampens this problem, since he acts in the same direction as the shareholders, so the fact that there
are two principals is not such an issue, as long as the two have similar objectives. Notice that
the mitigation of the multiprincipal problem due to the presence of the local government in
the shareholders’ board is not so high, and is maximum when the portion of shares owned by
the government converges to the portion of those to the citizens (i.e. the other shareholders
are not so powerful with respect to the local shareholders in managing the firm).

The retention rate is now
\[ r = 2 - \frac{\alpha}{1 - \alpha} \lambda \]
notice that this is reasonable, since the
government is pro-shareholder (thus, \( \alpha > \frac{1}{2} \)) and the second element on the right hand side
is always greater than one.

**Pro-consumers**

The pro-consumer local planner must solve:

\[
\max_{(q_i, \bar{e}_i)} \nu S(q_i) + (1 - \nu) S(\bar{q}_i) - (1 + \lambda) [\nu((\beta_i - e_i)q_i + \psi(e_i)) + \\
+ (1 - \nu)((\bar{\beta}_i - \bar{e}_i)\bar{q}_i + \psi(\bar{e}_i))] - \lambda \nu \Phi(\bar{e}_i) 
\]

(28)

s.t.\(^{14}\).

\[
S(q_i) - (1 + \lambda) [(\beta_i - e_i)q_i + \psi(e_i)] \geq S(\bar{q}_i) - (1 + \lambda) [(\beta_i - \bar{e}_i)\bar{q}_i + \psi(\bar{e}_i)] 
\]

(29)

\[
S(\bar{q}_i) - (1 + \lambda) [(\beta_i - \bar{e}_i)\bar{q}_i + \psi(\bar{e}_i)] - \frac{\nu(1 + 2\lambda)}{1 - \nu} \Phi(\bar{e}_i) + (1 - \alpha)(1 - r) \frac{\nu}{1 - \nu} \Phi(\bar{e}_i) \geq 0 
\]

(30)

yielding:

1. \( \frac{\partial L}{\partial \bar{q}_i} = 0 : \frac{S'(\bar{q}_i)}{1 + \lambda} = \beta_i - \bar{e}_i \iff \bar{q}_i = \bar{q}^*(\beta_i - \bar{e}_i). \)

2. \( \frac{\partial L}{\partial q_i} = 0 : \frac{S'(q_i)}{1 + \lambda} = \beta_i - e_i \iff q_i = q^*(\beta_i - e_i). \)

3. \( \frac{\partial L}{\partial e_i} = 0 : \phi_i = \psi'(e_i) \iff e_i = e^*. \)

\(^{13}\)Under the condition that \( \lambda \leq \frac{\alpha}{1 - \alpha} \).

\(^{14}\)(28) is binding with \( \mu(1 - \nu) \) as multiplier.
4. \( \frac{\partial L}{\partial e_i} = 0 \): 
\[ \psi'_i(e_i) = q_i - \lambda (1+2\mu) \frac{\nu}{1+\mu} \Phi'(e_i) - \frac{\nu}{1+\mu} \mu \psi'(e_i) \iff e^*_L > e^P_L > e^B_L. \]

5. \( U_i = \Phi(e_i) > 0, \quad t_i = \psi(e^*_i) + z_i + \Phi(e_i). \]

6. \( U_i = 0, \quad t = \psi(e_i) + z_i. \)

The level of effort obtained is even lower than under benevolent planner: given that the local government has the majority of shares, it can take the decision without taking into account the incentives of the rest of the board. So, if on one hand this allows access to information and less contrast with the shareholders’ objectives, on the other hand the government is leftist, and has objectives (e.g. redistribution) which are different from those of the shareholders, creating a greater conflict than with benevolent planner.

Now the retention rate the local government would choose is \( r = 1 \): given that as a leftist politician the local planner ignores the utility of the shareholders, he also decides as a shareholder that is better not to distribute dividends. Even though this prediction seems quite strong, it could be explained by the fact that the local government, when trying to balance between the commitment to his voters and that one to the shareholders’ board, prefers the first one, since the distribution of dividends can be seen as a behavior signalling disloyality to the electoral mandate from the poor citizens’ point of view.

In other words, being the citizens-shareholders the majority in the shareholder board, they will vote for a level of \( r \) which is lower than one. However, it can be predicted that the value of the expected distributed dividends when the government is leftist are less than under right government, since it would be the result of an attempt to balance between the local government’s desired retention rate and the one the private shareholders would prefer.

**Proposition 7.** Under asymmetric information and local partisan planner, the effort is further downward distorted for both the pro-consumer and the pro-shareholder planner. In the latter case, the direction of the distortion is opposite with respect to the central pro-shareholder regulator, and is due to the fact that the local government is a shareholder as well, but cannot use price discrimination.

The fact that the incentive scheme is less powerful under pro-consumer planner, is the result obtained also in Laffont (1996): he highlights the fact that moving from the left to the right party, incentives strengthens and the level of effort increases.

Note that the result that the effort with a centralized regulator is upward/downward distorted with respect to its utilitarian level when the regulator is pro-shareholder/consumer.
is in line with the findings in Laffont and Pouyet (2003). However, in the model by Laffont and Pouyet the competition between politicians when regulation is decentralized (due to the fact that there is a unique firm producing for both regions) avoids the fluctuations, so the level of effort under local regulators is the same, whatever is the party in power. In contrast, in my model there is no regulatory competition, given that each region has its own firm operating on its territory. The direction of the distortion in the levels of effort due to the introduction of an electoral stage is the same that under centralization, but it is somehow magnified or reduced (depending on the case\textsuperscript{15}) with respect to the central level by the fact that the local regulator is a shareholder as well, so he has a kind of ‘double personal agenda’ (one as a politician committed to its voters and one as a member of the shareholders’ board).

4.3 Political alignment between central and local level

Up to now I have assumed not only that the center and the regions do not communicate nor share any information, but I have also abstracted from the possibility that they do not have the same political party in power (or assumed that this have no consequences).

Here, on the contrary, I introduce a sort of political competition between the local and the central government: we can expect that the fact that the political party in power at local level is the same as the one at central level (or vice versa) has a positive (negative) effect on the shadow costs of public funds.

Suppose that the level of $\lambda$ taken in consideration in the previous Section is the one attained when it is assumed that the political alignment/disalignment between the center and the periphery has no consequences. Then, I assume that an increase (decrease) of the level of the shadow costs of public funds $\lambda$ is due to the mentioned political disalignment (alignment): this can be justified not only in terms of compatibility between levels of government due to common ideology, agenda and political programme, but also in a higher easiness -for example- for the two levels to come to agreements, or for the local government to get additional funds.

To see which would be the final direction of the distortion due to an increase (decrease) of $\lambda$, I will differentiate with respect to it the results obtained in the Section on partisan planners which can be affected by a change in the value of the social costs of public funds.

For any level of decentralization and any political party in power, points 1 and 2 of the solution (i.e. related to the marginal utility of the public good’s production for both

\textsuperscript{15}It is easy to show that $e^* > e_L^{PS} > e_C^{PS} > e_L^B > e_C^B > e_C^{PC} > e_L^{PC}$. 

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the efficient and inefficient firm’s cases) are always negatively (positively) distorted by an increase (decrease) of λ: \( \frac{\partial L}{\partial \lambda} = \beta - e_i \).

As for point 4, the components of the distortion of the marginal disutility of effort for the inefficient firm with respect to its optimal level are different and go in different directions, requiring to analyze them case by case.

With central and pro-shareholder planner,
\[
\frac{\partial L}{\partial \lambda} = \frac{1}{(1+\lambda)^2} \frac{1+2\mu}{1+\mu} \frac{\nu}{1-\nu} \Phi'(\overline{e}_i) - \frac{1}{(1+\lambda)^2} \frac{1-\alpha}{\alpha} \frac{\nu}{1-\nu} \Phi'(\overline{e}_i),
\]

while when the central planner is pro-consumer,
\[
\frac{\partial L}{\partial \lambda} = \frac{1}{(1+\lambda)^2} \frac{1+2\mu}{1+\mu} \frac{\nu}{1-\nu} \Phi'(\overline{e}_i) + \frac{1}{(1+\lambda)^2} \frac{\mu}{1+\mu} \frac{\nu}{1-\nu} \Phi'(\overline{e}_i).
\]

Thus, an increase in the shadow costs of public funds has an effect which can be decomposed into two parts. The first one is common among political parties and has the same (negative) intensity: an increase in \( \lambda \) increments the distortion imposed by the presence of the multiprincipal problem. The second component reinforces (mitigates) the negative effect of an increase in \( \lambda \), depending whether the politician is pro-shareholder or pro-consumer. The negative effect under pro-shareholder planner is due to the fact that the protection of poor citizens provided by the residual shares not owned by the voters comes at an increasing cost (since price discrimination is not possible), while the positive effect under pro-consumer planner is due to the fact that, as \( \lambda \) increases, the regulator perceives that ignoring the shareholders’ no shut-down condition can have bad consequences on the multiprincipal problem. Naturally, the directions of the distortions due to a decrease in the shadow costs of public funds would be of opposite sign and equal intensity.

Under local pro-shareholder and pro-consumer politicians, the variations due to an increase in \( \lambda \) are, respectively,
\[
\frac{\partial L}{\partial \lambda} = \frac{1}{(1+\lambda)^2} \frac{1+2\mu}{1+\mu} \frac{\nu}{1-\nu} \Phi'(\overline{e}_i) - \frac{1}{(1+\lambda)^2} \frac{1-\alpha}{\alpha} \frac{\nu}{1-\nu} \Phi'(\overline{e}_i) - \frac{1}{(1+\lambda)^2} \frac{(1-\alpha)(1-\nu)}{1+\mu} \frac{\mu}{1-\nu} \Phi'(\overline{e}_i)
\]

and
\[
\frac{\partial L}{\partial \lambda} = \frac{1}{(1+\lambda)^2} \frac{1+2\mu}{1+\mu} \frac{\nu}{1-\nu} \Phi'(\overline{e}_i) - \frac{1}{(1+\lambda)^2} \frac{1-\alpha}{\alpha} \frac{\nu}{1-\nu} \Phi'(\overline{e}_i) - \frac{1}{(1+\lambda)^2} \frac{(1-\alpha)(1-\nu)}{1+\mu} \frac{\mu}{1-\nu} \Phi'(\overline{e}_i).
\]

In the pro-shareholder regulator case, the second component represents the fact that the impossibility of making price discrimination comes at an increasing cost when the shadow costs of public funds increment, while the first and the second components should be put together to represent the growing cost of the multiprincipal problem, worsened by the fact that the more is costly to make transfers to the firm, the higher would have to be the shares to the local government. In the pro-consumer regulator case, the first part is the one related to the multiprincipal problem, while the last two represent the fact that a positive effect can be obtained when not all the shares are owned by the local government—which has objectives opposed to the shareholders- so that the multiprincipal conflict is mitigated, and this comes
at a higher cost when $\lambda$ is high.

5 Conclusions

This study is motivated by the presence -all over the world- of the phenomenon of reluctant privatization, which in many cases has a mainly local display. Even if this anomaly that characterizes many local governments in Italy and Europe has been subject to many studies, none of them has still tried to model what this would imply for the choice of the optimal regulatory rule, nor for the vertical allocation of regulatory tasks among levels of government.

In the present model I attempted to fill this missing point in the literature, using a methodology which demonstrates how asymmetric information interacts not only with political inefficiencies, but also with the level of decentralization, providing some insights on a problem which is still at the center of the academic debate.

The research agenda in this line of research is still rich: other formalizations on the regulatory problems can be added, as well as the problem of cross-subsidization between firms (and consequently, between jurisdictions). Other levels of government could be introduced, and the ownership of some shares by the central government could be hypothesized. More than just two groups of citizens can be taken into consideration, in order to generalize the results, and the introduction of re-election constraints and the reputational effects can show how the problem would change in a dynamic environment.

References


