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DEPARTAMENTO DE ECONOMIA

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some very preliminary considerations

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IMPLEMENTATION OF ANTI-CORRUPTION REFORMS

SOME PRELIMINARY CONSIDERATIONS[1]

*"New lessons: politics
and the art of taking (...)
New lessons: politics
and the art of giving"*

The Triumph of Politics, David Stockman

Martin Besfamille[2]
June 14, 1996

[1] I am extremely grateful to Jean Tirole for his intellectual advice and cordiality. I also thank Patrick Rey for his initial encouragement. I benefited from the numerous helpful discussions I had with Doh-Shin Jeon. Finally I do not want to forget Tony Carboni and Joseph Grifone because their factual and technical comments mark the retained formalization. Of course, errors remain my own. Financial support from the Université des Sciences Sociales de Toulouse is gratefully acknowledged.
[2] ENSAE (Paris) and Université des Sciences Sociales de Toulouse.

I Introduction

I.1 Two general problems of economic reforms

When a society realizes that a great (or not so great!) economic reform must be done, some problems for its practical implementation emerge. Two of them are very important: the resistances which emerge facing the reform and its possible time-inconsistency.

In most of the cases, some of the problem's causes that make the reform necessary are tied to the welfare of a particular group of people. Henceforth, if the reform is undertaken, their welfare will fall. It is not surprising then to observe that, when the decision towards the reform is made explicit, the concerned groups do not accept easily the reform. Moreover, the future losers start to exert a pressure on those who have the legal power to accept or refuse the reform. Their objective is clear: delay it or simply abort the intent.

It is important to note that this simple idea applies to a large sample of institutional frameworks. There are many examples of these reactions not only under authoritarian governments but also in open democratic societies. Under the first type of governments, the pressure is exerted on the ruling group (this is the reason why it is commonly said that the pressures may be exerted in an easier way). On the other hand, in democratic countries, the Parliament is constantly harassed by pressure groups.

Various economists have presented theoretical and empirical evidence of this reactionary behavior[1]. Olson (1966, 1982) is perhaps the most known in considering this problem a possible explanation of the economic difficulties in many countries. Against the usual approach of most economists, which try to explain economic problems as the unemployment or the stagflation with a quantitative view, Olson tries to apply a unifying and more fundamental theory. Its explicative variable is the influence of the lobbies and its effects on the incentives structure. The basic argument is that in stable democratic societies, the number and the power of small interest groups (*ie.* which pursue very specific interests) increase. Therefore, the social decisional process is slowed. The reason for that has to be founded on what he calls the "logic of the collective action". In a static vision, the more specific is the interest of a particular lobby, the higher probabilities it has to prevail over the general interests (which are more diffuse and generate less incentives to defend them). Therefore an inefficiency appears. But with the increase of the democratic rules' practice, the power of groups is increasing. At the same time, the public regulations are more complex calling for a bigger necessity of new pressure groups. Hence the decisional process is slowed. Moreover, this logic applied in a dynamic view results in the following counterpart of the static inefficiency: *"the distributional coalitions retard the society's capacity to adopt new technologies and reallocate the resources in response to changing conditions..."* (Olson, 1982).
The results that Thurow (1980) describes are less general. He restricts his analysis to the specificity of this behavior facing the great reforms that, in his opinion, the American economy needs. Nevertheless he also offers a convenient framework for our modeling because he accepts the fact that the causes of the problems can be (and are) identified. But, as we have said above, almost all the economic problems have a common characteristic: their

[1] We have to quote that other social scientists have analyzed this phenomena. For instance, in France Michel Crozier (1970) was the first to speak about a "blocked society".

solution *"require that a big group should tolerate a huge reduction in his welfare."* (Thurow, 1980). The problem is that *"no group wants to be the one to suffer the economic loses that are for the general welfare"* (Thurow, 1980).

The second problem of the implementation concerns the possibility of dynamic inconsistency of the reforms. As Kydland and Prescott (1977) point in their seminal article, a government who initially engages in an optimal sequence of politics may prefer to deviate out of the optimal path as the time goes on. In that sense they say that the optimal path of politics is not time-consistent. This strange property of the optimal path leaves the decision maker in a weak position because its commitment to follow it is not credible. So when a government face, for example, an election or an exogenous macroeconomic shock it may perfectly happen that, because of its time-inconsistency, it can not implement the optimal response.
This problem is very hard to overcome because the design of a time-consistent path of politics must follow the Bellman's Principle of Optimality. It is already very difficult to handle in discrete models. But the complexity increases in time-continuous models. As Cohen and Michel (1988) show, the only time-consistent path of politics, solution to the respective Hamilton-Jacobi-Bellman equation[2] that they were able to compute was a linear and stationary feed-back policy. Empirically, the time-inconsistency of different policies has been widely tested. An interesting example is described in Gadano and Galiani (1994). When, only because of fiscal needs, a government decides, the privatization of a public utility a problem of time-inconsistency may appear. In fact, the optimal way to sell it at a high optimal value is by ensuring the buyer a monopoly power. But, in next periods, this policy is obviously not optimal any more, so time-inconsistent.

A very interesting theoretical problem is the analysis of the design of a reform which, in a democratic institutional context, performs the above two issues; that is to obtain the implementation of a time-consistent reform.
If we concentrate only on the first part of this general objective, we can find recent examples in the economic literature. The basic contribution is Dewatripont and Roland (1992). They examine, under two different voting rules, the impact of political constraints on economic reform plans (specifically the transition of a centrally planned economy to a free market one). The tricky fact is that, in order to obtain the reform's approval under asymmetric information, the decision-maker has to leave some rents to the agents. Henceforth the successful reforms have extra costs for its implementation. In that sense, the trade-off between the search for the allocative efficiency and the rent extraction can generates a desired gradualism because the full reform costs too much. We must point out that this result confirms the pertinence of the "gradualism *versus* shock" debate of macroeconomics stabilization programs. But the obtained possible delay is of a different nature: it does not arise because of the eventual costs of the impact of the reform (which are not formalized in the Dewatripont and Roland's framework) but as a result of the cost of the leaving rents necessary to obtain the approval.

Concerning the achievement of the two joint objectives, there is no well-known example in the economic literature. Dewatripont and Roland (1992) verify the time-consistency of their reform plans but in an exogenous way. In fact, they impose two assumptions to ensure this desired result. First, the reform has a certain technical irreversibility: once engaged, the government can not come back. In that sense, there is no problem of commitment credibility. Then, by a behavior's hypothesis (the authors assume *"that individuals cannot "threaten" to*

[2] The Hamilton-Jacobi-Bellman is the partial-differential equation that ensures the Bellman's Principle in time-continuous models.

deviate from weakly dominant strategies in the future in order to obtain better deals from the Government") the time-consistency is reached on the agent's side.

I.2 The implementation of an anti-corruption reform

Surely, one of the most important practical applications of the theoretical results and normative propositions of all this cited literature should be the design of credible and implementable anti-corruption reforms.

In fact, since the beginning of *Mani pulite*, the Italian process against the cases of political and business corruption, this issue has become one of the urgencies of the nineties. In an special issue dedicated to this subject, *Business Week* (1995) shows that the phenomenon is widespread all over the world and does not respect any kind of barriers. Occidental countries and Asian NIC's, under democratic or military regimes, governed by left or right ideological bureaucracies have this problem although in different levels and forms. What strikes a lot is the discovery's speed about bribe's scandals and the importance of some anti-corruption campaigns. Again *Business Week* (1995) points that *"from that first case of Tangentopoli* (Mario Chiesa's, the midlelevel Socialist Party hack, was arrested in 1991), *Italia's anti-corruption magistrates have gone to arrest more than 1300 top businessmen, civil servants and politicians"*. Nevertheless, the levels of illegal transfers is what it retains more the attention for the public opinion: for example, former South Korea's President Roh Tae Woo is at the moment accused of bribery for an amount of \$369 million[3].

When different countries face the same serious problem, the need for global change is proclaimed. But, a question to answer is about the nature of the optimal changes. Should the power of the legal authorities be stronger in order to make the control more effective? Or alternatively should the economic and political institutions change in order to make the corruption activities most costly? A wise plan might consider the two possibilities. But more wise is to try to answer why corruption is so widespread.
The economic approach to the political science has some hints for an answer: corruption arises when there exists a fuzzy relation between the State and the private sector. When this happens, the confusion between the general and particular interests can lead to bribery. In the classical economic theory, those facts were poorly studied because governments were formalized as benevolent. In spite of this, and continuing the marxian view about the control of political institutions by the big business, several authors (which can be roughly classified as members of the "Chicago" or the "Public Choice" school) have stressed the need to depart from a benevolent paradigm for the explanation of the behavior of social decision-makers[4]. In fact, these authors argue that the social decision-makers follow the same utilitary interests as the private agents (like consumers or producers) do. If, within the economic models of the governmental decisions, civil servants are endowed with an objective function with the same arguments that neoclassical utility or profit functions have, the door is open to explain the official's bribery as a "rent seeking" behavior.

[3] Cross-sectional countries comparisons on the amount of the bribes should be, in a sense, "deflated" by a wealth indicator to take in account the following fact: there is a logical correlation between GNP and the possible amounts of bribes. Even so, the cited amount for an unique person is astonishing.
[4] One of the most conspicuous members of the "Chicago school" says: *"This failure of theories of benevolent government induced economists to join political scientists in searching for alternative ways to analyze actual government behavior"* (Becker, 1985).

In his survey about the rent seeking literature, Tollison (1982) first presents the terminological problem that arises around this expression. The difference between a "rent seeking" and "profit seeking" behavior lies on the different origins of these rents. Formally, rents can emerge from two sources: the normal working of the price system (which generates, by shifts in demand and supply curves of all marketable goods, different returns in excess of a resource owner's opportunity cost) and an artificial creation. The last can occur when, following the idea that Krueger's (1974) paper offers to the economic profession, governments restrict the economic activity, distorting the normal adjustment of the price system. But this fact does not impede that people try to compete for the these contrived transfers. Thus, *"the problem of income transfers is...that they lead people to employ resources in attempting to obtain or prevent such transfers"* says Tullock (1967). In other words, *"rent seeking is the expenditure of scarce resources to capture an artificially created transfer"* (Tollison (1982)). *"Sometimes such competition is perfectly legal. In another instances, rent seeking takes other forms, such as bribery, corruption, smuggling and black markets"* (Krueger (1974)).

In order to generalize and systematize all possible behaviors involved in this phenomena, Bhagwati's (1982) principal contribution was to broadly define the "directly unproductive, profit-seeking (DUP) activities": *"they represent ways of making a profit...by undertaking activities which are directly unproductive; that is, they yield pecuniary returns but do not produce goods or services that enter a utility function directly or indirectly via increased production or availability to the economy of goods that enter a utility function"*. His definition and the study of four categories of DUP activities (depending on the distorted quality of the initial and the final state of the world) embraces all the possible cases, including those that Krueger had in mind when she introduced the term "rent seeking" to economics.

But, as Laffont and Tirole (1993) point when they begin their presentation of the threat of regulatory capture, all these contributions suffer from two methodological limitations. First of all, by ignoring informational asymmetries there is no logic way to accept the emergence of the rents that the lobbies want to compete for. Secondly, the summarized contributions do not account for the agency problems inside the government acceptance-side (acceptance of bribes, of course). Thereafter, the incentive and contracting theory framework has become the technical support to analyze the impact of the interest groups behavior and the reforms' design against it[5]. What Laffont and Tirole do is to formalize, in a three-tier hierarchy (Congress, regulatory agency and regulated firm), the regulator's discretion as the possibility to hide a piece of hard information about the real type of the regulated monopoly[6]. In some states of the nature, the firm has a stake of corruption: she is disposed to pay up to the difference in rents that she would enjoy if the regulators misreport the true type. By an application of the "collusion-proofness principle"[7], they found the optimal regulation that integrates the need to compensate the regulator to induce truthful revelation of the information he receives.

The two kind of studied reforms we retain here, treated within the same conceptual framework cited just above, have the same common goal: make more difficult the corruption. The first kind of reform ensues from the general model presented by Tirole (1986): if we suppose a situation where the collusion prevails, the above mentioned principle advocates to

[5] It is interesting to note that the literature uses the term "collusion" instead of "corruption" even if they designate the same kind of organizational deviation.

[6] This formalization is an application of the general model presented in Tirole (1986).

[7] This principle, derived in Tirole (1986) says that under some conditions, there is no loss of generality in restraining the analysis to the design of organizations which do not leave scope for collusion.

the need of increasing the salary of the supervisor in order to prevent the collusion[8]. More subtlety, Laffont and Martimort (1996) propose, against the threat of corruption, a reorganization of the prevailing administrative institutions: the separation of regulators. By endowing them with a completely separate technology of information, the Nash behavior of each regulator (*ie.* as a consequence of the fact that when they decide how to report their information, they do not know what is the information the other regulator has) enables the principal to relax the collusion-proof constraint. So the welfare increases.

Although these reforms show theoretically the possibility to beat the threat of corruption, they do not respond to the principal question that motivates our research: how ensure that the proposal of these optimal reforms can pass through, for example, the pertinent institutional body that has the power to accept or refuse it? The fact is simple: as Olson and Thurow have shown, resistances to the reform will emerge. Concretely, the corrupts will try to bribe the people to refuse the reform so as to do not lose the rents of corruption. The design of the reform has to take in account this fact. Moreover, it has to anticipate the possibility of time-inconsistency. Then, our theoretical challenge is to try to formalize this ideas.

I.3 A general description of the retained modelization

The purpose of this paper is to present a simple model to go forward in the study of this complex but exciting real and theoretical problem. To achieve this goal, we adopt the methodology of the economic analysis of the political economy: the application of the economic model of individual behavior to other areas than on market interactions. Because we formalize a process where the agents take decisions concerning their (equivalent monetary) revenues, we believe that this utilitarian and rationalist paradigm can be well applied.

The retained country has democratic institutions. It bears a generalized corruption situation in the public administration. We must already make two important comments. First, we are not interested in the rationalization of the corruption. Therefore, the existence of such situation is exogenous to the model. Second, in this first approximation to the problem, even if this corrupt situation is *vox populi*, we do not integrate a judicial institution that controls the legality of the civil servant's behavior. In order to delimit the problem, we concentrate in the interaction of two institutional actors: the social decision maker (from now on, the President) and the Parliament.

The President proposes bills to the Congress. These bills can be institutional reforms. In fact, by constitutional attribution, the President can propose changes to the organigram or attributions of the public administration or even the Congress. Of course, they must be accepted.

We assume the Congress with the following attributions:
a) It holds a particular discretionary power, for example to judge the convenience of the realization of public projects or to implement a sectorial economic policy. Therefore, he is under the pressure of the pertinent lobbies. The description of these mechanisms (approval of special projects and the lobbies' pressure) will allow us to evaluate the rent's amounts. These computations are necessary to the posterior positive and normative reform's analysis.

[8] Surprisingly, Carrillo (1996) shows that, under some conditions about the agent's career-concerns, in a three-tier hierarchy the classic measure to increase salaries can lead to...more corruption!

b) It only has the power to accept or refuse the bill. We do not formalize a veto power for the President.
These assumptions deeply simplify the formalization: because the representatives are the corrupt agents, they are those who need to be compensated.

The timing of the model is as follows

• The situation of generalized corruption generates a particular distribution of rents, which the lobbies and the representatives enjoy.

• The President decides to implement an anti-corruption reform.

• The Congress votes the presidential bill.

• The new institutional framework eliminates or redistributes the former rents of corruption.

The first stage of this model is characterized, as we have already said, by a situation of generalized corruption within the Parliament. We formalize this stage in an atemporal way: as it yields the same distribution of rents per period, we can focus on a single-period analysis.

The second stage represents the decision and the design of the desired anti-corruption reform. We formalize the President as the *agenda-setter* models do. Moreover, we assume that:

a) The decision to fight the corruption is also taken in an exogenous way.
We can find two kind of arguments for this hypothesis. The first is a pure methodological one. Not only it simplifies the formalization but it allows us to concentrate only on the implementation issues. The second kind of argument lies on more realistic political considerations of countries under the explicit pressures of international organizations or other countries. During bilateral commercial negotiations between the USA and Latin American countries, the first sometimes conditions their imports levels from the last countries on the evidence of explicit fighting against corruption there. The explanation is simple: in that way they defend the interests of US companies. The reason is that the firms installed in such countries (where bribery is a generalized strategy to obtain, for example, public contracts) are economically penalized. In fact, because of the severity of American anti-corruption laws (which punish bribery even abroad), they have hard incentives to not corrupt. Therefore, they have lower probabilities to obtain public procurement contracts.
Another kind of implicit pressure comes from the biggest consulting companies. Because the emerging countries are strongly dependent on foreign investments, they make hard efforts to obtain a low risk qualification. But the corruption (related to the level of predictability and the reliability of the legal framework system, an issue so important to investors) causes a high risk qualification. Henceforth a president may be under the pressure of the circumstances to engage a reform.

b) The proposed reform is constitutionally viable and known.
We eliminate the problems caused by a manipulation if the National Constitution needs to be also changed to approve the reform. In this first paper, we also delay the search of the optimal reform. We only analyze two types of reform (and try an easy normative comparison between them).

c) The reform eliminates or diminishes the corruption.

d) The reform must be time-consistent.
It is in the circumstances described at the end of the first point (*ie.* the decisions of investment in corrupt countries) where the time-consistency of the reform is relevant. By this we mean that the reform have to endure: no agent must have the possibility to deviate from anti-corruption behavior in the future. Again, in this first framework, we impose that the President does not have the possibility to cancel the reform (without a high political cost), and the representatives can not propose a change of the law.

The paper is organized as follows. The Section II presents a detailed evaluation of the rents of corruption. This is necessary to the reform analysis. The section III starts the study of the implementation of the reform. We proceed to construct the suitable framework for future deeper considerations. Some partial results show that the model suits well. Finally we conclude with a summary on the principal results. We also expose further extensions to make.

II Rent seeking under the *status quo*

II.1 The basic model

This first section tries to identify the rents issued from the activity of corruption. As we have said above, this computation will be necessary when we proceed to analyze, in the next sections, the implementation of an anti-corruption reform.

As we have said in the introduction, we focus on representatives as one class of agents of this model because we need to identify a kind of corruptible agents who has the power to approve a legal reform. In this sense, the representatives are assimilated to the workers that play that role in the Dewatripont and Roland's paper (1992).

The Parliament is divided in three groups of different types of representatives[9]. We must be careful in signaling that by "groups" we do not express any consideration of political parties. In our model, only individual (different) representatives are important. The "three group-hypothesis" is the simplest assumption to make in order to analyze, in a easy way, voting equilibria under different majority's rules. The separation of representatives is common knowledge. We also assume that every group is composed by a large number n of representatives. We can say that n is large enough to consider that every group forms a *continuum* of agents. This assumption enables us to neglect the impact of any individual decision. This numerical precision do not alter the analysis of this section but are necessary for the computations in the next ones.

During the period that holds our attention, every separate representative is confronted to one pressure group. In fact, the lobby is composed by an unique member, who is an industrialist (in the next sections, we use indifferently the terms "lobby", "lobbyist" and "member of the pressure group" to identify the same person). This assumption enables us to ignore the coordination problems of the pressure group[10]. The matching is done randomly: the member of the pressure group does not know, *ex-ante*, the representative's identity[11]. Moreover, we will suppose that all the lobbyists are identical and that there is no strategic behavior between them (neither communication and collusion nor denunciation or competition). This simplification separates our model from Grossman and Helpman (1994), where all the civil servants organize an auction between the different lobbies. This formalization allows them to study the structure of protection that emerges in the political equilibrium. But this is not our goal because we have already supposed that the Parliament is highly corrupted.

We simplify the corruption analysis in the following way. The industrialist wants to realize an investment project $\mathcal{P}$ (to produce a private good). This project enables him to obtain an income I at a cost C. We assume that $I - C > 0$; that is the project should be privately undertaken because it yields strictly positive profits to the lobby. But, in order to increase his cash-flow, the member of the pressure group starts a DUP activity (concretely, the third case in Bhagwati (1982)): he tries to corrupt a representative so that the latter makes a proposal to the Parliament to subsidize the lobby's project. If the Parliament accepts the proposal, the State pays a proportion α of the initial costs of the project. Of course, the reward for this "favor" is a bribe b that the industrialist should give to the representative.

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9 The sense of this heterogeneity of representatives will become clear in the next sections.

10 In future research, we want integrate all the coordination features signaled by Olson (1966).

11 This also means that we do not allow the lobbies to meat, in subsequent periods, the same representative.

The corruption will be formalized through a (side) contract between the lobby (the principal) and the representative (the agent). The industrialist presents to the representative a "take-it or leave-it" contract of the form $\{\alpha, b\}$. In fact, we do not give any power of negotiation to representatives. Their rents therefore are pure informational rents.

We may be interested in knowing how to enforce this particular contract. In fact, to use standard agency methodology, we adopt the enforceability approach. It can be summarized by two main ideas: a) the assumption that any gain from trade between parties is realized; b) the no need to investigate the mechanism that ensures the compliance to the agreement (Tirole (1992)).

We assume another hypothesis that will reveal itself to be very convenient. If the representative refuses the contract proposed by the lobby, the latter cannot go to see another representative[12]. So, in that case, he has to content himself with undertaking the project as he has initially planed.
Moreover, we will suppose that the representative's proposal is always adopted by the Parliament. This hypothesis can be supported either by a need of simplification or by some reasons of party line or by some kind of coordination failures. In fact, the projects that retain our attention are not of a such scale that all the representatives have to study them in particular. So when a representative presents to his pairs a subvention demand, it is accepted because everybody is confident on the representative's good sense. A last reason can be that the representative can share the bribe with the most influent representatives. Afterwards, they will help him to vote for his project.

Finally, we want to remember this model is the first approach to a dynamic analysis of credible anti-corruption reforms. In that sense, it is atemporal and deterministic. We say atemporal because we do not integrate a precise time study of the decision making of the representatives (*ie.* we do not study some aspects such as the remaining mandate-time that the representative has, at the moment to propose the subsidization). By deterministic we want to stress the fact that this preliminary model does not treat the problems associated with the probability of the corruption's detection and all the resulting judicial problems.

II.2 The lobby

As we have already said, the industrialist always considers to undertake a private project $\mathcal{P}$ because his planned profits $\Pi = I - C$ are strictly positive.
The lobby's strategic goal is to convince a representative that, in order to undertake the project, he needs a subsidy from the State. We formalize this subsidy as a percentage α of the total cost C. But, to obtain the affirmative vote of the representative, the lobby has to bribe him with an amount b[13]. Hence, his utility is

$$U_I = \Pi = I - (1-\alpha)C - b$$

[12] We can justify this assumption in the following way. Sometimes, the industrialists try to obtain a subsidy from his regional representative. If he does not obtain the subsidy, he can not go and see a representative of another region.

[13] In this first model, the bribe will not be valued with a recollection shadow price (as in Laffont and Tirole (1993)). The reason for this assumption has already been mentioned: we do not take in account neither the coordination failures in the pressure group (because of its unique component) nor the problems of detection.

II.3 The representatives

In this paper, we adopt a *political support approach* in the sense that we introduce the self-interest in the representative's utility function. Thus we accept that the Constitution is an incomplete "grand contract": by given the representatives some general attributions, it cannot control all their decisions (Laffont and Tirole, 1993).
Nevertheless, we do not retain a reduced form for the representative's utility function. We believe that it has to include more primitive arguments. So the utility function is given by

$$U_r = U(L, R)$$

where L is the fiscal cost supported by consumers (implicated in the realization of the project[14]) in order to implement the chosen decision of the representative (*ie.* the amount needed to subsidize the project, evaluated at the shadow price of public funds). R is the subjective value that the representative assigns to his monetary revenues. The first of these two variables, which is included to reflect electoral considerations (*ie.* the negative impact, over the electorate, of a tax raise), equals

$$L = (1+\lambda)\alpha C$$

As we have said, the proportion α of the cost reimbursed by the State is valued at the shadow price of the public funds λ. We must stress the fact that the representative is not aware of the lobby's utility[15].

The value that the representative derives from monetary rewards is expressed as follows

$$R = g(\theta, b) + w$$

The representative receives a fixed amount w. For the moment, we normalize it to 0. Regarding the subjective value of the bribe, we formalize it through a two-argument function g (like gain) of b and θ. We adopt a classic three-type assumption: $\theta \in \{\underline{\theta}, \hat{\theta}, \overline{\theta}\}$, $0 < \underline{\theta} < \hat{\theta} < \overline{\theta}$ and we use the following notation $\hat{\Delta} = \hat{\theta} - \underline{\theta}$, $\overline{\Delta} = \overline{\theta} - \hat{\theta}$ (without any loss of generality, we sometimes fix $\Delta\theta = \hat{\Delta} = \overline{\Delta}$). This argument of the gain function is the private information of the representative or his type. It represents the subjective moral (monetary equivalent) value which the representative assigns to the fact of being bribed. Higher θ mean individuals with less moral scruples, so *ceteris paribus* the same bribe gives more satisfaction. The function g verifies the following properties[16]

$$\begin{aligned} & g(\theta, b) \geq 0 \quad \forall \theta \in \{\underline{\theta}, \hat{\theta}, \overline{\theta}\} \quad \forall b \\ & g(\theta, 0) = 0 \quad \forall \theta \in \{\underline{\theta}, \hat{\theta}, \overline{\theta}\} \\ & g_b \geq 0 \quad g_{bb} \leq 0 \quad g_\theta \geq 0 \quad g_{\theta\theta} \leq 0 \quad g_{\theta b} \geq 0 \end{aligned} \tag{1}$$

[14] To simplify, we assume that every private project is destined to the same number and type of consumers.
[15] By assuming this we rule out the analysis of the lobby's electoral support and the contribution campaigns.
[16] All over the paper, subscripts represent the argument of partial derivatives.

and the Inada conditions at the origin. All these signs seem quite intuitive. The retained function is increasing and concave in its two arguments. Moreover, the marginal utility of the bribe is also increasing in θ (Spence-Mirrlees condition) [see Figure 1].

In order to differentiate our analysis, we sequentially adopt one of the following two more specific assumptions:

$A1$: $\forall\theta\ \forall b\ \ g(\theta,b) > (1+\lambda)b$

$A2$: $\forall b\ \begin{cases} g(\underline{\theta},b) \geq b \\ g(\underline{\theta},b) \leq (1+\lambda)b \end{cases}$ and $\forall b\ \begin{cases} g(\hat{\theta},b) > (1+\lambda)b \\ g(\overline{\theta},b) > (1+\lambda)b \end{cases}$

$A1$ enables us to study the case where all the representatives individually strictly value more the bribe than its social cost. This assumption is crucial for most of the results that we obtain. We can find an argument to accept it: the representative evaluates more the bribe that the amount that it would cost to pay him in an official way (*ie.* if he has to receive exactly this amount for his job as a representative) because the lobby can give him the bribe in a non-monetary form that the representative would not be able to obtain only by his means. For example, even if the representative has the amount required, the lobby can make him meet some people that it would be impossible for him to accede.

On the other hand, the assumption $A2$ enables us to study what happens in the case where, even if the $\underline{\theta}$-representatives like receiving a bribe, they do not evaluate it more than its social cost. In other words, it is as if we relax the possibility of high corruption's dissemination (this sense will be clear in the next sections).

Finally we adopt a more formal functional hypothesis: the separability of the representative's utility function, so

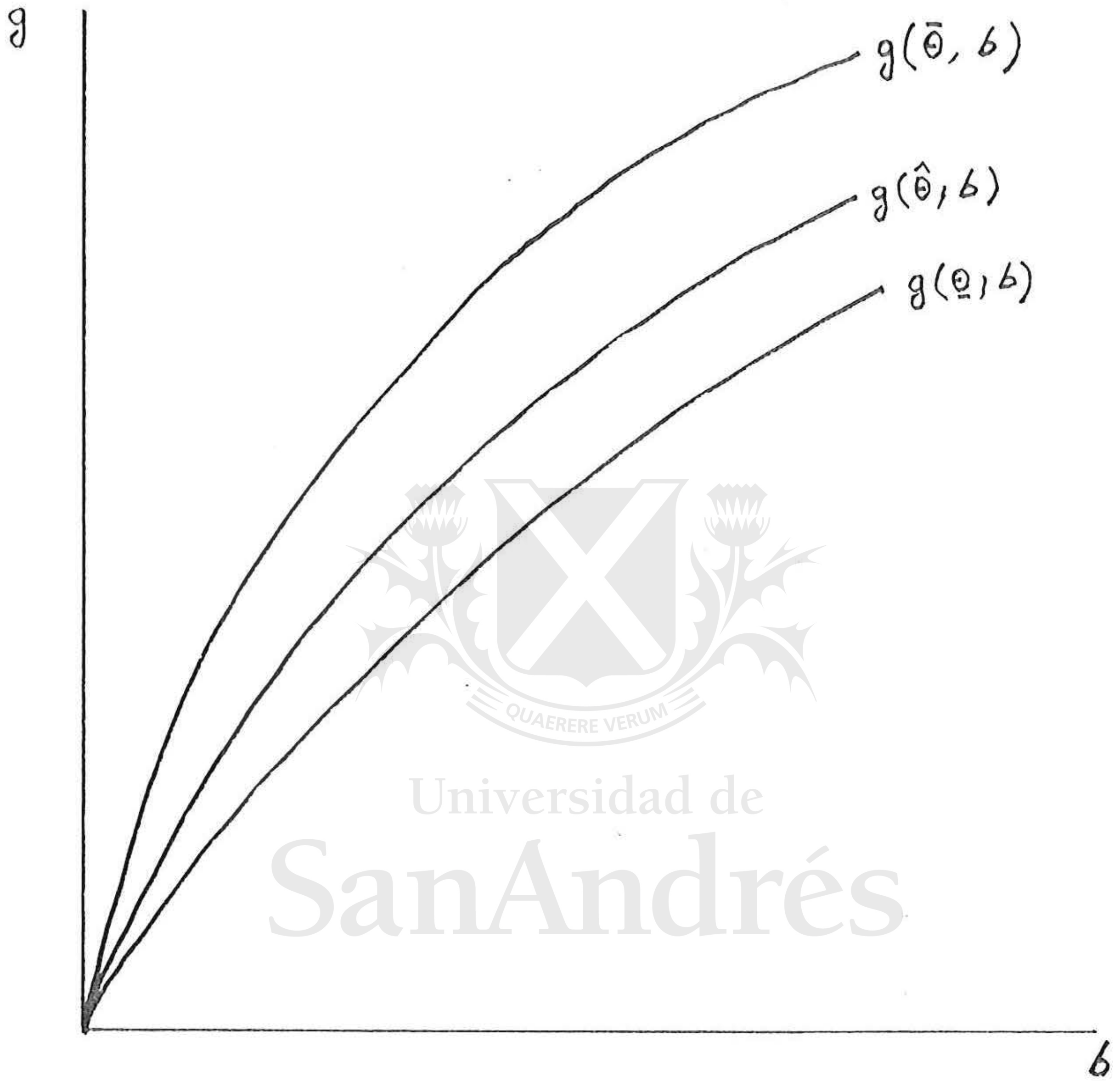
$$U_r = R - L = g(\theta,b) - \alpha(1+\lambda)C$$

All these assumptions, specifically the existence of a private information issue, thwart the methodological limitations of the "Chicago" and "Virginia" school and therefore suits the theoretical framework that Laffont and Tirole (1993) propose to analyze rigorously these phenomena.

II.4 All corruptible representatives' case

The purpose of this section is to find, under the assumption $A1$, whether the optimal corruption's contract involves all the representatives or only some types of them. We proceed in the classic methodological way, showing the full information results (as a benchmark) before computing the asymmetric information-second best optimum.

Figure 1



II.4.1 Full information

When the pressure group knows the representative's private information, he offers a contract (*ie.* a couple (α, b)) to obtain the acceptation of the representative. Hence, the optimal contract is obtained by solving the following optimization problem

$$Max_{\alpha,b} \quad I-(1-\alpha)C-b \tag{2}$$

subject to

$$g(0,b)-\alpha(1+\lambda)C \geq 0$$
$$I-(1-\alpha)C-b \geq I-C$$

The first constraint is the representative's participation constraint. As we have already said, if the representative refuses the contract, the industrialist must realize the project in its initial form. But, in that case, the representative does not enjoy any utility. Henceforth, the lobby must ensure the representative with his utility reservation level $U_0=0$. Moreover, for all representatives this level is the same (*ie.* the reservation level is independent of the representative's type). So, if we express this constraint as

$$g(0,b) \geq \alpha(1+\lambda)C \tag{3}$$

it means that the representative's subjective value of the bribe must be higher than the social cost of the subsidy.

The second constraint, which can be called the "lobby participation constraint", express the fact that the lobby must find the DUP activity profitable[17]. Again if we express it in a reduced form

$$\alpha C \geq b$$

we clearly see that the subsidized gain (by the corresponding decrease in cost) must be higher than the amount of the bribe. Under full information, this constraint is evidently redundant (because the lobby can always chose $\alpha=b=0$).

As it is usual in adverse selection problems, the representative's participation constraint is binding at the full information optimum. The intuition behind this is similar to the monopolist case one's: the lobby supports an opportunity cost (*ie.* the loss of his costs reduction) if he does not saturates the representative's participation constraint. The analysis of all these saturated participation's constraints proves that the lobby's participation constraint is, because of assumption (1.bis), strictly verified. So the problem can be simplified

$$Max_b \quad I-\left(1-\frac{g(0,b)}{(1+\lambda)C}\right)C-b \tag{4}$$

[17] We must repeat that, because of the retained formalization, the representative has no power in the negotiation game. So even if the representative knows this "participation constraint", there is no way to play strategically (*ie.* to threat the lobby in order to reduce, for a given bribe b, the percentage α).

As the maximand is concave and the constraint's set is convex, the first-order conditions are necessary and sufficient. So we can easily state that the optimal bribe $b^{FI}(\theta)$ (FI like "full information") schedule must verify the following set of first-order conditions

$$\forall\theta\in\left\{\underline{\theta},\hat{\theta},\overline{\theta}\right\}\quad \frac{g_b\left(\theta,b^{FI}(\theta)\right)}{(1+\lambda)}=1 \tag{5}$$

For every type, the optimal bribe must equalize the marginal rate of transformation between α and b for the lobby and the corresponding representative marginal rate of substitution. Moreover, by a simple application of the implicit function theorem, we can differentiate (5) and verify that the optimal bribe (and the consequent percentage of subsidy that the representative is imposed to promote) is increasing in θ . This property is intuitive because it seems realistic that the more unscrupulous the representative, the higher the bribe to buy a better proposal. We can visualize these results on the Figure 2, where are drawn the three-types corresponding participation constraint-indifference curve (*ie.* the indifference curve which yields the reservation utility) and the isoprofit line.

So under complete information, the optimal contract has the following shape

$$\left\{\left(\frac{g\left(\theta,b^{FI}(\theta)\right)}{(1+\lambda)C};b^{FI}(\theta)\right)_{\theta\in\left\{\underline{\theta},\hat{\theta},\overline{\theta}\right\}}\right\} \tag{6}$$

II.4.2 Asymmetric information: contracting with all the representatives

Now we assume that, when the lobby confronts with the representative, he does not know his type. We assume that the representative is risk-neutral. He only knows the discrete distribution of the types. We adopt an obvious notation

$$\underline{x}=\Pr ob\left(\theta=\underline{\theta}\right)\quad \hat{x}=\Pr ob\left(\theta=\hat{\theta}\right)\quad \overline{x}=\Pr ob\left(\theta=\overline{\theta}\right)$$

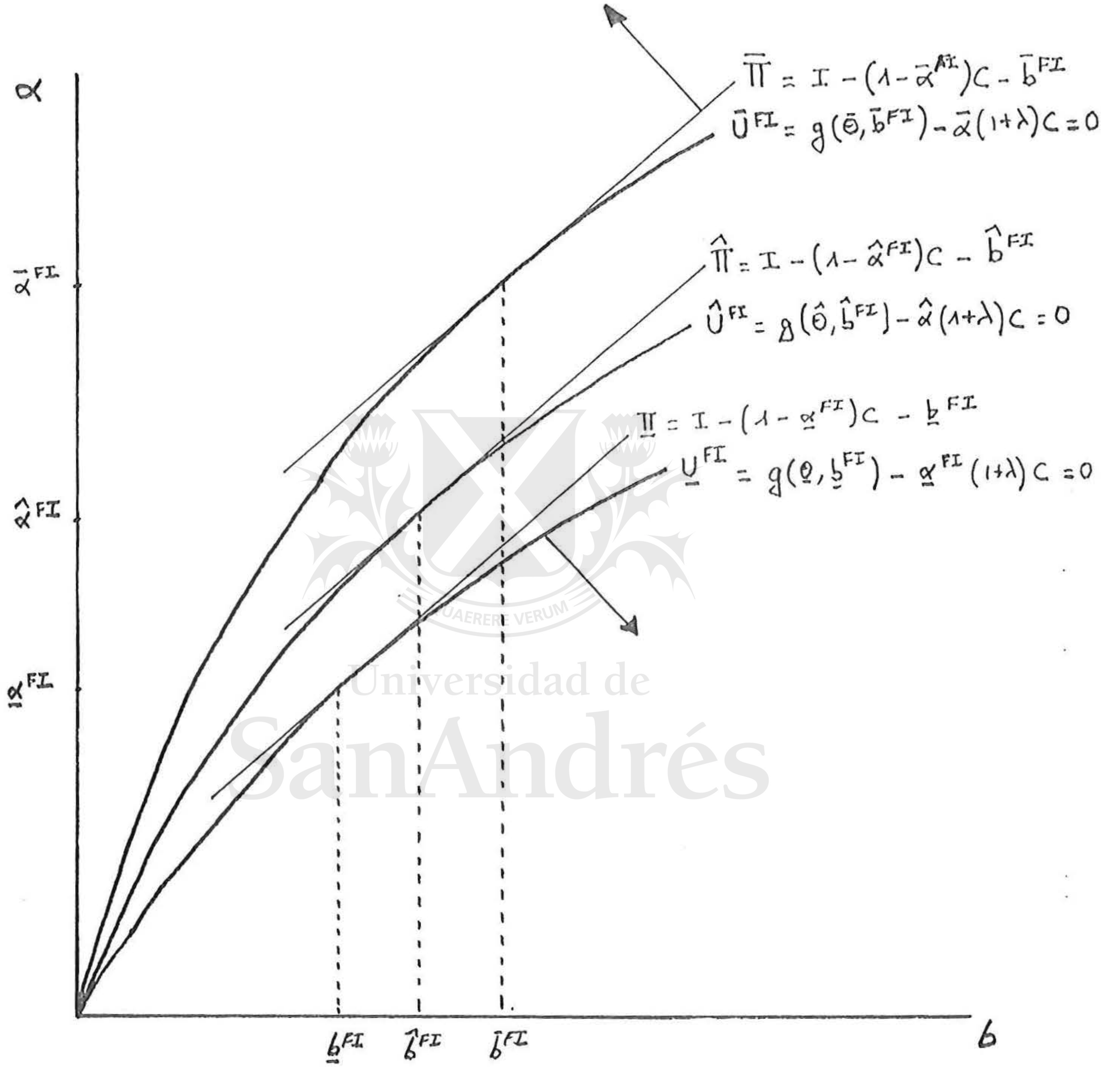
In order to simplify the computations, we set the probability of every type to $\frac{1}{3}$. The revelation principle enables us to restraint on a direct-revelation mechanism $\left\{\alpha\left(\tilde{\theta}\right),b\left(\tilde{\theta}\right)\right\}$, where $\tilde{\theta}\in\left\{\underline{\theta},\hat{\theta},\overline{\theta}\right\}$ is the announced type of the representative. We analyze first, as the title of this section shows, the design of a three-type incentive-compatible contract or global contract. If we note

$$\alpha(\underline{\theta})=\underline{\alpha}\qquad \alpha\left(\hat{\theta}\right)=\hat{\alpha}\qquad \alpha\left(\overline{\theta}\right)=\overline{\alpha}$$
$$b(\underline{\theta})=\underline{b}\qquad b\left(\hat{\theta}\right)=\hat{b}\qquad b\left(\overline{\theta}\right)=\overline{b}$$

the optimal incentive-compatible contract is the solution of the following lobby's problem

$$Max_{\underline{\alpha},\hat{\alpha},\overline{\alpha},\underline{b},\hat{b},\overline{b}}\quad \left\{\underline{x}\left[I-(1-\underline{\alpha})C-\underline{b}\right]+\hat{x}\left[I-(1-\hat{\alpha})C-\hat{b}\right]+\overline{x}\left[I-\left(1-\overline{\alpha}\right)C-\overline{b}\right]\right\} \tag{7}$$

Figure 2


$\overline{\Pi} = I - (1-\overline{\alpha}^{FI})C - \overline{b}^{FI}$
$\overline{U}^{FI} = g(\overline{\theta}, \overline{b}^{FI}) - \overline{\alpha}(1+\lambda)C = 0$
$\hat{\Pi} = I - (1-\hat{\alpha}^{FI})C - \hat{b}^{FI}$
$\hat{U}^{FI} = g(\hat{\theta}, \hat{b}^{FI}) - \hat{\alpha}(1+\lambda)C = 0$
$\underline{\Pi} = I - (1-\underline{\alpha}^{FI})C - \underline{b}^{FI}$
$\underline{U}^{FI} = g(\underline{\theta}, \underline{b}^{FI}) - \underline{\alpha}^{FI}(1+\lambda)C = 0$
α
$\overline{\alpha}^{FI}$
$\hat{\alpha}^{FI}$
$\underline{\alpha}^{FI}$
$\underline{b}^{FI}$
$\hat{b}^{FI}$
$\overline{b}^{FI}$
b

subject to the participation constraint for every type of representative,

$$
\begin{aligned}
g(\underline{\theta},\underline{b}) - \underline{\alpha}(1+\lambda)C &\geq 0 \\
g(\hat{\theta},\hat{b}) - \hat{\alpha}(1+\lambda)C &\geq 0 \\
g(\overline{\theta},\overline{b}) - \overline{\alpha}(1+\lambda)C &\geq 0
\end{aligned}
\tag{8}
$$

their incentives constraints,

$$g(\underline{\theta},\underline{b}) - \underline{\alpha}(1+\lambda)C \geq g(\underline{\theta},\hat{b}) - \hat{\alpha}(1+\lambda)C \tag{9}$$

$$g(\underline{\theta},\underline{b}) - \underline{\alpha}(1+\lambda)C \geq g(\underline{\theta},\overline{b}) - \overline{\alpha}(1+\lambda)C \tag{10}$$

$$g(\hat{\theta},\hat{b}) - \hat{\alpha}(1+\lambda)C \geq g(\hat{\theta},\underline{b}) - \underline{\alpha}(1+\lambda)C \tag{11}$$

$$g(\hat{\theta},\hat{b}) - \hat{\alpha}(1+\lambda)C \geq g(\hat{\theta},\overline{b}) - \overline{\alpha}(1+\lambda)C \tag{12}$$

$$g(\overline{\theta},\overline{b}) - \overline{\alpha}(1+\lambda)C \geq g(\overline{\theta},\underline{b}) - \underline{\alpha}(1+\lambda)C \tag{13}$$

$$g(\overline{\theta},\overline{b}) - \overline{\alpha}(1+\lambda)C \geq g(\overline{\theta},\hat{b}) - \hat{\alpha}(1+\lambda)C \tag{14}$$

and his *ex-ante* participation constraint. Now, he is constrained to verify his participation constraint in expectation because, as we have already said, the lobbyist is risk-neutral. This allows him to cross-subsidize his rent-seeking activity (*ie.* to lose money with one type of deputy but recovers enough with the others to make the expected gain positive). We momentarily neglect this last constraint and after the optimization we prove that the solutions verify it.

Straightforward simplifications of the maximand and the analysis of the relevant constraints[18] allow us to write, in an easier form, the optimization program

$$Max_{\underline{\alpha},\hat{\alpha},\overline{\alpha},\underline{b},\hat{b},\overline{b}} \quad \left(\underline{\alpha}+\hat{\alpha}+\overline{\alpha}\right)C - \left(\underline{b}+\hat{b}+\overline{b}\right)$$

subject to

$$
\begin{aligned}
g(\hat{\theta},\hat{b}) - \hat{\alpha}(1+\lambda)C &= g(\hat{\theta},\underline{b}) - \underline{\alpha}(1+\lambda)C \\
g(\overline{\theta},\overline{b}) - \overline{\alpha}(1+\lambda)C &= g(\overline{\theta},\hat{b}) - \hat{\alpha}(1+\lambda)C \\
g(\underline{\theta},\underline{b}) &= \underline{\alpha}(1+\lambda)C
\end{aligned}
$$

Eliminating from the maximand the respective percentages to implement[19], we can state the following proposition

[18] At the optimum, the participation constraint of the $\underline{\theta}$ - representative is binding and the incentive constraints of the other higher types are downward binding. Moreover, incentive compatibility requires the monotonicity condition on the schedule of bribes.

[19] In this problem, we do not follow the "Mirrlees' trick" (*ie.* the elimination of transfers). In fact, we proceed in a different way because we know much more things from the representative's valuation function of the bribe.

Proposition 1

**) When the lobby plans to contract with all the representatives under asymmetric information, the schedule of bribes* $\underline{b}^{AI}$, $\hat{b}^{AI}$ *and* $\overline{b}^{AI}$ *(AI like "asymmetric information") are fully characterized by the following first-order conditions*

$$g_b\left(\underline{\theta},\underline{b}^{AI}\right) = (1+\lambda) + 2\left[g_b\left(\hat{\theta},\underline{b}^{AI}\right) - g_b\left(\underline{\theta},\underline{b}^{AI}\right)\right] \quad (15)$$

$$g_b\left(\hat{\theta},\hat{b}^{AI}\right) = (1+\lambda) + \left[g_b\left(\overline{\theta},\hat{b}^{AI}\right) - g_b\left(\hat{\theta},\hat{b}^{AI}\right)\right] \quad (16)$$

$$g_b\left(\overline{\theta},\overline{b}^{AI}\right) = 1+\lambda \quad (17)$$

**) For* $\hat{\Delta} = \overline{\Delta}$ *sufficiently small, the bribes verify* $\underline{b}^{AI} \leq \hat{b}^{AI} \leq \overline{b}^{AI}$

Proof: *see Appendix 1*

As it is usual in adverse selection problems, there is no distortion for the "most efficient" type. But, comparing with the optimality conditions under full information, we can see that, in order to verify the incentive constraints, the other bribes are downward distorted (*ie.* $\underline{b}^{AI} \leq \underline{b}^{FI}$ and $\hat{b}^{AI} \leq \hat{b}^{FI}$). We also verify that the lobby's participation constraint is satisfied[20]. More important is to stress the values of the (informational) rents that the different types of representatives
retire from this particular relation with the lobby. If, from now on, the subscripts under the rents represent the number of types of representatives who receive a strictly positive bribe (here 3), we have then

$$\underline{U}_3^{AI} = 0 \quad (18)$$

$$\hat{U}_3^{AI} = g\left(\hat{\theta},\hat{b}^{AI}\right) - \hat{\alpha}^{AI}(1+\lambda)C = U_{\hat{\Delta}}\left(\underline{b}^{AI}\right) \quad (19)$$

$$\overline{U}_3^{AI} = g\left(\overline{\theta},\overline{b}^{AI}\right) - \overline{\alpha}^{AI}(1+\lambda)C = U_{\hat{\Delta}}\left(\underline{b}^{AI}\right) + U_{\overline{\Delta}}\left(\hat{b}^{AI}\right) \quad (20)$$

where $U_{\hat{\Delta}}\left(\underline{b}^{AI}\right) = g\left(\hat{\theta},\underline{b}^{AI}\right) - g\left(\underline{\theta},\underline{b}^{AI}\right) \geq 0$, $U_{\overline{\Delta}}\left(\hat{b}^{AI}\right) = g\left(\overline{\theta},\hat{b}^{AI}\right) - g\left(\hat{\theta},\hat{b}^{AI}\right) \geq 0$. As it usually quoted in these kind of problems, we obtain the increasing informational rents result. The Figure 3 represents all these results graphically.

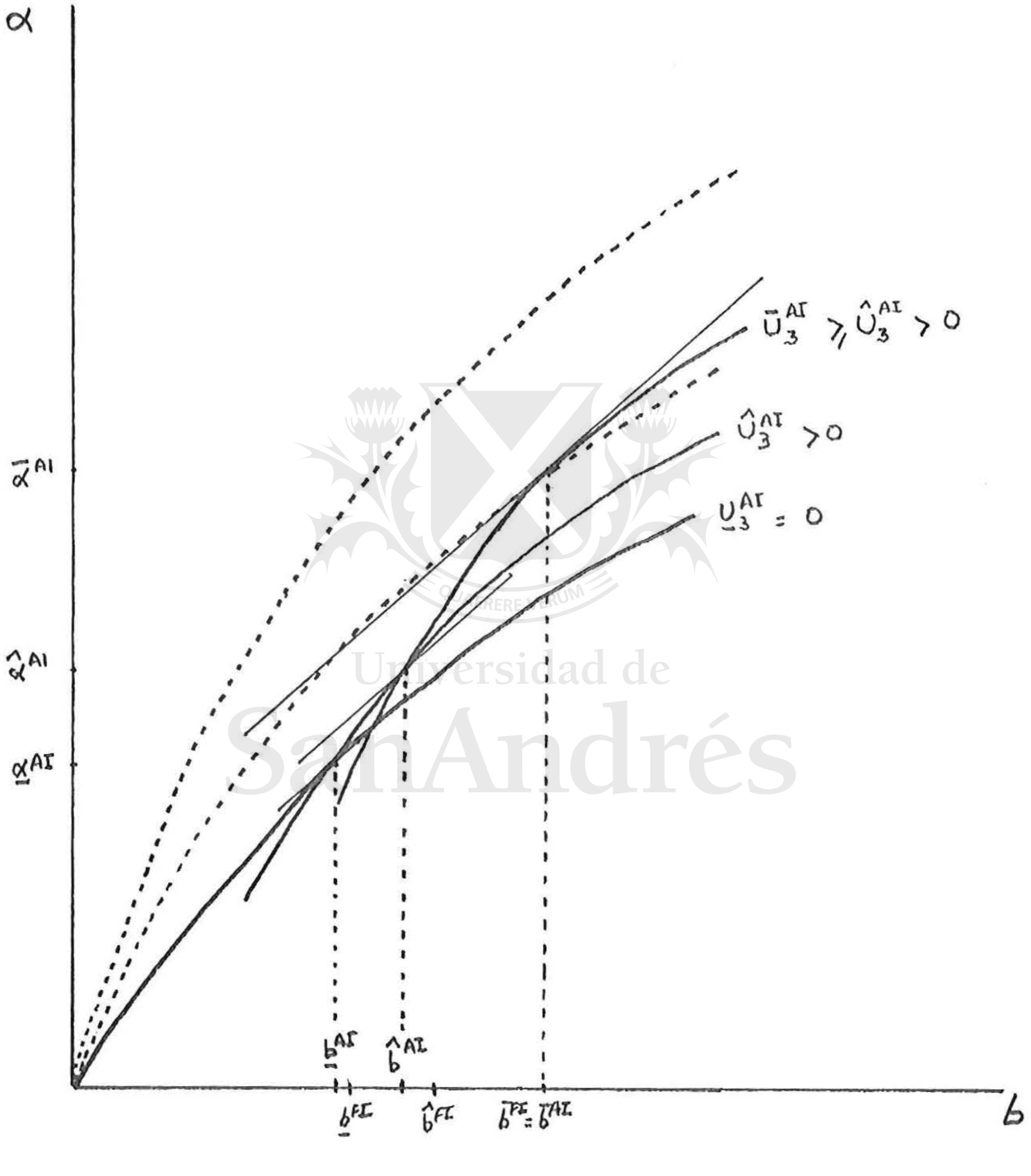
II.4.3 Asymmetric information: "shutdown" of one or two types of representatives

Computing his expected profit, the lobby can choose to design a contract where only some types are concerned. Henceforth, we must investigate if the optimal contract (*ie.* the one which gives the higher expected profit) is a contract of this particular kind.

---

[20] The lowest type of representative binds his participation constraint so, by the initial assumption of this section, also saturates the lobby's participation constraint. It is straightforward to see that, as $g\left(\hat{\theta},\underline{b}^{AI}\right) > g\left(\underline{\theta},\underline{b}^{AI}\right)$, then $\hat{\alpha}C \geq \frac{1}{1+\lambda} g\left(\hat{\theta},\hat{b}^{AI}\right)$ therefore the lobby's participation constraint is also verified for the $\hat{\theta}$ - type representative. The same idea applies for the higher representative so the whole lobby's *ex-ante* participation constraint is satisfied.

Figure 3



α
$\bar{\alpha}^{AI}$
$\hat{\alpha}^{AI}$
$\underline{\alpha}^{AI}$
$\bar{U}_3^{AI} \geq \hat{U}_3^{AI} > 0$
$\hat{U}_3^{AI} > 0$
$\underline{U}_3^{AI} = 0$
$\underline{b}^{AI}$
$\hat{b}^{AI}$
$\underline{b}^{FI}$
$\hat{b}^{FI}$
$\bar{b}^{FI} = \bar{b}^{AI}$
b

We analyze first the shape of the best "two-typed" contract (*ie.* when the lobby wants to bribe the two highest-type representatives). Now he must

$$Max_{\hat{\alpha},\overline{\alpha},\hat{b},\overline{b}} \; (\hat{\alpha}+\overline{\alpha})C-(\hat{b}+\overline{b})$$

subject to
$$g(\overline{\theta},\overline{b})-\overline{\alpha}(1+\lambda)C=g(\overline{\theta},\hat{b})-\hat{\alpha}(1+\lambda)C$$
$$g(\hat{\theta},\hat{b})=\hat{\alpha}(1+\lambda)C$$

and the lobby's participation constraint in expectation.

If we proceed in the usual way, eliminating the percentages to impose to the representatives, we obtain the following first-order conditions which characterize, in these circumstances, the optimal bribes

$$g_b(\hat{\theta},\hat{b})=(1+\lambda)+\left[g_b(\overline{\theta},\hat{b})-g_b(\hat{\theta},\hat{b})\right] \tag{21}$$
$$g_b(\overline{\theta},\overline{b})=1+\lambda \tag{22}$$

It is evident to see that the new bribes are identical from the pertinent ones that we obtained with the previous contract (this is the reason for not introducing new notations for the obtained results. The only difference is on the fact that the participation constraint of this contract's lowest representative (*ie.* $\hat{\theta}$) is now binding. By same considerations that are exposed in the note 20, we verify that the lobby's *ex-ante* participation constraint is satisfied. We then compute the expected profit attainable with this particular contract. As in the previous section, it is interesting to show the different rents:

$$\underline{U}_2^{AI}=0 \tag{23}$$
$$\hat{U}_2^{AI}=0 \tag{24}$$
$$\overline{U}_2^{AI}=U_{\overline{\Delta}}(\hat{b}^{AI}) \tag{25}$$

Last, we study the "single-typed" contract: the lobby designs an offer to corrupt only the highest type-representative. The computation is straightforward: the contract has exactly, in this second case, the same shape as the first best has. Again we evaluate the expected profit of this relation and the rents, which are all equal to zero.

After these computations, it is easy to evaluate the optimal contract in asymmetric information. We can postulate the next proposition, which summarizes the results of the whole section II.4:

Proposition 2

Under assumption A1 and for a fixed and sufficiently small $\Delta\theta$, the second best optimal contract involves

**) three types of representatives iff* $\forall\theta \;\; \forall b \;\; \frac{\partial g}{\partial\theta}(\theta,b)\Delta\theta\leq\frac{g(\theta,b)-(1+\lambda)b}{2}$;

*) *the two highest types of representatives iff*

$$\forall\theta \quad \forall b \quad \frac{g(\theta,b)-(1+\lambda)b}{2} \leq \frac{\partial g}{\partial\theta}(\theta,b)\Delta\theta \leq g(\theta,b)-(1+\lambda)b\,;$$

*) *only the most corruptible representative iff*

$$\forall\theta \quad \forall b \quad \frac{\partial g}{\partial\theta}(\theta,b)\Delta\theta \geq g(\theta,b)-(1+\lambda)b\,.$$

Proof: *see Appendix 2.*

Intuitively, the necessary and sufficient condition that ensures these important results imposes that, for small $\Delta\theta$, the function g should not increase very much with the variation in types. If not, the lobby prefers to contract with less types of representatives than he does in the global contract: the expected gain from excluding a lower type and saturating the participation constraint of the next type-representative is higher than the expected gain from saturating the lowest type's participation constraint and leaving a positive informational rent to the next type-representative. For example, let's take the global contract as the *status quo*. If the lobby decides to shutdown the lowest type of representative, he economizes $\frac{1}{1+\lambda}\left(\frac{\partial g}{\partial\theta}(\underline{\theta},\underline{b}^{AI}).\Delta\theta\right)$ for two types but looses $\frac{g(\underline{\theta},\underline{b}^{AI})}{1+\lambda}-\underline{b}^{AI}$ for the lowest type. If the functional condition holds, the lobby will no shutdown the lowest type of representative. The corruption is more concentrated only if the more unscrupulous types evaluates the bribes much more than the scrupulous ones.

II.5 The shutdown of the more scrupulous or the concentration of corruption

Now, we want to know how many types of representatives, under the assumption $A2$, the second best optimal contract involves. We believe that this section will enable us to state the robustness of some results that this model yields. We present the technical analysis in a reduced way because it follows the same principles as the precedent section.

II.5.1 Full information

If the lobby knows the type of every representative, he make a personalized contract. He maximizes his expected profit under his participation constraint and the representative participation constraint. As the first-order conditions are identical from the ones in the other case, he presents a contract like

$$\left\{\left(\frac{g(\theta,b^{FI}(\theta))}{(1+\lambda)C};b^{FI}(\theta)\right)_{\theta\in\{\underline{\theta},\overline{\theta}\}}\right\} \tag{26}$$

only for the highest types of representatives. The only difference lies in the fact that he does not contract with the lowest type of representative. Obviously because, even if he saturates the participation constraint for the more scrupulous representative, he can not verify his own budget constraint.

II.5.2 Asymmetric information

In this case, when the lobbyist designs the optimal incentive-compatible contract he seeks to maximize his expected profit under the representatives' participation and incentive constraints. Again, he is constrained to verify his *ex-ante* participation constraint.

When the lobby designs an incentive-compatible contract for the three types of representatives, he obtains the same first-order conditions of the section II.4.2. In that case, his participation constraint was automatically verified. But now we must verify if the lobbyist's *ex-ante* participation constraint is satisfied. In order to simplify the analysis, we assume the following fact: the lobbyist loose money to corrupt the lowest type of representatives but he recoup with the other two. Methodologically, this enables us to apply, for welfare comparisons, the results obtained in the section II.4.2[21].

The analysis of the two other cases (*ie.* when the lobby designs a contract for the two highest types or for the more corruptible representative only) is identical with the one of the section II.4.3.

The following proposition summarizes the results of this section and makes clear its title,

Proposition 3

Under assumption $A2$ *and for a fixed and sufficiently small* $\Delta\theta$, *the second best optimal contract*

**) never involves the three types of representatives;*

**) involves the two highest types of representatives iff* $\forall\theta \quad \forall b \quad \frac{\partial g}{\partial\theta}(\theta,b)\Delta\theta \leq g(\theta,b)-(1+\lambda)b$.

Proof: *This case is a special one of Proposition 2. In fact, because of the assumption* $A2$, *the conditions for the first two cases cannot be satisfied for* $\underline{\theta}$. *On the other hand, the condition that ensures the optimality of a "single-typed" contract is the same condition expressed in the last result of the Proposition 2.*

This proposition is intuitively easy to understand. By contracting only with the two highest types of representatives, the lobbyist saves the loss incurred within a global contract. In that sense we say that there is a concentration of the corruption: if some representatives are too expensive to bribe, there is no need of a functional condition to ensures this result.

[21] We are aware of the fact that this assumption is very restrictive. But even if we do not have proved the intuition in a rigorous way, we believe that the first result shown in the Proposition 3 remains unaltered.

The partial conclusion of this section is that the retained modelization enables us to evaluate the corruption-rents and to state the conditions to verify in order to observe a more concentrated rent seeking activity. This last phenomenon is strictly related to the value and the increasing properties of the representative's gain function.

III The implementation of a credible reform

III.1 The institutional process of a reform

At a definite moment, the President decides to implement a reform to reduce the Congress' corruption. We formalize neither the genesis of this political decision nor the explanation of the previous maintenance of the corruption. As we have already stated in the introduction, there are many reasons to accept this facts exogenously.

We assume that the President is completely benevolent. It is obviously a simplifying assumption but it is the simplest way to have a first insight of this problem.

The reform that the President wants to be approved by the Congress consists in a sharp reduction of its discretionary power. Effectively, he proposes to diminish or eliminate the Congress' attribution to give subsidies to the private sector. In that sense, the aim to fight the corruption is credible because a future return to the *status quo* will be very costly. If this reversal takes place, it will be only considered by the population as a representatives' rent-seeking behavior.

If the President's proposal contemplates only the retirement of the legislative attributions, the Congress will not accept it neither unanimously nor by a majority. The reason for this refusal lies on the fact that if the Congress promulgates the reform, the representatives will lose the bribes given by the lobbies. Only the more scrupulous representatives will vote for any kind of proposal because they are indifferent with any change of institutional framework. Henceforth, the problem of the implementation of this reform appears. The tricky fact is that the President must accept to leave some rents to the representatives in order to compensate them with the loss of the bribes. The objective of this whole section is to present the preliminary results that, within the simple model already presented, show that the we can present the best reform in terms of welfare gains.

All over this paper we analyze the implementation of the desired reform under the two most widespread voting rules: unanimity and simple majority. The reason to explain the existence of these two different regimes can be that some countries' Constitution imposes, to proceed to institutional reforms, different voting rules to be followed by the Congress.

It is important to point out that one important feature of the problem we try to study here is quite different from the one that Dewatripont and Roland (1992) study. In their paper, the authors formalized the economic reform as a proposal of a new labor contract for the bureaucracy. Within that framework, different workers could decide to accept or refuse the reform by signing or not the new contract. In fact, some types of workers could stay in the analyzed sector while others decide to abandon it. Because of the type of problem that we study here, we can not allow that possibility. When the representatives approve the reform, by definition, all of them are under the new institutional framework. This implies that we have to find a different way to generate the dynamics of the transition. In this paper, we analyze the simplest form of transition in the fight against the corruption. The next section presents the "full reform" under the two different regimes of approval. Then we analyze, within the same institutional framework, what we call the "partial reform". We believe that this simple model will enable us to say something about the very well known debate "gradualism *versus* shock" but in a very different context.

III.2 The implementation of a full reform

The first case we analyze is the so called "full reform" because the President proposes to eliminate all the discretionary power of the representatives (*ie.* he proposes $\alpha = 0$). The goal of this part is to prove if the cheapest way to compensate the representatives to obtain their approval under an unanimity or a majority voting rule allows to improve the welfare.

III.2.1 The unanimity voting rule

In this case, if the President wants to promulgate a reform that will totally eliminate the discretionary power of the representatives, he must propose to increase the fixed salary w (normalized to 0 in the previous section) to compensate them. In order to satisfy all the incentive compatible constraints that an unanimity voting rule imposes, the President must send to the Congress a proposal that sets a new salary $w = \overline{U}^{AI}$ for all the representatives[22].

As we have already said, the President is benevolent. In that sense, we can visualize his welfare criterion[23] by an utilitarian function like

$$W = S^{n} + U_{I} + U_{r}$$

The net consumer's surplus is $S^{n} = V - D - (1+\lambda)T$, where V is the gross consumer's surplus derived from the realization of the industrialist project, D is the total amount of expenditure to pay in order to have access to the services proposed by the project and T is the total amount of fiscal taxes, evaluated at the shadow cost of public funds. The other components of W are the same that those analyzed in the previous section[24].

Thus, the President evaluates the difference in welfare between the *status quo* with corruption and the post-reform era. We adopt new notation: W_c for the welfare in the corrupted situation and W_{nc}^{FR} for the respective situation after the full reform (FR like "full reform", nc like "no corruption"). In the most general case and remembering that we have three groups of n representatives, we have

$$\begin{aligned} W_c &= 3n(V - D) - n(1+\lambda)C\left(\underline{\alpha}^{AI} + \hat{\alpha}^{AI} + \overline{\alpha}^{AI}\right) \\ &+ \left\{ n\left[I - \left(1-\underline{\alpha}^{AI}\right)C - \underline{b}^{AI}\right] + n\left[I - \left(1-\hat{\alpha}^{AI}\right)C - \hat{b}^{AI}\right] + n\left[I - \left(1-\overline{\alpha}^{AI}\right)C - \overline{b}^{AI}\right]\right\} \\ &+ n\left(\underline{U}^{AI} + \hat{U}^{AI} + \overline{U}^{AI}\right) \end{aligned} \tag{27}$$

Applying the fact that, under an utilitarian framework, the transfers between the consumers and the industrialists compensate themselves and straightforward simplifications allow us to write this expression as

---

[22] Of course, here applies all the usual comments on the President's possibility to commit this offer.

[23] This is the criterion that we will use for the next sections to evaluate the different proposals.

[24] In fact, this formalization only takes in account the welfare derived from a single project. There is no loss of generality if we assume that these values are simply additive in order to compute all the projects and visualize the global situation. By saying that, we are assuming no complementarity or substitutability between different projects and we also rule out the saturation of the demand.

$$W_c = 3n(V - C) + n\left(\hat{U}^{AI} + \overline{U}^{AI}\right) - n\lambda\left(\underline{\alpha}^{AI} + \hat{\alpha}^{AI} + \overline{\alpha}^{AI}\right)C - n\left(\underline{b}^{AI} + \hat{b}^{AI} + \overline{b}^{AI}\right) \tag{28}$$

Concerning the welfare W_{nc}^{FR} after the proposed reform we shall write

$$\begin{aligned} W_{nc}^{FR} &= 3n(V - D) - (1 + \lambda)3n\overline{U}^{AI} \\ &+ 3n(I - C) \\ &+ 3n\overline{U}^{AI} \end{aligned} \tag{29}$$

which may be simplified in the same way and stated

$$W_{nc}^{FR} = 3n(V - C) - \lambda 3n\overline{U}^{AI} \tag{30}$$

Taking all the different cases of the section II into account, the computations of the differences in welfare enables us to state the following

Proposition 4

***)** *Under the two assumptions $A1$ and $A2$ and for a fixed and sufficiently small $\Delta\theta$, the full reform is always implementable with an increase in welfare.*

***)** *The welfare gains from a full reform are higher when the corruption is more widespread.*

Proof: *see Appendix 3.*

The intuition for the first part of the proposition lies on the heavy weight of savings against the payment compensation needed to obtain this reform's approval. In fact, after the reform the whole society saves the deadweight loss of the different subsidies. On the other hand, incentive-compatibility of an unanimity voting rule requires payment compensation (equal to $\overline{U}^{AI}$) for all the representatives. But for $\Delta\theta$ small, $\overline{U}^{AI}$ is small. Therefore we obtain the positive implementation result.
The second result of this proposition needs a more careful explanation. The first comparisons we make in Appendix 3 take in account a "total effect": we compare, for the different types of contracts (*ie.* for the more or less widespread corruption), the welfare gains after a full reform. But the "more widespread corruption" is an endogenous result, which depends on some functional properties of the gain function g . Henceforth, it could be possible that the changes in this functional parametrization which yields the more or less widespread corruption also directly alters welfare gains (this is the "direct effect"). It is more interesting to isolate these direct impacts: we choose a functional form of g that makes the lobby indifferent between two different contracts (for example, between a global and a "two-typed" one). If we proceed to the respective full reforms, we can then evaluate the "indirect effects". The results of these more precise comparisons enables us to affirm the second part of the proposition.

III.2.2The majority voting rule

We analyze the case where the Congress must approve the reforms by a two-thirds majority. Now we can see that our initial assumption about the division of the representatives in three groups simplifies the task. In fact, the President only need to send a bill where he proposes a uniform wage $w = \hat{U}^{AH}$. Even if the incentive constraint is not satisfied for the highest type of representative, the President obtains the reform's promulgation. Because now the necessary wages to pay are lower, all the welfare results are immediate. But it is more interesting to present, in Table I, the distribution of rents that results from the full reform under the two voting rules.

Table I

	Rents in the corrupted *status quo*	Rents after a full reform under unanimity rule	2/3 majority rule
Consumers:	$3n(V-D) - n(1+\lambda)\left(\underline{\alpha}^{AH} + \hat{\alpha}^{AH} + \overline{\alpha}^{AH}\right)$	$3n(V-D) - 3n(1+\lambda)\overline{U}^{AH}$	$3n(V-D) - 3n(1+\lambda)\hat{U}^{AH}$
Industrialists:	$I - C + \frac{1}{3}\left(\underline{\alpha}^{AH} + \hat{\alpha}^{AH} + \overline{\alpha}^{AH}\right) - \frac{1}{3}\left(\underline{b}^{AH} + \hat{b}^{AH} + \overline{b}^{AH}\right)$	$I - C$	$I - C$
Representatives:			
$\underline{\theta}$ - type	0	$\overline{U}^{AH}$	$\hat{U}^{AH}$
$\hat{\theta}$ - type	$\hat{U}^{AH}$	$\overline{U}^{AH}$	$\hat{U}^{AH}$
$\overline{\theta}$ - type	$\overline{U}^{AH}$	$\overline{U}^{AH}$	$\hat{U}^{AH}$

The most important results concerns the redistributions of rents, after the reform, in the two different voting rule's cases:

1) the same sharp reduction in profits for the industrialists after the reforms;
2) the entirely gains that the most scrupulous representatives obtain;
3) the other representatives obtain a difference in their rents, which can be positive (as the increase for the $\hat{\theta}$- type after under unanimity) or negative (as the decrease for the $\overline{\theta}$- type under a majority rule).

The reasons for these redistributions have to be found in the retained modelization. The President is not able to discriminate the deputies so he has to leave some rents to the more scrupulous representatives. We find the same result that Dewatripont and Roland (1992) observes for the less efficient workers: in order to accept the reduction of the bureaucracy, they have to be compensated. On the other hand, because we modelize passive lobbyists when they face the President's proposal, they are the great losers[25].

III.3 The implementation of a partial reform

In the previous section, we proved that, under the Proposition 4's assumptions, the full reform is implementable and, because of the way we formalize the cost of the corruption, it allows to increase the social welfare. Even if this result is very strong, the President is aware of the fact that this way of fighting the corruption provokes some problems about the redistribution of

[25] If we want to formalize more rigorously the lobbies' response to the presidential proposal, we need to adopt a multiprincipals framework.

rents. He might decide to engage in a gradual diminution of these distortions in the Congress' behavior.

As we have said in the introduction, the basic contribution to the informational features of the reforms' dynamic problems is the paper of Dewatripont and Roland (1992). But in our model, we cannot generate the gradualism as they do. The fundamental difference is that, when the Congress adopts a new institutional framework, the rules are not discriminatory (*ie.* there is no way, for example, to a difference in the salaries that the representatives receive, which is the instrument of the gradual reform in the cited paper). Here, the gradualism comes from the fact that the President only decides to decrease the discretionary power of the representatives. In fact, he will not propose to eliminate all this power; he will send to the Congress a bill where he asks for an upper bound to the percentages of subsidies that the Congress can give. He thinks in an *a priori* way that this kind of reform should cost less. Of course, in order to fight in an effective way against the corruption, this upper bound must be lower than the highest percentage of subsidies that the Congress accepts in the *status quo*. Formally, he seeks to impose

$$\alpha \leq \alpha^{*}_{Max} < \overline{\alpha}^{H} \tag{31}$$

But now the President must look for the optimal partial reform in a much more complicated way than for the full one. In that case, the President only evaluated the welfare gains between the era post-full reform and the *status quo*. The simplification came from the fact than after the full reform, there were no place for new bilateral relations between the lobbies and the representatives. So the computations are only of a accounting and monetary type.
Now this is no longer the case: the President accepts the fact that, even if the Congress promulgates his proposal, the corruption will continue (but evidently at a level he can hold out hope that the welfare is not lower). Henceforth, the welfare's evaluation after this partial reform is obtained from a backward induction analysis, which has a positive and a normative part. We present them as follows:

1) The President must analyze, for every α_{Max}, how the contracts between the lobbies ant the representatives are altered. The computations of the resulting informational rents will enable him to evaluate the incentive constraints to satisfy (*ie.* how much does he need to compensates the representatives in order that they accept the reform, under the different voting rules). We will see that, in some cases, this will not pose a real problem for the President.

2) Inasmuch he designs the incentive compatible reform that suits with every α_{Max}, he must then compare the resulting welfare with the *status quo*'s. Then he will be able to find the optimal partial reform.

The section presents the preliminary results that we were able to find. We believe that this framework could enable us to have deeper insights of this subject. All over the section, we restrict our analysis to the global contract (the three-type representatives contract) under assumption *A*1. In the section III.3.1, we analyze the optimal global contract that the lobby designs under different partial reforms. The results allow us to study, in the Section III.3.2 the normative properties of this type of partial reforms under the unanimity voting rule.

III.3.1 The optimal contract under different partial reforms

Under the same model of the Section II, we show that the optimal incentive compatible contract has a particular shape. First we suppose first that the President want to implement a partial reform where

$$\hat{\alpha}^{AI} \leq \alpha_{Max} < \overline{\alpha}^{AI} \tag{32}$$

How the contract between the lobby and the representative will change?

The full information analysis is straightforward. Without proof we can say that the optimal contract will binds all the participation constraints so it has the following shape

$$\left\{ \left(\frac{g\left(\theta, b^{FI}(\theta)\right)}{(1+\lambda)C}; b^{FI}(\theta) \right)_{\theta \in \{\underline{\theta}, \hat{\theta}\}}, \left(\frac{g\left(\overline{\theta}, \overline{b}^{FI}\right)}{(1+\lambda)C} = \alpha_{Max}, \overline{b}^{FI} \right) \right\} \tag{33}$$

On the other hand, the case under asymmetric information needs more attention[26]. The lobby must solve the same program of the Section II.4.2 with the new constraint

$$\overline{\alpha}' \leq \alpha_{Max} < \overline{\alpha}^{AI} \tag{34}$$

The formalization of the lobby's interests allows us to intuit that the new constraint is binding at the optimum. Hence, after the usual simplifications, the program must be rewritten as

$$Max_{\underline{\alpha}, \hat{\alpha}, \underline{b}, \hat{b}, \overline{b}} \quad \left(\underline{\alpha} + \hat{\alpha} + \alpha_{Max}\right)C - \left(\underline{b} + \hat{b} + \overline{b}\right)$$

subject to

$$\begin{aligned} g\left(\hat{\theta}, \hat{b}\right) - \hat{\alpha}(1+\lambda)C &= g\left(\hat{\theta}, \underline{b}\right) - \underline{\alpha}(1+\lambda)C \\ g\left(\overline{\theta}, \overline{b}\right) - \alpha_{Max}(1+\lambda)C &= g\left(\overline{\theta}, \hat{b}\right) - \hat{\alpha}(1+\lambda)C \\ g\left(\underline{\theta}, \underline{b}\right) &= \underline{\alpha}(1+\lambda)C \end{aligned}$$

Because α_{Max} is not under the control of the lobby, the program is finally

$$Max_{\underline{b}, \hat{b}, \overline{b}} \frac{1}{1+\lambda}\left\{2g\left(\underline{\theta}, \underline{b}\right) + g\left(\hat{\theta}, \hat{b}\right) - g\left(\hat{\theta}, \underline{b}\right)\right\} - \left(\underline{b} + \hat{b} + \overline{b}\right) \tag{35}$$

subject to

$$g\left(\underline{\theta}, \underline{b}\right) + g\left(\hat{\theta}, \hat{b}\right) + g\left(\overline{\theta}, \overline{b}\right) - g\left(\hat{\theta}, \underline{b}\right) - g\left(\hat{\theta}, \overline{b}\right) = \alpha_{Max}(1+\lambda)C \tag{36}$$

Solving the respective Lagrangean and analyzing the first-order conditions enables us to write the following proposition, which characterizes the optimal global contract when $\overline{\alpha}' \leq \alpha_{Max} < \overline{\alpha}^{AI}$.

---

26 Again, we need to adopt new notation. The results are of the optimization programs under this new framework are signaled with an apostrophe.

Proposition 5

*) *The partial reform entails a new schedule of bribes* $\underline{b}', \hat{b}'$ *and* $\overline{b}'$ *which verifies* $\underline{b}' \geq \underline{b}^{AI}, \hat{b}' \geq \hat{b}^{AI}$ *and* $\overline{b}' \leq \overline{b}^{AI}$.

*) *The lower* α_{Max} , *the closer are the bribes* $\hat{b}'$ *and* $\overline{b}'$. *There exists a particular percentage* $\alpha^{*}_{Max} > \hat{\alpha}^{AI}$ *where the contract between the two highest types of representatives is identical (ie. there is a bunching point).*

*) *Except the lowest type of representative, the other two types enjoy higher rents than the ones that they receive in the classic asymmetric information case.*

Proof: *See Appendix 4.*

As we see, the partial reform allows to decrease the difference between the equilibrium bribes. In a certain sense we can say that the incentive constraints are relaxed. When the upper bound percentage that the President proposes is less than the resulting one in asymmetric information, the rent of the highest type of representative has to, at least, increase. That means that even if we need to maintain the incentive compatibility of the contract, his pertinent incentive constraint is relaxed (because of the necessary increase in $g(\overline{\theta},b)$ regarding the previous case). Figure 4[27] can help to understand the intuition behind this results. It can also give an informal view about the proof of the second part of the proposition.

As the technical features are much more complicated, we continue the analysis in a graphical way. Let's visualize in the Figure 5 which is the optimal contract if the President proposal to the Congress is

$$\alpha_{Max} \leq \alpha^{*}_{Max} \tag{37}$$

If we visualize a small (negative) departure $\alpha^{*}_{Max} - \varepsilon$ from the bunching point, four contracts must catch our attention:

$$\begin{gathered}
\left\{\alpha^{*}_{Max} - \varepsilon, b^{*}\right\}_{\theta \in \{\hat{\theta}, \overline{\theta}\}} \\
\left\{\alpha^{*}_{Max} - \varepsilon, b^{*}\right\}_{\theta = \overline{\theta}} \quad \text{and} \quad \left\{\alpha^{*}_{Max} - \varepsilon, \hat{b}''\right\}_{\theta = \hat{\theta}} \\
\left\{\alpha^{*}_{Max} - \varepsilon, b^{*}\right\}_{\theta = \overline{\theta}} \quad \text{and} \quad \left\{\underline{\alpha}'', \hat{b}''\right\}_{\theta = \hat{\theta}} \\
\left\{\alpha^{*}_{Max} - \varepsilon, \hat{b}''\right\}_{\theta = \hat{\theta}, \overline{\theta}}
\end{gathered}$$

pointed respectively by {A}, {A, B}, {A, C} and finally {B} in the graphic. As it is easy to understand, the first three contracts can not be optimal. Concerning the first of them, which is another bunching point, the lobbyist can do better because the participation constraint of lowest type of representative is not binding. The contract {A, B} is not incentive compatible: the lowest type want to take the other contract. The same comment of the first also applies for the third contract. Finally the last contract is the optimal one: again, by bunching the types,

[27] For an expositionnary purpose, we graph only with two types. Obviously, the analysis is identical with three types.

Figure 4

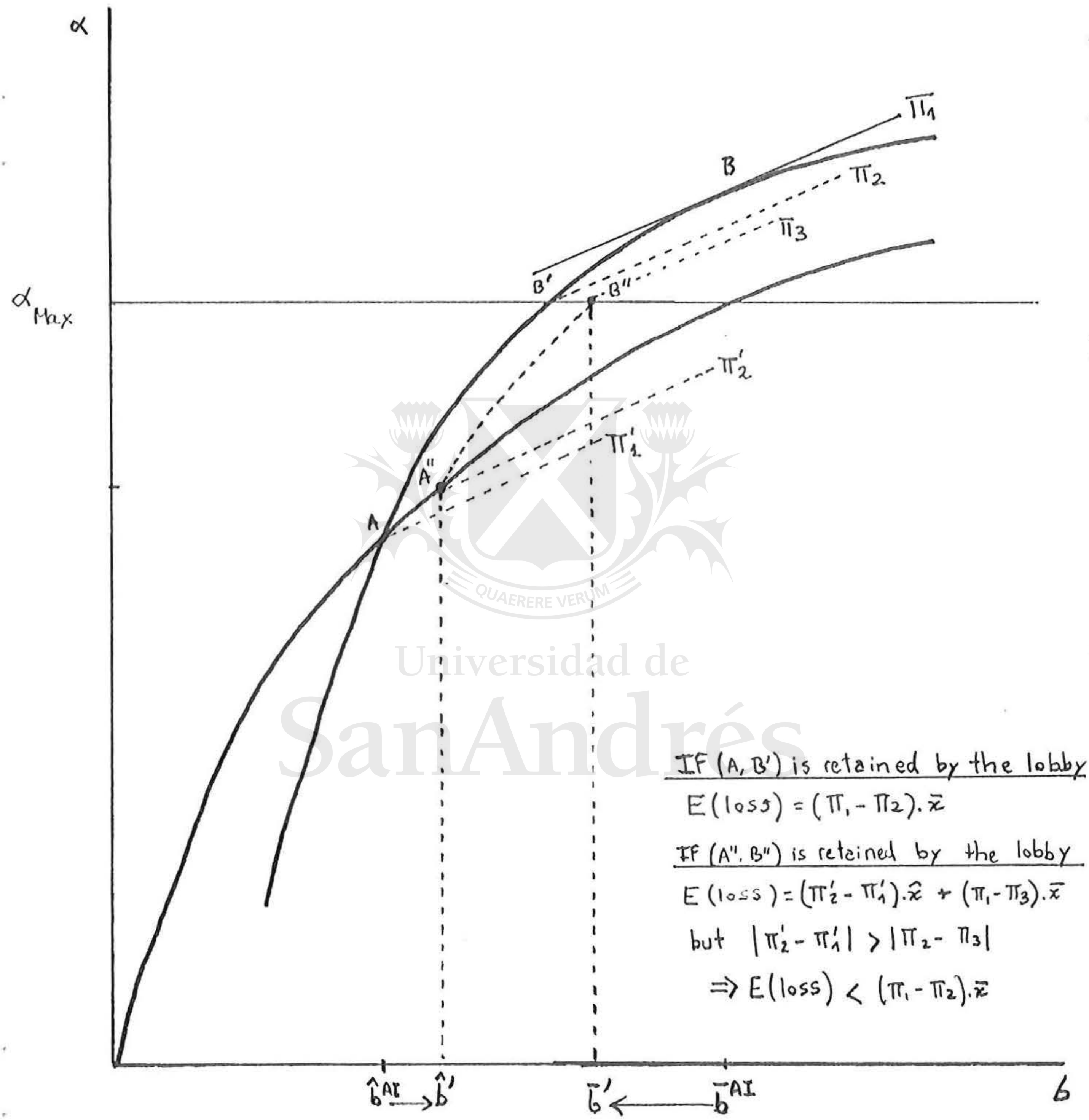
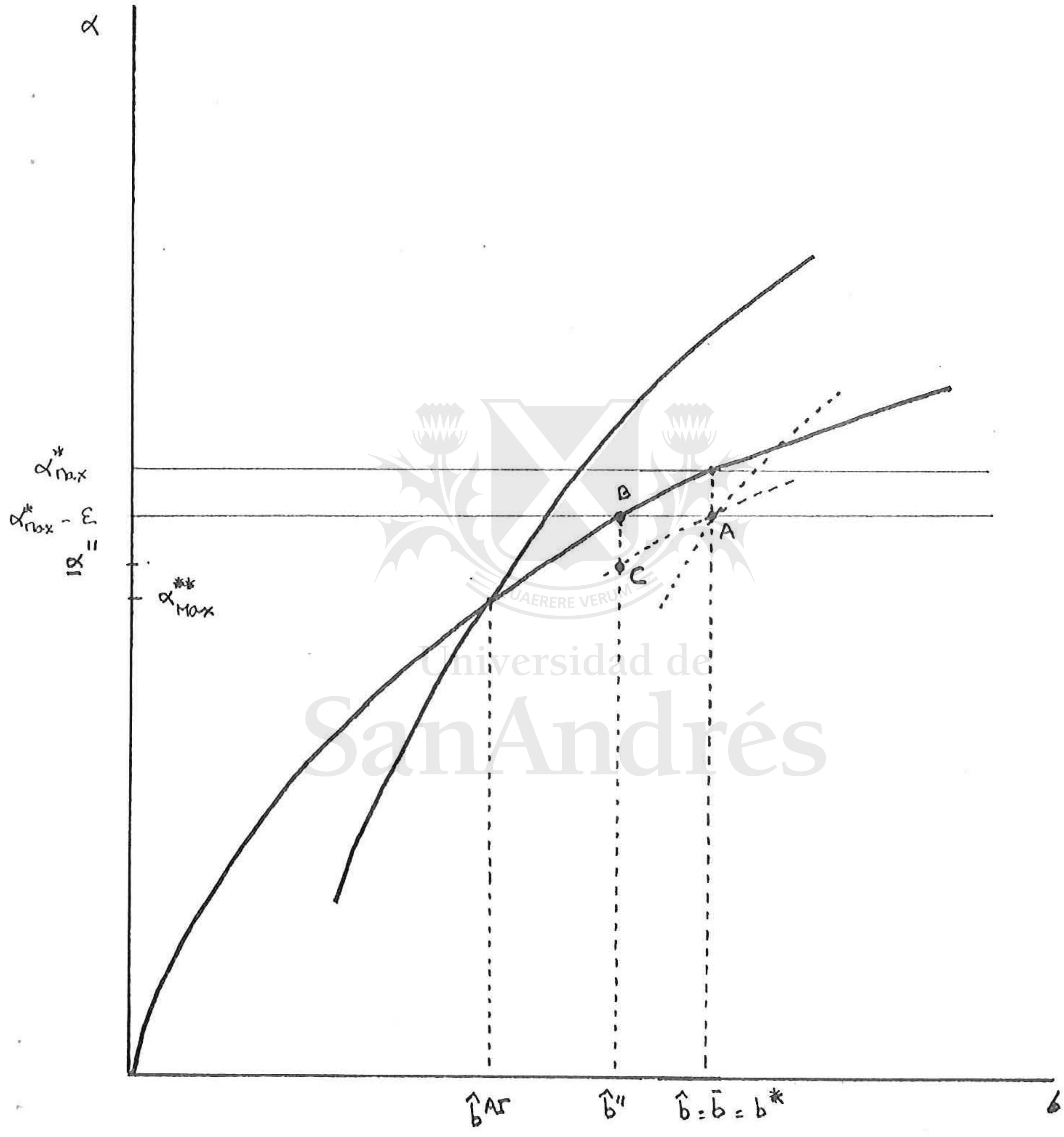

α
α Max
Π1
B
Π2
Π3
B'
B''
Π'2
Π'1
A''
A
b̂AI → b̂'
b̄' ← b̄AI
b
IF (A, B') is retained by the lobby
E(loss) = (Π1 - Π2).x̄
IF (A'', B'') is retained by the lobby
E(loss) = (Π'2 - Π'1).x̂ + (Π1 - Π3).x̄
but |Π'2 - Π'1| > |Π2 - Π3|
⇒ E(loss) < (Π1 - Π2).x̄

Figure 5



the lobby maximizes his expected profit. Of course, this analysis applies for every amount less than α^{*}_{Max}. If we finally take in account the three types of representatives and we proceed in the same graphic way, we can summarize the results of this section in

Proposition 6

**) When the President's proposal $\alpha_{Max} \in \left(\alpha^{*}_{Max}, \overline{\alpha}^{AI}\right)$, the optimal contract has the shape described in the Proposition 5.*

**) When the President's proposal $\alpha_{Max} \in \left(\alpha^{**}_{Max}, \alpha^{*}_{Max}\right]$ the optimal contract is a bunching point for the two highest type of representatives and the same allocation for the lowest type of representative (on his participation constraint-indifference curve). The sequence of bunching points lies on the same $\hat{\theta}$-type representative's indifference curve.*

**) When the President's proposal $\alpha_{Max} \leq \alpha^{**}_{Max}$, the optimal contract is a "global bunching point" which lies on the lowest type representative's participation constraint-indifference curve.*

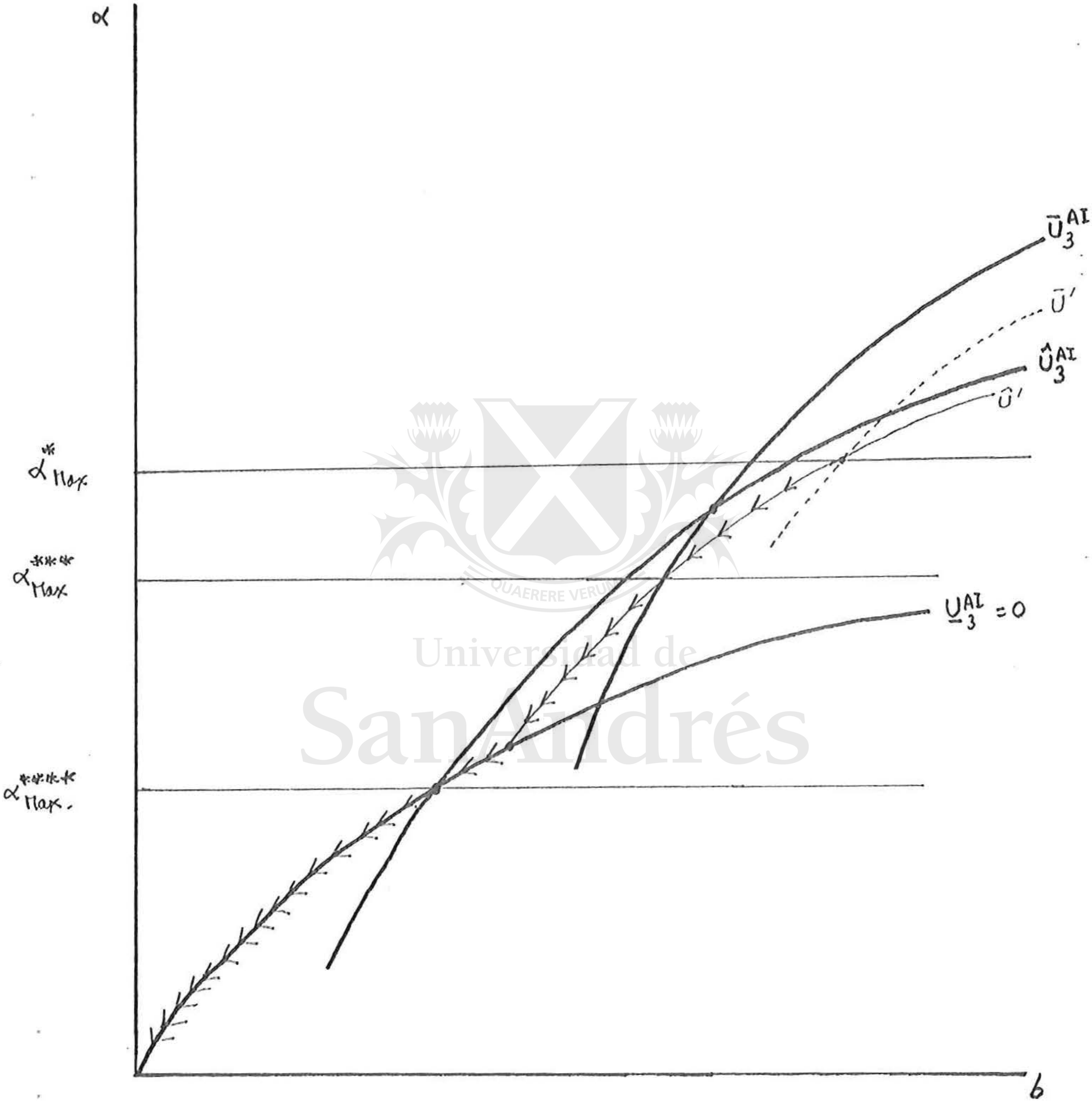
The explanation of these results is as follows. The first part has already been described. To understand the second point, we must explain that the value α^{**}_{Max} represents the percentage-value where the lowest type's participation constraint-indifference curve intercepts the $\hat{\theta}$-type representative's indifference curve $g\left(\hat{\theta}, b^{*}\right) - \alpha^{*}_{Max}(1+\lambda)C$. The allocation of the lowest type of representative remains unchanged in $\left\{\alpha^{**}_{Max}, \underline{b}^{**}\right\}$. When the proposal decreases bellow α^{**}_{Max} and applying the same type of analysis, we see that the optimal contract is a "global bunching point" lying on the lowest type's participation constraint-indifference curve. A graphical intuition allows us to state that the global contract assumption of this section is not restrictive: all along this sequence of bunching points contracts, the lobby gains by contracting with the three types of representatives.

As we did in all the previous sections, we must evaluate the informational rents that these different contracts leave. For that purpose, it will be very convenient to require the Figure 6, where we can see that, because of the shape of the different contracts analyzed in the Proposition 6, there are four pertinent regions to take in account. We summarize the results in the next table.

Table II

	$\underline{U}'$	$\hat{U}'$	$\overline{U}'$
$\alpha_{Max} \in \left[\alpha^{*}_{Max}, \overline{\alpha}^{AI}\right]$	0	$\hat{U}' > \hat{U}^{AI}$	$\overline{U}' > \overline{U}^{AI}$
$\alpha_{Max} \in \left[\alpha^{***}_{Max}, \alpha^{*}_{Max}\right]$	0	$\hat{U}' > \hat{U}^{AI}$	$\overline{U}' \geq \overline{U}^{AI}$
$\alpha_{Max} \in \left[\alpha^{****}_{Max}, \alpha^{***}_{Max}\right]$	0	$\hat{U}' \geq \hat{U}^{AI}$	$\overline{U}' < \overline{U}^{AI}$
$\alpha_{Max} < \alpha^{****}_{Max}$	0	$\hat{U}' < \hat{U}^{AI}$	$\overline{U}' < \overline{U}^{AI}$

Figure 6



where the large inequalities represent regions where the rents can converge with the respective value.

III.3.2 Normative properties of the partial reform

Even if the next paragraphs are in the section devoted to the partial reform, our goal is to compare, in welfare terms, the two types of reforms that we have already analyzed. In the previous section, we were not able to find the optimal partial reform yet. Nevertheless, the next two important results presented in the proposition suggest promissory alleys for research.

Proposition 7

**) Departing from the status quo, a small partial reform* $\alpha_{Max} = \overline{\alpha}^{H} - \varepsilon$ *can improve social welfare.*

**) If the lobby contracts with the three types of representatives under the legal framework after a partial reform, an incentive compatible proposal which states a very low* $\alpha_{Max} = \varepsilon$ *dominates the full reform if the shadow price of public funds exceeds a particular threshold.*

Proof: *see Appendix 5*

The first result enables the President to propose a reform of this type. It is important to remember that, under this particular reform, there is no need to compensate the representatives to obtain their approval. Table II shows that all receive higher rents than the *status quo* so their favorable voting is assured by incentive compatibility.
In the second result, which is more interesting, we analyze a proposal where the upper bound tends towards zero. Because after this kind of reform some space for the bilateral relations between the lobbies and the representatives remains, the society does not need to pay the whole highest informational rents in order to obtain the approval under unanimity. The representatives are only paid the highest difference between the *status quo* and the new corruption rents. Henceforth, if λ is larger enough, the necessity of paying the whole highest informational rent for the three types of representatives under a full reform plan makes the partial reform more convenient, even if corruption subsists.

The last result is very important because it allows us to intuit the existence of some parametrized regions where we can state the domination of one type of reform and the impact, on this result, of different voting rules.

IV Conclusion

In this paper, we present a simple model which enables us to start to analyze the problems of the implementation of anti-corruption reforms. When a reform of this nature is proposed, it generates reactions against it. Generally, the agents concerned begin to exert pressure on the people who have the legal power to refuse the proposal. In our model, we simplify this issue by joining in one unique person the representative and the one concerned by the reform (*ie.* the agent who will lose some rents).

We formalize the result of the lobbying activity as a contract between an industrialist and a representative. The contract specifies a percentage of subsidies that the representative has to make approved by the Parliament if he wants to receive a bribe. We analyze the shape of the optimal contracts with the classic tools of incentive theory, with a particular difference that we use the bribes as the optimization variable. We show that under incomplete information, incentive compatibility engenders the usual distortions. Moreover, we find the functional conditions which ensure the optimality of different types of contracts and therefore yield in the more or less concentrated corruption results.

Then the President presents a bill to the Congress. We study the problem of a full or a partial reform. The evaluation of the impact of a full reform is an easy normative exercise. We show that the trade-off between the decrease in corruption (gains by decreasing fiscal costs of subsidies) and the compensation costs to pay to the representatives allows always to increase the welfare.
But to compute the difference in welfare after a partial reform, we need to study the resulting optimal contract between the lobby and the representative. There we find some interesting results. Depending on the value of the upper bound proposed by the President, the optimal contract varies in the representatives discrimination. The lower the ceiling, the less discriminatory is the optimal contract. Therefore, after a graphical analysis we were able to find different regions for the values of the representatives' rents. This allows us to obtain two positive preliminary results. A partial reform is implementable with an increase in welfare respecting the *status quo* and, under some conditions concerning the shadow price of public funds, can dominate a full reform.

We believe that we are in a good position to continue, in future research, the undertaken analysis. First, we want to precise the work to do in the strict framework of this model.
a) There is a pure theoretical problem which requires to be analyzed more rigorously. We refer to the design of an optimal contract under an active principal's participation constraint. We hope to see the impact of this constraint on the incitative distortions. If we are able to obtain general results, we can apply them to a unfortunately more realistic case: when the initial project is in deficit but after the subsidies it yields strictly positive profits. The social trade-off to evaluate a reform must be accentuated: the gains in efficiency are more important but so the compensation to the corrupt representatives.
b) We need to find the technical conditions behind the bunching results of the Section III.31 . Thereafter we can analyze the possibility of shut down under the framework of a partial reform.
c) Once the complete solution of the optimal contract in that last case is characterized, we will be able to find the optimal partial reform. The following step is the analysis of the convenience of each type of reform. We believe that there must be parametrized regions

where one type of reform dominates the other (result that we have proved in a very particular case in the Proposition 7).
d) After the complete characterization of the results, the next exercise to do in this way is of comparative statics, for example to change the symmetric distribution of representatives' types, the consumer's utility derived from the project and the shadow price of public funds.
e) Last we need to deeply compare the two more widespread voting rules and their impact on the obtained comparative results about the dominance of a particular type of reform. We believe that in a continuum of types framework, it would be easier to analyze these aspects.

If we think now about some possible extensions of the model, the most evident to undertake is the introduction of a joint probabilistic and real time-dimension. The first one has to take in account the probability of discovery (which, in first research, could be exogenous). The second one has to push the representative's horizon of decision to integrate future periods. If we formalize the repetition of the corruption's relation in our contract framework with possibility of detection, we could be able to take in account various interesting issues as
a) the date of the reform's proposal and the time distance to an election: more corrupted representatives are more disposed to vote for a reform because they fear more the judicial persecutions after their possibly depart of the Parliament. If so the President can anticipate it and design in a different way the reform (here enters the possible considerations about an amnesty);
b) the reputations effects: if after a refusal of the representative the lobby can see another representative, the endogenous choice of the more corrupted representatives can be formalized;
c) the alteration of the obtained results if we formalize the probability of detection of the lobby, instead on the representative.

Another alley for research is the study of all these problems in a multiprincipals framework. Here we bypass this problem because we do not give any power of reaction to the lobby when he knows the presidential bill.

We believe that the last research line to pursue is the analysis of the time-consistency problem. We understand that it is a critical theoretic problem; that is the reason for what we have formalized it in a rude way. One possible way to integrate this important issue is to explicit the constraint which push the President to decide the reform. If we think about the fact a[illegible] presented in the introduction, concerning the risk qualifications of the country and their impact on the foreign investor's decision to invest in that country, the President has then an element to integrate into his analysis, element which can be easily formalized and generates problems of time-inconsistency.

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Appendix 1

*) After considering the binding constraints and thus eliminating the respective percentages to implement, the maximand becomes

$$\frac{1}{1+\lambda}\left[3g(\underline{\theta},\underline{b})+2g(\hat{\theta},\hat{b})+g(\overline{\theta},\overline{b})-2g(\hat{\theta},\underline{b})-g(\overline{\theta},\hat{b})\right]-\left[\underline{b}+\hat{b}+\overline{b}\right]$$

so the first-order conditions are straightforward:

$$\begin{aligned} 3g_b\left(\underline{\theta},\underline{b}^{AH}\right)-2g_b\left(\hat{\theta},\underline{b}^{AH}\right)&=1+\lambda \\ 2g_b\left(\hat{\theta},\hat{b}^{AH}\right)-g_b\left(\overline{\theta},\hat{b}^{AH}\right)&=1+\lambda \\ g_b\left(\overline{\theta},\overline{b}^{AH}\right)&=1+\lambda \end{aligned} \tag{A.1}$$

Immediate transformations allow to obtain the formulas in the core of the paper, rearranged to show in a easy way the decreasing property of the equilibrium bribes.

*) For the lowest types of representatives, incentive compatibility amounts to

$$\begin{aligned} g(\underline{\theta},\underline{b})-\underline{\alpha}(1+\lambda)C&\geq g(\underline{\theta},\hat{b})-\hat{\alpha}(1+\lambda)C \\ g(\hat{\theta},\hat{b})-\hat{\alpha}(1+\lambda)C&\geq g(\hat{\theta},\underline{b})-\underline{\alpha}(1+\lambda)C \end{aligned}$$

Adding up these expressions yields

$$g(\hat{\theta},\hat{b})-g(\underline{\theta},\hat{b})-g(\hat{\theta},\underline{b})+g(\underline{\theta},\underline{b})\geq 0$$

or

$$\int_{\underline{b}}^{\hat{b}}\int_{\underline{\theta}}^{\hat{\theta}} g_{b\theta}(\theta,b)\,d\theta\,db$$

which, together with $g_{b\theta}\geq 0$ and $\underline{\theta}<\hat{\theta}$ implies that $\hat{b}\geq\underline{b}$. For the highest types of representatives, the same proof applies.

Appendix 2

We need to find the necessary and sufficient condition that ensure the results of the proposition. If we compute the expected profit that the lobbyist can obtain from every different contract, we have (with obvious notations):

$$\begin{aligned} E\Pi_3 = I-C+\frac{1}{3(1+\lambda)}&\left[3g\left(\underline{\theta},\underline{b}^{AH}\right)+2g\left(\hat{\theta},\hat{b}^{AH}\right)+g\left(\overline{\theta},\overline{b}^{AH}\right)-2g\left(\hat{\theta},\underline{b}^{AH}\right)-g\left(\overline{\theta},\hat{b}^{AH}\right)\right] \\ &-\frac{1}{3}\left(\underline{b}^{AH}+\hat{b}^{AH}+\overline{b}^{AH}\right) \end{aligned} \tag{A.2}$$

$$E\Pi_2 = I-C+\frac{1}{3(1+\lambda)}\left[2g\left(\hat{\theta},\hat{b}^{AH}\right)+g\left(\overline{\theta},\overline{b}^{AH}\right)-g\left(\overline{\theta},\hat{b}^{AH}\right)\right]-\frac{1}{3}\left(\hat{b}^{AH}+\overline{b}^{AH}\right) \tag{A.3}$$

$$E\Pi_1 = I - C + \frac{1}{3(1+\lambda)} g\left(\overline{\theta},\overline{b}^{AH}\right) - \frac{1}{3}\overline{b}^{AH} \tag{A.4}$$

*) If we evaluate the difference between (A.2) and (A.3), we obtain

$$E\Pi_3 - E\Pi_2 = \frac{1}{3(1+\lambda)}\left[3g\left(\underline{\theta},\underline{b}^{AH}\right) - 2g\left(\hat{\theta},\underline{b}^{AH}\right)\right] - \frac{1}{3}\underline{b}^{AH} \tag{A.5}$$

For small $\hat{\Delta}$, we can apply a first-order Taylor - Young expansion to evaluate this difference. If we want to obtain always a positive difference, neglecting the higher order terms, the parameters of the model and the function g must verify the following necessary and sufficient condition, for all θ and b

$$g(\theta,b) - (1+\lambda)b \geq 2\frac{\partial g}{\partial\theta}(\theta,b).\Delta\theta \tag{A.6}$$

Again, if we evaluate the difference between (A.2) and (A.4) and writing it in way that facilitates the discussion, we have

$$\begin{aligned} E\Pi_3 - E\Pi_1 = & \frac{1}{3(1+\lambda)}\left[3g\left(\underline{\theta},\underline{b}^{AH}\right) - 2g\left(\hat{\theta},\underline{b}^{AH}\right)\right] - \frac{1}{3}\underline{b}^{AH} \\ & + \frac{1}{3(1+\lambda)}\left[2g\left(\hat{\theta},\hat{b}^{AH}\right) - g\left(\overline{\theta},\hat{b}^{AH}\right)\right] - \frac{1}{3}\hat{b}^{AH} \end{aligned} \tag{A.7}$$

We have already study the condition which ensures that the first part of this last expression is positive. Applying the same methodology, we can prove that this condition is also sufficient to ensure that the second part of the expression has the same sign. Moreover, the condition (A.6) is the weakest necessary and sufficient condition that ensures the whole result exposed in the first part of the proposition.

*) If the parameters of the model and the function g do not verify the condition (A.6), we have to find which type of contract is the optimal one. Hence, as we already know that the global contract is not optimal, we analyze the difference between (A.3) and (A.4), which yields

$$E\Pi_2 - E\Pi_1 = \frac{1}{3(1+\lambda)}\left[2g\left(\hat{\theta},\hat{b}^{AH}\right) - g\left(\overline{\theta},\hat{b}^{AH}\right)\right] - \frac{1}{3}\hat{b}^{AH} \tag{A.8}$$

Similarly, we can use a Taylor - Young expansion and neglect the higher order terms to visualize the necessary and sufficient condition that, for all θ and b, it ensures that (A.8) is positive:

$$g(\theta,b) - (1+\lambda)b \geq \frac{\partial g}{\partial\theta}(\theta,b).\Delta\theta \tag{A.9}$$

Hence the results exposed in the proposition.

Appendix 3

To prove the proposition is equivalent to find whether $W_{nc}^{FR} - W_c \geq 0$ holds or not. If we compute this difference in welfare we obtain, in the most general case[28]

$$\Delta W^{FR} \equiv W_{nc}^{FR} - W_c = n\lambda\left(\underline{\alpha} + \hat{\alpha} + \overline{\alpha}\right)C + n\left(\underline{b} + \hat{b} + \overline{b}\right) - n\left(\hat{U}^{A1} + (1+3\lambda)\overline{U}^{A1}\right) \qquad \text{(A.10)}$$

By the participation and incentive constraints binding at the second best optimum and the respective values of the informational rents, we can have (A.11)

$$\begin{aligned}\Delta W^{FR} \equiv W_{nc}^{FR} - W_c = n\Big\{&(5+3\lambda)g(\underline{\theta},\underline{b}) + (3+3\lambda)g(\hat{\theta},\hat{b}) + g(\overline{\theta},\overline{b}) - (4+3\lambda)g(\hat{\theta},\underline{b}) - (2+3\lambda)g(\overline{\theta},\hat{b})\Big\}\\ &+ n\left(\underline{b} + \hat{b} + \overline{b}\right) - 3n\underline{\alpha}C\end{aligned}$$

<u>**Case A**</u> : $A1$ holds.

That means $\forall\theta\ \forall b\ \ g(\theta,b) > (1+\lambda)b$; therefore we have already analyzed the conditions that ensure what kind of contract prevails in a particular situation.

*) First of all, if $\forall\theta\ \ \forall b\ \ \frac{\partial g}{\partial\theta}(\theta,b)\Delta\theta \leq \frac{g(\theta,b) - (1+\lambda)b}{2}$, we have shown in the Proposition 2 that the second best-optimal contract involves three types of representatives. Therefore we apply (A.11). Using the fact that the participation constraint of the lowest type of representative is binding and some first-order Taylor - Young expansions, we obtain

$$\begin{aligned}\Delta W_3^{FR} \equiv W_{nc}^{FR} - W_c \approx\ & n\left\{g(\underline{\theta},\underline{b}) - \frac{3}{1+\lambda}g(\underline{\theta},\underline{b}) - (4+3\lambda)\frac{\partial g}{\partial\theta}(\underline{\theta},\underline{b}).\Delta\theta\right\} + n\left\{g(\hat{\theta},\hat{b}) - (2+3\lambda)\frac{\partial g}{\partial\theta}(\hat{\theta},\hat{b}).\Delta\theta\right\}\\ &+ ng(\overline{\theta},\overline{b}) + n\left(\underline{b} + \hat{b} + \overline{b}\right)\end{aligned}$$

where the subscript signals that we are analyzing a reform concerning the three types of representatives. The functional condition showed above allows us to write

$$\begin{aligned}\Delta W_3^{FR} \equiv W_{nc}^{FR} - W_c \geq\ & n\left\{g(\underline{\theta},\underline{b}) - \frac{3}{1+\lambda}g(\underline{\theta},\underline{b}) - (4+3\lambda)\left(\frac{g(\underline{\theta},\underline{b}) - (1+\lambda)\underline{b}}{2}\right)\right\}\\ &+ n\left\{g(\hat{\theta},\hat{b}) - (2+3\lambda)\left(\frac{g(\hat{\theta},\hat{b}) - (1+\lambda)\hat{b}}{2}\right)\right\} + ng(\overline{\theta},\overline{b}) + n\left(\underline{b} + \hat{b} + \overline{b}\right)\end{aligned}$$

After some algebraic manipulations, this inequality becomes

$$\begin{aligned}\Delta W_3^{FR} \equiv W_{nc}^{FR} - W_c \geq\ & n\left\{\frac{3\lambda^2 + 7\lambda + 6}{2}\underline{b} - \frac{3\lambda^2 + 5\lambda + 8}{2(1+\lambda)}g(\underline{\theta},\underline{b})\right\} + n\left\{\frac{3\lambda^2 + 5\lambda + 4}{2}\hat{b} - \frac{3\lambda}{2}g(\hat{\theta},\hat{b})\right\}\\ &+ ng(\overline{\theta},\overline{b}) + n\overline{b}\end{aligned}$$

---

[28] From now on, we neglect all the supra $A1$ in the variables of the contract for simplicity.

Now, if we apply $A1$, we can say that

$$\Delta W_3^{FR} \equiv W_{nc}^{FR} - W_c \geq n\frac{2\lambda - 2}{2}\underline{b} + n\frac{2\lambda + 4}{2}\hat{b} + ng\left(\overline{\theta},\overline{b}\right) + n\overline{b}$$

Finally, as we have already shown in the Proposition 1 the increasing property for the bribes, we can write $\hat{b} = \underline{b} + \Delta\underline{b}$ where $\Delta\underline{b} > 0$. So the difference becomes

$$\Delta W_3^{FR} \equiv W_{nc}^{FR} - W_c \geq ng\left(\overline{\theta},\overline{b}\right) + n\overline{b} + n(2\lambda + 1)\underline{b} + n(\lambda + 2)\,\Delta\underline{b} > 0 \qquad \text{(A.12)}$$

*) If instead we have $\forall\theta\ \ \forall b\ \ \frac{g(\theta,b) - (1+\lambda)b}{2} \leq \frac{\partial g}{\partial\theta}(\theta,b)\Delta\theta \leq g(\theta,b) - (1+\lambda)b$ as a new condition, we have shown in the Proposition 2 that the second best - optimal contract involves only the two highest types of representatives. In that case, the informational rents are the ones indicated in the section II.4.3. The difference in welfare becomes then

$$\Delta W_2^{FR} \equiv W_{nc}^{FR} - W_c = n\lambda\left(\hat{\alpha} + \overline{\alpha}\right)C + n\left(\hat{b} + \overline{b}\right) - n(3\lambda + 1)\overline{U}_2^{H} \qquad \text{(A.13)}$$

By considering the binding participation and incentive constraints and after some manipulations, we express (A.13) as

$$\Delta W_2^{FR} \equiv W_{nc}^{FR} - W_c = \frac{n\lambda}{1+\lambda}g\left(\overline{\theta},\overline{b}\right) + n\left(\hat{b} + \overline{b}\right) + n\left(\frac{3\lambda^2 + 6\lambda + 1}{1+\lambda}\right)g\left(\hat{\theta},\hat{b}\right) - n\left(\frac{3\lambda^2 + 5\lambda + 1}{1+\lambda}\right)g\left(\overline{\theta},\hat{b}\right) \qquad \text{(A.14)}$$

After a first-order Taylor-Young expansion, we have

$$\Delta W_2^{FR} \equiv W_{nc}^{FR} - W_c \approx \frac{n\lambda}{1+\lambda}g\left(\overline{\theta},\overline{b}\right) + n\left(\hat{b} + \overline{b}\right) + \frac{n\lambda}{1+\lambda}g\left(\hat{\theta},\hat{b}\right) - n\left(\frac{3\lambda^2 + 5\lambda + 1}{1+\lambda}\right)\frac{\partial g}{\partial\theta}\left(\hat{\theta},\hat{b}\right)\overline{\Delta} \qquad \text{(A.15)}$$

Again, by taking in mind the new functional condition of this particular case and after other algebraic manipulations, (A.15) becomes the following inequality

$$\Delta W_2^{FR} \equiv W_{nc}^{FR} - W_c \geq \frac{n\lambda}{1+\lambda}g\left(\overline{\theta},\overline{b}\right) + n\overline{b} + n\left(3\lambda^2 + 5\lambda + 2\right)\hat{b} - \frac{n}{1+\lambda}\left(3\lambda^2 + 4\lambda + 1\right)g\left(\hat{\theta},\hat{b}\right) \qquad \text{(A.16)}$$

Again, if we apply $A1$, we can find that

$$\Delta W_2^{FR} \equiv W_{nc}^{FR} - W_c \geq \frac{n\lambda}{1+\lambda}g\left(\overline{\theta},\overline{b}\right) + n\overline{b} + n(\lambda + 1)\hat{b} > 0 \qquad \text{(A.17)}$$

Now let's compare the inferior threshold in (A.12) and the value of ΔW_2^{FR} in (A.15). The first value could be written as

$$Min\ \Delta W_3^{FR} = ng\left(\overline{\theta},\overline{b}\right) + n\overline{b} + 2\lambda n\underline{b} + n\underline{b} + n\lambda\Delta\underline{b} + n\Delta\underline{b} + n\Delta\underline{b} \qquad \text{(A.18)}$$

while the second is

$$\Delta W_2^{FR} = \frac{n\lambda}{1+\lambda} g\left(\bar{\theta},\bar{b}\right) + n\bar{b} + n\hat{b} + \frac{n\lambda}{1+\lambda} g\left(\hat{\theta},\hat{b}\right) - n\left(\frac{3\lambda^2+5\lambda+1}{1+\lambda}\right)\frac{\partial g}{\partial \theta}\left(\hat{\theta},\hat{b}\right)\bar{\Delta} \qquad \text{(A.19)}$$

Easy manipulations show that $Min\,\Delta W_3^{FR} > \Delta W_2^{FR}$: the total welfare gains from a full reform where the corruption is more concentrated are lower.

But, as we have said, this computation does not isolate the so called "direct effect" of functional changes on the welfare gains. If we want to insulate the indirect effect, which will enable us to state correctly the presented result, we proceed in the following way.

First, we assume that $\forall \theta \quad \forall b \quad \frac{\partial g}{\partial \theta}(\theta,b)\Delta\theta = \frac{g(\theta,b)-(1+\lambda)b}{2}$; therefore the lobby is indifferent between a global and a "two-typed" contract. Let's compute and compare, in that particular case, ΔW_3^{FR} and ΔW_2^{FR}. We obtain, by the same manipulations that we did above,

$$\Delta W_3^{FR} \approx n\left\{\frac{3\lambda^2+7\lambda+6}{2}\underline{b} - \frac{3\lambda^2+5\lambda+8}{2(1+\lambda)}g\left(\underline{\theta},\underline{b}\right)\right\} + n\left\{\frac{3\lambda^2+5\lambda+4}{2}\hat{b} - \frac{3\lambda}{2}g\left(\hat{\theta},\hat{b}\right)\right\}$$
$$+ng\left(\bar{\theta},\bar{b}\right)+n\bar{b}$$

Then, if we apply $A1$ we obtain the same expression

$$\Delta W_3^{FR} \equiv W_{nc}^{FR} - W_c \geq n\frac{2\lambda-2}{2}\underline{b} + n\frac{2\lambda+4}{2}\hat{b} + ng\left(\bar{\theta},\bar{b}\right) + n\bar{b}$$

By the same considerations, we obtain (A.17). We proceed identically, comparing the minimum of ΔW_3^{FR} and ΔW_2^{FR}, which yields

$$Min\,\Delta W_3^{FR} - \Delta W_2^{FR} \approx \frac{n}{1+\lambda}\left[g\left(\bar{\theta},\bar{b}\right) + \left(\frac{3\lambda^2+3\lambda+1}{2}\right)g\left(\hat{\theta},\hat{b}\right)\right] - \frac{n}{2}\left(3\lambda^2+3\lambda-1\right)\hat{b} + n(\lambda-1)\underline{b} \qquad \text{(A.20)}$$

an expression whose positive sign is straightforward. Hence, we have proved for the two more differentiated contracts, the most interesting result of the proposition, which states the increasing impact of the full reform if the corruption is more widespread.

*) The last possibility is to have, if $\forall \theta \quad \forall b \quad \frac{\partial g}{\partial \theta}(\theta,b)\Delta\theta \geq g(\theta,b)-(1+\lambda)b$, a "personalized" contract (*ie.* it is in the interest of the lobbyist to design a contract that only the most corruptible representative will accept). As this type of contract yields the same allocation that are obtained in the full information framework, the analysis of the full reform is straightforward. Because the participation constraint of the pertinent representative is binding, all the representatives receive their reservation utility $U_0 = 0$ (the other two types of representatives receive the same zero rent because they are not concerned by the contract). Hence the full reform is implementable without cost[29]! Evidently, the welfare is improved because

[29] Here we adopt the generalized methodology in contract theory: when an agent is indifferent between two actions, he decide to act as the principal wants.

$$\Delta W_1^{FR} = n\left(\lambda \overline{\alpha}^{FI} C + \overline{b}^{FI}\right) > 0 \tag{A.21}$$

Moreover, it is easy to verify that $\Delta W_3^{FR} > \Delta W_2^{FR} > \Delta W_1^{FR}$.

Again, if we try to insulate the indirect effect, we have to assume that

$$\frac{\partial g}{\partial \theta}(\theta,b)\Delta\theta = g(\theta,b) - (1+\lambda)b$$

therefore the lobby is indifferent between a "single-typed" and a "two-typed" contract. After the exactly same manipulations, we obtain $Min\,\Delta W_2^{FR} - \Delta W_1^{FR} \approx n(1+\lambda)\hat{b} > 0$. This ends the proof of Case A of the Proposition 4.

__Case B__: $A2$ holds.

The proof of the part of the proposition concerning this case is straightforward. In fact, it is the same as the Case A because we know that only two contracts are optimal and the allocations are identical.

Appendix 4

*) The Lagrangean of the problem is

$$\begin{aligned} L = & \frac{1}{1+\lambda}\left\{2g(\underline{\theta},\underline{b}) + g(\hat{\theta},\hat{b}) - g(\hat{\theta},\underline{b})\right\} - \left(\underline{b} + \hat{b} + \overline{b}\right) \\ & + \mu\left\{g(\underline{\theta},\underline{b}) + g(\hat{\theta},\hat{b}) + g(\overline{\theta},\overline{b}) - g(\hat{\theta},\underline{b}) - g(\hat{\theta},\overline{b}) - \alpha_{Max}(1+\lambda)C\right\} \end{aligned} \tag{A.22}$$

where μ is the Lagrangean multiplier associated with the constraint (36). First-order conditions are straightforward

$$\begin{aligned} &\frac{\partial L}{\partial \underline{b}} = 0 \Leftrightarrow g_b\left(\underline{\theta},\underline{b}'\right) = (1+\lambda) + \left(1+(1+\lambda)\mu\right)\left(g_b\left(\hat{\theta},\underline{b}'\right) - g_b\left(\underline{\theta},\underline{b}'\right)\right) \\ &\frac{\partial L}{\partial \hat{b}} = 0 \Leftrightarrow g_b\left(\hat{\theta},\hat{b}'\right) = (1+\lambda) + (1+\lambda)\mu\left(g_b\left(\overline{\theta},\hat{b}'\right) - g_b\left(\hat{\theta},\hat{b}'\right)\right) \\ &\frac{\partial L}{\partial \overline{b}} = 0 \Leftrightarrow \mu' = \frac{1}{g_b\left(\overline{\theta},\overline{b}'\right)} \\ &\frac{\partial L}{\partial \mu} = 0 \Leftrightarrow g\left(\underline{\theta},\underline{b}'\right) + g\left(\hat{\theta},\hat{b}'\right) + g\left(\overline{\theta},\overline{b}'\right) - g\left(\hat{\theta},\underline{b}'\right) - g\left(\hat{\theta},\overline{b}'\right) = \alpha_{Max}(1+\lambda)C \end{aligned} \tag{A.23}$$

Because $\overline{\alpha}' = \alpha_{Max}$ then, by the lobbyist' optimization behavior, $\overline{b}' \leq \overline{b}^{AI}$. That also means, by the concavity of the function g, that $g_b\left(\overline{\theta},\overline{b}'\right) \geq 1+\lambda$. If so, $(1+\lambda)\mu' \leq 1$. Then again, by the concavity of g, we verify the first part of the proposition.

*) The proof of the second part lies on the mathematical intuition behind the Lagrange multiplier of this particular problem. We can see that this multiplier is associated with an

incentive constraint. If α_{Max} decreases, this constraint is relaxed because of the increase in he rent of the highest type of representative. Hence, following the mathematical interpretation of a Lagrange multiplier, he must increase. Applying the first-order conditions, we see that the difference between the bribes $\overline{b}'$ and $\hat{b}'$ also decreases. So there exists a α^{*}_{Max} where it is optimal for the lobby to bunch between the two highest types of representatives.

*) The new rents can be written in the classic way

$$
\begin{aligned}
&\underline{U}_3' = g(\underline{\theta},\underline{b}') - \underline{\alpha}'(1+\lambda)C = 0 \\
&\hat{U}_3' = g(\hat{\theta}',\hat{b}') - \hat{\alpha}'(1+\lambda)C = g(\hat{\theta},\underline{b}') - g(\underline{\theta},\underline{b}') \\
&\overline{U}_3' = g(\overline{\theta},\hat{b}') - g(\hat{\theta}',\hat{b}') + g(\hat{\theta},\underline{b}') - g(\underline{\theta},\underline{b}')
\end{aligned}
\tag{A.24}
$$

If we evaluate the difference $\hat{U}_3' - \hat{U}_3^{AI}$, we obtain

$$
\hat{U}_3' - \hat{U}_3^{AI} = g(\hat{\theta},\underline{b}') - g(\hat{\theta},\underline{b}^{AI}) + g(\underline{\theta},\underline{b}^{AI}) - g(\underline{\theta},\underline{b}') \tag{A.25}
$$

We can apply two first-order Taylor-Young expansions and find a first-order approximation to this difference

$$
\hat{U}_3' - \hat{U}_3^{AI} \approx \left(g_b(\hat{\theta},\underline{b}^{AI}) - g_b(\underline{\theta},\underline{b}^{AI})\right)db \tag{A.26}
$$

where $db = \underline{b}' - \underline{b}^{AI} \geq 0$. By a initial assumption of the second cross derivative of the function g, we obtain the positiveness of the difference, hence the increase in the informational rent for the medium-type of representative. The same proof applies for the highest type of representative.

Appendix 5

*) Under the *status quo*, the welfare is given in (28). Of course, if the President proposes $\alpha_{Max} = \overline{\alpha}^{AI}$, the results remain identical, with an unique change in on the highest percentage in the welfare expression.

Next, the President proposes $\alpha_{Max} = \overline{\alpha}^{AI} - \varepsilon$ where $\varepsilon \to 0$. After the lobby's optimization, we obtain the schedules of bribes and the rents depicted in the Proposition 5. The resulting welfare W_{lc}^{PR} (PR like "partial reform", lc like "low corruption") is then

$$
W_{lc}^{PR} = 3n(V - C) + n(\hat{U}' + \overline{U}') - n\lambda\left(\underline{\alpha}' + \hat{\alpha}' + (\overline{\alpha}^{AI} - \varepsilon)\right)C - n\left(\underline{b}' + \hat{b}' + \overline{b}'\right) \tag{A.27}
$$

If we evaluate a first order linear approximation to the difference $W_{lc}^{PR} - W_c$, applying all the previous results (usual transformations of the percentages by incentive or participation compatibility, difference in rents showed in the proposition above) and first-order Taylor-Young expansions we can say that

$$
\begin{aligned}
W_{lc}^{PR} - W_c \approx\ & n\,db\left[2\left(1+\frac{\lambda}{1+\lambda}\right)g_b\left(\hat{\theta},\underline{b}^{AI}\right) - \left(2+\frac{3\lambda}{1+\lambda}\right)g_b\left(\underline{\theta},\underline{b}^{AI}\right) - 1\right] \\
& + n\Delta b\left[\left(1+\frac{\lambda}{1+\lambda}\right)g_b\left(\overline{\theta},\hat{b}^{AI}\right) - \left(1+\frac{2\lambda}{1+\lambda}\right)g_b\left(\hat{\theta},\hat{b}^{AI}\right) - 1\right] \\
& + n\partial b\left[\frac{\lambda}{1+\lambda}g_b\left(\overline{\theta},\overline{b}^{AI}\right) + 1\right]
\end{aligned}
\tag{A.28}
$$

where $db = \underline{b}' - \underline{b}^{AI}$, $\Delta b = \hat{b}' - \hat{b}^{AI}$ and $\partial b = \overline{b}^{AI} - \overline{b}'$ (the last change of sense is caused by the particular first result of the previous proposition). If we apply the first-order conditions that characterizes the results under asymmetric information of the Proposition 1 and rearrange, the difference could be approximated by

$$
W_{lc}^{PR} - W_c = n\,db\left[g_b\left(\underline{\theta},\underline{b}^{AI}\right) - 2(1+\lambda)\right] + n\Delta b\left[g_b\left(\hat{\theta},\hat{b}^{AI}\right) - 2(1+\lambda)\right] + n\partial b(1+\lambda)
\tag{A.29}
$$

This last expression allow us to postulate a sufficient condition to obtain a positive sign. If the functional form of the gain function sets that, at the second best optimum, its partial derivative with respect to b for the $\hat{\theta}$-type representative is important enough to make the difference in the second bracket positive, then the partial reform can improve the welfare in relation to the *status quo* situation.

*) By a heavy proposal for a partial reform we mean that $\alpha_{Max} = \varepsilon$ where $\varepsilon \to 0$. Henceforth, applying the last result of the Proposition 6, we analyze the situation where the optimal contact implies a "global bunching point" for the three types of representatives. In that particular case, the *ex-post* welfare is .

$$
\begin{aligned}
W_{lc}^{PR} = 3n & \left\{(V - C) - \lambda\varepsilon C - (1+\lambda)\left(\overline{U}^{AI} - \overline{U}'\right)\right\} \\
& - 3nb' \\
& + \left\{\underline{U}' + \left(\overline{U}^{AI} - \overline{U}'\right) + \hat{U}' + \left(\overline{U}^{AI} - \overline{U}'\right) + \overline{U}' + \left(\overline{U}^{AI} - \overline{U}'\right)\right\}
\end{aligned}
\tag{A.30}
$$

The first line shows the net consumer's surplus: it takes in account the deadweight loss of the same subsidies for the lobbies and the fiscal cost of paying an incentive-compatible-rent difference to all the representatives in order to have the proposal accepted. This difference has to be the one that compensates the group of representatives most hurt by the reform. By the formalization of the model (*ie.* the increasing-type property of the gain function) and the characterization of the optimal contract, it is the highest type of representatives who are the most hurt.
The second line considers the direct negative impact of paying the same bribe to all the representatives. The last one shows the total utilities of the different types of representatives. We say total because we take in account the resulting utility of the relation with the lobby and the received salary to promulgate the reform.

Applying the same transformations as we did all over the paper, the difference $W_{lc}^{PR} - W_{nc}^{FR}$ equals

$$
W_{lc}^{PR} - W_{nc}^{FR} = n\left[g\left(\hat{\theta},b'\right) + (1+3\lambda)g\left(\overline{\theta},b'\right)\right] - 3nb' + 3n\lambda^2\varepsilon C
\tag{A.31}
$$

Because all over this section we assume $A1$, we can say

$$W_{lc}^{PR} - W_{nc}^{FR} \geq n(2+3\lambda)g\left(\hat{\theta}, b'\right) - 3nb' + 3n\lambda^{2}\varepsilon C \qquad \text{(A.32)}$$

At the limit, a necessary and sufficient condition to ensure the positive sign is $2+3\lambda \geq \dfrac{3}{1+\lambda}$, which yields $\lambda \geq \dfrac{\sqrt{37}-5}{6}$. Hence the result of the last part of the proposition.