CAHIER 21-2001

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September 2001

RÉSUMÉ

Cet article tente d'expliquer pourquoi les réformes efficaces ne sont pas effectuées quand les gens qui en sont lésés ont le pouvoir de les bloquer, et ce, même quand des schémas de compensation sont possibles. Nous proposons un modèle de "signaling" avec information incomplète bilatérale dans lequel le gouvernement a besoin d'effectuer deux réformes de façon séquentielle en négociant avec des groupes d'intérêt. La formation des groupes d'intérêt est endogène, les compensations sont distorsionnaires et les types de gouvernement se soucient différemment des distorsions. Nous montrons que, lorsque les compensations sont informatives à propos du type de gouvernement, il y a un biais contre le paiement de compensations et la réalisation des réformes. Ceci est dû au fait que le paiement de compensations élevées aujourd'hui donne des incitations à certains groupes d'intérêt de s'organiser et de bloquer la réalisation de réformes subséquentes, avec le seul but d'obtenir des transferts. En payant des compensations plus basses, le gouvernement tente d'éviter l'organisation de ce genre de groupes d'intérêt. Cependant, ceci implique aussi que certaines réformes soient bloquées par des groupes d'intérêt ayant des pertes relativement élevées.

Mots clés : réformes, groupes d'intérêt, compensations, réputation

ABSTRACT

This paper proposes an explanation for why efficient reforms are not carried out when losers have the power to block their implementation, even though compensating them is feasible. We construct a signaling model with two-sided incomplete information in which a government faces the task of sequentially implementing two reforms by bargaining with interest groups. The organization of interest groups is endogenous. Compensations are distortionary and government types differ in the concern about distortions. We show that, when compensations are allowed to be informative about the government’s type, there is a bias against the payment of compensations and the implementation of reforms. This is because paying high compensations today provides incentives for some interest groups to organize and oppose subsequent reforms with the only purpose of receiving a transfer. By paying lower compensations, governments attempt to prevent such interest groups from organizing. However, this comes at the cost of reforms being blocked by interest groups with relatively high losses.

Key words : reforms, interest groups, compensations, reputation

1 Introduction

Economists have long been puzzled by the fact that efficiency-enhancing reforms are often not implemented. What seems puzzling is that the status quo prevails over reforms that produce benefits in excess of costs and for which mechanisms to compensate losers are feasible. The goal of this paper is to propose an explanation for this paradox.

The literature that has addressed the issues of economic policy reform (Fernandez and Rodrik (1991)), technology adoption (Krusell and Ríos-Rull (1996) and Parente and Prescott (1994, 1997)) and endogenous fiscal policy in growth models (Persson and Tabellini (1994), Bertola (1993) and Alesina and Rodrik (1994)) has shown that, if losers have enough power to prevent the change, economies will remain stuck at inefficient equilibria. A Coasian argument, however, suggests that if transaction costs were sufficiently low, losers could be compensated and efficiency would necessarily be attained. High transaction costs are then, sometimes implicitly, invoked as reasons why compensations are not feasible and reforms not carried out.

In this paper we explicitly formalize some of these transaction costs. Our starting point is the observation that reform processes have a sequential nature. Even in historical cases of "big bangs," as in Poland at the beginning of the 90's, the reform process has extended over a few years. If governments differ in their willingness to compensate losers and if this is private information, compensation payments may become a signaling device.

We capture these insights in a signaling model, in the spirit of Milgrom and Roberts (1982) and Kreps and Wilson (1982). A government faces the task of sequentially implementing two efficient reforms by bargaining with the losers from each reform. Losers may block the implementation of a reform by organizing, at a cost, as an interest group. The government offers compensations to induce an interest group to accept the reform. Interest groups are heterogenous in their loss from the reform and their cost of organizing. Since the decision to organize is endogenous, it will depend, among other things, on the amount of compensations the interest group expects to receive from the government.

Under "informational linkages" (Fudenberg and Kreps (1987)) - where the losers from the second reform can observe a government's first period compensation offer - a government may have an incentive to build a reputation of "toughness" by making a relatively low offer to the losers from the first reform. In the second period, a government's reputation for toughness pays off by discouraging some losers from organizing and opposing the implementation of the second reform. Under "informational isolation" - where no first period event can be observed - reputational concerns are not present.

We show that in all the equilibria of the model that satisfy a reasonable restriction on beliefs, there is a bias against the implementation of reforms and the payment of compensations. Specifically, the ex-ante probability of implementing the first reform and the expected amount of compensations paid in the first period of every equilibrium are lower under informational linkages than under informational isolation. Similar results also hold, under some conditions, for the second period path of play of every equilibrium.

The ex-ante probability of carrying out the first reform decreases because the government's reduced propensity to compensate increases the likelihood that its offer is rejected by the first interest group. More interestingly, in the second period, the effect of reputation on the organization of losers does not necessarily translate into a higher probability of implementing the reform. In fact, losers that are discouraged from organizing would be, instead, just seeking transfers from the government and would not oppose the implementation of the reform. In our model, governments sacrifice efficiency in the first period in order to obtain a larger share of the surplus produced by the second reform. Efficiency is thus traded-off for distribution.

These results show how the presence of informational linkages across periods can, by itself, introduce a bias against the implementation of reforms and the payment of compensations. In this respect, the paper provides a partial justification for the simplifying assumption, introduced by the papers mentioned above, of exogenously ruling out side payments to losers.

We also view our explanation of the status quo bias as complementary to those advanced

by other papers that have explicitly modelled some of the transaction costs involved in compensating losers from reform.

One type of transaction costs, proposed by Fernandez and Rodrik (1991) and Besley and Coate (1998), emphasizes the absence of commitment on the side of policymakers as one of the main problems with compensations.[1] In these models, a majority of agents today votes against the implementation of an efficient reform because it foresees that tomorrow a potentially different majority will not have the incentive to compensate it for its losses.

We share the view that commitment devices are generally not available to policymakers in the real world. In our model, if governments could commit to a compensation scheme at the outset of the reform process, reputational issues would not play any role since interest groups would not base their organization decision on expected compensations. Casual evidence suggests, however, that governments often find themselves forced to renege on their original intentions once faced with enough pressure from powerful interest groups. In a world without commitment devices, such as ours, reputational concerns are bound to play an important role whenever reforms have to be implemented sequentially.

A point in which we depart from this literature is that the political model we describe does not feature democratic voting as a means of aggregating the preferences of losers and winners from reform. In the model we propose, instead, winners and losers interact by bargaining over the surplus generated by the reform and losers, if they decide to organize, can block the implementation of a reform. This modelling choice reflects the fact that many reforms produce costs that are concentrated on a minority of losers, whereas the benefits are spread across the whole population. It thus seems likely that losers organize as pressure groups, while winners rely on the government to defend their interests.

Another sort of transaction costs, suggested by Dewatripont and Roland (1992), focuses on the implications of private information about the losers' characteristics for the timing

[1] Absence of commitment on the side of policymakers has also been stressed by Dixit and Londregan (1995) as a reason why efficient economic decisions are not undertaken. In their model competing political parties cannot commit not to make transfers according to agents' political characteristics, which reduces the rewards from efficient economic decisions.

of reform implementation. In their model a government faces the problem of reducing the size of a public sector, by inducing heterogenous workers to leave by means of compensations. Workers differ in terms of their disutility of work, which is private information. This informational constraint may induce the government to implement a partial reform, rather than a full one, to minimize the rents conceded to workers. As Dewatripont and Roland, we also assume that losers from reform have private information about their characteristics. However, the key element of our analysis is the assumption that the government's type is private information as well.

At the end of the paper we discuss an example that illustrates some of the key assumptions and mechanisms of our model: the current peace process in Colombia. In 1998, the Colombian government of Andres Pastrana initiated a reform process by sequentially bargaining with the country's two most powerful guerrilla groups. After the first group received a generous compensation package from the government to sit at the bargaining table, the second one staged a campaign of political violence to obtain a similar deal. In the paper we argue that this example points to the importance of reputational concerns in a world where reforms are implemented sequentially and governments cannot commit.

The paper is organized as follows. Section 2 describes the model. Section 3 analyzes the equilibria in two useful benchmarks: public information about the government and private information about the government in the absence of informational linkages across periods. Section 4 analyzes the equilibria of the model when the government's type is private information and periods are informationally linked. In this section we also characterize and show the existence of separating and pooling equilibria. Section 5 describes the effects of reputation on reforms and compensations. Section 6 discusses the Colombian example in detail. Section 7 concludes. We refer to the Appendix for the proofs of the results.

2 The Model

In this model a government faces the task of sequentially implementing two economic reforms by bargaining with two interest groups, one for each reform.[2] The objective of the government is the maximization of the discounted monetary surplus produced by the reforms, net of compensations to interest groups and the distortions they cause. Interest groups are heterogeneous in terms of their evaluation of the status quo and the cost of organizing themselves, which are both private information.

At the beginning of each period the concerned interest group has to decide whether to organize (in the following "enter"), at a cost. If the cost is not undertaken ("stay out") the interest group does not have any power to affect the outcome of the reform process. If it decides to organize, instead, it acquires the power to block the reform. After the entry decision has been taken the interest group receives a take-it-or-leave-it compensation offer from the government which it can accept or reject. In case of acceptance, the reform is implemented and compensations are paid. Otherwise the reform is blocked if the interest group has chosen to organize itself.

The sequential nature of the game depends on the amount of information about the government's type that the first round of negotiations conveys to the second interest group. If negotiations occur under "informational isolation", the game is equivalent to one in which reforms are carried out simultaneously. Under "informational linkages", instead, the second interest group can observe a government's first period compensation offer. In the real world, it is likely that the process of implementing reforms has a sequential nature. By "sequential" we mean that the time span between the implementation of two reforms is long enough for interest groups to be able to organize themselves.

We denote by $i = 1, 2$ both a reform and the concerned interest group.

Government

[2] In the following, we use the expression "interest groups" to indicate losers from reform both in the case they decide to organize and in the case they do not. Of course interest groups that do not organize will not have any power to block a reform.

The government's utility function is

$$E\left[\sum_{i=1}^{2}\delta^{i-1}I_i\left(v-\tau c_i\right)\right]$$

where $I_i = 1$ if reform i is implemented and 0 otherwise and where $\delta \in (0,1]$ is a discount factor. The parameter v represents the monetary surplus generated by each reform and c_i denotes the compensations that the government offers to interest group i. We view compensations in a broad sense: c_i may represent a direct monetary payment from the government to the interest group or the monetary value of any legislation act that would benefit the interest group.

The payment of compensations entails two kinds of cost for a government, which are captured by the parameter $\tau \geq 1$. First, we assume that the government cares only about the rest of society, not about interest groups, since it is the general public that will be responsible for its reelection. Each dollar transferred to interest groups therefore reduces the government's payoff by a dollar.

Second, we postulate that there is an additional cost of making transfers for a government. This cost could be due to the fact that compensations are simply distortionary, as in Dewatripont and Roland (1992). In this case $\tau - 1$ would represent the welfare cost of raising one dollar of side payments or of enacting legislation that favors interest groups.[3] Alternatively, governments may be concerned about being perceived by the general public to favor the particular interest group they are compensating, as in Coate and Morris (1995). In this case, $\tau - 1$ would represent any such cost to the government arising because of making transfers to special interests.[4] We interpret τ as summarizing these costs of making transfers and refer to it simply as a government's "willingness to compensate."

We assume that interest groups cannot directly observe a government's willingness to compensate. Differences in τ will be associated to unequal access by governments to efficient

[3] The specification of the government's preferences implies that only resources generated by the implementation of the reform will be used in paying compensations. Any compensation scheme is thus necessarily consistent with a balanced budget.

[4] In Coate and Morris (1995), when governments face such reputational concerns, they might resort to disguised and often inefficient compensation schemes. However, also in their model, reputational concerns can induce governments not to make neither direct nor disguised transfers to interest groups.

transfer mechanisms, or to their different concerns about compensating special interests. We consider two types of government denoted by τ_s ("strong" type) and τ_w ("weak" type), where we normalize $\tau_w = 1$ and let $\tau_s = t > 1$. Notice that the "strong" type is relatively less willing to compensate than the "weak" one.[5] The prior distribution of τ is common knowledge: a government is strong with probability $q \in [0,1]$ and weak with probability $1-q$.

Our key interest will be to investigate how the sequential nature of the reform process interacts with the fact that (i) governments dislike compensating interest groups per se, and that (ii) their willingness to compensate is private information.

Interest Groups

We assume interest group i only cares about reform i. An interest group is a collection of agents that would suffer a loss in the case a reform were implemented and which has the power to block it, at a cost.[6] We do not analyze the sources of this power. What we have in mind is the capacity of interest groups (unions, lobbies, etc.) to affect the outcomes of political processes by influencing the public opinion, government's officials and by not providing their sometimes essential cooperation to the successful implementation of reforms.

Interest groups have linear utility functions. They are indexed by the couple of parameters (λ, k) which is private information. The parameter λ represents the utility that an interest group derives from the status quo. It has a prior distribution which is uniform on the unit interval, i.e., $\lambda \sim U[0,1]$. We view the assumption that λ is private information as a realistic feature of our model, since it seems likely that an interest group has more information than a government on the way it may be affected by a reform.[7]

The parameter k represents the cost an interest group has to incur in order to organize itself as such and be able to participate in the negotiations. It represents different types of expenditures the interest group may incur: costs related to organization, collection of

[5] The labels "strong" and "weak" refer simply to the equilibrium behavior we anticipate for each government type in terms of compensation offers.

[6] Qualitatively similar results would follow if we assumed that the government could still implement the reform with some exogenous probability after a rejection of its compensation offer by the interest group.

[7] It could be argued that interest groups may signal their losses to the government in order to be compensated. We take the view that this type of signaling would typically be costly and thus imperfect.

information, public relations, etc. As we mentioned above, if this cost is not borne, interest groups cannot credibly threaten to block the reform, because of lack of organization. The cost k has a prior distribution which is uniform on the unit interval, i.e., $k \sim U[0,1]$. We assume that λ and k are independently distributed.[8]

For convenience we define a variable e_i which takes a value of 1 if interest group i decided to organize and 0 otherwise. We summarize the payoff of an interest group (λ, k) in Table 1, where c_1 represents compensations paid by the government to the interest group if it organizes and c_0 the compensations if it does not organize.

Table 1 - Payoff of Interest Group (λ, k).

	Reform Implemented	Reform Not Implemented
$e = 1$	$c_1 - k$	$\lambda - k$
$e = 0$	c_0	λ

Efficient Reforms

Reforms are assumed to produce aggregate benefits in the sense of Besley and Coate [1998]: a reform is efficient if there exists a compensation scheme that makes both the affected interest group and the government better-off with respect to a status quo characterized by no reform. The following assumption guarantees that all the reforms we consider are efficiency enhancing:

Assumption 1. $v \geq t$.

A government of type τ prefers a reform over the status quo if and only if $v \geq \tau c$. As long as $c = 1$ all interest group types are better-off if the reform is implemented. A government of type τ is better-off as long as $v \geq \tau$. Since $t > 1$, Assumption 1 guarantees that the reform can result in a Pareto improvement.

In order to avoid the trivial case in which the surplus produced by reforms is so large that, under public information about the government, both types would always want to compensate all interest groups, we assume the following

[8] The assumption that *both* λ and k are private information of interest groups is essential to demonstrate the role played by informational linkages in the reform process. Footnote 11 below provides an intuition for why this is the case.

Assumption 2. $v < 2$.

Strategies and Equilibrium

We limit our analysis to pure strategy equilibria. A strategy for a government of type τ facing entry levels e_1 and e_2 consists of first and second period compensation offers conditional on entry. A strategy for an interest group i of type (λ, k) is an entry decision e_i and a decision of whether to accept or reject a compensation offer c_i.

A perfect Bayesian equilibrium of this game is a strategy and beliefs for the government and a strategy and beliefs for each of the two interest groups, such that: i) the government's strategy is sequentially optimal given its beliefs and the interest groups' strategies; ii) each interest group's strategy is sequentially optimal given its beliefs and the government's strategy; iii) government's beliefs are consistent with interest groups' strategies, in the sense that they are derived from Bayes' rule whenever it is possible; iv) interest groups' beliefs are consistent with the government's strategy, in the sense that they are derived from Bayes' rule whenever it is possible.

3 Notation and Equilibria in Two Benchmark Games

We consider three cases which differ according to the informational structure of the game. First we analyze the perfect Bayesian equilibrium (from now on "equilibrium") of the game under public information about the government. Second, we consider the equilibrium of the game under incomplete information about the government when there is no informational linkages between reforms. These exercises establish two useful benchmarks with which we can compare the equilibria of the game under private information about the government and informational linkages between reforms. This analysis will allow us to isolate the effects of the sequential nature of reforms on compensations and reform implementation.

3.1 Public Information about the Government

Under public information about the government's type, dynamic considerations do not play any role since the government faces a randomly drawn interest group's type in each period.

We begin by describing the entry decision of an interest group of type (λ, k) when the government has generic type τ. First of all, notice that if it does not enter, it receives no compensations since it does not have any power to block the implementation of the reform. An interest group of type (λ, k), which anticipates to receive an offer c_τ^* from the government, is going to enter if and only if[9]

$$\max\{c_\tau^* - k, \lambda - k\} \geq 0.$$

This condition implies that all interest groups characterized by $\lambda \geq k$ or $k \leq c_\tau^*$ will enter. Interest groups characterized by $\lambda \geq k$ decide to enter independently from the expected amount of compensations. Interest groups characterized by $\lambda < k$, instead, enter only if expected compensations are large enough to cover the cost of organization. Thus a government that is willing to offer higher compensations will attract more interest groups that organize with the only purpose of receiving this transfer.

We denote the set of interest group types that decide to enter by $A_{c_\tau^*} = \{(\lambda, k) \text{ s.t. } k \leq c_\tau^* \text{ or } \lambda \geq k\}$. We will also use this set in the analysis of the equilibria of the sequential game. It is represented in Figure 1.

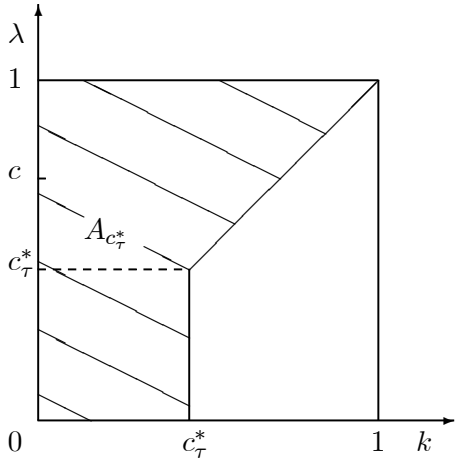

Figure 1 - Entry under Public Information about the Government's Type.

We now analyze the game given entry. From the previous discussion it follows that the only consistent beliefs of the government about the type of interest group that decided to enter are represented by the uniform distribution over the set $A_{c_\tau^*}$.

[9] We are assuming, without loss of generality, that an interest group will enter if indifferent.

An interest group of type (λ, k) that entered and is facing a compensation offer c will accept it if $c \geq \lambda$ and will reject otherwise.[10] Upon entry, a government of type τ makes a compensation offer

$$c_\tau^{pb} = \arg\max_c V_\tau\left(c; c_\tau^*\right) \tag{1}$$

where $V_\tau\left(c; c_\tau^*\right)$ is the expected utility of a government of type τ that offers c when entry is characterized by the set $A_{c_\tau^*}$. We restrict the analysis to $c \in [0,1]$ since $c > 1$ is clearly suboptimal from the government's perspective. Expected utility is given by

$$V_\tau\left(c; c_\tau^*\right) = (v - \tau c)\,\pi\left(c; c_\tau^*\right)$$

where $v - \tau c$ represents the net gain to the government from implementing a reform and paying c in compensations and $\pi\left(c; c_\tau^*\right)$ represents the government's subjective probability that its offer c is going to be accepted, conditional on entry, as characterized by $A_{c_\tau^*}$. Formally,

$$\pi\left(c; c_\tau^*\right) = \begin{cases} 2\theta c_\tau^* c \text{ if } 0 \leq c \leq c_\tau^* \\ \theta\left[c^2 + \left(c_\tau^*\right)^2\right] \text{ if } c_\tau^* < c \leq 1 \end{cases}$$

where $\theta = \theta\left(c_\tau^*\right) = 1/\left[1 + \left(c_\tau^*\right)^2\right]$. In Figure 1, the graphical interpretation of $\pi\left(c; c_\tau^*\right)$ is the area below c in the set $A_{c_\tau^*}$. In equilibrium, consistency of beliefs requires that $c_\tau^{pb} = c_\tau^*$. Our results are summarized in the following

Proposition 1. *In the unique equilibrium path of play of the game under public information about τ, only interest groups in the set $A_{c_\tau^{pb}}$ enter. Upon entry, a government of type τ offers*

$$c_\tau^{pb} = \frac{v}{2\tau}.$$

Among interest groups that entered, this offer is accepted by those characterized by (λ, k) such that $\lambda \leq c_\tau^{pb}$ and rejected otherwise. If a government does not observe entry, it implements the reform at no cost.

Notice that Assumption 2 guarantees that $c_\tau^{pb} < 1$ for both government's types.[11]

[10] We assume, without loss of generality, that the interest group accepts when indifferent.

[11] At this point we can provide an intuition for why we need both λ and k to be private information to be

3.2 Private Information about the Government under No Informational Linkages

Suppose now that the interest groups do not know the government's type. With no informational linkages between reforms the whole game is reduced to two independent static games. This can be interpreted as a situation in which reforms are carried out simultaneously.

We again start our analysis from the entry decision of interest groups. Since they do not know the government's type, they will base their decision on expected utility. An interest group of type (λ, k) is going to enter if and only if

$$q \max\{c_s^* - k, \lambda - k\} + (1-q)\max\{c_w^* - k, \lambda - k\} \geq 0 \tag{2}$$

where, as before, c_τ^* denotes the interest group's conjecture about the offer it is going to receive from a type τ government in case of entry. The condition above makes use of the fact that no government compensates interest groups that do not organize.

Notice that, as under public information about the government, all interest groups whose evaluation of the status quo λ is greater than the organization cost k decide to enter independently from the amount of compensations they expect to receive.

Consider now interest groups such that $\lambda < k$. Since the max is a convex function, Jensen's inequality implies that the left-hand side of equation (2) is weakly greater than $\max\{\overline{c}^* - k, \lambda - k\}$ where $\overline{c}^* = qc_s^* + (1-q)c_w^*$. When $\lambda < k$, the condition $\max\{\overline{c}^* - k, \lambda - k\} \geq 0$ is satisfied by interest groups with $k \leq \overline{c}^*$. The intuition for this result is simple. Since the utility of interest groups is linear in compensations and they can always keep the status quo by rejecting the compensation offer, interest groups are "risk lovers". This explains why all types whose cost of entry is below or equal to expected com-

able to demonstrate the role played by informational linkages in the reform process. Consider, for example, the case where k is a known constant. Under public information about the government, two situations then arise: 1) All interest group types in $[0,1]$ organize independently of the government's type; 2) Only interest group types in $[k,1]$ organize if the government is strong, while all types in $[0,1]$ organize if the government is weak. Situation 1) is not useful for our purposes because it implies that there are no gains from being perceived as strong rather than weak; thus there would be neither separating nor pooling equilibria in the game under informational linkages. Situation 2) does not suffer from this drawback, but is not consistent with our Assumption 1 (efficient reforms). The choice of modeling k as private information allows us to make entry by interest groups a function of the government's type, without violating the assumption that all reforms are efficient.

pensations decide to organize. Moreover, it also explains why types with $c_w^* > k > \overline{c}^*$ and $k > \lambda > c_s^*$ choose to enter as well. Formally, in this case, if $c_w^* > c_s^*$, equation (2) is satisfied if $\lambda \geq [k - (1-q)\, c_w^*]/q$.[12]

We denote the set of interest group types that decide to enter by $B_{c_s^*, c_w^*} = \{(\lambda, k) \text{ s.t. } \lambda \geq k \text{ or } k \leq \overline{c}^* \text{ or } \lambda \geq [k - (1-q)\, c_w^*]/q\}$. This set will also be used in the analysis of the equilibria of the sequential game. It is represented in Figure 2 in the case $c_w^* < 1$.

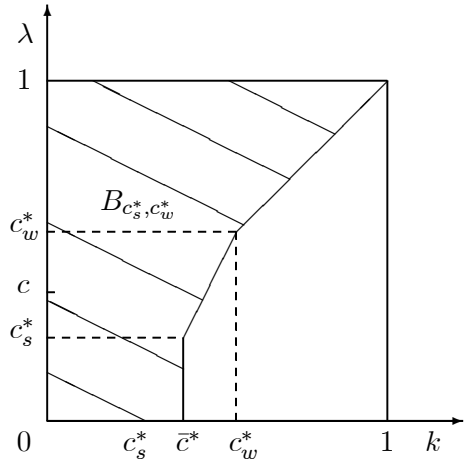

Figure 2 - Entry under Private Information about the Government's Type.

Consider now the problem of a government of type τ, given entry. As before, consistent beliefs require that it conjectures that interest groups that decide to enter are uniformly distributed on $B_{c_s^*, c_w^*}$. Given these beliefs the government offers

$$c_\tau^{nl} = \arg\max_c V_\tau\left(c; c_s^*, c_w^*\right) \tag{3}$$

where $V_\tau\left(c; c_s^*, c_w^*\right)$ is the expected utility of a type τ government that offers compensations c, when entry is characterized by the set $B_{c_s^*, c_w^*}$. It is given by, for $c \in [0,1]$

$$V_\tau\left(c; c_s^*, c_w^*\right) = (v - \tau c)\, \pi\left(c; c_s^*, c_w^*\right)$$

where $\pi\left(c; c_s^*, c_w^*\right)$ represents the probability that the offer c is accepted conditional on entry

[12] The opposite conjecture $c_w^* \leq c_s^*$ can never be verified in equilibrium.

as described by $B_{c_s^*,c_w^*}$. Formally,

$$\pi\left(c;c_s^*,c_w^*\right)=\begin{cases} 2\sigma\overline{c}^*c \text{ if } 0\leq c\leq c_s^* \\ 2\sigma\left[c\overline{c}^*+\frac{q}{2}\left(c-c_s^*\right)^2\right] \text{ if } c_s^*<c\leq c_w^* \\ 1-\sigma\left(1-c^2\right) \text{ if } c_w^*<c\leq 1 \end{cases}$$

where $\sigma=\sigma\left(c_s^*,c_w^*\right)=1/\left[1+q\left(c_s^*\right)^2+\left(1-q\right)\left(c_w^*\right)^2\right]$. In Figure 2, the graphical interpretation of $\pi\left(c;c_s^*,c_w^*\right)$ is the area below c in the set $B_{c_s^*,c_w^*}$. In equilibrium, consistency of beliefs requires that $c_s^{nl}=c_s^*$ and $c_w^{nl}=c_w^*$.

The solution for the weak government turns out to be

$$c_w^{nl}=\min\left\{\frac{v}{4-q}\left[1+\sqrt{1-\frac{q\left(4-q\right)}{4t^2}}\right],1\right\}.$$

In the rest of the paper we will concentrate on the region of the parameter space for which $c_w^{nl}=1$ because the analysis of the game under informational linkages is much simpler in this case, without changing any of our results.[13] The necessary and sufficient condition for $c_w^{nl}=1$ is then given by

Assumption 3. $\frac{4(1-v/2)}{1-(v/2t)^2}\leq q\leq 1$.

Proposition 2 characterizes the equilibrium under informational isolation when parameters satisfy Assumption 3.

Proposition 2. *In the unique equilibrium path of play of the game under "informational isolation", only interest groups in the set $B_{c_s^{nl},c_w^{nl}}$ enter. Upon entry, a strong government offers*

$$c_s^{nl}=\frac{v}{2t}$$

and a weak government offers

$$c_w^{nl}=1.$$

Among interest groups that entered, c_τ^{nl} is accepted by those characterized by (λ,k) such that $\lambda\leq c_\tau^{nl}$ and rejected otherwise. If a government does not observe entry, it implements the reform at no cost.

[13] We provide an analysis of the case under which $c_w^{nl}<1$ in Castro and Coen-Pirani (2001).

The proposition illustrates the fact that under "informational isolation" the compensation scheme offered by a weak government is larger than under public information. This is due to the fact that, when going from public to private information about the government, the risk of facing a strong type of government induces some interest groups with low evaluation of the status quo not to organize. Consequently a weak type has an incentive to increase its compensation offer in the economy with private information because it does not need to worry about these inframarginal interest groups.

3.3 Sources of Inefficiency under Informational Isolation

The sources of inefficiency under informational isolation are standard in this type of framework. The key element why some efficient reforms are not implemented in the context of the previous two sections is the fact that λ is private information. If λ was known, the government would make an offer $c = \lambda$ in case of entry, which would always be accepted. In this case all reforms would be implemented, whether the government's type is private information or not. Since the government does not know λ, but only its distribution, and since compensations are distortionary, it will not find it optimal in general to always implement the reform by offering $c = 1$. Consequently, some interest group types characterized by a high λ will reject the government's offer and block the reform.

As mentioned in the introduction, the model developed by Dewatripont and Roland (1992) is similar, in this particular respect, to our setup. In our analysis, though, also the government has private information: interest groups do not know its willingness to compensate. When we allow for informational linkages between reforms, this assumption, combined with uncertainty about λ, provides incentives for governments to use first period compensations as a signaling device. These incentives introduce a further bias against the implementation of reforms and the payment of compensations. The rest of the paper is devoted to the analysis of these dynamic mechanisms.

4 Informational Linkages between Reforms

We now assume that the second interest group can observe the offer made by the government during the negotiations over the first reform. After observing this offer, the second interest group updates, in a Bayesian fashion, its prior beliefs over the type of government it is facing.

This game displays two types of equilibria, separating and pooling. In a separating equilibrium the two types of government offer different compensations to an interest group that decides to enter in the first period. Consequently, the second interest group is able to infer the government's type and the game in the second period is identical to the one under public information analyzed in Section 3.1. In a pooling equilibrium, instead, both types make the same offer. In this case the game in the second period is the same as the one under no informational linkages and private information about the government's type analyzed in Section 3.2.

We cannot rule out the existence of equilibria characterized by an unnatural and unrealistic path of play. As an example, there exist separating equilibria in which a strong government signals its type by offering more compensations than it would have offered in the absence of reputational concerns. These equilibria are supported by out-of-equilibrium beliefs by the second interest group that place less probability mass on a strong type if lower compensations are offered. To rule out these equilibria, we restrict the second interest group's beliefs to satisfy the following monotonicity property[14]

Definition (Monotonic Beliefs). *Denote by $\mu(c)$ the probability assigned by the second interest group to a strong government after observing a compensation offer c. The second interest group has Monotonic Beliefs if, for any pair of first period compensation offers c and c' such that $c' > c$, $\mu(c) \geq \mu(c')$.*

This restriction allows us to prove Lemma 1, which characterizes the offer of a strong government in every equilibrium of the sequential game.

[14] This restriction on beliefs has been used, among others, by Coate and Morris (1995).

Lemma 1. *Under informational linkages, in every equilibrium with monotonic beliefs, the strong government's first period compensation offer does not exceed $v/2t$.*

Proof. By contradiction, consider an equilibrium with monotonic beliefs in which the strong government's first period offer is $c_s > v/2t$. Denote by c_w the weak type's first period offer in this equilibrium. Consider now a first period deviation by the strong type to $v/2t$. Monotonicity of beliefs guarantees that the strong type does not incur any reputational cost by decreasing its first period offer, i.e., $\mu(v/2t) \geq \mu(c_s)$. In a separating equilibrium, it must be the case that $\mu(c_s) = 1$, so that $\mu(v/2t) = 1$. This implies that a strong type's expected utility in the second period remains the same after the deviation. In order to obtain a contradiction it is sufficient to show that the strong type's expected utility in the first period is higher after the deviation to $v/2t$. In a separating equilibrium, in the first period, entry is characterized by the set B_{c_s,c_w} and a strong type's expected utility conditional on entry is proportional to $(v - tc)c$ for $0 \leq c \leq c_s$. It is immediate to check that it is maximized by $v/2t$, which leads to the contradiction.

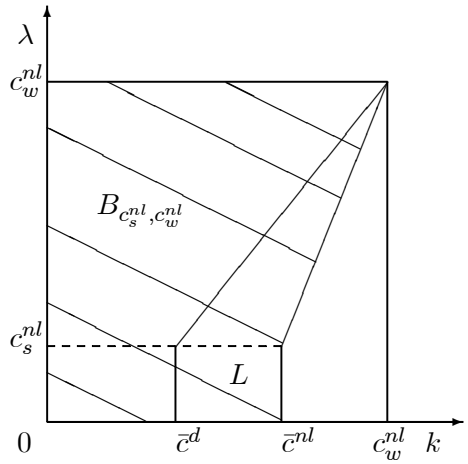

Figure 3 - Second Period Entry after a Deviation in a Pooling Equilibrium.

Consider now a pooling equilibrium where $c_w = c_s > v/2t$ and $\mu(c_s) = q$. Monotonicity of beliefs implies that $\mu(v/2t) \geq q$. This, in turn, implies that a strong type's expected utility in the second period does not decrease after the deviation. In fact, after the deviation, second period entry is characterized by the set $B_{c_s^{nl},c_w^{nl}} \backslash L$, as shown

in Figure 3 for $q < \mu(v/2t) < 1$,[15] where $\overline{c}^d = \mu(v/2t)\, c_s^{nl} + [1 - \mu(v/2t)]\, c_w^{nl}$. A strong government benefits when entry is characterized by the set $B_{c_s^{nl}, c_w^{nl}} \backslash L$ because it implements the reforms associated with interest groups with type $(\lambda, k) \in L$ without paying compensations. In order to obtain a contradiction it is sufficient to show that the strong type's expected utility in the first period is higher after the deviation to $v/2t$. In a pooling equilibrium, in the first period, entry is characterized by the set A_{c_s} and a strong type's expected utility conditional on entry is proportional to $(v - tc)\, c$ for $0 \leq c \leq c_s$. As above, it is immediate to check that it is maximized by $v/2t$, which leads to the contradiction. ■

Lemma 1 allows us to concentrate on equilibria in which the strong type offers first period compensations weakly below $v/2t$. In the following sections, we first provide a characterization of the separating and pooling equilibria with monotonic beliefs and then discuss their general existence.

We denote with primes all variables related to separating equilibria and with double primes all variables related to pooling equilibria. We also indicate with the letter "c" compensation offers in equilibrium and with the letter "z" offers that represent the best deviations from equilibrium.

4.1 Separating Equilibria

Consider a non-trivial separating equilibrium, in which a strong government makes a first period offer $c_s' < v/2t$. It can be supported using the following monotonic beliefs, indexed by the cut-off compensation level c^*: $\mu(c) = 1$ if $c \leq c^*$ and $\mu(c) = 0$ otherwise.

In the first round of negotiations, after entry, each government faces the following trade-off when deciding on compensations: either it offers its short-run optimum, in which case it will be considered weak by next period's interest group; or it chooses $c \leq c_s'$, which is sub-optimal from a short-run point of view but builds a reputation for being strong, deterring next period's entry by some interest group types that otherwise would have organized.[16]

[15] In the case $\mu(v/2t) = 1$, the set B_{c_s, c_w} collapses to the set A_{c_s} and the same kind of analysis applies.

[16] Notice that every $c < c_s'$ is strictly dominated by c_s' as a first period offer for both types of government.

In a separating equilibrium where the strong government offers compensations strictly below $v/2t$ if entry has occurred, less interest groups enter in the first period relative to the case under informational isolation. The weak government plays the myopic optimum. By the same argument as in Section 3.2, the weak government's myopic first period offer is then at least as high as c_w^{nl}, since the value of the status quo for the marginal interest group is now even higher. Upon entry, the first period offer of a weak government is then $c'_w = c_w^{nl} = 1$. In turn, first period entry is given by $B_{c'_s} = B_{c'_s,1}$. Formally, the short-run cost of offering c for a government of type τ, when first period entry is given by $B_{c'_s}$, is

$$C'_\tau\left(c; c'_s\right) = V_\tau^*\left(c'_s\right) - V_\tau\left(c; c'_s\right)$$

where $V_\tau^*\left(c'_s\right) = \max_{c\in[0,1]} V_\tau\left(c; c'_s\right)$. By definition, $C'_s\left(z'_s; c'_s\right) = 0$ and $C'_w\left(c'_w; c'_s\right) = 0$.

Consider now the second period. In Figure 4, the set N' represents interest group types that decide not to organize if they believe the government is strong rather than weak.

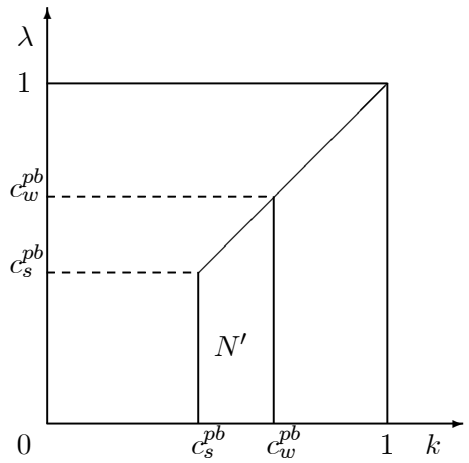

Figure 4 - Long-Run Gain in Separating Equilibrium.

The long-run gain of being perceived as strong is due to the fact that the reforms associated with interest groups in the set N' do not require any compensation payment to be implemented. Formally, the long-run gain of being perceived as strong for a government of type τ is

$$G'_\tau = \Pr\left(e_2 = 1; c_w^{pb}\right)\left[v - V_\tau^*\left(c_w^{pb}\right)\right] - \Pr\left(e_2 = 1; c_s^{pb}\right)\left[v - V_\tau^*\left(c_s^{pb}\right)\right]$$

where $\Pr\left(e_2 = 1; c_\tau^{pb}\right)$ is the probability that the second interest group decides to enter when entry is characterized by the set $A_{c_\tau^{pb}}$.

The following incentive compatibility constraints must hold in a separating equilibrium[17]

$$\begin{aligned} C'_w\left(c'_s; c'_s\right) &\geq \delta G'_w \\ C'_s\left(c'_s; c'_s\right) &\leq \delta G'_s. \end{aligned} \tag{4}$$

Proposition 3 provides a full characterization of the path of play in separating equilibria.

Proposition 3 (Separating Equilibria). *Under "informational linkages", in every non-trivial separating equilibria with monotonic beliefs, the unique path of play, indexed by c'_s, is the following. In the First Period:*

- *only interest groups characterized by (λ, k) in the set $B_{c'_s}$ choose to organize;*
- *a strong government offers $c'_s < v/2t$ to interest groups that entered and zero otherwise;*
- *a weak government offers $c'_w = 1$ to interest groups that entered and zero otherwise;*
- *among interest groups that entered, c'_s is accepted only by those characterized by $\lambda \leq c'_s$ and $c'_w = 1$ is accepted by all of them.*

If the interest group enters in the First Period, then the Second Period path of play is identical to the one under public information. Otherwise, the Second Period path of play is identical to the one with no informational linkages.

4.2 Pooling Equilibria

Consider now a pooling equilibrium in which $c''_s \leq v/2t$. It can be supported using the following monotonic beliefs, indexed by c^*: $\mu(c) = q$ if $c \leq c^*$ and $\mu(c) = 0$ otherwise. In the first period of a pooling equilibrium entry is described by the set $A_{c''_s}$.[18] In equilibrium,

[17] We assume, without loss of generality, that both the weak and the strong types do not deviate when indifferent.

[18] Notice that every $c < c''_s$ is strictly dominated by c''_s as a first period offer for both types of government, given monotonic beliefs.

both types of government play suboptimally from a short-run perspective. Myopically, a government of type τ would have offered z''_τ, with $z''_w = 1$ and $z''_s \leq 1$ since a weak government has a greater willingness to compensate. Formally, the short-run cost of offering c for a government of type τ, when first period entry is given by $A_{c''_s}$, is

$$C''_\tau\left(c; c''_s\right) = V^*_\tau\left(c''_s\right) - V_\tau\left(c; c''_s\right)$$

where $V^*_\tau\left(c''_s\right) = \max_{c\in[0,1]} V_\tau\left(c; c''_s\right)$. Notice that, by definition, $C''_\tau\left(z''_\tau; c''_s\right) = 0$.

The long-run gain of not being perceived as a weak type is that it discourages some interest group types from organizing in the second period. In Figure 5, interest group types in the set N''_1 do not organize because expected compensations under no informational linkages $\overline{c}^{nl}$ are lower than c^{pb}_w.

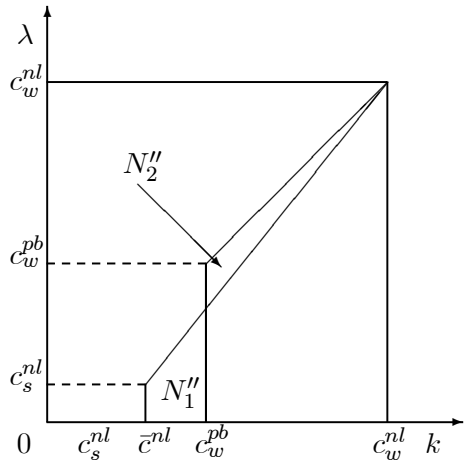

Figure 5 - Long-Run Gain from Pooling.

Notice that there is a set of interest group types, N''_2, that would not enter if they knew that the government was weak, but decide to enter under no informational linkages. They are characterized by an entry cost k which is slightly larger than their potential loss λ. The fact that they can always reject the offer made by the strong type leads them to organize in order to take advantage of the higher offer of a weak government. However, it can be shown that the area N''_1 is larger than the area N''_2, i.e., less interest group types organize under no informational linkages, and that both types of government enjoy a net benefit from pooling.

The long-run gain of not being perceived as weak, for a government of type τ, is

$$G''_\tau = \Pr\left(e_2 = 1; c_w^{pb}\right)\left[v - V_\tau^*\left(c_w^{pb}\right)\right] - \Pr\left(e_2 = 1; c_s^{nl}\right)\left[v - V_\tau^*\left(c_s^{nl}\right)\right].$$

In a pooling equilibrium, both the weak and the strong types choose c''_s, i.e., they incur the short-run cost in order not to be considered weak by the second interest group. The following incentive compatibility constraints must then be satisfied

$$\delta G''_\tau \geq C''_\tau\left(c''_s; c''_s\right) \text{ for } \tau = t, 1. \tag{5}$$

Proposition 4 provides a full characterization of the equilibrium path of play in pooling equilibria.

Proposition 4 (Pooling Equilibria). *Under "informational linkages", in every non-trivial pooling equilibria with monotonic beliefs the unique path of play, indexed by c''_s, is the following. In the First Period:*

- *only interest groups characterized by (λ, k) in the set $A_{c''_s}$ choose to organize;*
- *both government types offer $c''_s \leq v/2t$ to interest groups that entered and zero otherwise;*
- *among interest groups that entered, c''_s is accepted by those characterized by $\lambda \leq c''_s$ and rejected otherwise.*

The Second Period play is identical to the one under no informational linkages.

4.3 Existence

It is relatively easy to verify that a nontrivial separating equilibrium can be supported at c'_s close to $v/2t$, if δ is low enough. The argument relies on the fact that $C'_s\left(v/2t; v/2t\right) = 0$ and hence, by continuity, a strong government is always willing to make a first period offer $c'_s < v/2t$ arbitrarily close to $v/2t$, in order to discourage entry in the future. On the other hand, if δ is low enough, a weak government will attach a higher weight to the short-run cost of imitating a strong type than to the long-run gain of doing so. It is then possible to

find δ close enough to zero so that a weak government will not be willing to imitate a strong one by offering c_s' arbitrarily close to $v/2t$.

A nontrivial pooling equilibrium can also be supported at c_s'' close to $v/2t$ if δ and q are sufficiently high. Again, since $C_s''(v/2t; v/2t) = 0$, it is always going to be incentive-compatible for a strong government to offer $c_s'' < v/2t$ arbitrarily close to $v/2t$. For the weak government, instead, this requires δ to be close enough to 1, so that the discounted long-run gain from pooling is large. It also requires that q is close enough to 1, so that also the undiscounted long-run gain from pooling is higher than its short-run cost for a weak government. If the prior probability that the government is strong is high enough, in fact, entry in the second period of a pooling equilibrium will be relatively small, and the long-run gain for a weak type relatively high.

The argument we just outlined provides sufficient conditions on the parameters to ensure existence of nontrivial pooling or separating equilibria. Unfortunately, it becomes very complicated to check for existence by analytical methods for a more comprehensive set of parameter values. It is possible, however, to verify existence numerically for an arbitrarily dense grid of the whole parameter space. For every point in a grid with as much as $1,000$ values for v, τ and q (δ did not need to be discretized), we were able to find at least either a separating or a pooling equilibrium. The following claim summarizes our result.[19]

Claim 1 (General Existence) *For every v, τ, q and δ satisfying Assumptions 1, 2 and 3, there exists at least one first period offer by the strong type that can either be supported as a separating equilibrium or as a pooling equilibrium with monotonic beliefs.*

We now sketch the algorithm we used to check this claim. First, discretize the parameter space in the v, τ and q dimensions. Second, select the triples (v, τ, q) that satisfy Assumptions 1, 2 and 3. Third, for each admissible triple, select a compensation level $c \in [0, v/2t)$

[19] In the appendix we list the functions representing the gains and costs for governments of playing their equilibrium strategies. The computer code used to verify this claim can be downloaded from `http://www.fas.umontreal.ca/sceco/castroru` .

and compute the following four threshold discount factors

$$\begin{aligned} \delta'_s(c) &= \frac{C'_s(c;c)}{G'_s} & \delta'_w(c) &= \frac{C'_w(c;c)}{G'_w} \\ \delta''_s(c) &= \frac{C''_s(c;c)}{G''_s} & \delta''_w(c) &= \frac{C''_w(c;c)}{G''_w}. \end{aligned}$$

Together with the incentive compatible constraints (4) and (5), these four numbers define a region of discount factors in the interval $[0,1]$ where equilibria can be supported. Fourth, keep searching for alternative compensation levels until the union of all such regions of discount factors coincides with $[0,1]$. The claim is verified if for no admissible triple (v,τ,q) all possible compensation offers are exhausted without covering the whole interval $[0,1]$.

5 The Effect of Reputation on Reforms and Compensations

The purpose of this section is to evaluate the effects of informational linkages between negotiation rounds on the implementation of reforms and the payment of compensations. Specifically, we compare the path of play of separating and pooling equilibria with monotonic beliefs with the unique path of play of the game under informational isolation.

One approach would be to consider each combination of government and interest group types and check whether a reform is implemented or not under informational isolation and informational linkages, in a given period and a given equilibrium. The conclusion of such analysis would be ambiguous: in some cases, informational linkages imply that a reform fails to be implemented; however, the opposite situation may also occur.

We thus choose to provide a synthetic measure of the frequency at which reform implementation should be observed. The measure we adopt is the ex-ante probability - computed with respect to the prior distributions of τ and (λ,k) - of implementing a reform in a given equilibrium and a given period of the game. We use the same criterion to evaluate the compensations paid in equilibrium. Proposition 5 summarizes our results.

Proposition 5. *Under "informational linkages", in all the non-trivial separating equilibria with monotonic beliefs, when compared with the game under "informational isolation":*

- *the ex-ante probability of implementing the first reform is strictly lower;*
- *expected compensations paid in the first period are strictly lower;*
- *the ex-ante probability of implementing the second reform is strictly lower if* $q < q^*$ *for some* $0 < q^* \leq 1$*;*
- *expected compensations paid in the second period are strictly lower if* $q < q^{**}$ *for some* $0 < q^{**} \leq 1$.

In all the pooling equilibria with monotonic beliefs, when compared with the game under "informational isolation":

- *the ex-ante probability of implementing the first reform is strictly lower;*
- *expected compensations paid in the first period are strictly lower;*
- *expected compensations paid and the ex-ante probability of implementing the second reform do not change.*

As Proposition 5 shows, reputational concerns induce strong governments to reduce compensations offers in the first period of separating equilibria, thereby decreasing the probability of implementing the first reform. Figure 6 compares the equilibrium path of play in the first period of a separating equilibrium with the one under no informational linkages.

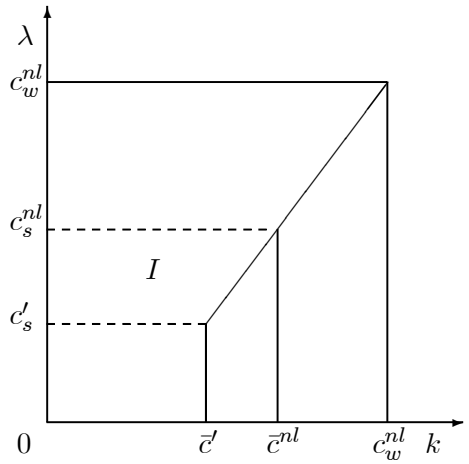

Figure 6 - First Period of a Separating Equilibrium versus No Informational Linkages.

Notice that the reforms associated with interest group types in the trapezoid I are not implemented under informational linkages if the government is strong.[20]

Reputational concerns also produce a similar bias in the offer of weak governments in the first period of pooling equilibria. Figure 7 compares the first period of a pooling equilibrium when both government types choose $c_s'' = v/2t$ with the game under no informational linkages.

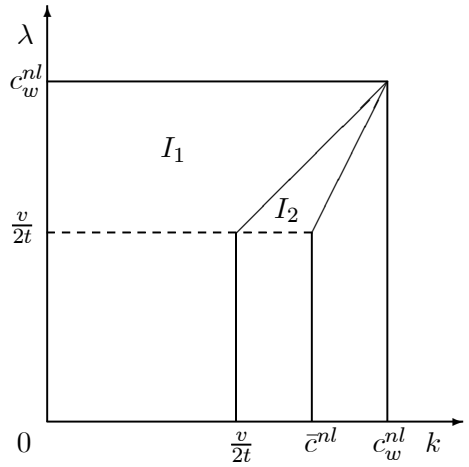

Figure 7 - First Period of a Pooling Equilibrium versus No Informational Linkages.

Interest group types that reject the weak government's offer in the first period of a pooling equilibrium are denoted by the trapezoid I_1. The reforms associated with these interest groups therefore fail to be implemented. Notice, however, that in this pooling equilibrium first period entry is lower than under informational isolation, due to the fact that the weak type offers less compensations. This effect tends to increase the chances of implementing the first reform if the government is strong because interest group types in the triangle I_2 do not organize in the first period of a pooling equilibrium. However, it can be shown that the first effect dominates the second one.

The second period path of play in a pooling equilibrium is obviously identical to the one under informational isolation. Interestingly, signalling by a strong type in the first period of a separating equilibrium does not necessarily translate into a higher probability

[20] Notice that the fact that some interest group types decide not to enter in the first period of a separating equilibrium, while they would have entered under informational isolation, does not affect this conclusion. In fact all these types would have accepted both governments' offers under informational isolation.

of implementing the second reform. By signalling its type a strong government discourages some interest group types from organizing in the second period, and therefore increases the probability of implementing the second reform at no cost. However, it also induces some interest group types, characterized by relatively low λ's and that otherwise would not have organized, to do so in order to extract compensations from a weak government. Following this different entry pattern, a weak government reduces its compensation offer with respect to the game under informational isolation, thereby reducing the probability of implementing the second reform. Therefore, if q is not too high, the effect associated with the weak type prevails and the ex-ante probability of implementing the second reform decreases in the second period of a separating equilibrium.

6 An Example: The Peace Process in Colombia

In order to illustrate how our story may help understand real world reform processes, we describe in some detail the peace negotiations undertaken by the President of Colombia, Andres Pastrana, since his election in June of 1998, with two left-wing guerrilla groups, the FARC (Revolutionary Armed Forces of Colombia) and the ELN (National Liberation Army).

For almost four decades these guerrilla groups have been waging a war against Colombia's government that left tens of thousands of people dead. In the aftermath of his election Pastrana initiated formal peace talks with the FARC, after agreeing to demilitarize a large (16,000 square miles) area of southern Colombia. The FARC thus obtained total control over an area which has approximately the size of Switzerland, without being subject to any kind of monitoring by neutral observers. When Pastrana turned to the ELN to initiate formal talks, the latter demanded pre-conditions similar to the ones already granted to the FARC. As *The Economist* (July 29th, 2000) puts it: "the ELN will not negotiate until a safe haven is cleared and secured." In order to put pressure on the government, the ELN organized, during the course of 1999, the mass kidnapping of people during a mass, the hijacking of a plane and the blowing of electricity pylons. Until recently Pastrana's government has been

reluctant to concede a safe haven to the ELN, partly because it is militarily less powerful than the FARC and partly because the FARC has been using its enclave to empower itself. In recent talks with the ELN, held in July 2000 in Geneva, Switzerland, Colombia's government agreed to grant the ELN an area of approximately 1,800 square miles. To date, however, no agreement has been reached between the two parts.

How does our model provide intuition into this reform process? The beginning of formal negotiations with each of the two guerrilla groups represents, in the language of our paper, a reform. Each reform would bring about a net gain for the country as a whole, by increasing the chances of ending the civil war and also, in the short-run, by reducing the amount of political violence and instability.

In terms of our theory, the dynamics of reform in Colombia can be interpreted as the path of play of a separating equilibrium when the government is weak. Pastrana's government began formal negotiations with the FARC by offering the latter a "compensation package" that included the demilitarization of a vast area of the country. When the government faced the second reform, i.e., inducing the ELN to sit at the bargaining table, it faced a guerrilla group that was not willing to negotiate before obtaining a safe haven like the one already granted to the FARC. The second interest group observed the outcome of the first negotiation stage and inferred that it could obtain a similar transfer from Pastrana's "weak" government. The ELN fits our description of an interest group with a low evaluation of the status quo (small λ) that decides to organize mainly with the purpose of obtaining a transfer from a weak government. The ELN is in fact smaller and militarily weaker than the FARC and "unlike the FARC (...), the ELN seems positively eager for peace" (*The Economist*, January 29th, 2000). The "organization" of this second interest group came in the form of mass kidnapping and blowing of electricity pylons, which were meant to signal the ELN's willingness to fight for the land transfer.

The government's initial attitude toward the ELN's claim was negative, to the point that *The Economist* (January 29th, 2000) wrote that "unless the ELN drops its demand for a haven in southern Bolivar, the prospects for a second set of peace talks are likely to remain

dark." However, after some months of uncertainty and lack of resolve, the government finally agreed to grant the ELN its safe haven. The ELN is thus likely to end up obtaining a transfer from the Colombian government that it might not have received in the absence of informational linkages across reforms, consistently with our model. In this case, the second reform is also likely to be implemented, but the second guerilla group obtains a higher share of the total surplus compared to the game under no informational linkages

The Colombian peace process exemplifies two important points that we have stressed in this paper: 1) It is difficult for governments to commit to certain policies: Pastrana's attitude toward granting a safe haven to the ELN changed after this group staged its mass kidnapping campaign. 2) When reforms are implemented sequentially a government's reputation has an important impact on interest groups' decisions to organize and take action. We should thus expect governments to take the sequentiality of the reform process into account when bargaining with interest groups.

While especially suggestive, the Colombian example is not unique. Another interesting case, which we do not explore in detail here, concerns the negotiations between several Italian governments and trade unions over labor market reforms in the last twenty years or so. There the political fragmentation of the unions created a setting where a government's reputational concerns were of primary importance when dealing with these interest groups.

7 Concluding Remarks

Understanding why efficiency-enhancing reforms are not implemented is a key problem in political economy. Every answer to this question has to provide an explanation for why payments of compensations to losers of reforms are not carried out when they are feasible. This paper deals with this issue by explicitly formalizing some of the transaction costs that make the payment of compensations problematic. Specifically, in our model losers from reforms have private information about their evaluation of the status quo and compensations are distortionary. Therefore, governments will in general not find it optimal to always compensate them. More interestingly, in our environment the formation of interest groups

is endogenous and depends on expected compensations. When reforms are sequential and governments differ according to their willingness to make transfers, current compensations may be used to discourage the formation of interest groups in the future. This will result in a bias against the payment of compensations and the implementation of reforms.

It is important to point out that we have summarized the effects of this dynamic mechanism in terms of a measure of the expected number of reforms that are not implemented, rather than in terms of a measure of its welfare cost. The discussion at the beginning of Section 5 suggests that, even though less reforms are implemented on average under informational linkages, it may be the case that the welfare cost associated with the reforms that fail to be implemented is smaller than the welfare benefit generated by the ones that are. In this sense, we cannot rule out that signaling could be welfare-enhancing in some cases.

Lastly, this paper has stressed the idea that some aspects of political reality, such as sequentiality of bargaining between governments and interest groups, may lead to inefficient outcomes. An important direction for future research is therefore to study and compare alternative institutional frameworks from an efficiency point of view.

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A Appendix

Proof of Proposition 1. In Section 3.1, we have shown that entry by interest groups must be characterized by the set $A_{c_\tau^*}$. To complete the proof it is enough to solve the government's problem (1) when entry is given by $A_{c_\tau^*}$ and to show that $c_\tau^{pb}(c_\tau^*) = c_\tau^*$ iff $c_\tau^* = c_\tau^{pb} = v/2\tau$. The optimal choice for $c \leq c_\tau^*$ is $v/2\tau$. Also, it is immediate to see that the optimal choice for $c_\tau^* \leq c$ is given by c implicitly defined by the first order condition

$$2c(v - \tau c) - \tau\left(c^2 + (c_\tau^*)^2\right) = 0$$

and such that the second order condition $v - 3\tau c < 0$ is satisfied. Moreover, when $c = c_\tau^* = c_\tau^{pb}$ in the preceding first order condition it is easy to check that $c_\tau^{pb} = v/2\tau$. This completes the proof. ■

Proof of Proposition 2. In Section 3.2, we have shown that entry by interest groups must be characterized by the set $B_{c_s^*, c_w^*}$. To complete the proof it is enough to solve the government's problem (3) when entry is given by $B_{c_s^*, c_w^*}$ and to show that $c_\tau^{nl}(c_s^*, c_w^*) = c_\tau^*$ for $\tau = t, 1$ iff

$$\begin{aligned} c_s^{nl} &= c_s^* = \frac{v}{2t} \\ c_w^{nl} &= c_w^* = \min\left\{\frac{v}{4-q}\left(1 + \sqrt{1 - \frac{q(4-q)}{4t^2}}\right), 1\right\}. \end{aligned} \tag{6}$$

Consider first a strong government. For $c \leq c_s^*$, the optimal choice of c is c_s^*. For $c_s^* \leq c \leq 1$, the optimal choice is given by c implicitly defined by

$$-t\left(c\overline{c}^* + \frac{q}{2}(c - c_s^*)^2\right) + (v - tc)\left(\overline{c}^* + q(c - c_s^*)\right) = 0 \tag{7}$$

and such that the second order condition

$$-2t\left(\overline{c}^* + q(c - c_s^*)\right) + q(v - tc) < 0$$

is satisfied. Moreover, evaluating (7) at $c = c_s^*$, as equilibrium requires, it is easy to check that the solution is $c_s^{nl} = v/2t$. For $c_w^* \leq c \leq 1$ the optimal choice is given by c_w^* because $\partial V_s(c; c_s^*, c_w^*)/\partial c < 0$ for $c \geq c_w^*$. Since $V_s(c; c_s^*, c_w^*)$ is continuous at $c = c_w^*$ it follows that $V_s\left(c_s^{nl}; c_s^*, c_w^*\right) > V_s(c_w^*; c_s^*, c_w^*)$ for all c_s^*, c_w^*. Thus, in equilibrium, $c_s^{nl} = v/2t = \arg\max_c V_s(c; c_s^*, c_w^*)$.

Consider now a weak government. For $c \leq c_s^*$, since $\partial V_w(c; c_s^*, c_w^*)/\partial c > 0$, its optimal choice is c_s^*. For $c_s^* \leq c \leq c_w^*$, the optimal choice is given by c implicitly defined by

$$-\left(c\overline{c}^* + \frac{q}{2}(c - c_s^*)^2\right) + (v - c)\left(\overline{c}^* + q(c - c_s^*)\right) = 0 \tag{8}$$

and such that the second order condition

$$-2\left(\overline{c}^* + q(c - c_s^*)\right) + q(v - c) < 0$$

is satisfied. Moreover, when $c = c_w^*$ and $c_s^* = v/2t$ in (8), it is easy to check that the solution is $c_w^{nl} = c_w^*$ as in (6). Finally, for $c_w^* \leq c$, the optimal interior choice is given by c implicitly defined by

$$\frac{1}{2}\left(1 - \sigma\left(c^2 + 1\right)\right) + (v - c)\sigma c = 0$$

and such that the second order condition $v - 3c < 0$ is satisfied. It is easy to check that the solution is $c_w^{nl} = c_w^*$. Notice that a weak government gets higher utility when it chooses c_w^{nl} than when it chooses c_s^*. This claim follows from the fact that $V_w\left(c; c_s^*, c_w^*\right)$ is continuous at c_s^* and

$$\lim_{c \to (c_s^*)^+} \frac{\partial V_w\left(c; c_s^*, c_w^*\right)}{\partial c} = \sigma \overline{c}^* \left(v - 2c_s^*\right) > 0$$

since $c_s^* < v/2$. Thus $V_w\left(c_w^{nl}; c_s^*, c_w^*\right) > V_w\left(c_s^*; c_s^*, c_w^*\right)$ for all c_s^*, c_w^* and so $c_w^{nl} = c_w^* = \arg\max_c V_w\left(c; c_s^*, c_w^*\right)$. This completes the proof. ■

Claim 1. In order to verify the existence result of this claim, we used the following functions representing the short-run costs and the long-run gains in the separating and pooling equilibria:

$$\begin{aligned}
G_w' &= \frac{1}{2}\left[v - 1 - \left(\frac{v}{2t}\right)^2\right] \\
C_w'\left(c; c\right) &= \left(v - 1\right) - 2\left(v - c\right) c \frac{qc + (1-q)}{1 + qc^2 + (1-q)} \\
G_s' &= \left(\frac{v}{2}\right)^3 \frac{t-1}{t} \\
C_s'\left(c; c\right) &= 2\left(v - tz_s'\right) \frac{z_s'\left(qc + 1 - q\right) + \frac{q}{2}\left(z_s' - c\right)^2}{1 + qc^2 + (1-q)} - 2\left(v - tc\right) c \frac{qc + 1 - q}{1 + qc^2 + (1-q)} \\
G_w'' &= \frac{1}{2}\left\{v - 2 + q\left[1 - \left(\frac{v}{2t}\right)^2\right]\right\} \\
C_w''\left(c; c\right) &= \left(v - 1\right) - 2\left(v - c\right) \frac{c^2}{1 + c^2} \\
G_s'' &= \frac{v}{2}\left[\left(\frac{v}{2}\right)^2 \left(\frac{t-1}{t}\right) - (1-q)\left(1 - \frac{v}{2t}\right)\right] \\
C_s''\left(c; c\right) &= \left(v - tz_s''\right) \frac{c^2 + \left(z_s''\right)^2}{1 + c^2} - 2\left(v - tc\right) \frac{c^2}{1 + c^2}
\end{aligned}$$

where the best unilateral deviations for a strong government in the separating and pooling equilibria are given respectively by

$$\begin{aligned}
z_s' &= \min\left\{\frac{qv - 2t\left(1-q\right) + \sqrt{\left(qv - 2t\left(1-q\right)\right)^2 - 6qt\left(\frac{tq}{2}c^2 - v\left(1-q\right)\right)}}{3qt}, 1\right\} \\
z_s'' &= \min\left\{\frac{v + \sqrt{v^2 - 3\left(tc\right)^2}}{3t}, 1\right\}.
\end{aligned}$$

Proof of Proposition 5.

1 Separating Equilibria.

1.1 First Period.

1.1.1 Ex-Ante Probability. The ex-ante probability of implementing a reform in the game under no informational linkages is given by

$$p^{nl} = q\left(c_s^{nl} + \frac{1}{2}(1 - c_s^{nl})\left(1 - \overline{c}^{nl}\right)\right) + (1-q)\, c_w^{nl}.$$

The ex-ante probability of implementing a reform in the first period of a separating equilibrium is, instead, given by

$$p_1' = q\left(c_s' + \frac{1}{2}(1-c_s')\,(1-\overline{c}')\right) + (1-q)\,c_w'$$

where

$$\overline{c}' = qc_s' + (1-q)\,c_w'.$$

We need to prove that $p_1' < p^{nl}$. Keeping into account that $c_w^{nl} = c_w' = 1$ and that $c_s^{nl} = v/2t$, this is equivalent to showing that

$$c_s' + \frac{q}{2}\,(1-c_s')^2 < \frac{v}{2t} + \frac{q}{2}\left(1-\frac{v}{2t}\right)^2.$$

It is easy to see that this is true if and only if $c_s' < v/2t$.

1.1.2. Expected Compensations. Define the function $f\,(.)$ as

$$f\,(c) = qc^2\,[1-q\,(1-c)] + (1-q)\left[1-\frac{q}{2}\left(1-c^2\right)\right].$$

We need to prove that expected compensations under informational isolation, $f\,(v/2t)$, are higher than in the first period of a separating equilibrium, $f(c_s')$. This is true if and only if $c_s' < v/2t$ because the function $f(.)$ is increasing in c.

1.2 Second Period.

1.2.1 Ex-Ante Probability. Let p_2' represent the probability of implementing the second reform in a separating equilibrium:

$$p_2' = \frac{q}{2}\left(1+\left(c_s^{pb}\right)^2\right) + \frac{(1-q)}{2}\left(1+\left(c_w^{pb}\right)^2\right),$$

with $c_s^{pb} = v/2t$ and $c_w^{pb} = v/2$. We need to show that there exists a $0 < q^* \leq 1$ such that for $q < q^*$, it is true that $p_2' < p^{nl}$. Consider $p^{nl} - p_2'$ as a function of q. This is a convex parabola with zeroes at $q = 1$ and $\widehat{q}$ defined as

$$\widehat{q} \equiv \frac{1-\left(\frac{v}{2}\right)^2}{(1-\frac{v}{2t})^2}.$$

If $\widehat{q} > 1$, then let $q^* = 1$: we would have shown that $p^{nl} - p_2' > 0$ for every q. If $\widehat{q} < 1$, let $q^* = \widehat{q}$, and we have $p^{nl} - p_2' > 0$ only for $q < q^*$.

1.2.2 Expected Compensations. We need to show that there exists a $0 < q^{**} \leq 1$ such that for $q < q^{**}$ expected compensations paid in the second period of a separating equilibrium are lower than the ones paid under no informational linkages. Expected compensations in the second period of a separating equilibrium are given by:

$$q\left(\frac{v}{2t}\right)^3 + (1-q)\left(\frac{v}{2}\right)^3.$$

Expected compensation in the game under no informational linkages are $f(v/2t)$, where the function $f(.)$ has been defined above. We need to show that

$$q\left(\frac{v}{2t}\right)^2\left[1-q\left(1-\frac{v}{2t}\right)\right] + (1-q)\left[1-\frac{q}{2}\left(1-\left(\frac{v}{2t}\right)^2\right)\right] > q\left(\frac{v}{2t}\right)^3 + (1-q)\left(\frac{v}{2}\right)^3.$$

Rearranging this inequality one gets

$$\frac{q}{2}\left(1-\frac{v}{2t}\right)\left[2\left(\frac{v}{2t}\right)^2-\left(1+\frac{v}{2t}\right)\right]+1-\left(\frac{v}{2}\right)^3>0.$$

If the term in square brackets of this equation is positive, let $q^{**}=1$: expected compensations in the second period of a separating equilibrium are always lower than under informational isolation in this case. Otherwise, define

$$\widetilde{q}=\frac{2\left[1-\left(\frac{v}{2}\right)^3\right]}{\left(1-\frac{v}{2t}\right)\left[\left(1+\frac{v}{2t}\right)-2\left(\frac{v}{2t}\right)^2\right]}$$

and let $q^{**}=\widetilde{q}$. In this case expected compensations in the second period of a separating equilibrium are lower than under informational isolation only if $q<\widetilde{q}$.

2 Pooling Equilibria.

2.1 First Period.

2.1.1 Ex-Ante Probability. Let p_1'' represent the ex-ante probability of implementing a reform in the first period of a pooling equilibrium:

$$p_1''=\frac{1}{2}\left(1+(c_s'')^2\right).$$

We need to show that $p_1''<p^{nl}$. This is equivalent to showing that

$$c_s''+\frac{1}{2}\left(1-c_s''\right)^2<q\left[\frac{v}{2t}+\frac{q}{2}\left(1-\frac{v}{2t}\right)^2\right]+1-q$$

for $c_s''<v/2t$. To verify that this is true, notice that the left-hand side of this equation is increasing in c_s'', so that it is enough to verify the inequality at $c_s''=v/2t$:

$$\frac{v}{2t}+\frac{1}{2}\left(1-\frac{v}{2t}\right)^2\leq q\left[\frac{v}{2t}+\frac{q}{2}(1-\frac{v}{2t})^2\right]+1-q.$$

For $q=1$ the two sides of this equation coincide. Moreover, the right-hand side decreases in q, so that for $q<1$ it is strictly above the left-hand side.

2.1.2 Expected Compensations. Expected compensations paid in the first period of the pooling equilibrium are just $\left(c_s''\right)^3$. The expected amount of compensations paid in the game under no informational linkages is $f(v/2t)$, where the function $f(.)$ has been defined above. Consider the limit-case where $c_s''=v/2t$. It is then sufficient to show that:

$$q\left(\frac{v}{2t}\right)^3+(1-q)\left(\frac{v}{2t}\right)^3<q\left(\frac{v}{2t}\right)^2\left[1-q\left(1-\frac{v}{2t}\right)\right]+(1-q)\left[1-\frac{q}{2}\left(1-\left(\frac{v}{2t}\right)^2\right)\right].$$

Rearranging this inequality we obtain

$$q\left(\frac{v}{2t}\right)^2\left[(1-q)\left(1-\frac{v}{2t}\right)\right]+(1-q)\left[\left(1-\frac{q}{2}\right)-\left(\frac{v}{2t}-\frac{q}{2}\right)\left(\frac{v}{2t}\right)^2\right]>0$$

where both the first and the second terms are positive because $v<2t$.

2.2 Second Period. The second period path of play of a pooling equilibrium is identical to the one under no informational linkages. ■