Rules transparency and political accountability*

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Abstract

Allocative and redistributive rules in the public sector are often less contingent on available information than normative theory would suggest. This paper offers a political economy explanation. Under different rules, even if the observable outcomes of policies remain the same, the informational content which can be extracted by these observations is different. Simpler rules are more transparent because they allow citizens to gain more information on politicians. Since there are limits to what voters can observe, this may be a relevant insight into the functioning of the political system.

1 Introduction

The rules of allocation and redistribution in the public sector are often simpler, in the sense that they are less contingent on available information, than those proposed by normative economic theory. A number of different examples may be given. Incentive mechanisms for public officials are "flatter"

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than optimal contract theory would suggest (Dixit (1996)); actual income and commodities tax rules are less complex than Ramsey's and Mirrlees's optimal formulas would suggest them to be (Slemrod (1990)); intergovernmental grants lack many of the features which are necessary in order to internalize the spillover effects across different jurisdictions (Bird (1993)); and so on. Why is this the case? Common explanations argue that economic theory may not give enough weight to a number of important costs (say, administrative costs in optimal taxation models), or that incentive schemes must be robust to a variety of circumstances, or more simply, that the policy makers may lack the information needed to implement the optimal rules.

In this paper we offer a different, although not necessarily alternative, explanation. Less contingent rules may be preferred as they induce more transparency in the behavior of politicians, making them more accountable to citizens. In particular, simpler rules may allow citizens to better discriminate between those politicians who pursue their interests, and those politicians who pursue other, more sectorial, interests. Since "flatter" rules are rarely the most efficient[1], this argument also points towards a potential trade-off between efficiency and accountability. To make politicians more accountable, one may have to pay a price, using rules which cause an efficiency loss with respect to alternative feasible policies. We argue that the greater transparency induced by less contingent rules has a particular value within the political context. This is due, on the one hand, to the large difference in information available to policy makers and to citizens, and on the other hand, to the very weak punishment-reward mechanism that democracy imposes on the politicians. In particular, citizens cannot write an explicit incentivating contract with their representatives in Parliament, specifying rewards and punishments according to the results of their policy. In modern democracies, politicians are basically punished and rewarded through the ballot box. Furthermore, this only happens at pre-determined election times. It is with reference to this particular context that we address the issue of the optimal choice of rules.

[1]The meaning of efficiency in a political context is not obvious, as it depends on whether political constraints are taken into account in defining the efficiency frontier. In this paper, "efficiency" will be naively assessed with respect to what voters could obtain if governments were simply maximizers of the welfare of their citizens (see the discussion in section 6). For more detailed discussion of the problem, see Wittman (1989), Coate and Morris (1995) and Besley and Coate (1998).

The idea that transparency in politics may be a good thing is of course not at all new. Moreover, it has already received some attention in economic theory. For instance, the macroeconomic literature often uses this notion when comparing the commitment potential of different monetary rules (e.g. Cukierman and Meltzer (1986), Persson and Tabellini (1990)). Indeed, some recent studies in the field go as far as to suggest the existence of a potential trade-off between transparency and efficiency (e.g. Cukierman (1995), Herrendorf (1998), Faust and Svensson (1998)). However, in these works, "transparency" is basically used to refer to the precision with which the public can observe the actions taken by the policy makers (i.e. Central Banks). Pegging of the exchange rates, say, is thought to be more transparent than money supply rules because it can be better monitored by the private sector. Our focus here is on a subtler meaning of the idea of transparency. Transparency is not simply a property of the rules of the game, but rather it is the result of the interaction between the rules of the game and the strategic behavior of the agents involved. Simpler rules may be more transparent because, in equilibrium, they allow citizens to gather more information about their representatives by observing the *same* set of governmental actions. Since there are indeed limits to what voters can observe, this may provide an important insight into the functioning of the political system.

It is also interesting to note that several economists, when reflecting on real-world economic reforms, have discussed ideas somewhat similar to ours. For instance, in his analysis of the US tax reform of the 1980's, Slemrod (1990) suggests that among the reasons for simplifying tax rules, and in particular those pertaining to corporate taxation, prominent was the objective of making them less aggredible by powerful interest groups. Harberger (1990), in discussing the recent move in several Latin America countries towards a unique tariff, makes a similar point, arguing that a single tariff should reduce the influence of interest groups on tariff policies. Yet neither author has attempted to spell out the argument in details, so that the exact nature of their claim has remained rather unclear[2].

Formalizing the argument is what we do in the present paper. We use a simple agency model in order to illustrate the point. An agency (which may be thought of as a public utility, a local governmental agency, or even a

[2]Indeed, in their several attempts to formalize Harberger's insight, Rodrik and Panagariya (1993) never make the connection between simplicity and accountability.

local government) receives a transfer from the government in order to offer a public good. The policy-maker finances the agency by raising money through taxation. There are two sources of asymmetric information in our model. On the one hand, governments can observe the effort exerted by the agency better than citizens can. On the other hand, citizens are unable to tell the degree to which governments are liable to "pressures" exerted by the agency itself. In particular, governments may be "bad" in the sense that they might like to leave some rents to the agency, possibly because they can get part of this money back in the form of bribes or political support. Both informational assumptions are very reasonable. The first is common in the public choice literature and can be easily justified; voters remain rationally ignorant because the expected benefits from becoming informed are small relative to the costs. The second is the one which motivates our analysis; if governments were known for sure to be only interested in maximizing the welfare of citizens, the issue of rule transparency, as we have defined it, would not arise.

We consider a two-period model, to which we add a pre-game constitutional stage in the last part of the paper. At the beginning of the first period, the government chooses taxes and transfers; at the end of this period an election takes place. Citizens observe first period outcomes, revise their expectations about the "type" of the government in charge, and vote consequently. Thus, our model belongs to the class of the "reputational" models of politics, originated with Barro (1973) and Ferejohn (1986) and further developed by a number of writers (i.e. Rogoff (1990), Besley and Case (1995), Coate and Morris (1995)). In such a setting, we compare and contrast two possible rules of funding for the agency, which we interpret as being constitutional rules. According to the first, which we call the "complex" rule, governments are allowed to draw up an optimal contract with the agency, using all available information to this end. According to the second rule, which we call the "simple" rule, governments can only offer "flat", non-contingent, contracts to the agency. In both cases the Constitution only sets out the *form,* and not the content, of the contracts. The latter is determined by the government. We consider this to be a reasonable description of the relationship between constitutional and ordinary policy-making.

We ask two questions. First, whether the simple rule, although less capable of eliciting effort on the part of the agency, may dominate the complex rule in terms of the expected welfare of citizens. Second, whether a welfare-maximizing constituent, on the basis of rational expectations on the type of the governments, would choose the flat rule. The answer is yes in both cases. The intuition is quite simple. Under the complex rule, bad governments are more capable of "hiding" themselves behind good governments, transferring money to the agency without paying the price of the higher risk of loosing the elections. On the contrary, the simple rule does not allow for "pooling" behavior and forces bad governments to reveal themselves before the elections. Hence, the simple rule works as a screening device for the citizens, and this signalling advantage may more than offset the resulting efficiency loss. It should also be stressed that this result occurs in equilibrium even if citizens expect with high probability governments to be only interested in maximizing their welfare. Thus, it is not necessary to have very bad expectations on politicians to wish to enforce flatter rules.

Our model makes out the case for the flat rule in a rather drastic form, since only separating (i.e. fully revealing) equilibria turn out to be compatible with this rule. This is a result of the very simple structure we adopt in the model in order to get clear-cut results. But we believe the message of the paper is a far more general one. As our previous discussion indicates, what we are suggesting here is that in general, under less contingent rules governments face higher political costs for transferring money to interest groups, and this advantage may more than compensate for the costs of employing otherwise obviously efficiency-dominated rules.

Our results should be compared and contrasted with the insights offered by several other strands of literature, such as the analysis of collusion in the theory of organization (i.e. Tirole (1991)) or the emerging literature on the internal organization of governments (i.e. Tirole (1994), Persson, Roland and Tabellini (1997)). Furthermore, our modelling strategy owes a lot to the work of Coate and Morris (1995), who also discuss different ways of transferring money to interest groups in a signalling model of politics. For the sake of clarity, however, we prefer to put off the discussion of these related works to a later section of the paper, after the presentation of our results.

The rest of the paper is organized as follows. Section 2 sets up the model. Section 3 describes the game. Section 4 defines and demonstrates equilibria under the two rules. Section 5 performs the (expected) welfare comparison between the two rules, thereby proving the main result of this paper. Section 6 raises the question on who would choose the rules and shows that a welfare-maximizing constituent could choose the simple rule. Section 7 compares our results to other findings and section 8 concludes. Most of the results are proved in the Appendix.

2 The model

2.1 Preliminaries

We consider an economy which lasts three periods. The first period, which we label period 0, is the constitutional stage and we do not discuss it until section 6. Period 1 and 2 are identical in terms of the choices which have to be made by the economic agents, except that at the end of period 1 an election takes place[3]. There are four agents in the economy: the incumbent government, the citizen, the agency, and the candidate government. At the beginning of each of the two periods, the incumbent government employs the agency to supply a public good. The amount of public good produced is stochastic and its realization depends on the effort made by the agency. For the sake of simplicity, we assume that the effort of the agency can only take two values, "high" and "low". Thus, the agency's action set is $\{a^L, a^H\}$, with $0 < a^L < a^H$. Output of the public good is $g \in \{g_1, g_2, \ldots g_n\}$, with $0 < g_1 < g_2 < \ldots < g_n$. The probability of observing output level g_i when the action chosen is a is $f_i(a) > 0$. We assume that the distribution of output as a function of the agency's action satisfies the monotone likelihood ratio property (MLR): if $j \geq i$, then $f_j(a^H)/f_j(a^L) \geq f_i(a^H)/f_i(a^L)$. This condition is well known in the literature (i.e. Hart and Holmstrom (1987)). The interpretation is that higher levels of output are more reliable signals that the high effort level has been chosen. In particular, MLR implies that the probability distribution induced by high effort first-order stochastically dominates that induced by low effort, so that $\sum f_i(a^H)g_i > \sum f_i(a^L)g_i$.

The agency is risk neutral. Given a transfer $t > 0$, its utility when the chosen action is a is $u^A(t, a) = t - c(a)$, where $c(a)$ is the cost of action a.

The citizen pays the tax which is used to finance the agency, and enjoys

[3] A natural interpretation of the model is that at the beginning of period 2 elections are so far off that the incumbent government does not care about them. Alternatively, one can think of institutional constraints which in practice reduce the life-time of the incumbent government to two periods only, such as for example a binding term limit. For an interpretation along these lines, see Besley and Case (1995).

the benefits of the public good. The citizen is also taken to be risk neutral. The expected utility of the citizen at the beginning of each period, if during that period the agency chooses action a, and government tax t, is thus $u^C(t,a) = \sum_i f_i(a)g_i - t$.

In every period, when the government is in charge, its utility is a weighted sum of the utilities of both the citizen and the agency, $W(t,a) = \lambda u^C(t,a) + (1-\lambda)u^A(t,a)$, where $\lambda \in [0,1]$;when the government is not in charge, its utility is zero. For simplicity's sake, we let λ take only one of the two extreme values: that is, either $\lambda = 1$ or $\lambda = 0$. In the first case, we say that the government is of a "good" type, as its welfare coincides with the utility of the citizen; in the second case, we say that the government is of a "bad" type, as its only interest lies in maximizing the agency's profits [4]. The terminology here reflects the idea that bad governments are such because they expect to share some of the agency's profits. We do not, however, model explicitly the bargaining over ex-post profits between the agency and the bad government. We assume this issue has already been settled with a binding agreement before the game starts[5]. The opponent government, were it in charge, would have an utility function of the same form of the incumbent government, except, of course, that its λ may be different. All agents in the economy, including the different types of government, discounts future utility at a rate $\delta \in (0,1)$.

2.2 Uncertainty

There are two sources of voter uncertainty in our model. The first concerns the "type" of the governments; that is, in the simplified setting we consider here, whether the incumbent and/or its opponent are of the good or bad type. We model this uncertainty as follows. At the beginning of the first period, nature chooses both the types of the incumbent government and the type of its opponent. These choices are not observed by the citizen, but only by the governments themselves. Thus, its own type is private information to each government. The citizen assigns a prior probability $\theta \in [0,1]$ to the event that the incumbent government is of a good type, and a prior probability $\overline{\theta} \in [0,1]$ the event that the opponent is of a good type, where

[4] The terminology is borrowed from Coate and Morris (1995).

[5] For a detailed discussion on the effect of different "technologies of corruption" on equilibria in principal-supervisor-agent models, see Tirole (1991).

$\overline{\theta}$ and θ may differ. The idea underlying the (possible) difference between θ and $\overline{\theta}$ is that the citizen has been able to form some expectations on the type of the incumbent government by observing its behavior in other related policy situations. No such experience is available for the opponent, as this has not been "tested" yet. Note that in this interpretation, θ also captures the "reputation" of the incumbent.

The second source of asymmetric information in the model concerns the agency's effort. Incumbent governments have better information than citizens do on the choices of the agency[6]. To keep things as simple as possible, we assume that the incumbent government can *directly* observe the effort made by the agency, so that there is no problem of asymmetric information between the government and the agency. The citizen, on the other hand, cannot observe the agency's level of effort. At best, she can try to recover it from the observation of the realized level of output and the tax she has to pay. Note that these extreme informational assumptions are only made for the sake of simplicity. Indeed, as will be clear from what follows, the presence of a genuine agency problem between the government and the agency would only reinforce our argument, as it would force even the good government to leave some rent to the agency.

3 The game

Figure 1 illustrates the sequence of events. At time 0, the Constitution sets up the rules for financing the agency; in particular, it decides whether a "simple" or a "complex" rule can be used by the incumbent government. At the beginning of time 1, nature moves and selects a type for the incumbent government λ, a type for the opponent government, and a signal θ for the citizen. Then, the incumbent moves and chooses the contract to be offered to the agency, within the constraints imposed by the Constitution. This contract involves the choice of the tax to be imposed on the citizen and the

[6]We do not need to make any assumptions about the information on the agency's effort held by the opponent government, as this information does not play any role in our analysis. In general, one would expect an opposing party to be better informed on agency behavior than the average citizen is. The point is, however, that the opponent has no way of credibly conveying this information to the citizen, as it would always be in its interest to depict the incumbent as "misbehaving".

transfer to be paid to the agency, t, and must satisfy the individual rationality constraints of both the agency and the citizen (see next section). It is then agency's turn to move and choose the optimal level of effort, a , given the contract offered by the incumbent government. Then, nature moves again and determines the level of production of the public good g_i, given the effort chosen by the agency. Finally, at the end of period 1 and after that g_i has been realized, elections take place. It is now citizen's turn to move, and either re-elect the incumbent government or elect the opponent.

As the probability of being of a good type is the only parameter which distinguishes the two candidate governments, the optimal strategy for the citizen is to choose the candidate with the higher probability of being of a good type at the end of period 1. This probability is $\overline{\theta}$ for the opponent, and it depends on citizen's revised belief for the incumbent. This posterior belief, which we indicate with $\mu(t, g_i, \theta)$, depends on the observations made by the citizen during period 1, and on the a-priori reputation of the incumbent government. The optimal strategy for the citizen is then to elect the incumbent if $\mu > \overline{\theta}$ and to elect the opponent if $\mu < \overline{\theta}$. The citizen is indifferent if $\mu = \overline{\theta}$; we assume that in such a case the citizen elects the incumbent.

With the results of the election, period 1 comes to an end and period 2 begins. Whichever government is in charge at this time will again choose a tax on the citizen and a contract for the agency, given the constraints imposed by the Constitution and individual rationality, to which the agency will respond by selecting an optimal level of effort. Once again, given the effort chosen by the agency, nature will select a realization of g. Both period 2 and the game end at this point.

INSERT FIGURE 1 APPROXIMATELY HERE

Clearly, as the structure of the game is identical in the two branches, any difference in the possible results can only hinge on the two financing rules. As was mentioned in the Introduction, the simple rule only allow for "flat" contracts. Governments cannot make the payment of the transfer to the agency conditional upon observations of its effort or realized output level. Under the complex rule, on the other hand, governments are entitled to use their ability to observe the agency's choice, and can directly specify the action to be taken and the corresponding payment. The citizen, who can observe the action prescribed by the government and the payment, but not the chosen level of effort, *cannot* verify whether the payment to the agency corresponds to the prescribed effort level, or to some other choice. Clearly, this may open the way to collusion between the bad government and the agency[7].

Carefully note that the Constitution only determines the *form* of the contracts: under both rules, governments are, however, free to set the transfer (and the effort level under the complex rule) at the level they wish. We take this as a reasonable assumption on what a Constitution can actually do; we will come back to this in section 7, when we discuss some related literature.

3.1 Notation and assumptions on parameters

We introduce some simplifying notation and make some assumptions on the parameters of the model. Let $W^H = \sum_i f_i(a^H)g_i - c(a^H)$, and $W^L = \sum_i f_i(a^L)g_i - c(a^L)$. We assume:

A1'. $W^H \geq W^L$.

A2'. $W^L \geq c(a^H) - c(a^L) > 0$.

A1' says that the (expected) surplus generated by a^H is not lower than the (expected) surplus generated by a^L. It implies that a^H (weakly) Pareto dominates a^L. A2' could be written as $\sum_i f_i(a^L)g_i \geq c(a^H)$; as will be clear below, its role lies in allowing more strategies to be played by the agents. A2' could be easily relaxed (see note 8 below) at the price of imposing some extra complications to the structure of the model.

Finally, in order to simplify the notation, let us also set $f_i(a^H) = f_i^H$, $f_i(a^L) = f_i^L$, $c(a^H) = c^H$, $c(a^L) = c^L$, $\chi = \frac{c^H - c^L}{W^H}$, and $\gamma = \frac{W^L}{W^H}$. Using these shorthands and A1' and A2' above, our assumptions on the parameters of the model can be summarized as:

A1. $0 < \chi \leq \gamma \leq 1$.

[7]Indeed, in our model, as the benefits of the public good go to the citizen, the *only* way in which the government can transfer resources to the agency is through a payment made using some of the tax levied on the citizen.

4 Equilibria

In this section, we study the equilibria of the model under the two financing rules. The notion of equilibrium is that of perfect Bayesian equilibrium. That is, at the equilibrium, the strategy of the incumbent government, as a function of its type, must be optimal given the beliefs and the strategy of the citizen and the strategy of the opponent; the strategy of the citizen (i.e. her electoral choice) must be optimal given her beliefs and the strategies of the incumbent and the opponent; the strategy of the opponent must be optimal and finally, whenever possible, citizen beliefs must be updated using Bayes' rule. It is well known that this notion of equilibrium is often "weak" in the sense of being unable to predict a definite outcome of the game. Yet we show in this section that under weak technological assumptions and restrictions on out-of-equilibrium beliefs, we obtain a determinate prediction under each of the two rules. This will allow us to perform the welfare comparison between the two rules in the next section. We analyze the complex rule first.

4.1 The complex rule

We solve the model by backward induction. In period 2, the incumbent government, whatever its type, does not need to worry about the effect of its choices on the probability of being re-elected, as no election takes place at the end of this period. Thus, the only constraints it faces in setting up the optimal contract are those determined by the participation constraint of the firm and the consumer. The incumbent government's problem in period 2 can thus be written as:

$$\begin{array}{ll} \max & W^{\lambda}(t,a) \\ t,a & \sum_i f_i(a)g_i - t \geq 0 \\ & t \geq c(a) \end{array} \tag{1}$$

where the suffix $\lambda \in \{0,1\}$ indexes the type of the government. Note that in (1) we set up the optimizing problem as if the government directly chose the effort of the agency. This is however without loss of generality. Under the complex rule, the incumbent can always force the agency to provide the desired level of effort, provided that the participation constraint of the agency is satisfied at the offered contract. The second constraint in problem (1) represents the participation constraint for the agency: the optimal contract must at least cover its cost at any level of effort.

The first constraint in problem (1), on the other hand, captures the idea that there is a limit to the resources which can be expropriated from citizens in a democracy. We model this as a lower bound on the expected utility level of the citizen, and for analytical convenience we normalize this lower bound to be zero[8].

Using the suffix b and g to indicate the optimal choices made by the bad and the good government, respectively, we get:

Lemma 1 *Under the complex rule, period 2 choices for the two types of government are:* $a^b = a^g = a^H$; $t^b = \sum_i f_i^H g_i$; $t^g = c^H$.

Lemma 1 is straightforward. Under A1, a^H maximizes total (expected) surplus. Thus, both types of government prefer to choose this action, and then set the tax so as to give all this surplus to the agency, in the case of the bad government, or to the citizen, in the case of the good government. Note that in both cases, the payoff for the incumbent government in period 2 is W^H.

Having solved period 2, we now turn to period 1. In period 1 the government faces the same agency problem as in period 2 and it is subject to the same individual rationality constraints. But it has a different objective function, as it must also take into account the effect of its first period choices on the probability it has of being re-elected. Since this depends on the posterior belief of the citizen as well as on her a-priori on the opponent, we can in general indicate this probability as $G(t, a, \theta, \overline{\theta})$. We will be more specific on the form of this function below.

Using this notation, period 1 problem for the two types of government is:

$$\begin{array}{ll} \max & W^{\lambda}(t,a) + \delta G(t,a,\theta,\overline{\theta}) W^H \\ a,t & \sum_i f_i(a) g_i - t \geq 0 \\ & t \geq c(a) \end{array} \qquad (2)$$

[8]It should be noted that given the quasi - linearity of the utility function, this constraint could easily be relaxed by introducing an exogenous income component in the consumer's budget. This would also allow us to get rid of A'2. However, this choice would only complicate the analysis without offering any extra insight into the economics of the problem.

To solve problem (2) we must first calculate the beliefs of the citizen at the end of the first period, as a function of the government's (and the agency's) choices. There can be two types of pure strategy equilibria in our game: separating and pooling. We consider them in turn.

4.1.1 Separating equilibria

At a separating equilibrium, the two types of government choose different levels of t in the first period, $t^g \neq t^b$. Upon observing the tax in the first period, the citizen finds out the type of the government. This implies $G(t^g, a, \theta, \overline{\theta}) = 1$, and $G(t^b, a, \theta, \overline{\theta}) = 0$, for all values of a , θ, and $\overline{\theta}$[9]. Given that, at a separating equilibrium, the choice of a in period 1 does not affect the probability the government has of being re-elected, both types will choose the surplus maximizing action, $a = a^H$ and, as in period 2, the bad type will give all this surplus to the agency and the good type will give it all to the citizen. Note, however, that the bad type has the option of mimicking the good type. Its best deviation is to choose t^g, agree with the agency on a low effort level (which cannot be observed by the citizen), and then be re-elected for sure[10]. Thus, one *necessary* condition for the existence of a separating equilibrium is that this deviation must not be profitable:

$$W^H \geq (t^g - c^L) + \delta W^H = (c^H - c^L) + \delta W^H.$$

Using the short-hands introduced in the previous section, this condition can also be re-written as $\delta \leq (1 - \chi)$. We thus conclude:

Lemma 2 *If $\delta > (1 - \chi)$, then there are no separating equilibria under the complex rule.*

We are interested in situations in which perfect revelation of the type of the incumbent is impossible under the complex rule. In what follows we will therefore assume:

A2. $\delta > (1 - \chi)$.

[9]Note that this is true even if $\overline{\theta}$=1, given our previous assumption concerning the choice of the citizen in the case of a "tie".

[10]Remember that under our assumptions on the production technology for the public good each g_i is realized with positive probability under both effort levels; thus, there is no way the citizen could realize by observing some g_i that the agency is playing a^L.

It should be noted that A2 is just a technological assumption on the discount rate. Given A1, χ is both positive and smaller than 1. Thus, A2 will certainly be satisfied if the discount factor is high enough. The intuition underlying Lemma 2 is then clear. If the discount factor is sufficiently high, the long-term benefit from re-election more than outweighs the short-term cost of imitation, and the bad type prefers to pool.

4.1.2 Pooling equilibria

At a pooling equilibrium, the choice of t, which is observable, must be the same for the two types : $t^g = t^b = \hat{t}$. This still allows for two types of equilibria. We call *full pooling* an equilibrium in which the chosen action is also the same, $a^g = a^b = \hat{a}$, and *partial pooling*, one in which the (unobserved) choice of action is different for the two types, $a^g \neq a^b$. To analyze these equilibria, note first that at a pooling equilibrium, whether partial or full, it cannot be the case that $a^b = a^H$. As $\hat{t} \geq c^L$ at any such equilibria, the deviation to a^L is always feasible for the bad type and it allows the latter to raise its short-term utility without this changing its prospects for re-election[11]. The only candidates for a pooling equilibrium are thus full pooling at $\hat{a} = a^L$, and partial pooling with $a^g = a^H$ and $a^b = a^L$.

Full pooling A simple dominance argument allows us to rule out full pooling equilibria. To see this, suppose there is full pooling equilibrium. We must have, at this equilibrium, $\hat{t} \geq c^L$ and $\hat{a} = a^L$. Notice first that it cannot be the case that $\hat{t} = c^L$. Indeed, the bad government would always prefer to deviate: the choice of $\hat{t} = c^L$ gives the bad type zero utility in the first period, and, even under the optimistic belief that by playing $\hat{t} = c^L$ it would be re-elected for sure, the bad type would rather maximize short term profits and loose elections: $W^H > \delta W^H$. Thus $t = c^L$ is a dominated action for the bad type. Suppose next $\hat{t} > c^L$. Consider the good type's optimal strategy. In period 1, playing $\hat{t} > c^L$ implies an unnecessary waste of resources to elicit effort a^L. The good type would rather choose $t = c^L$. Thus, this type only plays $\hat{t} > c^L$ if it expects that the beliefs of the voter are such that, upon observing $t = c^L$, she would conclude that the incumbent is with high enough probability of the bad type and punish it by electing the opponent.

[11]See the previous footnote.

However, this out-of-equilibrium belief is unreasonable. The voter should be able to realize that $t = c^L$ is a dominated action for the bad type, and should therefore assign probability one to the government being of the good type upon observing $t = c^L$. Hence, at a full pooling equilibrium with $\hat{t} > c^L$, the good type always has a profitable deviation which breaks this equilibrium.

Partial pooling We are thus left with the partial pooling at $a^g = a^H$ and $a^b = a^L$ as the only possible candidate equilibria. We now derive conditions on θ and t which support these equilibria. To start with, note that at this type of equilibrium, beliefs are defined, after the observation of $\hat{t}$ and g_i by:

$$\mu_i(\theta) = \mu(\hat{t}, g_i, \theta) = \frac{\theta f_i^H}{\theta f_i^H + (1-\theta) f_i^L} \tag{3}$$

Let $I(\theta, \overline{\theta})$ indicate the set of all indices $i \in \{1, 2, \ldots, n\}$ such that $\mu_i(\theta) \geq \overline{\theta}$. Given $\hat{t}$, if $i \in I(\theta, \overline{\theta})$ and g_i is observed, the citizen prefers the incumbent. The total probability of re-electing the incumbent government when the agency plays a is thus:

$$G(\hat{t}, a, \theta, \overline{\theta}) = \sum_{i \in I(\theta, \overline{\theta})} f_i^a$$

At a partial pooling equilibrium, the expected probability of re-election is then $G(\hat{t}, a^H, \theta, \overline{\theta})$ for the good type and $G(\hat{t}, a^L, \theta, \overline{\theta})$ for the bad type. Let us simplify the notation by writing: $G^a(\theta, \overline{\theta}) = G(\hat{t}, a, \theta, \overline{\theta})$. It is an easy matter to establish that:

4.a) $G^a(\theta', \overline{\theta}) \geq G^a(\theta, \overline{\theta})$ if $\theta' \geq \theta$;

4.b) $G^a(1, \overline{\theta}) = 1$;

4.c) $G^H(\theta, \overline{\theta}) \geq G^L(\theta, \overline{\theta}), \forall (\theta, \overline{\theta})$.

Properties 4.a) and 4.b) derive directly by inspecting equation (3); property 4.c) follows from the assumption of MLR. Using (4), we can derive *necessary* conditions on θ for the proposed equilibria to exist. These conditions can be summarized by:

$$G^L(\theta, \overline{\theta}) \geq \frac{1-\chi}{\delta} \tag{$C1$}$$

$$G^H(\theta, \overline{\theta}) \geq 1 - \frac{1-\gamma}{\delta} \qquad (C2)$$

Using these conditions, in the Appendix we prove the following proposition[12]:

Proposition 3 *Under A1 and A2, if* $\overline{\theta} < 1$*, there exists a* $\hat{\theta} < 1$ *such that, for all* $\theta \geq \hat{\theta}$*, the game admits (only) partial pooling equilibria with* $a^g = a^H$*,* $a^b = a^L$*, and* $c^H \leq \hat{t} \leq MIN[\sum_i f_i^L g_i, B(\theta, \overline{\theta})]$*.*

The intuition underlying the proposition is simple. A1 and A2 eliminate all separating equilibria. The dominance argument eliminates all full pooling equilibria. So the only possible (pure strategy) equilibria are partial pooling equilibria in which the bad type "mimicks" the good type by raising the same tax on citizens and transferring hidden resources to the agency by reducing the latter's level of effort. In turn, for such equilibria to exist the prior θ must be high enough to satisfy two conditions. Firstly, condition $C1$, the bad type must have no incentive to deviate and play its short-term maximizing strategy. For this to be the case, the probability of being elected for the bad type when playing a^L must be high enough to overcome the loss incurred by postponing its preferred short-term action to period 2. As this probability is a non-decreasing function of θ, this condition can be expressed as a lower bound on θ, $\theta \geq \theta^*$.

Secondly, condition $C2$, since the good type has always the option to signal its type by playing $t = c^L$ in period 1, the probability of being re-elected must be high enough not to provide it with such an incentive. Again, this imposes a condition on the a-priori belief θ, $\theta \geq \theta^{**}$. Thus, if $\theta \geq \max(\theta^*, \theta^{**}) = \hat{\theta}$ neither type has an incentive to deviate from the proposed equilibrium, and if $\hat{t}$ lies within the indicated interval, we can also be sure, by construction, that all individual rationality conditions are also satisfied. Hence, we have an equilibrium.

Figure 2 illustrates the proposition. In the figure, which is drawn for the non-degenerate case $\overline{\theta} < 1$, the two increasing step functions represent, respectively, $G^L(\theta, \overline{\theta})$ and $G^H(\theta, \overline{\theta})$, with the latter function which always lies to the left of the former, because of the MLR. The two horizontal lines represent conditions $C1$ and $C2$. In the figure, we assume $\frac{1-\chi}{\delta} > 1 - \frac{1-\gamma}{\delta}$,

[12]The function B appearing in the statement of the proposition is defined by $B(\theta, \overline{\theta}) = c^H + W^H[1 - \gamma - \delta(1 - G^H(\theta, \overline{\theta}))]$. See the Appendix.

so that the upper line represents condition $C1$. As shown in the figure, this then implies $\theta^* = \max(\ \theta^*, \theta^{**})$. Thus, the set of θ which supports partial pooling equilibria is the interval $\theta^* \leq \theta \leq 1$, the darker line on the horizontal axis.

INSERT FIGURE 2 APPROXIMATELY HERE

The figure also helps to illustrate an interesting relationship between "efficiency" and the set of equilibria. To see this, note first that $\gamma = W^L/W^H$ can be interpreted as a measure of the relative efficiency of the two levels of effort. When $\gamma \simeq 1$, there is little loss of efficiency in employing a^L rather than a^H; vice-versa, when $\gamma \simeq 0$, a^H strongly dominates a^L. If we take the limiting case $\gamma = \chi$ (i.e. $c^H = \sum_i f_i^L g_i$), we can then see that $C1$ and $C2$ are affected in an opposite direction by γ. When $\gamma \to 0$, condition $C2$ has not bite and $C1$ is very restrictive; vice-versa, when $\gamma \to 1$, $C1$ is always satisfied and $C2$ is very restrictive.

The reason for this is very simple. When γ is large, the good type can deviate to $t = c^L$ and get rid of the bad type at little cost in terms of efficiency loss on the part of the consumer. Thus, unless the probability of being re-elected is very high (i.e. θ is very high), it will certainly deviate. On the contrary, when γ is large, the cost of pooling for the bad type in period 1 is small, and so it does not require an high probability of re-election to pool. The opposite is true for small values of γ.

Putting the two effects together, one sees that the relationship between γ and the set of $\theta' s$ supporting the equilibria is not monotonic. This set shrinks to a very small interval for extreme values of γ, and it increases in size for intermediate values of γ. This can also be seen with the aid of figure 2. Suppose that we start with a low value of γ. Thus, as shown in the figure, the line representing $C1$ is certainly higher than the line representing $C2$. If we then let γ rise slightly, the upper line will shift downwards and the bottom line upwards. As a result, $\widehat{\theta}$ will fall and the set of values of θ supporting the partial pooling equilibria will become correspondingly larger. However, if we keep increasing γ , eventually $C2$ will become more restrictive than $C1$, and the set of the supporting values of θ will then begin to shrink once again.

Finally note, that while we have been able to reduce the set of possible equilibria under the complex rule to the partial pooling equilibria, we have not been able so far to select an *unique* equilibrium. Indeed, as Proposition 1 shows, there is a continuum of partial pooling equilibria, all characterized by the same choice of the action, but involving different levels of the period 1 tax. In particular, while the only first period equilibrium tax is c^H for $\theta = \theta^{**}$, it would appear that for larger value of θ, we may have higher equilibrium taxes. However, if we are prepared to put some more weight on the rationality of the voter, this is no longer true. As is shown in the Appendix, if we use Cho and Kreps (1986) "intuitive criterion" to eliminate all "equilibrium dominated" strategies for the bad type, it turns out that the admissible interval for $\hat{t}$ shrinks to the point $\hat{t} = c^H$ for high levels of θ. Furthermore, note that $\hat{t} = c^H$ is that equilibrium level of t which goes further *against* our argument here, as it is the level at which the citizen is least exploited by the bad government under the complex rule. For these reasons, in what follows we are always going to refer to the partial pooling equilibrium with $\hat{t} = c^H$ when discussing the complex rule.

Summing up, we have shown in this section that, provided that the discount rate is large enough and the initial reputation of the incumbent is high enough, there is a unique type of equilibria under the complex rule. The good government plays its most favorite strategy in both period 1 and 2, and the bad type "hides" behind the good type, imposing the same tax as the good type in the first period and colluding with the agency for a low level of effort. What happens under the simple rule?

4.2 Simple rule

Proposition 4 *Under the simple rule, there exists only a separating equilibrium. At this equilibrium, first period choices are:* $a^b = a^g = a^L$; $t^b = \sum f_i^L g_i$ *,* $t^g = c^L$.

The intuition behind the proposition is straightforward. The citizen understands that under the simple rule, as the contract involves a "flat" transfer, the agency's optimal response is a^L. Thus, she assigns the incumbent a probability zero of being of the good type if $t > c^L$ is observed. However, as we have seen in the previous sub-section, $t = c^L$ is a dominated strategy for the bad type. The bad type, by playing $t = c^L$ in period 1 could at best achieve (discounted) expected utility level δW^L in period 2, while by deviating in period 1 it could ensure itself W^L. Thus, it always prefers to deviate. As a consequence, posterior beliefs of the citizen are: $G(t^g, a^L, \theta, \overline{\theta}) = 1$ and $G(t^b, a^L, \theta, \overline{\theta}) = 0$, for all $\theta, \overline{\theta}$. The good type is then re-elected with certainty, and its period 2 choices again are, given the stricter constraints imposed by the simple rule, $a^g = a^L$ and $t^g = c^L$.

Thus, the simple rule does not allow for "hidden" transfers to the agency. Even if the observed variables are the same under both rules, a rational voter, by observing the incumbent transfer choice in the first period, can more easily detect collusive behavior. Given our assumptions, the bad type is thus forced to reveal itself before the elections. This is valuable result for the poorly-informed voter, as she does not run the risk of re-electing a bad type (or not re-electing a good type) as may happen under the complex rule. However, the simple rule achieves this result at a price in terms of efficiency: at best, the voter can now only achieve W^L. Is the greater accountability of politicians induced by the simple rule enough to compensate for this loss?

5 Comparison

In this section we compare the relative merits of simple and complex rules from the ex-ante citizen's point of view. To do so, it is useful to introduce first some new notation. Let $v^c(R,T)$ indicate the expected discounted utility of the consumer over periods 1 and 2 under rule R, conditional upon government being of type T at the beginning of period 1. $R \in \{S, C\}$ can either be "simple" or "complex" , and $T \in \{B, G\}$ can either be "bad" or "good". Thus, for example, $v^c(S, G)$ is the expected discounted utility of the voter over periods 1 and 2 under the simple rule when the incumbent is good in period 1. In the following, we assume that the initial reputation of the incumbent government is large enough to satisfy $\theta \geq \widehat{\theta}$, so that the partial pooling equilibrium described in the previous section can be supported under the complex rule. Building upon the results of the previous section, the (conditional) expected utilities of the consumer in the four possible cases are:

$$v^c(S, B) = \delta\overline{\theta} W^L$$

$$v^c(S, G) = W^L + \delta W^L$$

$$v^c(C,B) = \left(\sum f_i^L g_i - c^H\right) + \delta(1 - G^L(\theta,\overline{\theta}))\overline{\theta}W^H$$

$$v^c(C,G) = W^H + \delta G^H(\theta,\overline{\theta})W^H + \delta(1 - G^H(\theta,\overline{\theta}))\overline{\theta}W^H$$

To understand these formulas, take first $v^c(S,B)$. Under the simple rule and bad government, period 1 expected utility of the consumer is zero. However, in period 2, the incumbent is not elected and the opponent takes its place. At the beginning of period 1, the consumer assigns probability $\overline{\theta}$ to this candidate being of the good type, in which case her period 2 discounted expected utility is δW^L, and probability $(1-\overline{\theta})$ to this candidate being of the bad type, in which case her period 2 expected utility is zero. Hence, $v^c(S,B) = \delta\overline{\theta}W^L$. By the same token, if the rule is complex and the incumbent is good, in period 1 the expected utility of the consumer is W^H. In period 2, with probability $G^H(\theta,\overline{\theta})$ the good type is re-elected, and the consumer gains δW^H, and with probability $(1 - G^H(\theta,\overline{\theta}))$ it is not elected. In the latter case, the consumer elects the opponent, whose expected probability of being good is $\overline{\theta}$. Thus, even if the good government is not re-elected, the consumer still expects to earn δW^H in period 2 with ex-ante probability $(1 - G^H(\theta,\overline{\theta}))\overline{\theta}$, and zero otherwise. Summing over all these terms, we get $v^c(C,G)$. Similarly for $v^c(C,B)$. Finally, under the simple rule and a good government in period 1, the consumer does not run the risk of not re-electing it, so that she gains with certainty $(1+\delta)W^L$.

For the sake of the comparison between the two rules, the two following lemmas are enlightening[13]:

Lemma 5 *Let $\gamma = \chi$. Then, under condition $C1$, $v^c(S,B) > v^c(C,B)$.*

Lemma 6 *Under condition $C2$, $v^c(C,G) > v^c(S,G)$.*

Lemma 5 states that if the government turns out to be bad in the first period, $\gamma = \chi$ and condition $C1$ of the previous section guarantee that the consumer is in expected terms better off under the simple rule. The intuition is simple. $\gamma = \chi$ (i.e. $\sum f_i^L g_i = c^H$) implies that the expected utility of the

[13]Both lemmas can be proved by direct substitution.

consumer in period 1 under the complex rule is zero. Therefore, as her utility is also zero under both rules in period 2 if the bad type is re-elected, the comparison between the two rules only hinges on the probability to elect a good type in period 2. But, as we have seen in the previous section, in order to enforce a partial pooling equilibrium, $G^L(\theta, \overline{\theta})$ must be relatively large. The probability of re-electing a good type under the complex rule is therefore much smaller. Thus, even if the simple rule forces the good type to only offer the voter W^L rather than W^H, the citizen always prefers it. Note that $\gamma = \chi$ is not necessary for the result of the lemma; as the inequality is strict, the simple rule may dominate the complex rule even for γ "sufficiently close" to χ.

Lemma 6 states that under condition $C2$, the citizen is better off under the complex rule when the incumbent turns out to be good. The intuition is straightforward. By the previous dominance argument, the good type can always reproduce the screening property of the "simple rule" outcome under the complex rule, by playing $t = c^L$ in period 1 and getting rid of the bad type in period 2. This would give the consumer expected utility $W^L + \delta W^H > v^c(S, G)$. For the good type not to do so, its probability of being re-elected must be sufficiently high, and consequently its expected utility under the complex rule must be greater than $W^L + \delta W^H$. This is condition $C2$. But then, as $v^c(C, G)$ is at least as large as the good type's expected utility under the complex rule[14], lemma 6 follows immediately.

Thus, quite intuitively, the citizen is ex-ante better off under the complex rule if the incumbent turns out to be good, and she is ex-ante better off under the simple rule in the other case (provided γ is "sufficiently close" to χ). However, to enforce a partial pooling equilibrium, the reputation of the government in period 1 must be high, so that the case considered in the second lemma appears to be more likely. It is possible, nevertheless, that the simple rule dominate the complex rule? To answer this question, we define:

$$H(\theta, \overline{\theta}, \delta, \gamma) = \theta v^C(S, G) + (1 - \theta) v^C(S, B) - \theta v^C(C, G) - (1 - \theta) v^C(C, B).$$

In the range of θ which supports the partial pooling equilibrium, $H(\theta, \overline{\theta}, \delta, \gamma)$ measures the difference in expected utility for the consumer between the simple and the complex rule, where the ex ante probability of the two types to

[14] This is so because the utility of the good type is zero in period 2 if it is not re-elected, while the consumer's utility is positive if the opponent government turns out to be good in period 2.

occur is determined by the citizen's a-priori. Clearly, the simple rule dominates the complex rule if $H(\cdot) > 0$. In the Appendix we prove:

Proposition 7 *Let $\gamma = \chi$ and $\overline{\theta} < 1$. Then, under A1, A2, there exists a $\gamma^* < 1$, such that for $\gamma > \gamma^*$, there exists an open interval of $\theta's$ in the support of the partial pooling equilibrium where $H(\theta, \overline{\theta}, \delta, \gamma) > 0$.*

Figure 3 illustrates the result. In the picture, $H(\theta, \overline{\theta}, \delta, \gamma)$ is plotted as a function of θ, keeping all other parameters constant, for a value of γ bigger than γ^*. The interval $[\widehat{\theta}, 1]$ along the horizontal axis is the support for the partial pooling equilibrium. As is shown in the appendix (see also Figure 2), for $\theta \geq \tilde{\theta}$, both types are re-elected for sure, and $H(\theta)$ is a well-behaved continuous decreasing function of θ. Thus, as $H(\tilde{\theta}) > 0$ for $\gamma > \gamma^*$, there certainly exists an interval of $\theta's$ to the right of $\widetilde{\theta}$ where the simple rule dominates the complex rule. This is given by all $\theta's$ included in the interval from $\widetilde{\theta}$ to the point where $H(\theta)$ crosses the horizontal axis. For values of θ to the left of $\tilde{\theta}$, the probability of re-electing a bad government under the complex rule decreases, but at the same time it becomes possible to throw a good government out of office. The shape of the function H then depends on how the relative probabilities of these two types of "errors" change with θ. In general, we cannot exclude cases where, as shown in the figure, the complex rule may dominate the simple rule, even for some values of θ lower than $\tilde{\theta}$.[15]

INSERT FIGURE 3 APPROXIMATELY HERE

Figure 3 also helps to illustrate the relationship between the difference in "efficiency" between the two rules and the set of equilibria. To see this, let γ increase. As γ increases, $H(\theta)$ shifts to the right, thereby widening the range of $\theta's$ where the simple rule dominates the complex rule. However, at high levels of γ, $C2$ is certainly binding. Thus, $\hat{\theta}$ also moves to the right and the support of the partial pooling equilibrium shrinks. As γ approaches 1, $\hat{\theta}$

[15]It is possible to find conditions on f_i^H and f_i^L which would guarantee $H(\theta)$ to be a non-increasing function of θ everywhere. However, these conditions have no clear economic meaning.

tends to $\tilde{\theta}$, and, at this point, the simple rule dominates the complex rule on the *whole* support of the partial pooling equilibrium[16]. Viceversa, if we let γ fall, the process is inverted: the curve shifts to the left and, at least initially, the support of the partial pooling equilibrium becomes larger. However, if we keep reducing γ, eventually $C1$ becomes the binding condition. As an effect, $\widehat{\theta}$ will start moving again to the right. For very low levels of γ, the support of the partial pooling equilibrium converges again to $[\widetilde{\theta}, 1]$, this time with the complex rule dominating everywhere the simple rule.

Summing up, there is then a rather neat relationship between voter's expected welfare under the two rules and the difference in efficiency between the same rules. When this difference is small, the range of equilibria where the simple rule dominates the complex rule is very large; when this difference is large, this range is very small and disappears entirely for γ small enough. The intuition is simple. The benefits of the simple rule for voters are in its screening property, what we call here its "transparency"; its costs in its loss of efficiency with respect to the complex rule. When the incumbent government's initial reputation is good, but not extremely good, the screening property of the simple rule has the highest value and it is worthwhile for the voter to sacrifice efficiency in order to gain transparency.

6 Constitutional choices

In this section we raise the question of who would choose the rules. In particular, one may wonder if the choice of the rule could be used by the policy-maker itself as a signalling device, with, say, a good government choosing the simple rule to signal its type to the voter. As the two lemmas in the previous section demonstrate, the answer is however negative. Indeed, both types of government are better off under the complex rule. The bad type, because the complex rule allows it to pool, and so to extract more resources from the citizen. The good type, because the complex rule allows it to maximize the welfare of the citizen. Thus, if asked, each government, upon observing its type, would vote for the complex rule, although for opposite reasons[17].

[16]To see this, observe that at $\gamma = 1$, $H(\theta)$ is always non negative for $\theta \geq \widetilde{\theta}$ and only becomes zero at $\theta = 1$.

[17]This would not be true if we had allowed our "good" government to be concerned with the well-being of the citizen even in the event that it looses office. In this case, in fact,

We then ask if a Constituent could choose the simple rule[18]. As in the tradition of economic theory, we interpret here the Constituent as a higher level agent who, understanding the results of the game being played by the agents in the economy, sets up the rules so as to maximize social welfare[19]. One crucial characteristic of a Constituent is that the information in its possession is usually less specific than that of the actual players of any particular game. Constituents choose under a "veil of ignorance", because the rules they set do not refer to a single realization of the game but to several of them. We model this feature here by assuming that the Constituent, unlike the citizen, does not observe the prior θ on the type of the incumbent government, but only knows the cumulative function $F(\theta)$ from which these priors are drawn. As an interpretation, one may think that the reputation of a single government regards just that policy maker, while the Constituent, in making its choice, must take in account the "average" reputation of all the policy makers playing the game. The objective of the Constituent is that of maximizing the expected citizen's welfare, where expectations are now taken over all possible $\theta's$ rather than, as was the case in the previous section, on a specific θ.

It should be noted, however, that for values of $\theta < \hat{\theta}$, given our assumptions, there are no equilibria (in pure strategies) under the complex rule. We thus focus only on the set of $\theta's$ which lie in the support of the partial pooling equilibria; i.e. in evaluating the expected welfare of the consumer,

the good government might prefer the simple rule. In our view, our modeling strategy has the advantage of stressing the separation between the analysis of ordinary day - by - day politics and the constitutional stage during which rules are chosen. For an opposite modelling choice in the context of a signalling model of policy applied to a problem of environmental taxation, see Brett and Keen (1998).

[18]The label "Constituent" must not of course be taken too literally. According to the interpretation given to our model, the Constituent could also be the Congress, the High Court, or even the Central Government. For instance, if we interpret our policy makers of the previous sections as being local governments, the Constituent could well be the Central Government fixing the rules for the funding of local utilities.

[19]We assume here that social welfare coincides with the consumer (expected) utility. This assumption is no restrictive in our context. Even if the profits of the agency ultimately go to the citizens and should therefore be taken into consideration by the Constituent, in our simplified framework the distribution of surplus among the citizens and the agency is a zero-sum game. Furthermore, if taxes are also mildly restrictive, 1 dollar of profits left to the agency reduces consumer (expected) welfare by more than 1 dollar. Then, a welfare-maximizing Constituent would never opt to leave positive profits to the agency.

we take expectations only over the interval $[\widehat{\theta}, 1]$. As an interpretation, one may think that expectations over the types of governments have reached a stage where citizens always expect the realization of θ to be large enough to support the partial-pooling equilibria.

We can then prove:

Proposition 8 *Let $\gamma = \chi$ and $\overline{\theta} < 1$. Then, under A1, A2, there exists a $\gamma^{**} < 1$, such that for $\gamma > \gamma^{**}$, the Constituent would choose the simple rule.*

Again, all that matters for the result is that the difference in efficiency between the two rules is not too great. While this is not surprising given the results of the previous section, it is worthwhile pointing out that this happens in a society where expectations on policy-makers' "honesty" have reached a very high standard, high enough to support a partial pooling equilibrium for all realizations of θ. Thus, it is certainly not necessary to have very bad expectations on politicians in order to want to enforce "flat" rules. Indeed, in a sense the issue of the transparency of the rules is important when governments are expected to be good, rather than the other way round. It is only when the reputation of the average politician is high, infact, that a badly-minded policy maker can use the complexity of the contigent rules to "pool" and exploit citizens without being discovered.

7 Related literature

The thrust of our argument can be better appreciated by comparing it with some related literature. Firstly, we must acknowledge our modelling debt with the work of Coate and Morris (1995), although the focus of our analysis is very different. Coate and Morris are interested in clarifying the debate between the Chicago and the Virginia schools of public choice over the issue of the "efficiency" of politics. To this end, they compare two possible ways of transferring resources to an interest group: either directly, via an observable transfer, or indirectly, by implementing a risky public project. Governments can either be "good" or "bad", and citizens are less informed on the real benefits of the project than the governments are. Vindicating the Virginia approach, Coate and Morris show that in equilibrium bad governments may prefer to pool and avoid direct (Pareto efficient) transfers, as this would reveal their type and result in election defeat. This is very similar to one of the results of our paper, except that in our case is the most efficient rule which allows for pooling behavior. This different result is due to the inclusion in our model of an agency problem, a crucial difference with the Coate and Morris's paper. The agency problem allows us to highlight which is our main argument here: the potential trade-off between transparency and efficiency and the consequent normative problem of the choice of the rules.

A similar trade - off, between high-powered incentives and the threat of collusion, has been investigated in the literature on regulation (e.g. Laffont and Tirole (1993), Tirole (1991)). In the basic model of this literature, the Principal (i.e. the Congress) must design a contract for an Agent (i.e. the regulated firm), and she has the possibility of asking for the help of a Supervisor (i.e. a regulatory agency) which is endowed with better information on the Agent's behavior. The Principal takes into account that the Supervisor can be bribed by the Agent. Usually, in order to reduce the stakes on which corruption is based, the optimal "grand" contract involve less powered incentive payments than would otherwise be the case. In some cases, it is even optimal for the Principal to discard the Supervisor's information altogether. Reinterpreting the Supervisor as the government and the Principal as the citizen, the formal analogy with both the structure and the results of our model would appear to be substantial.

There is a crucial difference, though. As we focus on the political context, we take as a natural constraint the fact that the Principal (the citizen) cannot directly write a contract with the Supervisor (the government). To understand why this difference is crucial, imagine that we attempt to apply the Laffont-Tirole conclusions to our political context. This would lead us either to reducing the discretion of the policy maker, maybe by directly writing an optimal contract for the agency at the Constitutional level, or to providing the government with the right incentives not to collude. However, both suggestions are hardly feasible in the political context. Constitutions are incomplete contracts which can only very weakly constrain the behavior of ruling politicians (e.g. Dixit, 1996), and elections are a highly imperfect way of providing incentives to governments. Indeed, these specific constraints are exactly the reason why we believe the issue of the transparency of rules may be so important in the political context. Transparency allows an otherwise very poorly equipped Principal to have a better check on the behavior of her Agent. To put it down differently, our point here is not to say that as politicians may be "bad" it is better to "tie their hands" with flatter rules.

The point is rather that since it is not really possible to tie politicians' hands, or at least, not very tightly, the screening property of less contingent rules is valuable.

One limitation of the present work is that we only focus on electoral behavior as the citizen's means of rewarding or punishing the government. More generally, governments may lose consensus, or they may come under attack from opposing interest groups, or they may face stiffer opposition in Parliament, or may risk a more thorough examination by the judicial system. In all these cases, less contingent rules are likely to impose on policy makers higher political costs, as their "bad" behavior would be more easily detected. In a recent paper, Roland, Persson and Tabellini (1998) emphasize the role played by the design of a system of checks and balances in providing the citizen with a richer set of instruments to improve the accountability of elected bodies. They do not deal explicitly with the problem of adverse selection in the choice of candidates, which is our focus here. Extending our analysis to this richer institutional setting may be a promising area for future research.

8 Concluding remarks

Standard arguments used to explain the difference between the "simple" rules observed in many contexts and the "complex" mechanisms prescribed by the theory, are based on a consideration of implementation costs, or on the need to avoid an excessive sensibility to measurement errors. We offer a different explanation. Different rules may induce different types of equilibrium behavior, with different informational content. Simple rules, even when they lead to some loss of efficiency, may be preferable because they are more "transparent": they induce equilibria in which more information gets revealed.

In this paper, we illustrate this argument with reference to electoral behavior in the political context. This is a field within which our argument is likely to be of particular importance, because of the large gap in information between policy-makers and citizens, on one hand, and because elections are at best a very imperfect instrument to disciplining politicians, on the other hand. We show that it may be optimal to constrain governments to use simple rules, even at the cost of some inefficiency, precisely because the informational content of the same observed actions is higher at equilibrium.

The trade - off between accountability and efficiency may not be limited to the citizen - government relationship, however. In essence, the model discussed in this paper is one in which a severely constrained Principal faces both an adverse selection and a moral hazard problem. Given the limited set of instruments at her disposal to deal with adverse selection problem (i.e., in this paper, only her electoral behavior) it may be optimal to further constraint the set of instruments available to handle the moral hazard problem. As such, the model may have applications which go beyond the analysis we have developed here.

9 Appendix

Proof of Proposition 1 A necessary condition for the existence of a partial pooling equilibrium is that neither type prefers to separate and choose the short term maximizing tax level, in the worst possible case in which this choice causes loss of office for sure:

$$(\sum_i f_i^H g_i - \hat{t}) + \delta G^H(\theta, \overline{\theta}) W^H \geq W^H$$

$$(\hat{t} - c^L) + \delta G^L(\theta, \overline{\theta}) W^H \geq W^H.$$

These two conditions define an interval of candidate values for $\hat{t}$:

$$c^L + (1 - \delta G^L(\theta, \overline{\theta}))W^H \leq \hat{t} \leq \sum_i f_i^H g_i - (1 - \delta G^H(\theta, \overline{\theta}))W^H.$$

This interval is not empty if:

$$G^L(\theta, \overline{\theta}) + G^H(\theta, \overline{\theta}) \geq \frac{1-\chi}{\delta} \tag{$*$}$$

The proposed $\hat{t}$ must also satisfy the individual rationality conditions:

$$c^H \leq \hat{t} \leq \sum_i f_i^L g_i.$$

The intersection of these two intervals is not empty if besides $(*)$ the following condition is satisfied:

$$G^L(\theta, \overline{\theta}) \geq \frac{1-\gamma}{\delta} \tag{$**$}$$

Consider now the condition:

$$G^L(\theta, \overline{\theta}) \geq \frac{1-\chi}{\delta} \tag{$C1$}$$

By A1 and (4.c), C1 implies both $(*)$ and $(**)$. Condition C1 is actually slightly stronger than necessary, but it allow us to simplify both the calculations and the discussion of the results. Because of A2, the RHS of C1 is smaller than one. On the other hand, if we define :

$$\tilde{\theta} = \frac{\overline{\theta}}{\overline{\theta} + (1-\overline{\theta}) f_1^H / f_1^L},$$

we obtain, using MLR, that $G^L(\tilde{\theta}, \overline{\theta}) = 1$, so that C1 is certainly satisfied for all $\theta \geq \tilde{\theta}$. In the non degenerate case, $\overline{\theta} < 1$, so that $\tilde{\theta} < 1$. Thus, there always exist $\theta < 1$ such that C1 is satisfied. Let us indicate with θ^* the minimum level of θ such that C1 holds; i.e. C1 holds for all $\theta \geq \theta^*$.

For values of θ satisfying C1, $c^H + \delta G^H(\theta, \overline{\theta}) W^H \geq \sum_i f_i^L g_i$. Hence, if $c^H \leq \hat{t} \leq \sum_i f_i^L g_i$ and $\theta \geq \theta^*$, all necessary conditions for the existence of a partial pooling equilibrium are satisfied. To sustain these equilibria, it's enough to appropriately specify the citizen's belief out of equilibrium, for example by setting $\mu(t, g_i, \theta) = 0$ for all $t \neq \hat{t}$. Many of these equilibria, though, can only be supported by unreasonable beliefs. By the dominance argument discussed in the text, the good type can always signal itself by playing $t = c^L$ in period 1 and be re-elected for sure in period 2. We must then make sure that this deviation is not profitable for the good type:

$$(\sum_i f_i^H g_i - \hat{t}) + \delta G^H(\theta, \overline{\theta}) W^H \geq W^L + \delta W^H \tag{5}$$

Recalling that the agency's participation constrain implies that $\hat{t} \geq c^H$ at the proposed equilibrium, this gives us the further condition:

$$G^H(\theta, \overline{\theta}) \geq 1 - \frac{1-\gamma}{\delta} \tag{$C2$}$$

Condition C2 can be thought of as a (weak) refinement condition; it ensures that the proposed equilibria are not based on the unreasonable belief that the bad type could play a dominated strategy. By A1, the right hand side of C2 is certainly smaller than or equal than 1; again, the condition is satisfied at $\tilde{\theta} < 1$. Let θ^{**} be the minimum level of θ such that C2 holds; i.e. C2 holds for all $\theta \geq \theta^{**}$.
If we set $\hat{\theta} = MAX[\theta^*, \theta^{**}]$, both C1 and C2 are satisfied if $\theta \geq \hat{\theta}$.
Finally, (5) can be re-written as:

$$c^H \leq \hat{t} \leq B(\theta, \overline{\theta}),$$

where $B(\theta,\overline{\theta}) = c^H + W^H[1-\gamma-\delta(1-G^H(\theta,\overline{\theta}))]$, so that the interval of admissible values of the tax is:

$$c^H \leq \hat{t} \leq MIN[\sum_i f_i^L g_i, B(\theta,\overline{\theta})].$$

This ends the proof of the proposition.

Intuitive criterion We can further refine the interval of possible equilibria by considering the existence of deviations which are "equilibrium dominated" for the bad type, but not for the good type. If one accepts the Cho-Kreps (1987) argument, at a given equilibrium, the good type can play one of these deviations to signal his type, and guarantee his re-election. At a given equilibrium $\hat{t}$, the bad type will not want to play t, even followed by sure re-election, if :

$$(\hat{t}-c^L) + \delta G^L(\theta,\overline{\theta})W^H \geq (t-c^L) + \delta W^H$$

that is if $t < \hat{t} - (1-G^L(\theta,\overline{\theta}))\delta W^H$. It easy to see that such a t, if followed by re-election, is never dominated by the proposed equilibrium for the good type. Playing such a t is therefore a profitable deviation for the good type (assuming that the citizen understands the message). What equilibria can be eliminated by this argument? Given $a^g = a^H$, feasibility requires $t \geq c^H$, and the preceding argument can be used to eliminate all equilibria with $\hat{t} > c^H + (1-G^L(\theta,\overline{\theta}))\delta W^H$.

Observe that, if we allow the good type to deviate also in the action, and choose a^L, we can use the intuitive criterion to eliminate all the equilibria that we already eliminated by dominance. For high levels of θ, the intuitive criterion is more stringent though, and for θ converging to $\tilde{\theta}$ the interval reduces to the point c^H.

Proof of Proposition 3 Notice that, for $\theta \geq \tilde{\theta}$, $G^H(\theta,\overline{\theta}) = G^L(\theta,\overline{\theta}) = 1$, so that, over this range, the expression of H simplifies to.

$$H(\theta,\overline{\theta},\delta,\gamma) = W^H[(1-\theta)\delta\overline{\theta} + \overline{\theta}(1+\delta))\gamma - \theta(1+\delta)]$$

Given all the other parameters, this is a decreasing function of θ. If we now let $\gamma^* = \frac{\tilde{\theta}(1+\delta)}{(1-\tilde{\theta})\delta\overline{\theta}+\tilde{\theta}(1+\delta)}$, we have that $H(\tilde{\theta},\overline{\theta},\delta,\gamma) > 0$ for all $\gamma > \gamma^*$. For any such γ, using the above expression for H, we can find a value θ_γ such that $H(\theta,\overline{\theta},\delta,\gamma) > 0$ for all $\theta \in (\tilde{\theta},\theta_\gamma)$.

Proof of Proposition 4 Let $\gamma' = \delta \sum_{i \geq 2} f_i^H + (1-\delta)$. Using the expression for C2, we have that, if $\gamma > \gamma'$, $\hat{\theta} = \tilde{\theta}$. If we now let E indicate expectations over the range $[\tilde{\theta}, 1]$, we see that $E[H(\theta)] > 0$ if and only if

$$\gamma > \frac{E(\theta)(1+\delta)}{E(\theta)(1+\delta) + \overline{\theta}\delta(1 - E(\theta))}$$

Notice that $E(\theta) < 1$, so that the right-hand side of this expression is a number $\gamma" \in (0,1)$. If we set $\gamma^{**} = MAX[\gamma', \gamma"]$, the proposition is proved.

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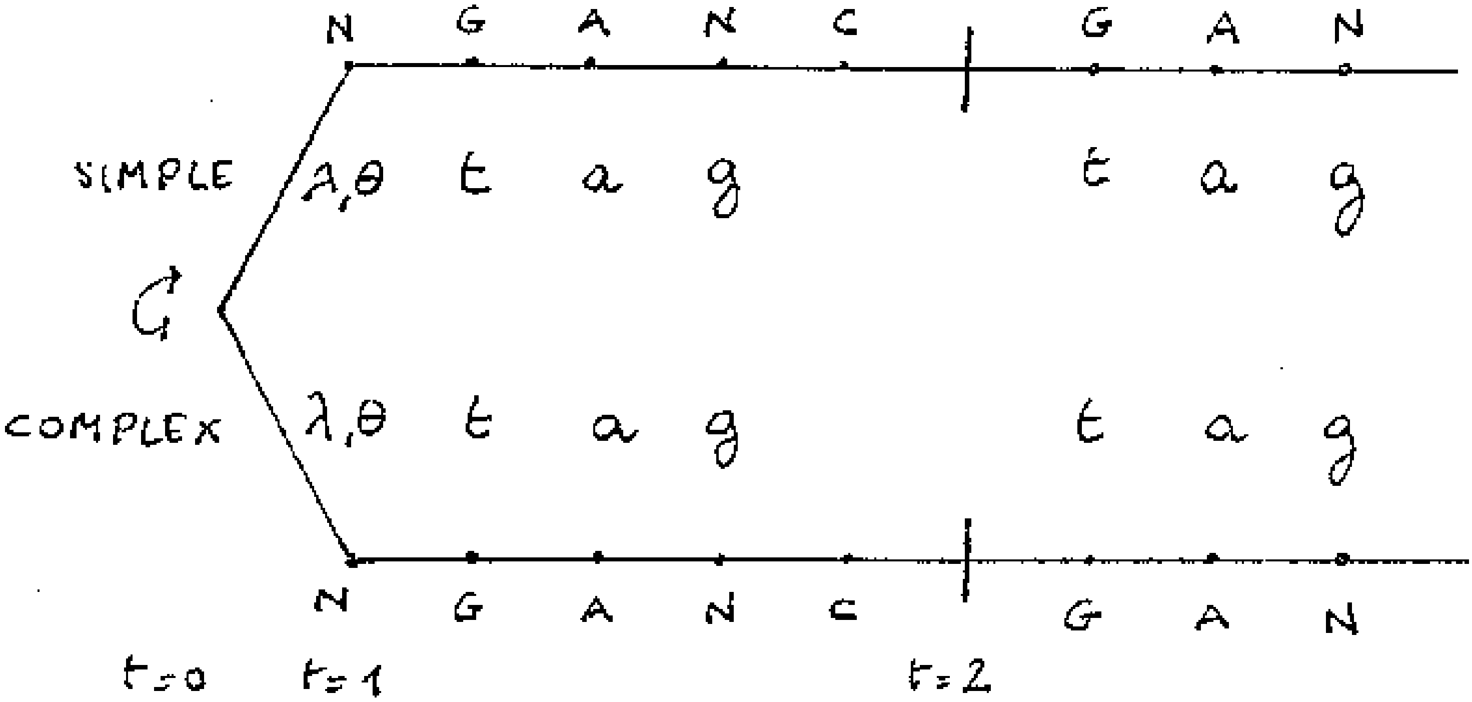
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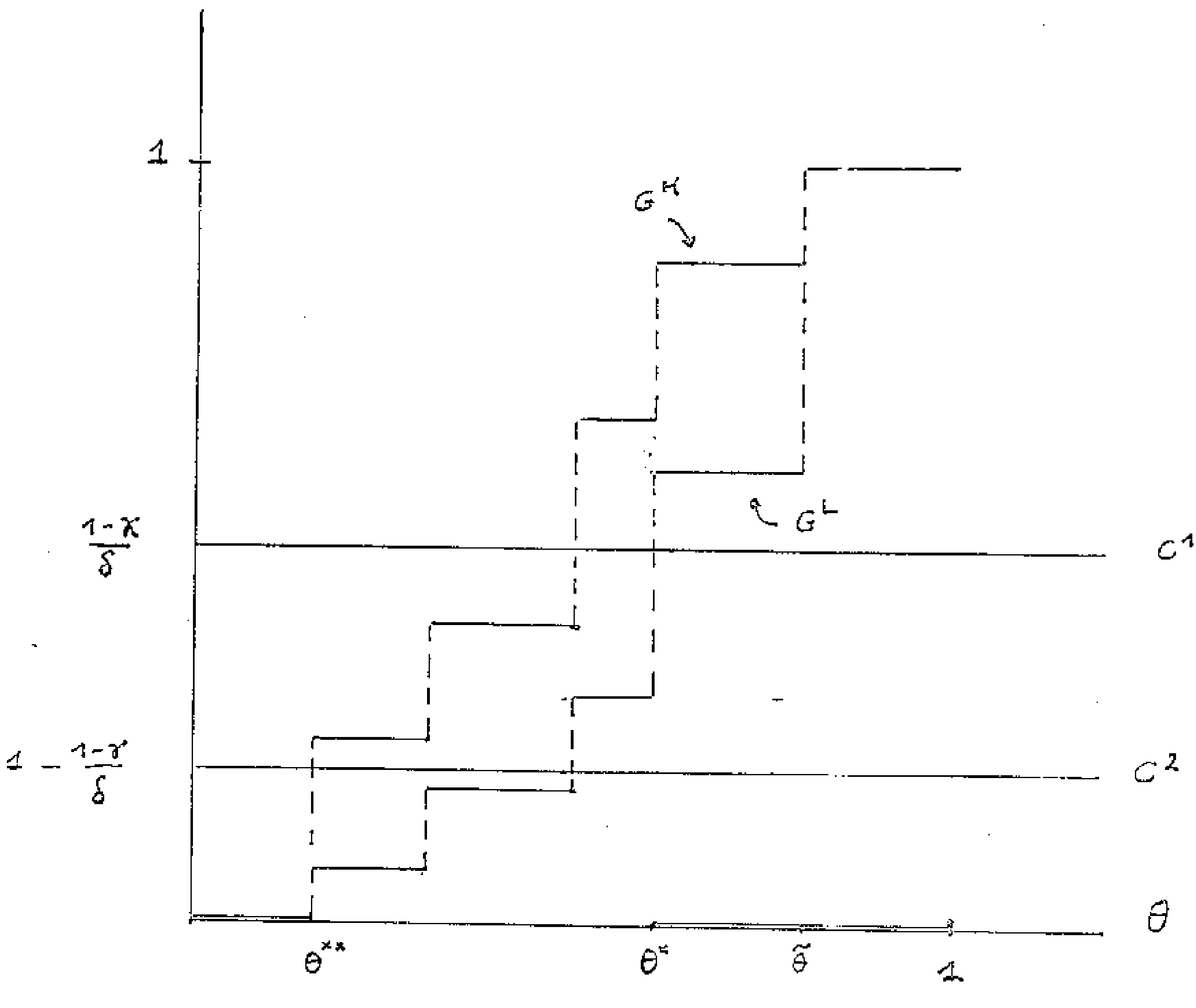

1
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C^1
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θ^{**}
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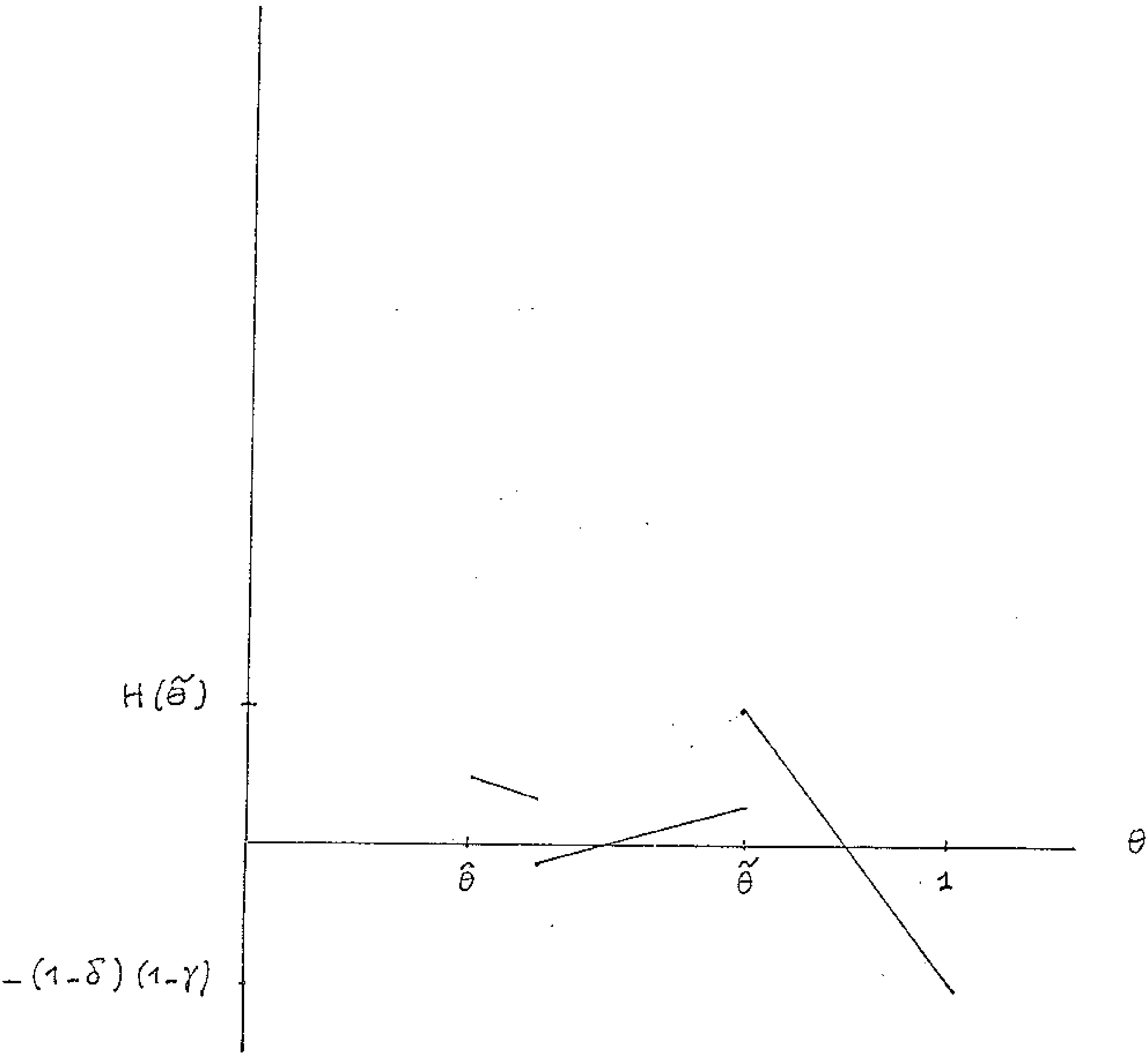

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