Constitutional Rules and Efficient Policies.*

Michela Cella[†] Giovanna Iannantuoni[‡] Elena Manzoni[§]

September 30, 2014

Abstract

This paper compares the ability to select the efficient policy of a parliamentary and a presidential constitutional setup. In order to do it we build a dynamic theoretical model with asymmetric information that succeeds in addressing both the politicians' accountability and the competence dimensions. There are two main differences between these institutional frameworks, one is the presence of the confidence vote in the parliamentary system that may cause elections before the natural end of the legislature, the other is the observability by voters of the executive's policy proposal before the assembly vote. We show how the informational structure shapes the constitutional characteristics and the equilibrium predictions suggest that, when the assembly is perfectly informed, the presidential system performs better. When there is asymmetric information regarding the state of the world, instead, the parliamentary may perform better because the executive has incentive to behave better for reputational motives.

Keywords: presidential system, parliamentary system, comparison confidence vote, hierarchical accountability

JEL Classification: C72, D72

*The authors gratefully acknowledge financial support from PRIN (2012-2015) " New approaches to political economics : positive political theories, empirical evidence and experiments in laboratory". Useful comments were received by: Leo Ferraris and other participants at the Political Economy Workshop (Milan 2014), Ascension Andina-Diaz and other participants at the 13th Journées LAGV (Aix-en-Provence 2014).

[†]michela.cella@unimib.it

[‡]giovanna.iannantuoni@unimib.it

[§]elena.manzoni@unimib.it

1 Introduction

It has been well acknowledged, since the seminal works by Persson and Tabellini [2002, 2005], that institutional setups have a relevant impact on the shape of economic policies. However, in spite of the substantial amount of literature, both in the fields of political science and economics, there is still no received knowledge on which constitutional design may be more desirable. We contribute to this debate by comparing the performance of a presidential and a parliamentary system in selecting the efficient policy and we show that either of the two systems may perform better depending on the level of information of the assembly.

We focus on the comparison between presidential and parliamentary systems under informational asymmetry; such asymmetry generates both a moral hazard problem (accountability) and an adverse selection one (politician's competence). We show that the two institutional frameworks respond differently to these two dimensions; the specific incentive schemes generated have a dramatic impact on the efficiency of the policies chosen by governments. In other words the informational structure shapes the constitutional characteristics.

Specifically, we compare presidential versus parliamentary systems through the following two-period setup. The government is defined by an executive body, represented by a single player, and by a legislative body, represented by an assembly composed by n members. At the beginning of the game each player observes his type (i.e. congruent or not). In the first period the executive observes the true state of the world while the members of the assembly receive only a (potentially fully) informative signal about it. At this point the executive proposes a policy that has to be approved by majority in the assembly. At the end of the first period each player observes the true state of the world, updates his beliefs and then period two occurs analogously. The first difference between the two systems is the presence of the confidence vote as a key constitutional ingredient of the parliamentary system. The main implication of the confidence requirement is that if the policy proposed by the executive is rejected, new elections are called for both government bodies. This allows the parliamentary system to get rid of very bad politicians even before the natural conclusion of the legislature; in turn though, it makes the system also very sensitive to the incentives of the members of the assembly who may have private agendas themselves and not act in the interest of voters. The other key difference between the two constitutional framework is that in the presidential one voters observe only the implemented policy, while in the parliamentary system they observe also the policy proposed by the executive before the vote of the assembly.

When the signal about the state of the world received by the assembly is fully informative we lose a dimension of asymmetric information and the presidential system always selects the efficient policy, therefore outperforming the parliamentary one. The force driving the result is the perfect information of the assembly that corrects any attempt at inefficient behavior by a non-congruent executive.

If instead the signal received by the assembly is not fully informative our equilibrium characterization shows that the parliamentary system may do better than the presidential one in some circumstances. This is due mainly to two reasons. First of all the presence of the confidence vote changes the incentives of the executive when making a policy proposal, and increases the probability of good behavior in the first period for fear of being voted against and sent home. A second driving force is the observability, by voters, of the policy proposed by the executive that improves the behavior of a non-congruent executive even in the second period due to reputational concerns.

In our model voters, directly and through the assembly, are able to exercise a form of control over the executive branch of the government by using policy proposals and assembly votes as signals about the congruency of the executive.

Our work is related, as mentioned above, to the literature on the relation between constitutional design and economic policy that began with Persson and Tabellini [2002, 2005] and to the literature on incentives in political economy (see for example Besley [2007]).

More precisely, the idea that a good way to judge a political system is its ability to select the efficient policy comes from Besley and Coate [1998], where, in a different setup, they identify a political failure as the inability to undertake a potentially Pareto improving public investment with the available policy instrument.

In our model we show that politicians with a different tenure or time horizon have different incentives in choosing policies irrespective of their utility function as Maskin and Tirole [2004]. We also model in a similar way the legacy motive present in congruent politicians (both in the executive and in the legislative body) and the value of being in office which characterizes all members of the political class. We do however modify the approach to politicians' accountability and the benefit of having elections which correct (or at least mitigate) inefficiencies due to both moral hazard (acting in the public interest) and adverse selection (weeding out the bad politicians), in order to take into account the hierarchical structure that comes from the presence of multiple levels of control, i.e. voters and assembly. We also observe some form of pandering in equilibrium, a perverse effect of politicians trying to be reelected, that is choosing to implement what is thought to be the popular policy to please the electorate.

Another related work is Diermeier and Vlaicu [2011] who study how constitutional features influence political behavior in terms of legislative success (passing of bills proposed by the executive) and they show that the confidence vote (that may send everybody home) is the critical feature that may explain the different performance of a parliamentary and presidential system in terms of legislative success.

Our hierarchical agency structure is related to the one in Vlaicu [2008] and Vlaicu and Whalley [2013] where they study accountability in government under different hierarchical controls without comparing different constitutions.

The structure of the papers is as follows: Section 2 describes the elements of the model, Sections 3 describes the working of the systems when the assembly is as informed as the executive, Section 4 compares the two systems when the signal received by the assembly is not fully informed, Section 5 briefly concludes. All proofs are in the Appendix.

2 The model

We analyze a two-period political system characterized by the presence of three (sets of) agents: the executive, the assembly and the voters.

Policy environment. Each period $t = 1, 2$ is characterized by a state of the world $s_t \in \{s_A, s_B\}$; each state is equally likely, $\mathbb{P}[s_t = s_k] = \frac{1}{2}$ for $k = A, B$, and states are independently distributed across periods.

In every period t a public good, A or B has to be produced. We indicate with $g_t \in \{A, B\}$ the implemented policy at time t, i.e. the choice of the public good produced in period t. The production cost of the public good A is $c_A \in (0, 1)$ while, w.l.o.g., we normalized to 0 the cost of production of the public good B.

The selection process works as follows: the executive proposes a policy $g_t^e \in \{A, B\}$ and the assembly votes on this proposal. If the assembly rejects the proposal a status-quo policy g^0 is implemented. We focus on $g^0 = A$ and will discuss on the alternative case in a subsequent section. If the executive wishes to implement the status-quo policy its proposal gets through with no vote.

The amount of resources in the country is 1, and it can be used to provide the public good g or it can be privately consumed (through perks) by the executive.

Voters. The electorate is made of N homogeneous voters with a per period utility $u(g, s_k)$ such that:

$$u(g, s_k) = \begin{cases} 1, & \text{if } g = k \\ 0, & \text{otherwise.} \end{cases} .$$

Hence the efficient policy is $g^*(s_t)$, where:

$$g^*(s_t) = \begin{cases} A, & \text{if } s_t = s_A \\ B, & \text{if } s_t = s_B. \end{cases}$$

Executive. The executive body is made of a single member whose privately observed type is $\theta^e \in \{0, 1\}$ where $\theta^e = 0$ indicates a non congruent executive and $\theta^e = 1$ a congruent one. The executive is congruent with probability $\mathbb{P}[\theta^e = 1] = \gamma$.

The executive's utility function is:

$$V^e = 1 - c(g_1) + \theta^e u(g_1, s_1) + \pi \left(1 - c(g_2) + \theta^e u(g_2, s_2) + \varepsilon \hat{\theta}^e\right)$$

where $u(g_t, s_t)$ is the period t utility of voters when the state is s_t and the implemented policy is g_t and π is the probability of being in power in period two ($\pi = 1$ for the presidential system and $\pi \leq 1$ for the parliamentary). The last term $\varepsilon \hat{\theta}^e$ represents the executive's concerns for reputation. $\hat{\theta}^e$ is the ex-post voters' belief on the probability that the executive is congruent while ε is a positive real number which is small enough to satisfy:

$$0 \leq \varepsilon \leq c_A$$

This condition ensures that the reputation concerns cannot overcome a congruent executive's incentives to implement the correct policy in the last period.[1] To put it simply a non congruent executive cares only about his rent while a congruent one has a legacy motive that depends on the utility of the electorate. Both types will choose policy proposals in order to maximize their utility over the two periods taking into account the behavior of the assembly and the beliefs of the voters.

Assembly. The assembly is the legislative body which has to approve or reject the executive's policy proposal in each period. It is composed of n (odd) members (legislators), $l = 1, ..., n$; each member has private information about his type $\theta^l \in \{0, 1\}$ where $\theta^l = 0$ is non congruent and $\theta^l = 1$ is congruent. The probability that each member's

[1] In particular the condition ensures that a congruent executive will not have incentive to do A in state L just to have a higher reputation.

type is congruent is $\mathbb{P}[\theta^l = 1] = \gamma$, and types are independent across members. We are therefore assuming that both executive and legislative posts are filled with politicians drawn from the same pool.

The utility function of the legislators is:

$$V^l = R + \theta^l \left(u(g_1, s_1) - c\left(g_1\right)\right) + \pi \left(R + \theta^l \left(u(g_2, s_2) - c\left(g_2\right)\right) + \varepsilon \hat{\theta}^p\right)$$

where R is the fixed rent from being in parliament, $u(g_t, s_t) - c\left(g_t\right)$ is the surplus generated in period t when the state is s_t and the implemented policy is g_t. Moreover $\hat{\theta}^p$ is the relevant reputation across electoral systems, that is the ex-post voters' belief on the probability that the majority of the assembly is congruent.

We assume $R \in [\varepsilon, 1 - c_A]$ only to ensure that rent-seeking motives do not overshadow the legacy motives also for the congruent members of the assembly.

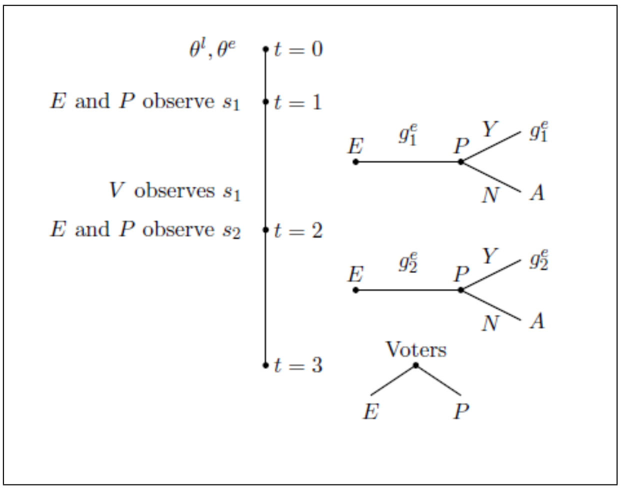
Information structure. As previously mentioned, members of the assembly and the executive have private information about their type.

Every politician (legislators and the executive) observes the state of the world in every period. We will relax this assumption in the second part of the paper.

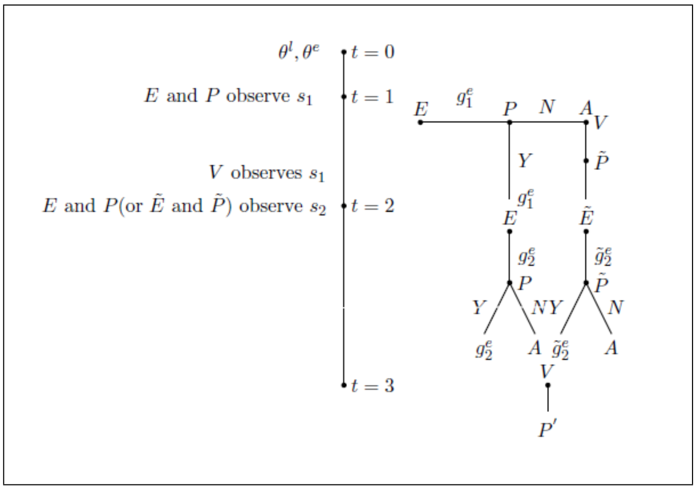
Voters will perfectly observe s_1 before the beginning of period 2.

Timing. Both systems are analyzed over two periods. In the presidential system at $t = 0$ each player observes his private type, at $t = 1$ the politicians observe the state of the world s_1. Then the executive makes a policy proposal and, if it is different from the status quo policy, the assembly votes to accept or reject. At the very end of period 1 voters observe the state of the world of the period that just ended and update their beliefs on the type of the executive and on the type of the assembly. In period two things happen exactly like in period one until the very end when there are new elections for both the assembly and the executive.

In the parliamentary setup the information structure and the game are very similar to the presidential system with the following exceptions: the policy proposal made by the executive is observed also by the voters and every vote on policy is like a confidence vote so that when a policy is rejected there are new elections. If the assembly rejects the policy a new executive ($\widetilde{E}$) and a new assembly ($\widetilde{A}$) will be in place at the beginning of period two. The new executive and the new assembly are randomly drawn from the same pool of politicians (with probability of congruence γ), and the probability that either the old executive or a member of the old assembly is reelected is 0.



Presidential system



Parliamentary system

3 Equilibrium analysis

3.1 The presidential

We now analyze the two-period presidential system. As mentioned in the previous section, periods in this setup have the same structure, due to the fact that politicians that are in power in the first period are sure to be present also in the second period. The legislature always runs to its natural end. The only difference between the two periods rests in the executive's reputation: by the second period both the assembly and the voters have received additional information (from the executive's behavior and from the state of the world) that allows them to update their beliefs on the type of the executive.

The assembly observes the state of the world and votes to implement the efficient policy, to maximise end of period reputation.

If this is the case then the presidential system has only one equilibrium outcome as described in the following proposition:

Proposition 1 *In the two-period presidential system, when* $g^0 = A$*, we have the following pure-strategy equilibrium:*

- *Each legislator approves* B *iff* $s_t = s_B$*;*

- *Both types of executive propose B if $s_t = s_B$ and they are indifferent between any policy proposal if $s_t = s_A$*

In this unique equilibrium both types of executive are indifferent between offering g^* or B, this is because all members of the assembly behave like congruent ones and vote for the proposal that is efficient. In other words, they correct any misbehavior of the executive by voting against the inefficient policy, if proposed. This allows for the efficient policy to be implemented in any state of the world, meaning that the total probability of doing the right thing is 2. This is the welfare measure we are adopting, with the underlying assumption that the gain from implementing the right policy is equal across states.

This system cannot be improved upon. The indifference between policy proposals when $s_t = s_A$ is due to the fact that whatever the proposal the implemented policy will be A and that is the only thing that voters observe when they update their beliefs on the reputation of the politicians.

3.2 The parliamentary system

We now move to the parliamentary system that, as described in section 2, has the important feature that players in the second period may be different since any assembly vote is a confidence vote that can end the legislature. In that case early elections take place and a whole new set of politicians, drawn from the same pool, will be in power.

This implies that the first period choice of the policy changes the continuation payoff in a relevant way, given the presence of the confidence vote. In this case, since reputational concerns are not too high, non-congruent types always approve the executive's proposal, to stay in power and keep their rent R also for the second period. The behavior of the congruent members depends instead on the ex post probability that the proposed policy is the correct one, but in any case, given that they are pivotal with positive probability, they will vote sincerely, for the alternative that maximizes their utility. All this is true in the first period of the parliamentary system. In the second period the assembly of the parliamentary system behaves exactly as in the presidential one, since new elections are called at the end of the period regardless of the assembly behavior. In addition the observability of the proposed policy by the voters improves the behavior of the executive in the second period due to reputational motives.

We denote by Γ the probability of the majority of the assembly being congruent.

Proposition 2 *In the two-period parliamentary system, when $g^0 = A$, congruent legislators approve B iff $s_t = s_B$ in every period, non-congruent legislators approve B always* *in the first period and iff $s_t = s_B$ in the second period the executive behaves according to the following two pure-strategy equilibria:*

-Equilibrium 1: *a congruent executive always proposes the efficient policy, a non-congruent executive proposes B in the first period and the efficient policy in the second period if $c_A > \frac{2(\varepsilon+\Gamma)}{2-\Gamma}$*

-Equilibrium 2: *both types of executive propose the efficient policy in the first and in the second period if $c_A < \frac{2(\varepsilon\gamma+\Gamma)}{2-\Gamma}$.*

The above proposition shows that the parliamentary system behaves like the presidential one when the cost of implementing policy A is not too high, this keeps a non congruent executive from deviating due to fear of a loss of reputation. In this case the probability of choosing the efficient policy is 2. When the cost of implementing policy A is higher instead, a non congruent type will offer B in the first period (loosing in reputation but saving on policy costs) and will see it approved whenever the majority of the assembly is not congruent. In other words this system will not always do the right thing and the efficient policy will be chosen with probability $\frac{3}{2} + \frac{\Gamma}{2} + \frac{\gamma}{2}(1 - \Gamma)$ which is always smaller than two.

3.3 Comparison between the two systems

The parliamentary system performs unequivocally better than the parliamentary one, even if they achieve the same welfare when the cost of implementing policy A is not too high. The superiority comes from the behavior of the perfectly informed assembly that corrects any attempt of misbehavior of a, possibly, non congruent executive.

In the second period, right before new elections are called with certainty, the two systems behave in the same way due to the strength of reputational incentives. In the parliamentary setup instead, in the first period even a perfectly informed assembly can approve the wrong policy just to avoid elections when the majority of legislators is non congruent. This is where the presence of the confidence vote kicks in, albeit with a negative effect on welfare.

4 Asymmetrically informed assembly

We now move to a world where legislators are not fully informed about the state of the world.

So, while the executive observes the state of the world in every period, each member of the assembly receives a common signal σ_t on the state of the world; the signal has precision $\rho < 1$ and it is observed in each period before voting on the executive's policy proposal. Formally the signal is as follows:

$$\sigma_t = \begin{cases} H \text{ with probability } \rho \\ L \text{ with probability } 1-\rho \end{cases} \quad \text{if } s_t = H;$$

$$\sigma_t = \begin{cases} L \text{ with probability } \rho \\ H \text{ with probability } 1-\rho \end{cases} \quad \text{if } s_t = L;$$

Assembly (and voters) perfectly observe s_1 before the beginning of period 2, so that the update on the executive's probability of being congruent is based on the true realization of the state of the world.

4.1 The presidential system

As introduced in the previous section, when there is asymmetric information about the state of the world the assembly will have to update its beliefs on the quality of the executive by using its signal and the policy proposal not unlike voters who did not observe the state of the world even in the previous setup. Notice however that, in general, members of the assembly and voters will hold different beliefs on the executive ($\widehat{\gamma}^a \neq \widehat{\gamma}^v$): the members of the assembly update their beliefs after observing g_1^e and s_1, while the voters update on the basis of g_1 and s_1. In this setting voters do not have the possibility of observing the proposed policy, and they cannot generally infer it from the implemented one.

In this framework there is always an equilibrium in which members of the assembly of every type vote according to what they believe is optimal in that period. That is they vote yes to a policy if they believe that the probability that the proposed policy is the optimal one is larger than $\frac{1}{2}$. This is always an equilibrium given that by doing so, their ex post reputation is the same as the ex-ante one; moreover, for the congruent members this is strictly better than the other possible strategies because in this way they maximize the component of their utility function that depends on $u(\cdot)$ while in such an equilibrium non-congruent members are actually indifferent between voting in favor or not. (This is because in equilibrium both actions are observed, therefore they cannot signal a higher reputation in any way). We focus on this equilibrium behavior of the assembly, that is, we assume that the assembly votes according to the probability that the proposed policy is the efficient one.

The following proposition describes the equilibrium behavior of the executive.

Proposition 3 *In the two-period presidential system we can have the following pure-strategy equilibria:*

(E1) $g_t^e(s_t, 1) = g^*(s_t)$, $g_t^e(s_t, 0) = B$ *; this is an equilibrium under the following conditions:*

- *if* $c_A > 2\varepsilon$ *when* $\rho < \frac{1}{2-\gamma}$;

- *if* $c_A > \varepsilon\gamma\left(\frac{1+\gamma-\rho\gamma}{2\gamma+\rho-2\rho\gamma}\right)$ *when* $\rho > \frac{1}{2-\gamma}$;

(E2) $g_t^e(s_t, 1) = g^*(s_t)$, $g_1^e(s_1, 0) = g^*(s_1)$, $g_2^e(s_2, 0) = B$; *this is an equilibrium under the following conditions:*

- *if* $c_A \in \left(\varepsilon\frac{2-2\gamma}{2-\gamma}, \varepsilon\frac{2\gamma}{2-\gamma}\right)$ *when* $\rho < \frac{1}{2-\gamma}$;

- *if* $c_A \in \left(\varepsilon\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} - \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right), \frac{1}{2}\varepsilon\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\right)$ *when* $\rho \geqslant \frac{1}{2-\gamma}$.

The above proposition describes the two possible pure-strategy equilibria of the presidential system when legislators are not fully informed on the state of the world.

The first equilibrium (**E1**) arises when the production of the public good A is costly enough. In this equilibrium both types of the executive replicate twice the same behavior: the congruent executive always proposes the efficient policy, while the non-congruent one always proposes B.

The second equilibrium (**E2**) arises for lower values of c_A. In this case all types of the executive pool on offering the efficient policy in the first period. By doing so they induce the assembly to approve every policy offer in period 1; moreover they enter the second period with the initial reputation γ, as nothing can be learned from their behavior in period 1. This equilibrium therefore exists if c_A is high enough to preserve the second period behavior of the non-congruent type but not too high so that even a non-congruent type may be willing to choose A in the right state of the world because of the gain in reputation which will grant him a greater probability of policy approval in the second period.

In both equilibria the behavior of the congruent executive is driven by legacy motives; as for the non congruent type, he may always propose B (as in the one-period version of the model) or he may choose the efficient policy just because of the gain in reputation that he obtains by making the same offer as the congruent type. The second period reputation

	$\rho \geqslant \frac{1}{2-\gamma}$	$\rho < \frac{1}{2-\gamma}$
E1	$\frac{5}{4}\gamma - \frac{5}{4}\gamma\rho + 2\rho$	$\frac{3}{4} + \frac{5}{4}\gamma + \frac{1}{2}\rho(1-\gamma)$
E2	$1 + \frac{\gamma}{2}(1-\rho) + \rho$	$\frac{3}{2} + \frac{\gamma}{2}$

Table 1: Welfare in the presidential system

may therefore have a disciplining effect that is at work in **E2**. This disciplining effect and the learning that is happening across the periods distinguish the two-period model from a repetition of the one-period version.

As we did previously we are adopting as welfare measure the total probability of choosing the efficient policy over the two periods. Now the assembly is not able, due to lack of perfect information, to correct any attempt at misbehavior form the executive, its performance (and hence the overall system one) will depend on γ (our measure of politician's quality) and on ρ (the precision of its signal).

The following table summarizes the total probability, over the two periods, of choosing the efficient policy for each equilibrium:

We can first of all notice that the welfare is always increasing in γ. This is very intuitive, since in this system a higher quality of the executive implies directly that the efficient policy is proposed more often. The welfare is also increasing in ρ: as the legislators make an effective use of their information, better information translates in higher welfare.

It's worth noting that **E1** performs better when the assembly exploits the good quality information they have ($\rho \geqslant \frac{1}{2-\gamma}$) while **E2** is better when the information is relatively poor ($\rho < \frac{1}{2-\gamma}$) . This is due to the fact that in **E2** the non congruent executive behaves as a congruent one in the first period. In fact the main driving force in **E1** is the signalling effect so the welfare is higher when the signal is good; when the signal is poor we see that **E2**, whose driving force is the disciplining effect, achieves a higher welfare.

4.2 The parliamentary system

We now analyze the equilibrium of a different institutional setting, the parliamentary system. The main difference with the presidential system is that in this case any assembly vote is a confidence vote; therefore if the executive's proposal is rejected there are new elections. This modifies the incentives of the executive and of members of the assembly. In particular the voting incentives of non-congruent legislators in the first period change, as their main concern is remaining in office. As a consequence the behavior of the assembly depends on the type of its majority.

We start the analysis of this system by considering the equilibrium behavior of legislators in relation with their type, period and executive's behavior[2].

Proposition 4 *Non-congruent legislators approve every proposal in the first period and behave as congruent in the second period.*

When the equilibrium strategies are $g_2^e(s_2, 1) = g^*(s_2)$ *and* $g_2^e(s_2, 0) = B$*, congruent legislators vote always yes after* B *if* $\rho < \frac{1}{2-\gamma}$*, while they vote according to their signal if* $\rho \geq \frac{1}{2-\gamma}$*.*

In the first period congruent legislators behave as follows, given $g_2^e(s_2, 1) = g^*(s_2)$ *and* $g_2^e(s_2, 0) = B$*:*

- *if* $g_1^e(s_1, 1) = g^*(s_1)$ *and* $g_1^e(s_1, 0) = B$ *they approve* B *always when* $\rho < \frac{1}{2-\gamma}$ *and follow the signal when* $\rho \geq \frac{1}{2-\gamma}$*;*
- *if* $g_1^e(s_1, 1) = g_1^e(s_1, 0) = g^*(s_1)$ *they always approve* B*;*
- *if* $g_1^e(s_1, 1) = A$ *and* $g_1^e(s_1, 0) = B$ *they follow the signal if* $\rho \geq \frac{1}{2} + \frac{\gamma}{6}$ *and vote against* B *otherwise;*
- *if* $g_1^e(s_1, 1) = g_1^e(s_1, 0) = A$ *they follow the signal.*

Proposition 4 shows one of the crucial differences between the two institutional systems: non congruent legislators always approve any policy proposals in the first period because the want to stay in power as long as possible. In the second period they behave like in the presidential model, therefore doing what they believe to be the efficient thing in order to maximize end of period reputation. Congruent legislators instead want to maximize the total probability of doing the right thing over the two period stretch.

Given the behavior of the assembly described above, we can now characterize the equilibria of the two-period parliamentary system.

Proposition 5 *In the two-period parliamentary system, in every pure strategy equilibrium the second period behavior is* $g_2^e(s_2, 1) = g^*(s_2)$ *and* $g_2^e(s_2, 0) = B$*. In the first period we can have the following equilibrium behavior:*

(E1) $g_1^e(s_1, 1) = g^*(s_1)$ *and* $g_1^e(s_1, 0) = B$*;*

(E2) $g_1^e(s_1, 1) = g_1^e(s_1, 0) = g^*(s_1)$*;*

[2] In this proposition we describe only the equilibrium behavior of the assembly as a response to possible equilibrium behaviors of the executive.

E1 $\rho \geq \frac{1}{2-\gamma}$	$c_A \geq \frac{2\rho\Gamma+2\varepsilon}{1-\rho\Gamma}$,
E1 $\rho < \frac{1}{2-\gamma}$	$c_A \geq 2\varepsilon$
E2 $\rho \geq \frac{1}{2-\gamma}$	$c_A \in \left[\varepsilon\frac{1}{\rho}\left(1-\frac{(1-\rho)^2\gamma}{(1-\rho)\gamma+(1-\gamma)}-\frac{\rho^2\gamma}{1-\gamma^v+\gamma\rho}\right), \frac{\varepsilon}{2}\left(\frac{\rho\gamma}{1-\gamma+\gamma\rho}+\frac{(1-\rho)\gamma}{1-\rho\gamma}\right)\right]$
E2 $\rho < \frac{1}{2-\gamma}$	$c_A \in \left[\varepsilon\left(\frac{2-2\gamma}{2-\gamma}\right), 2\varepsilon\frac{\gamma}{2-\gamma}\right]$
E3 $\rho \geq \frac{1}{2-\gamma}$	$c_A \in \left[\begin{array}{c} \varepsilon\frac{1}{\rho}\left(1-\frac{(1-\rho)^2\gamma}{(1-\rho)\gamma+(1-\gamma)}-\frac{\rho^2\gamma}{1-\gamma^v+\gamma\rho}\right), \\ \min\left\{\begin{array}{c} \frac{2(1-\rho)\Gamma}{2-(1-\rho)\Gamma}\left(1+\varepsilon\frac{1}{2}\left(\frac{\rho\gamma}{1-\gamma+\rho\gamma}+\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\right), \\ \frac{2}{2-\rho(1-\rho)\Gamma}\left(\begin{array}{c} -1+(1-\rho)\Gamma\left(\frac{5}{2}+\frac{1}{2}\rho\right) \\ +(1-\rho)\Gamma\frac{1}{2}\left(1+\rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}+(1-\rho)\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\varepsilon \end{array}\right) \end{array}\right\} \end{array}\right]$
E3 $\rho < \frac{1}{2-\gamma}$	$c_A \in \left[\varepsilon\frac{2-2\gamma}{2-\gamma}, \frac{2}{2-(1-\rho)\Gamma}\left(-1+3(1-\rho)\Gamma+(1-\rho)\Gamma\frac{1}{2}\varepsilon\left(1+\frac{\gamma}{2-\gamma}\right)\right)\right]$

Table 2: Existence conditions for Proposition 6

(E3) $g_1^e(s_1, 1) = g_1^e(s_1, 0) = A.$

The existence conditions are included in Table 2.

The first two equilibria, **E1** and **E2**, correspond to the equilibria of the presidential system. As for the presidential system, in **E1** the congruent executive proposes the efficient policy in both periods and the non congruent one always chooses B. This equilibrium exists if c_A large enough, so that a non congruent as no incentive to deviate and implement the efficient policy in some state of the world. In **E2** both types choose the efficient policy in every state of the world, and separate in the second period where the equilibrium behavior of the one-period model is preserved. In **E2** the disciplining effect of the second period is strong enough to make a non congruent executive behave alike a congruent one.

The fact that the destiny of the executive is linked to the vote of the assembly in our parliamentary system, where any vote over policy proposal is a confidence vote, introduces the possibility of pandering. In **E3** both types of executive propose policy A regardless of efficiency issues, just because that option is somehow the more popular one. This equilibrium involves no learning at all but also no disciplining effect as the main force driving the executive behavior is staying in power.

It's worth noting that **E1** and **E3** can coexist. However, as shown in the welfare

	$\rho \geqslant \frac{1}{2-\gamma}$	$\rho < \frac{1}{2-\gamma}$
E1	$\frac{1-\Gamma}{2} + \rho(1+\Gamma) + \frac{\gamma}{2}(1-\rho\Gamma)$ $+\frac{3}{4}\gamma(1-\rho) + \frac{(1-\gamma)\gamma}{4}\rho\Gamma(1-\rho)$	$\frac{3}{4} + \frac{5}{4}\gamma + \frac{1}{2}\rho(1-\gamma)$
E2	$1 + \frac{\gamma}{2}(1-\rho) + \rho$	$\frac{3}{2} + \frac{\gamma}{2}$
E3	$\frac{1}{2} + \frac{\gamma}{2}(1-\rho) + \rho$	$1 + \frac{\gamma}{2}$

Table 3: Welfare in the parliamentary system

analysis below,

Table 3 shows that the welfare is still (weakly) increasing in ρ, as in the presidential system: better informed legislators take better decisions also in the parliamentary system.

Let us now analyze the effects that are specific to the parliamentary system. We can start by noticing that in this system there is one new type of pure-strategy equilibria, **E3**. This equilibrium in which politicians pander on A, however, performs worse than the first two types of equilibria, in particular it is always worse than **E2**, as the probability of implementing the correct policy in **E3** is $\frac{1}{2}$ less than in **E2**. This is due to a different behavior in the first period, while in the second period the two equilibria deliver the same behavior. Notice also that the two equilibria are defined over overlapping regions.

Finally, some of the equilibria also depend on the quality of the assembly, Γ. The effect of Γ, whenever it affects the welfare, is unambiguously positive: better legislators induce better policy outcomes. This is particularly interesting because Γ may also be affected by the size of the assembly; if the quality of the legislators (γ) is sufficiently high, Γ, and in turn welfare, increases with the size of the assembly. This may suggest that parliamentary systems therefore perform better with large assemblies than with small ones.

4.3 Comparison across systems

We can now compare the welfare properties of the two institutional setups in presence of asymmetric information on the state of the world, and verify which one allows to implement the efficient policy more often and under which parametric conditions.

When $\rho < \frac{1}{2-\gamma}$ the behavior of the two systems is similar in **E1** and **E2**; in these equilibria the two systems generate the same welfare. This is due to the fact that the confidence vote never bites in these cases. However the parliamentary system may display another equilibrium, **E3**, which is dominated by **E2** in terms of welfare. This would suggest that in this parametric region the presidential system is better as the best welfare induced by both systems is the same, but the parliamentary system is characterized by a multiplicity of equilibria that may arise and lower the welfare.

When $\rho \geq \frac{1}{2-\gamma}$ we have the interplay of several effects. First of all notice that the two systems behave in the same way in **E2**. Moreover, the parliamentary system displays another equilibrium, **E3**, that is dominated in terms of welfare by **E2**. For both systems, however, **E1** is the equilibrium that induces the highest welfare in this region. If we want to compare the behavior of the two systems in **E1** things are not so clear cut. The parliamentary system performs better for $\Gamma > \frac{4\rho-2-2\gamma\rho}{4\rho-2-2\gamma\rho+(1-\gamma)\gamma\rho(1-\rho)}$; as the quality of the assembly improves, the parliamentary system, that relies more heavily on the work of the assembly, outperforms the presidential one. The confidence vote that allows to change the "wrong" politicians has a positive effect on welfare only if it is exercised, and this happens the larger is the share of congruent members of the assembly. Notice that, for $\gamma \geq \frac{1}{2}$, Γ is increasing in the size of the assembly; so our result can suggest that parliamentary systems perform best with larger assemblies.

5 Concluding remarks.

We provided a comparison of two different constitutional systems in terms of their ability to implement efficient policies. As it is typical of most democracies, we model the systems that we analyze as characterized by an interplay between the executive and the legislative bodies in the determination of the policy. We identified two key differences between the two frameworks: the confidence vote and the observability of the proposed policy which are both presents in a parliamentary system.

We also highlighted how asymmetric information may shape the incentives of all the political players with both a moral hazard element and an adverse selection one.

Such interaction is crucial to our results as the system that we analyze modify the incentives of the two bodies sometimes in opposite direction. In particular, the legislative body performs better under the Presidential system, while the executive has the best incentives under the Parliamentary. The confidence vote, in fact, has an effect on the behavior of the assembly, whose non congruent members always vote yes to anything to stay in power, and on the executive who is partly disciplined by the fear of being replaced.

We show that presidential systems tend to perform better than parliamentary ones, however the welfare induced by the equilibria in the parliamentary setup is highest in presence of a large assembly of "sufficiently" high quality legislators and it may be better at implementing the efficient policy due to the effect of early conclusions of legislatures, that follows a negative assembly vote, that replaces bad executives.

References

[1] Besley, T. (2007) *Principled Agents?: The Political Economy of Good Government*, Oxford University Press

[2] Besley, T. and S. Coate (1998) "Sources of Inefficiency in a representative Democracy: A dynamic Analysis", *American Economic Review*, 88(1): 139-156

[3] Diermier, D. and R. Vlaicu (2011), "Executive Control and legislative Success", *Review of Economic Studies* 78:846-871

[4] Maskin, E. and J. Tirole (2004), "The Politician and the Judge: Accountability in Government", *American Economic Review*, 94(4): 1034-1054

[5] Persson, T. and G. Tabellini (2002) *Political Economics: Explaining Economic Policy*, MIT Press

[6] Persson, T. and G. Tabellini (2005) *The Economics effects of Constitutions*, MIT Press

[7] Vlaicu, R. (2008) "Executive Performance under Direct and Hierarchical Accountability Structures: Theory and Evidence", mimeo

[8] Whalley, A. and R. Vlaicu (2013) "Hierarchical Accountability in Government: Theory and Evidence", mimeo

6 Appendix

Proof of Proposition 1. In the second period if $s_t = s_A$ then both types of executive are indifferent between offering A (that does not require a vote and maximises utility for the congruent and reputation for both types) and B (that is voted against by the assembly, so in the end A is implemented). When $s_t = s_B$ both types offer B, which is approved, and nobody gains by deviating to A because a congruent will have a lower "legacy" utility while a non congruent would see his utility reduced by the higher costs of the policy chosen.

Given the second period behavior the same considerations apply to the first period strategies. No type can gain from deviating, because the assembly votes in a way that the efficient policy is implemented and voters observe just that, so no gain in reputation can be achieved. ■

Proof of Proposition 2. In the second period the behavior is the same in the two equilibria, the only thing that matters is reputation and since voters observe also the implemented policy no type of executive gains from deviating (remember that the assembly behaves like in the presidential system in the second period).

In the first period in Equilibrium 1 a congruent executive never gains from deviation, there's not gain in utility or reputation. While a non-congruent executive could gain by deviating and offering A when $s_t = s_A$, for this not to be a profitable deviation the following must hold:

$$1 - \Gamma c_A + (1 - \Gamma)\left(1 - \frac{1}{2}c_A\right) + \varepsilon(0) > 1 - c_A + \left(1 - \frac{1}{2}c_A\right) + \varepsilon(1)$$

which is satisfied iff $c_A > \frac{2(\varepsilon+\Gamma)}{2-\Gamma}$.

In the first period in Equilibrium 2 a congruent executive never gains from deviation, there's not gain in utility or reputation. While a non-congruent executive could gain by deviating and offering B when $s_t = s_A$, for this not to be a profitable deviation the following must hold:

$$1 - c_A + \left(1 - \frac{1}{2}c_A\right) + \varepsilon(\gamma) > 1 - \Gamma c_A + (1 - \Gamma)\left(1 - \frac{1}{2}c_A\right) + \varepsilon(0)$$

which is satisfied iff $c_A < \frac{2(\varepsilon\gamma+\Gamma)}{2-\Gamma}$. ■

Proof of Proposition 3. We call $\widehat{\gamma}^p$ the updated belief that the legislators have on the congruence of the executive at the beginning of period two, and $\widehat{\gamma}^v$ the updated belief that the voters have on the congruence of the executive at the beginning of period 2. Notice that $\widehat{\gamma}^p$ is relevant to determine the voting behavior of the legislators in period 2, while $\widehat{\gamma}^v$ is relevant to determine the executive's reputation incentives. Moreover in the presidential system the two beliefs may differ, given that $\widehat{\gamma}^a$ is an update of γ based on g_1^e and s_1, while $\widehat{\gamma}^v$ is an update of γ based on g_1 and s_1, and in general g_1 may differ from g_1^e.

Equilibrium 1.

Second period. Notice that a congruent legislator maximizes his utility by voting for what he believes to be the efficient policy given the executive's proposal and equilibrium strategy, while a non-congruent one maximizes his utility by behaving as a congruent in order to maximize his end of period reputation. Given the second period executive's equilibrium behavior, if the assembly observes $g_2^e = B$ and $\sigma_2 = L$ it approves B because the signal that the legislators receive is compatible with the policy that is proposed by the executive. If the assembly observes $g_2^e = B$ and $\sigma_2 = H$, instead, it computes $\Pr[s_2 = L|g_2^e = B, \sigma_2 = H]$ in order to decide on its vote. Such probability is

$$\Pr[s = L|g^e = B, \sigma_2 = H] = \frac{\Pr[g_2^e = B, \sigma_2 = H|s_2 = L] \cdot \Pr[s_2 = L]}{\Pr[g_2^e = B, \sigma_2 = H]} = \frac{1-\rho}{1-\widehat{\gamma}^p \rho};$$

the assembly approves B after $\sigma_2 = H$ iff $\Pr[s_2 = L|g_2^e = B, \sigma_2 = H] > \frac{1}{2}$, which happens when $\rho < \frac{1}{2-\widehat{\gamma}^p}$.

$\rho < \frac{1}{2-\widehat{\gamma}^a}$ In this case the assembly approves every policy offer, regardless of the signal σ_2 received. Therefore the voters know that $g_2^e = g_2$. Notice that in this case the beliefs held by the voters on the congruence of the executive at the end of period 1 coincide with the beliefs held by the legislators, that is $\widehat{\gamma}^v(g_1, s_1) = \widehat{\gamma}^p(g_1^e, s_1) = \widehat{\gamma}$. The ex-post reputation after offering A therefore is 1 (only the congruent executive offers A) and the ex-post reputation after offering B is

$$\begin{aligned}\Pr[\theta^e &= 1|g_2 = B] = \Pr[\theta^e = 1|g_2^e = B] \\ &= \frac{\Pr[g_2^e = B|\theta^e = 1]\Pr[\theta^e = 1]}{\Pr[B]} = \frac{\widehat{\gamma}}{2-\widehat{\gamma}}.\end{aligned}$$

The strategies $g_2^e(s, 1) = g^*(s)$ and $g_2^e(s, 0) = B$ constitute a pure strategy NE if no type of executive has incentive to deviate. A type $\theta^e = 0$ could deviate and choose $g^e(H, 0) = A$. For this not to be a profitable deviation it must be:

$$1 + \varepsilon\left(\frac{\widehat{\gamma}}{2-\widehat{\gamma}}\right) \geq 1 - c_A + \varepsilon(1)$$

which is satisfied if $c_A \geq \varepsilon\left(\frac{2-2\widehat{\gamma}}{2-\widehat{\gamma}}\right)$. The same condition prevents the deviation to $g^e(L, 0) = A$.

A congruent type $\theta^e = 1$ never deviates to $g^e(H, 1) = B$ as this deviation decreases both the utility from policy implementation and reputation He could however deviate and choose $g^e(L, 1) = A$. For this not to be a profitable deviation it must be:

$$2+\varepsilon\left(\frac{\widehat{\gamma}}{2-\widehat{\gamma}}\right)\geq 1-c_A+\varepsilon\left(1\right)$$

which is always satisfied because of assumption $\varepsilon \leq c_A$.

$\rho \geq \frac{1}{2-\widehat{\gamma}^a}$ In this case the assembly, after observing B votes according to its signal. The ex-post reputation after A is no longer equal to 1, because there are cases in which the executive proposes B and B is not approved; in that case the executive may also be non-congruent, therefore the voters' belief on the executive being congruent after observing A is less than one. More precisely we have:

$$\Pr[\theta_e=1|g_2=A]=\frac{\Pr[g_2=A|\theta_e=1]\Pr[\theta_e=1]}{\Pr[A]}=\frac{(2-\rho)\,\widehat{\gamma}^v}{1+\widehat{\gamma}^v-\rho\widehat{\gamma}^v}$$

and the ex-post reputation after B is

$$\Pr[\theta_e=1|g=B]=\frac{\Pr[g=B|\theta_e=1]\Pr[\theta_e=1]}{\Pr[B]}=\frac{\rho\widehat{\gamma}^v}{1-\widehat{\gamma}^v+\rho\widehat{\gamma}^v},$$

where $\Pr[\theta_e=1|g_2=A]>\widehat{\gamma}^v>\Pr[\theta_e=1|g_2=B]$.

The strategies $g_2^e(s,1)=g^*(s)$ and $g_2^e(s,0)=B$ constitute a pure strategy NE if no type of executive has incentive to deviate. A type $\theta^e=0$ could deviate and choose $g^e(H,0)=A$. For this not to be a profitable deviation it must be:

$$1-\rho c_A+\varepsilon\left(\rho\frac{(2-\rho)\,\gamma}{1+\gamma-\rho\gamma}+(1-\rho)\,\frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\geq 1-c_A+\varepsilon\left(\frac{(2-\rho)\,\gamma}{1+\gamma-\rho\gamma}\right)$$

which is satisfied if $c_A\geq\varepsilon\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma}-\frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)$. The same condition also prevents the deviation to $g^e(L,0)=A$.

A congruent type could deviate and choose $g^e(H,1)=B$ or choose $g^e(L,1)=A$ and these are not profitable deviations for the very same reasons as for the case in which $\rho<\frac{1}{2-\gamma}$.

We have to prove that this is the only NE in pure strategies. The strategies available to an executive, whatever his type, are: $g^e(s,\theta^e)=g^*(s)\,,g^e(s,\theta^e)=A,g^e(s,\theta^e)=B,g^e(s,\theta^e)\neq g^*(s)$.

Under our assumptions $g^e(s,1)=A$ cannot be an equilibrium strategy because when $s=L$ a congruent executive will prefer to play B irrespective of voter's beliefs.

Under our assumptions $g^e(s,1) = B$ cannot be an equilibrium strategy because when $s = H$ a congruent executive will prefer to play A irrespective of voter's beliefs. Then $g^e(s,1) = g^*(s)$ is the only possible candidate for an equilibrium strategy for a type $\theta_e = 1$. For analogous reasons it cannot be an equilibrium strategy $g^e(s,1) \neq g^*(s)$ (that is $g^e(H,1) = B$ and $g^e(L,1) = A$).We could have $g^e(s,\theta^e) = g^*(s)$ for $\theta^e = 0,1$. In that case a policy offer will not signal anything and reputation will remain unchanged through the legislative process. A type $\theta^e = 0$ will always have an incentive to deviate because doing A will reduce his rent extraction and not increase his ex-post reputation. Moreover $g^e(s,1) = g^*(s)$ and $g^e(s,0) \neq g^*(s)$ cannot be an equilibrium. This is so because one of the following two cases applies: it can be that the assembly every proposal, because the signal that the assembly receives is not precise enough; in this case the non-congruent executive has the incentive to deviate to $g^e(s,0) = B$. Otherwise, it can be that the assembly votes according to its signal after having $g^e = B$, when $g^0 = A$; in this case $g^e(s,0) \neq g^*(s)$ is dominated by $g^e(s,0) = g^*(s)$ that induces a higher reputation and allows the non-congruent executive to implement B more often. Finally it can be that the assembly votes according to its signal after observing $g^e = A$, when $g^0 = B$; in this case the non-congruent executive has either an incentive to deviate to $g^e(H,0) = A$, or to $g^e(L,0) = B$. A fortiori $g^e(s,1) = g^*(s)$ and $g^e(s,0) = A$ cannot be an equilibrium because in this case $\Pr[\theta^e = 1|g = B] = 1$ (since only the congruent type offers B) therefore doing A brings a reduction in rents and a reduction in reputation.

First period

$\boldsymbol{\rho} < \frac{1}{2-\gamma}$ Based on the equilibrium strategies the legislators' beliefs at the beginning period 2 are:

$$\begin{aligned}
\widehat{\gamma}^p(A,H) &= \Pr(\theta^e = 1|g_1^e = A, s_1 = H) = 1,\\
\widehat{\gamma}^p(A,L) &= \Pr(\theta_e = 1|g_1^e = A, s_1 = L) = \gamma,\\
\widehat{\gamma}^p(B,H) &= \Pr(\theta^e = 1|g_1^e = B, s_1 = H) = 0\\
\widehat{\gamma}^p(B,L) &= \Pr(\theta^e = 1|g_1^e = B, s_1 = L) = \gamma
\end{aligned}$$

Notice that in this case the beliefs held by the voters on the congruence of the executive at the end of period 1 coincide with the beliefs held by the legislators, that is $\widehat{\gamma}^v(g_1, s_1) = \widehat{\gamma}^p(g_1^e, s_1)$. This is due to the fact that in this parametric region the legislators always approve B when it is offered in the

first period, therefore $g_1 = g_1^e$ always.
All the beliefs above are computed using Bayes' rule on the equilibrium path except for $\widehat{\gamma}(A, L)$. Given that neither type of executive has a predominant incentive to deviate to (A, L) we assume beliefs are passive and set $\widehat{\gamma}(A, L) = \gamma$.
A type $\theta^e = 1$ could deviate and choose $g_1^e(1, H) = B$. For $g_1^e(1, H) = B$ not to be a profitable deviation the following must hold:

$$\begin{aligned} & \overline{Y} - c_A + u(A, H) + \left(\overline{Y} + \frac{1}{2}(-c_A + u(A, H) + u(B))\right) + \varepsilon \\ \geq \; & \overline{Y} + u(B) + \left(\overline{Y} + \frac{1}{2}(-c_A + u(A, H) + \rho u(B) + (1 - \rho)(u(A, L) - c_A))\right) \end{aligned}$$

which, substituting in our assumptions, becomes

$$4 - \frac{3}{2}c_A + \varepsilon \geq \frac{5}{2} + \frac{\rho}{2} - \left(1 - \frac{\rho}{2}\right) c_A$$

is always satisfied by assumption $c_A < 1$.
A type $\theta^e = 1$ could deviate and choose $g_1^e(1, L) = A$. In this case for $g_1^e(1, L) = A$ not to be a profitable deviation the following must hold:

$$4 - \frac{1}{2}c_A + \frac{1}{2}\left(\frac{\gamma}{2 - \gamma} + 1\right)\varepsilon \geq 3 - \frac{3}{2}c_A + \frac{1}{2}\left(\frac{\gamma}{2 - \gamma} + 1\right)\varepsilon$$

which is satisfied by assumption since $c_A > 0$.
A type $\theta^e = 0$ could deviate and choose $g_1^e(1, H) = A$. For $g_1^e(1, H) = A$ not to be a profitable deviation the following must hold:

$$2 - \frac{1}{2}c_A \geq 2 - c_A + \varepsilon$$

which is satisfied if $c_A > 2\varepsilon$.
A type $\theta^e = 0$ could deviate and choose $g_1^e(0, L) = A$. For $g_1^e(0, L) = A$ not to be a profitable deviation the following must hold:

$$2 + \frac{\gamma}{2 - \gamma}\varepsilon \geq 2 - c_A + \frac{\gamma}{2 - \gamma}\varepsilon$$

which is satisfied given that $c_A > 0$.
Given the second period behavior characterized above, Equilibrium 1 exists if the more stringent condition $c_A > 2\varepsilon$ is satisfied.

$\rho \geq \frac{1}{2-\gamma}$ Reputation $\widehat{\gamma}^a$ at the end of period 1 is an update on the prior γ based on observed policy and s_1, the state of the world and equal to the previous case where $\rho < \frac{1}{2-\gamma}$.

In this case however, the voters' beliefs are different from the legislators' beliefs. Based on the equilibrium strategies, and on the voting behavior of the assembly the voters' beliefs at the beginning of period 2 are:

$$\begin{aligned}\widehat{\gamma}^v(A,H) &= \Pr(\theta^e = 1|g_1 = A, s_1 = H) = \tfrac{\gamma}{\gamma+(1-\gamma)\rho} > \gamma,\\ \widehat{\gamma}^v(A,L) &= \Pr(\theta_e = 1|g_1 = A, s_1 = L) = \gamma,\\ \widehat{\gamma}^v(B,H) &= \Pr(\theta^e = 1|g_1 = B, s_1 = H) = 0\\ \widehat{\gamma}^v(B,L) &= \Pr(\theta^e = 1|g_1 = B, s_1 = L) = \gamma\end{aligned}$$

A type $\theta_e = 1$ could deviate and choose $g_1^e(1,H) = B$. For $g_1^e(1,H) = B$ not to be a profitable deviation the following must hold:

$$4 - \frac{3}{2}c_A + \frac{1}{2}\left(\frac{(2-\rho)\widehat{\gamma}^v}{1+\widehat{\gamma}^v - \rho\widehat{\gamma}^v} + \frac{\rho\widehat{\gamma}^v}{1-\widehat{\gamma}^v+\rho\widehat{\gamma}^v}\right)\varepsilon \geq \frac{5}{2} + \frac{\rho}{2} - \left(1 - \frac{\rho}{2}\right)c_A$$

where $\widehat{\gamma}^v = \widehat{\gamma}^v(A,H)$ .The above condition is always satisfied by assumption since $c_A < 1$.

A type $\theta_e = 1$ could deviate and choose $g_1^e(1,L) = A$. For $g_1^e(1,L) = A$ not to be a profitable deviation the following must hold:

$$\begin{aligned}&\frac{5}{2} + \frac{3}{2}\rho - \left(2 - \frac{3}{2}\rho\right)c_A + \frac{1}{2}\left((2-\rho)\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon\\ &\geq \frac{5}{2} + \frac{1}{2}\rho - \left(2 - \frac{1}{2}\rho\right)c_A + \frac{1}{2}\left((2-\rho)\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon\end{aligned}$$

which is satisfied by assumption since $c_A > 0$.

A type $\theta_e = 0$ could deviate and choose $g_1^e(1,H) = A$. For $g_1^e(1,H) = A$ not to be a profitable deviation the following must hold:

$$\begin{aligned}&2 - \left(\frac{1}{2} + \rho\right)c_A + \frac{1}{2}\rho\left(\frac{(2-\rho)\widehat{\gamma}^v}{1+\widehat{\gamma}^v - \rho\widehat{\gamma}^v} + \frac{\rho\widehat{\gamma}^v}{1-\widehat{\gamma}^v+\rho\widehat{\gamma}^v}\right)\varepsilon\\ \geq\ &2 - \frac{3}{2}c_A + \frac{1}{2}\left(\frac{(2-\rho)\widehat{\gamma}^v}{1+\widehat{\gamma}^v - \rho\widehat{\gamma}^v} + \frac{\rho\widehat{\gamma}^v}{1-\widehat{\gamma}^v+\rho\widehat{\gamma}^v}\right)\varepsilon\end{aligned}$$

where $\widehat{\gamma}^v = \widehat{\gamma}^v(A,H)$. The condition is satisfied if $c_A > \frac{1}{2}\left(\frac{(2-\rho)\widehat{\gamma}^v}{1+\widehat{\gamma}^v-\rho\widehat{\gamma}^v} + \frac{\rho\widehat{\gamma}^v}{1-\widehat{\gamma}^v+\rho\widehat{\gamma}^v}\right)\varepsilon = \varepsilon\gamma\left(\frac{1+\gamma-\rho\gamma}{2\gamma+\rho-2\rho\gamma}\right)$.

A type $\theta_e = 0$ could deviate and choose $g_1^e(0, L) = A$. For $g_1^e(0, L) = A$ not to be a profitable deviation the following must hold:

$$\begin{aligned} & 2 - \left(\frac{3}{2} - \rho\right) c_A + \frac{1}{2}\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon \\ \geq \; & 2 - \frac{3}{2} c_A + \frac{1}{2}\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon \end{aligned}$$

which is satisfied given that $c_A > 0$. Given the second period behavior characterized above, Equilibrium 1 exists if the more stringent condition $c_A > \varepsilon\gamma\left(\frac{1+\gamma-\rho\gamma}{2\gamma+\rho-2\rho\gamma}\right)$ is satisfied.

Equilibrium 2.

Second period. The behavior of agents in the second period is the same as in Equilibrium 1. Hence, the above proof still applies.

First period First of all notice that in the first period in equilibrium both types of executive propose the efficient policy. As a consequence, the assembly always approves the policy proposed by the executive in the first period. Therefore $\widehat{\gamma}^p(g_1^e, s_1) = \widehat{\gamma}^v(g_1, s_1)$ in all parametric regions, given that $g_1^e = g_1$ for every ρ. In this case, both for the assembly and for the voters, the beliefs at the beginning of period 2 are:

$$\begin{aligned} \widehat{\gamma}^p(A, H) = \widehat{\gamma}^v(A, H) = \Pr(\theta^e = 1 | g_1^e = A, s_1 = H) = \gamma, \\ \widehat{\gamma}^p(A, L) = \widehat{\gamma}^v(A, L) = \Pr(\theta_e = 1 | g_1^e = A, s_1 = L) = \gamma, \\ \widehat{\gamma}^p(B, H) = \widehat{\gamma}^v(B, H) = \Pr(\theta^e = 1 | g_1^e = B, s_1 = H) = 0 \\ \widehat{\gamma}^p(B, L) = \widehat{\gamma}^v(B, L) = \Pr(\theta^e = 1 | g_1^e = B, s_1 = L) = \gamma \end{aligned}$$

All the beliefs above are computed using Bayes' rule on the equilibrium path except for $\widehat{\gamma}^p(A, L)$ and $\widehat{\gamma}^a(B, H)$. Given that neither type of executive has a predominant incentive to deviate to (A, L) we assume that $\widehat{\gamma}^p(A, L) = \gamma$.(passive beliefs)

We assume that $\widehat{\gamma}^p(B, H) = \widehat{\gamma}^v(B, H) = \Pr(\theta^e = 1 | g_1^e = B, s_1 = H) < \gamma$, since, net of the reputation concerns, (B, H) generates a higher utility than (A, H) for a non-congruent executive and a lower utility for a congruent one. This is enough to prove that the congruent executive has no incentive to deviate. However, in order to simplify the analysis of the non-congruent executive, we assume directly $\widehat{\gamma}^p(B, H) = \widehat{\gamma}^v(B, H) = \Pr(\theta^e = 1 | g_1^e = B, s_1 = H) = 0$.

$\rho < \frac{1}{2-\gamma}$ A type $\theta_e = 1$ could deviate and choose $g_1^e(1,H) = B$. For $g_1^e(1,H) = B$ not to be a profitable deviation the following must hold:

$$4 - \frac{3}{2}c_A + \frac{1}{2}\left(\frac{\gamma}{2-\gamma} + 1\right)\varepsilon \geq 3 - \frac{1}{2}c_A + \frac{1}{2}\varepsilon$$

which is always satisfied by assumption given $c_A < 1$.

A type $\theta_e = 1$ could deviate and choose $g_1^e(1,L) = A$. In this case for $g_1^e(1,L) = A$ not to be a profitable deviation the following must hold:

$$4 - \frac{1}{2}c_A + \frac{1}{2}\left(\frac{\gamma}{2-\gamma} + 1\right)\varepsilon \geq 3 - \frac{3}{2}c_A + \frac{1}{2}\left(\frac{\gamma}{2-\gamma} + 1\right)\varepsilon$$

which is satisfied by assumption since $c_A > 0$.

A type $\theta^e = 0$ could deviate and choose $g_1^e(1,H) = B$. For $g_1^e(1,H) = B$ not to be a profitable deviation the following must hold:

$$2 - c_A + \frac{\gamma}{2-\gamma}\varepsilon \geq 2 - \frac{1}{2}c_A$$

which is satisfied if $c_A < \varepsilon\frac{2\gamma}{2-\gamma}$.

A type $\theta^e = 0$ could deviate and choose $g_1^e(0,L) = A$. For $g_1^e(0,L) = A$ not to be a profitable deviation the following must hold:

$$2 + \frac{\gamma}{2-\gamma}\varepsilon \geq 2 - c_A + \frac{\gamma}{2-\gamma}\varepsilon$$

which is satisfied if $c_A > 0$.

The condition for the existence of the equilibrium in the second period is $c_A > \varepsilon\left(\frac{2-2\gamma}{2-\gamma}\right)$. Since $\frac{2-2\gamma}{2-\gamma} > 0\ \forall\gamma$ the equilibrium exists in this region iff $c_A \in \left(\varepsilon\frac{2-2\gamma}{2-\gamma}, 2\varepsilon\frac{\gamma}{2-\gamma}\right)$, provided that the interval is well-defined. Notice that such equilibrium never exist if $\gamma \leq \frac{1}{2}$.

$\rho \geq \frac{1}{2-\gamma}$ A type $\theta_e = 1$ could deviate and choose $g_1^e(1,H) = B$. For $g_1^e(1,H) = B$ not to be a profitable deviation the following must hold:

$$\begin{aligned} & \frac{7}{2} + \frac{\rho}{2} - c_A\left(2 - \frac{\rho}{2}\right) + \frac{1}{2}\left((2-\rho)\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon \\ \geq\ & \frac{5}{2} + \frac{\rho}{2} - c_A\left(1 - \frac{\rho}{2}\right) \end{aligned}$$

which is always satisfied by assumption given that $c_A < 1$.

A type $\theta_e = 1$ could deviate and choose $g_1^e(1, L) = A$. For $g_1^e(1, L) = A$ not to be a profitable deviation the following must hold:

$$\begin{aligned} & \frac{7}{2} + \frac{\rho}{2} - c_A\left(1 - \frac{\rho}{2}\right) + \frac{1}{2}\left((2-\rho)\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon \\ \geq & \frac{5}{2} + \frac{\rho}{2} - c_A\left(2 - \frac{\rho}{2}\right) + \frac{1}{2}\left((2-\rho)\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon \end{aligned}$$

which is satisfied by assumption since $c_A > 0$.

A type $\theta_e = 0$ could deviate and choose $g_1^e(1, H) = B$. For $g_1^e(1, H) = B$ not to be a profitable deviation the following must hold:

$$2 - \frac{3}{2}c_A + \frac{1}{2}\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon \geq 2 - \frac{1}{2}c_A$$

The condition is satisfied if $c_A < \frac{1}{2}\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon$.

A type $\theta_e = 0$ could deviate and choose $g_1^e(0, L) = A$. For $g_1^e(0, L) = A$ not to be a profitable deviation the following must hold:

$$\begin{aligned} & 2 - \frac{1}{2}c_A + \frac{1}{2}\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon \\ \geq \; & 2 - \frac{3}{2}c_A + \frac{1}{2}\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} + \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)\varepsilon \end{aligned}$$

which is satisfied if $c_A > 0$. The condition for the existence of the equilibrium in the second period is $c_A > \varepsilon\left(\frac{(2-\rho)\gamma}{1+\gamma-\rho\gamma} - \frac{\rho\gamma}{1-\gamma+\rho\gamma}\right)$.

■

Proof of Proposition 4.

A non-congruent legislator always approves any policy proposal in the first period given $R^a > \varepsilon$; in the second period he mimics the congruent legislator to maximize his final reputation.

A congruent legislator given his utility function and

$$R^a \leq 1 + c_A$$

always votes for what he believes to be the efficient policy in the second period. If he observes $g_2^e = B$ and $\sigma_2 = L$ he approves B because the signal is compatible with the policy proposed by the executive. If he observes $g_2^e = B$ and $\sigma_2 = H$, instead, he computes $\Pr[s_2 = L | g_2^e = B, \sigma_2 = H]$ in order to decide on his vote. Such probability is

$$\Pr[s_2 = L | g_2^e = B, \sigma_2 = H] = \frac{\Pr[g_2^e = B, \sigma_2 = H | s_2 = L] \cdot \Pr[s_2 = L]}{\Pr[g_2^e = B, \sigma_2 = H]} = \frac{1-\rho}{1-\widehat{\gamma}^p \rho};$$

hence he approves B after $\sigma_2 = H$ iff $\Pr[s_2 = L | g_2^e = B, \sigma_2 = H] > \frac{1}{2}$, which happens when $\rho < \frac{1}{2-\widehat{\gamma}^p}$.

In the first period a congruent legislator votes maximizing the total probability of implementing the efficient policy over the two periods. Therefore:

- if $g_1^e(s_1, 1) = g^*(s_1)$ and $g_1^e(s_1, 0) = B$ a congruent legislator follows the signal when $\rho \geq \frac{1}{2-\gamma}$ as shown above. When $\rho < \frac{1}{2-\gamma}$ they always approve B. Notice that it is never optimal for a congruent legislator to reject B after $\sigma_1 = H$ to improve on the expected quality of the executive in the second period. By doing so the total probability of implementing the efficient policy over two periods would be $\frac{3+\gamma}{2} - \frac{1-\rho}{1-\gamma\rho}$ which is smaller than $\frac{1-\rho}{1-\gamma\rho}\left(\frac{3+\gamma}{2} - \rho\right) + \rho$, the total probability when B is approved.

- if $g_1^e(s_1, 1) = g_1^e(s_1, 0) = g^*(s_t)$ they always approve B because B is proposed by any type of executive only when it is the efficient choice;

- if $g_1^e(s_1, 1) = A$ and $g_1^e(s_1, 0) = B$ the executive proposal reveals the type of the executive. In the event of $g_1^e(s_1) = B$ and $\sigma_1 = H$, a congruent legislator knows that the executive is non-congruent and believes that A is more likely to be the efficient policy and therefore votes against B. In the event of $g_1^e(s_1) = B$ and $\sigma_1 = L$ a congruent legislator expects, by approving B, the correct policy to be implemented with probability ρ in the first period. If he approves B he is sure of the executive being non-congruent in the second period and therefore implementing the efficient policy with probability ρ (since he follows the signal in the second period). The total probability is then 2ρ. If he votes against B instead, the probability is $(1-\rho)$ in the first period; in the second period however the executive is congruent with probability γ and the probability of the efficient policy is $\frac{3+\gamma}{2} - \rho$. The total probability is maximized by following the signal if $\rho \geq \frac{1}{2} + \frac{\gamma}{6}$ and always voting against otherwise.

- if $g_1^e(s_1, 1) = g_1^e(s_1, 0) = A$ he follows the signal because the executive's proposal is uninformative as it is not state dependent.

■

Proof of Proposition 5. Notice that in the parliamentary system the belief held by legislators on the congruence of the executive, $\widehat{\gamma}^p$, is the same as the belief held by the voters on the congruence of the executive, $\widehat{\gamma}^v$, because both legislators and voters have observed, at the beginning of period two, g_1^e and s_1.Therefore we call such updated reputation $\widehat{\gamma}$.

Second period We start from the case in which $\rho < \frac{1}{2-\widehat{\gamma}^p}$. As shown in Proposition 4 in this case the assembly approves every policy offer, regardless of the received signal σ_2. Therefore the ex-post reputation after offering A is 1 and the ex-post reputation after offering B is

$$\Pr[\theta^e = 1|g_2 = B] = \frac{\Pr[g_2 = B|\theta^e = 1]\Pr[\theta^e = 1]}{\Pr[B]} = \frac{\widehat{\gamma}^v}{2-\widehat{\gamma}^v}.$$

The strategies $g_2^e(s_2, 1) = g^*(s_2)$ and $g_2^e(s_2, 0) = B$ constitute a pure strategy NE if no type of executive has incentive to deviate. A type $\theta^e = 0$ could deviate and choose $g_2^e(H, 0) = A$. For this not to be a profitable deviation it must be:

$$1 + \varepsilon\left(\frac{\widehat{\gamma}^v}{2-\widehat{\gamma}^v}\right) \geq 1 - c_A + \varepsilon$$

which is satisfied if $c_A \geq \varepsilon\left(\frac{2-2\widehat{\gamma}^v}{2-\widehat{\gamma}^v}\right)$. This condition also prevents the deviation to $g_2^e(L, 0) = A$.

A type $\theta^e = 1$ could deviate and choose $g_2^e(H, 1) = B$. For this not to be a profitable deviation it must be:

$$2 - c_A + \varepsilon \geq 1 + \varepsilon\left(\frac{\widehat{\gamma}^v}{2-\widehat{\gamma}^v}\right)$$

which is trivially satisfied because of assumption $c_A < 1$.

A type $\theta^e = 1$ could deviate and choose $g_2^e(L, 1) = A$. For this not to be a profitable deviation it must be:

$$2 + \varepsilon\left(\frac{\widehat{\gamma}^v}{2-\widehat{\gamma}^v}\right) \geq 1 - c_A + \varepsilon$$

which is also always satisfied because of assumption $c_A > \varepsilon > 0$.

Now let's consider the case in which $\rho \geq \frac{1}{2-\widehat{\gamma}^a}$. In this case the assembly, after observing B votes according to its signal. Hence the ex-post reputation after offering A is 1. If the executive proposes B the proposal can be either accepted or rejected by the assembly. As voters observe both the proposed and the implemented policy, the ex-post reputations are as follows:

$$\Pr[\theta^e = 1 | g_2^e = B, g_2 = B] = \frac{\Pr[g_2^e = B, g_2 = B | \theta_e = 1] \Pr[\theta^e = 1]}{\Pr[g_2^e = B, g_2 = B]} = \frac{\rho \widehat{\gamma}^v}{1 - \widehat{\gamma}^v + \widehat{\gamma}^v \rho}.$$

$$\Pr[\theta^e = 1 | g_2^e = B, g_2 = A] = \frac{\Pr[g_2^e = B, g_2 = A | \theta_e = 1] \Pr[\theta^e = 1]}{\Pr[g_2^e = B, g_2 = A]} = \frac{(1-\rho)\,\widehat{\gamma}^v}{(1-\rho)\,\widehat{\gamma}^v + (1 - \widehat{\gamma}^v)}.$$

The strategies $g_2^e(s_2, 1) = g^*(s_2)$ and $g_2^e(s_2, 0) = B$ constitute a pure strategy NE if no type of executive has incentive to deviate. A type $\theta^e = 0$ could deviate and choose $g_2^e(H, 0) = A$. For this not to be a profitable deviation it must be:

$$1 - \rho c_A + \varepsilon \left(\rho \frac{(1-\rho)\,\widehat{\gamma}^v}{(1-\rho)\,\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} + (1-\rho)\,\frac{\rho \widehat{\gamma}^v}{1 - \widehat{\gamma}^v + \widehat{\gamma}^v \rho} \right) \geq 1 - c_A + \varepsilon$$

which is satisfied if $c_A \geq \varepsilon \frac{1}{1-\rho} \left(1 - \rho \frac{(1-\rho)\widehat{\gamma}^v}{(1-\rho)\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} - (1-\rho)\,\frac{\rho\widehat{\gamma}^v}{1-\widehat{\gamma}^v+\widehat{\gamma}^v\rho} \right)$.

A type $\theta^e = 0$ could deviate and choose $g_2^e(L, 0) = A$. For this not to be a profitable deviation it must be:

$$1 - (1-\rho)\,c_A + \varepsilon \left((1-\rho)\,\frac{(1-\rho)\,\widehat{\gamma}^v}{(1-\rho)\,\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} + \rho \frac{\rho \widehat{\gamma}^v}{1 - \widehat{\gamma}^v + \widehat{\gamma}^v \rho} \right) \geq 1 - c_A + \varepsilon$$

which is satisfied if $c_A \geq \varepsilon \frac{1}{\rho} \left(1 - \frac{(1-\rho)^2 \widehat{\gamma}^v}{(1-\rho)\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} - \frac{\rho^2 \widehat{\gamma}^v}{1-\widehat{\gamma}^v+\widehat{\gamma}^v\rho} \right)$. Notice that this condition implies the previous one, as

$$\varepsilon \frac{1}{\rho} \left(1 - \frac{(1-\rho)^2\,\widehat{\gamma}^v}{(1-\rho)\,\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} - \frac{\rho^2 \widehat{\gamma}^v}{1 - \widehat{\gamma}^v + \widehat{\gamma}^v \rho} \right) > \varepsilon \frac{1}{1-\rho} \left(1 - \rho \frac{(1-\rho)\,\widehat{\gamma}^v}{(1-\rho)\,\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} - (1-\rho)\,\frac{\cdots}{1 - \cdots} \right.$$

can be rewritten as

$$(1-\rho) - \frac{(1-\rho)^3\,\widehat{\gamma}^v}{(1-\rho)\,\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} - \frac{\rho^2\,(1-\rho)\,\widehat{\gamma}^v}{1 - \widehat{\gamma}^v + \widehat{\gamma}^v \rho} > \rho - \frac{\rho^2\,(1-\rho)\,\widehat{\gamma}^v}{(1-\rho)\,\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} - \frac{\rho^2\,(1-\rho)\,\widehat{\gamma}^v}{1 - \widehat{\gamma}^v + \widehat{\gamma}^v \rho}$$

which can be simplified to

$$1 - 2\rho > \frac{(1-\rho)\,\widehat{\gamma}^v\,(1-2\rho)}{(1-\rho)\,\widehat{\gamma}^v + (1-\widehat{\gamma}^v)},$$

that is $1 > \frac{(1-\rho)\widehat{\gamma}^v}{(1-\rho)\widehat{\gamma}^v + (1-\widehat{\gamma}^v)}$ which is always satisfied. The overall existence condition for the second period equilibrium is therefore $c_A \geq \varepsilon \frac{1}{\rho} \left(1 - \frac{(1-\rho)^2\widehat{\gamma}^v}{(1-\rho)\widehat{\gamma}^v + (1-\widehat{\gamma}^v)} - \frac{\rho^2\widehat{\gamma}^v}{1-\widehat{\gamma}^v+\widehat{\gamma}^v\rho} \right)$.

A type $\theta^e = 1$ could deviate and choose $g_2^e(H, 1) = B$ or choose $g_2^e(L, 1) = A$ and these are not profitable deviations for the very same reasons as for the case in which $\rho < \frac{1}{2-\widehat{\gamma}^a}$.

Equilibrium 1.

First period Given the equilibrium behavior of the executive we have that:

$$\begin{aligned}\widehat{\gamma}(A,H) &= \Pr(\theta^e = 1 | g_1^e = A, s_1 = H) = 1, \\ \widehat{\gamma}(A,L) &= \Pr(\theta_e = 1 | g_1^e = A, s_1 = L) = \gamma, \\ \widehat{\gamma}(B,H) &= \Pr(\theta^e = 1 | g_1^e = B, s_1 = H) = 0, \\ \widehat{\gamma}(B,L) &= \Pr(\theta^e = 1 | g_1^e = B, s_1 = L) = \gamma.\end{aligned}$$

All the beliefs above are computed using Bayes' rule on the equilibrium path except for $\widehat{\gamma}(A,L)$. Given that neither type of executive has a predominant incentive to deviate to (A,L) we assume that $\widehat{\gamma}(A,L) = \gamma$(passive beliefs).

$\rho < \frac{1}{2-\gamma}$ In this case the legislators do not follow their signal after B in the first period. A type $\theta_e = 0$ could deviate and choose $g_1^e(0,L) = A$ or $g_1^e(0,H) = A$, because this would ensure being in power in period 2. He has the greatest incentive to deviate when $s = H$ because, whatever $\widehat{\gamma}(A,L)$ is, the additional gain in reputation is larger after (A,H). For $g_1^e(0,H) = A$ not to be a profitable deviation the following must hold:

$$2 - \frac{1}{2}c_A \geq 2 - c_A + \varepsilon$$

that is $c_A \geq 2\varepsilon$.

A type $\theta_e = 1$ could deviate and choose $g_1^e(1,L) = A$. Given that $\widehat{\gamma}(A,L) = \gamma$, $\rho < \frac{1}{2-\widehat{\gamma}(A,L)}$. For $g_1^e(1,L) = A$ not to be a profitable deviation the following must hold:

$$4 - \frac{1}{2}c_A + \frac{1}{2}\left(1 + \frac{\gamma}{2-\gamma}\right)\varepsilon \geq 3 - \frac{3}{2}c_A + \frac{1}{2}\left(1 + \frac{\gamma}{2-\gamma}\right)\varepsilon$$

which is always satisfied given that $c_A > 0$.

A type $\theta_e = 1$ could never deviate to $g_1^e(1,H) = B$, as it delivers lower first period utility, lower second period expected utility and lower final reputation.

The executive enters the second stage with reputation either 1 or 0 or γ. In the first two cases the second period behavior is trivially an equilibrium one;

in the last case the relevant condition is $c_A \geq \varepsilon\left(\frac{2-2\gamma}{2-\gamma}\right)$, which is implied by the condition $c_A \geq 2\varepsilon$.

$\rho \geq \frac{1}{2-\gamma}$ A type $\theta^e = 0$ could deviate and choose $g_1^e(0, L) = A$ or $g_1^e(0, H) = A$, because this would ensure being in power in period 2, given that $g_0 = A$.

He has the greatest incentive to deviate when $s = H$ because of the additional gain in reputation. For $g_1^e(0, H) = A$ not to be a profitable deviation the following must hold:

$$2 - \rho\Gamma - \left(\frac{1}{2} + \frac{\rho\Gamma}{2}\right) c_A \geq 2 - c_A + \varepsilon$$

that is $c_A \geq \frac{2\rho\Gamma+2\varepsilon}{1-\rho\Gamma}$. Notice that if a type $\theta^e = 0$ has no incentive to deviate to $g_1^e(0, H) = A$ he has even less incentives to deviate to $g_1^e(0, L) = A$ as the condition that prevents such deviation has the same r.h.s, but a l.h.s that is higher both in terms of first period utility, probability of being in power in the second period and final reputation.

A type $\theta^e = 1$ could deviate and choose $g_1^e(1, L) = A$. Notice that $\widehat{\gamma}(A, L) = \gamma$, hence $\rho \geq \frac{1}{2-\widehat{\gamma}(A,L)}$. For $g_1^e(1, L) = A$ not to be a profitable deviation the following must hold:

$$\begin{aligned} &\frac{7}{2} + \frac{1}{2}\rho - \left(\frac{5}{2} + \frac{1}{2}\rho\right)(1-\rho)\Gamma - \left(1 - \frac{1}{2}\rho + \frac{1}{2}(2-\rho)(1-\rho)\Gamma\right) \\ &+\frac{1}{2}\left(1 + \rho\frac{\rho\gamma}{1-\gamma+\rho\gamma} + (1-\rho)\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)(1-(1-\rho)\Gamma)\varepsilon \\ &\geq \frac{5}{2} + \frac{1}{2}\rho - \left(2 - \frac{1}{2}\rho\right)c_A + \frac{1}{2}\left(1 + \rho\frac{\rho\gamma}{1-\gamma+\rho\gamma} + (1-\rho)\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\varepsilon \end{aligned}$$

This condition becomes

$$c_A \geq \frac{2}{2-\rho(1-\rho)\Gamma}\left(\begin{array}{c} \frac{5}{2}(1-\rho)\Gamma + \frac{1}{2}\rho(1-\rho)\Gamma - 1 \\ +\left(1+\rho\frac{\rho\gamma}{1-\gamma+\rho\gamma} + (1-\rho)\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)(1-\rho)\Gamma\varepsilon \end{array}\right),$$

which is implied by the condition $c_A \geq \frac{2\rho\Gamma+2\varepsilon}{1-\rho\Gamma}$.

In this case notice that the executive enters the second stage with reputation either 1 or 0 or γ. In the first two cases the second period behavior is trivially an equilibrium one; in the last case the relevant condition is $c_A \geq \varepsilon\frac{1}{\rho}\left(1 - \frac{(1-\rho)^2\widehat{\gamma}^v}{(1-\rho)\widehat{\gamma}^v+(1-\widehat{\gamma}^v)} - \frac{\rho^2\widehat{\gamma}^v}{1-\widehat{\gamma}^v+\widehat{\gamma}^v\rho}\right)$, which is implied by the condition $c_A \geq \frac{2\rho\Gamma+2\varepsilon}{1-\rho\Gamma}$. Therefore the overall condition of existence is $c_A \geq \frac{2\rho\Gamma+2\varepsilon}{1-\rho\Gamma}$.

Equilibrium 2.

First period Given the equilibrium behavior of the executive we have that:

$$\begin{aligned}
\widehat{\gamma}(A,H) &= \Pr\left(\theta^e = 1 | g_1^e = A, s_1 = H\right) = \gamma, \\
\widehat{\gamma}(A,L) &= \Pr\left(\theta_e = 1 | g_1^e = A, s_1 = L\right) = \gamma, \\
\widehat{\gamma}(B,H) &= \Pr\left(\theta^e = 1 | g_1^e = B, s_1 = H\right) = 0, \\
\widehat{\gamma}(B,L) &= \Pr\left(\theta^e = 1 | g_1^e = B, s_1 = L\right) = \gamma.
\end{aligned}$$

All the beliefs above are computed using Bayes' rule on the equilibrium path except for $\widehat{\gamma}(A,L)$. Given that neither type of executive has a predominant incentive to deviate to (A,L) we assume that $\widehat{\gamma}(A,L) = \gamma$ (passive beliefs). We assume the reputation $\widehat{\gamma}(B,H) = 0$ as in equilibrium 2 of Proposition 3.

$\rho < \frac{1}{2-\gamma}$ In this case the possible deviations are $g_1^e(L,1) = A$ and $g_1^e(H,0) = B$. The condition for $g_1^e(L,1) = A$ not to be a deviation is the following:

$$4 - \frac{1}{2}c_A + \frac{1}{2}\left(1 + \frac{\gamma}{2-\gamma}\right)\varepsilon \geq 3 - \frac{3}{2}c_A + \frac{1}{2}\left(1 + \frac{\gamma}{2-\gamma}\right)\varepsilon$$

which is always satisfied given $c_A > 0$.

The condition for $g_1^e(H,0) = B$ not to be a profitable deviation is the following:

$$2 - c_A + \frac{\gamma}{2-\gamma}\varepsilon \geq 2 - \frac{1}{2}c_A$$

therefore the equilibrium exists only if $c_A \leq \varepsilon\frac{2\gamma}{2-\gamma}$.

Existence condition Remember that the executive enters the second period, in equilibrium, with a reputation equal to γ. Therefore the condition for the last period behavior to be an equilibrium one is $c_A \geq \varepsilon\left(\frac{2-2\gamma}{2-\gamma}\right)$. Overall the equilibrium condition is $c_A \in \left[\varepsilon\left(\frac{2-2\gamma}{2-\gamma}\right), \varepsilon\frac{2\gamma}{2-\gamma}\right]$; notice that this interval is non-empty only for $\gamma > \frac{1}{2}$.

$\rho \geq \frac{1}{2-\gamma}$ Notice that $\widehat{\gamma}(A,L) = \gamma$, hence $\rho \geq \frac{1}{2-\widehat{\gamma}(A,L)}$. In this case the condition that ensures that $g_1^e(L,1) = A$ is not a profitable deviation for the congruent executive is the following one:

$$\frac{7}{2}+\frac{1}{2}\rho-\left(1-\frac{1}{2}\rho\right)c_A+\frac{1}{2}\left(1+\rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}+(1-\rho)\frac{(1-\rho)\gamma}{1-\rho\gamma}\right)\varepsilon \geq 3-\frac{3}{2}c_A+\frac{1}{2}\left(1+\frac{\gamma}{2-\gamma}\right)\varepsilon$$

The condition reduces to:

$$c_A \geq -1 + \varepsilon \frac{\left(\frac{\gamma}{2-\gamma} - \frac{\rho^2 \gamma}{1-\gamma+\gamma\rho} - \frac{(1-\rho)^2 \gamma}{1-\rho\gamma} \right)}{(1+\rho)};$$

this condition is always satisfied given that $\frac{\left(\frac{\widehat{\gamma}}{2-\widehat{\gamma}} - \frac{\rho^2 \gamma}{1-\gamma+\gamma\rho} - \frac{(1-\rho)^2 \gamma}{1-\rho\gamma} \right)}{(1+\rho)} < 1$, and $\varepsilon < c_A$.

The condition for the non-congruent not to find profitable to deviate to $g_1^e(0, H) = B$ is the following one:

$$2 - \frac{3}{2} c_A + \frac{1}{2} \varepsilon \left(\frac{\rho\gamma}{1-\gamma+\rho\gamma} + \frac{(1-\rho)\gamma}{1-\rho\gamma} \right) \geq 2 - \frac{1}{2} c_A$$

Therefore the condition becomes

$$c_A \leq \frac{\varepsilon}{2} \left(\frac{\rho\gamma}{1-\gamma+\gamma\rho} + \frac{(1-\rho)\gamma}{1-\rho\gamma} \right).$$

Existence condition Remember moreover that, given that the executive's reputation in equilibrium is γ at the beginning of the second period, the last period behavior is an equilibrium behavior iff

$$c_A \geq \varepsilon \frac{1}{\rho} \left(1 - \frac{(1-\rho)^2 \gamma}{(1-\rho)\gamma + (1-\gamma)} - \frac{\rho^2 \gamma}{1-\gamma+\gamma\rho} \right)$$

Therefore such equilibrium exists only for

$$c_A \in \left[\varepsilon \frac{1}{\rho} \left(1 - \frac{(1-\rho)^2 \gamma}{(1-\rho)\gamma + (1-\gamma)} - \frac{\rho^2 \gamma}{1-\gamma+\gamma\rho} \right), \frac{\varepsilon}{2} \left(\frac{\rho\gamma}{1-\gamma+\gamma\rho} + \frac{(1-\rho)\gamma}{1-\rho\gamma} \right) \right]$$

when this interval is non-empty.[3]

Equilibrium 3.

First period First of all notice that the first period actions of each executive are not state dependent. Therefore, we assume that the legislators follow their signal in the first period if they observe a deviation to B. Notice that the described equilibrium no longer exists if both types of legislators approve B in the first period, as the congruent executive always has an incentive to deviate to (B, L). Such equilibrium

[3] The interval is non-empty for high values of γ. We verified it graphically.

is perfectly pooling, and B is never observed as a first period offer. We assume that the reputation after (B,H) is 0 as the congruent executive never has an incentive to deviate to B in H. Moreover we assume that $\widehat{\gamma}(B,L)=\gamma$ that is not wlog but it does simplify the subsequent comparative statics analysis. Therefore each executive can enter the second stage either with $\widehat{\gamma}=0$ or with $\widehat{\gamma}=\gamma$, as follows:

$$\begin{aligned}
\widehat{\gamma}(A,H) &= \Pr\left(\theta^{e}=1|g_1^e=A,s_1=H\right)=\gamma,\\
\widehat{\gamma}(A,L) &= \Pr\left(\theta_{e}=1|g_1^e=A,s_1=L\right)=\gamma,\\
\widehat{\gamma}(B,H) &= \Pr\left(\theta^{e}=1|g_1^e=B,s_1=H\right)=0,\\
\widehat{\gamma}(B,L) &= \Pr\left(\theta^{e}=1|g_1^e=B,s_1=L\right)=\gamma.
\end{aligned}$$

$\rho>\frac{1}{2-\gamma}$ A type $\theta^e=1$ could deviate and choose $g_1^e(1,L)=B$. For $g_1^e(1,L)=B$ not to be a profitable deviation the following must hold:

$$\begin{aligned}
& \frac{5}{2}+\frac{1}{2}\rho-\left(2-\frac{1}{2}\rho\right)c_A+\frac{1}{2}\left(1+\rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}+(1-\rho)\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\varepsilon\\
\geq\ & \frac{7}{2}+\frac{1}{2}\rho-\left(1-\frac{1}{2}\rho+\frac{1}{2}\rho(1-\rho)\Gamma\right)c_A-(1-\rho)\Gamma\left(\frac{5}{2}+\frac{1}{2}\rho\right)\\
& +(1-(1-\rho)\Gamma)\frac{1}{2}\varepsilon\left(1+\rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}+(1-\rho)\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)
\end{aligned}$$

this condition becomes

$$c_A\leq\frac{2}{2-\rho(1-\rho)\Gamma}\left(\begin{array}{c}-1+(1-\rho)\Gamma\left(\frac{5}{2}+\frac{1}{2}\rho\right)\\ +(1-\rho)\Gamma\frac{1}{2}\left(1+\rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}+(1-\rho)\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\varepsilon\end{array}\right)$$

A type $\theta^e=0$ could deviate and choose $g_1^e(0,L)=B$. For $g_1^e(0,L)=B$ not to be a profitable deviation the following must hold:

$$\begin{aligned}
& 2-\frac{3}{2}c_A+\frac{1}{2}\left(\frac{\rho\gamma}{1-\gamma+\rho\gamma}+\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\varepsilon\\
\geq\ & 2-(1-\rho)\Gamma-\frac{1}{2}(1+(1-\rho)\Gamma)c_A\\
& +(1-(1-\rho)\Gamma)\frac{1}{2}\left(\frac{\rho\gamma}{1-\gamma+\rho\gamma}+\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\varepsilon
\end{aligned}$$

this condition becomes:

$$c_A\leq\frac{2(1-\rho)\Gamma}{2-(1-\rho)\Gamma}\left(1+\varepsilon\frac{1}{2}\left(\frac{\rho\gamma}{1-\gamma+\rho\gamma}+\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\right)$$

Notice that both executive's types enter the second stage with reputation γ therefore the second period equilibrium exists if $c_A \geq \varepsilon\frac{1}{\rho}\left(1-\frac{(1-\rho)^2\gamma}{(1-\rho)\gamma+(1-\gamma)}-\frac{\rho^2\gamma}{1-\gamma^v+\gamma\rho}\right)$.

Then equilibrium exists if:

$$c_A \in \left[\min\left\{\begin{array}{c}\varepsilon\frac{1}{\rho}\left(1-\frac{(1-\rho)^2\gamma}{(1-\rho)\gamma+(1-\gamma)}-\frac{\rho^2\gamma}{1-\gamma^v+\gamma\rho}\right), \\ \frac{2(1-\rho)\Gamma}{2-(1-\rho)\Gamma}\left(1+\varepsilon\frac{1}{2}\left(\frac{\rho\gamma}{1-\gamma+\rho\gamma}+\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\right), \\ \frac{2}{2-\rho(1-\rho)\Gamma}\left(\begin{array}{c}-1+(1-\rho)\Gamma\left(\frac{5}{2}+\frac{1}{2}\rho\right) \\ +(1-\rho)\Gamma\frac{1}{2}\left(1+\rho\frac{\rho\gamma}{1-\gamma+\rho\gamma}+(1-\rho)\frac{(1-\rho)\gamma}{(1-\rho)\gamma+(1-\gamma)}\right)\varepsilon\end{array}\right)\end{array}\right\}\right]$$

$\rho < \frac{1}{2-\gamma}$ A type $\theta^e = 1$ could deviate and choose $g_1^e(1,L) = B$. For $g_1^e(1,L) = B$ not to be a profitable deviation the following must hold:

$$\begin{aligned}&3-\frac{3}{2}c_A+\frac{1}{2}\varepsilon\left(1+\frac{\gamma}{2-\gamma}\right)\\ \geq\ &4-3(1-\rho)\Gamma-\frac{1}{2}(1+(1-\rho)\Gamma)c_A+\frac{1}{2}\varepsilon(1-(1-\rho)\Gamma)\left(1+\frac{\gamma}{2-\gamma}\right)\end{aligned}$$

this condition becomes:

$$c_A \leq \frac{2}{2-(1-\rho)\Gamma}\left(-1+3(1-\rho)\Gamma+(1-\rho)\Gamma\frac{1}{2}\varepsilon\left(1+\frac{\gamma}{2-\gamma}\right)\right)$$

A type $\theta^e = 0$ could deviate and choose $g_1^e(0,L) = B$. For $g_1^e(0,L) = B$ not to be a profitable deviation the following must hold:

$$2-c_A+\varepsilon\frac{\gamma}{2-\gamma} \geq 2-(1-\rho)\Gamma-(1-\rho)\Gamma c_A+(1-(1-\rho)\Gamma)\left(\varepsilon\frac{\gamma}{2-\gamma}\right)$$

this condition becomes: $c_A \leq \frac{(1-\rho)\Gamma}{1-(1-\rho)\Gamma}\left(1+\varepsilon\frac{\gamma}{2-\gamma}\right)$. which is implied by the previous condition.

Notice that both executive's types enter the second stage with reputation γ therefore the second period equilibrium exists if $c_A \geq \varepsilon\frac{2-2\gamma}{2-\gamma}$. Then equilibrium exists if:

$$c_A \in \left[\varepsilon\frac{2-2\gamma}{2-\gamma}, \frac{2}{2-(1-\rho)\Gamma}\left(-1+3(1-\rho)\Gamma+(1-\rho)\Gamma\frac{1}{2}\varepsilon\left(1+\frac{\gamma}{2-\gamma}\right)\right)\right]$$

Full characterization. There is no equilibrium in which $g_1^e(H,1) = B$ because by deviating to $g_1^e(H,1) = A$ the congruent executive increases his expected payoff since the efficient policy is always implemented and this is enough to compensate the possible loss in reputation. In addition neither $g_1^e(s,1) = A$ and $g_1^e(s,0) = s$ nor $g_1^e(s,1) = s$ and $g_1^e(s,0) = A$ can be equilibria because in both cases B would be approved with probability one from the assembly and therefore one of the two types of executive would like to deviate to B (in particular in the first case the congruent would offer B in L while in the second one the non-congruent would offer B in each state). The following as well is not an equilibrium:

$$\begin{array}{ll} g_1^e(s_1,1) = A & g_2^e(s_2,1) = g^*(s_2) \\ g_1^e(s_1,0) = B & g_2^e(s_2,0) = B \end{array}$$

First period As shown in Proposition 4, given this equilibrium behavior, congruent legislators always follow their signal in the first period as long as $\rho \geq \frac{1}{2} + \frac{\gamma}{6}$. Moreover, such equilibrium is perfectly separating. Therefore, after the first period action, each executive is "recognized" as congruent or non-congruent. Therefore each executive can enter the second stage either with $\widehat{\gamma} = 0$ or with $\widehat{\gamma} = 1$, as follows:

$$\begin{aligned} \widehat{\gamma}(A,H) &= \Pr(\theta^e = 1 | g_1^e = A, s_1 = H) = 1, \\ \widehat{\gamma}(A,L) &= \Pr(\theta_e = 1 | g_1^e = A, s_1 = L) = 1, \\ \widehat{\gamma}(B,H) &= \Pr(\theta^e = 1 | g_1^e = B, s_1 = H) = 0, \\ \widehat{\gamma}(B,L) &= \Pr(\theta^e = 1 | g_1^e = B, s_1 = L) = 0. \end{aligned}$$

If $\rho \geq \frac{1}{2} + \frac{\gamma}{6}$ the equilibrium conditions are the following ones.

A type $\theta^e = 0$ could deviate and choose $g_1^e(0,L) = A$ or $g_1^e(0,H) = A$, because this would ensure being in power in period 2. He has the greatest incentive to deviate when $s_1 = H$ because of the additional gain in reputation.

For $g_1^e(0,H) = A$ not to be a profitable deviation the following must hold:

$$\overline{Y} - \rho\Gamma c_A + (1-\rho\Gamma)\left(\overline{Y} - \frac{1}{2}c_A\right) \geq \overline{Y} - c_A + \overline{Y} + \varepsilon$$

that is $c_A \geq \frac{2\rho\Gamma\overline{Y} + 2\varepsilon}{1-\rho\Gamma}$.

A type $\theta^e = 1$ could deviate and choose $g_1^e(1,L) = B$. For $g_1^e(1,L) = B$ not to be a profitable deviation the following must hold:

$$3 - \frac{3}{2}c_A + \varepsilon \geq \frac{7}{2} + \frac{1}{2}\rho - \left(\frac{5}{2} + \frac{1}{2}\rho\right)(1-\rho)\Gamma - \left(1 - \frac{1}{2}\rho + \rho(1-\rho)\Gamma\right)c_A$$

This condition becomes

$$c_A \leq \frac{2}{1+\rho-\rho\Gamma+\rho^2\Gamma}\left(\left(\frac{5}{2}+\frac{1}{2}\rho\right)(1-\rho)\,\Gamma-\frac{1}{2}(1+\rho)+\varepsilon\right)$$

which is not compatible with the condition $c_A \geq \frac{2\rho\Gamma\overline{Y}+2\varepsilon}{1-\rho\Gamma}$, hence this is not an equilibrium.

■