

# Yardstick Competition and Political Agency Problems\*

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## Abstract

This paper analyzes the role of yardstick competition for improving political decisions. We examine how performance comparisons across jurisdictions affect the agency problem resulting from uncertainty about politicians (adverse selection) and their policies (moral hazard). We study two forms of inefficiency: the provision of wasteful project and the failure to provide useful project. We find a general neutrality result: yardstick competition does not affect the likelihood of fully efficient equilibria for any correlation (with a discontinuity at perfect correlation). We also find that yardstick competition has no effect on the likelihood of inefficient equilibria in which politicians refrain from implementing valuable projects. However, performance comparisons makes it less likely to have an equilibrium where bad politicians in both jurisdictions use wasteful projects as inefficient transfer forms.

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# 1 Introduction

In this paper we revolve around a fundamental question in political economics: to what extent can elections and performance comparisons through yardstick competition solve the political agency problem between the electorate and their elected representatives?

Surely voters do think that some politicians are intrinsically more likely to act in the public interest than others, and voters are interested in sorting out the relatively good politicians. But everyone also recognizes that politicians make, while in office, important policy choices that are not well monitored by the electorate and, thus, that political agency involves moral hazard in a central way. A theoretical model that captures this political agency problem simply but usefully must combine the elements of adverse selection and moral hazard.<sup>1</sup>

Elections may be seen as a way for sorting good from bad incumbents. By ‘good incumbent’, we mean someone who is honest, competent and not easily bought off by special interests. However elections do not work well in controlling and sorting politicians. There are severe problems in monitoring and evaluating the incumbent’s behavior in order to make informed decisions about whether to reelect or not. Voters face a formidable agency problem because they are inevitably poorly informed about politicians’ behaviour and type. Moreover, the electoral sanction (pass or fail) is such a crude incentive scheme that it can hardly induce the politicians to do what the public wants.

Given the difficulty of the agency problem voters face, it might be reasonable to try to organize competition among politicians for controlling problems of moral hazard and adverse selection. In this respect, the Brennan and Buchanan (1980) view is that decentralization is an effective mechanism to control Leviathan’s expansive tendencies. The basic argument is that competition among different decentralized governments can exercise a disciplinary force and break the monopoly power of a large central government. Comparing performances in office among different incumbents would help in sorting good types from bad types as well as controlling moral hazard. In this view, one votes against an incumbent if his performance is bad relative to others, in order to induce each incumbent to behave in the public interest.

To analyze the nature and effectiveness of this interaction, we consider

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<sup>1</sup>Banks and Sundaram (1993) present an infinite horizon model that incorporates both elements. Politicians are constrained to serve at most two terms and, as in Barro (1973) and Ferejohn (1986), politicians’ choice variable is effort not policy. See Laffont (2000) for a nice review of political agency theory whereas Shleifer and Vishny (1998) provide more focus on transition economics. See also Przeworsky et al (1999) for a broader historical perspective of political agency problems.

a multi-jurisdiction version of a political agency model due to Coate and Morris (1995).<sup>2</sup> In this model, the incumbent in each jurisdiction chooses a policy. Then, the respective electorate, uninformed about the policy and the quality of their incumbent, but informed about their relative performance, choose whether to retain their representative. In the second (and last) period, if reelected, and depending on his type, the incumbent chooses a transfer and the electorate receive utility. A strategy for the electorate will be a rule stating whether or not to reelect the incumbent according to their first-period welfare relative to the other jurisdiction. This strategy will take the form of a relative performance criterion. Note that voters are rationally seeking to influence their future welfare with their votes, so their retrospective vote has a prospective purpose.

The electorate face the decision problem of drawing an inference about the incumbent's quality from their observed relative welfare and then re-electing if the updated belief that the incumbent is good is sufficiently high. This is a simple matter of applying Bayes's rule. In turn the incumbent has to consider the effect of his policy choice and the policy choice in the other jurisdiction on the probability of being reelected, which depends on the updated beliefs and the reelection rule of the electorate.

A perfect Bayesian equilibrium obtains in the model when the electorate in each jurisdiction have correct expectation about the strategy their incumbent (and the other incumbent) will employ, and choose whether to reelect their incumbent according to this expectation. Furthermore, given the induced probability of reelection, no incumbent wants to change his strategy given the strategy of the other incumbent.

With a single agency, Coate and Morris (1995) show that incumbent seeking reelection may behave inefficiently in equilibrium either by providing non-valuable projects or by not providing valuable ones.<sup>3</sup> The aim of this paper is to examine how yardstick competition influences the incentives to behave efficiently in a multi-agency framework. Our first general result is that for any correlation (short of perfect correlation) between agencies, yardstick competition does not affect the likelihood of efficient pooling Perfect Bayesian Equilibria. At least one type of politician in one jurisdiction must behave inefficiently and yardstick comparisons has no effect on this (Proposition 1) except for the discontinuity whenever there is perfect cor-

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<sup>2</sup>This model differs from other political agency models (like Ferejohn, 1986 or Banks and Sundaram, 1993) by the fact that inefficient behavior is more likely the higher the value of holding office. This is because bad incumbents seeking reelection would rather make transfer to special interests in the form of inefficient public projects rather than more apparent cash transfers. For the same reason, shorter term limits or repeated elections have the paradoxical effect of encouraging inefficient behavior.

<sup>3</sup>See Alesina et al (1998) for evidence of the use of public employment as an indirect and possibly inefficient method of redistribution.

relation.<sup>4</sup> Turning to another type of equilibrium where bad politicians undertake bad projects in each jurisdiction irrespective of the situation in the other, we find that this sort of inefficiency is less likely under yardstick competition (Proposition 2). We also show that there cannot be an equilibrium in which bad incumbents might condition their actions on the type of project or politician in the other jurisdiction (Propositions 3 and 4). Lastly we show that yardstick competition does not affect the likelihood of inefficient equilibria where good and bad politicians refrain from implementing useful projects so as not to be seen as implementing possibly spurious project (Proposition 5).

This paper is related to the emerging literature on yardstick competition in political agency.<sup>5</sup> The common feature of this literature as well as most of the literature on electoral accountability is that the desire for reelection can motivate politicians to behave in the interest of citizens (see Wittman 1995). Besley and Case (1995) provide empirical support to the idea that voters use relative performance criterion in deciding whether to retain or not their incumbent. Besley and Smart (2001) is more theoretical and shows that the effect of yardstick competition can go either way depending on the initial reputation of the incumbent. The ambiguity arises essentially from the fact that yardstick comparison facilitates the detection of bad incumbent but has the adverse effect of inducing more rent diversion by bad incumbents who are less likely to be re-elected (last period effect). The distinctive feature of our analysis is that the electoral incentive and the desire for reelection are themselves the source of inefficiency and we assess the role of yardstick comparison in this context.<sup>6</sup> One consequence of this different approach is that yardstick competition cannot go the wrong way because in facilitating the detection of bad incumbents (sorting effect) it also makes it less likely that they will distort inefficiently their policy choice (discipline effect) in order to preserve their chance of reelection. Therefore the extra information that yardstick comparisons bring about cannot hurt the principal in our model: discipline and sorting effects work in the same direction.<sup>7</sup>

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<sup>4</sup>This contrasts with the principal-agent theory in which the possibility to use a more general incentive scheme than the crude electoral sanction enables yardstick competition to restore efficiency (see Shleifer, 1985 and Holmstrom, 1981) even with arbitrarily small amount of correlation (Cremer and Mc Lean, 1985). However Meyer and Vickers (1997) provide more ambiguous results in a dynamic principal-agent framework.

<sup>5</sup>A very nice survey of this literature can be found in Persson and Tabellini (2000, Chapters 4 and 9). See more specifically the papers by Besley and Case (1995) and Besley and Smart (2001). See also some recent papers like Wrede (2001) and Bodenstein and Ursprung (2001).

<sup>6</sup>For evidence that politicians are strongly motivated by the desire for reelection, see Cain *et al* (1987).

<sup>7</sup>This finding that more information can never hurt the principal should be contrasted with career concerns literature. For instance, Dewatripont *et al.* (1999) provide two examples in which a more precise signal about the agent's performance reduces discipline.

The model used to assess the effect of yardstick competition is set out in the next section. The general neutrality result of yardstick competition on the chance of fully efficient equilibria is presented and discussed in Section 3. The impact of yardstick competition on the overprovision inefficiency is examined in Section 4, while its impact on the underprovision inefficiency is studied in Section 5. Some concluding remarks are contained in Section 6.

## 2 A multi-jurisdiction political agency model

We use a two-period political agency model due to Coate and Morris (1995) (hereafter CM) that we extend to two agencies (jurisdictions) so that in a correlated environment, voters can use a relative performance criterion (i.e., yardstick competition) to decide whether or not to reelect their incumbent. In the first period, both incumbents choose independently and simultaneously whether or not to implement a public project, and whether or not to make cash transfers to some ‘special interest’. Each incumbent may be either ‘good’ or ‘bad’: a *good* incumbent always behaves in the interest of his electorate, while a *bad* incumbent may do rent-seeking at the expense of his electorate. An incumbent cannot afford to alienate his electorate if he wants to be reelected at the end of the first period.

The problem for voters is to distinguish a good from a bad incumbent on the basis of the first-period decision and realized performance of their own incumbent relative to the decision and performance of the other incumbent. In the second period, the incumbent, if reelected, simply selects a cash transfer to the special interest.

At the beginning of the game, nature selects an incumbent type in each jurisdiction. Incumbent is good with probability  $\lambda_I \in (0, 1)$  and bad with probability  $1 - \lambda_I$  in the domestic jurisdiction (the corresponding probabilities in the other jurisdiction are  $\tilde{\lambda}_I$  and  $1 - \tilde{\lambda}_I$ , respectively). Then nature selects a project quality in each jurisdiction according to some joint distribution  $\pi$ . There is uncertainty about the benefit of any project. However a valuable project is more likely to produce a high net benefit to the voters than a non-valuable project. More precisely, a valuable project produces

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Morris (2001) shows that observing more informative signals can worsen discipline because the good type may be induced to take more extreme action to separate from the bad type (“political correctness” effect). There is also a literature on the trade-off between transparency and efficiency. Bordignon and Minelli (1999) present a political agency model where it is optimal to have low powered incentives but more transparent rules (with negative discipline effect) to facilitate detection of bad politician (positive sorting effect). Prat (2001) presents a model in which better information on the agent’s action (more transparency over actions) can unambiguously hurt the principal by producing conformism. Conformism is detrimental because the agent is taking less appropriate action and his performance is less informative of his type.

a high net benefit  $B_H$  with probability  $\theta_1 \in (0, 1)$  and a low net benefit  $B_L$  with probability  $1 - \theta_1$  (with  $B_L < 0 < B_H$ ). A non-valuable project produces the same high net benefit  $B_H$  but with a lower probability  $\theta_0$  (with  $0 < \theta_0 < \theta_1 < 1$ ). To simplify the analysis we assume that the joint probability distribution of project types,  $\pi(\theta, \theta)$ , is symmetric:

$$\begin{aligned}\pi(\theta_0, \theta_0) &= \pi(\theta_1, \theta_1) = \rho/2, \\ \pi(\theta_0, \theta_1) &= \pi(\theta_1, \theta_0) = (1 - \rho)/2.\end{aligned}$$

We focus here on the case where  $1/2 \leq \rho \leq 1$ , so that there is *positive (or no) correlation* between the two jurisdictions. Naturally, in the absence of correlation ( $\rho = 1/2$ ), no useful information is transmitted through the record of the other jurisdiction and the model is then essentially the same as CM with the juxtaposition of two independent agencies.<sup>8</sup>

There is asymmetric information between the incumbents and voters insofar as incumbents know more about their type and the desirability of a public project: incumbents, but not voters, observe  $\theta = \{\theta_0, \theta_1\}$  before deciding whether to implement the project or not. For simplicity we shall also assume that there is symmetric information between politicians (i.e., each politician knows the politician and project type in the other jurisdiction).

In each jurisdiction the expected net benefit for the risk-neutral voters from a project of quality  $\theta$  is equal to  $\bar{B}(\theta) = \theta B_H + (1 - \theta)B_L$ . Moreover, both types of project produce a rent  $R > 0$  for a special interest group. We make the same assumption as CM.

**Assumption 1** (i)  $\bar{B}(\theta_1) > 0$ , (ii)  $\bar{B}(\theta_0) < -R < 0$ .

Part (i) says that a valuable project ( $\theta = \theta_1$ ) produces positive expected benefit to the voters. Part (ii) says that a non-valuable project ( $\theta = \theta_0$ ) yields negative expected benefit to the voters which exceeds the rent the interest group derives from this project; as a result, the voters would prefer to pay directly cash transfer of  $R$  to the special interest instead of having the project implemented (if they could credibly commit doing so).

In addition to the implementation of a project, each incumbent can also choose to make a cash transfer  $T \geq 0$  from the voters to the interest group. A good politician ( $i = g$ ) cares only about the expected welfare of the voters and about being in office. Thus, his first-period utility is  $v_g(\bar{B}(\theta) - T)$  or  $v_g(-T)$ , depending on his decision to implement or not a project of type  $\theta = \{\theta_0, \theta_1\}$  and to make a cash transfer  $T \geq 0$  to the interest group. Preference for being in office rather than out is reflected by  $v_g(0) > 0$ .

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<sup>8</sup>We do not lose any generality by making these assumptions. We can show that all our results go through under a more general non-symmetric distribution of project types with positive correlation defined as  $\pi(\theta_0, \theta_0)\pi(\theta_1, \theta_1) > \pi(\theta_1, \theta_0)^2$ .

A bad politician ( $i = b$ ), on the other hand, also cares about the interest group and his utility is  $v_b(\bar{B}(\theta) - T, R + T)$  or  $v_b(-T, +T)$ , depending on his decision to implement or not a project of type  $\theta \in \{\theta_0, \theta_1\}$  and to make a cash transfer  $T \geq 0$  to the interest group. We assume that  $v_b(\cdot, \cdot)$  is smooth and increasing in both arguments and that  $v_b(0, 0) > 0$  is the value of holding office for the bad incumbent. Let  $v_b^*(\bar{B}(\theta_1), R) \equiv \max_T v_b(\bar{B}(\theta_1) - T, R + T)$  with optimal cash transfer  $T = T_1$  and similarly,  $v_b^*(0, 0) \equiv \max_T v_b(-T, +T)$  with optimal cash transfer  $T = T_0$ . As in CM we make the following two assumptions on the preference of a bad politician in the two jurisdictions (with  $\delta \in [0, 1]$  representing the incumbents' discount factor).

**Assumption 2**  $v_b(\bar{B}(\theta_0), R) > v_b(0, 0)$ .

**Assumption 3** (i)  $v_b^*(\bar{B}(\theta_1), R) - v_b(\bar{B}(\theta_1), R) < \delta v_b^*(0, 0)$ ,  
(ii)  $v_b^*(0, 0) - v_b(0, 0) < \delta v_b^*(0, 0)$ .

Assumption 2 says that ignoring the reelection constraint, a bad incumbent wants to implement a bad project, at the expense of the voters, if it gives a rent  $R$  to the interest group. Assumption 3 says that the bad incumbent always prefers to give up the optimal cash transfer or the bad project in the first period if he could be reelected for sure and then implement unconstrained cash transfer in the next period.

Upon observing the project type  $\theta$ , an incumbent of type  $i \in \{g, b\}$  makes a project and cash transfer decision, possibly contingent on the politician or project type in the other jurisdiction. A first-period strategy for the incumbent in any jurisdiction specifies a project and transfer decision for each type of incumbent ( $i \in \{g, b\}$ ) and each realization of project type in that jurisdiction ( $\theta \in \{\theta_0, \theta_1\}$ ) based on his (perfect) information  $\Theta$  about the politician and project type in the other jurisdiction:  $s_i(\theta; \Theta) \in D \times R_+$ , where  $D = P$  ( $D = N$ ) denotes (no) project implementation.<sup>9</sup> Then, when the project of type  $\theta$  is implemented, nature selects its net benefit to the voters as either  $B_H$  with probability  $\theta$  or  $B_L$  with probability  $1 - \theta$ . Voters observe their incumbent's first-period record  $\mathcal{R} = (D, T, B)$ , as well as the other incumbent's record  $\tilde{\mathcal{R}} = (\tilde{D}, \tilde{T}, \tilde{B})$  (with  $B \in \{B_L, B_H\}$  for  $D = P$  and  $B = 0$  for  $D = N$ ). On the basis of these observations, voters use Bayes' rule to update their initial belief ( $\lambda_I$ ) that their incumbent is good as  $\alpha(\mathcal{R}, \tilde{\mathcal{R}}) \in [0, 1]$ , which also denotes the probability that they will reelect their incumbent. If reelected, and depending on his type, the incumbent makes a cash transfer decision and the game ends. There is no project decision to be made in the second period.

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<sup>9</sup>Recall that we assume symmetric information among politicians.

We solve the game for its perfect Bayesian equilibria (PBE). A PBE consists in a pair of strategies for the two incumbents, a reelection rule and beliefs for the voters that meet the following requirements: (i) each incumbent chooses a strategy that maximizes his discounted utility given the other incumbent's strategy, the voters' beliefs and the reelection decision rule; (ii) given their updated beliefs, voters' in each jurisdiction base their reelection decision on minimizing the cash transfer in the second period; (iii) voters' beliefs in each jurisdiction are updated using Bayes' rule, according to the two incumbents' strategies where possible.

Like CM, we refine the equilibrium concept by requiring out-of-equilibrium beliefs to be consistent with the following monotonicity criterion (*monotone beliefs*): given two first-period records  $\mathcal{R} = (D, T, B)$  and  $\mathcal{R}' = (D, T', B)$  with  $T' > T$  in one jurisdiction, associated with the same record  $\tilde{R}$  in the other jurisdiction, posterior belief is such that  $\alpha(\mathcal{R}', \tilde{R}) < \alpha(\mathcal{R}, \tilde{R})$ . The logic of this criterion is that posterior belief should reflect the fact that a bad type is more likely to deviate from the equilibrium play to make higher cash transfers. This monotonicity requirement implies that a good politician will never make cash transfers since this would only hurt his reputation without bringing any benefit. It follows that by making cash transfers the bad politician will reveal himself and thus he would rather choose optimal cash transfers if any (i.e.,  $T_0$  when the project is non-valuable and  $T_1$  when the project is valuable). The latter two conclusions are valid for the first period, as well as for the second period (supposing that the incumbent is reelected).

### 3 General neutrality result

In this section we want to examine whether performance comparisons and the resulting competition among politicians may reduce the chance that *at least* one type of incumbent in one jurisdiction behaves inefficiently. By inefficient decision we mean either undertaking bad projects or dropping good ones. The following proposition states that *yardstick competition does not make this general inefficiency less likely*.

**Proposition 1** *Under assumptions 1-3, for each jurisdiction there exists some  $\hat{\lambda} < 1$  such that if  $\lambda_I > \hat{\lambda}$  there is no PBE with monotone beliefs in which both types of incumbent behave efficiently, regardless of the incumbent strategy in the other jurisdiction. The threshold  $\hat{\lambda}$  is independent of the correlation between jurisdictions.*

**Proof.** See Appendix 7.1. ■

The intuition for Proposition 1 goes as follows. Suppose, by contradiction, efficient behavior from both types in one jurisdiction. If the initial

reputation of the incumbent exceeds  $\hat{\lambda}$ , bad incumbents have good chance of reelection and do not want to lose it by making cash transfer to the special interest. Indeed the minimal threshold  $\hat{\lambda}$  is determined so as to deter bad incumbents of making cash transfers. Then both types are pooling on the same (efficient) action and no information is revealed by the fact that the project is implemented or not since both are compatible with the equilibrium play. Hence, posterior belief following any decision to implement in one jurisdiction is simply the prior belief *irrespective* of what is happening in the other jurisdiction. This is true whatever the degree of correlation between projects. But then since there cannot be reputation loss from simply implementing a project, this will give the incentive to a bad incumbent to deviate from the equilibrium by implementing non-valuable projects. Therefore, when the initial reputation is sufficiently good to deter bad incumbents from using cash transfers, all types behaving efficiently cannot be an equilibrium.

The novel—and striking—result of this proposition is that the critical initial reputation above which equilibrium cannot involve efficient behavior is independent of the degree of correlation. In that sense, *yardstick competition in an imperfectly correlated environment does not affect the likelihood that all politicians behave efficiently*.<sup>10</sup> This finding is a natural feature of a more fundamental *trade-off between motivation and selection*: the better the performance of bad types in the first-period, the harder it is to sort them out from good types for the second-period.

To sum up the argument: yardstick competition is powerless to induce overall efficient behaviour because this requires both types in all jurisdictions pooling on the same action so that voters cannot gain any useful information from performance comparisons whatever the correlation among jurisdictions. It follows that the neutrality result is very general indeed: it holds whatever the number of jurisdictions, the degree of correlation between jurisdictions, and the information incumbents have about each other.

As a corollary to the previous argument, we would expect yardstick competition to have some effect only in situations where the two types of

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<sup>10</sup>However there is a discontinuity whenever there is perfect correlation ( $\rho = 1$ ). To see this, consider that voters observe that no cash transfers are made and no project is undertaken in the other jurisdiction. Expecting politicians to behave efficiently, voters infer that the project is bad in that jurisdiction and thus (by perfect correlation), that the project is also bad in their own jurisdiction. Therefore, deviating from the efficient equilibrium play by undertaking bad project, the bad incumbent would reveal himself and forego any chance of reelection (subject to natural out-of-equilibrium beliefs). But, by Proposition 1, this cannot be optimal if  $\lambda_I > \hat{\lambda}$  since the incumbent has then good chance of being reelected. It follows that with perfect correlation, both types of incumbent behaving efficiently is an equilibrium if the initial reputation is sufficiently high ( $\lambda_I > \hat{\lambda}$ ). By the same token, efficient equilibrium exists if both  $\theta_0 = 0$  and  $\theta_0 = 1$  since then bad politician would reveal himself by undertaking bad project.

incumbents behave differently (i.e., semi-pooling equilibrium). We examine situations of this sort in the next section.

## 4 Implementation of bad projects

We have seen that if the politicians' initial reputation is high enough and correlation is imperfect, at least one type of incumbent in at least one jurisdiction behaves inefficiently. The inefficiency can take two forms: either undertaking bad projects (*overprovision*) or not providing good projects (*underprovision*). Our task is now to see how in an imperfectly correlated environment, yardstick competition could affect the occurrence of these two forms of inefficiency. This section is devoted to overprovision while the next section deals with underprovision.

Regarding overprovision of bad projects, we consider the following strategy in which bad incumbents implement non-valuable projects irrespective of the situation (types of politician and project) in the other jurisdiction. We consider symmetric strategy between jurisdictions.

**Definition 1** *Strategy S is such that in each jurisdiction, for any configurations of politician and project in the other jurisdiction, (i) both types of incumbent make no cash transfers, (ii) good incumbent implements valuable project only (iii) bad incumbent implements both valuable and non-valuable projects.*

We now demonstrate that such strategy constitutes an equilibrium behavior on the part of the incumbents if the initial reputation of the incumbent is sufficiently high, but that yardstick competition makes this kind of equilibrium less likely to arise (and in fact impossible in a perfectly correlated environment). We proceed in three steps. First, we compute the posterior beliefs induced by strategy S. Second, we derive the reelection probabilities. Third, we prove that given the induced probability of reelection, it is optimal for both types of incumbent to play strategy S when the incumbent in the other jurisdiction does the same. We emphasize that it describes a symmetric equilibrium in pure strategy that corresponds to a partial pooling equilibrium.

### 4.1 Posterior beliefs

From strategy S, incumbents do not make cash transfers and the possible records in each jurisdiction are  $(P, 0, B_H)$ ,  $(P, 0, B_L)$ , and  $(N, 0, 0)$ , yielding  $3 \times 3$  different record profiles. We need to derive voters' beliefs that their incumbent is good for each record profile. That is, we must update voters' initial beliefs using Bayes rule according to incumbent strategy S. To simplify

notation (when no confusion is possible), we identify the records  $(P, 0, B_H)$ ,  $(P, 0, B_L)$  and  $(N, 0, 0)$  respectively by  $H$ ,  $L$ , and  $N$ . Using this notation, the posterior belief that the domestic incumbent is good for any record profile  $(R, \tilde{R}) \in \{H, L, N\} \times \{H, L, N\}$  is

$$\alpha_{ij} = \frac{\lambda_I}{\lambda_I + (1 - \lambda_I)(1 + \phi_{ij})} \quad \forall i, j \in \{H, L, N\}$$

where  $\phi_{ij}$  is a measure of the reputational cost (i.e.,  $\alpha_{ij} \leq \lambda_I \iff \phi_{ij} \geq 0$ ). Straightforward but tedious calculations establish the following (with  $\tilde{\lambda}_I$  denoting the incumbent's initial reputation in the other jurisdiction):

$$\begin{aligned} 0 < \phi_{HH} &= \frac{\theta_0}{\theta_1} \left( \frac{(1 - \rho)\theta_1 + \rho\theta_0(1 - \tilde{\lambda}_I)}{\rho\theta_1 + (1 - \rho)\theta_0(1 - \tilde{\lambda}_I)} \right) < \phi_{LH} = \frac{\theta_1}{\theta_0} \left( \frac{1 - \theta_0}{1 - \theta_1} \right) \phi_{HH}, \\ 0 < \phi_{HL} &= \frac{\theta_0}{\theta_1} \left( \frac{(1 - \rho)(1 - \theta_1) + \rho(1 - \theta_0)(1 - \tilde{\lambda}_I)}{\rho(1 - \theta_1) + (1 - \rho)(1 - \theta_0)(1 - \tilde{\lambda}_I)} \right) < \phi_{LL} = \frac{\theta_1}{\theta_0} \left( \frac{1 - \theta_0}{1 - \theta_1} \right) \phi_{HL}, \\ 0 < \phi_{HN} &= \frac{\theta_0}{\theta_1} \frac{\rho}{(1 - \rho)} < \phi_{LN} = \frac{\theta_1}{\theta_0} \left( \frac{1 - \theta_0}{1 - \theta_1} \right) \phi_{HN}. \end{aligned}$$

Thus, there is always a reputational cost to implement any project because bad politicians are more likely to implement than good politicians. Since a bad politician always implements, a good politician can reveal himself by not undertaking the project, and thus

$$\phi_{NH} = \phi_{NL} = \phi_{NN} = -1,$$

so that  $\alpha_{NH} = \alpha_{NL} = \alpha_{NN} = 1$  (the non-implementation decision guarantees reelection). When there is no correlation (i.e.,  $\rho = 1/2$ ) the model is similar to CM and the reputation costs from undertaking the project does not depend on the outcome of the project in the other jurisdiction:

$$0 < \phi_{HH} = \phi_{HL} = \phi_{HN} = \frac{\theta_0}{\theta_1} < 1 < \phi_{LH} = \phi_{LL} = \phi_{LN} = \frac{1 - \theta_0}{1 - \theta_1}.$$

Straightforward comparisons of posterior beliefs highlight a number of instructive results. First, there is a *direct* reputational effect: regardless of the outcome in the other jurisdiction, (i) a good performance  $B_H$  improves reputation relative to bad performance  $B_L$  (because bad politicians undertake non-valuable projects, which are more likely to fail) and (ii) undertaking the project reduces reputation relative to no implementation (because bad politicians are more likely to implement); i.e.,

$$\alpha_{LK} < \alpha_{HK} < \lambda_I < \alpha_{NK} = 1 \quad \forall K = H, L, N.$$

This direct reputational effect is already present in CM's analysis. However, in a correlated environment, voters observe a relative performance that is

not directly controlled by their incumbent. As a result, a second, *indirect*, reputational effect (or informational externality) appears in our model. It says that for any given domestic record, the reputation of the politician also depends on the record of the politician in the other jurisdiction. More precisely, we have the following rankings ( $\forall K = H, L$ ):

$$\begin{cases} \alpha_{KN} < \alpha_{KL} < \alpha_{KH} & \text{if } \rho > 1/2, \\ \alpha_{KN} = \alpha_{KL} = \alpha_{KH} \equiv \alpha_K & \text{if } \rho = 1/2, \end{cases} \quad (1)$$

(where  $\alpha_H$  and  $\alpha_L$  denote the posterior beliefs in an uncorrelated environment when respectively high and low benefit are observed). In words, when there is positive correlation, the reputation of the domestic incumbent undertaking the project is the lowest when the project is not undertaken in the other jurisdiction and the highest when the project is undertaken and is a success in the other jurisdiction. The intuition is the following. Not undertaking the project in the other jurisdiction reveals that it was a non-valuable project which by positive correlation makes it more likely that the domestic project is also bad. Since only bad incumbent implements non-valuable projects, undertaking the project leads voters to believe that their incumbent is bad. On the other hand, observing a successful project in the other jurisdiction increases the chance that it was a valuable project (since it is more likely to succeed) which, by positive correlation, increases the chance that the domestic project is also good and therefore, that it could have been implemented by a good politician. In this case the reputation cost for undertaking the project is less than when the project is not undertaken in the other jurisdiction. Obviously, the stronger the correlation, the more responsive is the posterior belief to the outcome in the other jurisdiction (i.e., the differences  $\alpha_{KH} - \alpha_{KL}$  and  $\alpha_{KL} - \alpha_{KN}$  both increase with  $\rho$ ).

To assess more precisely the effect of correlation, we compare the posterior beliefs in a correlated and in an uncorrelated environments. As illustrated by the following ranking (with  $K = H$  or  $L$ ), positive correlation improves the incumbent's reputation when a valuable project is implemented in the other region, but hurts it in the case of no implementation:<sup>11</sup>

$$\alpha_{KN} < \alpha_K < \alpha_{KH} \quad \text{if } \rho > 1/2. \quad (2)$$

Lastly, it is easily seen that *posterior* beliefs are increasing with the *prior* belief  $\lambda_I$  (unless, of course, when the posterior is 1).

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<sup>11</sup>How posterior beliefs respond to a *low* benefit in the other jurisdiction is ambiguous. Indeed, upon observing a low benefit in the other jurisdiction, posterior beliefs when undertaking the project (regardless of its outcome) are higher in a positively correlated environment (i.e.,  $\alpha_{HL} > \alpha_H$  and  $\alpha_{LL} > \alpha_L$ ) if and only if  $1 - \theta_1 > (1 - \theta_0)(1 - \lambda_I)$ . This condition means that a low benefit is more likely to arise from the failure of a good project (always undertaken) rather than from the failure of a bad project (only undertaken if the incumbent is bad).

## 4.2 Reelection probability

We can now derive the (*ex ante*) probability of reelection of each type of incumbent as a function of the type of the other incumbent and the project profile.<sup>12</sup>

- When  $(\theta, \tilde{\theta}) = (\theta_1, \theta_0)$ , the domestic project is valuable and from strategy S, both types of incumbent act in the same way (undertaking the project) while in the other jurisdiction, the project is non-valuable leading both types of incumbents to act differently (i.e., the good type does not implement whereas the bad type does). Therefore, the probability of reelection of the domestic incumbent is independent of his type due to pooling but depends on the type of the other politician:  $\forall i \in \{g, b\}$ .

$$\begin{aligned} p_i(\theta_1; \theta_0, g) &= \theta_1 \alpha_{HN} + (1 - \theta_1) \alpha_{LN} \\ p_i(\theta_1; \theta_0, b) &= \theta_1 [\theta_0 \alpha_{HH} + (1 - \theta_0) \alpha_{HL}] \\ &\quad + (1 - \theta_1) [\theta_0 \alpha_{LH} + (1 - \theta_0) \alpha_{LL}] \end{aligned} \quad (3)$$

- When  $(\theta, \tilde{\theta}) = (\theta_1, \theta_1)$ , the project is valuable in both jurisdictions and from strategy S, both types of incumbents pool on the same action (undertaking the project) in both jurisdictions. Therefore, the probability of reelection of the domestic incumbent is independent of his own type and of the other politician's type:  $\forall i \in \{g, b\}$ ,

$$\begin{aligned} p_i(\theta_1; \theta_1, j) &= \theta_1 [\theta_1 \alpha_{HH} + (1 - \theta_1) \alpha_{HL}] \\ &\quad + (1 - \theta_1) [\theta_1 \alpha_{LH} + (1 - \theta_1) \alpha_{LL}] \end{aligned}$$

- When  $(\theta, \tilde{\theta}) = (\theta_0, \theta_0)$ , the project is non-valuable in both jurisdictions and by strategy S, both types of incumbent in each jurisdiction separate on different actions (the good type does not implement revealing himself as a good type, while the bad type implements). Therefore, the probability of reelection of the domestic politician depends both on his own type and on the other politician's type:

$$\begin{aligned} p_b(\theta_0; \theta_0, g) &= \theta_0 \alpha_{HN} + (1 - \theta_0) \alpha_{LN}, \\ p_b(\theta_0; \theta_0, b) &= \theta_0 [\theta_0 \alpha_{HH} + (1 - \theta_0) \alpha_{HL}] \\ &\quad + (1 - \theta_0) [\theta_0 \alpha_{LH} + (1 - \theta_0) \alpha_{LL}], \\ p_g(\theta_0; \theta_0, g) &= p_g(\theta_0; \theta_0, b) = 1. \end{aligned}$$

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<sup>12</sup>The (*ex ante*) probability of reelection is before the outcomes are observed, while the posterior belief is the *ex post* probability of reelection once outcomes are realized.

- When  $(\theta, \tilde{\theta}) = (\theta_0, \theta_1)$ , both types of incumbents act the same in the other jurisdiction (both undertaking the project) and the probability of reelection of the domestic politician is independent of the other politician's type (with the good incumbent revealing himself by not implementing the non-valuable project):  $\forall j \in \{g, b\}$

$$\begin{aligned} p_b(\theta_0, \theta_1, j) &= \theta_0 [\theta_1 \alpha_{HH} + (1 - \theta_1) \alpha_{HL}] \\ &\quad + (1 - \theta_0) [\theta_1 \alpha_{LH} + (1 - \theta_1) \alpha_{LL}] , \\ p_g(\theta_0, \theta_1, j) &= 1 \end{aligned}$$

- Lastly, in the absence of correlation ( $\rho = 1/2$ ), which corresponds to the single-jurisdiction model), there is no informational externality and the probabilities of reelection induced by strategy S are

$$\begin{aligned} p_b(\theta_0) &= \theta_0 \alpha_H + (1 - \theta_0) \alpha_L, \\ p_g(\theta_0) &= 1 \\ p_b(\theta_1) &= p_g(\theta_1) = \theta_1 \alpha_H + (1 - \theta_1) \alpha_L. \end{aligned}$$

Building on the rankings of posteriors (1) and (2), we can order the probabilities of reelection for the two types of incumbents when they comply with strategy S. The next lemma summarizes our main results.

**Lemma 1** *In the presence of positive correlation between the two jurisdictions ( $\rho > 1/2$ ), a bad incumbent playing strategy S in each jurisdiction faces probabilities of reelection that depend on the situation in the other jurisdiction as follows:  $\forall \theta \in \{\theta_0, \theta_1\}$ ,*

$$\begin{aligned} (i) \quad & p_b(\theta, \theta_0, g) < p_b(\theta; \theta_0, b) < p_b(\theta; \theta_1, g) = p_b(\theta; \theta_1, b), \\ (ii) \quad & p_b(\theta; \theta_0, g) < p_b(\theta). \end{aligned}$$

According to part (i), a bad incumbent has the lowest chance to be reelected when the other project is non-valuable and the other politician is good (since, then, the project is not undertaken in the jurisdiction making voters suspicious about the domestic implementation). Part (ii) says that in this worst-case scenario (non-valuable project and good incumbent abroad), the bad domestic incumbent is clearly hurt by the voters' ability to compare performance in the two jurisdictions.

Note that the reelection prospects of a *good* incumbent are ranked in the same way when the project is valuable (and thus undertaken). However, when the project is non-valuable, the good incumbent reveals himself by not undertaking the project and thus get reelected with certainty irrespective of the situation in the other jurisdiction (i.e.,  $p_g(\theta_0; \theta, j) = 1 \forall \theta, j$ ).

### 4.3 Effect of yardstick competition

We are now in a position to check whether yardstick competition in a correlated environment can effectively reinforce the ability of voters to restrain bad incumbents undertaking non-valuable projects. We proceed in two steps. First, we derive the minimum initial reputation beyond which it is optimal for both types of politicians to play strategy S. The argument is the same as in CM. If a bad incumbent makes cash transfer in the first-period, he would reveal himself and destroy his chance of reelection. This would not deter him from making cash transfer if his initial reputation was so low that he had few chances of being reelected. But when his initial reputation is high enough, he has good chance of being reelected, giving him an incentive to give up cash transfers for a less transparent (but inefficient) redistribution to the special interest in the form of non-valuable projects.

The second step consists in showing that in a correlated environment yardstick competition increases the minimum initial reputation required for the incumbent to play strategy S. Thus, yardstick competition effectively reduces the incentive for undertaking non-valuable projects. This result supports the conventional wisdom that yardstick comparisons transmit valuable information about the type of incumbent and the quality of his decisions. The higher the degree of correlation the greater the incentive for the bad incumbent (seeking reelection) to choose a policy in the public interest.

To shed some light on this result, we need to understand how the minimum initial reputation is derived and how the degree of correlation affects this threshold. As already mentioned, to ensure that both types of incumbent behave as prescribed by strategy S, their reelection probability when playing strategy S must be high enough; since reelection probabilities increase, *ceteris paribus*, with the initial reputation, this amounts to say that the initial reputation must be high enough. Since strategy S prescribes actions for both types of incumbent that are independent of the situation in the other jurisdiction, both types of incumbent must find it optimal to play these actions for all possible configurations of projects and politician types in the other jurisdiction, and in particular for the most unfavorable situation. From part (i) of Lemma 1, we know that the prospect of reelection is worst when the incumbent faces a good politician with non-valuable project. We further know, from part (ii) of that lemma, that greater correlation makes this worst reelection prospect even worse by increasing the ability of voters to detect bad incumbents.

Our main result about the desirable effect of yardstick comparisons to restrain (bad) incumbent undertaking non-valuable project is described formally in the following proposition.

**Proposition 2** *Under Assumptions 1-3, there exists  $\lambda^*(\rho) < 1$  for all  $\rho \in$*

$[\frac{1}{2}, 1)$  such that a symmetric PBE involving incumbent strategy  $S$  in both jurisdictions exists if  $\lambda_I > \lambda^*(\rho)$ . Furthermore,  $\lambda^*(\rho) < \lambda^*(\rho') \forall \frac{1}{2} \leq \rho < \rho' < 1$ . However at the limit for  $\rho = 1$ , there is no  $\lambda^*(1) < 1$  and a PBE involving incumbent strategy  $S$  in both jurisdictions cannot exist.

**Proof.** See Appendix 7.2. ■

The interpretation of this proposition is that yardstick competition can reduce (and even eliminate in case of perfect correlation) the risk of undertaking bad projects by improving the ability of voters to detect those policy choices that are not in their interest, as well as the bad incumbents who make such choices. This result fits nicely with what seems to be the most popular argument for yardstick competition and performance comparisons. To see this more clearly, suppose first that there is no correlation between jurisdiction so that no information is revealed about the type of the incumbent from the policy outcome in the other jurisdiction. In this context, a bad incumbent seeking reelection with a good initial reputation may rely on bad (inefficient) projects to redistribute in favor of some special interest, instead of foregoing reelection by making explicit cash transfers. This follows from the stochastic relationships between project types and outcomes (i.e., non-valuable projects have some chance of success while valuable projects might fail). However, in a correlated environment, voters have the additional possibility of drawing inference about the quality of their incumbent from the policy outcome in the other jurisdiction. Not undertaking the project in the other jurisdiction reveals that it is a non-valuable project and given positive correlation, voters would infer that the domestic project is likely to be bad, reducing the chance of reelection of the incumbent undertaking it. Hence, incumbents will have lower incentive to implement non-valuable projects that are more easily detected through performance comparison.

The following subsection raises the question of whether the bad incumbent could to some extent neutralize the effect of yardstick competition by conditioning his decision to the type of politician and project in the other jurisdiction.

#### 4.4 Conditional implementation

We have established that a bad incumbent is less likely to undertake non-valuable projects when voters use comparative performance across jurisdictions to assess the quality of their incumbent. We have derived this result by assuming that the bad incumbent is undertaking non-valuable project independently of the other politician and project types. This implies for instance that voters can more easily detect a bad incumbent when the other politician is good.

We now explore the possibility for the bad incumbent to condition his action upon the situation in the other jurisdiction. We investigate whether the bad incumbent has an incentive to try and alleviate the adverse effect of yardstick comparisons by conditioning his decision to undertake non-valuable project either on the other politician's type or on the other project's quality. At first glance, one might think that in a positively correlated environment, a bad incumbent would have a higher incentive to behave efficiently when facing a good politician or a non-valuable project. However, these conjectures turn out to be mistaken. We show indeed that there cannot be an equilibrium in which the bad incumbent behaves efficiently or not depending either on the project type in the other jurisdiction (*project-based contingency*) or on the politician type in the other jurisdiction (*politician-based contingency*).

Let us first examine whether the *type of project* in the other jurisdiction can influence the behavior of a bad incumbent. We consider the following symmetric strategy.

**Definition 2** *The **project-based strategy S1** is the same as strategy S in each jurisdiction except that the bad incumbent does not implement non-valuable project if the project in the other jurisdiction is bad.*

The logic underlying this strategy is that there is a reputation cost to implement (voters are suspicious about those who implement projects because the bad type is more likely to do so) but that this cost is lower (voters are less suspicious) in a positively correlated environment when the other politician also implements (which is always the case when the project is valuable). It turns out, however, that this strategy cannot be part of an equilibrium. The intuition behind this result is very similar to the one behind Proposition 1. Consider that the project is not undertaken in the other jurisdiction. Voters infer that it has to be a non-valuable project. But then, there cannot be any reputation loss from implementing the project at home (since voters expect both types of incumbent to pool on the same action), which leads the bad incumbent to deviate by implementing non-valuable project even when the project is bad in the other jurisdiction. We record our result in the next proposition.

**Proposition 3** *Under Assumptions 1-2, there cannot be a PBE involving a project-based strategy S1 in both jurisdiction*

Now let us examine whether conditioning on the type of the other politician could be an equilibrium strategy. We consider the following symmetric strategy.

**Definition 3** The *politician-based strategy S2* is the same as strategy *S* except that the bad incumbent in each jurisdiction does not implement non-valuable project if the other incumbent is good.

Strategy S2 implies that the bad incumbent behaves inefficiently only if the other incumbent is bad. The logic underlying this strategy is that undertaking non-valuable project is more easily detected when the other incumbent is good. Again one might think that it could be worth for the bad incumbent to behave in such a way. However, it turns out again that the conjecture is mistaken. The argument goes as follows. Suppose that politicians in both jurisdictions adopt strategy S2. If the project is good in the other jurisdiction, then it will be implemented whatever the type of the politician. But since good and bad politicians pool on the same action, the chance of reelection of the domestic incumbent cannot depend on the other politician type. It then follows that a bad politician cannot find profitable to condition his decision on the type of the politician in the other region. Therefore, strategy S2 cannot be part of an equilibrium.

**Proposition 4** Under Assumption 1, there cannot be a PBE involving a policy-based strategy S2 in both jurisdictions.

## 5 Non implementation of valuable projects

In this section, we examine the impact of yardstick comparisons on the risk that politicians seeking reelection may not undertake valuable projects. The reason for this underprovision inefficiency is that politicians choose policies but not outcomes. A project that is good *ex ante* can fail *ex post*, leading the electorate to decrease its estimate that the incumbent is good. This is potentially worse when voters assess the quality of their incumbent from their relative performance since this adds an extra noise. Could it be that yardstick competition in the electoral process provides effective incentives to restrain spending on non-valuable projects but at the cost of refraining spending on valuable projects? In other words, is it possible that dissuading politicians to take decisions that are not in the public interest may, at the same time, dissuade them to take decisions that are in the public interest but whose (relative) outcome is uncertain?

Our first result is a generalization of Proposition 3 in CM to a correlated environment. It requires the following assumption.<sup>13</sup>

**Assumption 4** (i)  $v_g(\bar{B}(\theta_1)) - v_g(0) < \delta v_g(0)$ , (ii)  $v_b^*(\bar{B}(\theta_1), R) - v_b(0, 0) < \delta v_b^*(0, 0)$ .

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<sup>13</sup>This is the same as Assumption 5 in CM.

This assumption says that both types of incumbent are willing to forego the utility gain of implementing a valuable project if this could guarantee them reelection. Defining  $\bar{\lambda}$  as the maximum of  $[v_g(\bar{B}(\theta_1)) - v_g(0)]/\delta v_g(0)$  and  $[v_b^*(\bar{B}(\theta_1), R) - v_b(0,0)]/\delta v_b^*(0,0)$ , we can state the following result.

**Proposition 5** *Under assumptions 1-4, there exists a PBE involving no cash transfers and no implementation at all by both types of incumbent in both jurisdictions if  $\lambda_I > \bar{\lambda}$ . Moreover  $\bar{\lambda} \in (0, 1)$  is independent of the degree of correlation  $\rho$ .*

The proof of the first part is a straightforward extension of the proof of Proposition 3 in CM. The basic argument is the following: when the initial reputation is high, reelection is relatively likely and, by Assumption 4, both types of incumbent care enough about being reelected to forego the benefit of implementing valuable projects.<sup>14</sup> The novelty is about the neutrality of yardstick competition. Here, the argument is akin to the one used in Proposition 1 : since both types pool on the same action, the policy outcomes transmit no information on the quality of the incumbent and the correlation between jurisdiction has no effect on each incumbent's probability of reelection. As a result, yardstick comparisons do not affect the force of the electoral sanction. The key difference with proposition 1 is that here the pooling equilibrium exists.

The question arises, then, of whether correlation and comparative performance could affect the underprovision of valuable projects if both types of incumbents were choosing different actions (since, as suggested by Proposition 2, comparing policy outcomes would reveal something about the type of the incumbent). Surprisingly, the answer is no. Indeed, there is no equilibrium in which the good incumbent refrains from undertaking any project (either good or bad) and the bad incumbent chooses to implement at least one type of project. The intuition for this is simple. If the good incumbent never undertakes the project, the bad incumbent would reveal himself by undertaking any project. Facing no chance of reelection whatsoever, the bad incumbent makes thus cash transfers without any reservation. But then, since voters with monotone beliefs do not expect good incumbents to make cash transfers, there is no reputational penalty for a good incumbent of undertaking a project without cash transfers. Therefore (by Assumption 1), a good incumbent would deviate and implement a valuable project. We have demonstrated the following result.

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<sup>14</sup>As in CM, this equilibrium is supported by the "intuitive" out-of-equilibrium beliefs that any deviation is most likely to come from bad type (with greater incentive to implement or to make cash transfers).

**Proposition 6** *Under Assumption 1, there is no PBE in which in some jurisdiction the good incumbent never implements any type of projects while the bad incumbent implements at least one type of projects.*

Note that as in Proposition 1 this non-existence result is not restricted to symmetric strategies. The overall conclusion of this section is that *yardstick competition has no effect whatsoever on the risk of underproviding valuable projects.*

## 6 Conclusion

The usual presumption is that decentralized decision makers are more accountable. One possible reason is that decentralization allows performance comparison. In this paper we examine the role of yardstick competition for improving political decisions. Can yardstick competition make politicians more accountable? It is well known that in a general principal-agent relationships within a correlated environment, incentive schemes based on relative performance can enhance (Holmstrom, 1982) and even restore (Shleifer, 1985) efficiency. However, in political agency, voters are restricted to a very crude incentive scheme which is to re-elect or to vote their politicians out. In this context, Besley and Smart (2001) have shown that the effect of yardstick competition can go either way, depending on the residual degree of confidence about politicians.

In this paper we use a different political agency framework and show that yardstick competition cannot go the wrong way, although in several cases it has no effect at all. Our political agency model is similar to Coate and Morris (1995). In this model, inefficiency arises from the fact that politicians may use non-valuable public projects as an indirect and disguised method of channeling resources to some special interest when more transparent transfer would not find political support. Inefficiency arises also from the fact that politicians seeking reelection may refrain from undertaking valuable projects when voters are suspicious about these projects. Assuming symmetric information between politicians across jurisdictions, we find that yardstick competition may discourage some particular form of inefficiency but does not affect the likelihood of fully efficient equilibria. It has also no effect on the risk of dropping valuable projects by fear that they could be seen as spurious projects.

Clearly these findings are not conclusive and more work needs to be done to assess whether yardstick competition can improve the force of the electoral sanction. In future research we would like to adapt this model of yardstick competition to compare centralization with fully decentralized policymaking and separate elections. Seabright (1996) argues that decentralization should lead to greater efficiency and accountability because a

central decision maker does not need to please all jurisdictions to get re-elected but simply a majority of them. However this argument is usually balanced against the fact that the value of holding office is larger in a centralized arrangement and thus politicians more eager to win election, which in a conventional political agency model may increase accountability and efficiency. But in our model all the effects seem to point in the same direction: with decentralization (i) a lower value of holding office makes it less likely that politicians will distort inefficiently their policy to get re-elected, (ii) the possibility of yardstick comparison increases accountability and (iii) re-election requires to please the electorate in every jurisdiction. Therefore we should expect such model to predict unambiguously greater accountability and less rent diversion in decentralized government which is consistent with empirical evidence (see Fisman and Gatti, 2002).

## 7 Appendix

### 7.1 Proof of Proposition 1

The proof is similar to the proof of Proposition 1 in CM. Define

$$\hat{\lambda} = \max \left\{ \frac{v_b^*(0, 0) - v_b(0, 0)}{\delta v_b^*(0, 0)}, \frac{v_b^*(\bar{B}(\theta_1), R) - v_b(\bar{B}(\theta_1), R)}{\delta v_b^*(0, 0)} \right\}.$$

From Assumption 3,  $\hat{\lambda} < 1$ . Now suppose by contradiction that there exists a PBE in which both types of incumbent in both jurisdictions behave efficiently for  $\lambda_I > \hat{\lambda}$ . We proceed in two steps. In the first step we prove that for any  $\lambda_I > \hat{\lambda}$  any PBE with efficient behavior involves no bad incumbent making positive cash transfers. Then, in a second step, we show that there cannot be a PBE in which both types of incumbent behave efficiently and refrain from making cash transfers.

*Step 1: no cash transfers*

Efficient behavior implies that in both jurisdictions, when  $\theta = \theta_0$ , a good incumbent makes a project-transfer decision  $(N, 0)$  and a bad incumbent chooses  $(N, 0)$  or  $(N, T_0)$ . When  $\theta = \theta_1$ , whatever the jurisdiction, a good incumbent chooses  $(P, 0)$  and a bad incumbent chooses  $(P, 0)$  or  $(P, T_1)$ . Thus, when voters do not observe any cash transfer ( $T = 0$ ), they are unable to distinguish between the two types of incumbent. As a result, in both jurisdictions, the voters' beliefs consistent with this efficient equilibrium behaviour must be such that

$$\alpha(P, 0, B_H, \tilde{\mathcal{R}}), \alpha(P, 0, B_L, \tilde{\mathcal{R}}) \text{ and } \alpha(N, 0, 0, \tilde{\mathcal{R}}) \geq \lambda_I,$$

for any record  $\tilde{\mathcal{R}}$  observed in the other jurisdiction.

Now consider that in equilibrium a bad incumbent (whatever his jurisdiction) chooses to make a cash transfer  $T_0$  when  $\theta = \theta_0$ . (The other case

where he chooses  $T_1$  when  $\theta = \theta_1$  can be treated similarly.) By making a cash transfer he will reveal himself,  $\alpha(N, T_0, 0, \tilde{\mathcal{R}}) = 0 \forall \tilde{\mathcal{R}}$ , and thus get a payoff of  $v_b^*(0, 0)$ . However by giving up the transfer and choosing  $(N, 0)$  instead he would get  $v_b(0, 0) + \delta p(N, 0, 0)v_b^*(0, 0)$ , where  $p(N, 0, 0)$  is the incumbent's probability of reelection when its voters observe the record  $(N, 0, 0)$ . The latter probability depends on the foreign incumbent's identity and observed behavior. In any case, it will be computed as a linear combination of beliefs of the type  $\alpha(N, 0, 0, \tilde{\mathcal{R}})$ , which have just been shown to be larger than  $\lambda_I$ . We have, therefore, that

$$v_b(0, 0) + \delta p(N, 0, 0)v_b^*(0, 0) \geq v_b(0, 0) + \delta \lambda_I v_b^*(0, 0).$$

From the definition of  $\hat{\lambda}$ , this payoff from choosing  $(N, 0)$  exceeds the payoff  $v_b^*(0, 0)$  from choosing  $(N, T_0)$ . Thus equilibrium cannot involve the bad incumbent making cash transfer when  $\theta = \theta_0$  (and similarly when  $\theta = \theta_1$ ).

*Step 2: non-existence of efficient equilibrium*

We must prove that there exists no PBE in which both incumbents behave efficiently given that (from Step 1) there cannot be cash transfer made in such equilibrium. Suppose the contrary. Then efficient behavior and no cash transfer imply that the decision to implement or not the project cannot involve any reputation loss. Thus

$$\alpha(P, 0, B_H, \tilde{\mathcal{R}}) = \alpha(P, 0, B_L, \tilde{\mathcal{R}}) = \alpha(N, 0, 0, \tilde{\mathcal{R}}) = \lambda_I,$$

for any record  $\tilde{\mathcal{R}}$  observed in the other jurisdiction. But this leads to a contradiction because the payoff to a bad incumbent choosing  $(N, 0)$  would be  $v_b(0, 0) + \delta \lambda_I v_b^*(0, 0)$  (for any record  $\tilde{\mathcal{R}}$  observed in the other jurisdiction) which from Assumption 2 is less than what he can get by deviating from the efficient decision (i.e., by choosing  $(P, 0)$  when  $\theta = \theta_0$  which yields a payoff of  $v_b(\bar{B}(\theta_0), R) + \delta \lambda_I v_b^*(0, 0)$ ). QED

## 7.2 Proof of Proposition 2

We first prove that, for all  $\rho \in (0, 1)$ , there is a  $\lambda^*(\rho) < 1$  such that there exists a PBE involving strategy S when  $\lambda_I \geq \lambda^*(\rho)$ .

We first derive the conditions under which strategy S is an equilibrium play for both types of incumbent in both jurisdictions. Regarding the *good incumbent*, we know from monotone beliefs that he will never make cash transfers, and thus (by Assumption 1) he will always choose  $(N, 0)$  when  $\theta = \theta_0$ . The only requirement for a good incumbent to behave according to strategy S is thus to prefer  $(P, 0)$  over  $(N, 0)$  when facing a project  $\theta_1$ . Since this must be true for all project and politician types in the other jurisdiction we must have:  $v_g(\bar{B}(\theta_1)) + \delta p_g(\theta_1; \theta, j)v_g(0) \geq (1 + \delta)v_g(0)$ ,  $\forall \theta \in \{\theta_0, \theta_1\}, j \in \{g, b\}$  abroad (where the LHS is the discounted payoff

from choosing  $(P, 0)$  and the RHS is the discounted payoff from choosing  $(N, 0)$  getting reelected for sure). Using the ranking (1) of voters' beliefs induced by strategy S, we know that the lowest probability of reelection is  $p_g(\theta_1; \theta_0, g)$ . We have thus the following condition for the good incumbent to behave according to S:

$$p_g(\theta_1; \theta_0, g) \geq 1 - \frac{v_g(\bar{B}(\theta_1)) - v_g(0)}{\delta v_g(0)}. \quad (4)$$

We now derive the conditions under which strategy S is an equilibrium play for *bad incumbent*. When  $\theta = \theta_0$ , we know from part (ii) of Assumption 3 and monotone beliefs that the payoff from choosing  $(N, 0)$  with guaranteed reelection exceeds the payoff from choosing  $(N, T_0)$  with no chance of reelection. We thus need to ensure that the bad incumbent also prefers  $(P, 0)$  over  $(N, 0)$  for all project and politician types in the other jurisdiction. This requires,  $v_b(\bar{B}(\theta_0), R) + \delta p_b(\theta_0; \theta, j) v_b^*(0, 0) \geq v_b(0, 0) + \delta v_b^*(0, 0)$ ,  $\forall \theta \in \{\theta_0, \theta_1\}, j \in \{g, b\}$ . This condition is less likely to be satisfied when probability of reelection is the lowest: that is by Lemma 1 for  $p_b(\theta_0; \theta_0, g)$ . We have thus the following condition for the bad incumbent to behave according to S when  $\theta = \theta_0$ :

$$p_b(\theta_0; \theta_0, g) \geq 1 - \frac{v_b(\bar{B}(\theta_0), R) - v_b(0, 0)}{\delta v_b^*(0, 0)}. \quad (5)$$

When  $\theta = \theta_1$ , the discounted payoff from choosing  $(P, 0)$  is  $v_b(\bar{B}(\theta_1), R) + \delta p_b(\theta_1; \theta, j) v_b^*(0, 0)$ . It is easily shown that for any  $\theta \in \{\theta_0, \theta_1\}$  and  $j \in \{g, b\}$ , we have that  $p_b(\theta_1; \theta, j) > p_b(\theta_0; \theta, j)$ . Therefore, the payoff from choosing  $(P, 0)$  is larger when  $\theta = \theta_1$  than when  $\theta = \theta_0$ , which implies that condition (5) guarantees that the bad incumbent does not prefer  $(N, 0)$  when  $\theta = \theta_1$ . It remains to derive the condition for the incumbent to prefer  $(P, 0)$  over  $(P, T_1)$  for all project and politician types in the other jurisdiction. Choosing  $(P, T_1)$  destroys any chance of reelection yielding a payoff  $v_b^*(\bar{B}(\theta_1), R)$ . Choosing  $(P, 0)$  the lowest probability of reelection is  $p_b(\theta_1; \theta_0, g)$ . It follows that  $(P, 0)$  is always preferred to  $(P, T_1)$  if

$$p_b(\theta_1; \theta_0, g) \geq \frac{v_b^*(\bar{B}(\theta_1), R) - v_b(\bar{B}(\theta_1), R)}{\delta v_b^*(0, 0)}. \quad (6)$$

We now combine conditions (4), (5), and (6). We also use the facts (i) that all the probabilities of reelections in these conditions are increasing with  $\lambda_I$ , and (ii) that  $p_g(\theta_1; \theta, g) = p_b(\theta_1; \theta, g)$ . That allows us to derive the threshold  $\lambda^*(\rho)$  such that all three conditions are satisfied when  $\lambda_I > \lambda^*(\rho)$ . In particular, We also use the fact  $\lambda_I \rightarrow 1$  must be the smallest value of  $\lambda_I$  such that

$$\begin{cases} p_b(\theta_0; \theta_0, g) \geq 1 - \frac{v_b(\bar{B}(\theta_0), R) - v_b(0, 0)}{\delta v_b^*(0, 0)} \\ p_b(\theta_1; \theta_0, g) \geq \max \left\{ 1 - \frac{v_g(\bar{B}(\theta_1)) - v_g(0)}{\delta v_g(0)}, \frac{v_b^*(\bar{B}(\theta_1), R) - v_b(\bar{B}(\theta_1), R)}{\delta v_b^*(0, 0)} \right\}. \end{cases} \quad (7)$$

Assumptions 1-3 guarantee that the two right-hand side terms are below one. From Subsection 4.2  $p_b(\theta; \theta_0, g) = \theta\alpha_{HN} + (1 - \theta)\alpha_{LN}$  with  $\alpha_{HN} = \frac{\lambda_I}{\lambda_I + (1 - \lambda_I)(1 + \frac{\theta_0}{\theta_1} \frac{\rho}{1 - \rho})}$  and  $\alpha_{LN} = \frac{\lambda_I}{\lambda_I + (1 - \lambda_I)(1 + \frac{1 - \theta_0}{1 - \theta_1} \frac{\rho}{1 - \rho})}$  we have that for all  $\rho < 1$  the left-hand side reelection probabilities are increasing in  $\lambda_I$  and converging to one as  $\lambda_I \rightarrow 1$ . Therefore there exists such a  $\lambda^*(\rho) < 1$ .

The finding that  $\lambda^*(\rho) < \lambda^*(\rho')$  for all  $\frac{1}{2} \leq \rho < \rho' < 1$  follows directly from the fact that the above probabilities of reelection are decreasing with  $\rho$ . Lastly for  $\rho = 1$ , the two probabilities of reelection are equal to zero for all  $\lambda_I < 1$ . It is therefore clear that condition (7) cannot be met and that there is no  $\lambda^*(\rho) < 1$  for  $\rho = 1$ . QED

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