

# COMPARATIVE BUREAUCRACY\*

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## Abstract

How do elections affect public administration? We develop a dynamic model of policy choice and bureaucratic performance in the presence of electoral transitions. In each period of the game, an elected politician prioritizes one task for execution by a bureaucrat. Outcomes require two periods of bureaucratic effort, and newly elected politicians may continue an ongoing project or abandon it in favor of a new one. We examine policy and effort under both patronage appointments and civil servants. The model identifies several channels through which bureaucratic inefficiencies may occur. First, politicians may abandon their predecessors' tasks and delay governmental outputs. Second, bureaucrats may under-invest because of uncertainty over future policy choices. Finally, civil servants may under some circumstances deliberately induce abandonment through low effort. The model characterizes the trade-offs between ideology and implementation quality, and will serve as a framework for comparing the performance of different national institutional systems.

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# 1 Introduction

In modern democratic systems, voters choose politicians who direct bureaucrats to execute policies. The relationship between bureaucrats and their principals raises a widely documented set of agency problems, amplified in the political context by ideological divergence and various institutional constraints.<sup>1</sup>

Reforms to procedures and personnel systems have played an important role in ameliorating agency problems inherent in the public sector. A partial list of improvements includes greater transparency and efficiency, higher quality bureaucrats, better use of policy-relevant information, de-politicized administration, and reduced corruption (e.g., McCubbins, Noll and Weingast 1987, Knott and Miller 1987, Horn 1995, Rauch and Evans 2000, Folke, Hirano, and Snyder 2011, and Gailmard and Patty 2013). Yet, a basic tension inevitably remains: while electoral turnover may improve the ideological match between citizens and politicians, it also affects the choices of politicians and bureaucrats. Today’s politicians and bureaucrats must worry that future politicians might “strand” their investments in current policies. For example, in September 2009 the Obama administration cancelled a 2007 Bush administration plan to deploy an anti-missile system in Central Europe, opting instead for a simpler system that used pre-existing technology (Congressional Research Service 2013). The abandoned program required extensive research and development, costing almost \$700 million in 2008 and 2009.

Recent cross-country governance indicators hint further at a relationship between electoral transitions and bureaucratic output. Figure 1 illustrates the significant negative relationship between indicators of bureaucratic quality from IHS Global Insight and the frequency of government change across the EU and OECD.<sup>2</sup> While there are numerous plausible interpretations of the result, there is to our knowledge only a limited body of theoretical work that can help to account for it.

To understand this environment, this paper develops a dynamic theory of policy choice and bureaucratic performance. Its central tension is between ideology and productive effort. Politicians may choose favored ideological tasks or projects, but bureaucrats exert effort on them in anticipation of whether projects will actually be completed in the future. Additionally, bureaucrats who expect to remain in office regardless of election results have incentives

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<sup>1</sup>A generation of work has addressed this problem in various forms. For an overview, see Gailmard and Patty (2012).

<sup>2</sup>Other data sources, including the World Bank’s World Governance Indicators and simple counts of election frequencies across countries, provide similar results.

to increase or decrease the appeal of projects for future politicians. The broader ambition of the framework is to ask how a range of common national institutional features and personnel policies generate trade-offs between policy and investment choices.

A main assumption of the model is projects that are long term, in the sense that their performance may cross electoral periods. This is obviously a necessity for making the incentives induced by electoral turnover interesting, but we believe that it also describes a sizable proportion of significant policy-making. In addition to advance planning, we also assume a moral hazard problem that prevents politicians from imposing effort choices on the bureaucracy. Some prominent examples of policies fitting this description include:

- Several of the 20th century’s most important military developments in the U.S. and U.K. – aircraft carriers, amphibious landings, and air defense – were the product of long-term investments by organizational insiders, who operated without the explicit instruction of politicians (Rosen 1988).
- The late 19th century expansion of the U.S. postal service (in particular, the rural free delivery system) was enabled by the data and research efforts of mid-level bureaucrats. Congress later officially endorsed and expanded the system (Carpenter 2001).
- The modern pharmaceutical approval system was born from the efforts of U.S. Food and Drug Administration scientists who scrutinized clinical data on drugs that were proposed for the U.S. market. Congress formalized the procedural requirements in the 1962 Kefauver Harris Amendment (Quirk 1980).
- Emissions trading programs were pioneered by experiments by the U.S. Environmental Protection Agency in the mid-1970s. These later resulted in the extensive trading systems authorized by Title IV of the 1990 Clear Air Act Amendments (EPA 2001).

Our game aims to capture in the simplest possible dynamic framework the standard division of labor in government: politicians choose policies, and bureaucrats implement them. In each period, there is a single politician who directs a bureaucrat to perform one of three tasks. Politicians belong to one of two parties, and after each period, the incumbent may be replaced by an opposition politician. Two of the tasks are “partisan” and associated with a party, while the third is ideologically moderate. The bureaucracy is composed of one or more bureaucrats who jointly exert costly effort on prioritized tasks. Each task takes two periods to complete, and incumbents are bound to complete tasks that they initiated,

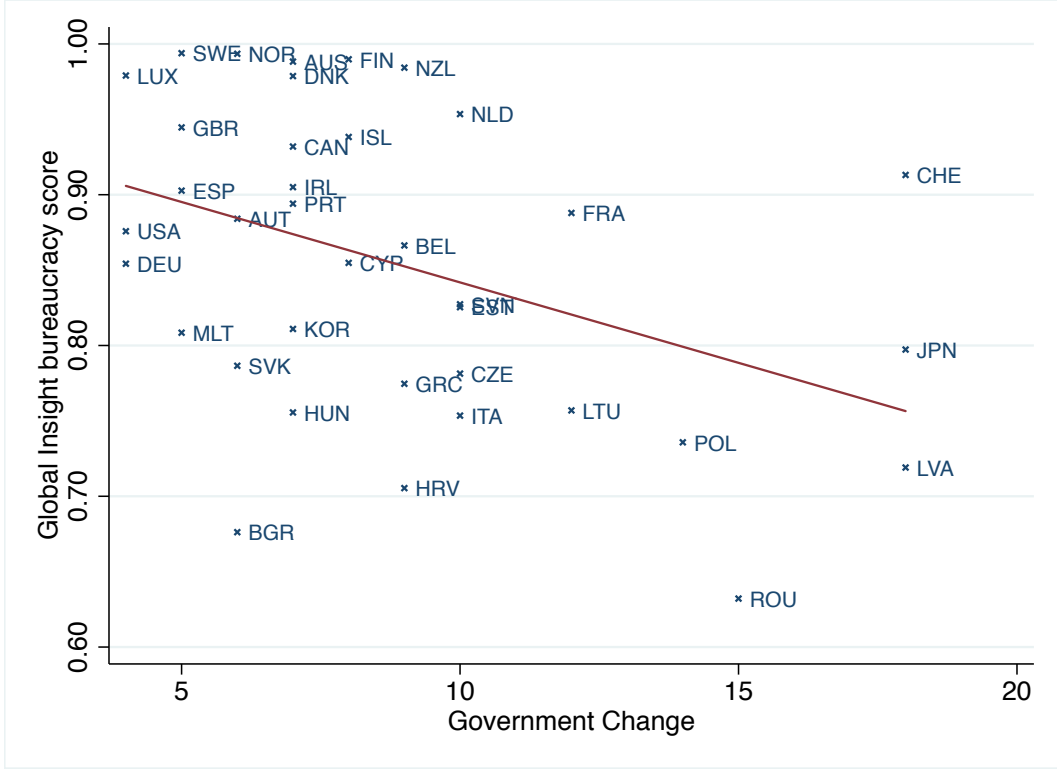


Figure 1: Bureaucratic Quality and Election Frequency in the European Union and OECD. These figures plot IHS Global Insight bureaucratic quality indicators for 41 EU and OECD countries against changes in government. Government change is measured as the number of changes in ruling coalition between 1996 and 2012 due to election or coalitional change, as defined by Armingeon *et al.* (2013). Bureaucratic quality is an average over 1996-2012 of expert assessments of the quickness of bureaucratic decisions and policy consistency across governments. In OLS regressions, electoral stability is significant at the 1% level both in isolation and when controlling for a battery of national variables such as left party control, political system, debt, human development index, GDP growth, unemployment and education.

while newly elected opposition politicians may freely abandon the previous party's task and initiate a new one.

We examine the implications of two kinds of personnel systems. Under a civil service, the bureaucrat remains in office for all periods. The bureaucrat favors the moderate task, but may lean ideologically toward one party. By contrast, with a political appointee (or a patronage system), the bureaucrat has the same preferences as the politician in office, and is removed when her patron leaves office. Although few pure patronage systems exist in the developed world, this system might describe agencies that are populated by a high proportion of politically appointed officials.

Under the civil service, bureaucrats have long time horizons and may increase effort in policies that the political opposition will continue. This intuition is perhaps standard, but it neglects the bureaucrat's role in shaping the choices of future office-holders. Importantly, she may increase effort on a policy in an attempt to ensure its political durability. And in some cases, this incentive can actually work in reverse: she may also "sabotage" the execution of a policy in order to convince future opposition politicians to start over. Thus civil servants may be responsible both for very high and very low levels of execution. While they frequently ensure policy continuity, they can also be responsible for abandoned policies. From the perspective of citizens, policy continuity may also reduce the government's ideological responsiveness and thus welfare.

Under a patronage system, the bureaucrat's incentives are aligned with the incumbent politician's. However inefficient policies might result because the bureaucrat is unwilling to invest when re-election is unlikely. Moreover, the ideological match between politicians and bureaucrats creates a greater temptation for politicians to abandon a predecessor's partially completed projects. One benefit for citizens, however, is the closer match between bureaucratic output and politician or voter preferences.

Our analysis thus far establishes a few simple features of Markov Perfect equilibria of the game. First, under a political appointee politicians always prioritize their favored ideological task, and politicians complete their predecessors' tasks when ideological polarization is low. Second, under a civil service there are multiple equilibria. An equilibrium where the bureaucrat's favored task is always prioritized and completed exists for a broader range of parameters than an equilibrium where ideological tasks are prioritized. Third, with symmetric preferences, politicians always continue their predecessor's tasks under the civil service, and generally prefer political appointees. Thus, asymmetric preferences that reflect agency problems in the relationship between bureaucrats and politicians are necessary to generate

abandonment with civil servants, and to induce a preference for civil service systems.

The ultimate ambition is to develop the model explore the effect of different institutional contexts on government effectiveness and citizen welfare. Welfare is determined jointly by the ability to realize long-term projects and the political system's ideological responsiveness to citizen preferences. Some of the institutional variables that we will consider include:

- Frequency of elections. Systems with regular, exogenous elections like the U.S. would have no elections some years, while less stable parliamentary systems would have a high probability of election each year.
- Separation of powers. Suppose that two principals are elected independently, and one has appointment power over bureaucrats while the other has policy rights. This may induce some smoothing of effort choices over time, since divided government will typically be the most likely outcome (induced stability). This feature would set up the contrast between systems like the U.S. and U.K.
- Bureaucratic composition. Our model is set up more generally to make bureaucratic output a function of a proportion of civil servants and political appointees.
- Endogenous re-election. What happens if voters reward performance?

The paper proceeds as follows. The next section presents the model. Section 3 presents our preliminary equilibrium characterization, and Section 4 concludes.

## 1.1 Literature

Our model joins a growing theoretical and empirical literature on the determinants of government quality. In particular, a number of works examine the effects of personnel systems on various performance metrics, both in the U.S. (Lewis 2008) and internationally (Rauch and Evans 2000). There is also extensive work on the determinants of corruption, which can be considered one kind of bureaucratic performance (Persson, Tabellini and Trebbi 2003, Ferraz and Finan 2008).

Our theoretical approach is most closely related to a dynamic incentives in the bureaucracy. The task environment in this paper perhaps most closely resembles that of Rauch (1995), who examines long-term versus short-term investments in U.S. municipal governments that adopted civil service reforms. Gailmard and Patty (2007) use an overlapping generations framework to examine incentives for bureaucrats to acquire expertise. Also related is Ting, Folke, Hirano, and Snyder (2013), who examine the effect of elections on the

adoption of civil service reforms. All of these models are concerned with the role of civil service protections in improving performance. Other models that incorporate electoral concerns are Nath (2014), who shows how longer tenures improve monitoring in Indian bureaucracies, and Ujhelyi (2014), who examines civil service in a political agency context.

The key assumptions about politicians and bureaucrats in our model have been addressed in many contexts. For example, Alesina and Tabellini (2007) derive implications of the different career incentives of bureaucrats and politicians (or equivalently, political appointees). Weingast and Moran (1983) show how changes in the ideological leadership congressional committee memberships can affect even the behavior of an independent commission.

## 2 Model

We develop an infinite horizon game of elections, policy choice, and agency effort. In each period  $t$  there is a government composed of a politician and a bureaucracy. Politicians belong to one of two parties, L or R. Where there is no confusion about the identity of the players, let  $P$  denote the current politician,  $Q$  denote the out-party's candidate in the upcoming election, and  $P'$  the politician in the next period (who may be either  $P$  or  $Q$ ). The bureaucracy is composed of two players,  $B$  and  $B^p$ , who may be considered a civil servant and a political appointee, respectively. The civil servant remains in office in all periods. The political appointee is appointed with each new politician and leaves office when that politician is defeated or retires.

There are three tasks, corresponding to an “ideal” policy for each party and the civil servant. Each task requires two periods to complete and if completed in period  $t$  generates an outcome  $x_t \in \mathbb{R}_+$  that depends on bureaucratic effort. At most one task may be completed in any given period. A completed task  $j$  generates for each player  $i \in \{P, Q, B\}$  a payoff of  $w_{ij}x_t$ . The weights  $w_{ij}$  correspond to ideological payoffs. We normalize  $w_{ii} = 1$  for all players, and assume the following for the politicians:

$$w_{PP} = 1 > w_{PQ} = w_{QP} > 0.$$

Thus, parties have symmetric ideological preferences, and lower values of  $w_{PQ}$  correspond to higher levels of politicization. Note that players do not receive payoffs after leaving office.

The politically appointed bureaucrat's policy utility parameters are identical to those of the incumbent. We do not presently impose any structure on the civil servant's payoff parameters, other than that  $w_{BP} \in (w_{PQ}, 1)$ ,  $w_{BQ} \in (w_{PQ}, 1)$  and  $w_{B\tau} = w_{\tau B}$ . Thus,  $B$  is

ideologically “between” the two parties. However, one possibly useful structure might be the following:

$$\begin{aligned} w_{PB} &= \alpha^P w_{PP} + (1 - \alpha^P) w_{PQ} \\ w_{BP} &= \alpha^P w_{PP} + (1 - \alpha^P) w_{PQ} - a \end{aligned}$$

Thus,  $\alpha^P \in [0, 1]$  would represent how closely the bureaucrat is ideologically aligned with P (by symmetry,  $\alpha^Q = 1 - \alpha^P$ ). The parameter  $a \geq 0$  then measures agency or monitoring problems when an agency executes a policy that is not her ideal. To keep her payoffs bounded, B discounts future payoffs by a factor  $\delta$ .

We next discuss the technology of bureaucratic tasks and outcomes. Each period has a policy state  $s_t \in \mathcal{S} \equiv \emptyset \cup \{P, Q, B\} \times \mathbb{R}_+$ , where  $\emptyset$  is the default state and  $s_1 = \emptyset$ . In each period where  $s_t = \emptyset$ , P chooses one task  $\tau_t \in \{P, Q, B\}$  to *prioritize*. The bureaucracy then collectively chooses an effort level  $e_{t,\tau_t}$  on the prioritized task. This choice is reflected in the following period’s policy state  $s_{t+1} \in \{P, Q, B\} \times \mathbb{R}_+$ . Prioritization therefore corresponds the official authorization or funding of a task, and continued prioritization is necessary for generating policy outcomes.

In each period where  $s_t \neq \emptyset$ , P can reset the state to  $s_t = \emptyset$  and choose a new task to prioritize. Doing so can be interpreted as abandoning previous projects and “starting over.” If P does not reset the state, then the bureaucracy exerts effort on the previously prioritized task  $\tau_{t-1}$ , which then generates an observable outcome. After a period where  $s_t \neq \emptyset$ , the state reverts to  $s_{t+1} = \emptyset$ . It will be convenient to refer to a period where  $s_t = \emptyset$  as an *initiation* phase for a task, and a period where  $s_t \neq \emptyset$  as a *completion* phase. Note that no more than half of the periods can be completion phases.

A central feature of the model is the way in which bureaucratic effort generates outputs. When  $s_t = \emptyset$ , the output is  $x_t = 0$ . When  $s_t \neq \emptyset$  and the same task  $\tau$  was prioritized in periods  $t$  and  $t - 1$ , the output is given by the sum of the bureaucracy’s aggregate effort in the initiation and completion phases:

$$x_t = e_{t-1,\tau} + e_{t,\tau}.$$

Aggregate effort in any given period is a weighted sum of individual efforts by the civil servant and political appointee. We use superscript  $e$  and  $p$  to denote these individual effort levels in the obvious way. Let  $\beta \in [0, 1]$  denote the weight on the civil servant.<sup>3</sup> For a

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<sup>3</sup>Alternatively,  $\beta$  is the extent of the bureaucracy’s de-politicization.



prioritized task  $\tau_t$  in period  $t$ , aggregate effort is given by:

$$e_{t,\tau} = \beta e_{t,\tau}^c + (1 - \beta) e_{t,\tau}^p. \quad (1)$$

For bureaucrat  $i$ , effort imposes a cost  $(e_{t,\tau}^i)^2/2$ .

After effort levels are chosen, policy outcomes (if any) are revealed and the policy state is updated. There is then an election, where the incumbent party  $i$  is re-elected with probability  $\pi_i \in (0, 1)$ , where we allow  $\pi_L + \pi_R \neq 1$  to reflect an incumbency advantage or disadvantage.

In each period, the sequence is as follows.

1. P chooses a prioritized task  $\tau_t$  and whether to set  $s_t = \emptyset$ .
2. B chooses effort levels on  $\tau_t$ .
3. P is re-elected with probability  $\pi_P$ ; otherwise, Q is elected.

We characterize a Markov perfect equilibrium in pure strategies. The state space is  $\mathcal{S} \times \{L, R\}$ , corresponding to the policy state and the incumbent's party. A strategy for a party  $i$  politician in an initiation phase is a choice  $p_1^i \in \{L, R, B\}$  of policy prioritization, and her strategy in a completion phase  $p_2^i : \mathcal{S} \rightarrow \text{complete} \cup \{L, R, B\}$  maps the policy state to decision over whether to reset and a task prioritization if there is a reset. Bureaucrat  $i$ 's strategy  $b^i : \mathcal{S} \times \{L, R\} \times \{L, R, B\} \rightarrow \mathbb{R}_+$  maps the state and prioritization to an effort level on the prioritized task.

### 3 Results

We adopt the following notation. Let  $V^i$  denote the ex ante continuation value when  $s_t = \emptyset$  for a party  $i$  politician, and let  $V^{c,i}$  and  $V^{p,i}$  denote continuation values for civil servants and political appointees, respectively, under a party  $i$  politician. Let  $\tau$  denote the prevailing prioritization choice. We use subscript 1 and 2 to denote strategies in initiation and completion phases, respectively.

#### 3.1 Bureaucratic Effort

We begin with some preliminary derivations about completion phase strategies. If politician  $P'$  (i.e., the completion phase politician, of either party) does not reset the policy,

then bureaucrats know that any effort choice will result in the initiation phase in the following period, and by stationarity will then optimize myopically. Given  $\tau$ , straightforward optimization gives the following optimal effort choices:

$$e_{2,\tau}^{c*} = \beta w_{B\tau} \quad (2)$$

$$e_{2,\tau}^{p*} = (1 - \beta)w_{P'\tau}. \quad (3)$$

We denote by  $e_{2,\tau}^*$  the corresponding bureaucracy's aggregate effort, and define  $e_{1,\tau}^*$  analogously.

These choices are sufficient to establish that in equilibrium, a re-elected politician P never resets to an initiation phase. Thus, the prioritization can change only when politician Q is elected in a completion phase. All proofs can be found in the appendix.

**Lemma 1** *No resetting own policy. If  $s_t \neq \emptyset$ , then  $p_2^P = \text{complete}$ .*

Lemma 1 implies that bureaucrats in an initiation phase can anticipate that the incumbent will continue the (equilibrium) prioritized task  $\tau$ . For the political appointee, the expected return depends on the probability  $\pi_P$  that the incumbent is re-elected. By the additive separability of her utility, her optimal effort is:

$$e_{1,\tau}^{p*} = \pi_P(1 - \beta)w_{P\tau}. \quad (4)$$

For the civil servant, optimal effort on  $\tau$  depends on the anticipation of whether a party Q politician will continue  $\tau$  if elected. Let  $\tilde{\pi}_P \in \{\pi_P, 1\}$  denote the probability of continuation, where  $\tilde{\pi}_P = \pi_P$  implies that Q chooses to reset. The civil servant's preferred effort given  $\tilde{\pi}_P$  is then:

$$e_{1,\tau}^c(\tilde{\pi}_P) = \tilde{\pi}_P \delta \beta w_{B\tau}. \quad (5)$$

We denote by  $e_{1,\tau}(\tilde{\pi}_P)$  the aggregate effort given that the civil servant exerts  $e_{1,\tau}^c(\tilde{\pi}_P)$ .

The civil servant's optimal effort level depends on whether she actually wants completion by an opposition party's politician, and also on whether  $e_{1,\tau}^c(\tilde{\pi}_P)$  can in fact induce the anticipated continuation behavior. Our next preliminary result addresses the latter issue by establishing a general condition for completion versus starting over. Consider the politician's incentives during a completion phase. Starting over results in the initiation phase immediately, while completion of the previously initiated task results in the initiation phase in the following period. Given policy state  $(\tau, e_\tau)$ , Q starts over if:

$$V^Q > \frac{w_{Q\tau}(e_\tau + e_{2,\tau}^*)}{1 - \pi_Q}. \quad (6)$$

It is then straightforward to characterize critical values  $\bar{e}_\tau$  such that Q will prefer continuing  $\tau$  over restarting if  $e_\tau$  is at least  $\bar{e}_\tau$ .

**Lemma 2** *Continuation threshold.* A politician Q continues a previously initiated task  $\tau$  in a completion phase if initiation phase effort is at least  $\bar{e}_\tau$ , where:

$$\bar{e}_\tau = \frac{(1 - \pi_Q)V^Q}{w_{Q\tau}} - \beta^2 w_{B\tau} - (1 - \beta)^2 w_{Q\tau} \quad (7)$$

The threshold  $\bar{e}_\tau$  determines whether effort level  $e_{1,\tau}^c(\tilde{\pi}_P)$  can be optimally exerted in equilibrium. For example, when  $\bar{e}_\tau$  is very low, even low aggregate effort will cause Q to complete task  $\tau$ . As a result, the civil servant must exert some effort level below  $e_{1,\tau}^c(\pi_P)$  in order to cause abandonment by Q. There are three cases, each of which produces qualitatively different bureaucratic strategies:

1.  $\bar{e}_\tau \in (e_{1,\tau}(\pi_P), e_{1,\tau}(1))$ : the civil servant compares the optimal effort conditional upon Q continuing and the optimal effort conditional on Q starting over.
2.  $\bar{e}_\tau \leq e_{1,\tau}(\pi_P)$ :  $e_{1,\tau}(\pi_P)$  is so high that it induces Q to continue. Thus the civil servant compares the optimal effort conditional upon Q continuing and an effort level below  $e_{1,\tau}(\pi_P)$  that induces Q not to continue.
3.  $\bar{e}_\tau \geq e_{1,\tau}(1)$ :  $e_{1,\tau}(1)$  is insufficient to induce Q to continue. Thus the civil servant compares the optimal effort conditional upon Q not continuing and an effort level above  $e_{1,\tau}(1)$  that induces Q to continue.

For each case, we establish the condition under which civil servants will exert enough effort to ensure that opposition politicians will continue task  $\tau$  in a completion phase.

*Case 1 (Optimal Effort).* In this case, the civil servant is always able to exert her optimal level of effort, conditional upon the future politician's anticipated choices. The condition  $\bar{e}_\tau \in (e_{1,\tau}(\pi_P), e_{1,\tau}(1))$  can be re-stated as a moderate expected value for the political opposition:

$$V^Q \in \left( \frac{w_{Q\tau} [\beta^2(1 + \delta\pi_P)w_{B\tau} + (1 - \beta)^2(w_{Q\tau} + \pi_P w_{P\tau})]}{1 - \pi_Q}, \frac{w_{Q\tau} [\beta^2(1 + \delta)w_{B\tau} + (1 - \beta)^2(w_{Q\tau} + \pi_P w_{P\tau})]}{1 - \pi_Q} \right) \quad (8)$$

The opposing politician starts over if the civil servant's effort is  $e_{1,\tau}^c(\pi_P)$ , and continues if the effort is  $e_{1,\tau}^c(1)$ . The condition for the civil servant to prefer the "continue" level of effort is given by the following lemma.

**Lemma 3** For  $\bar{e}_\tau \in (e_{1,\tau}(\pi_P), e_{1,\tau}(1))$ , the civil servant receives higher expected utility from initiation phase aggregate effort  $e_{1,\tau}(1)$  than from  $e_{1,\tau}(\pi_P)$  if:

$$(1-\delta\pi_Q)V^{c,Q} - \delta(1-\pi_Q)V^{c,P} < (1-\beta)^2w_{B\tau}(2\pi_Pw_{P\tau} + (1-\pi_P)w_{Q\tau}) + (\delta+\delta\pi_P-1)\frac{\beta^2w_{B\tau}^2}{2}. \quad (9)$$

Obviously, a newly elected politician would only prefer resetting if parties offered different policies in equilibrium. Expression (9) suggests that as an initiation phase incumbent's re-election probability or the civil servant's affinity for task  $\tau$  increases, the prospects for continuation improve.

*Case 2 (Sabotage).* Suppose instead that the bureaucracy's optimal aggregate effort for a task that Q will not continue actually exceeds  $\bar{e}_\tau$  and is therefore sufficient for Q to continue. This corresponds to values of  $V^Q$  below the interval in expression (8). Now the civil servant has effectively two choices in the initiation phase: she may exert the optimal level of effort  $e_{1,\tau}^c(1)$  conditional upon continuation, or fall back to a level that produces aggregate effort  $\bar{e}_\tau < e_{1,\tau}(\pi_P)$ , which causes Q to be indifferent between continuation and starting over. Thus in contrast to case 1 the civil servant may under-perform due to electoral concerns. Note that by additive separability, the political appointee's incentives are unchanged.

Substituting from (4) and (7), the civil servant's effort  $\bar{e}_\tau^c$  that produces  $\bar{e}_\tau$  is:

$$\begin{aligned} \bar{e}_\tau &= \beta\bar{e}_\tau^c + (1-\beta)e_{1,\tau}^{p*} \\ \Leftrightarrow \bar{e}_\tau^c &= \frac{(1-\pi_Q)V^Q}{\beta w_{Q\tau}} - \beta w_{B\tau} - \frac{(1+\pi_P)(1-\beta)^2w_{P\tau}}{\beta}. \end{aligned} \quad (10)$$

The civil servant's expected payoff from choosing  $e_{1,\tau}^c(1)$  with continuation by Q can then be written:

$$\begin{aligned} \delta w_{B\tau}(e_{1,\tau}(1) + e_{2,\tau}^*) - \frac{(e_{1,\tau}^c(1))^2}{2} - \delta \frac{(e_{2,\tau}^{c*})^2}{2} + \delta^2(\pi_P^2 + (1-\pi_P)(1-\pi_Q))V^{c,P} \\ + \delta^2(\pi_P(1-\pi_P) + (1-\pi_P)\pi_Q)V^{c,Q}. \end{aligned} \quad (11)$$

Similarly, the civil servant's expected payoff from choosing  $\bar{e}_\tau^c$  under the anticipation of starting over by Q is:

$$\delta\pi_Pw_{B\tau}(\bar{e}_\tau + e_{2,\tau}^*) - \frac{(\bar{e}_\tau^c)^2}{2} - \delta\pi_P\frac{(e_{2,\tau}^{c*})^2}{2} + \delta(1-\pi_P)V^{c,Q} + \delta^2\pi_P^2V^{c,P} + \delta^2\pi_P(1-\pi_P)V^{c,Q} \quad (12)$$

The following lemma establishes the condition under which the former payoff is higher.

**Lemma 4** For  $\bar{e}_\tau \leq e_{1,\tau}(\pi_P)$ , the civil servant receives higher expected utility from initiation phase aggregate effort  $e_{1,\tau}(1)$  than from  $\bar{e}_\tau$  if:

$$2(1 - \beta)^2 w_{B\tau} [\delta(2 - \pi_P)w_{P\tau}\pi_P + (1 + \pi_P + \delta - \delta\pi_P + \delta\pi_P^2)w_{Q\tau}] + (\delta^2 + \delta + \delta\pi_P + 1)\beta^2 w_{B\tau}^2 > \\ 2(1 + \delta\pi_P)w_{B\tau} \left( \frac{(1 - \pi_Q)V^Q}{w_{Q\tau}} \right) - \left( \frac{(1 - \pi_Q)V^Q}{\beta w_{Q\tau}} - \frac{(1 + \pi_P)(1 - \beta)^2 w_{P\tau}}{\beta} \right)^2 \\ + 2\delta(1 - \pi_P) [(1 - \delta\pi_Q)V^{c,Q} - \delta(1 - \pi_Q)V^{c,P}]. \quad (13)$$

Condition (13) is implied by condition (3) in Lemma 3, since it is based on a suboptimal effort level (from the civil servant's perspective) for a non-continued task.

*Case 3 (Rescue).* When the bureaucracy's optimal aggregate effort for an always-continued task is less than  $\bar{e}_\tau$  (equivalently, when  $V^Q$  is above the interval in expression (8)), the civil servant has the opposite set of choices from the previous case. She may either supply additional effort — i.e., over-perform — in order to reach an aggregate of  $\bar{e}_\tau$  and induce continuation, or fall back to  $e_{1,\tau}(\pi_P)$  and accept starting over by Q. Again by additive separability, the political appointee's incentives are unchanged.

As in case 2, the amount of civil servant effort required to reach  $\bar{e}_\tau$  is  $\bar{e}_\tau^c$ , as given by expression (10). Performing the analogous comparison as that in Lemma 4, the following lemma establishes the condition under which the civil servant prefers choosing  $\bar{e}_\tau^c$  and guaranteeing continuation.

**Lemma 5** For  $\bar{e}_\tau \geq e_{1,\tau}(1)$ , the civil servant receives higher expected utility from initiation phase aggregate effort  $\bar{e}_\tau$  than from  $e_{1,\tau}(\pi_P)$  if:

$$2(1 + \delta)w_{B\tau} \frac{(1 - \pi_Q)V^Q}{w_{Q\tau}} - \left( \frac{(1 - \pi_Q)V^Q}{\beta w_{Q\tau}} - \frac{(1 + \pi_P)(1 - \beta)^2 w_{Q\tau}}{\beta} \right)^2 > \\ 2(1 - \beta)^2 w_{B\tau} [\delta\pi_P((2\pi_P - 1)w_{P\tau} + (2 - \pi_P)w_{Q\tau}) + (1 + \pi_P)w_{Q\tau}] \\ + (1 + \delta(\pi_P^2\delta + \pi_P + 1))\beta^2 w_{B\tau}^2 + 2\delta(1 - \pi_P) [(1 - \delta\pi_Q)V^{c,Q} - \delta(1 - \pi_Q)V^{c,P}]. \quad (14)$$

Observe that because the civil servant is unable to choose  $e_{1,\tau}(1)$  in this case, condition (14) implies condition (3) in Lemma 3.

## 3.2 Equilibria

For simplicity, we initially focus on the extreme cases of  $\beta = 0$  and  $\beta = 1$ , which represent the “pure” cases of patronage appointments and civil service reform, respectively. To characterize

equilibria, we identify candidates and calculate their associated value functions. We then examine consistency with civil servant effort as characterized by Lemmas 3-5, and finally verify that the politicians have no incentive to deviate to alternative tasks in initiation phases.

P's expected value in the initiation phase of an equilibrium where  $\tau$  is prioritized is:

$$V^P = \frac{\pi_P w_{P\tau}(e_{1,\tau}(\tilde{\pi}_P) + e_{2,\tau}^*)}{1 - \pi_P^2}, \quad (15)$$

where, as before,  $\tilde{\pi}_P$  is the anticipated probability of continuation. Note that this affects P's payoff only through the civil servant's effort.

The political appointee's expected value is identical to the politicians, but with addition of effort costs:

$$\begin{aligned} V^{p,P} &= \pi_P w_{P\tau}(e_{1,\tau}(\tilde{\pi}_P) + e_{2,\tau}^*) - \frac{(e_{1,\tau}^{p*})^2}{2} - \pi_P \frac{(e_{2,\tau}^{p*})^2}{2} + \pi_P^2 V^{p,P} \\ &= \frac{\pi_P w_{P\tau}(e_{1,\tau}(\tilde{\pi}_P) + e_{2,\tau}^*) - (1 + \pi_P)\pi_P(1 - \beta)^2 w_{P\tau}^2/2}{1 - \pi_P^2}. \end{aligned} \quad (16)$$

The civil servant's initiation phase expected value depends on whether newly elected politicians continue their predecessors' policies. Again let  $\tau$  be P's equilibrium prioritization. With continuation, the expected value is given recursively as follows:

$$\begin{aligned} V^{c,P} &= \delta w_{B\tau}(e_{1,\tau}(1) + e_{2,\tau}^*) + \delta^2(\pi_P^2 + (1 - \pi_P)(1 - \pi_Q))V^{c,P} \\ &\quad + \delta^2(\pi_P(1 - \pi_P) + (1 - \pi_P)\pi_Q)V^{c,Q} - \frac{(e_{1,\tau}^{c*})^2}{2} - \delta \frac{(e_{2,\tau}^{c*})^2}{2} \\ &= \frac{\delta w_{B\tau}(e_{1,\tau}(1) + e_{2,\tau}^*) - (e_{1,\tau}^{c*})^2/2 - \delta \beta^2 w_{B\tau}^2/2 + \delta^2(\pi_P(1 - \pi_P) + (1 - \pi_P)\pi_Q)V^{c,Q}}{1 - \delta^2(\pi_P^2 + (1 - \pi_P)(1 - \pi_Q))} \end{aligned} \quad (17)$$

Similarly, when there is abandonment the expected value is:

$$\begin{aligned} V^{c,P} &= \delta \pi_P w_{B\tau}(e_{1,\tau}(\pi_P) + e_{2,\tau}^*) + \delta(1 - \pi_P)V^{c,Q} + \delta^2 \pi_P^2 V^{c,P} + \delta^2 \pi_P(1 - \pi_P)V^{c,Q} \\ &\quad - \frac{(e_{1,\tau}^{c*})^2}{2} - \delta \pi_P \frac{(e_{2,\tau}^{c*})^2}{2} \\ &= \frac{\delta \pi_P w_{B\tau}(e_{1,\tau}(\pi_P) + e_{2,\tau}^*) - (e_{1,\tau}^{c*})^2/2 - \delta \pi_P \beta^2 w_{B\tau}^2/2 + \delta(1 - \pi_P)(1 + \delta \pi_P)V^{c,Q}}{1 - \delta^2 \pi_P^2}. \end{aligned} \quad (18)$$

### 3.2.1 Political Appointee

Suppose that the bureaucracy has only a political appointee (i.e.,  $\beta = 0$ ). This case is simple because the political appointee's time horizon and preferences are identical to those of the

sitting politician. Because she leaves office along with the incumbent, there is no incentive to change effort levels in order to induce the opposing politician to continue or abandon a policy. However, a politician who is newly elected during a completion phase may choose to continue her predecessor's initiated task.

Using (3) and (4), the policy choices in an equilibrium where politicians  $P$  and  $P'$  prioritize task  $\tau$  are, respectively:

$$e_{1,\tau}^{p*} = \pi_P w_{P\tau} \quad (19)$$

$$e_{2,\tau}^{p*} = w_{P'\tau}. \quad (20)$$

The associated expected values for the politician and political appointee are then:

$$V^P = \frac{\pi_P w_{P\tau}^2}{1 - \pi_P}$$

$$V^{P,P} = \frac{\pi_P w_{P\tau}^2}{2(1 - \pi_P)}.$$

Our first equilibrium result is that when  $\beta = 0$ , politicians must prioritize their preferred policies in initiation phases. Depending on re-election probabilities and preference divergence, newly elected politicians in completion phases may continue the previously initiated task.

**Proposition 1** *Political Appointee.* *If  $\beta = 0$ , all politicians prioritize task  $P$  in initiation phases. Newly elected politicians complete previously initiated tasks in completion phases if:*

$$\pi_Q < w_{QP}(\pi_P + w_{QP}). \quad (21)$$

The intuition of the result is straightforward: since the political appointee and the politician both agree on the policy task, there is always an incentive to prioritize task  $P$ . Thus  $P$  can be the only equilibrium choice in initiation phases. In completion phases, a newly elected politician will choose to complete  $P$  if she faces poor re-election prospects ( $\pi_Q$  is low); if the initiation phase effort was high ( $\pi_P$  is high); or if ideological polarization is low ( $w_{QP}$  is high).

### 3.2.2 Civil Servant

Now consider a bureaucracy composed of only a civil servant (i.e.,  $\beta = 1$ ). Equilibria are more complex whenever  $\beta > 0$  because the civil servant's time horizon gives her an incentive to worry about the future of policies that last beyond the term of the incumbent politician. Additionally, her desire to work hardest on task  $B$  gives politicians an incentive to acquiesce to that task. We focus on the three possible equilibria where both parties adopt symmetric strategies.

*B-B equilibrium.* The first is a “nonpartisan” world in which both parties prioritize task  $B$ . Because of this policy convergence, it is obvious that they will complete each other's initiated  $B$  tasks in equilibrium. In fact, it is straightforward to verify that (6) can never hold for any  $e_\beta \geq 0$ , and thus the bureaucrats anticipate completion for any effort level.

By (5) and (2), the civil servant's effort levels under this equilibrium are  $e_{1,B}^c(1) = \delta w_{BB} = \delta$  and  $e_{2,\tau}^{c*} = w_{BB} = 1$ . Using (15) and (17), the equilibrium value functions can be written as follows:

$$V^P = \frac{\pi_P w_{PB}(\delta + 1)}{1 - \pi_P^2} \quad (22)$$

$$V^{c,Q} = V^{c,P} = \frac{\delta}{2(1 - \delta)}. \quad (23)$$

This expected payoff is strictly greater than that of the political appointee equilibrium (21) if  $w_{PB} > \frac{1 + \pi_P}{1 + \delta}$ , or when  $P$ 's valuation of task  $B$  is high and her probability of re-election is low.

A non-partisan equilibrium does not always exist, and our next result characterizes the conditions for existence. Essentially, politicians are willing to choose  $B$  as long as deviation to another task (in particular,  $P$ ) in an initiation phase does not result in very high effort by the civil servant. Recall that the civil servant may work hard in order to induce continuation by politician  $Q$ . We therefore use Lemma 5 to establish conditions under which the civil servant will not do so.

**Proposition 2** *Civil Servant, B-B equilibrium.* *There exists an equilibrium where  $\beta = 1$  and all politicians prioritize task  $B$  if:*

$$\frac{\pi_Q}{1 + \pi_Q} < \frac{w_{BP} w_{QP}}{w_{QB}}. \quad (24)$$

or:

$$(1 + \delta)^2 \left( w_{BP} - \frac{\pi_Q w_{QB}}{(1 + \pi_Q) w_{QP}} \right)^2 < (1 - \pi_P) \delta [(1 + \delta + \delta \pi_P) w_{BP}^2 - 2\delta]. \quad (25)$$



Observe that condition (24) implies that  $w_{BP} - \frac{\pi_Q w_{QB}}{(1+\pi_Q)w_{QP}} < 0$ . Thus a higher affinity by P for the bureaucrat's policy ( $w_{PB}$ ) increases the range of parameters for which the equilibrium exists. However, higher values of  $w_{QB}$  have the opposite effect, and thus the equilibrium can exist only when the civil servant is relatively moderate. Additionally, high ideological polarization ( $w_{QP}$ ) will also help the existence of this equilibrium. The effect of re-election probabilities is ambiguous.

*P-Q equilibrium with abandonment.* The second possible symmetric equilibrium features partisan policies and abandonment of a predecessor's work in completion phases. This implies that in equilibrium, initiation phase effort is no higher than  $\bar{e}_P$ . This in turn produces the following upper bound on P's expected value:

$$V^P \leq \frac{\pi_P w_{BP} (\pi_P \delta + 1)}{1 - \pi_P^2}. \quad (26)$$

The expression holds with equality when initiation phase effort is exactly  $\bar{e}_P$ .

The following result establishes that politicized policy-making with abandonment cannot occur with a civil servant and symmetric preference parameters. The reason is that symmetry of the  $w$  terms implies that the politician values equally the civil servant's effort on tasks  $P$  and  $B$ . That is, holding re-election prospects constant, the higher bureaucratic effort on task  $B$  is exactly offset by the politician's lower valuation of that task. This produces an incentive to deviate to  $B$ , as the civil servant can optimally choose an even higher level of effort that anticipates completion by Q.

**Proposition 3** *Civil Servant, P-Q equilibrium with abandonment. If  $\beta = 1$ , there exists no symmetric equilibrium in which the politicians prioritize task P and newly elected politicians reset in completion phases.*

The result suggests that any equilibrium abandonment of a predecessor's policies will require some asymmetry in the preference parameters. A deviation to  $B$  will be unappealing if, for example,  $w_{BP} > w_{PB}$  and the politician places less value the civil servant's effort (due perhaps to some form of agency loss). In this case, sufficiently ideologically polarized politicians would abandon each other's projects.

*P-Q equilibrium with continuation.* The final symmetric equilibrium has partisan choices but continuation of previously initiated tasks. Continuation raises bureaucratic effort, and therefore reduces the politician's temptation to deviate to task  $B$ .

There are three possible cases of equilibria, corresponding Lemmas 3, 4, and 5. In the first two, the bureaucrat chooses  $e_{1,P}^c(1)$  in initiation phases and so generates the following expected value for the politician:

$$V^P = \frac{\pi_P w_{BP}(\delta + 1)}{1 - \pi_P^2} \quad (27)$$

Note that because  $w_{PB} = w_{BP}$ , this expected payoff is equal to that of the B-B equilibrium (22).

The civil servant's expected payoff for each type of politician in these cases is:

$$V^{c,P} = \frac{\delta}{2(1-\delta)} \frac{w_{BQ}^2 \delta^2 (1 - \Pi_P) + w_{BP}^2 (1 - \Pi_Q) \delta^2}{1 + (1 - \Pi_P - \Pi_Q) \delta^2} \quad (28)$$

$$V^{c,Q} = \frac{\delta}{2(1-\delta)} \frac{w_{BP}^2 \delta^2 (1 - \Pi_Q) + w_{BQ}^2 (1 - \Pi_P) \delta^2}{1 + (1 - \Pi_P - \Pi_Q) \delta^2}, \quad (29)$$

where  $\Pi_P = \pi_P^2 + (1 - \pi_P)(1 - \pi_Q)$  and  $\Pi_Q = \pi_Q^2 + (1 - \pi_Q)(1 - \pi_P)$  are the probabilities of party P and Q being in office in the next initiation phase, respectively, given their incumbency in the current initiation phase.

In the remaining case, the bureaucrat chooses the “rescue” effort level of  $\bar{e}_P^c$  in order to induce continuation by Q. We do not provide results for this case.

The following result characterizes the conditions under which a P-Q equilibrium exists with continuation. In this equilibrium, the bureaucrat chooses a high level of effort that anticipates completion. Thus, like the B-B equilibrium, all tasks are completed.

**Proposition 4** *Civil Servant, P-Q equilibrium with continuation. If  $\beta = 1$ , there exists an equilibrium where politicians prioritize task P and civil servant effort is  $e_{1,P}^c(1)$  in initiation phases, and newly elected politicians complete existing tasks in completion phases if either:*

(i)  $V^Q \in \left( \frac{(1+\delta\pi_P)w_{QP}w_{BP}}{1-\pi_Q}, \frac{(1+\delta)w_{QP}w_{BP}}{1-\pi_Q} \right)$  and:

$$(1 - \delta\pi_Q)V^{c,Q} - \delta(1 - \pi_Q)V^{c,P} < (\delta + \delta\pi_P - 1) \frac{w_{BP}^2}{2}. \quad (30)$$

(ii)  $V^Q \leq \frac{(1+\delta\pi_P)w_{QP}w_{BP}}{1-\pi_Q}$  and:

$$2\delta(1 - \pi_P) \left[ (1 - \delta\pi_Q)V^{c,Q} - \delta(1 - \pi_Q)V^{c,P} \right] < \delta(\delta + 1 - \pi_P - \delta\pi_P^2)w_{BP}^2 + \left( (1 + \delta\pi_P)w_{BP} - \frac{\pi_Q(\delta + 1)w_{BQ}}{(1 + \pi_Q)w_{QP}} \right)^2. \quad (31)$$

Figure 2 depicts the different kinds of equilibria in the simple case where re-election probabilities and preferences are fully symmetric; that is,  $\pi_P = \pi_Q$  and  $w_{BP} = w_{BQ} = (1 + w_{PQ})/2$  (so that the civil servant is ideologically “between” the politicians). The figure shows that task continuation is possible for a broader range of parameters under a civil servant than under a political appointee. It is also evident that the P-Q equilibrium is intermediate between the B-B equilibrium and the political appointee equilibrium with continuation.

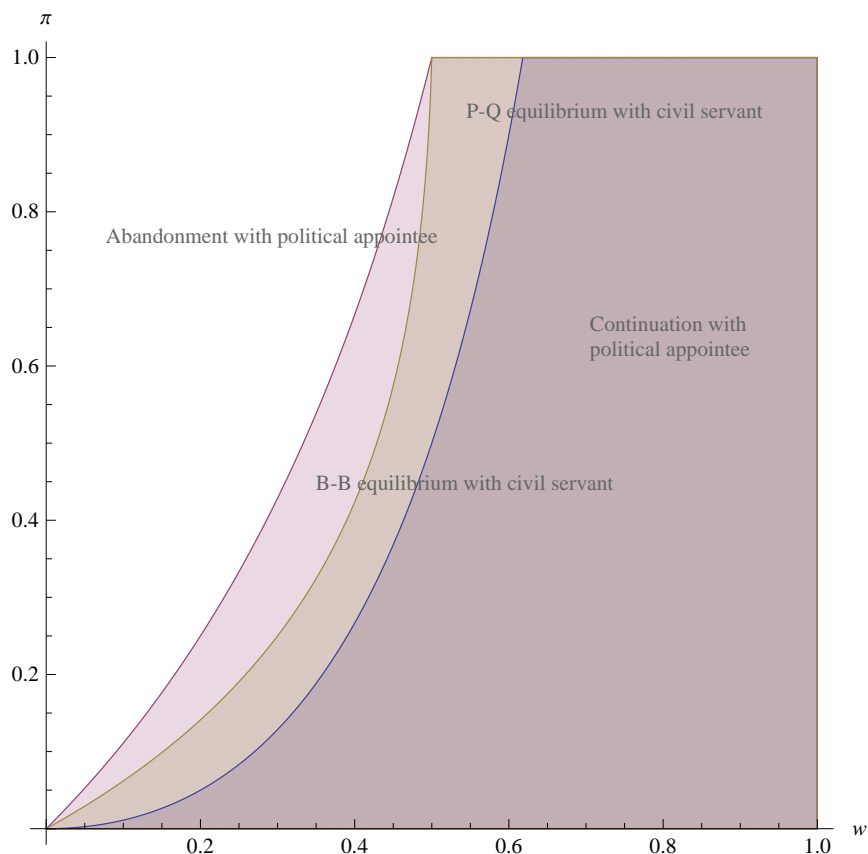


Figure 2: Existence Under Political Appointees and Civil Servants. Here  $\delta = 0.8$ ,  $\pi_P = \pi_Q$  and  $w_{BQ} = w_{BP} = (1 + w_{PQ})/2$ . The horizontal axis is  $w_{PQ}$ , and the vertical axis is  $\pi_P$ . The shaded regions correspond to parameters where a political appointee continues a predecessor’s task; where a B-B equilibrium exists; and where a P-Q equilibrium exists.

### 3.2.3 Implications

When  $\delta$  is low, the politician prefers the political appointee. This is because the civil servant’s effort on task  $P$  is low enough to offset her longer time horizon, from the politician’s

perspective. However, civil servants would provide higher expected utility when: (i) re-election probabilities are low; (ii) ideological polarization is low; and (iii) the civil servant's discount factor is high. These conditions correspond to the bottom right corner of Figure 2. By contrast, when polarization and re-election probabilities are high, politicians will prefer political appointees.

We are ultimately interested in constructing a measure of citizen welfare. This is a non-trivial exercise because it is not obvious how to model the welfare of an electorate that changes its collective preference over politicians. It is also not yet clear how to handle multiple equilibria. Yet our results do suggest a few conjectures. Ideologically moderate citizens would sometimes prefer civil servants even when politicians do not, because they would prefer the B-B equilibrium to one in which politicians alternated between  $P$  and  $Q$ . It is also evident that for some range of parameter values, citizens will face a tradeoff between quality of execution and ideological responsiveness. With civil servants, there is no task abandonment but low responsiveness. With political appointees, there is task abandonment but high responsiveness.

## 4 Discussion

While many results remain to be characterized, the model provides a tractable foundation for examining bureaucratic incentives in a dynamic setting with competitive elections. It potentially allows for an examination of the institutional determinants of the quality of governance, defined as a combination of ideological fit and policy execution.

The model can be expanded in three promising directions. First, as stated in the introduction, we view the model as a framework for the studying comparative government performance. However the model does not presently include a number of features that are important for studying comparative systems. Perhaps the most important among these is the separation of powers between two politicians. Second, politicians may in practice be able to provide additional inducements for performance. These could be budgetary rewards or, in the case of political appointees, dismissal for poor results. Finally, a more convincing model would endogenize re-election probabilities. In an environment where diversion of effort toward socially wasteful activities is not a concern, political appointees will unambiguously help performance, while civil servants may sometimes have incentives to sabotage current politicians.

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## APPENDIX

**Proof of Lemma 1.** Suppose otherwise. Then in a completion phase P resets the state and prioritizes some task  $\tau' \in \{L, R, B\}$  according to the equilibrium, receiving  $V^P$ . By continuing the task, she receives  $C^P = \sum_{t=1}^2 (\beta e_{t,\tau}^{c*} + (1-\beta)e_{t,\tau}^{p*}) + \pi_P V^P$ . Resetting is then optimal if and only if:

$$V^P \geq \frac{C^P}{1 - \pi_P}.$$

Now note that if  $\tau = \tau'$ ,  $C^P$  is at least the maximum per period payoff attainable by P in equilibrium, and that P receives 0 in some periods in equilibrium. Thus the expression cannot hold: contradiction. ■

**Proof of Lemma 2.** We derive  $\bar{e}_\tau$  by solving for  $e_\tau$  in (1). Substituting from (2) and (3), this expression can be re-written as follows:

$$\begin{aligned} \bar{e}_\tau &= \frac{(1 - \pi_Q)V^Q}{w_{Q\tau}} - e_{2,\tau} \\ &= \frac{(1 - \pi_Q)V^Q}{w_{Q\tau}} - \beta^2 w_{B\tau} - (1 - \beta)^2 w_{P\tau}. \quad \blacksquare \end{aligned}$$

**Proof of Lemma 3.** The civil servant's expected payoff from effort  $e_{1,\tau}^c(1)$ , if it would result in continuation of  $\tau$  by politician Q, is:

$$\begin{aligned} \delta w_{B\tau}(e_{1,\tau}(1) + e_{2,\tau}^*) - \frac{(e_{1,\tau}(1))^2}{2} - \delta \frac{(e_{2,\tau}^*)^2}{2} + \delta^2(\pi_P^2 + (1 - \pi_P)(1 - \pi_Q))V^{c,P} \\ + \delta^2(\pi_P(1 - \pi_P) + (1 - \pi_P)\pi_Q)V^{c,Q}. \end{aligned}$$

The civil servant's expected payoff from effort  $e_{1,\tau}^c(\tilde{\pi}_P)$ , if it would result in starting over by politician Q, is:

$$\delta \pi_P w_{B\tau}(e_{1,\tau}(\pi_P) + e_{2,\tau}^*) - \frac{(e_{1,\tau}(\pi_P))^2}{2} - \delta \pi_P \frac{(e_{2,\tau}^*)^2}{2} + \delta^2 \pi_P^2 V^{c,P} + \delta^2 \pi_P(1 - \pi_P)V^{c,Q} + \delta(1 - \pi_P)V^{c,Q}.$$

Substituting and simplifying, the former is greater than the latter if:

$$\begin{aligned} \delta w_{B\tau}(\beta^2 \delta w_{B\tau} + (1 - \beta)^2 \pi_P w_{P\tau}) - \frac{(\delta \beta w_{B\tau})^2}{2} &> \delta(1 - \beta)^2 w_{B\tau}((2\pi_P^2 - \pi_P)w_{P\tau} - (1 - \pi_P)^2 w_{Q\tau}) \\ &\quad + \delta(\pi_P^2 \delta + \pi_P - 1) \frac{\beta^2 w_{B\tau}^2}{2} + \delta(1 - \pi_P)V^{c,Q} \\ &\quad - \delta^2(1 - \pi_P)((1 - \pi_Q)V^{c,P} + \pi_Q V^{c,Q}) \\ \delta(1 - \pi_P)(\delta(1 - \pi_Q)V^{c,P} - (1 - \delta\pi_Q)V^{c,Q}) &> \delta(1 - \beta)^2 w_{B\tau}((2\pi_P^2 - 2\pi_P)w_{P\tau} - (1 - \pi_P)^2 w_{Q\tau}) \\ &\quad + \delta(\pi_P^2 \delta - \delta + \pi_P - 1) \frac{\beta^2 w_{B\tau}^2}{2} \end{aligned}$$

Further simplification produces the result. ■

**Proof of Lemma 4.** The civil servant's expected payoffs from choosing  $e_{1,\tau}^c(1)$  and  $\bar{e}_\tau^c$  are given by (11) and (12), respectively. Substituting and simplifying, the payoff from the former is greater if:

$$\begin{aligned}
& \delta w_{B\tau} e_{1,\tau}(1) - \frac{(e_{1,\tau}^c(1))^2}{2} + \delta(1 - \pi_P) \left( w_{B\tau}(\beta^2 w_{B\tau} + (1 - \beta)^2(\pi_P w_{P\tau} + (1 - \pi_P)w_{Q\tau})) - \frac{\beta^2 w_{B\tau}^2}{2} \right) > \\
& \delta \pi_P w_{B\tau} \left( \frac{(1 - \pi_Q)V^Q}{w_{Q\tau}} - \beta^2 w_{B\tau} - (1 - \beta)^2 w_{Q\tau} \right) - \frac{\left( \frac{(1 - \pi_Q)V^Q}{\beta w_{Q\tau}} - \beta w_{B\tau} - \frac{(1 + \pi_P)(1 - \beta)^2 w_{Q\tau}}{\beta} \right)^2}{2} \\
& \quad + \delta(1 - \pi_P)V^{c,Q} - \delta^2(1 - \pi_P) \left( (1 - \pi_Q)V^{c,P} + \pi_Q V^{c,Q} \right) \\
& \Leftrightarrow \delta((2 - \pi_P)w_{P\tau} + w_{Q\tau})(1 - \beta)^2 \pi_P w_{B\tau} + (\delta^2 + \delta + \delta \pi_P) \frac{\beta^2 w_{B\tau}^2}{2} + \delta(1 - \pi_P)^2 (1 - \beta)^2 w_{B\tau} w_{Q\tau} > \\
& \delta \pi_P w_{B\tau} \left( \frac{(1 - \pi_Q)V^Q}{w_{Q\tau}} \right) - \frac{\left( \frac{(1 - \pi_Q)V^Q}{\beta w_{Q\tau}} - \beta w_{B\tau} - \frac{(1 + \pi_P)(1 - \beta)^2 w_{Q\tau}}{\beta} \right)^2}{2} \\
& \quad + \delta(1 - \pi_P)V^{c,Q} - \delta^2(1 - \pi_P) \left( (1 - \pi_Q)V^{c,P} + \pi_Q V^{c,Q} \right). \\
& (1 - \beta)^2 w_{B\tau} [(\delta(2 - \pi_P)w_{P\tau} + w_{Q\tau})\pi_P + (1 + \pi_P)w_{Q\tau}] +
\end{aligned}$$

Further simplification produces the result. ■

**Proof of Lemma 5.** The civil servant's expected payoff from choosing  $\bar{e}_\tau^c$  given continuation by Q is:

$$\begin{aligned}
& \delta w_{B\tau}(\bar{e}_\tau + e_{2,\tau}^*) - \frac{(\bar{e}_\tau^c)^2}{2} - \delta \frac{(e_{2,\tau}^*)^2}{2} + \delta^2(\pi_P^2 + (1 - \pi_P)(1 - \pi_Q))V^{c,P} \\
& \quad + \delta^2(\pi_P(1 - \pi_P) + (1 - \pi_P)\pi_Q)V^{c,Q}. \tag{32}
\end{aligned}$$

The civil servant's expected payoff from choosing  $e_{1,\tau}^c(\pi_P)$  given abandonment by Q is:

$$\begin{aligned}
& \delta \pi_P w_{B\tau}(e_{1,\tau}(\pi_P) + e_{2,\tau}^*) - \frac{(e_{1,\tau}^c(\pi_P))^2}{2} - \delta \pi_P \frac{(e_{2,\tau}^*)^2}{2} + \delta(1 - \pi_P)V^{c,Q} \\
& \quad + \delta^2 \pi_P^2 V^{c,P} + \delta^2 \pi_P(1 - \pi_P)V^{c,Q}. \tag{33}
\end{aligned}$$

Substituting and simplifying, expression (32) is greater than expression (33) if:

$$\begin{aligned}
& \delta w_{B\tau} \bar{e}_\tau - \frac{(\bar{e}_\tau^c)^2}{2} + \delta(1 - \pi_P) \left( (1 - \beta)^2 w_{B\tau}(\pi_P w_{P\tau} + (1 - \pi_P)w_{Q\tau}) + \frac{\beta^2 w_{B\tau}^2}{2} \right) > \\
& \delta \pi_P^2 (1 - \beta)^2 w_{B\tau} w_{P\tau} + \frac{(\pi_P \delta \beta w_{B\tau})^2}{2} + \delta(1 - \pi_P)V^{c,Q} - \delta^2(1 - \pi_P) \left( (1 - \pi_Q)V^{c,P} + \pi_Q V^{c,Q} \right)
\end{aligned}$$



$$\begin{aligned}
&\Leftrightarrow 2(1 + \delta)w_{B\tau} \frac{(1 - \pi_Q)V^Q}{w_{Q\tau}} - \left( \frac{(1 - \pi_Q)V^Q}{\beta w_{Q\tau}} \right)^2 - \left( \frac{(1 + \pi_P)(1 - \beta)^2 w_{Q\tau}}{\beta} \right)^2 + \\
&\quad 2 \left( \frac{(1 - \pi_Q)V^Q}{\beta w_{Q\tau}} \right) \left( \frac{(1 + \pi_P)(1 - \beta)^2 w_{Q\tau}}{\beta} \right) > \\
&2\delta\pi_P(1 - \beta)^2 w_{B\tau}((2\pi_P - 1)w_{P\tau} + (2 - \pi_P)w_{Q\tau}) + 2(1 + \pi_P)(1 - \beta)^2 w_{B\tau}w_{Q\tau} + \\
&(1 + \delta(\pi_P^2\delta + \pi_P + 1))\beta^2 w_{B\tau}^2 + 2\delta(1 - \pi_P)V^{c,Q} - 2\delta^2(1 - \pi_P)((1 - \pi_Q)V^{c,P} + \pi_Q V^{c,Q}).
\end{aligned}$$

Further simplification produces the result. ■

**Proof of Proposition 1.** We first show that politicians prioritize  $P$  in initiation phases. Suppose that in equilibrium,  $P$  initiates some task  $\tau$ . The bureaucrat's effort levels are given by (19) and (20). Over the initiation and completion phases, these give  $P$  an expected utility of  $\pi_P w_{P\tau}^2(\pi_P + 1)$ . If  $P$  deviates to task  $P$ , then by an argument identical to that in Lemma 1,  $P$  will continue with  $P$  in the completion phase. Thus the bureaucrat exerts effort  $\pi_P w_{PP} = \pi_P$  in the initiation phase and  $w_{PP} = 1$  in the completion phase, giving  $P$  an expected utility of  $\pi_P(\pi_P + 1)$ . Since  $w_{P\tau} < 1$  for any  $\tau \neq P$ ,  $P$  will always deviate from any  $\tau \neq P$  and never deviate from  $\tau = P$ .

Next, we derive the conditions under which  $Q$  continues or abandons task  $P$ . Continuing with  $P$  is preferred to starting over with  $Q$  if and only if:

$$\begin{aligned}
w_{QP}(\pi_P + w_{QP}) + \pi_Q V^Q &> V^Q \\
\Leftrightarrow \pi_Q &< w_{QP}(\pi_P + w_{QP}).
\end{aligned} \tag{34}$$

Thus there is a unique equilibrium when  $\beta = 0$  where  $P$  prioritizes  $P$  and  $Q$  continues  $P$  if and only if the preceding condition is satisfied. ■

**Proof of Proposition 2.** Since all politicians have an obvious incentive to complete any initiated  $B$  task, the only condition to check is whether politicians will have an incentive to deviate to a non- $B$  task  $\tau'$  in an initiation phase. Observe that from a single deviation in an initiation phase,  $P$ 's expected payoff in the subsequent completion phase is at most:

$$\pi_P w_{P\tau'}(e'_1 + e_{2,\tau'}^{c*}), \tag{35}$$

where  $e'_1$  is the effort that  $P$  anticipates that the civil servant will exert on  $\tau'$  in the initiation phase, and  $e_{2,\tau'}^{c*} = w_{B\tau'}$ .

Since the bureaucrat chooses effort  $\delta w_{BB}$  in equilibrium when  $B$  is prioritized, expression (35) implies that the deviation payoff can exceed the equilibrium payoff only if the civil servant chooses  $e_{1,\tau'} > \delta w_{B\tau'}$ . This is possible only if the civil servant chooses  $\bar{e}_{\tau'}$ , which induces politician  $Q$  to complete  $\tau'$  if elected. To see if she will do so, we apply Lemma 5. Two conditions are necessary and sufficient. First,  $\bar{e}_{\tau'} \geq e_{1,\tau'}(1)$ ; substituting from (5) and (7) produces:

$$\frac{\pi_Q}{1 + \pi_Q} > \frac{w_{B\tau'} w_{Q\tau'}}{w_{QB}}. \tag{36}$$

It is immediately obvious that this expression cannot hold for  $\tau' = Q$ , and thus the only possible task for P to deviate to is  $P$ . We therefore let  $\tau' = P$  in what follows.

Second, the civil servant must have sufficient incentive to choose  $\bar{e}_P$ , which induces Q to continue with task  $P$ . Applying (14), we have:

$$\begin{aligned} & 2(1 + \delta)w_{BP}\frac{(1 - \pi_Q)V^Q}{w_{QP}} - \left(\frac{(1 - \pi_Q)V^Q}{w_{QP}}\right)^2 > \\ & (\pi_P^2\delta^2 + \pi_P\delta + \delta + 1)w_{BP}^2 + 2\delta(1 - \pi_P) [(1 - \delta\pi_Q)V^{c,Q} - \delta(1 - \pi_Q)V^{c,P}] \\ \Leftrightarrow & (1 + \delta)^2 \left( w_{BP} - \frac{\pi_Q w_{QB}}{(1 + \pi_Q)w_{QP}} \right)^2 > (1 - \pi_P)\delta [(1 + \delta + \delta\pi_P)w_{BP}^2 - 2\delta]. \end{aligned} \quad (37)$$

When condition (37) holds, the bureaucrat will choose effort  $\bar{e}_P$ , which gives P a greater payoff than the equilibrium over the two phases if:

$$\pi_P w_{PP}(\bar{e}_P + w_{BP}) > \pi_P w_{PB}(\delta + 1) \quad (38)$$

This reduces to  $\bar{e}_P > \delta$ , which is guaranteed by (36). Thus the politician will deviate to P if (36) and (37) hold, and the equilibrium in which both parties prioritize  $B$  does not exist. ■

**Proof of Proposition 3.** We show that P has an incentive to deviate to task  $B$  in any equilibrium where politician Q resets the state when she is elected in a completion phase.

Observe first that the civil servant's equilibrium initiation phase effort on  $P$  is bounded from above by  $e_{1,P}^c(\pi_P)$ . This implies that Q's expected value satisfies the bound  $V^Q \leq \frac{\pi_Q w_{QB}(\delta\pi_Q + 1)}{1 - \pi_Q^2}$ .

If P deviates to  $B$  in an initiation phase, then her payoff in the subsequent completion phase exceeds her equilibrium payoff if:

$$\begin{aligned} \pi_P w_{PB}(e_{1,B} + e_{2,B}^{c*}) & > \pi_P w_{PP}(\delta\pi_P w_{BP} + w_{BP}) \\ \Leftrightarrow e_{1,B} & > \delta\pi_P, \end{aligned} \quad (39)$$

where  $e_{1,B}$  is the effort that P anticipates that the bureaucrat will exert on  $B$  in the initiation phase. It is thus sufficient to show that B exerts effort  $e_{1,\tau}^c(1) = \delta$  upon such a deviation.

To derive the civil servants effort under the deviation, note that:

$$V^Q \leq \frac{\pi_Q w_{QB}(\delta\pi_Q + 1)}{1 - \pi_Q^2} < \frac{(1 + \delta\pi_P)w_{QB}w_{BB}}{1 - \pi_Q}$$

This implies that her effective policy choice is determined by Lemma 4: optimal effort is either  $e_{1,\tau}^c(1)$  (which induces completion by Q) or  $\bar{e}_B$  (which does not). The former clearly gives the civil servant with her highest feasible payoff in the subsequent completion phase, and is therefore the optimal deviation effort. ■

**Proof of Proposition 4.** We first derive conditions under which politician Q continues task  $P$  when she is elected in a completion phase, and then derive conditions under which politician P does not deviate from prioritizing task  $P$  in an initiation phase.

Note that in an equilibrium where the bureaucrat chooses  $e_{1,P}^c(1)$  in initiation phases,  $V^Q = \frac{\pi_Q w_{BQ}(\delta+1)}{1-\pi_Q^2}$ . There are two cases, corresponding to different values of  $V^Q$ .

Case (i):  $\bar{e}_P \in (e_{1,P}(\pi_P), e_{1,P}(1))$ , or equivalently  $V^Q \in \left( \frac{(1+\delta\pi_P)w_{QP}w_{BP}}{1-\pi_Q}, \frac{(1+\delta)w_{QP}w_{BP}}{1-\pi_Q} \right)$ . By Lemma 3, the civil servant will choose  $e_{1,P}^c(1)$  when (9) holds, or:

$$(1 - \delta\pi_Q)V^{c,Q} - \delta(1 - \pi_Q)V^{c,P} < (\delta + \delta\pi_P - 1)\frac{w_{BP}^2}{2}. \quad (40)$$

Case (ii):  $\bar{e}_P \leq e_{1,P}(\pi_P)$ , or equivalently  $V^Q \leq \frac{(1+\delta\pi_P)w_{QP}w_{BP}}{1-\pi_Q}$ . By Lemma 4, the civil servant will choose  $e_{1,P}^c(1)$  when (13) holds, or:

$$\begin{aligned} \delta(\delta + 1 - \pi_P - \delta\pi_P^2)w_{BP}^2 + \left( (1 + \delta\pi_P)w_{BP} - \frac{\pi_Q(\delta + 1)w_{BQ}}{(1 + \pi_Q)w_{QP}} \right)^2 > \\ 2\delta(1 - \pi_P) [(1 - \delta\pi_Q)V^{c,Q} - \delta(1 - \pi_Q)V^{c,P}]. \end{aligned} \quad (41)$$

Next, we check whether P will have an incentive to deviate to  $\tau' \neq P$  in an initiation phase. Observe that from a single deviation in an initiation phase, P's expected payoff in the subsequent completion phase exceeds her equilibrium payoff if:

$$\begin{aligned} \pi_P w_{P\tau'}(e_{1,\tau'} + e_{2,\tau'}^{c*}) &> \pi_P w_{PP}(\delta w_{BP} + w_{BP}) \\ \Leftrightarrow e_{1,\tau'} &> \frac{w_{BP}(\delta + 1)}{w_{P\tau'}} - w_{B\tau'}, \end{aligned} \quad (42)$$

where  $e_{1,\tau'}$  is the effort that P anticipates that the bureaucrat will exert on  $\tau'$  in the initiation phase.

To derive  $e_{1,\tau'}$ , we determine the bureaucrat's incentive to induce continuation by Q using the conditions of Lemmas 3-5. Observe that for  $\tau' \in \{B, Q\}$ , it is easily verified that:

$$V^Q = \frac{\pi_Q w_{QB}(\delta + 1)}{1 - \pi_Q^2} < \frac{(1 + \delta\pi_P)w_{Q\tau'}w_{B\tau'}}{1 - \pi_Q}$$

This implies that the bureaucrat's effective policy choice following the deviation is determined by Lemma 4: the bureaucrat's optimal effort is either  $e_{1,\tau'}(1)$  or  $\bar{e}_{\tau'}$  (where  $e_{1,\tau'}(1) > \bar{e}_{\tau'}$ ). But expression (42) implies that P cannot prefer  $\tau' = B$  or  $\tau' = Q$  at either effort level. We conclude that P cannot deviate from task  $P$ . ■