Bureaucratic Quality and Electoral Accountability
Supporting Information

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A1 Additional theoretical results and proofs

Lemma A1 is useful in the proofs of Propositions 1 and A1.

Lemma A1 *The incumbent's probability of victory,* $\frac{\tau(\mu,\boldsymbol{a})}{\mu}$ *is weakly increasing in the voter's posterior belief,* μ*,* $\frac{\partial\tau(\mu,\boldsymbol{a})}{\partial\mu} \geq 0$.

Proof: Differentiating (8) with respect to μ yields:

$$\frac{\partial\tau(\mu,\boldsymbol{a})}{\partial\mu} = \frac{E[g_2^i|\theta=\overline{\theta}] - E[g_2^i|\theta=\underline{\theta}]}{2b}$$

$E[g_2^i|\theta=\overline{\theta}] \geq E[g_2^i|\theta=\underline{\theta}]$ follows from the parametric assumption $\overline{\theta} > \underline{\theta}$ and (7). Thus, $\frac{\partial\tau(\mu,\boldsymbol{a})}{\partial\mu} \geq 0$. ■

A1.1 Proof of Proposition 1

This proof proceeds in two sections. I first prove the existence of the equilibria characterized in Proposition 1, then I prove uniqueness. To reduce redundancy, note that in every case, the bureaucrat's equilibrium effort follows from inspection of (1) and the politician's second-period allocation strategy follows from (7).

Existence: First, suppose that $q < \frac{1}{\overline{\theta}}$ and consider the following strategy and belief profile: politicians of both types allocate $a_1 = 0$ and $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter re-elects the incumbent if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z \in \{\emptyset, 0\} \\ 1 & \text{if } z = q \text{ (off-path).} \end{cases} \tag{A1}$$

By inspection, μ is derived via Bayes' rule. Denoting posterior beliefs in (A1) as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$, the competent type cannot profitably deviate by allocating $a_1 = 1$ because:

$$1 + p\tau(\mu_0,\boldsymbol{a}) + (1-p)\tau(\mu_\emptyset,\boldsymbol{a}) > \overline{\theta}q + p\tau(\mu_1,\boldsymbol{a}) + (1-p)\tau(\mu_\emptyset,\boldsymbol{a}).$$

In this interval, $\overline{\theta}q < 1$ and $\tau(\mu,\boldsymbol{a}) = \frac{1}{2}\forall\mu$ because $a_1 = a_2 = 0\forall\theta$. This ensures that the inequality is always satisfied and the competent type cannot profitably deviate. Since $\underline{\theta} < \overline{\theta}$, the incompetent type similarly cannot profitably deviate by allocating $a_1 = 1$.

Second, suppose that $q \in \left[\frac{1}{\overline{\theta}}, \frac{2b(1-\pi\overline{\theta})}{\underline{\theta}(2b(1-\pi\overline{\theta})+\overline{\theta}p(1-\pi))}\right)$ and consider the following strategy and belief profile: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_1 = a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ \frac{\pi(1-\overline{\theta})}{\pi(1-\overline{\theta})+1-\pi} & \text{if } z = 0 \\ 1 & \text{if } z = q. \end{cases} \tag{A2}$$

By inspection, μ is derived via Bayes' rule. Denoting the posterior beliefs in (A2) as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$, a politician of type $\theta = \overline{\theta}$ will not deviate from $a_1 = 1$ to $a_1 = 0$ when:

$$\overline{\theta}q + \left(p\overline{\theta}\tau(\mu_q,\boldsymbol{a}) + p(1-\overline{\theta})\tau(\mu_0,\boldsymbol{a}) + (1-p)\tau(\mu_\emptyset,\boldsymbol{a})\right)\overline{\theta}q > 1 + \left(p\tau(\mu_0,\boldsymbol{a}) + (1-p)\tau(\mu_\emptyset,\boldsymbol{a})\right)\overline{\theta}q.$$

This inequality is satisfied for any $q \in \left[\frac{1}{\overline{\theta}}, \frac{2b(1-\pi\overline{\theta})}{\underline{\theta}(2b(1-\pi\overline{\theta})+p\overline{\theta}(1-\pi))}\right)$ since $\overline{\theta}q > 1$ and, by Lemma A1, $\tau(\mu_q, \boldsymbol{a}) > \tau(\mu_0, \boldsymbol{a})$. A politician of type $\underline{\theta}$ cannot profitably deviate to allocate $a_1 = 1$ to increase her chances of re-election when:

$$1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) > \underline{\theta}q + p\underline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\underline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$

Substituting $\mu_q = 1$ and $\mu_0 = \frac{\pi(1-\overline{\theta})}{\pi(1-\overline{\theta})+1-\pi}$ and solving for q indicates that this inequality holds when:

$$q < \frac{2b(1-\pi\overline{\theta})}{\underline{\theta}(2b(1-\pi\overline{\theta})+\overline{\theta}p(1-\pi))}.$$

Third suppose that $q \in \left[\max\{\frac{1}{\overline{\theta}}, \frac{2b(1-\pi\overline{\theta})}{\underline{\theta}(2b(1-\pi\overline{\theta})+\overline{\theta}p(1-\pi))}\}, \frac{2b(\underline{\theta}(\pi-1)-\overline{\theta}\pi)(1+\underline{\theta}(\pi-1)-\overline{\theta}\pi)}{\underline{\theta}\left(2b(\underline{\theta}(\pi-1)-\overline{\theta}\pi)(1+\underline{\theta}(\pi-1)-\overline{\theta}\pi)+\overline{\theta}(\overline{\theta}-\underline{\theta})p(\pi-1)\pi\right)}\right)$ and consider the following strategy and belief profile: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_1 = 1$ with probability $k \in (0,1)$, $a_1 = 0$ with probability $(1-k)$, and $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ \frac{\pi(1-\overline{\theta})}{\pi(1-\overline{\theta})+(1-\pi)(1-\underline{\theta}k)} & \text{if } z = 0 \\ \frac{\pi\overline{\theta}}{\pi\overline{\theta}+(1-\pi)\underline{\theta}k} & \text{if } z = q. \end{cases} \tag{A3}$$

By inspection, μ is derived via Bayes' rule. Denoting posterior beliefs in (A3) as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$, a politician of type $\theta = \overline{\theta}$ will not deviate from $a_1 = 1$ to $a_1 = 0$ when:

$$\overline{\theta}q + (p\overline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\overline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q > 1 + (p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\,\overline{\theta}q.$$

This inequality is satsified because $\overline{\theta}q > 1$ and by Lemma A1, $\tau(\mu_q, \boldsymbol{a}) > \tau(\mu_0, \boldsymbol{a})$. In order for a politician of type $\theta = \underline{\theta}$ to mix first-period allocation strategies, it must be the case that:

$$\underline{\theta}q + p\underline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\underline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\pi, \boldsymbol{a}) = 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\pi, \boldsymbol{a})$$
$$\tau(\mu_q, \boldsymbol{a}) - \tau(\mu_0, \boldsymbol{a}) = \frac{1-\underline{\theta}q}{p}$$

Substituting $\mu_q = \frac{\pi\overline{\theta}}{\pi\overline{\theta}+(1-\pi)\underline{\theta}k}$ and $\mu_0 = \frac{\pi(1-\overline{\theta})}{\pi(1-\overline{\theta})+(1-\pi)(1-\underline{\theta}k)}$ and solving for k yields

$$k = \frac{\overline{\theta}pq\pi + 2b(\underline{\theta}q-1)(2\overline{\theta}\pi-1) - \sqrt{4b^2(\underline{\theta}q-1)^2 + 4b\overline{\theta}(2\overline{\theta}-1)\underline{\theta}pq(\underline{\theta}q-1)\pi + \overline{\theta}^2\underline{\theta}^2p^2q^2\pi^2}}{4b\underline{\theta}(\underline{\theta}q-1)(\pi-1)}$$

Note that when $q = \frac{2b(1-\pi\overline{\theta})}{\underline{\theta}(2b(1-\pi\overline{\theta})+\overline{\theta}p(1-\pi))}$, $k = 0$. When $q = \frac{2b(\underline{\theta}(\pi-1)-\overline{\theta}\pi)(1+\underline{\theta}(\pi-1)-\overline{\theta}\pi)}{\underline{\theta}\left(2b(\underline{\theta}(\pi-1)-\overline{\theta}\pi)(1+\underline{\theta}(\pi-1)-\overline{\theta}\pi)+\overline{\theta}(\overline{\theta}-\underline{\theta})p(\pi-1)\pi\right)}$, $k = 1$. Further note that:

$$\frac{\partial k}{\partial q} = \frac{\overline{\theta}p\pi\left(2b(2\overline{\theta}-1)(q\underline{\theta}-1) + \overline{\theta}\underline{\theta}pq\pi - \sqrt{4b^2(\underline{\theta}q-1)^2 + 4b\overline{\theta}(2\overline{\theta}-1)\underline{\theta}pq(\underline{\theta}q-1)\pi + \overline{\theta}^2\underline{\theta}^2p^2q^2\pi^2}\right)}{4b(\underline{\theta}q-1)^2(\pi-1)\sqrt{4b^2(\underline{\theta}q-1)^2 + 4b\overline{\theta}(2\overline{\theta}-1)\underline{\theta}pq(\underline{\theta}q-1)\pi + \overline{\theta}^2\underline{\theta}^2p^2q^2\pi^2}} \geq 0.$$

This first-order-condition can be signed by noting that the denominator is strictly negative (because $\pi < 1$). Further, note that $\overline{\theta}p\pi \geq 0$. It is straightforward to show that:

$$2b(2\overline{\theta}-1)(q\underline{\theta}-1) + \overline{\theta}pq\pi < \sqrt{4b^2(\underline{\theta}q-1)^2 + 4b(2\overline{\theta}-1)(\underline{\theta}q-1)\overline{\theta}pq\pi + \overline{\theta}^2p^2q^2\pi^2},$$

for any $\overline{\theta} \in [\frac{1}{q}, 1]$ and $\underline{\theta} \in [0, \frac{1}{q})$. This ensures that $\frac{\partial k}{\partial q} > 0$.

Fourth, suppose that $q \in \left[\frac{2b(\underline{\theta}^2(\pi-1)^2+\overline{\theta}\pi(\overline{\theta}\pi-1)-\underline{\theta}(\pi-1)(2\overline{\theta}\pi))}{\underline{\theta}2b(\underline{\theta}^2(\pi-1)^2+\overline{\theta}\pi(\overline{\theta}\pi-1)-\underline{\theta}(\pi-1)(2\overline{\theta}\pi))+p\overline{\theta}(\overline{\theta}-\underline{\theta})(\pi-1)\pi}, \frac{1}{\underline{\theta}}\right)$ and consider the following strategy and belief profile: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_1 = 1$ and $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ \frac{\pi(1-\overline{\theta})}{\pi(1-\overline{\theta})+(1-\pi)(1-\underline{\theta})} & \text{if } z = 0 \\ \frac{\pi\overline{\theta}}{\pi\overline{\theta}+(1-\pi)\underline{\theta}} & \text{if } z = q. \end{cases} \tag{A4}$$

By inspection, μ is derived via Bayes' rule. Denoting posterior beliefs in (A4) as μ_z and the equilibrium allocation strategies as $\boldsymbol{a}$, a politician of type $\theta = \overline{\theta}$ will not deviate from $a_1 = 1$ to $a_1 = 0$ if:

$$\overline{\theta}q + (p\overline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\overline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q > 1 + ((p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q \quad .$$

This inequality holds for any $q \in \left[\frac{2b(\underline{\theta}(\pi-1)-\overline{\theta}\pi)(1+\underline{\theta}(\pi-1)-\overline{\theta}\pi)}{\underline{\theta}\left(2b(\underline{\theta}(\pi-1)-\overline{\theta}\pi)(1+\underline{\theta}(\pi-1)-\overline{\theta}\pi)+\overline{\theta}(\overline{\theta}-\underline{\theta})p(\pi-1)\pi\right)}, \frac{1}{\underline{\theta}}\right)$ given that $\overline{\theta}q > 1$ and, by Lemma A1, $\tau(\frac{\pi\overline{\theta}}{\pi\overline{\theta}+(1-\pi)\underline{\theta}}, \boldsymbol{a}) > \tau(\frac{\pi(1-\overline{\theta})}{\pi(1-\overline{\theta})+(1-\pi)(1-\underline{\theta})}, \boldsymbol{a})$. A politician of type $\theta = \underline{\theta}$ cannot profitably deviate by allocating $a_1 = 0$ if:

$$\underline{\theta}q + p\underline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\underline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) > 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$

This inequality holds when:

$$\frac{1-\underline{\theta}q}{p} > \tau(\frac{\pi\overline{\theta}}{\pi\underline{\theta}+(1-\pi)\underline{\theta}}, \boldsymbol{a}) - \tau(\frac{\pi(1-\overline{\theta})}{\pi(1-\overline{\theta})+(1-\pi)(1-\underline{\theta})}, \boldsymbol{a})$$

$$q > \frac{2b(\underline{\theta}(\pi-1)-\overline{\theta}\pi)(1+\underline{\theta}(\pi-1)-\overline{\theta}\pi)}{\underline{\theta}\left(2b(\underline{\theta}(\pi-1)-\overline{\theta}\pi)(1+\underline{\theta}(\pi-1)-\overline{\theta}\pi)+\overline{\theta}(\overline{\theta}-\underline{\theta})p(\pi-1)\pi\right)}.$$

Finally, suppose that $q \geq \frac{1}{\underline{\theta}}$ and consider the following strategy and belief profile: a politician of either type allocates $a_1 = a_2 = 1$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] > E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ \frac{\pi(1-\overline{\theta})}{\pi(1-\overline{\theta})+(1-\pi)(1-\underline{\theta})} & \text{if } z = 0 \\ \frac{\pi\overline{\theta}}{\pi\overline{\theta}+(1-\pi)\underline{\theta}} & \text{if } z = q. \end{cases} \tag{A5}$$

By inspection, μ is derived via Bayes' rule. Denoting posterior beliefs in (A5) as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$, a politician of type $\theta = \underline{\theta}$ will not deviate from $a_1 = 1$ to $a_1 = 0$ if:

$$\underline{\theta}q + p\underline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\overline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) > 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$

This inequality holds for any $q \geq \frac{1}{\underline{\theta}}$ because $\underline{\theta}q > 1$ and, by Lemma A1, $\tau(\mu_q \boldsymbol{a}) > \tau(\mu_0, \boldsymbol{a})$. This is condition, combined with the parametric assumption that $\overline{\theta} > \underline{\theta}$, is sufficient to ensure that a politician of type $\theta = \overline{\theta}$ similarly does not deviate.

Uniqueness: Consider first the candidate pooling equilibria and then the candidate separating and semi-separating equilibria. First, note that $a_1 = 1$ implies that $g_1 \in \{0, q\}$ and $a_1 = 0$ implies that $g_1 = 0$. This implies that off-path beliefs are only invoked in an equilibrium in which both types allocate $a_1 = 0$. Per the intuitive criterion refinement, I impose the off-path belief that $\mu = 1$ upon observation that $z = q$ in any such equilibrium. I first consider the possibility for pooling equilibria where both types allocate $a_1 = 0$ when $q \geq \frac{1}{q}$.

- First, suppose $q \in \left[\frac{1}{\overline{\theta}}, \frac{1}{\underline{\theta}}\right)$. Consider the following strategy and belief profile: politicians of both types allocate $a_1 = 0$ and a politician of type $\theta = \overline{\theta}$ allocates $a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z \in \{\emptyset, 0\} \\ 1 & \text{if } z = q \text{ (off-path).} \end{cases} \tag{A6}$$

  Denoting poterior beliefs in (A6) as μ_z and equilibrium allocation strategies, $\boldsymbol{a}$, a politician of type $\theta = \overline{\theta}$ will not deviate if:

$$1 + (p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q \geq \overline{\theta}q + (p\overline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\overline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q$$

  Note that $\tau(\mu_0, \boldsymbol{a}) = \tau(\mu_\emptyset, \boldsymbol{a})$. The preceding inequality is never satisfied since $\overline{\theta}q \geq 1$ and $\tau(\mu_q, \boldsymbol{a}) > \tau(\mu_0, \boldsymbol{a})$. Thus, this strategy and belief profile is not an equilibrium.

- Second, suppose $q \geq \frac{1}{\underline{\theta}}$. Consider the following strategy and belief profile: politicians of both types allocate $a_1 = 0$ and a politician of both types allocate $a_2 = 1$. All other beliefs and strategies are identical to the previous case.

  Denoting poterior beliefs in (A6) as μ_z and equilibrium allocation strategies, $\boldsymbol{a}$. A politician of type $\theta = \overline{\theta}$ will not deviate to allocate $a_1 = 1$ if:

$$1 + (p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q \geq \overline{\theta}q + (p\overline{\theta}\tau(1, \boldsymbol{a}) + p(1-\overline{\theta})\tau(\pi, \boldsymbol{a}) + (1-p)\tau(\pi, \boldsymbol{a}))\overline{\theta}q$$

  However, this inequality is never satisfied since $\overline{\theta}q \geq 1$ and $\tau(\mu_q, \boldsymbol{a}) > \tau(\mu_0, \boldsymbol{a})$. Thus, this strategy and belief profile is not an equilibrium.

Now consider possible candidate pooling equilibria in which both types allocate $a_1 = 1$ for $q \leq \frac{2b(1-\pi\overline{\theta})}{\underline{\theta}(2b(1-\pi\overline{\theta})+\overline{\theta}p(1-\pi))}$.

- First, suppose $q < \frac{1}{\overline{\theta}}$. Consider the following strategy and belief profile: politicians of both types allocate $a_1 = 1$ and either type of politician allocates $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ \frac{(1-\overline{\theta})\pi}{(1-\overline{\theta})\pi + (1-\underline{\theta})(1-\pi)} & \text{if } z = 0 \\ \frac{\overline{\theta}\pi}{\overline{\theta}\pi + (1-\pi)\underline{\theta}} & \text{if } z = q. \end{cases} \tag{A7}$$

  Denoting the posterior beliefs in (A7) as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$, a politician of type $\theta = \underline{\theta}$ will not deviate if:

$$\underline{\theta}q + p\underline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\underline{\theta}\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) \geq 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$

  In any equilibrium in which $a_2 = 0 \forall \theta$, $\tau(\mu, \boldsymbol{a})$ is equivalent for any μ, per (8). Combined with $\underline{\theta}q < 1$ in this region of the parameter space, this inequality never holds. Thus, this strategy and belief profile is not an equilibrium.

- Second, suppose $q \in [\frac{1}{\overline{\theta}}, \frac{2b(1-\pi\overline{\theta})}{\underline{\theta}(2b(1-\pi\overline{\theta})+\overline{\theta}p(1-\pi))})$. Consider the following strategy and belief profile: politicians of both types allocate $a_1 = 1$ and a politician of type $\theta = \overline{\theta}$ allocates $a_2 = 1$ and a politician of type $\theta = \underline{\theta}$ allocates $a_2 = 0$. All other strategies and beliefs are identical to the previous case.

Denoting the posterior beliefs in (A7) as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$, a politician of type $\theta = \underline{\theta}$ will not deviate if:

$$\underline{\theta}q + p\underline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1 - \underline{\theta}\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) \geq 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$
$$q \geq \frac{2b(1 - \pi\overline{\theta})}{\underline{\theta}(2b(1 - \pi\overline{\theta}) + \overline{\theta}p(1 - \pi))}$$

This threshold is derived in the second case in the proof of existence. This profile of strategies and beliefs cannot be sustained for a lower value of q.

Now, consider candidate separating equilibria. First, note that because $\overline{\theta} > \underline{\theta}$, there cannot exist an equilibrium in which a politician $\underline{\theta}$ allocates $a_t = 1$ while a politician of type $\theta = \overline{\theta}$ allocates $a_t = 0$. Thus, consider equilibria in which in which a politician of type $\theta = \overline{\theta}$ allocates $a_1 = 1$ and a politician of type $\theta = \underline{\theta}$ allocates $a_1 = 0$ in the parameter spaces $q < \frac{1}{\overline{\theta}}$ and $q \geq \frac{1}{\underline{\theta}}$.

- First, suppose that $q < \frac{1}{\overline{\theta}}$. Consider the following strategy and belief profile: $\theta = \overline{\theta}$ allocates $a_1 = 1$ and a politician of type $\theta = \underline{\theta}$ allocates $a_1 = 0$; either type of politician allocates $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ \frac{\pi(1-\overline{\pi})}{\pi(1-\overline{\pi})+1-\pi} & \text{if } z = 0 \\ 1 & \text{if } z = q \end{cases} \tag{A8}$$

  Denoting posterior beliefs in (A8) as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$. A politician of type $\theta = \overline{\theta}$ will not deviate if:

$$\overline{\theta}q + p\overline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1 - \underline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) \geq 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$

  In any equilibrium in which $a_2 = 0 \forall\theta$, $\tau(\mu, \boldsymbol{a})$ is equivalent for any μ, per Equation 8. Combined with $\overline{\theta}q < 1$ in this parameter space, this inequality is never satisfied. Thus, this strategy and belief profile is not an equilibrium.

- Suppose $q \geq \frac{1}{\underline{\theta}}$: Consider the following strategy and belief profile: A politician of type $\theta = \overline{\theta}$ allocates $a_1 = 1$ and a politician of type $\theta = \underline{\theta}$ allocates $a_1 = 0$; either type of politician allocates $a_2 = 1$. All other strategies and beliefs are identical to the previous case. Denoting posterior beliefs in (A8) as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$, a politician of type $\theta = \underline{\theta}$ will not deviate if:

$$\underline{\theta}q + \underline{\theta}q\left[p\overline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1 - \underline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})\right] \geq 1 + \underline{\theta}q\left[p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})\right]$$

  Note that $\mu_q > \mu_0$, so by Lemma A1, $\tau(\mu_q, \boldsymbol{a}) > \tau(\mu_0, \boldsymbol{a})$. Additionally, $q\underline{\theta} \geq 1$ when $q \geq \frac{1}{\underline{\theta}}$. This that this inequality is never satisfied. Thus, this strategy and belief profile is not an equilibrium. ■

Finally, consider the candidate semi-separating equilibrium when $q \leq \frac{1}{\overline{\theta}}$: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = 1$ with probability $k \in (0, 1)$ and $a_1 = 0$ with probability $1 - k$ and $a_2 = 0$; politician of type $\theta = \underline{\theta}$ allocates $a_1 = a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter re-elects the incumbent if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ \frac{\pi(1-k\overline{\theta})}{\pi(1-k\overline{\theta})+1-\pi} & \text{if } z = 0 \\ 1 & \text{if } z = q. \end{cases} \tag{A9}$$

Denoting the posterior beliefs in (A9) as μ_z and equilibrium allocation strategies as **a**, a politician of type $\overline{\theta}$ chooses k such that they are indifferent between allocating resources to the public good and not allocating resources to the public good.

$$\overline{\theta}q + p\overline{\theta}\tau(\mu_q, \boldsymbol{a}) + p(1-\overline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) = 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$
$$\tau(\mu_q, \boldsymbol{a}) - \tau(\mu_0, \boldsymbol{a}) = \frac{1-\overline{\theta}q}{p\overline{\theta}}$$

Note from (8) that $\tau(1, \boldsymbol{a}) = \tau(\frac{\pi(1-\overline{\theta}k)}{\pi(1-\overline{\theta}k+1-\pi)}, \boldsymbol{a}) = \frac{b-\overline{\theta}q\pi k}{2b}$. Because $1-\overline{\theta}q > 0$ when $q < \frac{1}{\overline{\theta}}$, there exists no $k \in (0,1)$ at which the politician of type $\theta = \overline{\theta}$ is indifferent between contributing and not contributing to public goods. As such this strategy and belief profile is not an equilibrium. ■

A1.2 Proposition A1 and Proof

Consider a variant of the model in which the voter does not observe public goods. Instead, they observe the politician's first-period allocation decision, a_1 with probability p. As such, the realized signal is $z \in \{\emptyset, 0, 1\}$. All other aspects of the model are identical to the model presented in the main text.

Proposition A1 *In the unique Perfect Bayesian Equilibrium:*

(i) If $q < \frac{1}{\overline{\theta}}$, both types of politicians allocate $a_1 = a_2 = 0$ to public goods.

(ii) If $q \in \left[\frac{1}{\overline{\theta}}, \frac{2b}{\underline{\theta}2b+p\overline{\theta}}\right)$, a competent-type politician allocates $a_1 = a_2 = 1$ while a incompetent-type politician allocates $a_1 = a_2 = 0$ to public goods.

(iii) If $q \in \left[\max\{\frac{1}{\overline{\theta}}, \frac{2b}{\underline{\theta}2b+p\overline{\theta}}\}, \frac{2b}{\underline{\theta}2b+p\overline{\theta}\pi}\right)$, a competent-type politician allocates $a_1 = a_2 = 1$ while an incompetent-type politician allocates $a_1 = 1$ with probability $k \in (0,1)$, $a_1 = 0$ with probability $1-k$, and $a_2 = 0$ to public goods.

(iv) If $q \in \left[\frac{2b}{\underline{\theta}2b+p\overline{\theta}\pi}, \frac{1}{\underline{\theta}}\right)$, a competent-type politician allocates $a_1 = a_2 = 1$ while an incompetent-type politician allocates $a_1 = 1$ and $a_2 = 0$ to public goods.

(v) If $q \geq \frac{1}{\underline{\theta}}$, both types of politicians allocate $a_1 = a_2 = 1$ to public goods.

This proof proceeds in two sections. I first prove the existence of the equilibria characterized in Proposition A1, then I prove uniqueness. To reduce redundancy, note that in every case, the bureaucrat's equilibrium effort follows from inspection of (1), the politician's second-period allocation strategy is given by (7), and the voter's choice is optimal given the specified posterior belief and (8).

Existence: First, suppose that $q < \frac{1}{\overline{\theta}}$ and consider the following strategy and belief profile: politicians of both types allocate $a_1 = 0$ and $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$, and voter's posterior beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z \in \{\pi, 0\} \\ 1 & \text{if } z = 1 \text{(off-path)} \end{cases} \tag{A10}$$

By inspection, μ is derived via Bayes' rule. Denoting the voter's posterior beliefs in (A10) by μ_z and equilibrium strategies by $\boldsymbol{a}$. A politician of type $\theta = \overline{\theta}$ type cannot profitably deviate by allocating $a_1 = 1$ if:

$$1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) > \overline{\theta}q + p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$

In this interval, $\overline{\theta}q < 1$, and $\tau(\mu_z, \boldsymbol{a}) = \frac{1}{2}\forall z$ when $a_1 = a_2 = 0\forall\theta$. This ensures that the inequality holds. Since $\overline{\theta} > \underline{\theta}$, the incompetent type similarly cannot profitably deviate by allocating $a_1 = 1$.

Second, suppose that $q \in \left[\frac{1}{\overline{\theta}}, \frac{2b}{\underline{\theta}2b+p\overline{\theta}}\right)$ and consider the following strategy and belief profile: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_1 = a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[U_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ 0 & \text{if } z = 0 \\ 1 & \text{if } z = 1. \end{cases} \tag{A11}$$

By inspection, μ is derived via Bayes' rule. Denoting the voter's posterior beliefs in (A11) by μ_z and equilibrium strategies by $\boldsymbol{a}$, a politician of type $\theta = \overline{\theta}$ will not deviate from $a_1 = 1$ to $a_1 = 0$ if:

$$\overline{\theta}q + (p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\,\overline{\theta}q \geq 1 + (p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\,\overline{\theta}q.$$

This inequality clearly holds for any $q \in \left[\frac{1}{\overline{\theta}}, \frac{2b}{\underline{\theta}2b+p\overline{\theta}}\right)$ since $\overline{\theta}q \geq 1$ and, by Lemma A1, $\tau(\mu_1, \boldsymbol{a}) \geq \tau(\mu_0, \boldsymbol{a})$. A politician of type $\theta = \underline{\theta}$ cannot profitably deviate to allocate $a_1 = 1$ to increase her chances of re-election when:

$$\begin{aligned} 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) &> \underline{\theta}q + p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) \\ \Leftrightarrow q &< \frac{2b}{\underline{\theta}2b + p\overline{\theta}}. \end{aligned}$$

Third suppose that $q \in \left[\max\{\frac{1}{\overline{\theta}}, \frac{2b}{\underline{\theta}2b+p\overline{\theta}}\}, \frac{2b}{\underline{\theta}2b+p\overline{\theta}\pi}\right)$ and consider the following strategy and belief profile: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_1 = 1$ with probability $k \in (0, 1)$ and $a_1 = 0$ with probability $(1-k)$, and $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ 0 & \text{if } z = 0 \\ \frac{\pi}{\pi+(1-\pi)k} & \text{if } z = 1. \end{cases} \tag{A12}$$

By inspection, μ is derived via Bayes' rule. Denoting the voter's posterior beliefs in (A12) by μ_z and equilibrium allocation strategies by $\boldsymbol{a}$, the analysis of the politician of type $\theta = \overline{\theta}$ is identical to the previous case. In order for a politician of type $\theta = \underline{\theta}$ to mix first-period allocation strategies, it must be the case that:

$$\begin{aligned} \underline{\theta}q + p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) &= 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) \\ \tau(\mu_1, \boldsymbol{a}) - \tau(\mu_0, \boldsymbol{a}) &= \frac{1-\underline{\theta}q}{p} \end{aligned}$$

Substituting $\mu_1 = \frac{\pi}{\pi+(1-\pi)k}$ and $\mu_0 = 0$ and solving for k yields:

$$\begin{aligned} \frac{\pi}{\pi+(1-\pi)k} &= \frac{2b(1-\underline{\theta}q)}{pq\overline{\theta}} \\ k &= \frac{pq\overline{\theta} - 2b(1-\underline{\theta}q)\pi}{2b(1-\underline{\theta}q)(1-\pi)}. \end{aligned}$$

It is straighforward to verify that $k = 0$ when $q = \frac{2b}{\overline{\theta}p+2b\underline{\theta}}$ and $k = 1$ when $q = \frac{2b}{\overline{\theta}p\pi+2b\underline{\theta}}$. Further, note that $\frac{\partial k}{\partial q} = \frac{-\overline{\theta}\pi p}{2b(\underline{\theta}q-1)^2(\pi-1)} > 0$ for all $\pi < 1$.

Fourth, suppose that $q \in \left[\frac{2b}{\underline{\theta}2b+p\overline{\theta}\pi}, \frac{1}{\underline{\theta}}\right)$ and consider the following strategy and belief profile: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_1 = 1$ and $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ 0 & \text{if } z = 0 \text{ (off-path)} \\ \pi & \text{if } z = 1. \end{cases} \tag{A13}$$

By inspection, μ is derived via Bayes' rule. Denoting the voter's posterior beliefs in (A13) by μ_z and equilibrium allocation strategies by $\boldsymbol{a}$. Denoting the equilibrium allocation strategy, $\boldsymbol{a}$, a politician of type $\theta = \overline{\theta}$ will not deviate from $a_1 = 1$ to $a_1 = 0$ if:

$$\overline{\theta}q + (p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q > 1 + (p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q$$

This inequality holds for any $q \in \left[\max\{\frac{1}{\overline{\theta}}, \frac{2b}{\underline{\theta}2b+p\overline{\theta}}\}, \frac{1}{\underline{\theta}}\right)$ since $\overline{\theta}q > 1$ and, by Lemma A1, $\tau(\mu_1, \boldsymbol{a}) \geq \tau(\mu_0, \boldsymbol{a})$. A politician of type $\theta = \underline{\theta}$ cannot profitably deviate by allocating $a_1 = 0$ if:

$$\underline{\theta}q + p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})) \geq 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$
$$\Leftrightarrow q \geq \frac{2b}{\underline{\theta}2b + \overline{\theta}p\pi}$$

This inequality therefore holds for any $q \in \left[\frac{2b}{\underline{\theta}2b+p\overline{\theta}\pi}, \frac{1}{\underline{\theta}}\right)$.

Finally, suppose that $q \geq \frac{1}{\underline{\theta}}$ and consider the following strategy and belief profile: politicians of both types allocate $a_1 = a_2 = 1$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] > E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ 0 & \text{if } z = 0 \text{ (off-path)} \\ \pi & \text{if } z = 1. \end{cases} \tag{A14}$$

By inspection, μ is derived via Bayes' rule. Denoting the voter's posterior beliefs in (A14) by μ_z and equilibrium allocation strategies by $\boldsymbol{a}$, a politician of type $\theta = \underline{\theta}$ will not deviate from $a_1 = 1$ to $a_1 = 0$ if:

$$\underline{\theta}q + p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) > 1 + (p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\underline{\theta}q$$

This inequality holds for any $q \geq \frac{1}{\underline{\theta}}$ because $\underline{\theta}q > 1$ and $\tau(\pi, \boldsymbol{a}) \geq \tau(0, \boldsymbol{a})$ per Lemma A1. This is sufficient to ensure that a politician of type $\theta = \overline{\theta}$ similarly does not deviate.

Uniqueness: I consider all candidate pooling equilibria and then examine the candidate separating and semi-separating equilibria. In any pooling equilibrium in which both types allocate $a_1 = 0$, I impose the off-path belief that $\mu = 1$ upon observation of $a_1 = 1$, per the intuitive criterion refinement. There exist three candidate equilibria in which both types allocate $a_1 = 0$. The first is an equilibrum (the first case in the proof of existence), the others are not:

- First, suppose that $q \in \left[\frac{1}{\overline{\theta}}, \frac{1}{\underline{\theta}}\right)$. Consider the following strategy and belief profile: politicians of both types allocate $a_1 = 0$ and a politician of type $\theta = \overline{\theta}$ allocates $a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_2 = 0$;

the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z \in \{\emptyset, 0\} \\ 1 & \text{if } z = 1. \end{cases} \tag{A15}$$

These posterior beliefs follow from Bayes' rule. Denote the posterior beliefs in (A15) as μ_z and equilibrium allocation strategies $\boldsymbol{a}$. A politician of type $\theta = \overline{\theta}$ will not deviate if:

$$1 + (p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q > \overline{\theta}q + (p\overline{\theta}\tau(\mu_1, \boldsymbol{a}) + p(1-\overline{\theta})\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}))\overline{\theta}q$$

This inequality is never satisfied since $\overline{\theta}q \geq 1$ and $\tau(\mu_1, \boldsymbol{a}) > \tau(\mu_0, \boldsymbol{a})$. Thus, this strategy and belief profile is not an equilibrium.

- Second, suppose that $q \geq \frac{1}{\underline{\theta}}$. Consider the following strategy and belief profile: politicians of both types allocate $a_1 = 0$ and a politician of both types allocate $a_2 = 1$. All other beliefs and strategies are equivalent to the previous case.

  Note that the politician of type $\theta = \overline{\theta}$ faces identical incentives to the previous case. As above, such a politician will deviate because $\overline{\theta}q > 1$ and $\tau(\mu_1, \boldsymbol{a}) > \tau(\mu_0, \boldsymbol{a})$. Thus, this strategy and belief profile is not an equilibrium.

In a pooling equilibrium in which both types allocate $a_1 = 1$, I impose the off-path belief that $\mu = 0$ upon observation of $a_1 = 0$, per the intuitive criterion refinement. There exist three candidate equilibria in which both types allocate $a_1 = 0$. The last (when $q \geq \frac{1}{\underline{\theta}}$) is an equilibrum (the fifth case in the proof of existence), the others are not, as shown below:

- First, suppose $q < \frac{1}{\overline{\theta}}$. Consider the following strategy and belief profile: politicians of both types allocate $a_1 = 1$ and a politician of either type allocates $a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z \in \{\emptyset, 1\} \\ 0 & \text{if } z = 0. \end{cases} \tag{A16}$$

  By inspection, these beliefs follow from Bayes' rule. Denote posterior beliefs in A16 as μ_z and equilibrium allocation strategies as $\boldsymbol{a}$. A politician of type $\theta = \underline{\theta}$ will not deviate if:

$$\underline{\theta}q + p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) > 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$

  In this equilibrium, $E[g_2|\theta = \overline{\theta}] = E[g_2|\theta = \underline{\theta}] = 0$ since $a_2 = 0 \forall \theta$. This implies that $\tau(\mu, \boldsymbol{\alpha}) = \frac{1}{2}$ for any μ. Because $\underline{\theta}q < 1$ in this region, the inequality is never satisfied. Thus, this strategy and belief profile is not an equilibrium.

- Second, suppose $q \in \left[\frac{1}{\overline{\theta}}, \frac{1}{\underline{\theta}}\right)$: This equilibrium is equivalent to the fourth case of Proposition A1. This equilibrium can be sustained for any $q \in [q \geq \frac{2b}{2\underline{\theta}b + \overline{\theta}p\pi}, \frac{1}{\underline{\theta}})$.

Now, consider the candidate separating equilibria.

- First, suppose that $q < \frac{1}{\overline{\theta}}$. Consider the following strategy and belief profile: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = 1$ and $a_2 = 0$ while a politician of type $\theta = \underline{\theta}$ allocates $a_1 = a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ 0 & \text{if } z = 0 \\ 1 & \text{if } z = 1. \end{cases} \tag{A17}$$

These beliefs follow from Bayes' rule by inspection. Denoting the posteriors in (A17) and equilibrium allocation strategies as $\boldsymbol{a}$, a politician of type $\theta = \overline{\theta}$ will not deviate if:

$$\overline{\theta}q + p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) \geq 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$
$$\tau(\mu_1, \boldsymbol{a}) - \tau(\mu_0, \boldsymbol{a}) \geq \frac{1-\overline{\theta}q}{p}.$$

But when $a_2 = 0 \forall \theta$, $\tau(\mu, \boldsymbol{a}) = \frac{1}{2} \forall \mu$. This means that $\tau(\mu_1, \boldsymbol{a}) - \tau(\mu_0, \boldsymbol{a}) = 0$, and so the inequality is never satisfied. Thus, this profile of strategies and beliefs cannot be sustained as an equilibrium.

- Second, suppose $q \geq \frac{1}{\underline{\theta}}$ Consider the following strategy and belief profile: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = a_2 = 1$ while a politician of type $\theta = \underline{\theta}$ allocates $a_1 = 0$ and $a_2 = 1$; the bureaucrat exerts effort proportional to θ in each period; the voter votes to re-elect if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are identical to the previous case.

  Denoting posterior beliefs in (A17) as μ_z and equilibrium allocation strategies, $\boldsymbol{a}$, a politician of type $\theta = \underline{\theta}$ will not deviate if:

$$1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) \geq \underline{\theta}q + p\tau(\mu_1, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$
$$\frac{1-\underline{\theta}q}{p} \geq \tau(\mu_1, \boldsymbol{a}) - \tau(\mu_0, \boldsymbol{a}).$$

  As $\underline{\theta}q > 1$ and $\tau(0, \boldsymbol{a}) < \tau(1, \boldsymbol{a})$ by Lemma A1, this cannot be sustained as an equilibrium.

Finally consider a candidate semi-separating equilibrium. Suppose that $q \leq \frac{1}{\overline{\theta}}$: a politician of type $\theta = \overline{\theta}$ allocates $a_1 = 1$ with probability $k \in (0,1)$ and $a_1 = 0$ with probability $1-k$ and $a_2 = 0$; politician of type $\theta = \underline{\theta}$ allocates $a_1 = a_2 = 0$; the bureaucrat exerts effort proportional to θ in each period; the voter re-elects the incumbent if $E[u_2^V(i)] \geq E[u_2^V(c)]$; and the voter's beliefs are as follows:

$$\mu = \begin{cases} \pi & \text{if } z = \emptyset \\ \frac{\pi(1-k)}{\pi(1-k)+1-\pi} & \text{if } z = 0 \\ 1 & \text{if } z = q. \end{cases} \tag{A18}$$

Denoting the posterior beliefs in (A18) as μ_z and equilibrium allocation strategies as **a**, a politician of type $\overline{\theta}$ chooses k such that they are indifferent between allocating resources to the public good and not allocating resources to the public good.

$$\overline{\theta}q + p\tau(\mu_q, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a}) = 1 + p\tau(\mu_0, \boldsymbol{a}) + (1-p)\tau(\mu_\emptyset, \boldsymbol{a})$$
$$\tau(\mu_q, \boldsymbol{a}) - \tau(\mu_0, \boldsymbol{a}) = \frac{1-\overline{\theta}q}{p}$$

Note from (8), that $\tau(\mu_q, \boldsymbol{a}) = \tau(\mu_0, \boldsymbol{a}) = \frac{b-\overline{\theta}q\pi k}{2b}$. Because $1 - \overline{\theta}q > 0$ when $q < \frac{1}{\overline{\theta}}$, there exists no $k \in (0,1)$ at which the politician of type $\theta = \overline{\theta}$ is indifferent between contributing and not contributing to public goods. As such this strategy and belief profile is not an equilibrium. ■

A1.3 Proposition D1

See Dataverse Appendix D1.1 for Proposition D1 and proof.

A1.4 Formal Motivation of Empirical Tests

The tests described in Table 1 follow directly from Propositions 1 and A1. However, in the data, politicians represent a mix of first- and second-period politicians. As such, it is necessary to examine the equilibrium composition of incumbents to make testable predictions. In Table A1, I introduce notation for the shares of each type of incumenbent (by type and term). To denote these shares, is useful to denote the **equilibrium probability of re-election**, as $R(q)$.

	Politician type, θ		
	$\overline{\theta}$	$\underline{\theta}$	
First term ($t = 1$)	$\pi(1 - R(q))$	$(1 - \pi)(1 - R(q))$	$1 - R(q)$
Second term ($t = 2$)	$\pi R(q\|\theta = \theta)$	$(1 - \pi)R(q\|\theta = \underline{\theta})$	$R(q)$

Table A1: $R(q)$ is the equilibrium probability of re-election.

Corollaries A1-A2 follow from Proposition 1.

Corollary A1 *In the model and equilibria characterized in Proposition 1:*
(i) For any $q < q_1$, $R(q|\theta = \overline{\theta}) = R(q|\theta = \underline{\theta}) = \frac{1}{2}$.
(ii) For any $q \geq q_1$, $R(q|\theta = \overline{\theta}) > R(q|\theta = \underline{\theta})$.

Corollary A2 *In the model and equilibria characterized in Proposition 1:*
(i) For any $q \notin [q_2, q_4)$, $R(q) = \pi R(q|\theta = \overline{\theta}) + (1 - \pi)R(q|\theta = \underline{\theta}) = \frac{1}{2}$.
(ii) For any $q \in [q_2, q_3)$, $R(q) = \frac{b+\underline{\theta}qk(\pi-1)}{2b} < \frac{1}{2}$, *where* k *is the probability that a first-period incumbent of type* $\theta = \underline{\theta}$ *allocates* $a_1 = 1$.
(iii) For any $q \in [q_3, q_4)$, $R(q) = \frac{b+\underline{\theta}q(\pi-1)}{2b} < \frac{1}{2}$.

Remark A1 ***Empirical Implication #1****: Politician allocations to rents,* $1 - a_t$, *are (weakly) piecewise decreasing in bureaucratic quality,* q.

Proof: Following the equilibrium characterization in 1 and Corollary A1:

$$E[1-a] = \begin{cases} 1 & \text{if } q < q_1 \\ (1-\pi)(1-R(q)) + (1-\pi)R(q|\theta=\underline{\theta}) & \text{if } q \in [q_1, q_2) \\ (1-\pi)(1-R(q))(1-k) + (1-\pi)R(q|\theta=\underline{\theta}) & \text{if } q \in [q_2, q_3) \\ (1-\pi)R(q|\theta=\underline{\theta}) & \text{if } q \in [q_3, q_4) \\ 0 & \text{if } q \geq q_4. \end{cases} \tag{A19}$$

To show that $E[1-a]$ is piecewise decreasing in q, it is clear from inspection that $E[1-a|q < q_1] > E[1-a|q \in [q_1, q_2)]$ and that $E[1-a|q \in [q_3, q_4)] < E[1-a|q \geq q_4]$. When $q \in [q_1, q_2)$, Corollary A2 establishes that $R(q) = \frac{1}{2}$. It is straightforward to show that $\frac{\partial R(q|\theta=\underline{\theta})}{\partial q} = -\frac{\overline{\theta}^2 p(1-\pi)\pi}{2b(1-\overline{\theta}\pi)} < 0$ in this region. This is sufficient to ensure that in this region, $\frac{\partial E[1-a]}{\partial q} < 0$.

Second, consider $q \in [q_2, q_3)$. Recall from the proof of Proposition 1 that k is strictly increasing in q. This implies that $\frac{\partial 1-k}{\partial q} < 0$. Per Corollary A2, $\frac{\partial R(q)}{\partial q} = \frac{(\pi-1)\overline{\theta}k}{2b} < 0$. It is also straightforward to show that $\frac{\partial R(q|\theta=\underline{\theta})}{\partial q} = \frac{\overline{\theta}(k(\pi-1)-\pi p+\frac{\overline{\theta}\underline{\theta}kp\pi}{\overline{\theta}\pi+\underline{\theta}k(1-\pi)}-\frac{(\overline{\theta}-1)(\underline{\theta}k-1)\pi p}{-1+\overline{\theta}\pi+k\underline{\theta}(1-\pi)})}{2b} < 0$ under the relevant parametric assumptions. These observations are jointly sufficient to ensure that $\frac{\partial E[1-a]}{\partial q} < 0$ in this region.

Finally consider $q \in [q_3, q_4)$. It is straightforward to show that $\frac{\partial R(q|\theta=\underline{\theta})}{\partial q} = -\frac{\overline{\theta}(\overline{\theta}-\underline{\theta})^2 p(1-\pi)\pi^2}{2b(\underline{\theta}(1-\pi)+\overline{\theta}\pi)(1-\underline{\theta}(1-\pi)-\overline{\theta}\pi)} < 0$ in this region. This is sufficient to ensure that in this region, $\frac{\partial E[1-a]}{\partial q} < 0$.

No bureaucrat case: When $\overline{\theta} = 1$ and $\underline{\theta} = 0$, the separating equilibrium obtains for all q. In this case $(1-\pi)(1-R(q))$ does not vary in q and $\frac{\partial R(q|\theta=\underline{\theta})}{\partial q} = -\frac{p\pi}{2b} < 0$. The competent type always allocates funds to public goods while the incompetent type allocates funds to rents. Any decreases in rents in q are driven by positive-selection of second-period bureaucrats.

Remark A2 ***Empirical Implication #2***: *Politicians allocate more or less to rents in their second term ($t = 2$) than in their first term ($t = 1$). This difference is attenuated to zero at very low and high levels of bureaucratic quality.*

Proof: Following the equilibrium characterization in Proposition 1:

$$E[1-a_2] - E[1-a_1] = \begin{cases} 0 & \text{if } q < q_1 \\ \frac{(1-\pi)R(q|\theta=\underline{\theta})}{R(q)} - \frac{(1-\pi)(1-R(q))}{(1-R(q))} & \text{if } q \in [q_1, q_2) \\ \frac{(1-\pi)R(q|\theta=\underline{\theta})}{R(q)} - \frac{(1-k)(1-\pi)(1-R(q))}{(1-R(q))} & \text{if } q \in [q_2, q_3) \\ \frac{(1-\pi)R(q|\theta=\underline{\theta})}{R(q)} & \text{if } q \in [q_3, q_4) \\ 0 & \text{if } q > q_4 \end{cases} \tag{A20}$$

Consider the case in which $q \in [q_1, q_2)$ which corresponds to the separating equilibrium. In this region, each type makes the same allocation in both periods. As such term effects must be driven only by the difference in the composition of first- versus second-period incuments. By Proposition A1 and Lemma A1, second-period politicians are more likely to be of type $\overline{\theta}$ than are first-period politicians when $p > 0$. As such, $\frac{(1-\pi)R(q|\theta=\underline{\theta})}{R(q)} - \frac{(1-\pi)(1-R(q))}{(1-R(q))} \leq 0$.

Next, consider the case in which $q \in [q_3, q_4)$, the pooling equilibrium in which an incompetent type allocates $a_1 = 1$ but $a_0 = 0$. In this case, second-period incompetent-type politicians shirk with probability 1. As such, $E[1-a_2] - E[1-a_1] = \frac{(1-\pi)R(q|\theta=\underline{\theta})}{R(q)} > 0$, the share of incompetent second-period politicians.

Finally, consider the case in which $q \in [q_2, q_3)$, the partially pooling equilibrium. Because the corner cases ($q = q_2$ and q_3) are identical to the second and fourth cases, respectively, $\frac{(1-\pi)R(q|\theta=\underline{\theta})}{R(q)} - \frac{(1-k)(1-\pi)(1-R(q))}{(1-R(q))}$ is increasing in k and must cross zero where the effect of positive selection is perfectly compensated for by the rate at which the politician allocates to public goods (k) in the first period.

No bureaucrat case: When $\overline{\theta} = 1$ and $\underline{\theta} = 0$, the separating equilibrium obtains for all q. In this case $\frac{\rho_{2\underline{\theta}}(q)}{\rho_2(q)} - \frac{\rho_{1\theta}}{\rho_1(q)} \geq 0$, which follows from the case when $q \in [q_1, q_2)$.

No information case: When $p = 0$, $q_2 = q_3 = q_4$. This implies $E[1-a_2] - E[1-a_1] = 0 \forall q$. For $q < q_1$ and $q \geq q_4$, this follows from (A20). For $q \in [q_1, q_4)$, note that a lack of voter information prevents updating and thus positive selection. This implies, $\frac{\rho_{2\underline{\theta}}(q)}{\rho_2(q)} = \frac{\rho_{1\theta}}{\rho_1(q)} = 1 - \pi$, so that $E[1-a_2] - E[1-a_1] = 0$.

Remark A3 ***Empirical Implication #3***: *At high levels of bureaucratic quality, a voter's posterior belief (μ) is equivalent to her prior (π) upon receiving a signal that a politician allocated no funds to rents ($a = 1$).*

Proof: This follows directly from (iv) and (v) of Proposition A1.

No bureaucrat case: When $\overline{\theta} = 1$ and $\underline{\theta} = 0$, the separating equilibrium obtains for all q. In this case, when $z = 1$, $\mu = 1 > \pi$, so a voter should update positively in response to a signal of $a_1 = 1$.

Remark A4 ***Empirical Implication #4***: *Incumbency disadvantage does not emerge at low or high levels of bureaucratic quality (q).*

Proof: Incumbency disadvantage emerges only when $q \in [q_2, q_4)$. This follows directly from Corollary A2.

No bureaucrat case: When $\overline{\theta} = 1$ and $\underline{\theta} = 0$, the separating equilibrium obtains for all q. Corollary A2 shows that incumbency disadvantage does not emerge for $q \in [q_1, q_2)$.

No information case: When $p = 0$, $q_2 = q_3 = q_4$. Corollary A2 shows that incumbency disadvantage does not emerge for $q < q_2$ or $q \geq q_4$. As such, incumbency disadvantage does not emerge in this case.

A1.5 Bureaucratic quality and/or politician competence?

See Dataverse Appendix D1.2.

A2 Bureaucratic Quality Measure

A2.1 Operationalization

The bureaucratic quality question is coded from counts of public employees in direct municipal administration according to Table A2.

	Category (Portuguese)	Highest education	N	Value (v)
1	*Sem instrução*	Incomplete primary	N_0	$v_0 = 0$
2	*Ensino fundamental*	Complete primary	N_1	$v_1 = 1$
3	*Ensino médio*	Complete secondary	N_3	$v_2 = 2$
4	*Ensino superior*	Complete undergraduate	N_4	$v_3 = 3$
5	*Pós-graduação*	Complete post-grad	N_5	$v_4 = 4$

Table A2: Classification of educational composition of municipal employees as reported MUNIC surveys.

The average education measure is calculated, within a survey (single year) as:

$$\text{Average education} = \frac{\sum_{c=1}^{5} N_c v_c}{\sum_{c=1}^{5} N_c} \tag{A21}$$

Denote average education in municipality θ in year t as q_{mt}. The z-score standardization, denoted Q_{mt}, is calculated as:

$$Q_{mt} = \frac{q_{mt} - \mu_{q_{mt}}}{\sigma_{q_{mt}}} \tag{A22}$$

where $\mu_{q_{mt}}$ denotes the mean of q_{mt} and $\sigma_{q_{mt}}$ denotes the standard deviation of $q_m t$. In estimation, all quantiles refer to the full distribution of Q_{mt} (equivalent to the quantiles of q_{mt}, *not* quantiles within the sample.

A2.2 Description

Figure A1 depicts the distribution of the raw (unstandardized) measure of bureaucratic quality over time. Figure A2 depicts the relationship between the set of covariates intended to adjust for variation in local labor markets. and bureaucratic quality. These provide a visualization of the fixed effects used in (non-interactive) specifications. I plot the explanatory power of these covariates in Figure A3, showing that these covariates account less than 20% of the variation in the bureaucratic quality measure.

A2.3 Persistence of bureaucratic quality

Measuring the persistence of the bureaucratic quality measure is important for two reasons. First, per the model, q is an exogenous parameter assumed to be outside the short-term policy options available to an incumbent. While Figure

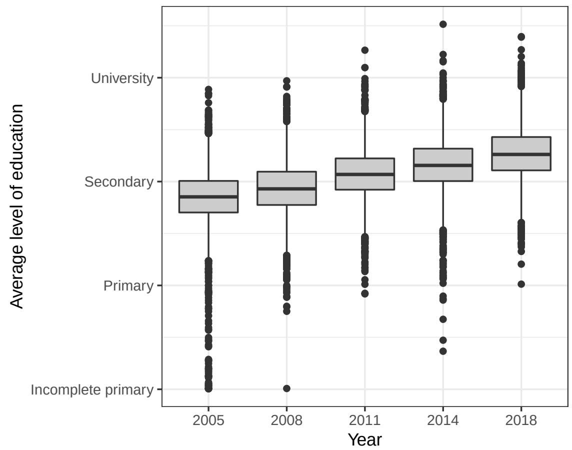

Figure A1: Distribution of the bureaucratic quality measure (not standardized), by year. The interquartile range (IQR) is given by the gray boxes. The confidence intervals are given by the Median $\pm \frac{1.58 \text{ IQR}}{\sqrt{n}}$, where n is the number of observations.

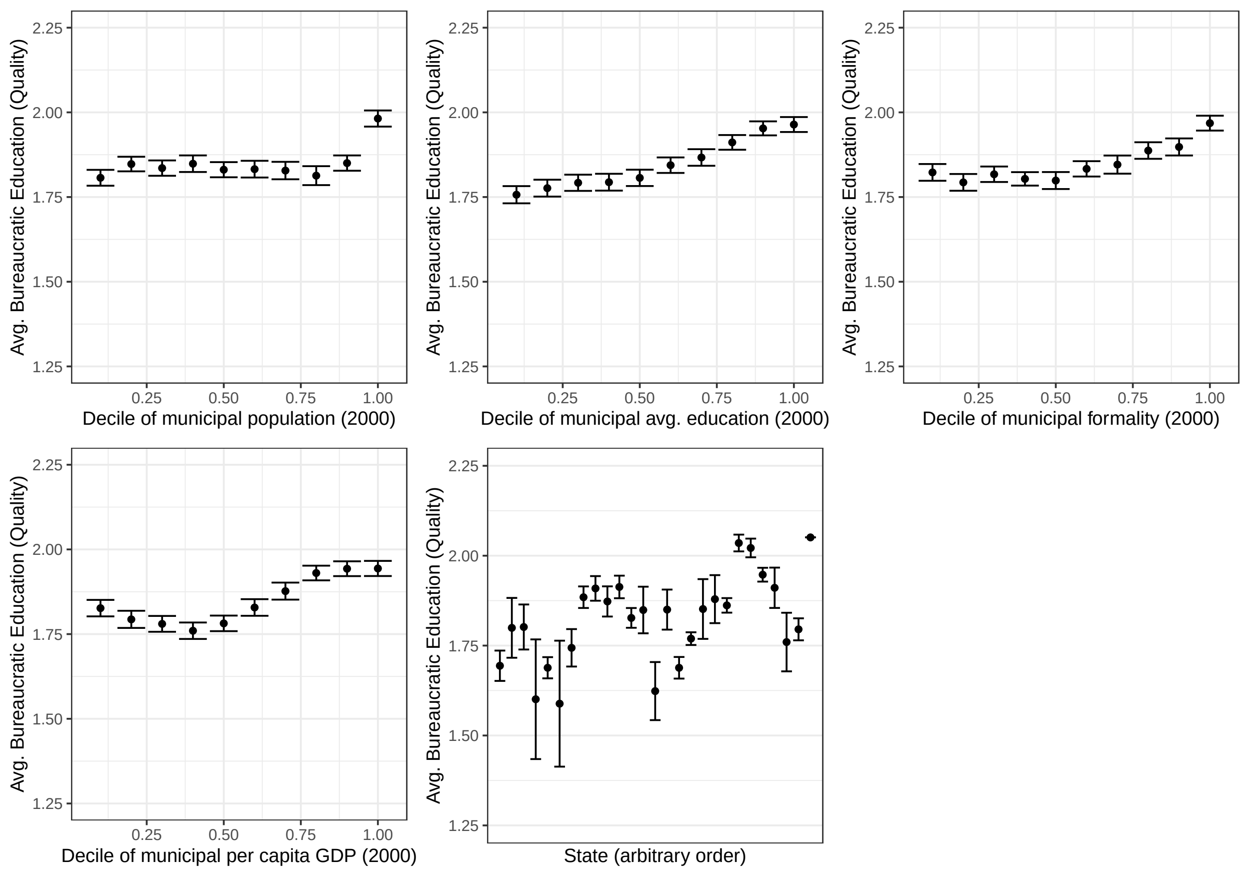

Figure A2: Conditional means of the 2005 bureaucratic quality measure (not standardized) at deciles of municipal population, average years of education, percentage of formal employees in the workforce, and GDP per capital as well as by state. The segments represent 95% confidence intervals.

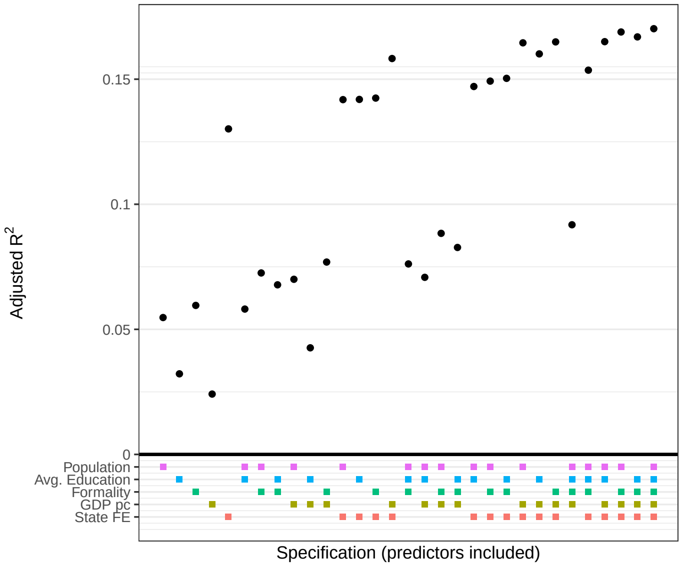

Figure A3: This plot shows the explanatory power of the state fixed effects and binned economic covariates in predicting the bureaucratic quality measure. Each point represents the adjusted R^2 of a model regressing standardized bureaucratic quality on the set of covariates shown below the x-axis. Note that state FE have the highest predictive power and a substantial portion (>80%) of the variation in bureaucratic quality is not explained by these covariates.

A1 shows gradual increases in education (quality) over time, I seek to understand whether these changes are driven by variation in the local political environment. It is important to clarify whether changes in politician (or party) yield differential changes in bureaucratic quality. Second, given the years in which education is reported in the MUNIC surveys do not align perfectly with the years in which the other data occurred/was collected, it is important to show that relative measures of bureaucratic quality are "sticky." I provide two analyses to respond to these considerations empirically.

Table A3 reports the autocorrelation of the measures used in the construction of the bureaucratic quality measure. It indicates substantial autocorrelation across waves of the MUNIC survey for all component categories of the bureaucratic quality measure.

Table A4 conducts a first-difference analysis of changes in bureaucratic quality as a function of changes in municipal administration. Since all elections are simultaneous, the "treatments" of interest are (1) whether the mayor changes

Measure	Raw count/measure		Per-capita measure	
	≈ Triennial	Annualized	≈ Tri-ennial	Annualized
Total officials in direct administration	0.977	0.993	0.851	0.952
Highest education: primary school complete	0.866	0.957	0.437	0.775
Highest education: secondary school complete	0.951	0.985	0.400	0.754
Highest education: undergraduate degree	0.975	0.992	0.473	0.794
Highest education: postgraduate degree	0.889	0.964	0.537	0.826
Average education of officials (quality)	0.574	0.843	–	

Table A3: Autocorrelation of bureaucratic education/quality measures over five waves of MUNIC. The per-capita measure of total officials uses municipal population (measured in the preceding census) as a denominator. The per-capita measures of highest education level use the number of officials in direct administration as a denominator.

	Δ Bureaucratic Quality					
		2008-2011			2011-2014	
	(1)	(2)	(3)	(4)	(5)	(6)
Change in mayor	-0.011	-0.007	-0.004	0.008	0.009	0.009
	(0.009)	(0.009)	(0.007)	(0.012)	(0.012)	(0.010)
Change in party	0.013	0.003	0.002	-0.017	-0.019^{*}	-0.016^{*}
	(0.009)	(0.009)	(0.008)	(0.011)	(0.011)	(0.009)
Lagged bureaucratic quality			-0.638^{***}			-0.560^{***}
			(0.015)			(0.016)
State FE		✓	✓		✓	✓
DV Mean, no change	0.137	0.137	0.137	0.084	0.084	0.084
DV St. Dev, no change	0.261	0.261	0.261	0.251	0.251	0.251
Adj. R^2	0.000	0.026	0.360	0.000	0.003	0.255
Num. obs.	4932	4932	4932	4719	4719	4719
Election year	2008	2008	2008	2012	2012	2012
		2014-2018			Pooled	
	(7)	(8)	(9)	(10)	(11)	(12)
Change in mayor	-0.014	-0.015	-0.003	-0.014^{**}	-0.011^{*}	0.008
	(0.012)	(0.012)	(0.010)	(0.006)	(0.006)	(0.005)
Change in party	0.003	0.002	-0.001	0.002	-0.002	0.001
	(0.011)	(0.011)	(0.010)	(0.006)	(0.006)	(0.005)
Lagged bureauratic quality			-0.601^{***}			-0.547^{***}
			(0.018)			(0.010)
State FE		✓	✓		✓	✓
DV Mean, no change	0.104	0.104	0.104	0.109	0.109	0.109
DV St. Dev, no change	0.251	0.251	0.251	0.255	0.255	0.255
Adj. R^2	-0.000	0.003	0.319	0.000	0.007	0.293
Num. obs.	4362	4362	4362	14013	14013	14013
N Clusters				5293	5293	5293
Election year	2016	2016	2016	All	All	All

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table A4: First difference analysis of the effects of changing a mayor or partisan affiliation of the mayor in an election on bureaucratic quality. The cross-sectional specifications use heteroskedasticity-robust standard errors and the panel specification clusters standard errors at the municipal level. Note that the state fixed effects are implemented by demeaning which produces no estimates of these parameters.

(71% of observations); and (2) whether the party of the mayor changes (68% of observations). Note that due to comparatively high rates of party switching, there are cases in which a mayor is re-elected under a different party label. I conduct a first-difference analysis of the form:

$$Q_{ms,t=1} - Q_{m,t=0} = \beta_0 + \beta_1 \text{New mayor}_m + \beta_2 \text{Different party}_m + \gamma_s + \kappa Q_{m,t=0} + \epsilon ms$$

Table A4 estimates this equation with OLS for each election (specifications 1-9) and then on the pooled sample. Columns 10-12 estimate this expression on the pooled sample, clustering standard errors at the municipality level. All coeficients are very small in magnitude and are generally indistinguishable from 0. In the pooled sample with covariate adjustment (Column 12), we can reject any effects outside of the [-0.003, 0.018] interval for a new mayor and outside the [-0.010, 0.011] interval for a mayor of a different party. In sum, this analysis provides no evidence that, on average, changes in leadership lead to substantive changes in bureaucratic quality.

To be sure that the effect of changing a mayor or mayoral party is not obscured by examining only mean shifts, I plot the ECDFs of the differenced bureaucratic quality outcome by each political "treatment" in Figure A4. There is no evidence of effects on the variance.
Finally, I examine correlation between bureaucratic quality and the presence of community radio. Community radio is the the medium through which information from audit investigations is purported to diffuse (Ferraz and Finan, 2008).

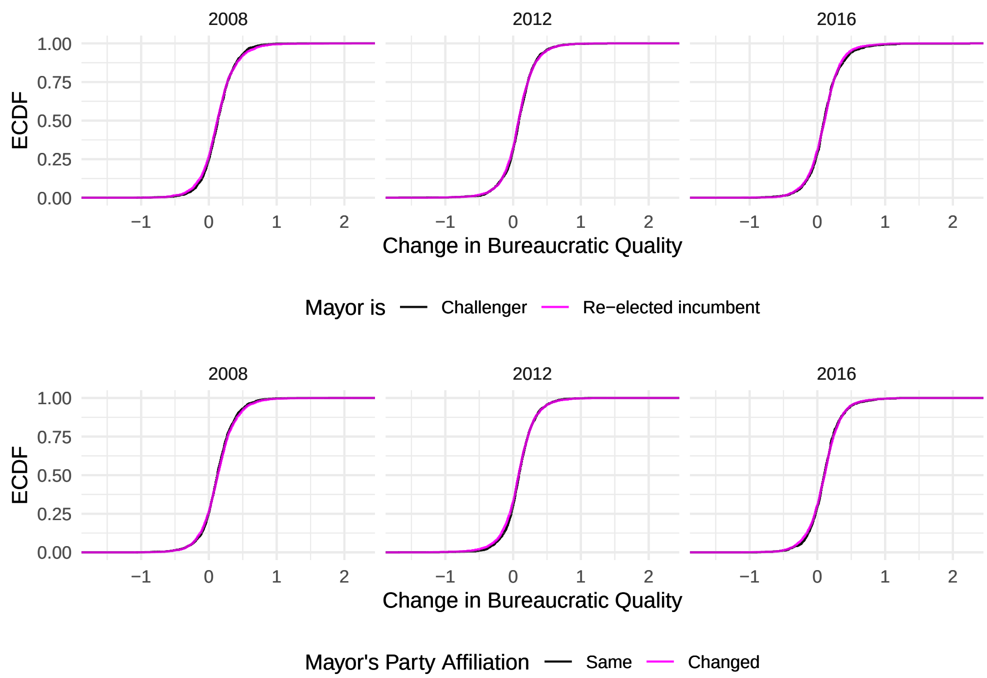

Figure A4: These graphs plot the ECDF of differences in bureaucratic quality for each of the political "treatments" examined in Table A4.

Note that, in general, existing evidence suggests that community radio simply diffuses informational signals if they emerge, i.e., the results of local audits. There is not evidence that the presence of a community radio station alone increments the probability of revelation (p in the model).

I gather data on community radio from ANATEL, Brazil's National Telecommunications Agency. I use ANATEL's database of historical licensing of FM radio stations to collect the data.[1] I examine the radio stations that were licensed on December 31 of the preceding year.

To ensure that bureaucratic quality is not simply capturing community radio presence, I examine the association between bureaucratic quality and radio presence in each year that I study. Table A5 shows that while the contemporaneous presence of community radio is positively associated with bureaucratic quaity, this association disappears after conditioning on the standard set of controls described in Figure A3.

A2.4 Assessing the correlation of bureaucratic quality and politician competence

The empirical implications enumerated in Table 1 are all-else-equal predictions about variation in bureaucratic quality q. However, covariance between bureaucratic quality and politician competence could over- or understate the magnitude of the effects of bureaucratic quality, as shown in the analysis of Appendix D1.2.2.

To evaluate the extent of these concerns empirically, I draw upon data on all mayoral candidates that competed in the 2004 and 2008 mayoral elections in Brazil. I use two proxies for candidate competence: education and the average education level of the candidate's declared profession. The latter measure attributes higher competence to candidates who work in occupations with higher average education than their level of formal education and vice versa. In each

[1] See http://sistemas.anatel.gov.br/se/public/view/b/srd.php for data.

	Community radio in municipality (Indicator)			
	(1)	(2)	(3)	(4)
Bureaucratic Quality (z-score)	0.053***	−0.000	0.059***	−0.000
	(0.007)	(0.005)	(0.007)	(0.005)
Sample (year)	2004	2004	2011	2011
State FE		✓		✓
Demographic covariates (decile bins)		✓		✓
Adj. R^2	0.015	0.451	0.015	0.439
Num. obs.	5349	5347	5230	5230
RMSE	0.437	0.326	0.477	0.360

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table A5: Association between bureaucratic quality and community radio presence. The demographic covariates include municipal population, education, formality, and GDP per capita decile bins. Heteroskedasticity-robust standard errors in parentheses. All fixed effects and covariates are binary indicators. Covariate adjustment is implemented by demeaning, which produces no estimates of these parameters.

Competence based on candidate:	Correlation	Residualized correlation
AVERAGE OF ALL MAYORAL CANDIDATES		
Education level	00.108 [0.089, 0.127]	0.022 [0.003, 0.041]
Profession	0.106 [0.087, 0.125]	0.024 [0.005, 0.043]
WEIGHTED BY VOTE SHARE		
Education level	0.051 [0.032, 0.071]	-0.006 [-0.026, 0.014]
Profession	0.05 [0.03, 0.07]	-0.006 [-0.026, 0.014]

Table A6: Correlation between bureaucratic quality and a measure of politician competence. 95% confidence intervals in brackets. The residualized correlations use the full set of flexible labor market controls.

municipality, I generate a summary measure of the mayoral candidate pool by taking the (weighted) average of the competence measure for all politicians in a municipality. For the main measure of politician competence, I take the average across all candidates. For a secondary measure of politician competence, I weight by candidates' eventual vote share, such that the measure favors winning or highly competitive candidates.

Table A6 reports the correlation between politician competence measures and bureaucratic quality across all municipalities over two election cycles (2004 and 2008). It shows a highly circumscribed positive correlation between bureaucratic quality and either politician competence measures that is (nearly) eliminated when both measures are residualized by the standard set of covariates. The results do not substantially vary across the two approaches to weighting different candidates. It is important to acknowledge that education or profession may be noisy measures of politician competence. To the extent that this is the case, measurement error is likely to attenuate the reported correlations toward zero.

A3 Bureaucratic Quality and Allocation to Rents

A3.1 Plots of Raw Data

See Dataverse Appendix D2.2 for visualization of the relationship between bureaucratic quality and corrupt spending.

A3.2 Sensitivity Analysis

All sensitivity analyses report the senstitivity statistics proposed by Cinelli and Hazlett (2020). For each specification, I present three sensitivity statistics, with the following interpretation (see Cinelli and Hazlett (2020)):

- $R^2_{Y\sim D}$ or $R^2_{Y\sim D|\mathbf{X}}$ reports the partial-R^2 of the relevant treatment, D, with the outcome, Y, unconditional or conditional on covariates, **X**. One interpretation of this quantity is that an extreme confounder that is orthogonal to included covariates that explans all (100%) of the variation in the outcome would need to explain at least $R^2_{Y\sim D|\mathbf{X}} \times 100\%$ of the variation in the treatment, D to explain away the observed estimate.

- $RV_{q=1}$ reports the robustness value, which means that an unobserved confounder that is orthogonal to the included covariates would need to explain more than $RV_{q=1} \times 100\%$ of the residual variance in *both* the treatment, D and the outcome Y to explain away the observed estimate (e.g., attenuate the estimate to zero).

- $RV_{q=1,\alpha=.1}$ reports the robustness value for the qualitative inference at the $\alpha = 0.1$ level. This means that an unobserved confounder that is orthogonal to the included covariates would need to explain more than $RV_{q=1,\alpha=0.1} \times 100\%$ of the residual variance in *both* the treatment, D and the outcome Y to lead us to fail to reject the null hypothesis at the $\alpha = 0.1$ level. This value is obviously 0 for any estimate that is not statistically significant at the $\alpha = 0.1$ level.

The challenge with any of these quantities is how to benchmark them. For a given treatment and outcome, what is a large robustness value? This obviously depends on how prognostic of covariates we have. I use two benchmarks for the robustness value ($RV_{q=1}$):[2]

- The minimum partial-R^2 of the *most prognostic covariate* (or covariate level) on treatment or the outcome. To select the most prognostic covariate, I estimate the partial-R^2 from the covariate-adjusted regression model as well as a regression of the treatment on the full set of covariates described in the paper. This generates two partial-R^2 estimates per covariate. The most prognostic covariate has the largest *minimum* of these two partial-R^2's. I then report the ratio of the robustness value to the minimum of these two partial-R^2's. This yields the following interpretation: the robustness value is K times as strong as the minimum partial-R^2 of the best predictor. Values above 1 mean an omitted confounder would need to be more prognostic than the most prognostic covariate.

- The partial-R^2 of the full set of covariates described in the paper. I calculate the partial-R^2 of the covariates (omitting the intercept and treatment from the partial-R^2) as well as the partial-R^2 from a regression of the treatment on covariates (also omitting the intercept from the partial R^2). I report the ratio of the robustness value to the minimum of these two partial-R^2's. This yields the following interpretation: the robustness value is K times as strong as the minimum partial-R^2 of the full set of flexible predictors that I use in the covariate adjustment set. Values above 1 mean an omitted confounder would need to be more prognostic than the full adjustment set.

Tables A7-A8 report these statistics and conduct the above-described benchmarking exercise. It suggests that for the contrasts in which we detect that rents are decreasing in bureaucratic quality (the linear specification, the tercile 3 to tercile 1 comparison, and the quartile 4 to quartile 1 comparison), a confounder would need to be quite strong to explain away the observed estimate. Specifically, it would need to be 4-8 times as strong as the most prognostic covariate in any specification and 42%-53% as strong as the full set of predictors used in the covariate-adjusted analysis (this includes 71 covariates or covariate levels). This suggests that the results in Table 2 are quite robust to the possibility of confounding.

A3.3 Extensions

See Dataverse Appendix D2.3 for extensions of Result 1 that decompose corrupt spending by category and examine heterogeneity by community radio presions.

[2]Note that Cinelli and Hazlett (2020) propose plotting the with a contour plot of both partial-R^2's. The ratios I use communicate the distance along the longer dimension of the contour plot.

Panel	Treatment	Bivariate specification (Column 1) Est.	SE	$R^2_{Y\sim D}$	$RV_{q=1}$	$RV_{q=1,\alpha=.1}$	Multivariate specification (Column 3) Est.	SE	$R^2_{Y\sim D\|\mathbf{X}}$	$RV_{q=1}$	$RV_{q=1,\alpha=.1}$
A	BQ (Z-score)	-0.014	0.006	0.013	0.107	0.035	-0.017	0.007	0.016	0.121	0.043
B	BQ Tercile 2	-0.009	0.012	0.001	0.035	0.000	-0.009	0.012	0.002	0.038	0.000
	BQ Tercile 3	-0.027	0.012	0.011	0.098	0.025	-0.036	0.018	0.011	0.100	0.020
C	BQ Quartile 2	-0.009	0.015	0.001	0.027	0.000	-0.002	0.015	0.000	0.006	0.000
	BQ Quartile 3	-0.019	0.015	0.004	0.058	0.000	-0.029	0.015	0.009	0.092	0.011
	BQ Quartile 4	-0.029	0.014	0.010	0.093	0.020	-0.042	0.021	0.011	0.099	0.019

Table A7: Sensitivity statistics for the estimates in Table 2. Each row corresponds to one row in the regression table. See above for discussion of the interpretation of the sensitivity statistics.

		Partial-R^2				Ratio	
		Best predictor		Full covariate set		Best predictor	Full covariate set
Panel	Treatment	$R^2_{Y\sim X\|D}$	$R^2_{D\sim X}$	$R^2_{Y\sim\mathbf{X}\|D}$	$R^2_{D\sim\mathbf{X}}$		
A	BQ (Z-score)	0.021	0.015	0.228	0.294	8.003	0.531
B	BQ Tercile 2	0.017	0.008	0.228	0.299	4.527	0.168
B	BQ Tercile 3	0.021	0.047	0.228	0.458	4.858	0.437
C	BQ Quartile 2	0.018	0.010	0.234	0.294	0.620	0.027
C	BQ Quartile 3	0.023	0.041	0.234	0.471	3.974	0.393
C	BQ Quartile 4	0.023	0.030	0.234	0.491	4.275	0.423

Table A8: Benchmarking robustness values to the implied partial-R^2's from the estimates in Column (3) of Table 2. The ratio is given by $RV_{q=1}/\min\{R^2_{Y\sim\mathbf{X}|D}, R^2_{D\sim\mathbf{X}}\}$.

A4 First-term vs. Second-term Allocation to Rents

A4.1 Plot of Conditional Means

See Dataverse Appendix D3 for an alternative visualization of Result 2.

A4.2 Regression table

Given the estimator in (10), the quantity of interest is $\beta_1 + \beta_3 Q_m$. Table A9 suggests that this quantity is positive at low quantiles of bureaucratic quality but indistinguishable from 0 at high quantiles. The estimates of β_1 are consistently positive and statistically significant. The significance of the interaction term varies, though its sign is consistently negative. Ultimately the inference that I draw is on the estimate $\widehat{\beta}_1 + \widehat{\beta}_3 Q_m$, not simply $\widehat{\beta}_3$.

A4.3 Decomposing the sources of second-term shirking

To decompose the compound mechanism behind term effects, I use a RDD in an attempt to vary the composition of the second period mayors by varying bandwidths. As I am interested in average differences, as opposed to CATEs at the threshold where the margin of victory is equal to zero, I use zero-degree polynomials in contrast to increasingly standard practice in RDs. I estimate Equation 10 at different bandwidths in terms of the 2000 margin of victory, starting with 0.1, which is smaller than the bandwidth selected in (Ferraz and Finan, 2011).[3] At smaller bandwidths, incompetent types should theoretically represent a larger share of the second-term politicians. Since these are the mayors predicted to extract rents in their second term, the marginal effect of term should be larger at small bandwidths, but only at low levels of bureaucratic quality. This is consistent with the point estimates (and differences between the narrowest and widest bandwidths) in Figure A5.

[3] To maintain a common set of covariates across bandwidths, I omit the covariates except for lottery fixed effects in this analysis. The estimates are substantively similar with covariates but I lack degrees of freedom to estimate effects at the narrowest bandwidths.

	Share of corrupt spending				
	(1)	(2)	(3)	(4)	(5)
LINEAR BUREAUCRATIC QUALITY MEASURE (Z-SCORE)					
Second term	0.021^{**}	0.021^{**}	0.019^{*}	0.022^{**}	0.022^{**}
	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
Bureaucratic quality (Z-score)	−0.007	−0.009	-0.015^{*}	−0.007	−0.008
	(0.006)	(0.007)	(0.009)	(0.007)	(0.007)
Second term × BQ	−0.019	−0.012	−0.007	−0.018	−0.016
	(0.012)	(0.014)	(0.015)	(0.013)	(0.015)
BUREAUCRATIC QUALITY TERCILES					
Second term	0.050^{**}	0.043^{*}	0.036^{*}	0.023^{**}	0.023^{**}
	(0.022)	(0.022)	(0.021)	(0.010)	(0.011)
Bureaucratic quality, tercile 2	0.011	0.007	0.004	0.010	0.010
	(0.015)	(0.014)	(0.015)	(0.015)	(0.016)
Bureaucratic quality, tercile 3	−0.017	−0.021	−0.034	−0.018	−0.021
	(0.015)	(0.016)	(0.021)	(0.015)	(0.018)
Second term × BQ tercile 2	-0.052^{**}	−0.042	−0.035	-0.053^{**}	-0.054^{*}
	(0.026)	(0.026)	(0.025)	(0.026)	(0.028)
Second term × BQ tercile 3	−0.029	−0.017	−0.010	−0.028	−0.025
	(0.026)	(0.026)	(0.028)	(0.026)	(0.033)
BUREAUCRATIC QUALITY QUARTILES					
Second term	0.053^{**}	0.045^{*}	0.036	0.023^{**}	0.023^{**}
	(0.026)	(0.027)	(0.025)	(0.010)	(0.011)
Bureaucratic quality, quartile 2	0.008	0.012	0.010	0.008	0.012
	(0.017)	(0.020)	(0.020)	(0.017)	(0.019)
Bureaucratic quality, quartile 3	−0.009	−0.018	−0.030	−0.011	−0.011
	(0.017)	(0.018)	(0.021)	(0.017)	(0.019)
Bureaucratic quality, quartile 4	−0.014	−0.020	−0.036	−0.016	−0.016
	(0.017)	(0.020)	(0.025)	(0.018)	(0.021)
Second term × BQ quartile 2	−0.046	−0.043	−0.035	-0.051^{*}	-0.055^{*}
	(0.031)	(0.032)	(0.030)	(0.030)	(0.032)
Second term × BQ quartile 3	−0.032	−0.018	−0.005	−0.031	−0.029
	(0.031)	(0.033)	(0.031)	(0.031)	(0.033)
Second term × BQ quartile 4	−0.044	−0.033	−0.021	−0.043	−0.043
	(0.030)	(0.032)	(0.033)	(0.031)	(0.038)
State FE		✓	✓		
Lottery FE		✓	✓	✓	✓
Demographic covariates			✓		✓
Covariate × term interactions				✓	✓
Num. obs.	448	448	448	448	448

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table A9: Conditional associations between politician term and rent allocation, by levels of bureaucratic quality. The interactive specifications in Columns 4 and 5 use the estimator proposed in Lin (2013). All models are estimated by OLS with heteroskedasticity-robust standard errors in parentheses. All fixed effects and non-interactive covariates are binary indicators. Covariate adjustment is implemented by demeaning, which produces no estimates of these parameters.

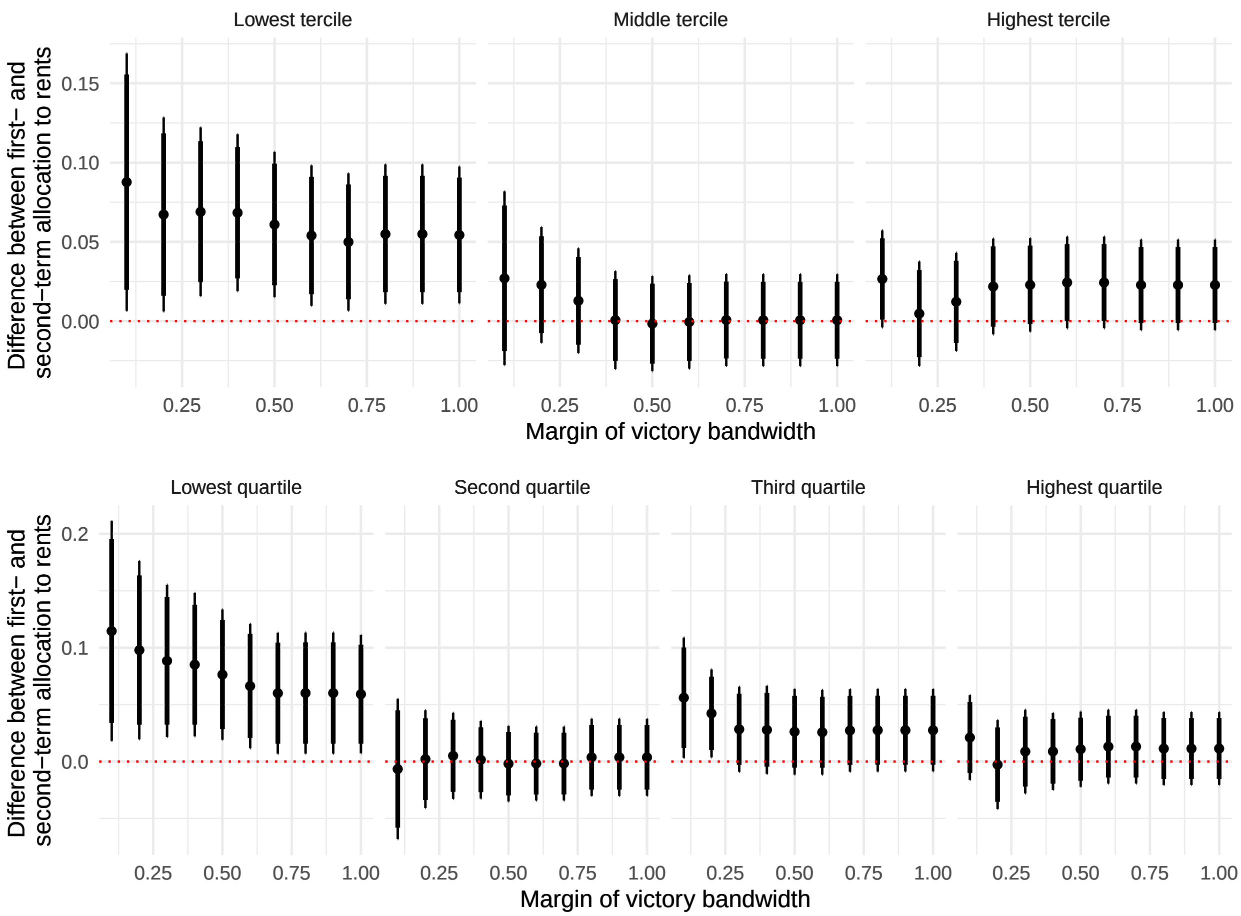

Figure A5: Results of an experimental analogue (e.g. polynomial of degree zero) of a RD specification at varying bandwidths. At low bandwidths, incompetent types are more common among re-elected politicians and differences by term are exaggerated.

A5 Survey Experimental Test of Voter Updating

A5.1 Design of survey and experiment

See Dataverse Appendix D4.1 for details of survey design and vignette translations.

A5.2 Regression table and extensions

Table A10 reports the regression specifications that estimate the CATEs of both clean and corrupt signals at different levels of bureaucratic quality by estimating the following by OLS:

$$\begin{aligned} Y_{ims} =& \beta_0 + \beta_1 + \beta_2 \text{Clean signal}_i + \beta_3 \text{Clean signal}_i Q_m + \\ & \beta_4 \text{Corrupt signal}_i + \beta_5 \text{Corrupt signal}_i Q_m + \boldsymbol{\gamma}_s + \boldsymbol{\theta X}_m + \epsilon_{ims} \end{aligned} \tag{A23}$$

It also include a number of robustness tests that vary: (i) the dependent variable (vote intent versus feeling thermometer); (ii) the set of covariates (fixed effects) in each model; and (iii) the use of the sample with or without imputed bureaucratic quality. Ultimately, we are interested in the CATE of the clean mayor signal at different levels of bureaucratic quality. As such, Figure D5 plots the CATEs calculated from the regression results in columns (3), (6), (9), (12) of Table A10.

See Dataverse Appendix D4.2 for additional visualization of these estimates and subgroup analysis based on respondent education.

A6 Incumbency Disadvantage

A6.1 Decomposing incumbency disadvantage

The political process underpinning the regression discontinuity design is depicted in Figure A6. Close elections in election t determine whether a party, p, is an incumbent or challenger. That party can then choose to field a candidate (or not) in election $t+1$, which is defined by the outcome Ran $\in \{0, 1\}$. Given the "menu" of candidates, the electorate (V) votes. Incumbency disadvantage is measured by comparing electoral outcome in election $t + 1$ as a function of incumbency status. I will consider two measures of electoral outcomes at time $t + 1$. First Won $\in \{0, 1\}$ measures whether a party won at time $t + 1$. Second, a party's MoV $\in [-100, 100]$ shows the incumbent's margin of victory (if > 0) or defeat (if < 0) in election $t + 1$.
Klašnja and Titunik (2017) focus on the following outcome as a function of incumbency status, $Z \in \{0, 1\}$.

$$\begin{aligned} E[\text{Won}_p|Z = z] &= E[\text{Ran}_p|Z = z]E[\text{Won}_p|Ran_p = 1, Z = z] + (1 - E[\text{Ran}_p|Z = z]) \times 0 \\ &= E[\text{Ran}_p|Z = z]E[\text{Won}_p|\text{Ran}_p = 1, Z = z] \end{aligned}$$

Similarly, one can formulate the same outcome for margin of victory in time $t + 1$:

$$\begin{aligned} E[\text{MoV}_p|Z = z] &= E[\text{Ran}_p|Z = z]E[\text{MoV}_p|\text{Ran}_p = 1, Z = z] + (1 - E[\text{Ran}_p|Z = z]) \times 0 \\ &= E[\text{Ran}_p|Z = z]E[\text{MoV}_p|\text{Ran}_p = 1, Z = z] \end{aligned}$$

Klašnja and Titunik (2017) advocate imputing a 0 outcome when a party does not run in $t + 1$ to measure the "unconditional" effect of incumbency. This decomposition suggests that the constituent quantities $E[\text{Ran}_p|Z = z]$ and $E[\text{MoV}_p|\text{Ran}_p = 1, Z = z]$ should *also* be of interest. Differences in these quantities define three estimands of interest:

1. $LATE$ on unconditional electoral outcomes (with 0's imputed when a party does not run).

$$LATE_{UC} = \lim_{x \downarrow c} E[Y_p] - \lim_{x \uparrow c} E[Y_p]$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Vote intent						Feeling thermometer					
PANEL A: LINEAR MEASURE OF BUREAUCRATIC QUALITY												
Intercept	3.283***			3.284***			5.296***			5.303***		
	(0.083)			(0.080)			(0.148)			(0.142)		
Bureaucratic quality	0.160**	0.174**	0.003	0.162**	0.165**	−0.007	0.254**	0.256*	0.064	0.259**	0.267**	0.078
	(0.067)	(0.080)	(0.104)	(0.065)	(0.075)	(0.093)	(0.125)	(0.135)	(0.179)	(0.121)	(0.130)	(0.161)
Clean mayor signal	0.137	0.135	0.131	0.101	0.101	0.095	0.353*	0.353*	0.353*	0.287*	0.287	0.287
	(0.097)	(0.099)	(0.101)	(0.093)	(0.094)	(0.097)	(0.184)	(0.186)	(0.191)	(0.173)	(0.176)	(0.180)
Corrupt mayor signal	−1.098***	−1.100***	−1.099***	−1.109***	−1.109***	−1.110***	−1.720***	−1.720***	−1.720***	−1.714***	−1.714***	−1.714***
	(0.122)	(0.124)	(0.127)	(0.117)	(0.119)	(0.122)	(0.185)	(0.188)	(0.192)	(0.180)	(0.183)	(0.187)
BQ × clean signal	−0.197***	−0.196**	−0.196**	−0.178**	−0.178**	−0.177**	−0.415***	−0.415***	−0.415***	−0.379**	−0.379**	−0.379**
	(0.075)	(0.076)	(0.078)	(0.073)	(0.074)	(0.076)	(0.152)	(0.154)	(0.158)	(0.147)	(0.149)	(0.152)
BQ × corrupt signal	−0.179*	−0.178*	−0.178*	−0.179*	−0.179*	−0.177*	−0.294*	−0.294*	−0.294*	−0.303*	−0.303*	−0.303*
	(0.103)	(0.105)	(0.107)	(0.100)	(0.102)	(0.103)	(0.158)	(0.160)	(0.164)	(0.155)	(0.157)	(0.160)
PANEL B: TERCILE BINS OF BUREAUCRATIC QUALITY												
Intercept	3.045***			3.021***			4.622***			4.571***		
	(0.215)			(0.211)			(0.337)			(0.332)		
BQ Tercile 2	0.355	0.372	0.131	0.389	0.381*	0.169	1.128***	1.105***	0.774**	1.190***	1.189***	0.901**
	(0.243)	(0.235)	(0.247)	(0.237)	(0.222)	(0.241)	(0.371)	(0.367)	(0.391)	(0.361)	(0.346)	(0.375)
BQ Tercile 3	0.414*	0.399*	0.049	0.444**	0.394*	0.083	0.903**	0.780**	0.314	0.977***	0.876**	0.466
	(0.230)	(0.238)	(0.259)	(0.225)	(0.225)	(0.249)	(0.369)	(0.380)	(0.428)	(0.362)	(0.363)	(0.406)
Clean mayor signal	0.377	0.374	0.363	0.265	0.268	0.255	1.311***	1.311***	1.311***	1.184***	1.184***	1.184***
	(0.242)	(0.247)	(0.253)	(0.237)	(0.240)	(0.247)	(0.349)	(0.354)	(0.362)	(0.347)	(0.352)	(0.360)
Corrupt mayor signal	−0.909***	−0.911***	−0.927***	−0.896***	−0.890***	−0.913***	−1.267***	−1.267***	−1.267***	−1.184***	−1.184***	−1.184***
	(0.293)	(0.299)	(0.304)	(0.288)	(0.294)	(0.298)	(0.415)	(0.422)	(0.431)	(0.430)	(0.436)	(0.445)
Tercile 2 × clean signal	−0.323	−0.321	−0.309	−0.211	−0.216	−0.208	−1.443***	−1.443***	−1.443***	−1.374***	−1.374***	−1.374***
	(0.273)	(0.278)	(0.285)	(0.263)	(0.267)	(0.275)	(0.440)	(0.446)	(0.457)	(0.421)	(0.427)	(0.436)
Tercile 3 × clean signal	−0.473*	−0.473*	−0.467*	−0.371	−0.374	−0.366	−1.426***	−1.426***	−1.426***	−1.307***	−1.307***	−1.307***
	(0.262)	(0.266)	(0.274)	(0.256)	(0.260)	(0.267)	(0.392)	(0.398)	(0.407)	(0.389)	(0.395)	(0.403)
Tercile 2 × corrupt signal	−0.185	−0.188	−0.162	−0.226	−0.235	−0.201	−0.575	−0.575	−0.575	−0.697	−0.697	−0.697
	(0.342)	(0.349)	(0.356)	(0.332)	(0.339)	(0.344)	(0.489)	(0.497)	(0.508)	(0.491)	(0.498)	(0.509)
Tercile 3 × corrupt signal	−0.433	−0.430	−0.414	−0.457	−0.461	−0.440	−0.834*	−0.834*	−0.834*	−0.919*	−0.919*	−0.919*
	(0.319)	(0.326)	(0.331)	(0.313)	(0.320)	(0.324)	(0.465)	(0.472)	(0.483)	(0.474)	(0.481)	(0.492)
PANEL C: TERCILE BINS OF BUREAUCRATIC QUALITY												
Intercept	2.600***			2.690***			3.960***			4.172***		
	(0.297)			(0.274)			(0.506)			(0.471)		
BQ quartile 2	0.890***	0.868**	0.967***	0.783**	0.744**	0.804**	1.560***	1.513***	1.856***	1.363***	1.381***	1.541***
	(0.327)	(0.338)	(0.347)	(0.308)	(0.320)	(0.344)	(0.555)	(0.535)	(0.525)	(0.523)	(0.524)	(0.537)
BQ quartile 3	0.863***	0.963***	0.852**	0.725**	0.783**	0.669*	1.797***	1.859***	1.980***	1.471***	1.595***	1.577***
	(0.321)	(0.340)	(0.349)	(0.295)	(0.309)	(0.346)	(0.535)	(0.552)	(0.518)	(0.504)	(0.524)	(0.546)
BQ quartile 4	0.834***	0.817**	0.488	0.773***	0.728**	0.486	1.562***	1.450***	1.186**	1.406***	1.375***	1.094**
	(0.310)	(0.332)	(0.323)	(0.287)	(0.305)	(0.333)	(0.529)	(0.530)	(0.511)	(0.494)	(0.510)	(0.544)
Clean mayor signal	0.960***	0.960***	0.960***	0.862***	0.862***	0.862***	1.960***	1.960***	1.960***	1.724***	1.724***	1.724***
	(0.225)	(0.229)	(0.234)	(0.240)	(0.244)	(0.249)	(0.467)	(0.473)	(0.485)	(0.449)	(0.456)	(0.466)
Corrupt mayor signal	−0.642	−0.641	−0.643	−0.725*	−0.718*	−0.735*	−1.000*	−1.000*	−1.000*	−1.069**	−1.069*	−1.069*
	(0.440)	(0.448)	(0.460)	(0.402)	(0.410)	(0.420)	(0.552)	(0.560)	(0.573)	(0.537)	(0.545)	(0.557)
Quartile 2 × clean signal	−1.010***	−1.012***	−1.019***	−1.026***	−1.026***	−1.043***	−1.600***	−1.600***	−1.600***	−1.671***	−1.671***	−1.671***
	(0.314)	(0.319)	(0.326)	(0.306)	(0.311)	(0.317)	(0.582)	(0.591)	(0.605)	(0.542)	(0.550)	(0.562)
Quartile 3 × clean signal	−1.199***	−1.204***	−1.210***	−1.048***	−1.048***	−1.047***	−2.474***	−2.474***	−2.474***	−2.094***	−2.094***	−2.094***
	(0.276)	(0.281)	(0.289)	(0.283)	(0.288)	(0.295)	(0.524)	(0.532)	(0.545)	(0.527)	(0.535)	(0.547)
Quartile 4 × clean signal	−0.942***	−0.943***	−0.948***	−0.870***	−0.872***	−0.878***	−1.943***	−1.943***	−1.943***	−1.741***	−1.741***	−1.741***
	(0.246)	(0.249)	(0.254)	(0.258)	(0.262)	(0.268)	(0.495)	(0.502)	(0.514)	(0.477)	(0.484)	(0.495)
Quartile 2 × corrupt signal	−0.481	−0.488	−0.475	−0.475	−0.480	−0.460	−0.500	−0.500	−0.500	−0.556	−0.556	−0.556
	(0.483)	(0.490)	(0.504)	(0.439)	(0.448)	(0.457)	(0.666)	(0.676)	(0.692)	(0.638)	(0.647)	(0.661)
Quartile 3 × corrupt signal	−0.654	−0.657	−0.652	−0.457	−0.465	−0.444	−1.129*	−1.129*	−1.129*	−0.863	−0.863	−0.863
	(0.491)	(0.500)	(0.514)	(0.450)	(0.459)	(0.469)	(0.623)	(0.632)	(0.647)	(0.604)	(0.613)	(0.627)
Quartile 4 × corrupt signal	−0.650	−0.650	−0.648	−0.611	−0.616	−0.602	−1.087*	−1.087*	−1.087*	−1.080*	−1.080*	−1.080*
	(0.463)	(0.471)	(0.483)	(0.426)	(0.434)	(0.444)	(0.595)	(0.604)	(0.618)	(0.580)	(0.589)	(0.602)
Num. obs.	759	759	759	817	817	817	777	777	777	837	837	837
State FE		✓	✓		✓	✓		✓	✓		✓	✓
Demographic covariates			✓			✓			✓			✓
Imputed BQ				✓	✓	✓				✓	✓	✓

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Table A10: This table reports the regressions from which Figure 5 (right panel) is constructed as well as a number of robustness checks. Columns (1)-(6) show the vote intention outcome whereas columns (7)-(12) show the feeling thermometer outcome. All fixed effects and covariates are binary indicators. Standard errors are clustered at the municipality level. Covariate adjustment is implemented by demeaning, which produces no estimates of these parameters.

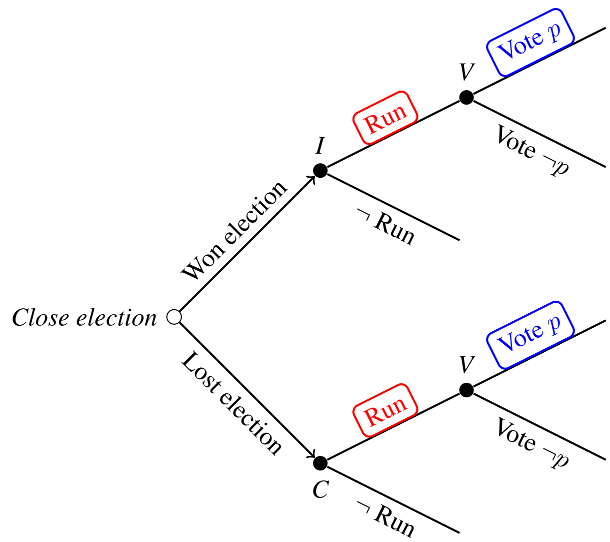

Figure A6: Sequence of actions in electoral RD study of disincumbency advantage.

2. $LATE$ on party p running in election $t + 1$.

$$LATE_{Ran} = \lim_{x \downarrow c} E[Ran_p] - \lim_{x \uparrow c} E[Ran_p]$$

3. Post-treatment estimand measuring electoral outcomes given that the party runs in election $t + 1$.

$$PT_Y = \lim_{x \downarrow c} E[Y_p | Ran_p] - \lim_{x \uparrow c} E[Y_p | Ran_p]$$

In Figure 6, the left column of panels reports estimates of the unconditional LATE on re-election ($LATE_{UC}$), by quantile of bureaucratic quality. The next column of panels reports estimates of the $LATE_{Ran}$, by quantiile of bureaucratic quality. The third and right columns report PT_Y for two operationalizations of Y: a binary indicator for won, and margin of victory (or defeat) of the incumbent candidate.

A6.2 Design validation, robustness

For validation of the RDD-design see Dataverse Appendix D5.1. Tables A11-**??** report the estimates reported in Figure 6 and alternative specifications.

A6.3 Commensurability Analysis

For commensurability analysis of incumbency advantage with the present accountability model see Dataverse Appendix D5.2.

A7 Meta-Study #2: Information and accountability experiments

The results in the main paper provide evidence from the case of Brazil. To what extent can the model explain empirical patterns beyond this context? This is an open empirical question. In general, careful operationalization and measurement of variation in bureaucratic quality is necessary to extend the empirical examination to other contexts. While renewed efforts to measure bureaucratic quality at the national level are underway, the study of Brazil emphasizes the need to study variation in the quality of bureaucracies overseen by the politicians under study. Even without such data,

	Terciles of BQ			Quartiles of BQ			
	Tercile 1	Tercile 2	Tercile 3	Quartile 1	Quartile 2	Quartile 3	Quartile 4
PANEL A: UNCONDITIONAL LATE ON INCUMBENT WON $(t+1)$							
Conventional	-0.175	-0.110	-0.159	-0.186	-0.126	-0.102	-0.167
Conventional s.e.	(0.044)	(0.039)	(0.039)	(0.047)	(0.051)	(0.043)	(0.042)
Bias-corrected	-0.191	-0.116	-0.171	-0.205	-0.134	-0.103	-0.179
Robust s.e.	(0.05)	(0.046)	(0.045)	(0.052)	(0.061)	(0.051)	(0.048)
PANEL B: UNDITIONAL LATE ON RESIDUALIZED INCUMBENT WON $(t+1)$							
Conventional	-0.174	-0.108	-0.155	-0.181	-0.125	-0.107	-0.161
Conventional s.e.	(0.044)	(0.038)	(0.038)	(0.046)	(0.051)	(0.044)	(0.042)
Bias-corrected	-0.192	-0.115	-0.166	-0.199	-0.134	-0.113	-0.172
Robust s.e.	(0.05)	(0.045)	(0.043)	(0.051)	(0.06)	(0.052)	(0.047)
PANEL C: LATE ON INCUMBENT RAN $(t+1)$							
Conventional	-0.015	-0.034	-0.116	-0.024	-0.033	-0.011	-0.142
Conventional s.e.	(0.048)	(0.047)	(0.044)	(0.051)	(0.056)	(0.05)	(0.049)
Bias-corrected	-0.026	-0.026	-0.125	-0.035	-0.027	-0.006	-0.151
Robust s.e.	(0.055)	(0.056)	(0.051)	(0.059)	(0.066)	(0.059)	(0.056)
PANEL D: LATE ON RESIDUALIZED INCUMBENT RAN $(t+1)$							
Conventional	-0.010	-0.035	-0.103	-0.019	-0.025	-0.022	-0.132
Conventional s.e.	(0.048)	(0.047)	(0.04)	(0.05)	(0.055)	(0.047)	(0.049)
Bias-corrected	-0.020	-0.031	-0.112	-0.028	-0.020	-0.017	-0.139
Robust s.e.	(0.056)	(0.056)	(0.046)	(0.059)	(0.066)	(0.054)	(0.056)
PANEL E: POST-TREATMENT ESTIMAND WON $(t+1)$| RAN $(t+1)$							
Conventional	-0.306	-0.160	-0.182	-0.317	-0.207	-0.161	-0.176
Conventional s.e.	(0.07)	(0.061)	(0.053)	(0.078)	(0.079)	(0.063)	(0.063)
Bias-corrected	-0.326	-0.164	-0.194	-0.338	-0.216	-0.161	-0.186
Robust s.e.	(0.082)	(0.073)	(0.061)	(0.091)	(0.095)	(0.074)	(0.073)
PANEL F: POST-TREATMENT ESTIMAND WON $(t+1)$| RAN $(t+1)$							
Conventional	-0.316	-0.149	-0.187	-0.320	-0.210	-0.148	-0.186
Conventional s.e.	(0.071)	(0.061)	(0.053)	(0.077)	(0.078)	(0.063)	(0.063)
Bias-corrected	-0.339	-0.148	-0.198	-0.344	-0.223	-0.145	-0.195
Robust s.e.	(0.083)	(0.073)	(0.061)	(0.089)	(0.093)	(0.074)	(0.072)
PANEL G: POST-TREATMENT ESTIMAND MARGIN OF VICTORY $(t+1)$| RAN $(t+1)$							
Conventional	-0.118	-0.041	-0.046	-0.152	-0.046	-0.018	-0.057
Conventional s.e.	(0.036)	(0.027)	(0.024)	(0.042)	(0.036)	(0.036)	(0.029)
Bias-corrected	-0.130	-0.043	-0.044	-0.167	-0.046	-0.011	-0.056
Robust s.e.	(0.042)	(0.032)	(0.028)	(0.047)	(0.043)	(0.043)	(0.034)
PANEL H: POST-TREATMENT ESTIMAND MARGIN OF VICTORY $(t+1)$| RAN $(t+1)$							
Conventional	-0.119	-0.037	-0.048	-0.149	-0.045	-0.011	-0.063
Conventional s.e.	(0.037)	(0.027)	(0.024)	(0.041)	(0.034)	(0.036)	(0.029)
Bias-corrected	-0.132	-0.036	-0.047	-0.165	-0.047	-0.002	-0.062
Robust s.e.	(0.042)	(0.032)	(0.028)	(0.047)	(0.041)	(0.043)	(0.034)

Table A11: Robustness of the LATE estimates plotted in Figure 6, which plots the bias-corrected LATE estimates. Note that all estimates use the same kernel (triangular) and bandwidth (the MSE-optimal bandwidth on the full sample for each outcome). For covariate adjustment, panels B, D, F, and G residualize the outcome using state indicators and decile bins of municipal education, formality, GDP per capita, and population). This residualization does not provide estimates of covariates corresponding to the covariates.

however, the model offers some insights for how we consider evidence from other contexts.

Prior to imposing the model in more heterogeneous contexts, it is important to clarify the scope conditions of the theory. First, while the Brazilian meta-study focuses on mayors, the model should apply to elected politicians in national or subnational offices so long as they: (i) rely on bureaucrats to implement or produce public goods; (ii) have the authority to monitor or oversee those bureaucrats. Second, while term limits are arguably an important feature of Brazilian politics, they are not necessary for the general dynamics with respect to politician allocations and voter updating to emerge. Finally, the theory intentionally considers a continuum of levels of bureaucratic quality and should be applicable in low, middle, and high capacity settings if these scope conditions are satisfied.

Because the empirical manifestations of accountability vary in bureaucratic quality, researcher choices of where to study accountability pose underappreciated limitations for how we understand accountability and its failures. Drawing from the combined efforts of Enríquez et al. (2022) and Incerti (2020), I identify 16 experiments or natural experiments on voter information and accountability conducted in eight countries, enumerated in Table A12. Situating these sites on (national level) macro indicators of bureaucratic quality, corruption, and public goods provision, Figure A7 suggests that such studies have, to date, been confined to democracies with low-to-middling levels of bureaucratic quality. Further, the motivation of some works suggests selection on features of the equilibrium, i.e. poor public goods provision or high corruption.

	Country	Citation	Design	Metaketa-I	Included in Fig. A8
1	Benin	Adida et al. (2017)	E	✓	✓
2	Brazil	Ferraz and Finan (2008)	NE		
3	Brazil	Boas, Hidalgo, and Melo (2019)	E	✓	✓
4	Burkina Faso	Lierl and Holmlund (2019)	E	✓	✓
5	India	Banerjee et al. (2011)	E		✓
6	India	George, Gupta, and Neggers (2018)	E		✓
7	Philippines	Cruz, Keefer, and Labonne (2018)	E		
8	Philippines	Cruz et al. (2019)	E		✓
9	Mexico	Chong et al. (2015)	E		✓
10	Mexico	Arias et al. (2022)	E	✓	✓
11	Mexico	Enríquez et al. (2022)	E		✓
12	Mexico	Larreguy, Marshall, and Snyder Jr. (2020)	NE		
13	Senegal	Bhandari, Larreguy, and Marshall (2011)	E		✓
14	Uganda	Humphreys and Weinstein (2012)	E		
15	Uganda	Buntaine et al. (2018)	E	✓	✓
16	Uganda	Platas and Raffler (2019)	E	✓	✓

Table A12: Studies of information and accountability and their locations. Under design, "E" corresponds to an experiment and "NE" corresponds to a natural experiment (one where the investigators did not manipulate provision of information).

Examining eleven of these studies across all eight countries that: (i) are experimental and (ii) provide estimates on vote choice for the incumbent subsequent to the revelation of both good and bad news, Figure A8 depicts the relationship between national bureaucratic quality and the effects of information provision. On average, "good news" modestly increases incumbent vote share and "bad news" modestly reduces incumbent vote share, but only as bureaucratic quality (within sample) increases. Because all experiments are conducted in different constituencies the implication here is that the separating equilibrium appears to be more common (across constituencies) at higher levels of (national) bureaucratic quality. This finding is only suggestive and future research could strengthen this analysis in three ways. First, future experiments should avoid building the sample of constituencies by selecting on equilibrium outcomes (corruption or public goods provision). Second, measurement of the quality of bureaucrats actually managed by the politicians in question would allow up tog these dynamics much more precisely within cases. Finally, research designs that study accountability in a parallel fashion across places that with more substantial variation in bureaucratic qual-

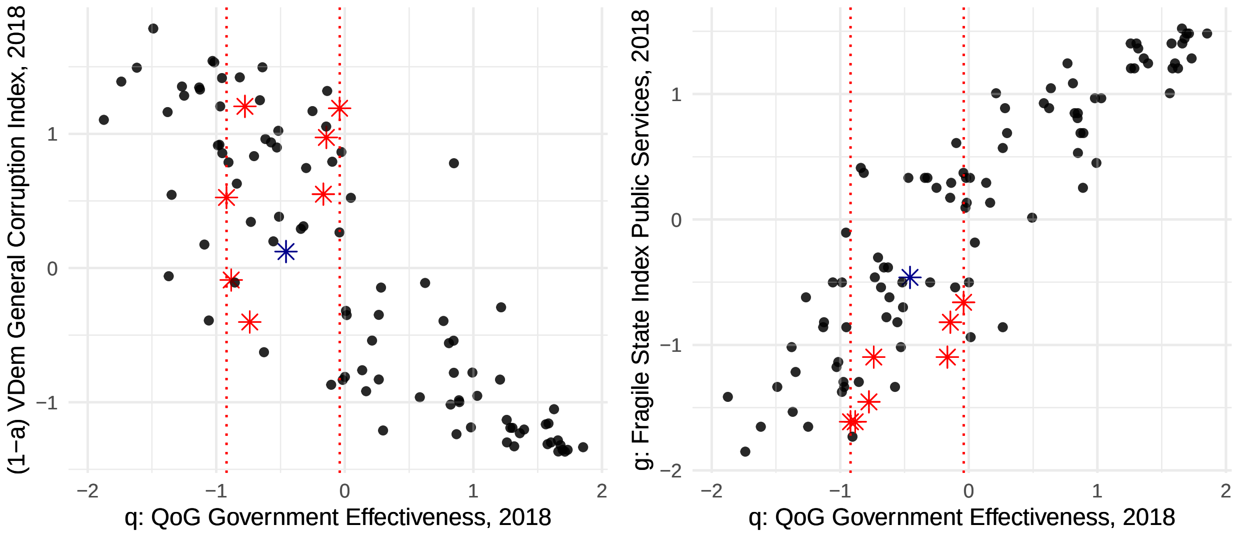

Figure A7: Correlations between bureaucratic quality (x-axis) and corruption (y-axis, left panel) and public service provision (y-axis, right panel). All measures are standardized to the set of democracies (defined by the Quality of Government dataset), such that all measures are z-scores. The navy star indicates Brazil and the red stars indicate other countries in which I identify accountability experiments/natural experiments.

ity (see Figure A7) would allow for more comprehensive tests of the theory than are afforded by the existing estimates.[4]

Considering this evidence from relatively similar studies across multiple sites yields two central takeaways. First, the observational equivalencies generated by the model provide new scope conditions on what inferences we can draw about accountability from partial equilibrium tests of information and accountability. Absent characterization of the underlying equilibrium, zero or null results on the effects of information provision provide less evidence that voters are uninformed or unable to update than is currently implied. Second, under the model I advance, estimates of a common distribution of treatment effects will be attenuated toward zero when sites fall into either pooling equilibrium. This is the central finding of two influential meta-analyses (Dunning et al., 2019; Incerti, 2020). Figure A8 provides suggestive evidence as to why such an approach may not be able to capture the effect of information on accountability. More generally, this reasoning motivates a need to define external validity relative to a mechanism, as opposed to a point estimate. This broader conception of external validity opens new avenues for cumulation of evidence and research design (Slough and Tyson, 2023).

[4] Figure A8 ultimately includes only eight country-level estimates of bureaucratic quality, which approximate "clusters" for the purpose of this analysis.

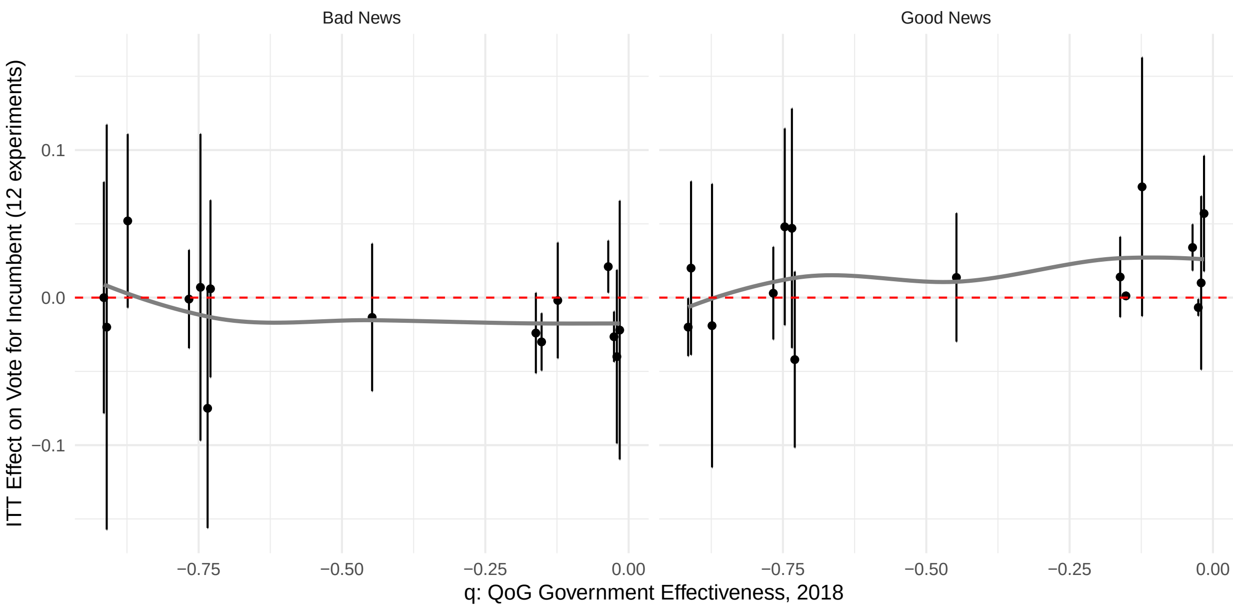

Figure A8: ITTs on vote choice for the incumbent or incumbent's party in 12 experiments in 8 countries using survey and/or administrative data. The dependent variable can be interpreted as the change in incumbent (party) vote share as a function of the revelation of incumbent performance information, by the type of signal "bad news" (left) or "good news" (right). Points are jittered on the x-axis for visibility. Estimates and standard errors come directly from estimated by these 12 studies.

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