Oversight, Capacity, and Inequality
Supporting Information

Tara Slough*

April 16, 2024

Contents

A1 Proofs **A-2**
A1.1 Proof of Proposition 1 . . . . A-2
A1.2 Proof of Proposition 2 . . . . A-7
A1.3 Proof of Proposition 3 . . . . A-9
A1.4 Proof of Proposition 4 . . . . A-11

A2 Extension: Alignment of Citizen Preferences with Policy Goals **A-12**

A3 Extension: No Commitment by Politician **A-15**

A4 Visualization of the Effect of Information Transmission on Capacity and Inequality **A-22**

A5 Additional Empirical Motivation **A-24**

*Assistant Professor, New York University

A1 Proofs

A1.1 Proof of Proposition 1

Consider three cases, defined in terms of partitions of the politician type space, θ_M.

- Case #1: $\theta_M > 1$:

  First, note that the median citizen could never be induced to complain per (7) if $\theta_M > 1$. Substituting $\rho(0,0)$ and $\rho(1,0)$ into the politician's objective, the politician maximizes:

$$\max_{\substack{\rho(0,0),\rho(0,1),\\ \rho(1,0),\rho(1,1),\Delta}} \begin{array}{l} \frac{1}{2}\big[(q+ep)(1-\frac{\rho(1,0)^2}{2}) + (1-q-ep)(\rho(0,0)-\frac{\rho(0,0)^2}{2}) + \\ (q+ep)(1-\frac{\rho(0,0)^2}{2}) + (1-q-ep)(\rho(1,0)-\frac{\rho(1,0)^2}{2})\big] - \frac{\rho(0,1)^2}{2} - \frac{\rho(1,1)^2}{2} \end{array} \tag{A1}$$

  Note that because the politician does not internalize service delivery to citizens who may complain (e.g., citizens of type $\theta < 1$), monitoring rates $\rho(0,1)$ and $\rho(1,1)$ enter only as costs to the politician. Optimal monitoring rates $\rho^*(0,0) = (1-q-pe)$, $\rho^*(0,1) = 0$, $\rho^*(1,0) = (1-q-pe)$, and $\rho^*(1,1) = 0$ follow from inspection of (A1). Substituting $\rho^*(0,0)$ and $\rho^*(1,0)$, the bureaucrat's IC constraint in (8) simplifies to:

$$\Delta \geq \frac{2d}{2p(1-q-p)} = \frac{d}{p(1-q-p)}$$

  Note that $\frac{d}{p(1-q-p)} \in (\overline{\Delta}_M, \overline{\Delta}_H]$. As such, effort incentives can only be provided if $\overline{\Delta} = \overline{\Delta}_H$. The bureaucrat's additional IC constraints (9) and (10) are satisfied because $\rho^*(0,0) = \rho^*(1,0)$. Define the two resultant contracts without and with effort incentives as:

$$\boldsymbol{\varrho}_\emptyset = \{\rho(0,0) = 1-q, \rho(0,1) = 0, \rho(1,0) = 1-q, \rho(1,1) = 0, \overline{\Delta} < \frac{d}{p(1-q-p)}\}$$

$$\boldsymbol{\varrho}_E = \{\rho(0,0) = 1-q-p, \rho(0,1) = 0, \rho(1,0) = 1-q-p, \rho(1,1) = 0, \overline{\Delta} \in [\frac{d}{p(1-q-p)}, \overline{\Delta}_H]\}$$

  The difference in the politician's expected utility with and without bureaucratic effort is:

$$E[U_P(\boldsymbol{\varrho}_E)] - E[U_P(\boldsymbol{\varrho}_\emptyset)] = \frac{p(2q+p)}{2} \geq 0$$

  Thus, for $\overline{\Delta} = \overline{\Delta}_H$, the politician will implement contract $\boldsymbol{\varrho}_E$. For $\overline{\Delta} \in \{\overline{\Delta}_L, \overline{\Delta}_M\}$, the politician will implement contract $\boldsymbol{\varrho}_\emptyset$.

- Case #2: $\theta_M \leq \frac{q+p}{q+p+(1-p-q)^2}$:

  First, consider the case when the median citizen could always be induced to complain, which occurs when $\theta_M \to 0$, if $\omega = 1$ and $a = 0$. Substituting $\rho(0,0)$, $\rho(0,1)$, and $\rho(1,0)$ into the politician's objective, the politician maximizes:

$$\max_{\substack{\rho(0,0),\rho(0,1),\\ \rho(1,0),\rho(1,1),\Delta}} \begin{aligned} &\frac{1}{2}\big[(q+ep)(1-\frac{\rho(1,0)^2}{2})+(1-q-ep)(\rho(0,1)-\frac{\rho(0,1)^2}{2})+ \\ &(q+ep)(1-\frac{\rho(0,0)^2}{2})+(1-q-ep)(\rho(1,0)-\frac{\rho(1,0)^2}{2})\big]-\frac{\rho(1,1)^2}{2} \end{aligned} \tag{A2}$$

Note here that, a citizen of type θ_M will not complain when allocated the service (when $a = 1$), so monitoring rate $\rho(1,1)$ is internalized by the politician as a cost. Maximization of (A2) yields $\rho^*(0,0) = 0, \rho^*(0,1) = 1, \rho^*(1,0) = (1-q-ep)$, and $\rho^*(1,1) = 0$. However, these monitoring probabilities do not satisfy the IC constraint in (9):

$$\frac{\rho(1,0)}{\rho(0,1)} = \frac{(1-q-ep)}{1} < \frac{1-q-pe}{q+pe}$$

Violation of this constraint implies that the bureaucrat would not exert effort ($e = 0$) and would (i) allocate $a = 1$ to all citizens for whom $\theta \leq 1$, per (9). Further, the inequality in (10) is not satisfied so the bureaucrat allocates $a = 0$ to all citizens for whom $\theta > 1$ regardless of his investigation.

Per the results in Prendergast (2003), the politician can pursue two alternative contracts. First, consider the case when the politician sets $\Delta = 0$ and maintains the optimal monitoring probabilities. Denote this contract $\boldsymbol{\varrho}_I$:

$$\boldsymbol{\varrho}_I = \{\rho(0,0) = 0, \rho(0,1) = 1, \rho(1,0) = 1-q, \rho(1,1) = 0, \Delta = 0\}$$

In the absence of a penalty, the bureaucrat exerts no effort ($e = 0$) and (by assumption) breaks indifference by following his investigation. The politician's expected utility under this contact is:

$$E[U_P(\boldsymbol{\varrho}_I)] = \frac{2+q+q^2}{4}$$

$E[U_P(\boldsymbol{\varrho}_I)] - E[U_P(\boldsymbol{\varrho}_\emptyset)] = \frac{q-q^2}{4} > 0$ indicating that $E[U_P(\boldsymbol{\varrho}_I)] > E[U_P(\boldsymbol{\varrho}_\emptyset)]$ when $\theta_M < 1$. Note that any deviation to $\Delta > 0$ induces the to bureaucrat accede to the citizen with certainty granting $a = 1$ per (9). This yields an expected utility of $\frac{1+q-q^2}{2} < \frac{2+q+q^2}{4}$. Thus, the politician cannot increase Δ while maintaining optimal monitoring rates.

Alternatively, the politician can provide effort incentives and adjust monitoring rates such that the bureaucrat cannot profitably accede to a prospective complainant. (9) provides the relevant IC constraint to ensure that the bureaucrat does not accede to a legible citizen. Maximizing (A2) subject to the constraint implied by (9) yields:

$$\rho^*(0,0) = 0, \qquad \rho^*(0,1) = \frac{q+p}{q+p+(1-q-p)^2},$$
$$\rho^*(1,0) = \frac{1-q-p}{q+p+(1-q-p)^2}, \qquad \rho^*(1,1) = 0$$

Substituting $\rho^*(0,1)$ and $\rho^*(1,0)$ into the bureaucrat's (other) IC constraint in (8) yields:

$$\Delta \geq \frac{2d(q+p+(1-q-p)^2)}{p} = \overline{\Delta}_M$$

Define this contract as:

$$\boldsymbol{\varrho}_{\overline{IE}} = \{\rho(0,0) = 0, \rho(0,1) = \frac{q+p}{q+p+(1-q-p)^2}, \rho(1,0) = \frac{1-q-p}{q+p+(1-q-p)^2}, \\ \Delta \in \left[\overline{\Delta}_M, \overline{\Delta}\right]\}$$

The politician's expected utility is:

$$E[U_P(\boldsymbol{\varrho}_{\overline{IE}})] = \frac{1+4p^3+3q-4q^2+4q^3+4p^2(-1+3q)+p(3-8q+12q^2)}{4(q+p+(1-q-p)^2)}$$

When $\theta_M < \frac{q+p}{q+p+(1-q-p)^2}$, the politician cannot profitably deviate by forgoing information as $E[U_P(\boldsymbol{\varrho}_{\overline{IE}})] - E[U_P(\boldsymbol{\varrho}_E)] > 0$. For $\overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\}$, the politician adopts the contract $\boldsymbol{\varrho}_{\overline{IE}}$ if $E[U_P(\boldsymbol{\varrho}_{\overline{IE}})] \geq E[U_P(\boldsymbol{\varrho}_I)]$. Define $\widehat{p}(q)$ as the solution to $E[U_P(\boldsymbol{\varrho}_{\overline{IE}})] = E[U_P(\boldsymbol{\varrho}_I)]$, expressed as a function of q:

$$\widehat{p}(q) = \frac{1}{12}\left[q^2 - 11q + 6 + \tilde{q} - \frac{-q^4 - 2q^3 - q^2 + 24}{\tilde{q}}\right]$$

where:

$$\tilde{q} = \sqrt[3]{q^6 + 3q^5 + 3q^4 + q^3 + 126q^2 + 6\sqrt{3}\sqrt{3q^8 + 12q^7 + 16q^6 + 6q^5 + 128q^4 + 260q^3 - 121q^2 - 252q + 236} + 126q - 108}$$

Note that $\widehat{p}(q) \in [0, \frac{1}{2}]\ \forall q \in [\frac{1}{2}, 1)$ and $\widehat{p}(q) < 1 - q\ \forall q \in [\frac{1}{2}, 1)$.

With incentives, the marginal complainant is $\theta = \frac{q+p}{p+q+(1-p-q)^2}$. Thus, for any $\theta_M \leq \frac{q+p}{p+q+(1-p-q)^2}$, the equilibrium contract is:

$$\boldsymbol{\varrho} = \begin{cases} \boldsymbol{\varrho}_{\overline{IE}} & \text{if } \overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\} \text{ and } p \geq \widehat{p}(q) \\ \boldsymbol{\varrho}_I & \text{else} \end{cases}$$

- Case #3: $\theta_M \in (\frac{q+p}{q+p+(1-p-q)^2}, 1]$:

  Finally, consider a distribution of θ for which $\theta_M \in (\frac{q+p}{q+p+(1-p-q)^2}, 1]$. Per (7), such a citizen can be induced to complain when $\rho(0,1) - \rho(0,0) \geq \theta_M$. As such, the politician's objective is identical to the previous case. In this case, the contract without incentives ($\boldsymbol{\varrho}_I$) implies that a citizen of type $\theta \in (\frac{q+p}{q+p+(1-p-q)^2}, 1]$ can be induced to complain. This contract follows directly from the proof of the previous case and is therefore omitted.

  For a contract with effort incentives, however, the politician can only induce complaints by monitoring at higher rates than the contract $\boldsymbol{\varrho}_{\overline{IE}}$. Noting that the optimal $\rho(0,0) = 0$ as above and Equation (7), the politician must monitor at the rate $\rho(0,1) = \theta_M$ to incentivize complaint the median citizen. In this interval, it is straightforward to see that $\theta_M > \frac{q+p}{q+p+(1-p-q)^2}$. Substituting $\rho(0,1)$ into 9, and rearranging, the politician must set $\rho(1,0) = \frac{\theta_M(1-p-q)}{q+p}$ to satisfy the bureaucrat's "truth-telling" constraint. Substituting $\rho(0,1)^*$ and $\rho(1,0)^*$ into the bureaucrat's (other) IC constraint in Equation (8) yields:

$$\Delta \geq \frac{2d(q+p)}{p\theta_M} \in (\overline{\Delta}_L, \overline{\Delta}_M]$$

when $\theta_M < 1$. Thus, denote the contract with effort incentives:

$$\boldsymbol{\varrho}_{\underline{IE}} = \{\rho(0,0) = 0, \rho(0,1) = \theta_M, \rho(1,0) = \frac{\theta_M(1-q-p)}{q+p}, \Delta \in [\overline{\Delta}_M, \overline{\Delta}]\}$$

The politician's expected utility is:

$$\begin{aligned} E[U_P(\boldsymbol{\varrho}_{\underline{IE}})] =& 2\theta_M(q-q^2)(1+\theta_M) - \theta_M^2 + (q^3+p^3)(4+\theta_M^2) + p^2(-2\theta_M(1+\theta_M) + 3q(4+\theta_M^2)) + \\ & p(2\theta_M(1+\theta_M) - 4q\theta_M(1+\theta_M) + 3q^2(4+\theta_M^2)) \end{aligned}$$

As in the previous case, the politician cannot profitably deviate by forgoing information as $E[U_P(\boldsymbol{\varrho}_{\underline{IE}})] - E[U_P(\boldsymbol{\varrho}_E)] > 0$. For $\overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\}$, the politician adopts the contract $\boldsymbol{\varrho}_{\underline{IE}}$ if $E[U_P(\boldsymbol{\varrho}_{\underline{IE}})] \geq E[U_P(\boldsymbol{\varrho}_I)]$. Define $\bar{p}(q)$ as the solution to $E[U_P(\boldsymbol{\varrho}_{\underline{IE}})] = E[U_P(\boldsymbol{\varrho}_I)]$, expressed as a function of q. Note that $\bar{p}(q) \in [0, \frac{1}{2}]\ \forall q \in [\frac{1}{2}, 1)$; $\bar{p}(q) < 1-q\ \forall q \in [\frac{1}{2}, 1)$; and $\bar{p}(q) < \widehat{p}(q)$.

Thus, for any $\theta_M \in (\frac{q+p}{q+p+(1-p-q)^2}, 1]$, the equilibrium contract is given by:

$$\boldsymbol{\varrho} = \begin{cases} \boldsymbol{\varrho}_{\underline{IE}} & \text{if } \overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\} \text{ and } p \geq \bar{p}(q) \\ \boldsymbol{\varrho}_I & \text{else.} \end{cases}$$

■

Capacity and Distribution Under Each Contract

Table A1 provides calculations of two quantities relevant to the distributional implications of the contracts. Panel A gives the conditional expectation of the ultimate (post-monitoring) allocation given citizen type, $E[a^\dagger|\theta]$ and Panel B gives the conditional expectations of implementation capacity by citizen type, $E[Y|\theta]$. Both quantities are calculated from the equilibrium contracts in Proposition 1 according to the following formulas. Recall that R is an indicator that takes the value "1" when the politician monitors and detects a bureaucratic error, thereby reversing the allocation.

$$\begin{aligned} E[a^\dagger|\theta] = \frac{1}{2}[&\Pr(a=1|\omega=1;\theta) + \Pr(R|a=0,\omega=1;\theta)\Pr(a=0|\omega=1;\theta) + \\ &\Pr(a=1|\omega=0;\theta) - \Pr(R|a=1,\omega=0;\theta)\Pr(a=1|\omega=0;\theta)] \\ E[Y|\theta] = \frac{1}{2}[&\Pr(a=1|\omega=1;\theta) + \Pr(R|a=0,\omega=1;\theta)\Pr(a=0|\omega=1;\theta) + \\ &\Pr(a=0|\omega=0;\theta) + \Pr(R|a=1,\omega=0;\theta)\Pr(a=1|\omega=0;\theta)] \end{aligned}$$

Contract	Citizen type, θ: $\theta \leq \frac{p+q}{p+q+(1-p-q)^2}$	$\theta \in (\frac{p+q}{p+q+(1-p-q)^2}, \theta_M]$	$\theta_M \in (\max\{\frac{p+q}{p+q+(1-p-q)^2}, \theta_M\}, 1]$	$\theta > 1$
Panel A: Ultimate (Post-Monitoring) Allocation $E[a^\dagger \mid \theta]$				
$\boldsymbol{\varrho}_{\emptyset}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
$\boldsymbol{\varrho}_{E}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
$\boldsymbol{\varrho}_{I}$	$\frac{1}{2}(1+q-q^2)$	$\frac{1}{2}(1+q-q^2)$	$\frac{1}{2}(1+q-q^2)$	$\frac{1}{2}(2q-q^2)$
$\boldsymbol{\varrho}_{\overline{IE}}$	$\frac{2(p+q-pq)-q^2-p^2}{2(p+q+(1-p-q)^2)}$	—	0	0
$\boldsymbol{\varrho}_{\underline{IE}}$	$\frac{p+q+\theta_M[3(q+p)-2(q^2+p^2)-4qp-1]}{2(p+q)}$	$\frac{1}{2} + \frac{\theta_M[3(q+p)-2(q^2+p^2)-4qp-1]}{2(p+q)}$	0	0
Panel B: Implementation Capacity by Citizen Type $E[Y \mid \theta]$				
$\boldsymbol{\varrho}_{\emptyset}$	$1-q+q^2$	$1-q+q^2$	$1-q+q^2$	$1-q+q^2$
$\boldsymbol{\varrho}_{E}$	$q+p+(1-q-p)^2$	$q+p+(1-q-p)^2$	$q+p+(1-q-p)^2$	$q+p+(1-q-p)^2$
$\boldsymbol{\varrho}_{I}$	$\frac{1}{2}(2-q+q^2)$	$\frac{1}{2}(2-q+q^2)$	$\frac{1}{2}(2-q+q^2)$	$\frac{1}{2}(1+q^2)$
$\boldsymbol{\varrho}_{\overline{IE}}$	$q+p+\frac{1-p-q}{2(q+p+(1-p-q)^2)}$	—	$\frac{1}{2}$	$\frac{1}{2}$
$\boldsymbol{\varrho}_{\underline{IE}}$	$q+p+\frac{\theta_M(1-p-q)}{2(p+q)}$	$q+p+\frac{\theta_M(1-p-q)}{2(p+q)}$	$\frac{1}{2}$	$\frac{1}{2}$

Table A1: Implications of each contract for distribution, measured by $E[a^\dagger|\theta]$, and implementation capacity, measured by $E[Y|\theta]$, by citizen type. — means that this interval is empty when the contract $\boldsymbol{\varrho}_{\overline{IE}}$ is adopted.

Proof of Remark 1

For $E[Y] = 1$, $E[Y|\theta] = 1 \forall\theta$. First, consider Contract $\boldsymbol{\varrho}_{\emptyset}$. Under this contract, $E[Y] = q + (1-q)^2$. Given that $q \in [\frac{1}{2}, 1]$, $E[Y] = 1$ implies that $q = 1$.

Second, consider contract $\boldsymbol{\varrho}_E$. $E[Y] = 1 \Rightarrow q + p + (1-q-p)^2 = 1$, which implies $q + p = 1$. Adoption of $\boldsymbol{\varrho}_E$ does not occur when $q + p = 1$ because, as $p + q \to 1$, $\overline{\Delta}_H \to \infty$.

Third, consider Contract $\boldsymbol{\varrho}_E$. For $E[Y] = 1$, it must be the case that (i) $E[Y|\theta \leq 1] = 1$ and $F(1) = 1$ or (ii) $E[Y|\theta \leq 1] = E[Y|\theta > y] = 1$. (i) requires that $F(1) = 1$ and $\frac{2-q+q^2}{2} = 1$. For $q \in [\frac{1}{2}, 1]$ this implies that $q = 1$. (ii) requires that $\frac{2-q+q^2}{2} = \frac{(1+q^2)}{2}$ which implies that $q = 1$.

Fourth, consider contract $\boldsymbol{\varrho}_{\overline{IE}}$. For $E[Y] = 1$ it must be the case that $q + p + \frac{1-p-q}{2(p+q+(1-p-q)^2)} = 1$ and $F(\frac{1-p-q}{2(p+q+(1-p-q)^2)}) = 1$. $q + p + \frac{1-p-q}{2(p+q+(1-p-q)^2)} = 1$ implies that $q + p = 1$.

Finally consider contract $\boldsymbol{\varrho}_{\underline{IE}}$. For $E[Y] = 1$ it must be the case that $q + p + \frac{\theta_M(1-p-q)}{q+p} = 1$ and $F(q + p + \frac{\theta_M(1-p-q)}{q+p}) = 1$. $q + p + \frac{\theta_M(1-p-q)}{q+p} = 1$ implies that $q + p = 1$.

■

A1.2 Proof of Proposition 2

Following Table A1, the measure of implementation capacity in the presence of information transmission is given by the following expression. With some abuse of notation, the I subscript refers to any equilibrium contract (in a given parameter space) with information transmission.

$$E[Y] = F(\widetilde{\theta})E[Y(\boldsymbol{\varrho}_I)|\theta \leq \widetilde{\theta}] + (1 - F(\widetilde{\theta}))E[Y(\boldsymbol{\varrho}_I)|\theta < \widetilde{\theta}]$$

In the absence of information transmission, implementation capacity is given by:

$$E[Y(\boldsymbol{\varrho}_{\neg \boldsymbol{I}})]$$

where the $\neg I$ subscript refers to any equilibrium contract (in a given parameter space) without information transmission.

Denote by λ the share of the legible population, $F(\widetilde{\theta})$, at which implementation capacity is equivalent in contracts with and without information, formally:

$$\lambda(E[Y(\boldsymbol{\varrho}_I)|\theta \leq \widetilde{\theta}]) + (1 - \lambda)E[Y(\boldsymbol{\varrho}_I)|\theta < \widetilde{\theta}] = E[Y(\boldsymbol{\varrho}_{\neg I})]$$

A sufficient condition for $\lambda \in [0, 1]$ is $E[Y(\boldsymbol{\varrho}_I)|\theta > \widetilde{\theta}] \leq E[Y(\boldsymbol{\varrho}_{\neg I})] \leq E[Y(\boldsymbol{\varrho}_I)|\theta \leq \widetilde{\theta}]$.

Proceed by considering cases defined by regions of the parameter space denoted in Proposition 1, using the implementation capacity calculations from Table A1.

- Case #1: $\overline{\Delta} = \overline{\Delta}_L$
  In this case, compare implementation capacity under Contract $\boldsymbol{\varrho}_I$ to Contract $\boldsymbol{\varrho}_\emptyset$:

$$E[Y(\boldsymbol{\varrho}_I)|\theta \le \widetilde{\theta}] = \frac{2-q+q^2}{2}$$
$$E[Y(\boldsymbol{\varrho}_I)|\theta > \widetilde{\theta}] = \frac{1+q^2}{2}$$
$$E[Y(\boldsymbol{\varrho}_\emptyset)] = 1-q+q^2$$

  Clearly, for any $q \in [\frac{1}{2}, 1)$, $\frac{1+q^2}{2} < 1-q+q^2 < \frac{2-q+q^2}{2}$, which is sufficient for $\lambda \in [0,1]$.

- Case #2: $\overline{\Delta} = \overline{\Delta}_M$ and $p < \widehat{p}(q)$:
  This case is identical to the previous case and is therefore omitted.

- Case #3: $\overline{\Delta} = \overline{\Delta}_M$ and $p \in [\widehat{p}(q), \overline{p}(q))$:
  In this case, compare first implementation capacity under Contract $\boldsymbol{\varrho}_{\overline{IE}}$ to $\boldsymbol{\varrho}_\emptyset$:

$$E[Y(\boldsymbol{\varrho}_{\overline{IE}})|\theta \le \widetilde{\theta}] = q+p+\frac{1-p-q}{2(q+p+(1-p-q)^2)}$$
$$E[Y(\boldsymbol{\varrho}_{\overline{IE}})|\theta > \widetilde{\theta}] = \frac{1}{2}$$
$$E[Y(\boldsymbol{\varrho}_\emptyset)] = 1-q+q^2$$

  For any $q \in [\frac{1}{2}, 1)$, $p \in (\widehat{p}(q), 1-q]$, $\frac{1}{2} < 1-q+q^2 < q+p+\frac{1-p-q}{2(q+p+(1-p-q)^2)}$. The latter inequality holds when $p=0$ and note that $\frac{\partial E[Y(\boldsymbol{\varrho}_{\overline{IE}})|\theta \le \widetilde{\theta}]}{\partial p} > 0$.
  The comparison between Contract $\boldsymbol{\varrho}_I$ and Contract $\boldsymbol{\varrho}_\emptyset$ is equivalent to Case #1 and is therefore omitted.

- Case #4: $\overline{\Delta} = \overline{\Delta}_M$ and $p \ge \overline{p}(q)$:
  The analysis of $\boldsymbol{\varrho}_{\overline{IE}}$ and $\boldsymbol{\varrho}_\emptyset$ is identical to the previous case.

  Compare implementation capacity under Contract $\boldsymbol{\varrho}_{\underline{IE}}$ to Contract $\boldsymbol{\varrho}_\emptyset$:

$$E[Y(\boldsymbol{\varrho}_{\underline{IE}})|\theta \le \widetilde{\theta}] = q+p+\frac{\theta_M(1-p-q)}{2(q+p)}$$
$$E[Y(\boldsymbol{\varrho}_{\underline{IE}})|\theta > \widetilde{\theta}] = \frac{1}{2}$$
$$E[Y(\boldsymbol{\varrho}_\emptyset)] = 1-q+q^2$$

  For any $q \in [\frac{1}{2}, 1)$, $p \in (\widehat{p}(q), 1-q]$, $\frac{1}{2} < 1-q+q^2 < q+p+\frac{\theta_M(1-p-q)}{2(q+p)}$. By Proposition 1, in this parameter region, $\frac{\theta_M(1-p-q)}{2(q+p)} > q+p+\frac{1-p-q}{2(q+p+(1-p-q)^2)}$ from the previous case. Combined with the previous case, this is sufficient for the the inequality to hold.

- Case #5: $\overline{\Delta} = \overline{\Delta}_H, p < \widehat{p}(q)$: Compare implementation under Contract $\boldsymbol{\varrho}_I$ to Contract $\boldsymbol{\varrho}_E$ as follows:

$$E[Y(\boldsymbol{\varrho}_I)|\theta \leq \widetilde{\theta}] = \frac{2-q+q^2}{2}$$
$$E[Y(\boldsymbol{\varrho}_I)|\theta > \widetilde{\theta}] = \frac{1+q^2}{2}$$
$$E[Y(\boldsymbol{\varrho}_\emptyset)] = q+p+(1-p-q)^2$$

  For any $q \in [\frac{1}{2}, 1), p \in (\widehat{p}(q), 1-q]$, $\frac{1+q^2}{2} < q+p+(1-p-q)^2$. If $p < \frac{1}{2}(1-2q+\sqrt{1-2q+2q^2})$, $\frac{2-q+q^2}{2} > q+p+(1-p-q)^2$. This condition is satisfied for any $p < \widehat{p}(q)$.

- Case #6: $\overline{\Delta} = \overline{\Delta}_H, p \in [\widehat{p}(q), \overline{p}(q))$:
  The comparison of Contracts $\boldsymbol{\varrho}_I$ to $\boldsymbol{\varrho}_E$ is identical to the previous case, though note that $p < \frac{1}{2}(1-2q+\sqrt{1-2q+2q^2})$ is also satisfied for any $p < \overline{p}(q)$.

  Compare implementation capacity under contracts $\boldsymbol{\varrho}_{\overline{IE}}$ and $\boldsymbol{\varrho}_E$:

$$E[Y(\boldsymbol{\varrho}_{\overline{IE}})|\theta \leq \widetilde{\theta}] = q+p+\frac{1-p-q}{2(q+p+(1-p-q)^2)}$$
$$E[Y(\boldsymbol{\varrho}_{\overline{IE}})|\theta > \widetilde{\theta}] = \frac{1}{2}$$
$$E[Y(\boldsymbol{\varrho}_E)] = q+p+(1-q-p)^2$$

  For any $q \in [\frac{1}{2}, 1)$, $p \in (\widehat{p}(q), 1-q]$, it is clear from inspection that $\frac{1}{2} < q+p+(1-q-p)^2 < q+p+\frac{1-p-q}{2(q+p+(1-p-q)^2)}$.

- Case #7: $\overline{\Delta} = \overline{\Delta}_H, p \geq \overline{p}(q)$: The comparison of implementation capacity under Contracts $\boldsymbol{\varrho}_{\overline{IE}}$ and $\boldsymbol{\varrho}_E$ is equivalent to the previous case.

  Compare implementation capacity under contracts $\boldsymbol{\varrho}_{\underline{IE}}$ and $\boldsymbol{\varrho}_E$:

$$E[Y(\boldsymbol{\varrho}_{\underline{IE}})|\theta \leq \widetilde{\theta}] = q+p+\frac{\theta_M(1-p-q)}{2(q+p)}$$
$$E[Y(\boldsymbol{\varrho}_{\underline{IE}})|\theta > \widetilde{\theta}] = \frac{1}{2}$$
$$E[Y(\boldsymbol{\varrho}_E)] = q+p+(1-q-p)^2$$

  For any $q \in [\frac{1}{2}, 1)$, $p \in (\widehat{p}(q), 1-q]$, it is clear from inspection that $\frac{1}{2} < q+p+(1-q-p)^2 < q+p+\frac{\theta_M(1-p-q)}{2(q+p)}$.

■

A1.3 Proof of Proposition 3

First, note that the area of the triangle defined by the coordinates in Definition 2 is given by:

$$\mu_2\left((0,0), (F(\widetilde{\theta}), \frac{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}]}{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}] + (1-F(\widetilde{\theta}))E[a^\dagger|\theta > \widetilde{\theta}]}), (1,1)\right)$$
$$= \frac{1}{2}\left(\frac{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}]}{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}] + (1-F(\widetilde{\theta}))E[a^\dagger|\theta > \widetilde{\theta}]} - F(\widetilde{\theta})\right)$$

Consider each of the five contracts. For Contracts $\boldsymbol{\varrho}_\emptyset$ and $\boldsymbol{\varrho}_E$, $E[a^\dagger|\theta]$ is equivalent for all a. This implies that the point $F(\widetilde{\theta}) = \frac{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}]}{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}]+(1-F(\widetilde{\theta}))E[a^\dagger|\theta > \widetilde{\theta}]}$. Thus, $TAI(\boldsymbol{\varrho}_\emptyset) = TAI(\boldsymbol{\varrho}_E) = 0$ and $\frac{\partial TAI(\boldsymbol{\varrho}_1)}{\partial q} = \frac{\partial TAI(\boldsymbol{\varrho}_2)}{\partial q} = 0$.

Under Contract $\boldsymbol{\varrho}_I$:

$$\frac{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}]}{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}] + (1 - F(\widetilde{\theta}))E[a^\dagger|\theta > \widetilde{\theta}]} = \frac{F(1)(1+q-q^2)}{F(1) - F(1)q + (2-q)q}$$

$$\Rightarrow TAI(\boldsymbol{\varrho}_I) = \frac{F(1)(1+q-q^2)}{F(1) - F(1)q + (2-q)q} - F(1)$$

$$= \frac{F(1)(1-F(1))(1-q)}{F(1)(1-q) + (2-q)q} > 0$$

Note that $\frac{\partial TAI(\boldsymbol{\varrho}_I)}{\partial q} = \frac{(F(1)-1)F(1)(2-2q+q^2)}{(F(1)(q-1)+(q-2)q)^2} < 0$.

Under Contract $\boldsymbol{\varrho}_{\overline{IE}}$, $E[a^\dagger|\theta \leq \frac{q+p}{q+p+(1-q-p)^2}] = 0$. Therefore:

$$\frac{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}]}{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}] + (1 - F(\widetilde{\theta}))E[a^\dagger|\theta > \widetilde{\theta}]} = 1$$

$$\Rightarrow TAI(\boldsymbol{\varrho}_{\overline{IE}}) = 1 - F\left(\frac{q+p}{q+p+(1-q-p)^2}\right) > 0$$

Note that $\frac{\partial TAI(\boldsymbol{\varrho}_{\overline{IE}})}{\partial q} = -f(\frac{q+p}{q+p+(1-q-p)^2})\frac{1-p^2-q^2-2qp}{(p+q+(1-p-q)^2)^2}$. $f(\cdot)$ is the pdf of θ and is non-negative. As such $\frac{\partial TAI(\boldsymbol{\varrho}_{\overline{IE}})}{\partial q} \leq 0$.

Finally, under Contract $\boldsymbol{\varrho}_{\underline{IE}}$, $E[a^\dagger|\theta < \theta_M] = 0$. Therefore:

$$\frac{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}]}{F(\widetilde{\theta})E[a^\dagger|\theta \leq \widetilde{\theta}] + (1 - F(\widetilde{\theta}))E[a^\dagger|\theta > \widetilde{\theta}]} = 1$$

$$\Rightarrow TAI(\boldsymbol{\varrho}_{\underline{IE}}) = 1 - F(\theta_M) > 0$$

Note that $\frac{\partial TAI(\boldsymbol{\varrho}_{\underline{IE}})}{\partial q} = 0$.

Comparing TAI across the contracts with information transmission, $TAI(\boldsymbol{\varrho}_{\overline{IE}}) > TAI(\boldsymbol{\varrho}_I)$ can be seen by inspection of the inequality:

$$1 - F\left(\frac{q+p}{q+p+(1-q-p)^2}\right) > \frac{F(1)(1+q-q^2)}{F(1) - F(1)q + (2-q)q} - F(1)$$

Note that $1 > \frac{F(1)(1+q-q^2)}{F(1)-F(1)q+(2-q)q}$ and $F\left(\frac{q+p}{q+p+(1-q-p)^2}\right) \leq F(1)$. Similarly, $TAI(\boldsymbol{\varrho}_{\underline{IE}}) > TAI(\boldsymbol{\varrho}_I)$ is given by:

$$1 - F(\theta_M) > \frac{F(1)(2-q+q^2)}{F(1) - F(1)q + (2-q)q} - F(1)$$

as $1 > \frac{F(1)(2-q+q^2)}{F(1)-F(1)q+(2-q)q}$ and $F(\theta_M) \leq F(1)$.

■

A1.4 Proof of Proposition 4

Optimal contracts and incentives, by citizen type, follow directly from Proposition 1 and are represented in Table A2.

Contract	Parameter region $\overline{\Delta}$	p	Citizen type, θ: $\theta \leq \frac{q+p}{p+q+(1-p-q)^2}$	$\theta \in (\frac{q+p}{p+q+(1-p-q)^2}, 1]$	$\theta > 1$
ς_1	$\overline{\Delta}_L$	any	$\boldsymbol{\varrho}_I$	$\boldsymbol{\varrho}_I$	$\boldsymbol{\varrho}_\emptyset$
	$\overline{\Delta}_M$	$p < \widehat{p}(q)$			
ς_2	$\overline{\Delta}_M$	$p \in [\widehat{p}(q), \overline{p}(q))$	$\boldsymbol{\varrho}_{\overline{IE}}$	$\boldsymbol{\varrho}_I$	$\boldsymbol{\varrho}_\emptyset$
ς_3	$\overline{\Delta}_M$	$p > \overline{p}(q)$	$\boldsymbol{\varrho}_{\overline{IE}}$	$\boldsymbol{\varrho}_{\underline{IE}}$	$\boldsymbol{\varrho}_\emptyset$
ς_4	$\overline{\Delta}_H$	$p < \widehat{p}(q)$	$\boldsymbol{\varrho}_I$	$\boldsymbol{\varrho}_I$	$\boldsymbol{\varrho}_E$
ς_5	$\overline{\Delta}_H$	$p \in [\widehat{p}(q), \overline{p}(q))$	$\boldsymbol{\varrho}_{\overline{IE}}$	$\boldsymbol{\varrho}_I$	$\boldsymbol{\varrho}_E$
ς_6	$\overline{\Delta}_H$	$p \geq \overline{p}(q)$	$\boldsymbol{\varrho}_{\overline{IE}}$	$\boldsymbol{\varrho}_{\underline{IE}}$	$\boldsymbol{\varrho}_E$

Table A2: Optimal contracts, by citizen type.

Each contract imposes monitoring rates of $\rho(0,1) > \rho(0,0)$ for some citizen type by employing contracts $\boldsymbol{\varrho}_I$, $\boldsymbol{\varrho}_{\overline{IE}}$ or $\boldsymbol{\varrho}_{\underline{IE}}$ for some portion of the population for any $F(1) > 0$. Given the assumption $F(1) \in (0,1)$, $\rho(0,1) > \rho(0,0)$ induces some citizen to complain.

Per Definition 2, a sufficient condition for $TAI > 0$ is that $\exists \theta', \theta'' \in supp(f)$ such that $E[a^\dagger|\theta'] \neq E[a^\dagger|\theta'']$. The expressions for $E[a^\dagger|\theta]$ in Table A1, indicate for any $F(1) \in (0,1)$ and $q < 1$, $TAI > 0$ for contracts $\boldsymbol{\varrho}_1$ to $\boldsymbol{\varrho}_6$.

Finally, compare the levels of inequality generated by the contracts in Table A2 to inequality generated by their any constituent contract with information. For contract with two "constituent" contracts (ς_1 and ς_4), these comparisons are straightforward:

$$TAI(\boldsymbol{\varsigma}_1) - TAI((\boldsymbol{\varrho}_I) = \frac{F(1)(1+q-q^2)}{1+F(1)(q-q^2)} - F(1) - \left[\frac{F(1)(1+q-q^2)}{(2-q)q+F(1)(1-q)} - F(1)\right] < 0$$
$$TAI(\boldsymbol{\varsigma_2}) - TAI(\boldsymbol{\varrho}_I)) = \frac{F(1)(1+q-q^2)}{1+F(1)(q-q^2)} - F(1) - \left[\frac{F(1)(1+q-q^2)}{(2-q)q+F(1)(1-q)} - F(1)\right] < 0$$

In the case of contracts $\boldsymbol{\varsigma}_2$, $\boldsymbol{\varsigma}_3$, $\boldsymbol{\varsigma_5}$, and $\boldsymbol{\varsigma}_6$ there exist two thresholds defining different contracts that are applied across the population. Geometrically, the area measure relevant to the calculation of TAI is depicted for the quadrilateral representing $\boldsymbol{\varsigma}_3$ in Figure A1.
Given the notation in the Figure, $TAI(\boldsymbol{\varrho})$ is equivalent to:

$$2\mu_2\left((0,0),(F(\widetilde{\theta}_1),{a_1}^\dagger),(F(\widetilde{\theta}_2),{a_2}^\dagger),(1,1)\right) = {a_2}^\dagger(1-F(\widetilde{\theta}_1)) + F(\widetilde{\theta}_2)({a_1}^\dagger - 1)$$

Note two observations about contracts $\boldsymbol{\varsigma}_2$, $\boldsymbol{\varsigma}_3$, $\boldsymbol{\varsigma_5}$, and $\boldsymbol{\varsigma}_6$. Each includes contract $\boldsymbol{\varrho}_{\overline{IE}}$ for some segment of the population. In this case, $F(\tilde{\theta}_1)$ is equivalent as the marginal complainant under contract $\boldsymbol{\varrho}_{\overline{IE}}$ is the same.

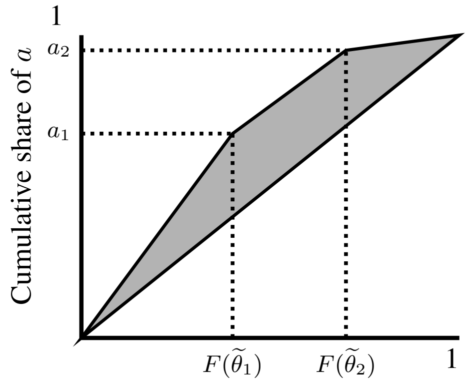


Figure A1: Geometric representation of inequality measure with three partitions of the type space (x-axis). Note that TAI is equivalent to double the shaded area.

As such, TAI is greater under $\varrho_{\overline{IE}}$ than under any contract in: ς_2, ς_3, ς_5, ς_6 if:

$$1 - F(\widetilde{\theta}_1) > a_2^{\dagger}(1 - F(\widetilde{\theta}_1)) + F(\widetilde{\theta}_2)(a_1^{\dagger} - 1)$$

This inequality is always satisfied since $a_2^{\dagger} < 1$ and $a_1^{\dagger} < 1$.

■

A2 Extension: Alignment of Citizen Preferences with Policy Goals

In the main model, I consider a citizen who values receiving the service, regardless of their eligibility. Recall that the policy goal is to match the service to a citizen's eligibility. I now consider an extension of the model in which the *citizen instead seeks for the service to be matched to (congruent with) their eligibility*. The only difference from the main model is therefore the citizen's utility which is now defined as:

$$U_C = Y - \theta c \tag{A3}$$

I solve the model following the same process as in the main variant. First, consider the citizen's decision to complain. If $\omega = 1$ and the citizen was denied the service ($a = 0$), then the citizen will complain if:

$$\rho(0,1) - \rho(0,0) \geq \theta \tag{A4}$$

If $\omega = 0$, the citizen will complain when wrongly granted the service ($a = 1$) if:

$$\rho(1,1) - \rho(1,0) \geq \theta \tag{A5}$$

Note that there are (potentially) two thresholds for citizen legibility that depend on a citizen's eligibility. Denote $\widetilde{\theta}_1 \equiv \rho(0,1) - \rho(0,0)$ as the marginal legible citizen if $\omega = 1$. Further denote $\widetilde{\theta}_0 \equiv \rho(1,1) - \rho(1,0)$ as the marginal legible citizen if $\omega = 0$. It is useful to note that $\widetilde{\theta} \leq 1$. There are four possible cases, depending on the ordering of θ, $\widetilde{\theta}_1$ and $\widetilde{\theta}_0$. Lemma A1 characterizes the politician's posterior beliefs in each case.

Lemma A1. ***Informational value of citizen (non-)complaints****:*
(i) If $\theta > \widetilde{\theta}_1$ and $\theta > \widetilde{\theta}_0$, the citizen never complains ($c = 0$). In hte absence of a complaint, the probability of non-congruence is: $Pr(a \neq \omega) = 1 - q - pe$ for any a.
(ii) If $\theta \leq \widetilde{\theta}_1$ and $\theta \leq \widetilde{\theta}_0$ the citizen complains if and only if $a \neq \omega$. The probability of non-congruence between ω and a, conditional on the citizen's complaint, c, is:

$$Pr(a \neq \omega) = \begin{cases} 1 & \text{if } c = 1 \\ 0 & \text{if } c = 0 \end{cases}$$

(iii) If $\theta \in [\widetilde{\theta}_0, \widetilde{\theta}_1)$ then the citizen complains if and only if $\omega = 0$ and $a = 1$. The probability of non-congruence between ω and a, conditional on the citizen's complaint, c, is:

$$Pr(a \neq \omega) = \begin{cases} 1 & \text{if } a = 1, c = 1 \\ 0 & \text{if } a = 1, c = 0 \\ 1 - q - pe & \text{if } a = 0 \end{cases}$$

(iv) If $\theta \in [\widetilde{\theta}_1, \widetilde{\theta}_0)$ then the citizen complains if and only if $\omega = 1$ and $a = 0$. The probability of non-congruence between ω and a, conditional on the citizen's complaint, c, is:

$$Pr(a \neq \omega) = \begin{cases} 1 & \text{if } a = 0, c = 1 \\ 0 & \text{if } a = 0, c = 0 \\ 1 - q - pe & \text{if } a = 1 \end{cases}$$

The bureaucrat's allocation of effort and the service follow from the main model. As such, we now examine the politician's determination of the contract. Consider first the case when $\theta_M > 1$. A citizen of type $\theta = \theta_M$ can never be induced to complain since $\widetilde{\theta}_1 \leq 1$ and $\widetilde{\theta}_0 \leq 1$. This case is identical to Case #1 from the proof to Proposition 1, and is therefore omitted.

Now consider the case of $\theta_M \leq 1$. The median citizen would can be incentivized to complain regardless of their eligibility if $\theta \leq \widetilde{\theta}_\omega$. The politician's optimization problem is therefore:

$$\max_{\substack{\rho(0,0),\rho(0,1),\\ \rho(1,0),\rho(1,1),\Delta}} \begin{array}{l} \frac{1}{2}\big[(q+ep)(1-\frac{\rho(1,0)^2}{2}) + (1-q-ep)(\rho(0,1)-\frac{\rho(0,1)^2}{2})+ \\ \quad (q+ep)(1-\frac{\rho(0,0)^2}{2}) + (1-q-ep)(\rho(1,1)-\frac{\rho(1,1)^2}{2})\big] \end{array} \tag{A6}$$

Maximization yields $\rho(1,1)^* = 1$, $\rho(0,1)^* = 1$, $\rho(0,0)^* = 0$, $\rho(1,0)^* = 0$. Given these monitoring rates, any legible citizen will report an error in either direction. Lemma A1 implies that any citizen or whom $\theta < 1$ will reveal their eligibility via complaint. As such, the bureaucrat has no incentive to accede to the citizen. By ignoring their research, the bureaucrat increases the chance of an error, which would be reported by a legible citizen and punished by the politician. This means that incentive compatibility constraints in (9) and (10) are always satisfied. As a consequence, the politician need not choose between providing incentives and monitoring at optimal rates. Following the incentive compatibility constraint in (8), the politician can offer effort incentives for any $\Delta \geq \frac{d}{p}$, though the bureaucrat will only work on behalf of a legible citizen.

Given the parametric assumptions in Assumption 1, condition is satisfied only for $\overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\}$. Denote the resultant contract without effort incentives as:

$$\boldsymbol{\rho}_I^{\ddagger} = \{\rho(0,0) = 0, \rho(0,1) = 1, \rho(1,0) = 0, \rho(1,1) = 1, \Delta \leq \overline{\Delta}_L\} \tag{A7}$$

and the contract with effort incentives as:

$$\boldsymbol{\rho}_{IE}^{\ddagger} = \{\rho(0,0) = 0, \rho(0,1) = 1, \rho(1,0) = 0, \rho(1,1) = 1, \Delta \in [\frac{d}{p}, \overline{\Delta}_H]\} \tag{A8}$$

Any $\theta_M \leq 1$ chooses the contract:

$$\boldsymbol{\rho} = \begin{cases} \boldsymbol{\rho}_{IE}^{\ddagger} & \text{if } \overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\} \\ \boldsymbol{\rho}_I^{\ddagger} & \text{else} \end{cases} \tag{A9}$$

Collectively, this analysis characterizes the equilibrium contract:

Proposition A1. *Equilibrium contracts:*
(i) If $\theta_M > 1$, the politician implements a contract that does not incentivize information transmission. The contract provides effort incentives if and only if $\overline{\Delta} = \overline{\Delta}_H$.
(ii) If $\theta_M \leq 1$, the politician implements a contract that incentivizes information transmission. The contract provides effort incentives if $\overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\}$.

Proof: The first case of $\theta_M > 1$ follows directly from the proof to Proposition 1. The second case of $\theta_M \leq 1$ is given by the preceding discussion.

Following Table A1, I characterize the conditional expectations for capacity and post-monitoring allocations under the contracts described in Proposition A1.

	A: $E[a^{\dagger}\|\theta]$		B: $E[Y\|\theta]$		C: *Ex-ante* $E[U_C\|\theta]$	
	Citizen type, θ:		Citizen type, θ:		Citizen type, θ:	
Contract	$\theta \leq 1$	$\theta > 1$	$\theta \leq 1$	$\theta > 1$	$\theta \leq 1$	$\theta > 1$
$\boldsymbol{\rho}_{\emptyset}$	$\frac{1}{2}$	$\frac{1}{2}$	$1 - q + q^2$	$1 - q + q^2$	$1 - q + q^2$	$1 - q + q^2$
$\boldsymbol{\rho}_I^{\ddagger}$	$\frac{1}{2}$	$\frac{1}{2}$	1	q	$1 - \theta + \theta q$	q
$\boldsymbol{\rho}_{IE}^{\ddagger}$	$\frac{1}{2}$	$\frac{1}{2}$	1	q	$1 - \theta + \theta q$	q

Table A3: Conditional expectations of implementation capacity, $E[Y|\theta]$, ultimate allocations $E[a^{\dagger}|\theta]$, and the citizen's *ex-ante* expected utility under the equilibrium contracts characterized in Proposition A1.

From examination of Table A3, we can make the following observations about inequality and implementation capacity:

Proposition A2. *Implementation capacity and inequality: When the citizen values congruence of the policy output with her eligibility, then:*

(i) If $F(\widetilde{\theta}) \geq \frac{1-2q+q^2}{1-q}$ implies that monitoring on the basis of citizen complaints weakly increases state implementation capacity. For $F(\widetilde{\theta}) < \frac{1-2q+q^2}{1-q}$, monitoring on the basis of complaints decreases state capacity.

(ii) Conditioning oversight on citizen complaints does not introduce inequality in the allocation of the service. $TAI = 0$ for any contract.

Proof: First consider implementation capacity. First, note from Table A3 that implementation capacity is equivalent under contracts $\rho_I^{\ddagger}$ and $\rho_{IE}^{\ddagger}$. As such, either contract with information transmission increases implementation capacity if:

$$F(\widetilde{\theta}) + (1 - F(\widetilde{\theta}))q = 1 - q + q^2$$
$$F(\widetilde{\theta}) = \frac{1 - 2q + q^2}{1 - q}.$$

For all $q \in [\frac{1}{2}, 1)$, it is clear that $\frac{1-2q+q^2}{1-q} \in [0, 1]$. To see that $TAI = 0$, it is clear from Table A3 that $E[a^{\dagger}|\theta] = \frac{1}{2} \forall \theta$. Since $\omega \perp \theta$, it therefore follows that there is no type-attributable inequality. ■

Note, however, that because the citizen now values Y (as opposed to $a^{\dagger}$), the citizen's *ex-ante* expected utility is not equivalent when contracts incentivize information transmission. So the introduction of information transmission introduces inequality on this dimension when citizens value congruence of their eligibility and the policy.

A3 Extension: No Commitment by Politician

In the main model, the politician commits to oversight institutions *ex-ante*. This modeling choice is consistent with empirical observation: principals generally set up complaint systems and specify known penalties for bureaucrats rather than dealing with service provision issues on a case-by-case basis. However, it is useful to consider how robust the results are to relaxing this commitment assumption. This extension changes the sequence of the baseline model and the equilibrium concept. The extension proceeds as follows:

1. The citizens' eligibility, ω is realized and revealed to only the citizen.
2. The bureaucrat chooses effort level, e, allocating the service, a, to the citizen.
3. The citizen observes a and decides whether or not to complain, c.
4. *The politician chooses $\boldsymbol{\rho}(a, c)$ and Δ and monitors accordingly.* When monitoring reveals bureaucratic errors, the allocation is reversed and the bureaucrat is punished.
5. Utilities are realized.

The departure from the baseline model is italicized. When the politician determines monitoring rates and penalties after observing a citizen complaint, I characterize a perfect Bayesian equilibrium rather than a

Bayesian Nash equilibrium.

I invoke three further assumptions in this extension. First, note that *ex-post*, the politician is indifferent between imposing a penalty and not penalizing the bureaucrat if an error is uncovered. While the politician is constrained by the degree of bureaucratic insulation (so that $\Delta \leq \overline{\Delta}$), I will assume that the politician cannot commit to abstaining from punishing the bureaucrat (by setting $\Delta = 0$). Second, I follow the extension in A2, and assume that the politician values providing service to all citizens and can condition monitoring on a citizen's type (θ). If the politician valued only service provision to some specific θ (e.g., θ_M), then the politician would not monitor service provision to any other citizen. The bureaucrat would then exert no effort, the level of implementation capacity would fall to $E[Y] = q$. Finally, the PBE requires specification of off-path beliefs. To this end, I invoke the following assumption about off-path beliefs: If a politician observes a complaint off the equilibrium path, they assume that the allocation does not match the citizen's eligibility, e.g., $\omega \neq a$.

Propositions A3 and A4 characterizes the resultant equilibria for a citizen of type $\theta > 1$ and $\theta \leq 1$, respectively. Proposition A5 characterizes the distributional implications of these equilibria.

Case #1: $\theta > 1$: The politician's monitoring decision depends on her posterior beliefs about the citizen's eligibility. Recall that per (3) when $\theta > 1$, complaint is too costly regardless of the bureaucrat's allocation and the citizen's eligibility. As such, such a citizen will not complain (on the equilibrium path), regardless of the bureaucrat's allocation. This discussion and assumptions about complaints off path yield Lemma A2.

Lemma A2. *Suppose that $\theta > 1$. The politician's posterior belief that the citizen is eligible ($\omega = 1$), as a function of the bureaucrat's allocation (a) and the citizen's complaint (c) are as follows:*

$$Pr(\omega = 1) = \begin{cases} q + pe & \textit{if } a = 1, c = 0 \\ 1 - q - pe & \textit{if } a = 0, c = 0 \\ 0 & \textit{if } a = 1, c = 1 \textit{ (off-path)} \\ 1 & \textit{if } a = 0, c = 1 \textit{ (off-path)} \end{cases}$$

Given these beliefs, the politician's objective is given by:

$$\max_{\substack{\rho(0,0),\rho(0,1),\\ \rho(1,0),\rho(1,1),\Delta}} \begin{array}{l} \frac{1}{2}\big[(q+pe)(1-\frac{\rho(1,0)^2}{2}) + (1-q-pe)(\rho(0,0)-\frac{\rho(0,0)^2}{2}) + \\ (q+pe)(1-\frac{\rho(0,0)^2}{2}) + (1-q-pe)(\rho(1,0)-\frac{\rho(1,0)^2}{2})\big] + \\ \rho(0,1)-\frac{\rho(0,1)^2}{2} + \rho(1,1)-\frac{\rho(1,1)^2}{2} \end{array} \tag{A10}$$

Optimization of monitoring rates yields $\rho^*(1,0) = \rho^*(0,0) = 1 - q - pe$ and $\rho^*(1,1) = \rho^*(0,1) = 1$. The politician prefers that the bureaucrat exert effort ($e = 1$), and will set Δ high enough to induce effort if $\overline{\Delta}$ is sufficiently high. We return to the characterization of Δ when considering the bureaucrat's actions.

Recall that complaint-making is off the path of play for citizens for whom $\theta > 1$. If we examine the most favorable scenario for citizen complaint—a service denial ($a = 0$) to an eligible citizen ($\omega = 1$)—it is clear that:

$$\underbrace{1-\theta}_{u_C(c=1)} < \underbrace{1-q-pe}_{u_C(c=0)}.$$

Turning to the bureaucrat's effort allocation decision, substituting in the politician's monitoring rates into (8), the bureaucrat will exert effort if $\Delta \geq \frac{d}{p(1-p-q)}$, which is feasible when $\overline{\Delta} = \overline{\Delta}_H$. The bureaucrat has no incentive to ignore their investigation since $\rho^(0,0) = \rho^*(1,0)$ and $\rho^*(1,0) = \rho^*(1,1)$.

Proposition A3. ***Equilibrium:*** *For a citizen is of type $\theta > 1$, when $\overline{\Delta} \in \{\overline{\Delta}_L, \overline{\Delta}_M\}$, the bureaucrat does not exert effort ($e = 0$) and follows their investigation when allocating the service. The citizen does not complain ($c = 0$). The politician monitors with probabilities $\rho(0,0) = \rho(1,0) = 1-q$ and $\rho(0,1) = \rho(1,1) = 1$ and sets $\Delta \in (0, \overline{\Delta})$. The politician's beliefs are given by Lemma A2.*

When $\overline{\Delta} = \overline{\Delta}_H$, the bureaucrat exerts effort ($e = 1$) and follows their investigation when allocating the service. The citizen does not complain ($c = 0$). The politician monitors with probabilities $\rho(0,0) = \rho(1,0) = 1-q-p$ and $\rho(0,1) = \rho(1,1) = 1$ and sets $\Delta \in [\frac{d}{p(1-q-p)}, \overline{\Delta}_H]$. The politician's beliefs are given by Lemma A2.

Proof: Follows from the analysis of Case #1 above. ■

It is worthwhile to note that the observable implications of A3 are identical to those of those of the type-specific contracts with commitment in Table A2.

Case #2: $\theta \leq 1$**:** For the case of citizens of type $\theta \leq 1$, we need to consider possible sub-cases, which depend on whether the bureaucrat follows their investigation.

Sub-case #1: First, consider the case in which the bureaucrat follows their investigation. Recall that that complaints reveal the citizen's eligibility if a citizen is allocated $a = 0$. However, a lack of complaint when $a = 1$ is uninformative. This discussion and assumptions about complaints off path yield Lemma A3.

Lemma A3. *The politician's posterior belief that the citizen is eligible ($\omega = 1$), as a function of the bureaucrat's allocation (a) and the citizen's complaint (c) are as follows:*

$$Pr(\omega = 1) = \begin{cases} q + pe & \textit{if } a = 1, c = 0 \\ 0 & \textit{if } a = 0, c = 0 \\ 1 & \textit{if } a = 0, c = 1 \\ 0 & \textit{if } a = 1, c = 1 \textit{ (off-path)} \end{cases}$$

Given these beliefs, the politician's objective is given by:

$$\max_{\substack{\rho(0,0),\rho(0,1),\\ \rho(1,0),\rho(1,1),\Delta}} \begin{aligned} &\frac{1}{2}\big[(q+pe)(1-\frac{\rho(1,0)^2}{2}) + (1-q-pe)(\rho(0,1) - \frac{\rho(0,1)^2}{2}) + \\ &(q+pe)(1-\frac{\rho(0,0)^2}{2}) + (1-q-pe)(\rho(1,0) - \frac{\rho(1,0)^2}{2})\big] + \\ &\rho(1,1) - \frac{\rho(1,1)^2}{2} \end{aligned} \tag{A11}$$

Optimization of monitoring rates yields $\rho^*(0,0) = 0$, $\rho^*(1,0) = 1 - q - pe$ and $\rho^*(1,1) = \rho^*(0,1) = 1$. The politician prefers that the bureaucrat exert effort ($e = 1$), and will set Δ high enough to induce effort if $\overline{\Delta}$ is sufficiently high. We return to the characterization of Δ when considering the bureaucrat's optimization problem.

Now consider the citizen's complaint-making decision. First, suppose that $\omega = 1$ and $a = 0$. The citizen complains because:

$$\underbrace{1-\theta}_{u_C(c=1)} \geq \underbrace{0}_{u_C(c=0)},$$

which follows in this case when $\theta \leq 1$. When $\omega = 1$ and $a = 1$, the citizen would keep the service, but gets no utility from complaining and pays costs of complaint. When $\omega = 0$ and $a = 1$, the citizen will lose the service if the politician investigates. Since complaint increases the rate of investigation (under the off-path assumptions imposed), the citizen will not complain. Finally, when $\omega = 0$ and $a = 0$, the citizen cannot obtain the service via complaint because they are ineligible and therefore will not pay the costs of complaint.

Finally, consider the bureaucrat's effort allocation decision under the assumption that they follow their investigation. Substituting in the politician's monitoring rates into (8), the bureaucrat will exert effort when $\Delta \geq \frac{2d}{p(1-q-p)}$, which is feasible when $\overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\}$.

Sub-case #2: Now consider the the possibility that the bureaucrat ignores their investigation, allocating $a = 1$ to any citizen of type $\theta \leq 1$. Note that the citizen never has an incentive to complain, since monitoring will result in the revocation of the service when the citizen is ineligible.

Lemma A4. *The politician's posterior belief that the citizen is eligible ($\omega = 1$), as a function of the bureaucrat's allocation (a) and the citizen's complaint (c) are as follows:*

$$Pr(\omega = 1) = \begin{cases} \frac{1}{2} & \textit{if } a = 1, c = 0 \\ \frac{1}{2} & \textit{if } a = 0, c = 0 \textit{ (off-path)} \\ 1 & \textit{if } a = 0, c = 1 \textit{ (off-path)} \\ 0 & \textit{if } a = 1, c = 1 \textit{ (off-path)} \end{cases}$$

Given these beliefs, the politician's objective is:

$$\max_{\substack{\rho(0,0),\rho(0,1),\\ \rho(1,0),\rho(1,1),\Delta}} \begin{array}{l} \frac{1}{2}[1 - \frac{\rho(1,0)^2}{2}) + \rho(1,0) - \frac{\rho(1,0)^2}{2}] + \\ \rho(1,1) - \frac{\rho(1,1)^2}{2} - \frac{\rho(0,1)^2}{2} + \frac{\rho(0,0)}{2} - \frac{\rho(0,0)^2}{2}. \end{array} \tag{A12}$$

Optimization of monitoring rates yields $\rho^*(1,0) = \frac{1}{2}$, $\rho^*(0,1) = 0$ and $\rho^*(1,1) = \rho(0,0) = 1$. When the bureaucrat does not follow their investigation, the politician is indifferent to the bureaucrat's decision to exert effort.

Now we will consider the bureaucrat's decision of whether to follow their signal and, if so, whether to exert effort. Given these monitoring rates and citizen complaint-making, we can write these expected utilities as follows:

$$
\begin{aligned}
E[U_B(e=0,\text{follow investigation})] &= -\frac{(1-q)\Delta}{2}[\underbrace{1}_{\rho(0,1)}+\underbrace{1-q}_{\rho(1,0)}] = -\frac{(1-q)(2-q)\Delta}{2} \\
E[U_B(e=1,\text{follow investigation})] &= -d-\frac{(1-q-p)\Delta}{2}[\underbrace{1}_{\rho(0,1)}+\underbrace{1-q-p}_{\rho(1,0)}] \\
&= -\frac{2d+(1-q-p)(2-q-p)\Delta}{2} \\
E[U_B(e=0,\text{ignore investigation})] &= -\frac{\Delta}{4}
\end{aligned}
$$

Straightforward comparison of expected utilities and some algebra yields:

$$E[U_B(e=0,\text{follow investigation})] \geq E[U_B(e=0,\text{ignore investigation})] \Rightarrow q \geq \frac{3-\sqrt{3}}{2}$$

$$E[U_B(e=1,\text{follow investigation})] \geq E[U_B(e=0,\text{follow investigation})] \Rightarrow \Delta \geq \frac{2d}{p(3-2q-p)}$$

$$E[U_B(e=1,\text{follow investigation})] \geq E[U_B(e=0,\text{ignore investigation})] \Rightarrow \Delta \geq \frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3}$$

Finally, consider how the level of bureaucratic (non)-insulation ($\overline{\Delta}$) constrains the politician's choice of incentives. Suppose first that $q < \frac{3-\sqrt{3}}{2}$. A politician will induce the bureaucrat to exert effort by setting incentives $\Delta \in [\frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3}, \overline{\Delta}]$ when:

$$\frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3} \leq \overline{\Delta}.$$

Note that there exist regions of the parameter space for which $\frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3} \leq \overline{\Delta}_L$ (e.g., $q = \frac{9}{16}, p = \frac{5}{128}$, and $d = 1$). Moreover, there exist regions of the parameter space for which $\frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3} > \overline{\Delta}_H$ (e.g., $q = \frac{9}{16}, p = \frac{297}{4096}$, and $d = 1$).

Now suppose that $q \geq \frac{3-\sqrt{3}}{2}$. Here, the politician cannot offer incentives sufficient to induce effort when $\overline{\Delta} = \overline{\Delta}_L$ because:

$$\frac{2d}{p(3-2q-p)} > \frac{d}{p},$$

which follows by noting that $3-2q-p < 2$. However, for $\overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\}$, the politician will always offer incentives sufficent to induce effort because:

$$\frac{2d}{p(3-2q-p)} \leq \frac{2d(p+q+(1-p-q)^2)}{p}.$$

Proposition A4. ***Equilibrium:*** *For a citizen of type $\theta \leq 1$, when $q \geq \frac{3-\sqrt{3}}{2}$ and $\overline{\Delta} = \overline{\Delta}_L$, the bureaucrat does not exert effort ($e = 0$) but follows their investigation. The citizen complains when wrongly denied the service. The politician monitors with probabilities $\rho(0,0) = 0, \rho(1,0) = 1 - q$, and $\rho(0,1) = \rho(1,1) = 1$ and sets $\Delta \in (0, \overline{\Delta}_L]$. The politician's beliefs are given by Lemma A3.*

When $q \geq \frac{3-\sqrt{3}}{2}$ and $\overline{\Delta} \in \{\overline{\Delta}_M, \overline{\Delta}_H\}$, the bureaucrat exerts effort ($e = 1$) and follows their investigation. The citizen complains when wrongly denied the service. The politician monitors with probabilities $\rho(0,0) = 0, \rho(1,0) = 1 - q - p$, and $\rho(0,1) = \rho(1,1) = 1$ and sets $\Delta \in [\frac{2d}{p(3-2q-p)}, \overline{\Delta})$. The politician's beliefs are given by Lemma A3.

When $q < \frac{3-\sqrt{3}}{2}$ and $\frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3} \leq \overline{\Delta}$, the bureaucrat exerts effort ($e = 1$) and follows their investigation. The citizen complains when wrongly denied the service. The politician monitors with probabilities $\rho(0,0) = 0, \rho(1,0) = 1-q-p$, and $\rho(0,1) = \rho(1,1) = 1$ and sets $\Delta \in [\frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3}, \overline{\Delta})$. The politician's beliefs are given by Lemma A3.

When $q < \frac{3-\sqrt{3}}{2}$ and $\frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3} > \overline{\Delta}$, the bureaucrat ignores their investigation, allocating $a = 1$ to the citizen. The citizen does not complain because they are never wrongly denied the service. The politician monitors with probabilities $\rho(1,0) = \frac{1}{2}, \rho(0,1) = 0$, and $\rho(0,0) = \rho(1,1) = 1$ and sets $\Delta \in (0, \overline{\Delta}]$. The politician's beliefs are given by Lemma A4.

Proof: Follows from the analysis of Case #2 above. ■

Implications: Table A4 provides a summary of the service allocation and implementation capacity under the equilibria characterized in Propositions A3 and A4. As is clear from Proposition A4, note that the bureaucrat will ignore their investigation when $q \leq \frac{3-\sqrt{3}}{2}$ and $\frac{4d}{6(q+p)-2(q^2+p^2)-4pq-3} \leq \Delta$. To streamline notation in the table, define:

$$\widetilde{\Delta} \equiv \frac{4d}{6(q+p) - 2(q^2+p^2) - 4pq - 3}$$

Observation of the table yields the following result:

Proposition A5. *In the absence of commitment to a monitoring scheme by a politician, for any $F(1) \in (0,1)$, any equilibrium monitoring strategy incentivizes information transmission from citizen types.*

(a) When bureaucratic quality is sufficiently low, $q < \frac{3-\sqrt{3}}{2}$, the use of information can increase or decrease implementation capacity to citizens who can be induced to complain relative to those that cannot be induced to complain. For high levels of bureaucratic quality, $q \geq \frac{3-\sqrt{3}}{2}$, the use of information increases implementation capacity to citizens who can be induced to complain relative to those who cannot.

(b) All equilibria generate type-attributable inequality in service provision $TAI > 0$.

Proof: Consider first implementation capacity, $E[Y]$. From inspection of Case #1:

$$\frac{2-(1-p-q)(p+q)}{2} > 1 - q + q^2 \Rightarrow \frac{q - q^2 - p + p^2 + 2pq}{2} > 0,$$

	Parameter space			$E[a^\dagger\|\theta]$		$E[Y\|\theta]$	
Case	q	$\overline{\Delta}$	$\widetilde{\Delta}$	$\theta \leq 1$	$\theta > 1$	$\theta \leq 1$	$\theta > 1$
1	$< \frac{3-\sqrt{3}}{2}$	$\in \{\overline{\Delta}_L, \overline{\Delta}_M\}$	$\leq \overline{\Delta}$	$\frac{1+(1-p-q)(p+q)}{2}$	$\frac{1}{2}$	$\frac{2-(1-p-q)(p+q)}{2}$	$1-q+q^2$
2	$< \frac{3-\sqrt{3}}{2}$	$\in \{\overline{\Delta}_L, \overline{\Delta}_M\}$	$> \overline{\Delta}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$1-q+q^2$
3	$< \frac{3-\sqrt{3}}{2}$	Δ_H	$\overline{\Delta}$	$\frac{1+(1-p-q)(p+q)}{2}$	$\frac{1}{2}$	$\frac{2-(1-p-q)(p+q)}{2}$	$q+p+(1-q-p)^2$
4	$< \frac{3-\sqrt{3}}{2}$	Δ_H	$> \overline{\Delta}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$q+p+(1-q-p)^2$
5	$\geq \frac{3-\sqrt{3}}{2}$	$\overline{\Delta}_L$		$\frac{(1+q-q^2)}{2}$	$\frac{1}{2}$	$\frac{2-q+q^2}{2}$	$1-q+q^2$
6	$\geq \frac{3-\sqrt{3}}{2}$	$\overline{\Delta}_M$		$\frac{1+(1-p-q)(p+q)}{2}$	$\frac{1}{2}$	$\frac{2-(1-p-q)(p+q)}{2}$	$1-q+q^2$
7	$\geq \frac{3-\sqrt{3}}{2}$	$\overline{\Delta}_H$		$\frac{1+(1-p-q)(p+q)}{2}$	$\frac{1}{2}$	$\frac{2-(1-p-q)(p+q)}{2}$	$q+p+(1-q-p)^2$

Table A4: Allocation $E[a^\dagger]$ and implementation capacity $E[Y]$, as implied by the equilibria characterized in Propositions A3 and A4 from the extension without commitment.

which holds because $0 \leq p < q \leq 1$. From inspection of Case #3:

$$\frac{2-(1-p-q)(p+q)}{2} > q+p+(1-q-p)^2 \Rightarrow \frac{p+q-p^2-q^2-2pq}{2} > 0.$$

Note that $p+q-p^2-q^2-2pq = (1-p-q)(p+q) \geq 0$. In Cases #1 and #3, $E[Y|\theta \leq 1] > E[Y|\theta > 1]$. Now, from Case #2:

$$\frac{3}{4} > 1-q+q^2 \Rightarrow q < \frac{1}{2},$$

contradicting our parametric assumptions on q. Further in Case #4:

$$\frac{3}{4} > p+q+(1-p-q)^2 \Rightarrow -\frac{(2(p+q)-1)^2}{4} > 0,$$

which cannot hold. Thus, in Cases #2 and #4, $E[Y|\theta \leq 1] < E[Y|\theta > 1]$. This occurs when the ex-post incentives cannot prevent the bureaucrat from acceding to a prospective complainant. Collectively, this shows that for sufficiently low bureaucratic quality, $q < \frac{3-\sqrt{3}}{2}$, the use of information from citizen complaints can increase or decrease implementation capacity among citizens who can be induced to complain ($\theta \leq 1$) relative to those who cannot complain.

Now consider Case #5. By inspection, it is clear that $E[Y|\theta \leq 1] \geq E[Y|\theta < 1]$. Case #6 is equivalent to Case #1 and Case #7 is equivalent to Case #3. This implies that for sufficient high bureaucratic quality, when $q \geq \frac{3-\sqrt{3}}{2}$, the use of information from complaints increases increases implementation capacity among citizens who can be induced to complain ($\theta \leq 1$) relative to those who cannot complain.
Turning to analysis of TAI, note that a sufficient condition for $TAI \geq 0$ is:

$$E[a^\dagger|\theta \leq 1] \neq E[a^\dagger|\theta > 1].$$

Straightforward observation of Table A4 shows that this inequality obtains for any $q < 1$ and $p < 1-q$. ■

A4 Visualization of the Effect of Information Transmission on Capacity and Inequality

The model includes two parameters that capture canonical features of civil service systems (or lack thereof): q measures bureaucratic quality and $\overline{\Delta}$ measures of bureaucratic (non)-insulation from political principals. These features interact with societal composition, measured by $f(\theta)$, to produce implications for implementation capacity and inequality. This section provides several visualizations to better describe these relationships.

Figure A2 compares the effect of information transmission – which occurs when the politician incentivizes citizen complaint – on implementation capacity and type-attributable inequality, varying the share of endogenously legible citizens, $F(\widetilde{\theta})$, q, and $\overline{\Delta}$.

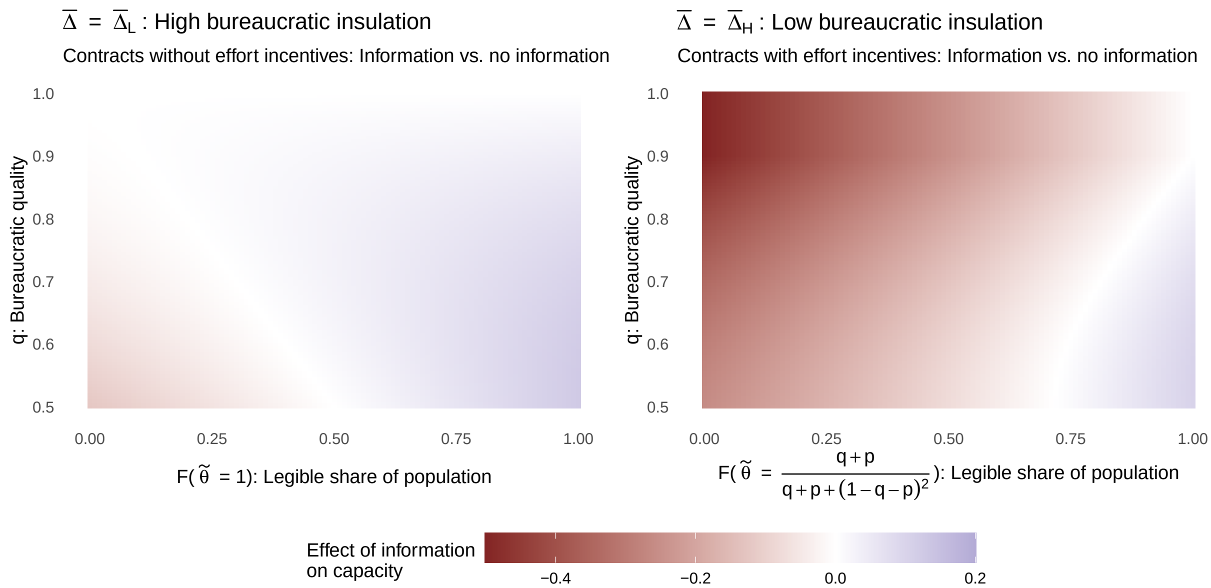
Figure A2a shows first the effect of information transmission on implementation capacity is uniformly increasing in the share of legible citizens. In both panels, the effect of information transmission on capacity is ambiguous, as is stated in Proposition 2. Second, these effects vary in both bureaucratic capacity and insulation. These interaction effects can be summarized as follows:

- With high bureaucratic insulation (left panel), the politician cannot provide effort incentives. In this case, for any $F(1) > 1 - q$, information transfer increases implementation capacity. Moreover, at low levels of bureaucratic quality, bureaucrats are less accurate in their initial allocations so changes to the oversight regime (here, providing information transmission incentives) have a larger marginal effect on capacity.
- With low bureaucratic insulation (right panel), any politician can provide effort incentives. The right panel compares the equilibrium contract proposed when $\theta_M > \frac{q+p}{q+p+(1-q-p)^2}$ (with $p \geq \widehat{p}(q)$) to a contract with effort incentives alone. We see that in this case, that in highly unequal societies, where $F(\widetilde{\theta})$ is low, implementing information transmission and effort incentives impose very large reductions in capacity because the bureaucrat denies service all illegible citizens to avoid oversight. This has particularly substantial costs when bureaucratic quality is high, because bureaucrats allocate the service fairly accurately in the absence of information transmission.

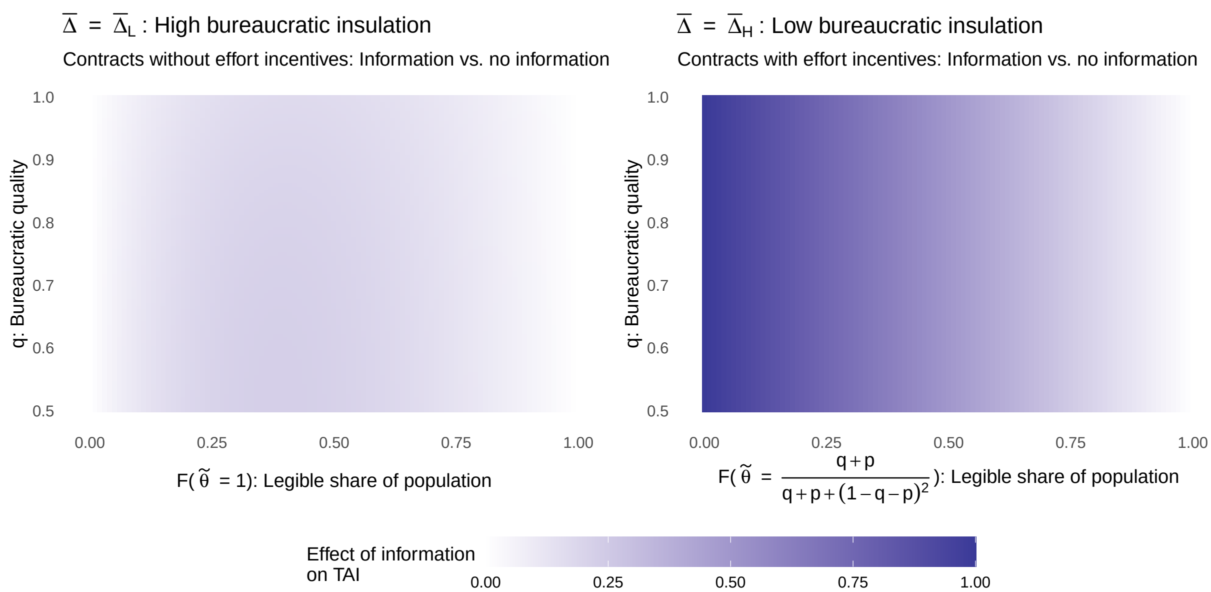
By comparing the two panels, we can see that societal composition, bureaucratic quality, and bureaucratic incentives interact to produce the effect of information transmission on implementation capacity.

Figure A2b shows the effect of information transmission on type-attributable inequality under the same parametric assumptions in Figure A2a. These interaction effects can be summarized as follows:

- With high bureaucratic insulation (left panel), the politician cannot provide effort incentives. The effect of information transmission and type-attributable inequality is non-monotonic in $F(1)$. This occurs because inequality is greatest when society is most polarized – when half the population is legible and half the population is not. As in Proposition 3, inequality is decreasing (slightly) in q, i.e. $\frac{\partial TAI}{\partial q} \leq 0$.
- With low bureaucratic insulation (right panel), the politician can provide effort incentives. These incentives force the the bureaucrat to deny service all illegible citizens to avoid oversight. This means illegible citizens receive no services. As such, inequality is highest when very few citizens are able



(a) Implementation capacity



(b) Type-Attributable Inequality

Figure A2: The effects of information transmission on (a) implementation capacity and (b) type-attributable inequality across a range of parameters. The left plot compares a contract that incentivizes information transfer but no effort incentives to a contract without information transfer or effort incentives. Such a comparison will necessarily arise when $\overline{\Delta} = \overline{\Delta}_L$. The right panel compares the contract with information transfer and effort incentives chosen when $p = \max\{0.1, 1 - q\}$ and $\theta_M \leq \frac{q+p}{q+p+(1-p-q)^2}$ to a contract with only effort incentives.

to access services (through the prospect of complaint). As the share of legible citizens increases, inequality decreases.

By comparing the two panels, we can see that societal composition, bureaucratic quality, and bureaucratic incentives interact to produce the effect of information transmission on type-attributable inequality.

A5 Additional Empirical Motivation

The text provides three possible reasons for variation in complaint rates across geographic units in the same city. I will refer to these units as "neighborhoods."

1. Different rates of service utilization as a function of characteristics of the composition of neighborhood residents. Some neighborhoods' populations may be more reliant on specific government services (or types of government services) than others.
2. Different quality of service provision across different neighborhoods. Lower quality services may yield more complaints.
3. Citizens vary in their costs of complaint in a manner that correlates with the neighborhoods they live in.

To assess these possibilities, I descriptively examine rates of complaint across geographic units in Bogotá and New York, by wealth of residents. I use this measure because wealth is believed to correlate positively with service provision (#2) in both cities. The relative magnitude of this correlation across the cities, however, is not evident.

To examine #1, I disaggregate complaints by the agency to which complaints were directed. This is provided in both datasets. I plot this data descriptively in Figure A3. Clear gradients emerge in the usage of some services as a function of neighborhood (unit) wealth. In particular, departments of housing are the most frequent recipient of complaints in poorer neighborhoods. This makes sense as their services are disproportionately used by lower-income citizens in both cities. This supports the argument in #1 but it does not speak to variation in rates of complaint.

Figure A4 looks at variation in the volume of complaint by neighborhood wealth with and without housing-related complaints. In Bogotá, despite widespread evidence and perceptions that services are *better* in rich localities, they also file substantially more complaints than poor localities. The relationship looks quite similar with and without housing complaints given the low rate of complaints from poor localities in general.

In New York, the relationship between census tract wealth and complaint-filing is less clear. Overall, there appears to be slight non-monotonicity in complaint rates by neighborhood wealth. This occurs even though popular wisdom holds that service quality is *increasing* in neighborhood wealth. When health complaints are omitted, a positive correlation between neighborhood wealth and complaint rate emerges, albeit at a lower magnitude than in Bogotá.

The inverse relationship between service quality and complaint rates in both cities, even when adjusting (symmetrically) for different types of service utilization, suggests variation in the propensity of citizens to make complaints. The model captures these tendencies in terms of costs of complaint.

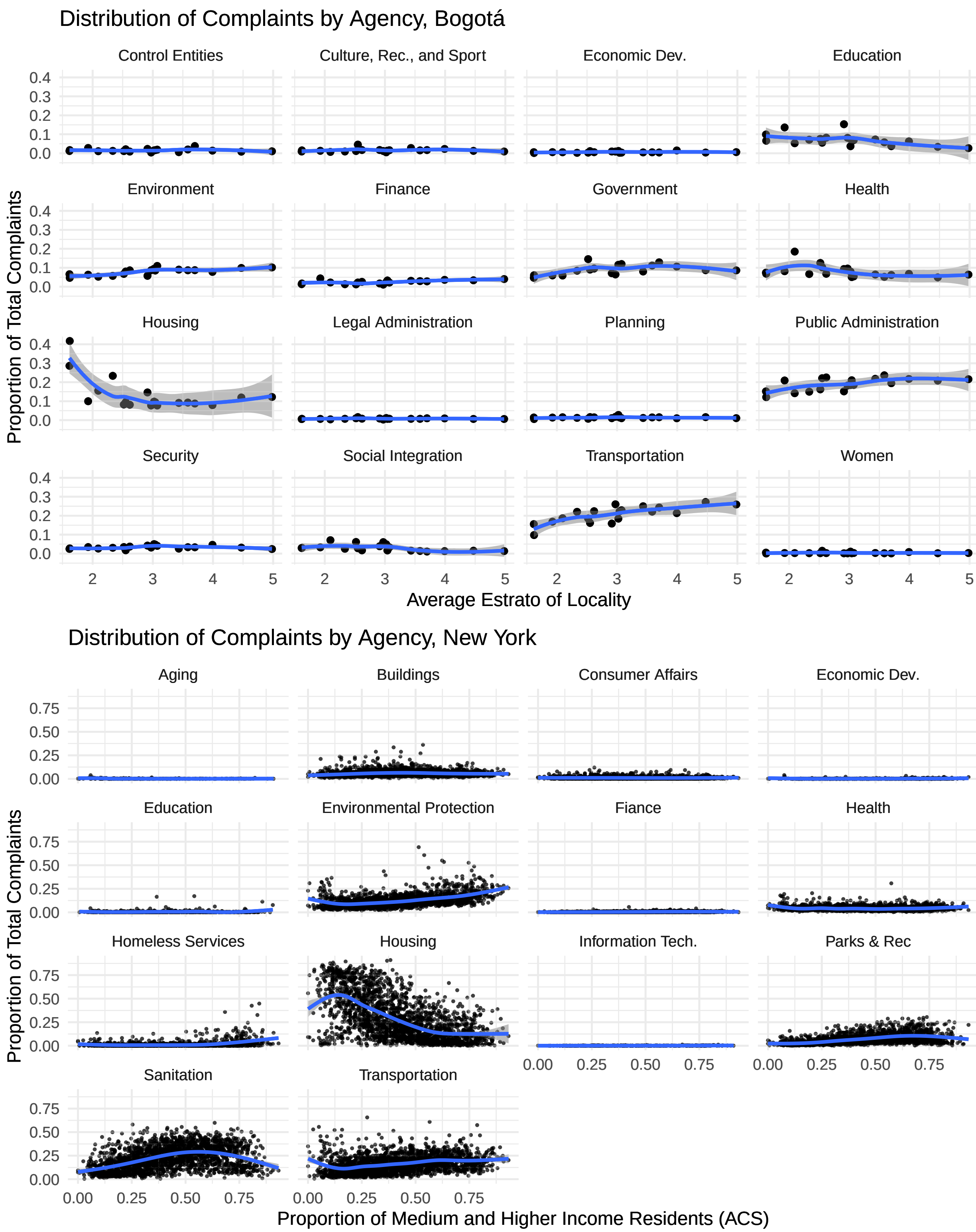


Figure A3: Proportion of total complaints directed to each city government agency in Bogotá and New York, by neighborhood wealth. The x-axis is increasing in neighborhood wealth. The complaints are aggregated over the January 2017-June 2018 period in both cities.

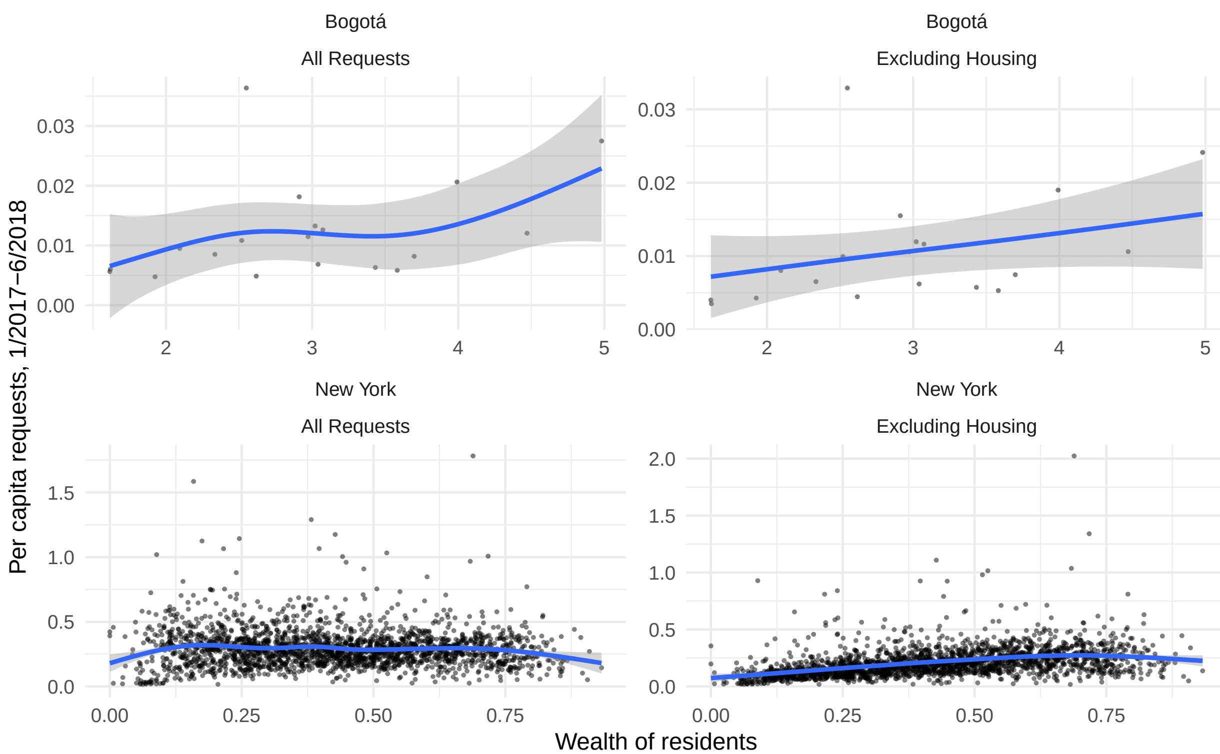


Figure A4: Per-capita rate of complaint-making by neighborhood wealth. The x-axis is increasing in neighborhood wealth. The rows index the two cities and the columns report the rate of "all complaints" and all non-housing complaints.