Bureaucracy and Development

Part 2:
Incentives

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Moe (1984)

The new economics of organizations

Which elements unify the core of neoclassical economics?

- Individual agents as the unit of analysis;
- Assumption of rational, utility-maximizing behavior;
- Efficiency as the normative yardstick;
- Preference for mathematical formalization of models.

Is it possible to discuss organizations without leaving this framework?

Moe (1984)

From black boxes to contractual hierarchies

The challenge: organizations as black boxes

- Models usually collapse an organization into an atomistic decision-maker;
- Useful to study optimal choices given market conditions;
- But little scope to study the inner workings of an organization.

The new economics of organizations as formal models of hierarchies

- Not a single, overarching model, but a family of extensions and approaches;
- In general, models of hierarchical relationships based on imperfect contracts;
- Key insight: intra-organizational inefficiencies due to **asymmetric information**.

First problem: uncertainty about individual types

Assume there exist high types and low types.

- You would prefer to interact (hire, trade, collaborate...) with a high counterpart;
- But you can't distinguish the types ex-ante.

Consequences:

- Allocation will likely be inefficient. *Why?*
- And the inefficiency can be exacerbated by **adverse selection**. *Why?*

(Partial) fixes:

- **Signaling:** The informed party invests in a costly signal.
- **Screening:** The uninformed party invests in a filter.

How does this discussion apply to public bureaucracy? (See also topic 1.)

Second problem: uncertainty about individual actions

Once engaged in the interaction, individuals choose their level of effort.

- You may prefer that your counterpart makes a high effort;
- But you might not be able to perfectly track their actions.

Consequences:

- **Moral hazard.** The risk that the informed party will shirk when exempted from the consequences of their negligence, which affects the uninformed party.

(Partial) fixes:

- **Incentive designs** between principals and agents.

The Principal-Agent framework

A principal hires an agent to take some action.

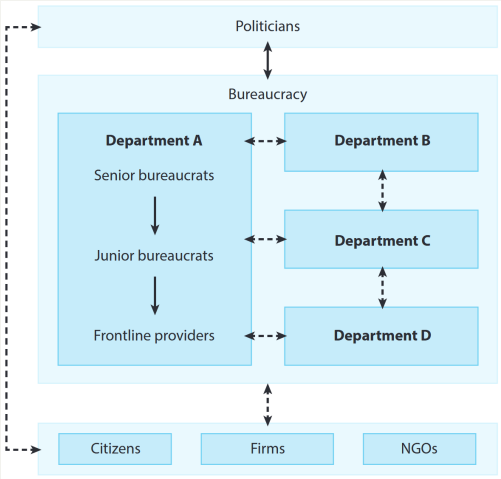
- The agent's actions influence the outcome of interest;
- If the agent makes a high (costly) effort, a high-quality outcome is more likely;
- A high-quality outcome brings a higher benefit to the principal.

Action scope for each party:

- The principal designs the contract, anticipating the agent's responses;
- The agent decides whether to take the contract and how much effort to put into it.

If we are discussing bureaucracy, who's the principal and who's the agent?

Principal-agent relationship(s) (Besley et al. 2022)



A Principal-Agent setup with binary effort, binary outcome

Agent's objective: to maximize their utility, based on payment (w) and effort (e).

- Effort (e) can be high (e_H) or low (e_L);
- Assume $u(w, e) = v(w) - g(e)$, with $v' > 0$, $v'' < 0$ and $g(e_H) > g(e_L)$. *Meaning?*
- Agent has an outside option that guarantees $\overline{u}$.

Principal's objective: to maximize some expected outcome (π) net of costs (w).

- Outcome quality (π) can be high ($\overline{\pi}$) or low ($\underline{\pi}$);
- Define $p_H \equiv \mathbb{P}(\pi = \overline{\pi} \mid e_H)$ and $p_L \equiv \mathbb{P}(\pi = \overline{\pi} \mid e_L)$. *Meaning?*
- *What would you assume about the relative magnitudes of p_H and p_L? Why?*

Case 1: The principal observes the agent's effort

What's the lowest wage the agent will accept to make a low effort?

- $w^*_{e_L}$ such that $v(w^*_{e_L}) - g(e_L) = \overline{u}$

What's the lowest wage the agent will accept to make a high effort?

- $w^*_{e_H}$ such that $v(w^*_{e_H}) - g(e_H) = \overline{u}$

When is it worth it for the principal to offer a high-effort contract?

- When $p_H\,\overline{\pi} + \left(1 - p_H\right)\underline{\pi} - w^*_{e_H} > p_L\,\overline{\pi} + \left(1 - p_L\right)\underline{\pi} - w^*_{e_L}$

In this case, the optimal contract pays a fixed wage linked to effort.

- *Why? Implications?*
- *Who bears the risk associated with the stochastic nature of the outcome?*

Case 2: The principal can't observe the agent's effort

Assume the principal wants to induce high effort; how should the incentives be designed?

- Principal can only link remuneration to outcomes, not to actions;
- Incentive is such that the agent chooses high effort even without monitoring. *How?*

The two fundamental constraints in incentive designs

Define $w_{\overline{\pi}}$ and $w_{\underline{\pi}}$ as the remuneration associated with outcomes $\overline{\pi}$ and $\underline{\pi}$

- Agent's expected utility if low effort: $\mathbb{E}(u_L) = \Big(p_L\, v(w_{\overline{\pi}}) + (1 - p_L)\, v(w_{\underline{\pi}})\Big) - g(e_L)$
- Agent's expected utility if high effort: $\mathbb{E}(u_H) = \Big(p_H\, v(w_{\overline{\pi}}) + (1 - p_H)\, v(w_{\underline{\pi}})\Big) - g(e_H)$

Incentive Compatibility (IC) constraint: $\mathbb{E}(u_H) \geqslant \mathbb{E}(u_L)$

Individual Rationality (IR) constraint: $\mathbb{E}(u_H) \geqslant \overline{u}$

Discussion

If a wage schedule is such that incentive compatibility and individual rationality hold

- *Will the agent accept the contract?*
- *How much effort will the agent put in?*
- *Does it guarantee a high compensantion (i.e., $w_{\overline{\pi}}$)? Implications?*

Key results from this framework

- Principal is more likely to propose incentives when output is more sensitive to effort;
- If agents are more risk-averse, wages are even higher than under perfect info. *Why?*
- Contracts are further from the first-best case when output is a noisy signal about effort.

What does it imply for contract design in the public sector?

Hood (1991)

Incentives and the “New Public Management”

The Principal-Agent model has been influential since its early days.

- Interestingly, it provided support to the “New Public Management”, a set of principles behind many managerial reforms since the 1980s.

Among the core components the New Public Management:

- Clear assignment of responsibility for actions;
- Explicit measures of performance;
- Greater emphasis on results, rather than procedures;
- Shifts to disaggregation of departments.

Extrinsic incentives in practice: the good, the bad, and the ugly

Incentives in practice: the good

Extrinsic incentives do improve service delivery (Finan, Olken, and Pande 2017)

- See pay-per-performance with teachers in India (Muralidharan and Sundararaman 2011)

And incentives do not necessarily require larger budgets.

- Recognition (Ashraf, Bandiera, and Jack 2014);
- Promotions (Bertrand et al. 2020; Deserranno, Kastrau, and León-Ciliotta 2025);
- Transfers (Khan, Khwaja, and Olken 2019).

Incentives in practice: the bad

Sharp incentives may clash with other desirable features

- Strong carrot/stick rules may weaken insulation (from politics), hurting resilience;
- Rewards may contribute to the persistence of inequalities. *How?*

Goodhart's law: when a measure becomes a target, it ceases to be a good measure.

- Teaching to the test (Glewwe, Ilias, and Kremer 2010);
- More effort without better outcomes (Huillery and Seban 2021).

Implementation is as important as the principles behind it

- Enforcing carrot/stick is harder than it sounds...

Dhaliwal and Hanna (2017)

The devil is in the details:
The successes and limitations of bureaucratic reform in India

[Student presentation]

Holmstrom and Milgrom (1991)

Incentives in practice: An important extension

Given the strong results of the Principal-Agent model, why are fixed wages so prevalent?

- Among other reasons, the inherent complexity of the tasks complicates things;
- The standard model adopts unidimensional effort — not a harmless assumption.

The issue of *multitasking*:

- The principal either has several tasks for the agent;
- Or the agent's task has several dimensions to it.

Holmstrom and Milgrom (1991)

Multitasking: An illustration

The agent is responsible for producing a *high volume* of *good quality* output.

- *Examples in the bureaucracy?*

If volume is easy to measure: adopt piece rate pay. *Consequences?*

If quality can be audited: impose fines for deviations. *Consequences?*

Holmstrom and Milgrom (1991)

Multitasking: The hidden trade-off

If tasks are multidimensional, agents will re-optimize their effort(s).

- Incentives will not only share risks to motivate hard work;
- They will redirect agents' attention *among* their various duties.

Solutions?

- If tasks are separable, assign them to different agents (the *unit of responsibility*)
- If all tasks are measurable, propose more and more complex contracts (*downsides?*)
- Otherwise, the good old fixed wage might be the optimal contract.

Holmstrom and Milgrom (1991)

Multitasking

"More generally, the desirability of providing incentives for any one activity decreases with the difficulty of measuring performance in any other activities that make competing demands on the agent's time and attention." (p. 26)

What do you think?

Acemoglu et al. (2020)

Incentives in practice: the ugly

Let's conclude with a dramatic case study: the State fighting guerrillas.

- In 2002, Álvaro Uribe won the presidential election in Colombia with a promise to increase military efforts in the combat against guerrilla groups (FARC, ELN).

Under our analytical framework:

- the executive government (*principal*) has the objective of fighting the guerrillas;
- the army officers (*agent*) may or may not make the effort to implement this policy.

What should the government do?

Acemoglu et al. (2020)

The design of a pay-for-performance

Uribe's government expanded the army and adopted pay-for-performance.

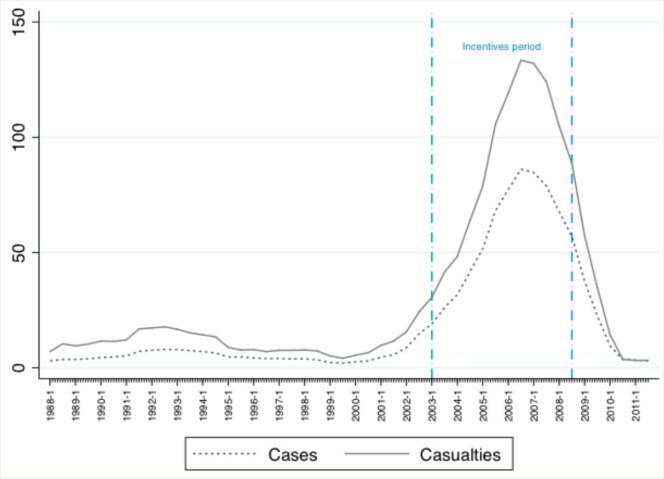
- Pay for information leading to the capture or killing of guerrillas;
- Large payments for capturing or killing (up to 15) guerrilla leaders;
- Lower (but unlimited) payments for foot soldiers;
- Operations did not require ex ante authorization;
- Killings could be justified by ex post intelligence.

What happened?

Acemoglu et al. (2020)

"False positives"

Notes: Number of "false positives" between the first semester of 1988 and the second semester of 2011. Cases are the number of events producing false positives, casualties are the number of people killed in these events. In both cases, the plot shows 18-month moving averages.



Acemoglu et al. (2020)

A potential parallel with multitasking

"In our model, agents (army officers) can exert good effort, which produces 'true positives' (real nonstate armed actors killed), and bad effort, which produces false positives. The extent to which false positives can be portrayed as true positives is determined by the weakness of local judicial institutions." (p. 4)

What does this model suggest for the empirical identification?

Empirical specification (Acemoglu et al. 2020)

$$
\begin{aligned}
(8) \qquad y_{m,t} = {} & \nu^{Pre,Col}(Pre \times Colonel_{m,t}) + \beta^{Col}(Incentives_t \times Colonel_{m,t}) \\
& + \nu^{Post,Col}(Post \times Colonel_{m,t}) + \nu^{Pre,Jud}(Pre \times J.\ Ineff_{m,0}) \\
& + \beta^{Jud}(Incentives_t \times J.\ Ineff_{m,0}) + \nu^{Post,Jud}(Post \times J.\ Ineff_{m,0}) \\
& + \varphi\, Colonel_{m,t} + \delta_m + \gamma_t + \sum_{x \in \mathbf{X}_m} \Phi_x(x \times \gamma_t) + \varepsilon_{m,t}.
\end{aligned}
$$

In (8), $y_{m,t}$ is our outcome variable of interest—in our main results, either true or false positives, but also later the quality of judicial institutions in the municipality. In our main specifications, these variables are parameterized as $\ln(1+x)$ since there are many municipality-year observations in which false positives or true positives are equal to zero.[31] The term $Colonel_{m,t}$ is the share of brigades with jurisdiction over m that are commanded by colonels, while $J.\ Ineff_{m,0}$ is our measure of judicial inefficiency in the municipality. As already discussed above and suggested by Figure 1, we will use two specifications for $Incentives_t$: either an indicator variable for the period in which incentives were in place (from 2003 to 2008) or a linear trend for this period. This latter parameterization attempts to capture both the intensification of high-powered incentives and the potentially cumulative effects of these policies while they were in effect. Throughout, we also always include an interaction with the year before the period in which the incentives are in effect (2002,

Main results (Acemoglu et al. 2020)

	Incentives dummy		Incentives linear		Incentives dummy		Incentives linear	
	Cases	Casualties	Cases	Casualties	Cases	Casualties	Cases	Casualties
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable is log(1 + *false positives*)								
Judicial inefficiency								
… × 2002	−0.006	0.032	−0.014	0.028	−0.003	0.033	−0.014	0.027
	(0.056)	(0.073)	(0.057)	(0.074)	(0.057)	(0.075)	(0.058)	(0.075)
… × incentives	0.159	0.215	0.042	0.060	0.162	0.216	0.042	0.060
(2003–2008)	(0.039)	(0.050)	(0.011)	(0.015)	(0.040)	(0.052)	(0.011)	(0.015)
… × 2009					0.011	0.002	0.001	−0.003
					(0.048)	(0.053)	(0.049)	(0.054)
Colonel in charge (share)								
… × 2002	−0.007	−0.022	−0.004	−0.019	−0.007	−0.021	−0.002	−0.016
	(0.015)	(0.023)	(0.015)	(0.022)	(0.015)	(0.023)	(0.015)	(0.023)
… × incentives	0.032	0.046	0.008	0.011	0.032	0.047	0.009	0.012
(2003–2008)	(0.016)	(0.021)	(0.003)	(0.005)	(0.016)	(0.022)	(0.004)	(0.005)
… × 2009					0.000	0.003	0.005	0.007
					(0.012)	(0.015)	(0.013)	(0.016)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
× time effects								
Observations	9,823	9,823	9,823	9,823	9,823	9,823	9,823	9,823
Municipalities	893	893	893	893	893	893	893	893
R^2	0.094	0.091	0.095	0.092	0.094	0.091	0.095	0.092

Acemoglu et al. (2020)

Discussion

What went wrong with the structure of incentives in this case?

- Mistake “body count” for a measure of policy success;
- Misdirection of bureaucratic attention to undesirable efforts;
- High-powered extrinsic incentives combined with weak independent controls.

Epilogue: High-powered incentives for military personnel ended in 2008 after strong media repercussions following the abduction and murder of 22 men by the army.

Takeaways

The principal-agent model offers a powerful structure to discuss a classic issue...

- I.e., how to get public servants to act in the interest of politicians, citizens?

... within a framework that is coherent with the rest of neoclassical economics.

- Individual choice, rationality, efficiency, under mathematical formality.

By doing so, it pins down some difficulties with aligning incentives in complex orgs.

- Actual effort is hardly observable, and contributions to output are noisy;
- Each organizational layer represents a potentially new principal-agent instance;
- However, implementing extrinsic rewards may clash with other desirable features.

Core Readings

Acemoglu, Daron, Leopoldo Fergusson, James Robinson, Dario Romero, and Juan F. Vargas. 2020. “The Perils of High-Powered Incentives: Evidence from Colombia’s False Positives.” *American Economic Journal: Economic Policy* 12 (3): 1–43. https://doi.org/10.1257/pol.20180168.

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Abdullah Hussein Mohammed Al-Harazi, manager at the planning and infrastructure department of the district of Dhi Sufal, Yemen, in 2006. Behind him, a portrait of the president, Ali Abdullah Saleh. Monthly salary: about US$ 180.

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