The Choice Between Market Failures and Corruption
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Introduction

- Government interventions may cause inefficiencies
  - Many social scientists prefer to live with market failures rather than government failures
  - Politicians work for their interests rather than correcting market failure
- Tradeoff between market failures and government failures
- Why government intervention designed to correct market failures also leads to corruption and inefficiencies
This paper develops a simple framework to analyze the links between government interventions and government failures.

Three main assumptions:
1. Government intervention requires the use of agents to implement policy.
2. The bureaucrats (agents) are self-interests, and hard to monitor perfectly.
3. There is some heterogeneity among bureaucrats.
I. Basic Model

- Consider a static economy consisting of risk neutral agents with mass 1
- Agents can be either entrepreneurs or government employees
- Entrepreneurs can use a “good” or “bad” technology. Both technologies produce output y
- “Bad” technology costs 0, “good” technology cost e. $0 < e < y$
- Each firm that uses good technology produces positive externality $\beta$
- “n” is the mass of entrepreneurs in the economy
- $x \leq n$ is the mass of entrepreneurs choosing the good technology.
- Good firms produce aggregate good externality “$x\beta$”
- Let $e \leq \beta$ so that good technology is socially efficient
A. Laissez-Faire equilibrium and the first best

- If there is no government, \( n = 1 \).
  \[
  \pi_g = y + \beta x - e \\
  \pi_b = y + \beta x
  \]
- Since \( \pi_g < \pi_b \) everybody chooses bad tech
- However, since \( e \leq \beta \), choosing good technology is socially efficient
- We have prisoner’s dilemma
B. Optimal Regulation without corruption

- The government provides subsidy(s) to good firms and charges tax ($\tau$) to bad firms.
- The government pays wage “$w$” to employees
- One government employee can inspect one firm so probability of inspection is $P(n)=\min\{(1-n)/n,1\}$
Timing
1. The government announces its policy such as wage \(w\), tax \(\tau\), subsidy \(s\) and the number of bureaucrats \(1-n\)
2. Agents choose their jobs
3. Private sector agents choose a technology (the technology is not observed without the inspection)
4. Each bureaucrat randomly inspects one entrepreneur
5. Each bureaucrat reports the result
- Social utility (2) \( SS = ny + (\beta - e)x \)

- Constraints
  - Limited liability constraint (3): \( \tau \leq y \) (\( \tau = y \))
  - Technology choice constraint (4) \( \pi_g \geq \pi_b \) (\( \pi_g = \pi_b \))
  - \( \Rightarrow \) \( \tau + s \geq \frac{n}{1 - n}e \)
  - The allocation of talent constraint (5)
    \[ w \geq y - e + \frac{1 - n}{n}s \]
  - The government budget constraint (6)
    \[ (1 - \frac{x}{n})\tau \geq w + \frac{x}{n}s \]
  - Constraint set of the government (7) (by (3)-(6))
    \[ x \leq \min \{ \frac{(1 - n)^2 y}{ne}, y \} \]
Figure 1. Optimal Government Intervention Without the Potential of Corruption
PROPOSITION 1: suppose there is no corruption opportunity. Then if

$$\beta > \sqrt{ye} + e$$

is satisfied, the optimal allocation of resources has $n = x = \hat{n}$ given by

$$\hat{n} \equiv \frac{\sqrt{y}}{\sqrt{y + \sqrt{e}}}$$

(here $s < 0$)

Otherwise, the optimal allocation is laissez-faire.
II. Optimal Regulation with Corruption

A. Setup

◦ The needs to employ bureaucrats to collect information is combined with corruptibility

◦ Corrupt bureaucrats get $\sigma$ portion of subsidy and tax, i.e., $\sigma(\tau + s)$

◦ Probability of being caught : $q$

◦ If the corrupt official is caught, he loses his entire wealth
• Constraints
  • Corruption constraint on wage (10)

\[ w \geq \frac{1-q}{q} \sigma(\tau + s) = \frac{1-q}{q} \frac{n}{1-n} \sigma e \]

• Corruption constraint and gov’t budget constraint result in the constraint set of the government (11):

\[ x \leq \frac{y}{e} - \left( \frac{y}{e} + \frac{1-q}{q} \sigma \right) n \]
Figure 2. Optimal Government Intervention with Potential Corruption
(i) (11) is less restrictive than (7), so \( n = x = \hat{n} > \frac{1}{2} \) as given by (8);

(ii) (7) is less restrictive than (11), and \( n = x = n_c > \frac{1}{2} \) where \( n_c \) is given by imposing \( n = x \) in (7):

\[
(12) \quad n_c \equiv \frac{y}{y + e + \frac{1 - q}{q} \cdot \sigma \cdot e}
\]

(iii) \( n = \frac{1}{2} \) and \( x \) is chosen so as to balance the government budget constraint, thus

\[
(13) \quad x = \max\left\{ \frac{1}{2} \cdot \left( \frac{y}{e} - \frac{1 - q}{q} \cdot \sigma \right); 0 \right\}.
\]
PROPOSITION 2: Suppose that bureaucrats are corruptible. The optimal allocation is:

1. If $\frac{y}{e} \geq [1 + \sigma \cdot (1 - q)/q]^2$ and $\beta > \sqrt{e \cdot (\sqrt{y} + \sqrt{e})}$, then there is government intervention with $n = x = \hat{n}$ as given by (8).
2. If $\frac{y}{e} \in (1 + \sigma \cdot (1 - q)/q; [1 + \sigma \cdot (1 - q)/q]^2)$ and $\beta > 2e + e \cdot \sigma \cdot (1 - q)/q$, then the optimal allocation has government intervention with $n = x = n_c$ as given by (12).
3. If $\frac{y}{e} < 1 + \sigma \cdot (1 - q)/q$ and $\beta > e + \frac{y}{y/e - \sigma \cdot (1 - q)/q}$, then there is government intervention with $n = \frac{1}{2}$, $x = \frac{1}{2}$ [ $y/e - \sigma \cdot (1 - q)/q]$. 
4. Otherwise, the optimal allocation is laissez-faire.
B. Discussion
- If “q” is large enough or σ is sufficiently small, then corruption is easy to prevent.
- If “q” is small or σ is large, then corruption is tempting and officials need to be paid rent if corruption is to be prevented.
- When market failure is important (i.e., β is high), hiring many agents from the private sector is worthwhile in order to prevent market failure.
- Possibility of corruption increases the optimal size of the bureaucracy, because more bureaucrats → greater probability of an audit → τ + s can be low and, therefore, w can be low.
- If bureaucrats become more difficult to control (σ increases or q decreases) but it is still worth it to prevent market failure, government would raise w and hire more bureaucrats; this would look as a rent grab, but it would be socially optimal.

- Comparative statics for “y” (next slide)
Figure 3. The Relation Between the Level of Income and Government Intervention
Poor economies (low “y”)
- Resources are limited
- Gov’t budget constraints can only be satisfied by having enough entrepreneurs use bad technology so that they could be taxed
- Since the point of the intervention is to increase $x$, it becomes less desirable (i.e., requires higher $\beta$)

Rich economies (high “y”)
- As $y$ increases the opportunity cost of hiring bureaucrats rises, making government intervention less desirable
III. Heterogeneity and Equilibrium Corruption

- The authors assume two kinds of bureaucrats. A group is good at taking bribes and the other group is not good at taking bribes. $(\hat{q}, q)$

- Fraction of high (dishonesty) type is $m$. 
A. Analysis
  ◦ Constraints
    • Technology choice constraint (14)
      \[
      \tau + s \geq \frac{n}{1-n} * \frac{1}{1-m} e
      \]
    • Corruption constraint (15)
      \[
      w \geq \frac{1-q}{q} (\tau + s) = \frac{1-q}{q} \frac{n}{1-n} \frac{\sigma}{1-m} e
      \]
    • Gov’t Budget constraint (16)
      \[
      (1-n)w + (1-n)(1-m)\frac{x}{n}s + (1-n)m(1-q)s \\
      \leq (1-n)m\hat{q}(w+\tau) + (1-n)(1-m)(1-\frac{x}{n})\tau
      \]
• Allocation of talent constraint (17)

\[(1 - m)w + m(1 - \hat{q})[w + \sigma(\tau + s)]\]

\[\geq y - \frac{1-n}{n}\tau + \frac{1-n}{n}m(1-q)(1-\sigma)(\tau + s)\]

• Constraint set for government intervention (18)

\[x \leq \min\{n; (1-n)\frac{y}{e} - n[m(1-\hat{q}) + \frac{1-q}{q}\frac{1-m\hat{q}}{1-m}]; \frac{(1-n)^2}{ne}\}\]
PROPOSITION 3: Suppose that bureaucrats are corruptible and that a proportion $1 - m$ get caught with probability $q$, and a proportion $m$ get caught with probability $\hat{q} \in (0, q)$. Then there exists a unique $Q(m, q) \in (0, q)$ such that:

1. When $\hat{q} < Q(m, q)$, government intervention, whenever optimal, involves a fraction $m$ of bureaucrats accepting bribes (i.e., partial corruption), and:
   (a) If $y/e \geq (1 + A)^2$ and $\beta > \sqrt{e} \cdot (\sqrt{y} + \sqrt{e})$, then the optimal allocation has government intervention with $n = x = \hat{n}$ as given by (8).
   (b) If $y/e \in (1 + A; (1 + A)^2)$ and $\beta > 2e + A \cdot e$, then the optimal allocation has government intervention with $n = x = n_{pc}$ as given by $n_{pc} = (y/e)/[(y/e) + 1 + A]$.
   (c) If $y/e < 1 + A$ and $\beta > e + [y/(y/e) - A]$, then the optimal allocation has government intervention with $n = \frac{1}{2}$, $x = \frac{1}{2} (y/e - A)$.
   (d) Otherwise the optimal allocation is laisser-faire.

2. When $\hat{q} \geq Q(m, q)$, government intervention, whenever optimal, involves no corruption and the optimal allocation is as given in Proposition 2 with $q$ substituted by $\hat{q}$ and $\sigma = 1$. 
B. Discussion

Figure 4. Equilibrium Corruption with Heterogeneous Bureaucrats
It is optimal to have government intervention to deal with the market failure, but at the same time allow some of the government employees to be corrupt.

- All corruption could be prevented by offering a high enough wage to ensure that even dishonesty bureaucrats do not accept bribes and this gives the smaller triangle.

- Shaded triangle is larger than the no corruption triangle, partial corruption yields a larger choice set, and is therefore preferred to no corruption in this case.
V. Conclusion

- The possibility of corruption is likely to increase the size of government and public sector wages, as compared to the case where corruption was not possible.

- The model predicts that government intervention with partial corruption is likely to be optimal only when corruption is relatively rare and the market failure it is trying to correct is relatively important.