Economics 270C
Corruption Lecture

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January 30, 2007
Outline

- Theory
  - Monitoring and Efficiency Wages (Becker and Stigler 1974)
  - IO of corruption (Shleifer and Vishny 1993)

- Empirics:
  - How much corruption is there? (Fisman 2001, others)
  - Is corruption efficient? (Bertrand et al 2006, others)
  - How to reduce corruption? (Olken 2005, others)
Punishments, efficiency wages, etc

- Becker and Stigler (1974) model of corruptible enforcers (police, auditors, etc)
- Wage $w$, outside wage $v$
- If bribed:
  - If detected, gets outside wage $v$ (probability $p$)
  - If undetected, gets $b + w$ (probability $1 - p$)
- Equilibrium wage set so the agent is indifferent

\[ w = pv + (1 - p)(b + w) \]

i.e.

\[ w - v = \frac{1 - p}{p} b \]
Punishments, efficiency wages, etc

- One issue: this creates rents for bureaucrats
- Becker and Stigler suggest selling the job for $\frac{1-p}{p} b$ so that agent only receives market wage in equilibrium
- Suppose social cost of an audit is $A$. Then social cost is $pA$
- Then by setting $p \to 0$, can discourage corruption at no social cost!
- In practice, high entry fees would encourage state to fire workers without cause, so optimal $p$ is not 0
Multiple equilibria

- Instead of endogenous wage, fix wage $w$, but suppose probability of detection $p$ is endogenous and depends on how many other people are also corrupt.

- Denote by $c$ fraction of population that’s corrupt.

- Suppose $p(c) = 1 - c$.

- Recall agent will steal if

\[ w - v < \frac{1 - p}{p} b \]

- Substituting terms:

\[ w - v < \frac{c}{1 - c} b \]
Multiple equilibria

- Implication: temporary wage increase or corruption crackdown can have permanent effects
Multiple equilibria

- Many potential reasons for multiple equilibria
  - Probability of detection
  - Enforcers (who will punish the punishers)
  - Chance of being reported in binary interaction
  - Selection into bureaucracy
  - And others...
Industrial Organization of Corruption

- Shleifer and Vishny (1993): think of corrupt agent as a monopolist

- Two types of corruption:
  1. Corruption without theft - bribes paid on top of official fees
     - Corruption decreases efficiency
  2. Corruption with theft - bribes paid instead of fees
     - AlignS the interests of briber and bribe payer and sustains corruption
     - Efficiency implications unclear
Corruption without theft

![Graph showing Corruption without Theft](image-url)
Corruption with theft

Figure Ib
Corruption with Theft
Centralized vs. decentralized corruption

- Idea: Corruption was more efficient in Communist Russia than in post-Communist Russia, or under Soeharto in Indonesia than in Indonesia today

- Suppose you need 2 permits to build a house. Permits are complements

- Centralized monopolist jointly sets prices (bribes) and quantities of both goods. Sets $p_1$ such that

\[
MR_1 + MR_2 \frac{dq_2}{dq_1} = MC_1
\]

- Because permits are complements, $\frac{dq_2}{dq_1} > 0$, so $MR_1 < MC$

- Keep bribe on permit 1 low to expand demand for permit 2
Centralized vs. decentralized corruption

- Suppose each monopolist acted separately. Then monopolist sets

\[ MR_i = MC_i \]

taking other price as given.

- This implies that \( p_1 + p_2 \) is greater than in centralized case

- Now suppose permits are perfect substitutes, i.e., you can get the permit either from agent 1 or agent 2.

  - If agents engage in Bertrand competition, then bribes are driven down to 0, and \( p_1 = MC_1 \)
  
  - Similarly, if there is free entry (e.g., through political processes), threat of entry will keep \( p_1 = MC_1 + \varepsilon \)
Value of connections

- Question:
  - How much are political connections worth?

- Research design (Fisman 2001):
  - Stock market 'event study'
    - Look at how stock prices react to news
    - If stock markets are efficient, the change in market prices reflects the change in firm market value in response to news
  - Fisman's idea:
    - News event: rumors that Indonesian President Soeharto was in ill health
    - Compare change in market value of connected firms to change in market of unconnected firms
  - Note: this measures market perceptions of value of connections, which is not necessarily equal to true value
Methodology

- Use Lexis-Nexis search to identify news about Soeharto’s health
  - Keywords: Soeharto, health, Indonesia & (stock or financial)
  - Identifies 6 news episodes about bad health in 1995-7

- Obtained Soeharto dependency index (POL\textsubscript{i}) for each of 79 firms from an economic consulting firm
  - Ranges from 0 to 4 where 4 means firm owned by Soeharto’s children, 0 if unconnected

- Regression:
  - $R_{ie}$ is firm $i$’s return during event window $e$: (end price-start price)/start price
  - Runs separate regressions for each event: $R_i = \alpha + \beta POL_i + \varepsilon_i$
  - Finds negative $\beta$ for each news event
Graphical Results

**Figure 1. Effect of Political Dependence on Share Price Returns**
Pooled Results

- Use overall market return $NR$ as measure of how bad the news was
- Run pooled regression

$$R_{ie} = \alpha + \rho_1 POL_i + \rho_2 NR_e + \rho_3 POL_i \times NR_e + \varepsilon_{ie}$$

- Find a positive coefficient on $\rho_3$
Pooled Results

Implies that up to 22 percent of firm value is due to connections to Soeharto

- $0.2 \times 4 \times 0.28 = 0.22$
Other estimates of magnitude

- Idea: compare two estimates of same quantity, one ‘before’ and one ‘after’ corruption takes place

- Examples:
  - School expenditures in Uganda (Reinnika and Svensson 2004)
    - 80% in first survey, 20% in second survey
  - Corruption in roads in Indonesia (Olken 2005)
    - 25%
  - Corruption in subsidized rice program in Indonesia (Olken 2006)
    - lower bound of 18% missing
  - U.N. Oil-for-food program (Hsieh and Moretti 2006)
    - 1-3%

- Note: all of these may be selected samples.
Is corruption efficient?

- Many reasons to imagine corruption is inefficient
  - Restricts government ability to correct externalities
  - Imposes tax on business, government purchases
  - Need to be secretive creates inefficient behavior

- Huntington (1968) expresses view that corruption may be efficient in some circumstances
  - People compete for scarce resources such as permits and the ones who value them most receive them (allocative efficiency)
  - Bureaucrats taking bribes basically earn a piece rate so incentives to work harder
  - In presence of bad bureaucracy, corruption allows people to ’grease the wheels’
Cross-country regression approach

- Mauro (1995): Do more corrupt countries have less investment and slower growth?
- Uses 1980-1983 Business International indices of corruption and other measures of institutions
  - Based on qualitative surveys of international business community asking about 'perceptions' of corruption
- Finds low corruption countries have higher growth
Cross-country regression approach

FIGURE III
Growth and Bureaucratic Efficiency
BE index is 1980–1983 average of BI indices of corruption, red tape, and judiciary.
67 countries, $r = 0.32$. 
Cross-country regression approach

- Is this relationship causal?
  - Instruments for corruption with ethnolinguistic fragmentation(!!!)
Micro approach: drivers’ licenses in India

- Bertrand et al. (2006): Does corruption produce unsafe drivers?
- Research design: randomized experiment
  - Recruit people interested in getting a driver’s license in New Delhi
  - Randomize into 3 groups:
    - Bonus: Rs. 2,000 (1.5 weeks wage) if license can be obtained within 32 days (2 days more than statutory minimum)
    - Lesson: Offer free driving lessons
    - Control
- Measure whether members of each group obtained a license, how long, what they paid, and ex-post driving ability
# Micro approach: drivers’ licenses in India

<table>
<thead>
<tr>
<th></th>
<th>Payment Above Official</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fess (1)</td>
<td>Tried to Bribe (2)</td>
<td>Hired an Agent (3)</td>
</tr>
<tr>
<td>Comp. Group Mean</td>
<td>338.21</td>
<td>0.05</td>
<td>0.39</td>
</tr>
<tr>
<td>Bonus Group</td>
<td>178.4</td>
<td>0.02</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>(46.33)***</td>
<td>(0.02)</td>
<td>(0.05)***</td>
</tr>
<tr>
<td>Lesson Group</td>
<td>-0.24</td>
<td>-0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td></td>
<td>(44.38)</td>
<td>(0.02)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>N</td>
<td>666</td>
<td>666</td>
<td>666</td>
</tr>
<tr>
<td>R^2</td>
<td>0.13</td>
<td>0.11</td>
<td>0.12</td>
</tr>
<tr>
<td>Fstat</td>
<td>12.06</td>
<td>2.53</td>
<td>14.07</td>
</tr>
<tr>
<td>P-value</td>
<td>0.00</td>
<td>0.08</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Micro approach: drivers’ licenses in India

<table>
<thead>
<tr>
<th></th>
<th>Obtained License (all tracked)</th>
<th>Obtained License in 32 days or less</th>
<th>Obtained a License without taking Licensing Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Comp. Group Mean</td>
<td>0.45</td>
<td>0.48</td>
<td>0.15</td>
</tr>
<tr>
<td>Bonus Group</td>
<td>0.24 (0.05)***</td>
<td>0.25 (0.05)***</td>
<td>0.42 (0.04)***</td>
</tr>
<tr>
<td>Lesson Group</td>
<td>0.12 (0.05)***</td>
<td>0.15 (0.05)***</td>
<td>-0.05 (0.04)***</td>
</tr>
<tr>
<td>N</td>
<td>731</td>
<td>666</td>
<td>666</td>
</tr>
<tr>
<td>R^2</td>
<td>0.12</td>
<td>0.14</td>
<td>0.31</td>
</tr>
<tr>
<td>Fstat</td>
<td>14.24</td>
<td>13.50</td>
<td>87.60</td>
</tr>
<tr>
<td>P-value</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 3: Obtaining a License in 32 days or less.
Micro approach: drivers’ licenses in India

<table>
<thead>
<tr>
<th>Obtained License &amp; Automatically Failed Ind. Exam</th>
<th>Obtained License &amp; Exam Score &lt; 50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(7)</td>
<td>(8)</td>
</tr>
<tr>
<td>0.29</td>
<td>0.32</td>
</tr>
<tr>
<td>0.18</td>
<td>0.22</td>
</tr>
<tr>
<td>(0.05)***</td>
<td>(0.05)***</td>
</tr>
<tr>
<td>-0.22</td>
<td>-0.18</td>
</tr>
<tr>
<td>(0.04)***</td>
<td>(0.05)***</td>
</tr>
<tr>
<td>666</td>
<td>666</td>
</tr>
<tr>
<td>0.24</td>
<td>0.20</td>
</tr>
<tr>
<td>64.48</td>
<td>51.12</td>
</tr>
<tr>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Micro approach: trucking bribes in Indonesia

- Olken (2007): bribes that truck drivers’ pay at weigh stations
- Engineers say damage truck does to road rises to the 4th power of truck’s weight
  - Optimal fine should be highly convex so that truckers internalize this cost
  - Actual fine schedule is highly convex (major penalties if more than 5% overweight)

- In equilibrium
  - All truckers pay a bribe instead of actual fine
  - Efficiency question: how convex is bribe as a function of truck weight?
  - Examine using locally-weighted (Fan) regressions
Micro approach: trucking bribes in Indonesia

**Banda Aceh**

**Banda Aceh - Gebang**

**Banda Aceh - Seumedam**

**Meulaboh**

**Meulaboh - Doulu**

**Meulaboh - Sidikalang**
How to reduce corruption: roads in Indonesia

- Olken (2005): Randomized field experiment in Indonesia of interventions to reduce corruption in rural infrastructure projects
  - Government program that funded building of new roads and other small infrastructure projects
  - Paper studies 608 villages in East/Central Java building 1-3km non-asphalt roads
How to reduce corruption: roads in Indonesia

▶ Randomized villages into one of three treatments:
  ▶ Audits: increased probability of central government audit from 0.04 to 1
  ▶ Invitations: increased grass-roots monitoring of corruption
  ▶ Comments: created mechanism for anonymous comments about corruption in project by villagers

▶ Invitations & comment forms distributed either via schools or by neighborhood associations

▶ Matrix randomization

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Invitations</th>
<th>Invitations + Comment Forms</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>114</td>
<td>105</td>
<td>106</td>
<td>325</td>
</tr>
<tr>
<td>Audit</td>
<td>93</td>
<td>94</td>
<td>96</td>
<td>283</td>
</tr>
<tr>
<td>Total</td>
<td>207</td>
<td>199</td>
<td>202</td>
<td>608</td>
</tr>
</tbody>
</table>

Table 1: Number of villages in each treatment category
Measuring corruption

- **Goal:** Measure the difference between reported expenditures and actual expenditures.

Measuring reported expenditures

- Obtain line-item reported expenditures from village books and financial reports.

Measuring actual expenditures

- Take core samples to measure quantity of materials.
- Survey suppliers in nearby villages to obtain prices.
- Interview villagers to determine wages paid and tasks done by voluntary labor.

Key dependent variable:

\[ \text{THEFT}_i = \log (\text{REPORTED}_i) - \log (\text{ACTUAL}_i) \]

- Calibrate so that \( \text{THEFT}_i = 0 \) if no corruption.
Measuring corruption
Why might treatments reduce corruption

- Village leaders thought to skim money from infrastructure projects
- Audits increase the probability of being caught and punished
  - But... auditors may themselves be corrupt
- Grassroots participation
  - Better informed than government auditors so better able to monitor
  - Better incentives than government auditors
  - But... potential for free-riding and elite capture
Impact of audits
# Impact of audits

<table>
<thead>
<tr>
<th>Percent missing:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log reported value – Log actual value</td>
</tr>
<tr>
<td>Control Mean</td>
</tr>
<tr>
<td>Major items in roads</td>
</tr>
<tr>
<td>Major items in roads and ancillary projects</td>
</tr>
<tr>
<td>Breakdown of roads:</td>
</tr>
<tr>
<td>Materials</td>
</tr>
<tr>
<td>Unskilled labor</td>
</tr>
</tbody>
</table>
### Impact of grass-roots monitoring

<table>
<thead>
<tr>
<th>Percent missing: Log reported value – Log actual value</th>
<th>Control Mean</th>
<th>Treatment Mean: Invites</th>
<th>No Fixed Effects</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major items in roads</td>
<td>0.252</td>
<td>0.230</td>
<td>-0.021</td>
<td>0.556</td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td>(0.033)</td>
<td>(0.035)</td>
<td></td>
</tr>
<tr>
<td>Major items in roads and ancillary projects</td>
<td>0.268</td>
<td>0.236</td>
<td>-0.030</td>
<td>0.360</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.031)</td>
<td>(0.032)</td>
<td></td>
</tr>
<tr>
<td>Breakdown of roads: Materials</td>
<td>0.209</td>
<td>0.221</td>
<td>0.014</td>
<td>0.725</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.041)</td>
<td>(0.038)</td>
<td></td>
</tr>
<tr>
<td>Unskilled labor</td>
<td>0.369</td>
<td>0.180</td>
<td>-0.187*</td>
<td>0.058</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.077)</td>
<td>(0.098)</td>
<td></td>
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</tbody>
</table>
### Impact of grass-roots monitoring

<table>
<thead>
<tr>
<th>Percent missing: Log reported value – Log actual value</th>
<th>Control Mean</th>
<th>Treatment Mean</th>
<th>Treatment effect</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invitations + comment forms distributed via neighborhood heads</td>
<td>0.252 (0.033)</td>
<td>0.278 (0.036)</td>
<td>0.025 (0.036)</td>
<td>0.483</td>
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<tr>
<td>Major items in roads</td>
<td>0.268 (0.031)</td>
<td>0.277 (0.039)</td>
<td>0.010 (0.039)</td>
<td>0.792</td>
</tr>
<tr>
<td>Major items in roads and ancillary projects</td>
<td>0.252 (0.033)</td>
<td>0.179 (0.036)</td>
<td>-0.070* (0.041)</td>
<td>0.093</td>
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<tr>
<td>Invitations + comment forms distributed via schools</td>
<td>0.268 (0.031)</td>
<td>0.198 (0.034)</td>
<td>-0.064 (0.042)</td>
<td>0.127</td>
</tr>
</tbody>
</table>
Other papers

- Taxes and corruption: Fisman and Wei (2004): Compare imports declared in China to exports reported by Hong Kong. When tax rate increases, missing imports increase
- Role of intermediaries: Bertrand et. al (2006), Fisman and Wei (2005): Role of intermediaries in making corruption happen
- Outsourcing bureaucracy: Yang (forthcoming)
- Connections: Khwaja and Mian (2005): Lending to politically connected firms by government banks in Pakistan
Some open questions

- Is corruption efficient? Micro evidence on investment, growth
- Multiple equilibria
- Efficiency wages? Distinguish two stories:
  - Honesty as a luxury good (they only steal because they need to feed their families)
  - Efficiency wages
- Incentives for bureaucrats
- Competition reducing corruption
References


