

# Economics 270C

## Corruption Lecture

Ben Olken  
Harvard Society of Fellows

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# 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  $p \rightarrow 0$ , 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

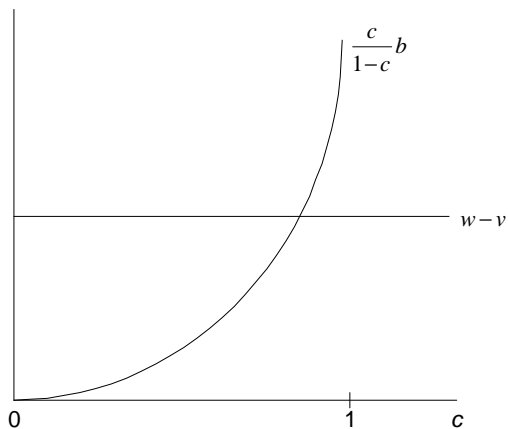
- ▶ Instead of endogenous wage, fix wage  $w$ , but suppose probability of detection  $p$  is endogenous and depends on how many other people are also corrupt
- ▶ Denote by  $c$  fraction of population that's corrupt
- ▶ Suppose  $p(c) = 1 - c$
- ▶ Recall agent will steal if

$$w - v < \frac{1 - p}{p} b$$

- ▶ 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

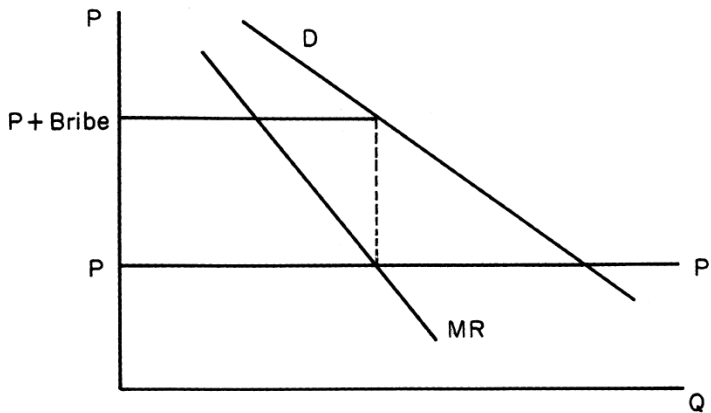


FIGURE Ia  
Corruption without Theft

# Corruption with theft

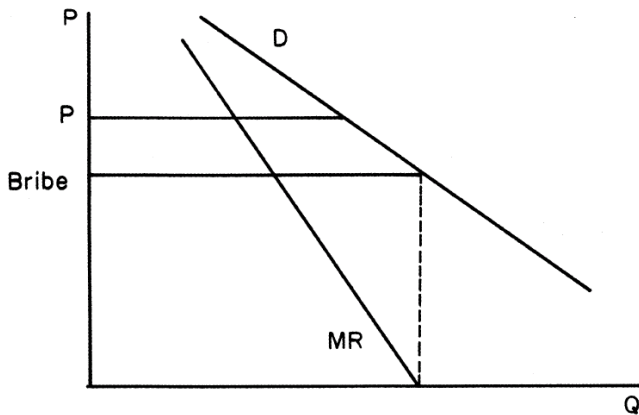


FIGURE Ib  
Corruption with Theft

## 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 ( $POL_i$ ) 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

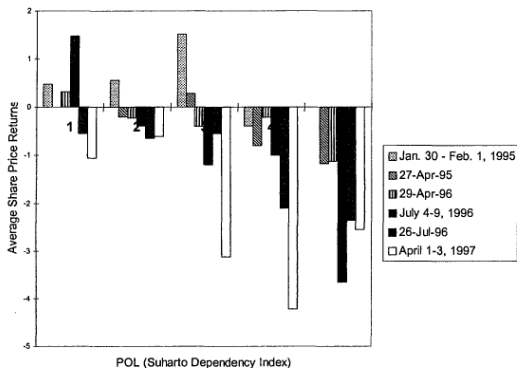


FIGURE 1. EFFECT OF POLITICAL DEPENDENCE ON SHARE PRICE RETURNS

## 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

TABLE 3—EFFECT OF POLITICAL CONNECTIONS ON CHANGES IN SHARE PRICE

	(1)	(2)
<i>POL</i>	-0.60** (0.11)	-0.19 (0.15)
<i>NR(JCI)</i>	0.25 (0.14)	-0.32 (0.28)
<i>NR(JCI) · POL</i>		0.28* (0.11)
Constant	0.88 (0.27)	0.06 (0.35)
$R^2$	0.066	0.078
Number of observations	455	455

- ▶ Implies that up to 22 percent of firm value is due to connections to Soeharto
  - ▶ 0.2 (drop in market if Soeharto died) \* 4 (max value of *POL*) \* 0.28 (coefficient) = 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

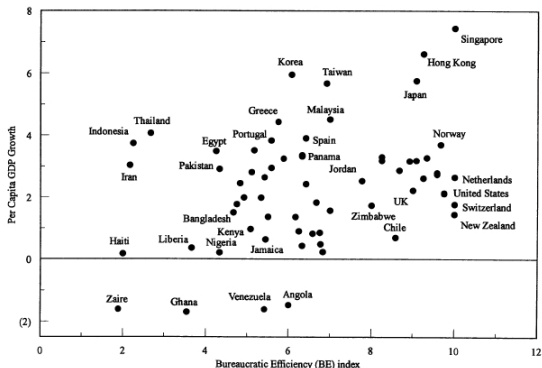


FIGURE III  
Growth and Bureaucratic Efficiency

BE index is 1980–1983 average of BI indices of corruption, red tape, and judiciary.

Average GDP per capita growth 1960–1985 from Summers and Heston [1988].  
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 4: Payments**

	Payment		Hired an Agent
	Above Official Fess (1)	Tried to Bribe (2)	
Comp. Group Mean	338.21	0.05	0.39
Bonus Group	178.4 (46.33)***	0.02 (0.02)	0.19 (0.05)***
Lesson Group	-0.24 (44.38)	-0.02 (0.02)	-0.02 (0.05)
N	666	666	666
R <sup>2</sup>	0.13	0.11	0.12
Fstat	12.06	2.53	14.07
P-value	0.00	0.08	0.00



# Micro approach: drivers' licenses in India

**Table 3: Obtaini**

	Obtained License (all tracked) (1)	Obtained License (2)	Obtained a license in 32 days or less (3)	Obtained a License without taking Licensing Exam (4)
Comp. Group Mean	0.45	0.48	0.15	0.34
Bonus Group	0.24 (0.05)***	0.25 (0.05)***	0.42 (0.04)***	0.13 (0.05)***
Lesson Group	0.12 (0.05)**	0.15 (0.05)***	-0.05 (0.04)	-0.03 (0.05)
N	731	666	666	666
R <sup>2</sup>	0.12	0.14	0.31	0.12
Fstat	14.24	13.50	87.60	7.48
P-value	0.00	0.00	0.00	0.00

## Micro approach: drivers' licenses in India

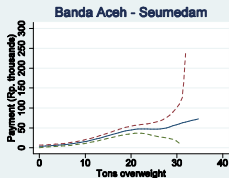
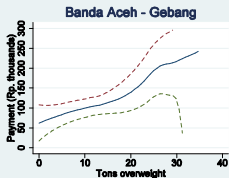
Obtained License & Automatically Failed Ind. Exam	Obtained License & Exam Score < 50%
(7)	(8)
0.29	0.32
0.18 (0.05)***	0.22 (0.05)***
-0.22 (0.04)***	-0.18 (0.05)***
666	666
0.24	0.20
64.48	51.12
0.00	0.00

## Micro approach: trucking bribes in Indonesia

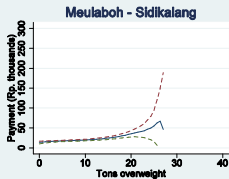
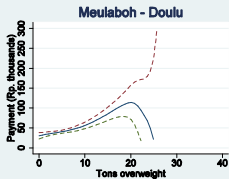
- ▶ Olken (2007): bribes that truck drivers' pay at weigh stations
- ▶ Engineers say damage truck does to road rises to the 4th power of truck's weight
  - ▶ Optimal fine should be highly convex so that truckers internalize this cost
  - ▶ Actual fine schedule is highly convex (major penalties if more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



## Meulaboh



## 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 1: Number of villages in each treatment category**

	Control	Invitations	Invitations + Comment Forms	Total
Control	114	105	106	325
Audit	93	94	96	283
Total	207	199	202	608

## 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:

$$THEFT_i = \log(REPORTED_i) - \log(ACTUAL_i)$$

- ▶ Calibrate so that  $THEFT_i = 0$  if no corruption

# Measuring corruption

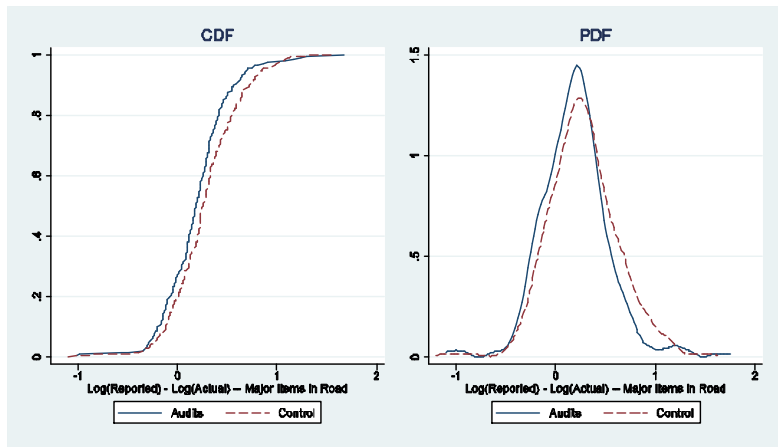




## Why might treatments reduce corruption

- ▶ 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

<i>Percent missing: Log reported value – Log actual value</i>	Control Mean	Treatment Mean: Audits	No Fixed Effects	
			Audit Effect	P-Value
Major items in roads	0.277 (0.033)	0.192 (0.029)	-0.085* (0.044)	0.058
Major items in roads and ancillary projects	0.291 (0.030)	0.199 (0.030)	-0.091** (0.043)	0.034
Breakdown of roads:				
Materials	0.240 (0.038)	0.162 (0.036)	-0.078 (0.053)	0.143
Unskilled labor	0.312 (0.080)	0.231 (0.072)	-0.077 (0.108)	0.477

# Impact of grass-roots monitoring

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

# Impact of grass-roots monitoring

<i>Percent missing: Log reported value – Log actual value</i>	Control Mean	Treatment Mean	No Fixed Effects	
			Treat- ment effect	P-Value
<i>Invitations + comment forms distributed via neighborhood heads</i>				
Major items in roads	0.252 (0.033)	0.278 (0.036)	0.025 (0.036)	0.483
Major items in roads and ancillary projects	0.268 (0.031)	0.277 (0.039)	0.010 (0.039)	0.792
<i>Invitations + comment forms distributed via schools</i>				
Major items in roads	0.252 (0.033)	0.179 (0.036)	-0.070* (0.041)	0.093
Major items in roads and ancillary projects	0.268 (0.031)	0.198 (0.034)	-0.064 (0.042)	0.127

## Other papers

- ▶ Efficiency wages: Di Tella and Schargrotsky (2003): Crackdown of corruption in Buenos Aires' hospitals and effect on overinvoicing
- ▶ 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

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