14.750x: Corruption Lecture 1

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Outline

- Do we care about corruption? Efficiency costs
- The corrupt official's decision problem: Balancing risks, rents, and incentives
- The IO of corruption: embedding the decision problem into a market structure

Measurement

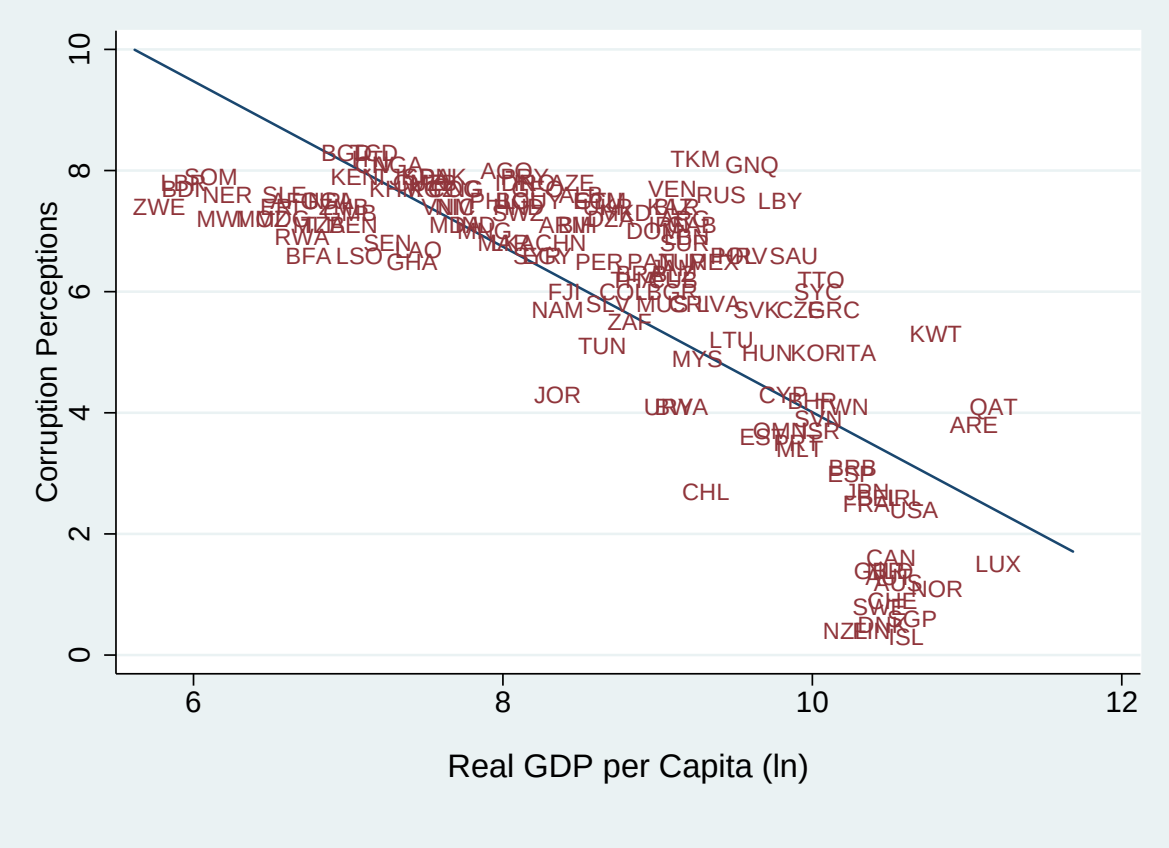
- A particular problem in empirical research on corruption is measurement: you can't just ask people how corrupt they are.
- So people take some combination of one of four basic approaches:
  - Perceptions of corruption
    - From surveys (usually cross-country data)
  - Comparing two measures of the same thing
    - Road building in Indonesia
    - Oil-for-food in Iraq
    - Education subsidies in Uganda
  - Direct measurement
    - Surveys of bribe-paying in Uganda
    - Observation of truck driver bribes in Indonesia
    - Audits of teacher attendance around the world
  - Use theory to distinguish between corruption and inefficiency
    - Taxes in Hong Kong vs. China

Poor countries appear most corrupt

Perceptions Based Measures

Figure 1: Cross-Country Relationship Between GDP and Corruption

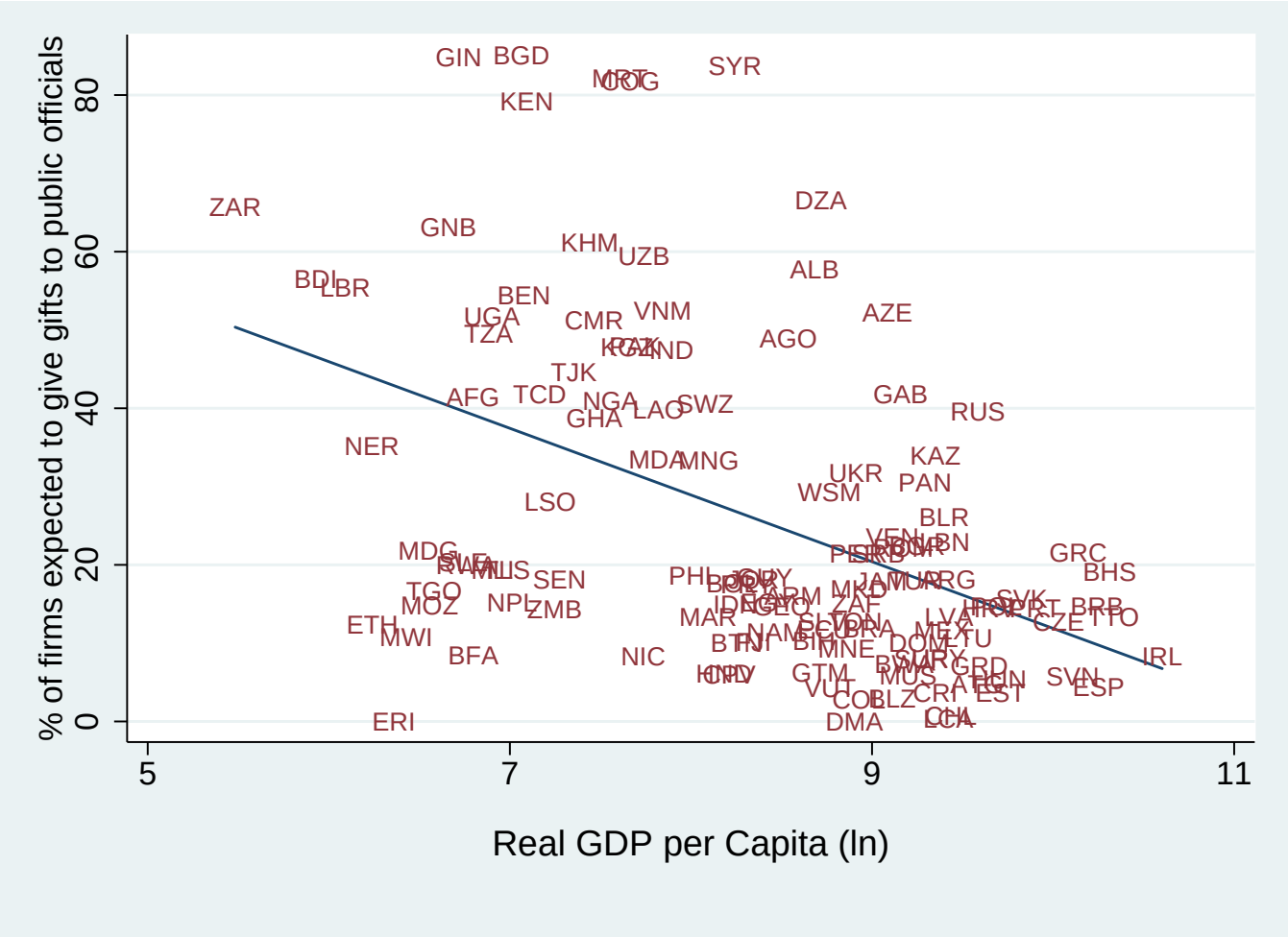
Panel A. Transparency International Corruption Index (2005)



Poor countries appear most corrupt

Survey Based Measures

Figure 2: Relationship Between GDP and Corruption Using Survey Data from Firms



A more sophisticated way of using perceptions

Fisman 2001: "Estimating the value of political connections"

- Setting: Indonesia under Soeharto
- Empirical idea:
  - Use stock market event study to gauge the "market value" of political connections to Soeharto
  - Identification: when Soeharto gets sick, what is the effect on stock price of Soeharto-connected firms relative to unconnected firms
    - *"Whenever Mr. Soeharto catches a cold, shares in Bimantara Citra catch pneumonia" – Financial Times*
- Note that this is still perceptions in some sense, but it allows us to turn them into a number; we need to believe in efficient markets for this perception to be accurate

Data and estimation

- Data on connections to Soeharto
  - Indonesian political consultancy rates each firm on scale of 0-4 of how close they are to Soeharto
  - Examples of "4" firms are those owned by Soeharto's children, Soeharto's cronies from childhood, and his relatives
- Data on dates of 6 Soeharto health shocks from Lexis-Nexis
- Then run a stock market event study for each event

$$R_{ie} = \alpha + \rho POL_i + \varepsilon_{ie}$$

- Since events are heterogeneous, measures total effect of event with net return of Jakarta stock exchange ($NR\left(JCI\right)$), then estimates

$$R_{ie} = \alpha + \rho_1 POL_i + \rho_2 NR_e\left(JCI\right) + \rho_3 POL_i \times NR_e\left(JCI\right) + \varepsilon_{ie}$$

Results

Event by event

TABLE 2—EFFECT OF POLITICAL CONNECTIONS ON CHANGES IN SHARE PRICE, SEPARATE ESTIMATION FOR EACH EVENT

	Jan. 30–Feb. 1, 1995	April 27, 1995	April 29, 1996	July 4–9, 1996	July 26, 1996	April 1–3, 1997
POL	−0.58* (0.34)	−0.31 (0.18)	−0.24* (0.15)	−0.95*** (0.27)	−0.57*** (0.22)	−0.90** (0.35)
Constant	1.29 (0.79)	0.21 (0.32)	0.12 (0.46)	0.83 (0.64)	−0.07 (0.41)	0.77 (0.97)
R^2	0.037	0.043	0.025	0.147	0.078	0.075
Observations	70	70	78	79	79	79

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

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

The value of connections

- Need to examine the counterfactual event where Soeharto died and firm connections went to 0.
  - Fisman uses JCI return to benchmark this, since JCI also declines whenever Soeharto gets sick
  - Specifically, he asked investment bankers what would happen to JCI if Soeharto died and value of connections went to 0 – their estimate was a decline of 20%
  - This implies that coefficient on POL would be $.28 * -20 - .19 = -5.8$ in such a scenario.
  - So for a firm wit maximum connections $(POL = 4)$, Soeharto's death would reduce firm value by about 23 percent.
- What do we infer from this?

An international comparison

Fisman, Fisman, Galef and Kharuna (2012)

- One can repeat the same exercise in different countries to gauge the value of political connections in that country
- Fisman et al. (2006) do the exact same exercise in the US– they look at the value of connections to Dick Cheney
- Definitions of connections:
  - Halliburton (Cheney was CEO)
  - Board ties (Cheney was on board, or overlap with Halliburton's board)
- Events:
  - Heart attacks
  - Self-appointment as VP-nominee
  - Changes in probability of Bush-Cheney victory
  - Changes in probability of war in Iraq

Results: No detectable impact

Table 2: The effect of Cheney's political fortunes on event returns: Time-series regression

VARIABLES	(1) Industry-adjusted euqal-weighted portfolio abnormal	(2) Industry-adjusted value-weighted portfolio abnormal	(3) Industry-adjusted Halliburton abnormal returns:
4/19/2000 dummy	-0.002	-0.011	-0.008
	(0.005)	(0.008)	(0.004)
7/21/2000 dummy	0.000	-0.006	-0.013
	(0.002)	(0.004)	(0.007)
11/22/2000 dummy	0.001	-0.005	0.000
	(0.001)	(0.004)	(0.011)
3/5/2001 dummy	0.003	0.012	-0.003
	(0.005)	(0.009)	(0.003)
AR_IndAdjusted (t-1)	-0.238	-0.238*	-0.351***
	(0.122)	(0.098)	(0.051)
AR_IndAdjusted (t-2)	-0.237*	-0.240***	-0.256***
	(0.109)	(0.050)	(0.039)
AR_IndAdjusted (t-3)	-0.088	-0.034	-0.159**
	(0.088)	(0.063)	(0.052)
Observations	330	330	330
Adjusted R-squared	0.014	0.103	0.156

Results: No detectable impact

Table 3. Relationship between probability of a Bush victory and excess returns, across all connected firms, over both a one-day and five-day period: clustered at date level

Dependent variable	Returns over one-day period			Returns over five-day (weekly) period		
	Risk-adjusted returns (all connected firms)	Risk-adjusted returns relative to industry median (all connected firms)	Risk-adjusted returns relative to industry median (Halliburton only)	Risk-adjusted returns (all connected firms)	Risk-adjusted returns relative to industry median (all connected firms)	Risk-adjusted returns relative to industry median (Halliburton only)
	(1)	(2)	(3)	(4)	(5)	(6)
ΔBush	0.013	0.020	0.022			
	(0.028)	(0.019)	(0.099)			
ΔBush				0.057	0.059	-0.028
				(0.067)	(0.054)	(0.160)
N	1,729	1,729	133	338	338	26
R2	-0.004	-0.003	-0.007	-0.007	-0.016	-0.041

A framework

Banerjee, Hanna, and Mullainathan (2009): Corruption Handbook Chapter

- Idea: Mechanism design approach to corruption.
- Setting: two actors: supervisor (the bureaucrat) and participants in the economy (the agents).
- Setup:
  - Set of slots of size 1 that need to be allocated to a population of size N.
  - Two types of agents: Type H and type L, numbering N_H and N_L respectively. Types are private information.
  - For type H, the:
    - Social benefit of giving a slot to H is H.
    - Private benefit is h.
    - Ability to pay is $y_H \leq h$.
  - Define all variables similarly for L types.
  - Assume $H > L$, but ordering of (h, l) and (y_H, y_L) can be arbitrary.

Four cases

cases	$y_H > y_L$	$y_H \leq y_L$
$h > l$	I: Aligned	III: Partial Misalignment
$h \leq l$	II: Partial Misalignment	IV: Misaligned

- Examples of Case I $(y_H > y_L, h > l)$
  - Choosing efficient contractors for road construction: Type H are more efficient contractors. For the same contract, they make more money: $h > l$. Since they are the ones who will get paid, the price they pay on the contract is just a discount on how much they are getting paid. Plausibly therefore $y_H = h$ and $y_L = l$.
  - Allocating licenses to import: like road construction, but in this case there may be credit constraints

Four cases

cases	$y_H > y_L$	$y_H \leq y_L$
$h > l$	I: Aligned	III: Partial Misalignment
$h \leq l$	II: Partial Misalignment	IV: Misaligned

- Examples of Case II $(y_H > y_L, h \leq l)$
  - Merit goods like subsidized condoms against HIV infection: H are high risk-types. They like taking risks: $h < l$. But perhaps richer: $y_H > y_L$
- Examples of Case III $(y_H \leq y_L, h < l)$
  - Hospital beds: $H = h > L = l > 0$, $y_H = y_L = y$, i.e. no systematic relation between ability to pay and willingness to pay.
  - Public distribution system: $H = h > L = l > 0, y_H < y_L$.

Four cases

cases	$y_H > y_L$	$y_H \leq y_L$
$h > l$	I: Aligned	III: Partial Misalignment
$h \leq l$	II: Partial Misalignment	IV: Misaligned

- Examples of Case IV $(y_H \leq y_L, h \leq l)$
  - Law enforcement: $H > 0 > L, y_H = y_L = y$, $h = l$:the slot is not going to jail.
  - Driving Licenses: $H > 0 > L, y_H = y_L = y$, $h < l$.
  - Speeding tickets: $H > 0 > L, y_H = y_L = y = h = l$: the slot is not getting a ticket.
  - Let the slot be a "does not need to pay taxes" certificate. Suppose H types are those who should not pay taxes and type $L's$ are those who should pay an amount T_L.
    - In other words, $h = l = T_L$.
    - Finally assume that $y_H < y_L = T_L$

Implications

- Suppose corruption means that bureaucrat can allocate slots to the highest bidder
  - What are the efficiency allocations? How does it depend on what case we're in?
- Some implications
  - Case I: Government and bureaucrat incentives are aligned: give it to the highest willingness to pay. Bureaucrat may introduce screening (red tape) to further increase revenue. Efficiency losses come from the red tape.
  - Case IV: Government and bureaucrat incentives are opposed: suggests corruption pressure will be great.

Efficiency costs

Bertrand, Djankov, Hanna, and Mullainathan 2007: "Obtaining a Driver's License in India: An Experimental Approach to Studying Corruption"

- Setting: Obtaining driver's license in India
- Question: Does corruption merely 'grease the wheels' or does it actually create inefficiency?
- Experiment: Experimentally create three groups of people:
  - "Bonus group" offered a large financial reward to obtain license in 32 days
  - "Lesson group" offered free driving lessons
  - Control
- For each group, measure driving ability with driving tests, find out about bribe paying process, whether obtained license.
- What would "efficient corruption" predict? What would "inefficient corruption" predict?

Summary Statistics

TABLE II
SUMMARY STATISTICS ON THE BUREAUCRATIC PROCESS FOR THE COMPARISON GROUP

Variable	Mean
A. Final license status	
Obtained a final license	0.48
Obtained a license in 32 days or less	0.15
Obtained a final license conditional on trying	0.69
Obtained a license without taking licensing exam	0.34
Obtained license & automatically failed ind. exam	0.29
B. The process by which individuals obtained licenses	
Number of days between temporary and final license	47.99
	(29.14)
Predicted number of trips	6.46
	(4.10)
Number of trips	2.50
	(0.73)
Minutes spent at RTO (across all trips)	206.07
	(111.86)
Number of officials spoken with	4.73
	(2.90)
Lines waited in (final license)	2.51
	(1.09)
Took RTO licensing exam	0.30
	(0.46)

Main results

TABLE III
OBTAINING A LICENSE

	Obtained license (all tracked) (1)	Obtained license (2)	Obtained license in 32 days or less (3)	Obtained license without taking licensing exam (4)	Obtained license and did not have anyone teach them to drive (5)	Obtained license and attended a driving school (6)	Obtained license and automatically failed ind. exam (7)	Obtained license and exam score <50% (8)
Comp. group mean	0.45	0.48	0.15	0.34	0.23	0.03	0.29	0.32
Bonus group	0.24	0.25	0.42	0.13	0.29	0.03	0.18	0.22
	(0.05)***	(0.05)***	(0.04)***	(0.05)***	(0.04)***	(0.02)	(0.05)***	(0.05)***
Lesson group	0.12	0.15	−0.05	−0.03	−0.12	0.35	−0.22	−0.18
	(0.05)**	(0.05)***	(0.04)	(0.05)	(0.04)***	(0.03)***	(0.04)***	(0.05)***
N	731	666	666	666	666	666	666	666
R^2	0.12	0.14	0.31	0.12	0.26	0.26	0.24	0.20
Fstat	14.24	13.50	87.60	7.48	61.38	52.83	64.48	51.12
p-value	.00	.00	.00	.00	.00	.00	.00	.00

Payments

TABLE IV
PAYMENTS AND PROCESS

	Payment above official fees (1)	Tried to bribe (2)	Hired an agent (3)	Hired an agent and obtained license (4)	Payment to agent above official fees (5)	Obtained license and took more than three trips (6)
Comp. group mean	338.21	0.05	0.39	0.37	313.97	0.05
Bonus group	178.4	0.02	0.19	0.21	142.4	0.03
	(46.33)***	(0.02)	(0.05)***	(0.05)***	(45.54)***	(0.02)
Lesson group	−0.24	−0.02	−0.02	−0.02	−42.22	0.05
	(44.38)	(0.02)	(0.05)	(0.05)	(43.77)	(0.02)**
N	666	666	666	666	666	666
R^2	0.13	0.11	0.12	0.13	0.11	0.09
F-stat	12.06	2.53	14.07	16.45	11.98	2.11
p-value	.00	.08	.00	.00	.00	.12

Summary of results

- Bonus group was:
  - 25 pct. points more likely to obtain a license
  - 42 pct. points more likely to obtain a license quickly
  - 13 pct. points more likely to obtain a license without taking an exam
  - 18 pct. points more likely to obtain license without being able to drive
  - Paid about 50% more
- Lesson group was:
  - 15 pct. points more likely to obtain a license
  - 0 pct. points more likely to obtain a license quickly
  - 0 pct. points more likely to obtain a license without taking an exam
  - 22 pct. points less likely to obtain license without being able to drive
  - Paid no more than control
- So what do we conclude? Is corruption efficient or inefficient?

Agents

- One important result is that almost all of the change in the bonus group comes from using agents
- To study what agent can and cannot do, author conducted an "audit study":
  - Hired actors to approach agents to request assistance obtaining a drivers' license
  - Varied their situation (can drive, can't drive, etc), and measured whether agent states he can produce a license and, if so, the price

Results

TABLE VI
AUDIT STUDY

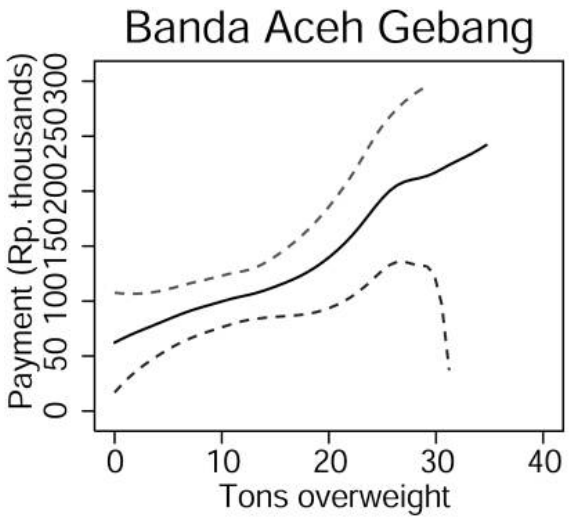
	Agent can procure license (Mean = 0.57)		Final price if agent can procure license (Mean = 1,586)	
Group	(1)	(2)	(3)	(4)
Constant	1	1.02	1,277.89	1,303.17
	(0.00)***	(0.04)***	(57.36)***	(83.21)***
Cannot drive	0	−0.01	62.65	110.54
	(0.00)	(0.02)	(81.66)	(85.76)
No residential proof	−0.5	−0.51	1,285.26	1,295.81
	(0.08)***	(0.08)***	(99.34)***	(102.30)***
No age proof	−0.21	−0.23	329	366.85
	(0.07)***	(0.07)***	(87.18)***	(90.96)***
Cannot come back	−0.95	−0.94	317.11	411.55
	(0.04)***	(0.04)***	(256.50)	(263.70)
Need license quick	−0.92	−0.91	855.44	850.51
	(0.05)***	(0.05)***	(212.03)***	(214.55)***
Actor fixed effects		X		X
N	226	226	128	128

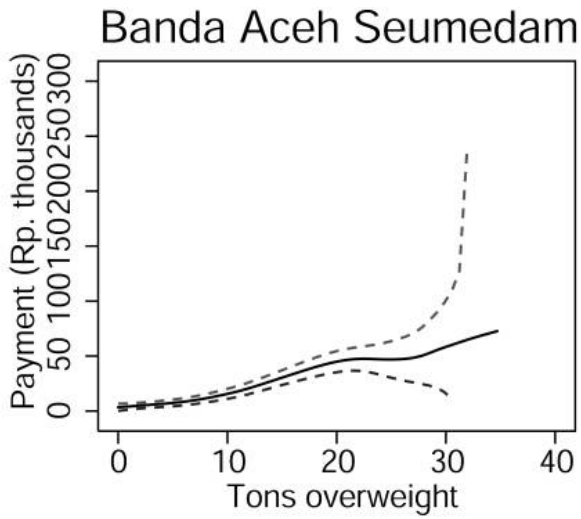
Another example: trucking

Barron and Olken (2009): "The Simple Economics of Extortion: Evidence from Trucking in Aceh"

- Setting: long-distance trucking in Aceh, Indonesia
- Investigate corruption at weigh stations:
  - Engineers in the 1950s figured out that road damage rises to the 4th power of a truck's weight per axle
  - Thus weight limits on trucks are required to equate private marginal cost of additional weight with social marginal cost
  - In Indonesia, the legal rule is that all trucks more than 5% overweight supposed to be ticketed, unload excess, and appear in court
- What happens with corruption?
  - Among our 300 trips, only 3% ticketed, though 84% over weight limit (and 42% of trucks more than 50% over weight limit!)
  - The rest paid bribes
  - What do we need to know to think about efficiency?

Results


Banda Aceh Gebang
Payment (Rp. thousands)
0 50 100 150 200 250 300
0 10 20 30 40
Tons overweight


Banda Aceh Seumedam
Payment (Rp. thousands)
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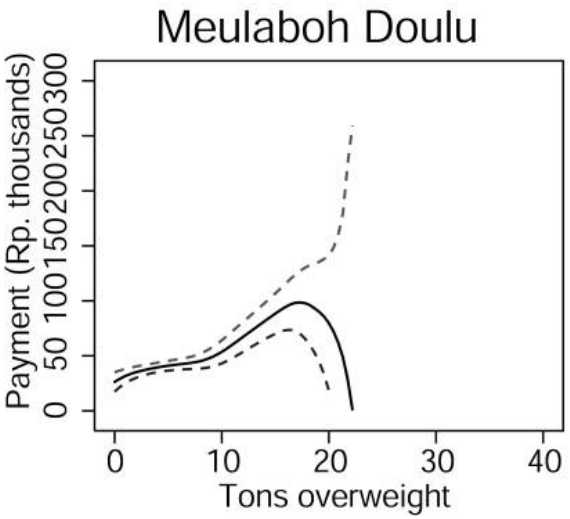
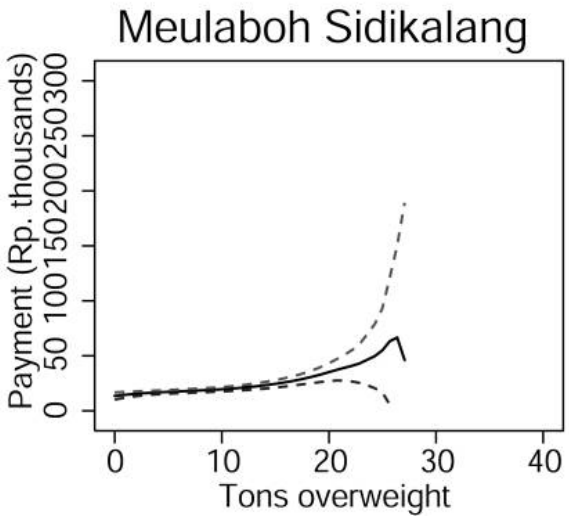
0 10 20 30 40
Tons overweight


Meulaboh Doulu
Payment (Rp. thousands)
0 50 100 150 200 250 300
0 10 20 30 40
Tons overweight


Meulaboh Sidikalang
Payment (Rp. thousands)
0 50 100 150 200 250 300
0 10 20 30 40
Tons overweight

Summary of findings

- Payments at weigh stations increasing function of truck weight
  - Note that the intercept is greater than 0 – so some extortion
  - On average, Rp. 3,400 (US $0.3) for each ton overweight
  - Much more concave than official fine schedule
- Interesting question: how should the government design the rules, knowing they will be used as the threat point in a corrupt bargaining game?

Summary

- Four main ways to measure corruption
  - Perceptions
  - Comparing two measures of the same thing
  - Direct measurement
  - Inference from theory
- Efficiency implications
  - Depends on whether the government's interests are aligned with or against private interests
  - Efficiency costs likely to be higher when government interests are against private willingness to pay
  - Examples from trucking and drivers' licenses suggest that this may be the case
  - But understanding efficiency costs of corruption is an area for more research