Notes: Corruption and Development

Jorge M. Agüero
jorge.aguero@ucr.edu

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Outline of today's lecture

1. **Introduction**
2. **What is corruption?**
3. **Measuring corruption**
   - Cross-country measures
   - Common features
   - Magnitude
4. **Theories**
   - Wages
   - IO approach
5. **Corruption and Growth**
6. **Ugandan Firms**
   - Who pays bribes?
   - Is corruption harmful to growth?

First, some numbers

- Mobutu Sese Seko, President of Zaire, looted some $5 billion (approx. Zaire's external debt in 1997.)
- Suharto (Indonesia) two times that figure and Ferdinand Marcos (Philippines) seven times higher.
- An IMF report found that in 2001 alone, $1 billion of oil revenues vanished from Angolan state accounts. That's $77 per Angolan, where 3/4 of the population lives with less than a dollar a day.
- The World Bank estimates that bribes account for around $1 trillion in a given year.

2. What is corruption

- Misuse of public office for private gain.
- Corruption is an outcome.
- It is a response to beneficial or harmful rules.
  - Individuals paying bribes to avoid penalties for harmful conduct.
  - Bribes allow you to get around bad policies or inefficient institutions.

Corruption and taxes and lobbying

- Corruption could be seen as a tax or fee.
- Like takes, bribes create a gap between actual and privately appropriated MPK.
- But bribes do not go to Government's accounts.
- Unlike taxes, bribes are not enforceable in courts and have higher transaction costs due to secrecy and uncertainty.

Corruption and lobbying

- Like lobbying, bribes influence buying or campaign contributions.
- There are however three main differences
  1. Lobbying affects all firms in the industry. Bribes have firm-specific effects.
  2. Lobbying has more permanent effects because there are cost associate to re-enacting a law. A bribed official might ask for anothe bribe in the future.
  3. In accepting or rejecting the lobbyist's agenda the evaluation is based on the costs and benefits for the governments. In the case of bribes is depends on private costs and benefits.

Cross-country measures I

- Cross-country measures can be divided in two groups.
- *Soft* evidence:
  - International Country Risk Guide: Based on risk assessment. It measures the likelihood government officials will demand special payments and the the extent of these payments throughout government tiers (e.g., Mauro 1995).
  - Corruption Perception Index (Transparency International): Nationally-representative perception surveys.
  - Control of Corruption (KKM, 2003).
- All these indicators are highly correlated. ρ(CC,CPI)=.97 and ρ(CC or CPI,ICRG)$\approx .75$.

Cross-country measures II

- *Hard* evidence:
  - EBRD (World Bank): Firm estimates of share of annual sales "firms like yours" typically pay in unofficial payments to public officials (26 transition countries only.)
  - International Crime Victim Surveys (UN): Urban/large cities household surveys about bribes paid to government officials. It existed since 1989.
- Main problem: We lack hard evidence on corruption.

Table 1

The Most Corrupt Countries

(the bottom 10 percent most corrupt countries from each data set)

Country	*CC*	*Country*	*CPI*	*Country*	*ICRG*	*Country*	*ICVS*
Equatorial Guinea	1.9[c,i,v]	Bangladesh	8.7[v]	Zimbabwe	5.8[v]	Albania	0.75
Haiti	1.7[v]	Nigeria	8.6	China	5[v]	Uganda	0.36
Iraq	1.4[v]	Haiti	8.5[v]	Gabon	5[c,v]	Mozambique	0.31
Congo, Dem. Rep.	1.4[c,v]	Myanmar	8.4[v]	Indonesia	5[v]	Nigeria	0.30
Myanmar	1.4[v]	Paraguay	8.4[v]	Iraq	5[v]	Lithuania	0.24
Afghanistan	1.4[c,i,v]	Angola	8.2[v]	Lebanon	5[v]		
Nigeria	1.4	Azerbaijan	8.2	Myanmar	5[v]		
Laos	1.3[c,i,v]	Cameroon	8.2[v]	Niger	5[c,v]		
Paraguay	1.2[v]	Georgia	8.2[i]	Nigeria	5		
Turkmenistan	1.2[c,i,v]	Tajikistan	8.2[i,v]	Russia	5		
Somalia	1.2[c,v]	Indonesia	8.2[v]	Sudan	5[v]		
Korea. North	1.2[c,v]	Kenya	8.1[v]	Somalia	5[c,v]		
Zimbabwe	1.2[v]	Cote d'Ivoire	7.9[v]	Congo, Dem. Rep.	5[c,v]		
Indonesia	1.2[v]	Kyrgyzstan	7.9[i,v]	Serbia and Montenegro	5[v]		
Angola	1.1[v]	Libya	7.9[v]	Haiti	4.8[v]		
Bangladesh	1.1[v]	Papua New Guinea	7.9[v]	Papua New Guinea	4.8[v]		
Cameroon	1.1[v]						
Niger	1.1[c,v]						
Sudan	1.1[v]						
Azerbaijan	1.1						
Tajikistan	1.1[i,v]						
Sample size	195		133		140		44

Notes: CC is the Control of Corruption Index for 2002 from Kaufmann, Kraay and Mastruzzi (2003). The index takes values between −2.5 to 2.5, with a higher score indicating higher corruption (rescaled). CPI is the Corruption Perception Index for 2003 from Transparency International. The index takes values between 0 to 10, with a higher score indicating higher corruption (rescaled). ICRG is the International Country Risk Guide's corruption indicator for 2001 (average over 12 months). The index takes values between 0 to 6, with a higher score indicating higher corruption (rescaled). ICVS is the incidence of bribes in 2000 (share of households responding they need or are expected to pay bribes in 2000) from the International Crime Victim Surveys.

[c] indicates that the country is not included in the Corruption Perception Index ranking.

[i] indicates that the country is not included in the ICRG ranking.

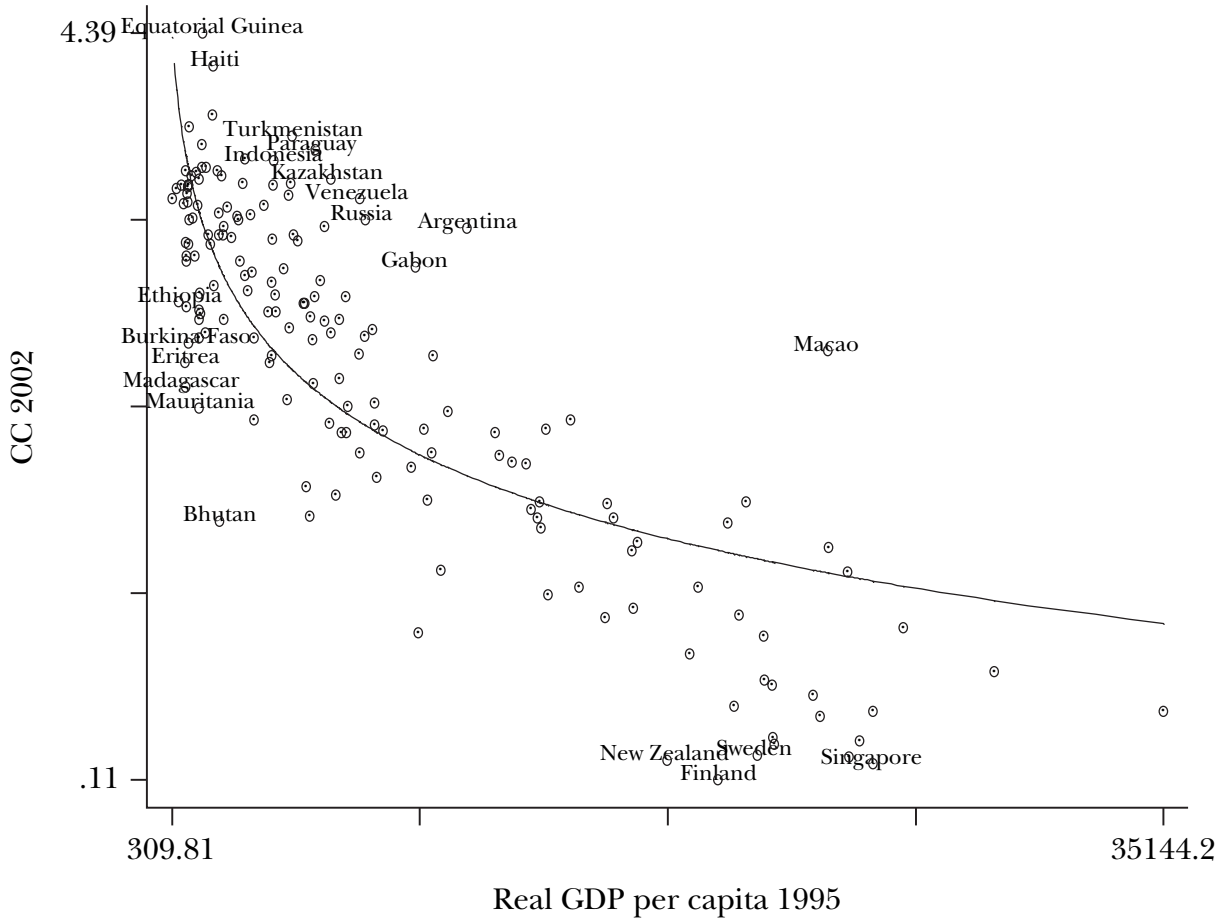
[v] indicates that the country is not included in the ICVS survey.

Common features of highly corrupted countries

- Mostly developing or transition countries.
- Had socialist governments.
- Closed economies, except for Indonesia.

Figure 1

Corruption and Income



Note: The graph depicts the regression line of corruption (CC 2002) on real GDP per capita (in logarithms) 1995.

Institutional theories I

- There are two main institutional views.
- Institutions are shaped by economic factors
  - Institutions develop as response to the country's income level.
  - Human capital: education and human capital is needed for courts and formal institutions to operate efficienlty.
  - An illiterate electorate is more permissive to government abuse.
  - Income and education are the causes of corruption.

Institutional theories II

- Direct effects
  - Institutions have a long-lasting effect and are inherited.
  - Think along the terms of AJR's paper on settlers' mortality.
  - More regulatory institutions (French system) leads to more corruption (La Porta, Lopez, Shleifer and Vishny, 1998).
  - Religion: Protestant church arose, in part, as an opposition to state-sponsored religion.
  - Politicians are less challenged in Catholic and Muslim countries compare to Protestant countries (Landes, 1998).

Table 2

Corruption and Country Characteristics: Human Capital

Dep. variable	*Control of Corruption (2002)*	*Corruption Perception Index (2003)*	*ICRG Corruption Score (1982–01)*	*ICRG Corruption Score (2001)*	*IVSC Incidence of Bribes (2000)*
Real GDP per capita (log)	−0.60***	−1.38***	−0.87***	−0.73***	−0.03**
	(.123)	(.33)	(.20)	(.19)	(.01)
Years of schooling (log)	−0.62***	−1.53***	−0.53**	−0.51***	−0.06*
	(.18)	(.52)	(.27)	(.28)	(.03)
Sample size	91	79	83	83	26

Notes: Control of Corruption Index for 2002 from Kaufmann, Kraay and Mastruzzi (2003). The index takes values between −2.5 to 2.5, with a higher score indicating higher corruption (rescaled). Corruption Perception Index for 2003 from Transparency International. The index takes values between 0 to 10, with a higher score indicating higher corruption (rescaled). ICRG is the International Country Risk Guide's corruption indicator for 2001 (average over 12 months). The index takes values between 0 to 6, with a higher score indicating higher corruption (rescaled). ICVS is the incidence of bribes in 2000 (share of households responding they need or are expected to pay bribes in 2000) from the International Crime Victim Surveys. Real GDP per capita in 1970 is from the Penn World Tables. Years of schooling of the total population aged over 25 in 1970 is from Barro and Lee (2000). Robust standard errors in parenthesis.

*** statistically significant at 1 percent level.

** statistically significant at 5 percent level.

* statistically significant at 10 percent level.

Table 3

Corruption and Country Characteristics: Openness

Dep. variable	*Control of Corruption (2002)*	*Corruption Perception Index (2003)*	*ICRG Corruption Score (1982–01)*	*ICRG Corruption Score (2001)*	*IVSC Incidence of Bribes (2000)*
Real GDP per capita (log)	−0.67***	−1.43***	−0.90***	−0.71***	−0.06***
	(.12)	(.32)	(.21)	(.20)	(.01)
Years of schooling (log)	−0.51***	−1.36***	−0.47*	−0.53*	
	(.18)	(.50)	(.27)	(.28)	
Imports/GDP	−0.01**	−0.03***	−0.00	−0.01	−0.00
	(.00)	(.01)	(.00)	(.00)	(.00)
Sample size	89	77	83	81	44

Notes: For details on sources of data, see Table 2. Imports/GDP is imports of goods and services as percentage of GDP (average from 1980–2000) from World Development Indicators (2004).
*** statistically significant at 1 percent level.
** statistically significant at 5 percent level.
* statistically significant at 10 percent level.

Table 5

Corruption and Country Characteristics: Freedom of Media

Dep. variable	*Control of Corruption (2002)*	*Corruption Perception Index (2003)*	*ICRG Corruption Score (1982–01)*	*ICRG Corruption Score (2001)*	*IVSC Incidence of Bribes (2000)*
Real GDP per capita (log)	−0.55***	−1.29***	−0.81***	−0.68***	−0.06***
	(.11)	(.31)	(.20)	(.19)	(.01)
Years of schooling (log)	−0.65***	−0.97*	−0.18	−0.22	
	(.12)	(.59)	(.28)	(.36)	
Freedom of media index	−0.05**	−0.10*	−0.06**	−0.05*	−0.01**
	(.02)	(.06)	(.03)	(.03)	(.00)
Sample size	91	79	83	83	44

Notes: For details on sources of data, see Table 2. Freedom of media index is the average score of the four criteria "Laws and regulations that influence media content," "Political pressures and controls on media content," "Economic influences over media content," "Repressive actions" for print and broadcast media, average over 1994–2001, from the Freedom House.

Magnitude of corruption

- Rankings cannot tell us much about the magnitude of corruption.
- Here are some micro examples
- Uganda (Svensson 2003, QJE): 80% of firms reported need to pay bribes.
- For graft-paying firms, graft is 8% of total costs.
- Other studies include Olken's project in Indonesia, Di Tella and Schargrosky (2003) in Argentina.
- Hsieh and Moretti (2005) paper on Iraq and UN Oil for Food Program.

4. Theories

- We will consider two main theories.
- One sees the problem as what wages should be paid to agents in order to avoid corruption.
- The other sees corruption and Principal-Agent problem.

Bureaucrat's wages

- Becker and Stigler (1974) is a model of corruptible enforcers (e.g., auditors and police).
- Let w be the wage and v outside wage.
- If bribed:
  - With probability p, person is detected and receives outside wage v.
  - With probability $1-p$ is not detected and receives $b+w$
- Equilibrium wage (indifferent between taking bribes or not)

$$w = pv + (1-p)(b+w)$$

- This implies

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

- Compensation $(w-v)$ increases with b and decreases with p.

Multiple equilibria

- Consider wage w fixed.
- But now the probability of detection (p) depends on proportion of corrupted people in the population (c).
- Assume that $p(c) = 1 - c$.
- The agent is indifferent is

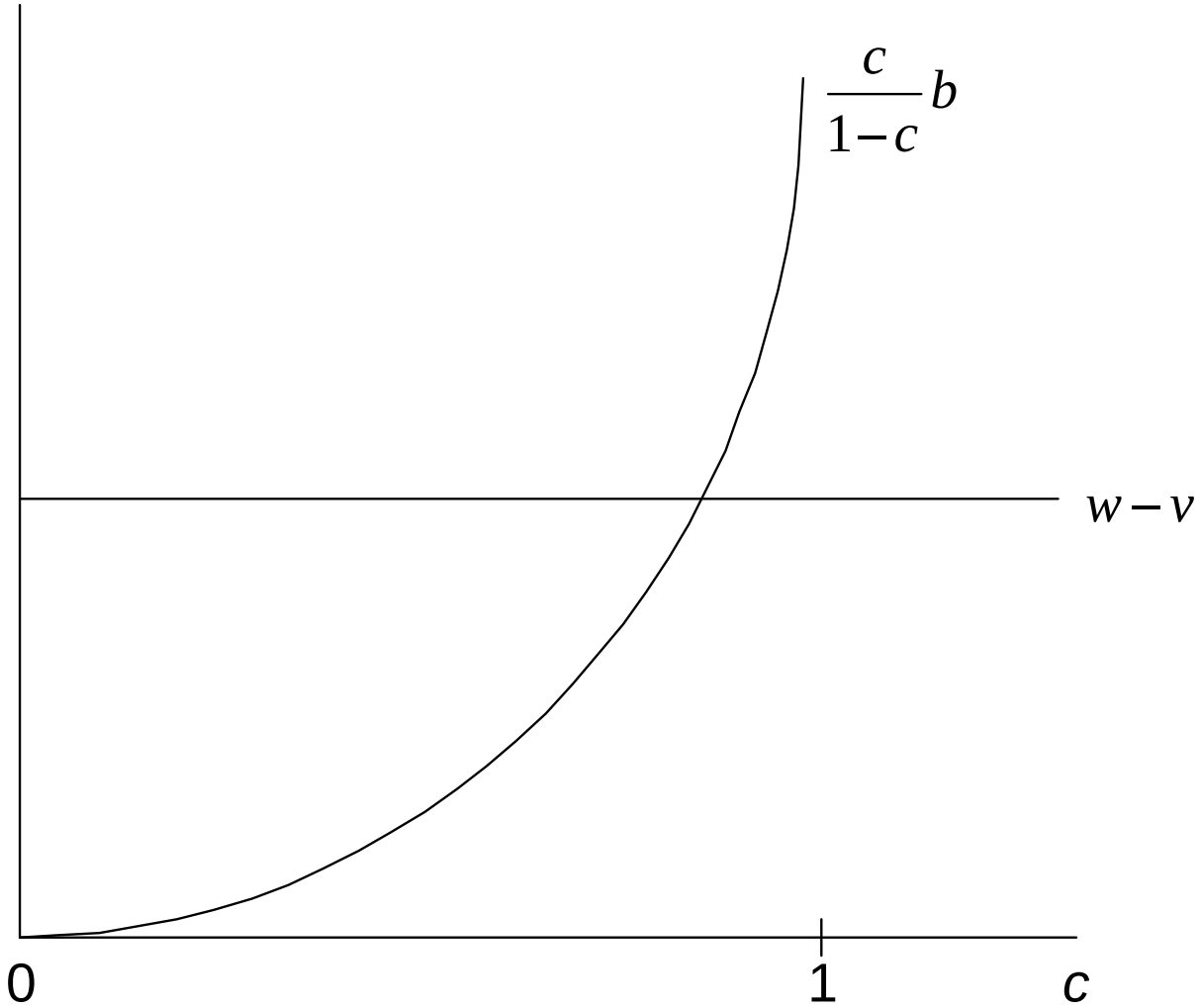
$$w = pv + (1 - p)(b + w)$$

- In terms of c, take bribe if

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

- This generates multiple equilibria.
- Small changes in wage or corruption crackdown can create permanent changes.

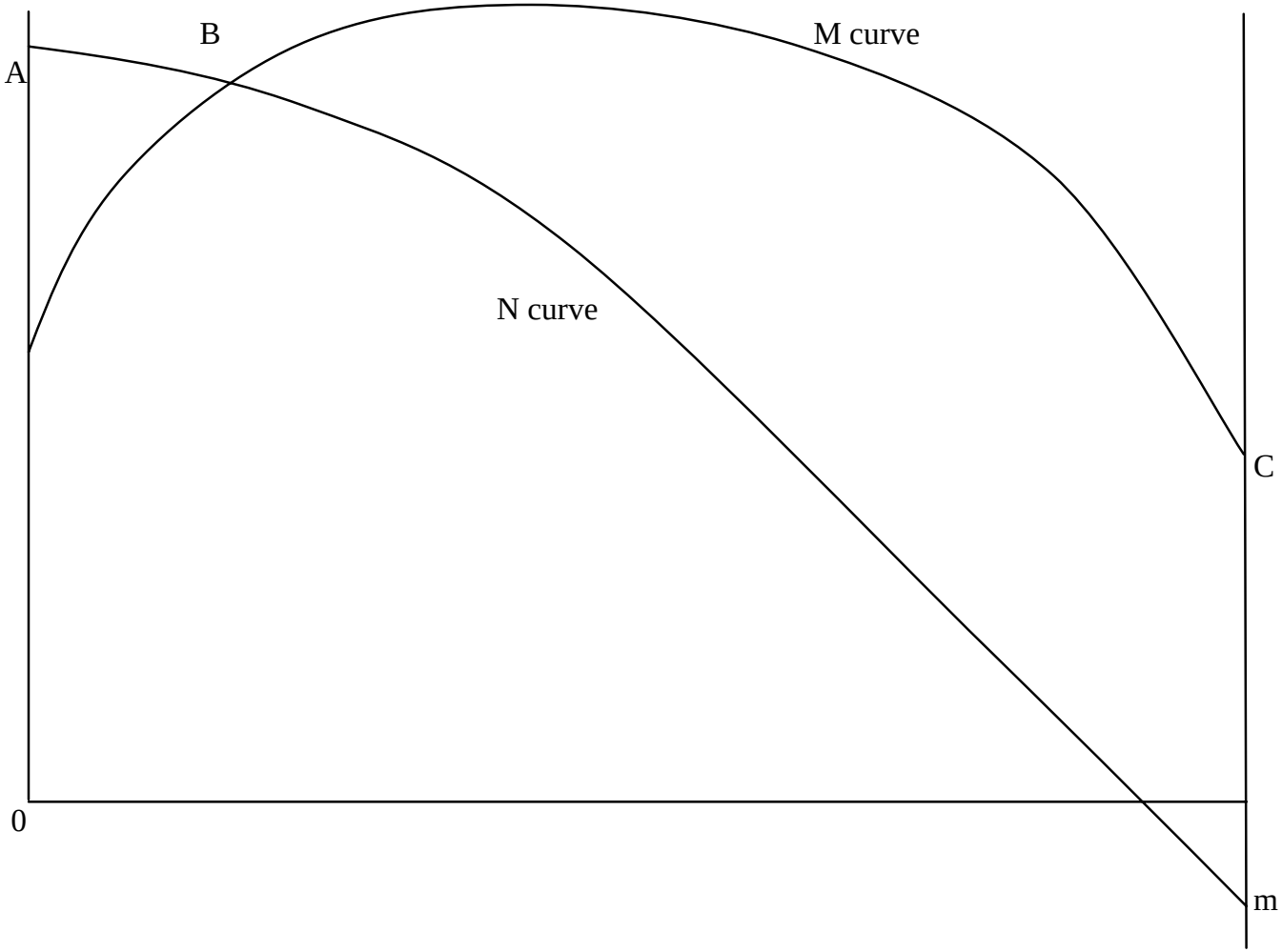
Multiple equilibria



Multiple equilibria: Bardhan and Udry (1999)

- Measure the proportion of corrupt agents along the x-axis.
- The M and N-curve show the marginal benefits for corrupt and non-corrupt officials.
- With low corruption $N > M$ and with high corruption $M > N$.
- N can even be negative at high levels of corruption (as shown in m).
- There are three equilibrium levels: A, B and C.
- A and C are stable. B is not.

Multiple equilibria: Bardhan and Udry (1999)



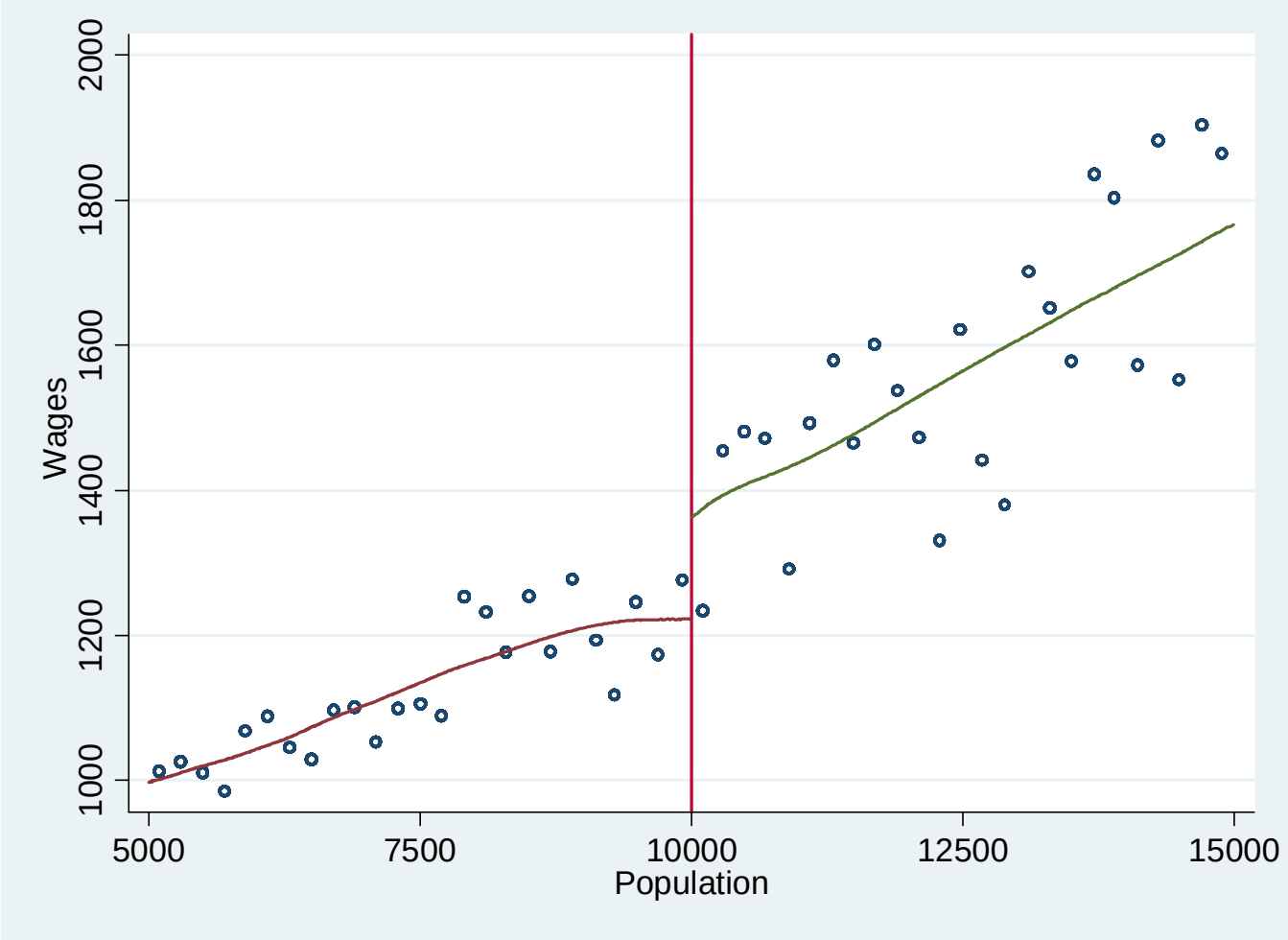
Multiple equilibria: Bardhan and Udry (1999)

- This shows how two otherwise similar countries (same SES and moral attitudes) may have different levels of corruption.
- It depends on how close these countries are to point B.
- Like before, small changes can create permanent changes.

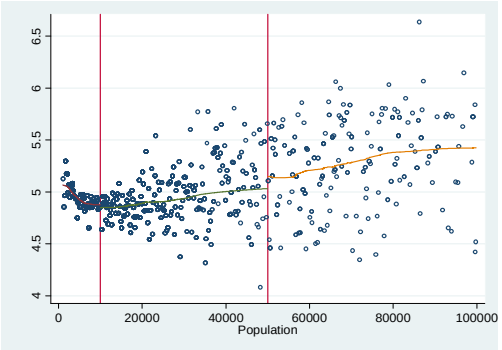
Does higher wages attract "better" politicians?

- Ferraz and Finan (2009)
- Reform in Brazil: salaries to politicians can vary due to population size.
- These provides a natural experiment.
- Income will increase due to "exogenous" variation.
- Is the pool of applicants different when wages are higher?

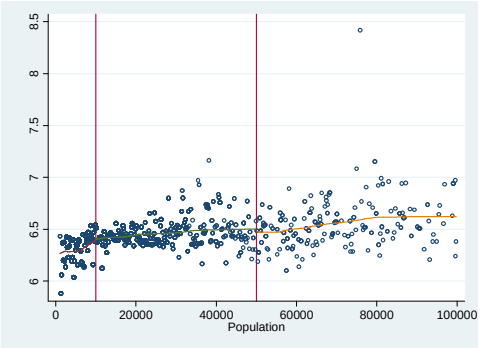
Wages and population



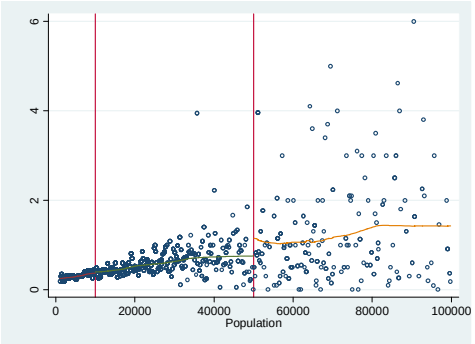
Ceteris paribus



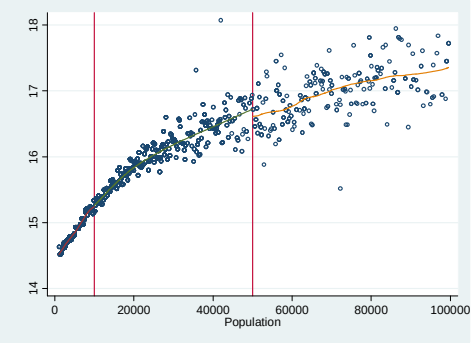
Income per capita (log)



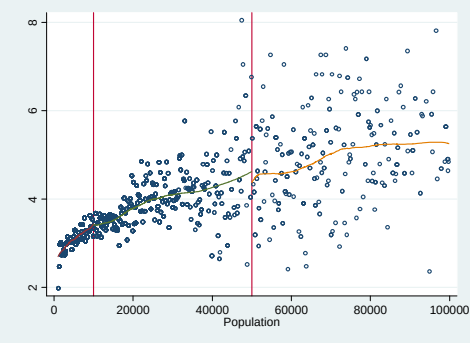
Private Sector Wages (logs)



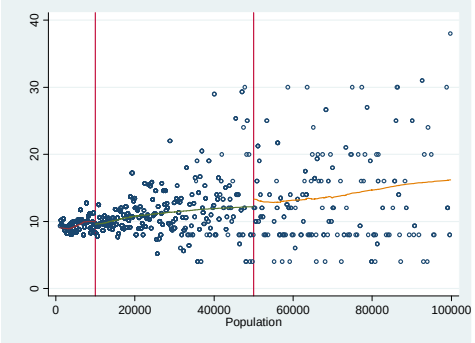
Assistants per legislators



Total Expenditure 2000



Effective Number of Political Parties in 1996 Elections



Hours in session

FIGURE 2: MUNICIPAL CHARACTERISTICS BY POPULATION

Notes: The figure shows municipal characteristics by population. Each figure presents the mean of the municipal characteristic for a bin size of 200 inhabitants (hollow-circles) along with a locally weighted regression calculated within each population segment with a bandwidth of 0.5. The vertical lines denote the various cutoff points.

"Better" pool of candidates

Table 7. The Effects of Politicians' Wages on Candidate Selection

Dependent variable:	Log Years of schooling		Share with at least a high school education		Share skilled occupations		Share of female	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Candidate characteristics								
Log wages	0.584	0.602	0.062	0.068	0.062	0.062	0.026	0.028
	[0.352]*	[0.318]*	[0.037]*	[0.035]*	[0.028]**	[0.027]**	[0.017]	[0.017]*
F-test (exc. instruments)	29.12	29.76	29.12	29.76	30.03	29.93	29.12	29.76
Panel B. Legislators' characteristics								
Log wages	0.885	0.876	0.107	0.11	0.084	0.079	0.039	0.043
	[0.478]*	[0.444]**	[0.053]**	[0.051]**	[0.049]*	[0.048]	[0.031]	[0.031]
F-test (exc. instruments)	29.12	29.76	29.12	29.76	30.03	29.93	29.12	29.76
Municipal characteristics	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4887	4887	4889	4889	4890	4890	4889	4889

Notes: The table reports the TSLS estimates for the effects of wages on the characteristics of those that ran and were elected as legislators in the 2004 elections. All regressions control for the number of hours the legislature functions per week and assistants per legislator. Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population, log average wage in private and public sector in municipality, and a linear spline in population. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to these excluded instruments.

Industrial Organization approach

- Two types of corruption (Shleifer and Vishny, 1993):
  1. Corruption without theft: bribes are paid on top of official fees. Here corruption decreases efficiency.
  2. Corruption with theft: bribes are paid instead of fees. The impact on efficiency is unclear.

Principal-agent problem

- The chief of a village (the principal) monitors villagers (the agents) and collect taxes from them.
- As the village grows it is harder for him to keep track of all villagers. So he hires "policemen" and tax collectors.
- They are the "intermediaries".
- The problem: agents and intermediaries can engage in private contracts (bribes) so that intermediaries do not report to chief.
- This is a problem with asymmetric information.
- How do we solve the problem?

Principal-agent problem

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- They are the "intermediaries".
- The problem: agents and intermediaries can engage in private contracts (bribes) so that intermediaries do not report to chief.
- This is a problem with asymmetric information.
- How do we solve the problem?
- Just like in the typical problem, you will make a payment such that the policeman will tell you the truth.

Zero corruption?

- Can we eradicate corruption at any cost?

Zero corruption?

- Can we eradicate corruption at any cost?
- The principal might not be well informed about the intermediary propensity for corruption.
- Consider the case where a policeman can be corrupted by low or high bribes.
- To eliminate corruption you will have to make high payments to the former type.
- It is much cheaper to make smaller payments.

5. Corruption and economic growth

- Mauro (1995, QJE).
- Question: Do more corrupt countries have less investment and slower growth?
- Uses 1980-1983 Business International indices of corruption.
- This is the risk-based assessment measure described above.
- OLS estimates show a negative relationship between corruption and growth.
- But is this causal?
- He instruments using ethnolinguistic fragmentation.

TABLE I
BUREAUCRATIC EFFICIENCY INDEX

1.5–4.5	4.5–5.5	5.5–6.5	6.5–7.5	7.5–9	9–10
Egypt	Algeria	Angola	Argentina	Austria	Australia
Ghana	Bangladesh	Dominican Rep.	Ivory Coast	Chile	Belgium
Haiti	Brazil	Ecuador	Kuwait	France	Canada
Indonesia	Colombia	Greece	Malaysia	Germany	Denmark
Iran	India	Iraq	Peru	Ireland	Finland
Liberia	Jamaica	Italy	South Africa	Israel	Japan
Nigeria	Kenya	Korea	Sri Lanka	Jordan	Hong Kong
Pakistan	Mexico	Morocco	Taiwan	Zimbabwe	Netherlands
Thailand	Philippines	Nicaragua	Uruguay		New Zealand
Zaire	Saudi Arabia	Panama			Norway
	Turkey	Portugal			Singapore
	Venezuela	Spain			Sweden
		Trinidad/Tobago			Switzerland
					United Kingdom
					United States

BE is the bureaucratic efficiency index, which I compute as the simple 1980–1983 average of three Business International indices: judiciary system, red tape, and corruption. A *high* value of the BE index means that the country's institutions are good.

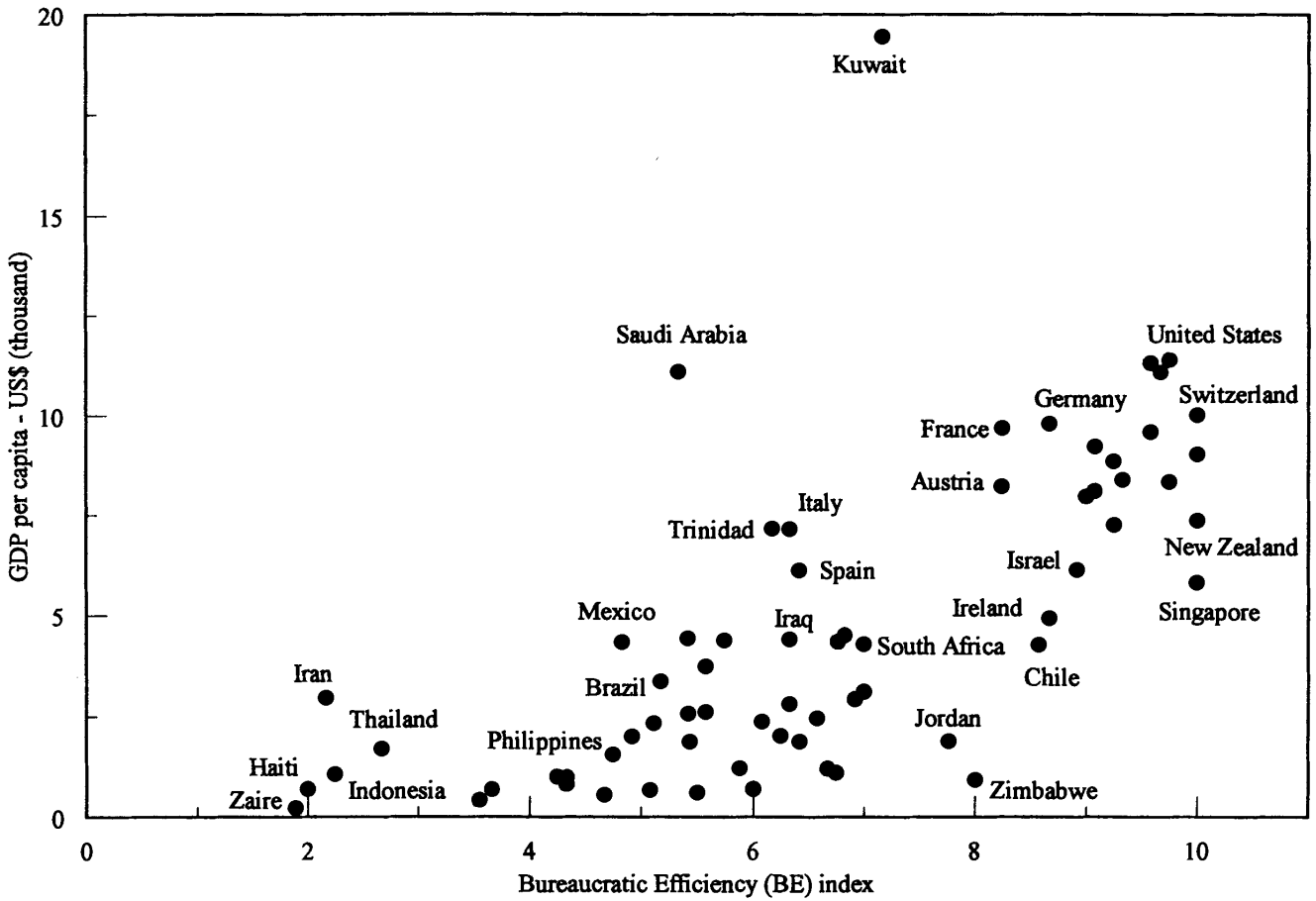

FIGURE I

Per Capita Income and Bureaucratic Efficiency

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

Per capita GDP at PPP in 1980 is from Summers and Heston [1988].

67 countries, $r = 0.68$.

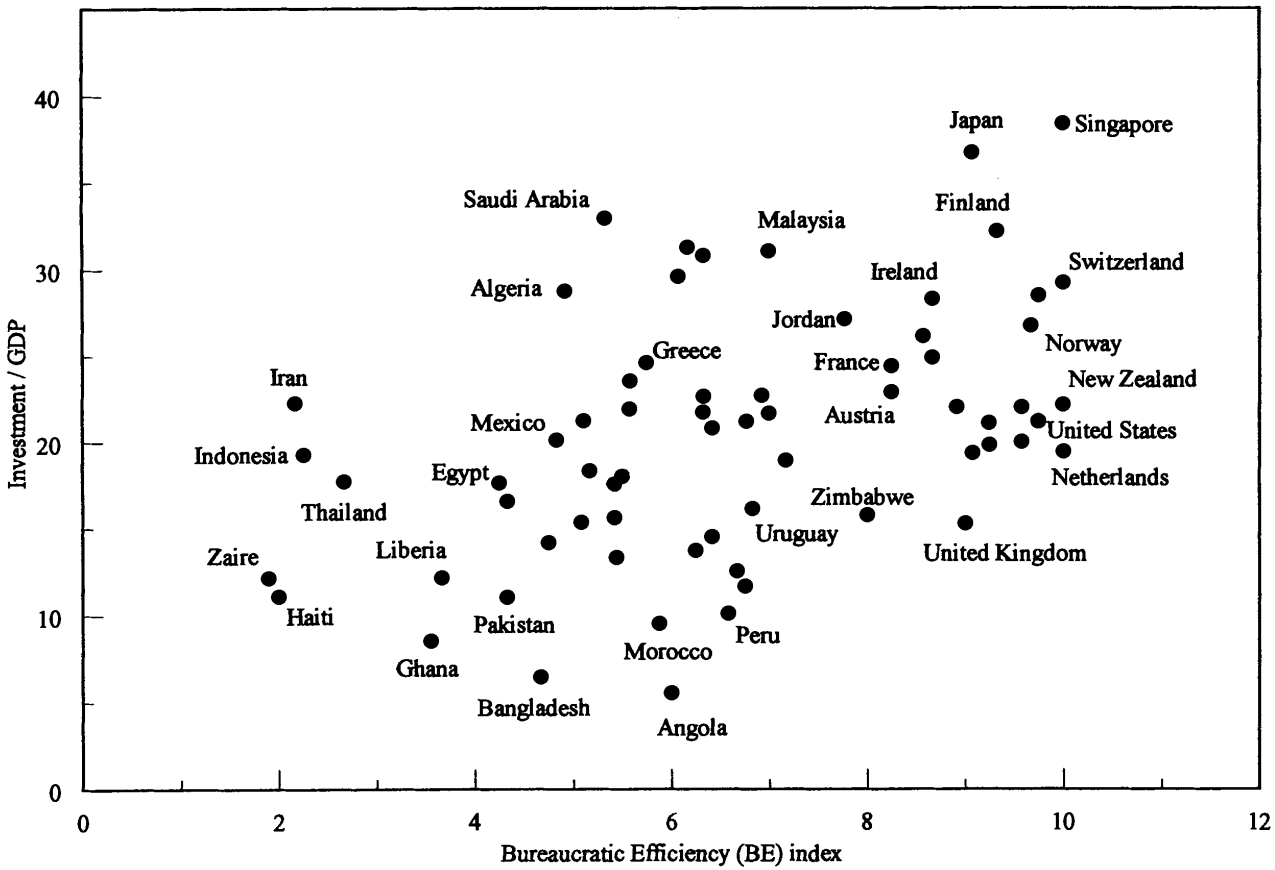

FIGURE II
Investment and Bureaucratic Efficiency

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

Average investment 1980–1985 from Summers and Heston [1988].

67 countries, $r = 0.46$.

TABLE III

ETHNOLINGUISTIC FRACTIONALIZATION, 1960

100–75	75–55	55–35	35–15	15–5	5–0
Angola	Canada	Algeria	Argentina	Austria	Dominican Rep.
Bangladesh	Ghana	Belgium	Australia	Brazil	Egypt
India	Malaysia	Ecuador	Finland	Chile	Germany
Indonesia	Pakistan	Iraq	France	Colombia	Haiti
Iran	Peru	Morocco	Israel	Denmark	Hong Kong
Ivory Coast	Philippines	New Zealand	Kuwait	Greece	Ireland
Kenya	Thailand	Singapore	Mexico	Jamaica	Italy
Liberia	Trinidad/ Tobago	Spain	Nicaragua	Jordan	Japan
South Africa		Sri Lanka	Panama	Netherlands	Korea
Zaire		Switzerland	Turkey	Saudi Arabia	Norway
		Taiwan	United Kingdom	Sweden	Portugal
		United States	Uruguay	Venezuela	
		Zimbabwe			

The ethnolinguistic fractionalization index for 1960 is drawn from Taylor and Hudson [1972].

TABLE VI

INVESTMENT ON CORRUPTION, BUREAUCRATIC EFFICIENCY

Dependent variable: investment/GDP (1960–1985 Average)

Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.104	0.114	0.196	0.036	0.039	0.186	0.001
	(3.03)	(3.18)	(4.65)	(0.42)	(0.40)	(0.31)	(0.01)
GDP in 1960	−0.008	−0.006	−0.004	−0.026	−0.021	−0.015	−0.017
	(−1.31)	(−0.81)	(−0.60)	(−1.57)	(−1.41)	(−2.50)	(−2.73)
Secondary education in 1960	0.060	0.111	0.096	−0.078	0.017	0.082	0.115
	(0.97)	(1.68)	(1.40)	(−0.56)	(0.16)	(1.60)	(2.04)
Population growth	−1.373	−0.620	−0.913	−2.754	−1.144		
	(−1.38)	(−0.61)	(−0.82)	(−1.84)	(−1.12)		
Primary education in 1960						0.105	0.111
						(2.89)	(3.36)
Government expenditure						−0.166	−0.206
						(−1.06)	(−1.39)
Revolutions and coups						−0.009	−0.005
						(−0.22)	(−0.139)
Assassinations						−0.164	−0.276
						(−0.69)	(−1.03)
PPI60						−0.058	−0.061
						(−2.81)	(−2.79)
PPI60DEV						0.043	0.035
						(1.24)	(1.04)
Africa							0.036
							(1.92)
Latin America							0.017
							(0.88)
High Bureaucratic efficiency dummy			0.051				
			(2.26)				
Low Bureaucratic efficiency dummy			−0.014				
			(−0.77)				
Political stability index						0.013	0.014
						(1.64)	(1.79)
Bureaucratic efficiency index	0.019			0.004		0.010	0.009
	(4.04)			(1.76)		(2.19)	(1.76)
Corruption index		0.013			0.034		
		(2.94)			(1.56)		
Estimation method	OLS	OLS	OLS	2SLS	2SLS	OLS	OLS
R^2	0.51	0.47	0.44	(*)	(*)	0.65	0.66

A *high* value of a BI index means the country has *good* institutions. One standard deviation equals 2.16 for the bureaucratic efficiency (BE) index, 2.51 for the corruption index, and 1.29 for the political stability index. The high (low) BE dummy takes the value one when the BE index is above 8.33 (below 5.80); there are 19 high BE and 19 low BE countries. There are 58 observations in the case of OLS and 57 in the case of 2SLS. White-corrected t-statistics are reported in parentheses. The Barro [1991] regressors used are per capita GDP, primary education, secondary education, the purchasing-power parity value for the investment deflator (PPI60) and its deviation from the sample mean (PPI60DEV) in 1960, the 1960–1985 average of the ratio of government consumption expenditure (net of spending on defense and education) to GDP, population growth, the number of revolutions and coups, the number of assassinations, and dummies for Latin America and Sub-Saharan Africa where indicated. 2SLS indicates that the index of ethnolinguistic fractionalization in 1960, from Taylor and Hudson [1972], is used as an instrument. (*) The R^2 is not an appropriate measure of goodness of fit with two-stage least squares.

Update on Mauro's paper

Table 6

Growth and Corruption

Dep. variable	*Growth (1980–2000)* *Ordinary least squares*	*Growth (1980–2000)* *Fixed effects*
Real GDP per capita (log)	−0.82*	−6.50***
	(.47)	(1.03)
Years of schooling (log)	1.86***	6.63***
	(.66)	(1.36)
Corruption	−0.33	0.11
	(.24)	(.24)
Countries	85	86
Observations	85	335

Notes: For details on sources of data, see Table 2. Growth is growth in real GDP per capita over the period 1980–2000 in specification (1) and growth in real GDP per capita over the periods 1981–1985, 1986–1990, 1991–1995, 1996–2000 in specification (2). Real GDP per capita and years of schooling are measured at the start of the sample period (in 1980 for specification (1) and in 1980, 85, 90, 95 for specification (2)). Corruption is the International Country Risk Guide's corruption indicator, average for 1982–2000 in specification (1) and average over 1982–1985, 1986–1990, 1991–1995, 1996–2000 in specification (2).

Two questions about corruption

1. Who pays bribes? (Svensson, 2003)
2. Is corruption harmful to growth? (Fisman and Svensson, 2007)

Who pays bribes?

PROBIT REGRESSIONS ON THE INCIDENCE OF CORRUPTION

Specification	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.203	0.647	0.428	0.254	0.206	−0.090	
	(.342)	(.155)	(.276)	(.356)	(.467)	(.461)	
	[.554]	[.000]	[.121]	[.476]	[.659]	[.846]	
Employment	8.4E-5	−7.9E-5	−8.2E-5	0.001	0.001	0.001	0.001
	(4.3E-4)	(4.4E-4)	(4.4E-4)	(.001)	(.001)	(.001)	(.001)
	[.848]	[.857]	[.852]	[.280]	[.278]	[.477]	[.380]
Infrastructure service	0.192						
	(.094)						
	[.041]						
Trade		0.430					
		(.238)					
		[.070]					
Pay tax			0.374				
			(.220)				
			(.089)				
Formal sector				0.140	0.141	0.213	0.200
				(.082)	(.083)	(.099)	(.074)
				[.088]	[.087]	[.032]	[.007]
Profit				−2.6E-9	−4.0E-9	1.7E-8	2.4E-9
				(4.8E-8)	(4.8E-8)	(4.9E-8)	(5.3E-8)
				[.957]	[.935]	[.730]	[.964]
Capital stock				−3.2E-7	−3.1E-7	−4.2E-7	−3.4E-7
				(2.5E-7)	(2.6E-7)	(2.5E-7)	(2.8E-7)
				[.199]	[.224]	[.090]	[.224]
Alternative return				−8.8E-7	−7.6E-7	2.4E-7	−6.3E-7
				(1.1E-5)	(1.1E-5)	(1.1E-5)	(1.1E-5)
				[.934]	[.884]	[.983]	[.956]
Competition					0.003		
					(.018)		
					[.884]		
Sell to government						−0.337	
						(.272)	
						[.216]	
Exemption						0.515	
						(.216)	
						[.017]	
Industry	—	—	—	—	—	—	5.09
							[.885]
LR(z)				6.15	5.84	7.05	4.86
				[.104]	[.119]	[.070]	[.183]
Observations	176	167	173	149	148	134	149

a. Dependent variable "incidence of graft" takes the value 1 if the firm reported positive bribe payments and 0 otherwise.
b. Standard errors are in parentheses, and p-values are in brackets.
c. Industry is the likelihood-ratio test statistic for the H_0 that the industry effects are equal.
d. LR(z) is the likelihood-ratio test statistic for the H_0 that the coefficients on the bargaining measures (profit, capital stock, alternative return) are zero.

Who pays more?

CORRUPTION REGRESSIONS

Specification	(1)	(2)	(3)	(4)	(5)
Constant	17.1	14.2	38.8	−3.19	
	(37.1)	(35.9)	(49.1)	(46.2)	
	[.646]	[.694]	[.432]	[.945]	
Profit per employee	0.0040	0.0040	0.0042	0.0042	0.0038
	(.0008)	(.0008)	(.0008)	(.0008)	(.0008)
	[.000]	[.000]	[.000]	[.000]	[.000]
Capital stock per employee	0.0041	0.0043	0.0040	0.0047	0.0041
	(.0024)	(.0022)	(.0024)	(.0023)	(.0027)
	[.089]	[.062]	[.090]	[.043]	[.123]
Alternative return per employee	−0.234	−0.239	−0.235	−0.253	−0.228
	(.096)	(.093)	(.094)	(.092)	(.099)
	[.017]	[.012]	[.014]	[.007]	[.024]
Formal sector	9.83	9.61	8.20	12.2	7.13
	(7.41)	(7.22)	(7.52)	(8.31)	(8.72)
	[.187]	[.186]	[.278]	[.145]	[.416]
Competition			−1.30		
			(1.75)		
			[.460]		
Sell to government				−3.29	
				(24.0)	
				[.891]	
Exemption				0.977	
				(17.2)	
				[.955]	
Industry	—	—	—	—	8.41
					[.752]
LR(**z**)[c]	27.8	30.1	30.4	32.7	27.9
	[.000]	[.000]	[.000]	[.000]	[.000]
Observations	119	117	116	105	117

a. Dependent variable is graft in US$ per employee.
b. Least-squares estimates with standard errors are in parentheses, and p-values are in brackets.
c. Specification (1) includes two outliers.
d. Industry is the likelihood-ratio test statistic for the H_0 that the industry effects are equal.
e. LR(z) is the likelihood-ratio test statistic for the H_0 that the coefficients on the bargaining measures (profit, capital stock, alternative return) are zero.

Is corruption harmful to growth?

Table 3
Effect of bribery and taxation on growth: instrumental variable estimation

Dependent variable: GROWTH					
	(1)	(2)	(3)	(4)	(5)
Method	IV	IV	IV	IV	IV
BRIBE	−3.320**	−3.291**	−3.635**	−4.173**	−3.485**
	(1.558)	(1.641)	(1.671)	(2.100)	(1.628)
TAX	−1.342**	−1.579**	−1.698**	−1.849**	−1.640**
	(0.638)	(0.684)	(0.680)	(0.723)	(0.701)
LSALES95	0.008 (0.018)	−0.009 (0.014)	−0.019 (0.015)	−0.022 (0.017)	−0.019 (0.015)
LAGE	−0.063 (0.043)	−0.049 (0.039)	−0.052 (0.044)	−0.060 (0.046)	−0.051 (0.043)
FOREIGN		0.261** (0.001)	0.216** (0.102)	0.211** (0.101)	0.2(0.102)
TRADE			0.125* (0.066)	0.133** (0.064)	0.125* (0.066)
INFRASERV				0.043 (0.039)	
REGULATION				0.012 (0.054)	
Cons	0.249 (0.340)	0.506* (0.304)	0.671** (0.314)	0.569* (0.307)	0.664** (0.308)
F-test of instruments (in BRIBE regression)	24.05 {0.00}	24.14 {0.00}	23.65 {0.00}	19.66 {0.00}	13.33 {0.00}
F-test of instruments (in TAX regression)	18.04 {.000}	27.53 {.000}	23.61 {.000}	25.98 {.000}	14.11 {.000}
Hansen *J*-statistic					1.153 {.562}
Observations	126	126	123	123	123

Standard errors in parentheses; all regressions use Huber–White correction for heteroskedasticity, allowing for clustering by location-industry.
The instruments are industry-location averages of BRIBE and TAX in specifications (1)–(4). In specification (5), industry-location averages of REGULATION and INFRASERV are added as additional instruments.
F-test on instruments is the test statistic on the *F*-test of the joint significance of the instruments (BRIBE, TAX, REGULATION and INFRASERV) in the first-stage regressions, with *p*-values in braces. Hansen *J*-statistic is the test statistic on the overidentification test of the instruments, with *p*-values in braces.
* Significant at the 10% level.
** Significant at the 5% level.

Is corruption harmful to growth?

Table 4
Effect of bribery and taxation on growth, outliers excluded

Dependent variable: GROWTH		
	(1)	(2)
Method	OLS	IV
BRIBE	−6.261** (2.973)	−7.875** (3.728)
TAX	−0.314* (0.171)	−0.817** (0.388)
LSALES95	−0.013 (0.009)	−0.026 (0.015)
LAGE	−0.031 (0.026)	−0.048 (0.028)
FOREIGN	0.096* (0.056)	0.136* (0.071)
TRADE	0.052 (0.044)	0.080* (0.044)
Cons	0.411** (0.161)	0.779** (0.284)
R^2	0.11	
Observations	114	119

Standard errors in parentheses; all regressions use Huber-White correction for heteroskedasticity, allowing for clustering by location-industry.
* Significant at the 10% level.
** Significant at the 5% level.

References

- Main reference is Svensson (2005, JEP).
- Fisman and Svensson (2007) "Are corruption and taxation really harmful to growth? Firm level evidence", *Journal of Development Economics*, 83(1):63-75.
- Svensson (2003) "Who Must Pay Bribes and How Much? Evidence from a Cross Section of Firms", *Quarterly Journal of Economics*, 118(1):207-30.
- But also Olsen's lecture notes.
- Bardhan and Udry (1999) *Development Microeconomics*.
- J.-J. Laffont chapter in Benerjee et al (2006) *Understanding Poverty*.