LECTURE NOTES

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Lectures Outline

Common Agency Approaches
I & II

Outline

1. Introduction: Why Common Agency?
2. The Mechanics of Common Agency
3. Some Applications
   - Environmental Federalism
   - Trade and the Environment
   - Corruption and Political Instability
   - Lobby Group Formation
   - Extensions
4. Some Empirical Evidence

Related Readings

Grossman, G. and E. Helpman (1994), "Protection for Sale," *American Economic Review* 84(4): 833-50.

Aidt, T.S. (1998), "Political Internalization of Economic Externalities and Environmental Policy," *Journal of Public Economics* 69(1): 1-16.

Fredriksson, P.G. and N. Gaston (2000), "Environmental Governance in Federal Systems: The Effects of Capital Competition and Lobby Groups," *Economic Inquiry* 38(3): 501-14.

Damania, R. (2001), "When the Weak Win: The Role of Investment in Environmental Lobbying," *Journal of Environmental Economics and Management* 42(1): 1-22.

Eliste, P. and P.G. Fredriksson (2002), "Environmental Regulations, Transfers, and Trade: Theory and Evidence," *Journal of Environmental Economics and Management* 43(2): 234-50.

Fredriksson, P.G. and J. Svensson (2002), "Political Instability, Corruption and Policy Formation: The Case of Environmental Policy," forthcoming, *Journal of Public Economics* (available at http://www.sciencedirect.com/science/journal/00472727).

Damania, R., P.G. Fredriksson, and J.A. List (2002), "Trade Liberalization, Corruption, and Environmental Policy Formation: Theory and Evidence," forthcoming, *Journal of Environmental Economics and Management* (available at http://www.sciencedirect.com/science/journal/00950696).

Fredriksson, P.G., H.R.J. Vollebergh, and E. Dijkgraaf (2003), "Corruption and Energy Efficiency in OECD Countries: Theory and Evidence," forthcoming, *Journal of Environmental Economics and Management* (available at http://www.beijer.kva.se/publications/pdf-archive/Disc176.pdf).

Lecturer's profile

Academic Experience

Visiting Professor, University of Gothenburg, 2003.
Assistant Professor, Southern Methodist University (SMU), 1999-present.
Consultant, The World Bank, 1997-1999.
Lecturer, University of Adelaide, 1995-1999.

Some Publications

Fredriksson, P.G. (1997), "The Political Economy of Pollution Taxes in a Small Open Economy," *Journal of Environmental Economics and Management* 33(1): 44-58.

Damania, R. and P.G. Fredriksson (2000), "On the Formation of Industry Lobby Groups," *Journal of Economic Behavior and Organization* 41(4): 315-35.

Fredriksson, P.G. and D.L. Millimet (2002), "Strategic Interaction and the Determination of Environmental Policy Across US States," *Journal of Urban Economics* 51(1): 101-22.

Fredriksson, P.G. and R. Damania (2003), "Trade Reform, Endogenous Lobby Group Formation, and Environmental Policy," *Journal of Economic Behavior and Organization* 52(1): 47-69.

Fredriksson, P.G., D.L. Millimet, and J.A. List (2003), "Bureaucratic Corruption, Environmental Policy and Inbound US FDI: Theory and Evidence," *Journal of Public Economics* 87: 1407-30.

THE POLITICAL ECONOMY OF ENVIRONMENTAL POLICY: COMMON AGENCY

- Theory developed by Bernheim and Whinston (QJE 1986) and applied by Grossman and Helpman (AER 1994) to trade policy.
- Many lobby groups (principals) influence a government (agent) to take a favorable policy choice (e.g. a lower/greater pollution tax).
- The government cares about monetary contributions (campaign contributions or bribes) and aggregate social welfare. The model applies also to other forms of influence-seeking that require resource expenditures.
- This approach yields detailed predictions of policy outcomes across sectors, states, or countries.
- Many predictions have received empirical support.
- Some advantages of this approach:
- The lobby groups' objective functions are derived from the individual members' utility functions, not using a "black box".
- The model yields detailed predictions about lobby groups' incentives to seek policy changes.
- Useful for predictions of the long term "fine tuning" of policy, not abrupt, large policy changes.
- Useful to analyze multi-sector, multi-lobby policy outcomes.

THE MODEL: A ROAD MAP

Individual Utility Functions

=> Lobby Groups' (Indirect) Utility Functions

The Game: A Menu Auction

=> The Equilibrium Characterization

=> The (Explicit) Environmental Policy Prediction

=> Empirical Tests?

Political Instability, Corruption and Policy Formation:
The Case of Environmental Policy

P.G. Fredriksson and J. Svensson (JPUBE 2003)

THE MODEL

- Focus: The interaction effect of political instability and corruption on environmental policy formation.
- n≥1 agricultural firms produce a polluting good.
- Consumers suffer disutility from pollution.
- The incumbent government sets pollution tax *t*.
- The government weighs bribes and aggregate social welfare. The weight is a measure of corruption. Bribes are used to buy policy, not to influence elections.
- Firms organize a lobby group, which offers a bribe schedule to the incumbent government, in return for favorable policy.
- With some probability, the government leaves office before policy implementation.
- A 3-stage game is played between the lobby and the incumbent:

Stage 1: The lobby offers the government a bribe schedule, knowing the prob. $0<\gamma<1$ that the government leaves office before policy implementation in Stage 3.

Stage 2: The government sets its optimal policy, taking γ into account, and collects the associated bribe.

Stage 3: With prob. $(1-\gamma)$ the incumbent government stays and implements the policy determined in stage 2.

A new government sets an identical policy with prob. $0<\lambda<1$. With prob. $1-\lambda$ the exogenous policy t^c is set.

Utility functions

The producer lobby's expected gross utility:

$$E[\Omega^F(t)] \equiv n\pi(t)[(1-\gamma(1-\lambda)] + n\pi(t^C)[\gamma(1-\lambda)], \quad (5)$$

where $\pi(t)$ is firm profits. Aggregate social welfare:

$$\Omega^A(t) \equiv n\pi(t) + \delta(p^*) + \tau(t) - \theta X(t), \quad (6)$$

The incumbent government's objective function:

$$E[I(t)] \equiv \Lambda^F(t) + (1-\gamma)a\Omega^A(t), \quad (7)$$

where *a* is the weight on welfare relative to the bribe = corruption.

The equilibrium characterization becomes:

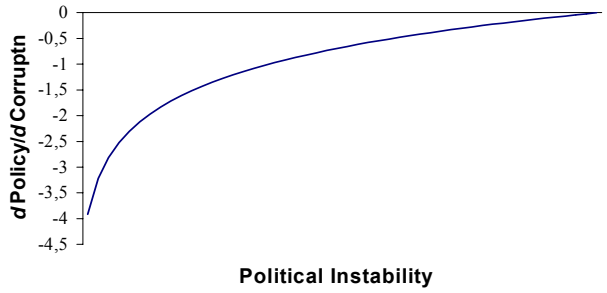
$$\Omega_t^F(t^*) + (1-\gamma)a\Omega_t^A(t^*) = 0. \quad (8)$$

Differentiating (5) and (6) wrt *t*, and substituting into (8) yields:

$$-\theta(h(t))X(t)[1-\gamma(1-\lambda)] + a(1-\gamma)(t^*-1)\left(\theta(h(t))\frac{\partial X}{\partial t} + X(t)\frac{\partial \theta(h(t))}{\partial h}\frac{\partial h}{\partial t}\right) = 0. \quad (11)$$

=> $t^* < 1$.

Result 1: Corruption has a negative effect on environmental policy, but the effect disappears as the degree of political instability rises:



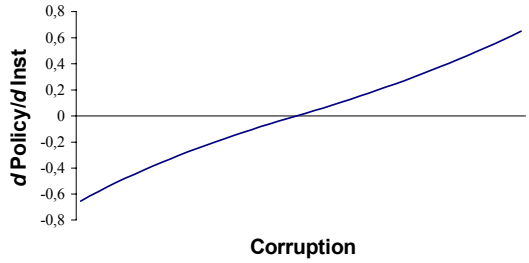
$$\frac{dt^*}{da} = \frac{\overbrace{(1-\gamma)}^{(+)}\overbrace{(1-t^*)}^{(+)}\overbrace{\left(\theta(h(t))\frac{\partial X(t)}{\partial t} + X(t)\frac{\partial \theta(t)}{\partial h}\frac{\partial h(t)}{\partial t}\right)}^{(-)}}{\underbrace{|D|}_{(-)}} > 0.$$

INTUITION

- Social welfare becomes less important as corruption increases => $t\downarrow$.
- With high political instability, welfare considerations are of little importance to the government (it is less likely to benefit from delivering social welfare) => corruption has no effect on *t*.

Comment:

Result 2: The effect of political instability on environmental policy is conditional on corruption:



$$\frac{dt^*}{d\gamma} = \frac{\overbrace{a(t^*-1)\left(\theta(h(t))\frac{\partial X(t)}{\partial t} + X(t)\frac{\partial \theta(h(t))}{\partial h(t)}\frac{\partial h(t)}{\partial t}\right)}^{(A)} \overbrace{-\theta(h(t))X(t)(1-\lambda)}^{(B)}}{|D|}.$$

INTUITION

Political instability has two opposing effects:

A. Bribes become more attractive to the incumbent since the probability of benefiting from social welfare falls => $t\downarrow$.

B. Bribery becomes less profitable when instability rises since the probability of policy implementation falls => $t\uparrow$.

- When the degree of corruption is high (low), an increase in political instability increases (reduces) the pollution tax.

EMPIRICAL WORK

- Stringency of Environmental Regulation Index in the agricultural sector for 62 countries for 1990 (Eliste and Fredriksson, 2002).
- Corruption Index (0-6). Political Risk Services Index (ICRG-index) (Knack and Keefer, 1995).
- Political Instability. Average number of government crisis 1981-1990 (Banks, 1994).

Table 1: Environmental Policy Regressions - Basic Findings

Equation	(1)	(2)
LGDPPC	13.4***	13.2***
ALABOR	-.02	-.04
DEVELOPED	38.6***	39.6***
DEMOCRACY	-13.6*	-13.3*
CORRUPTION	-5.0**	-7.6***
INSTABILITY	-4.8	-54.4**
CORRUPTION INSTABILITY*		24.5**
Adjusted R^2	.89	.90
Observations	61	61

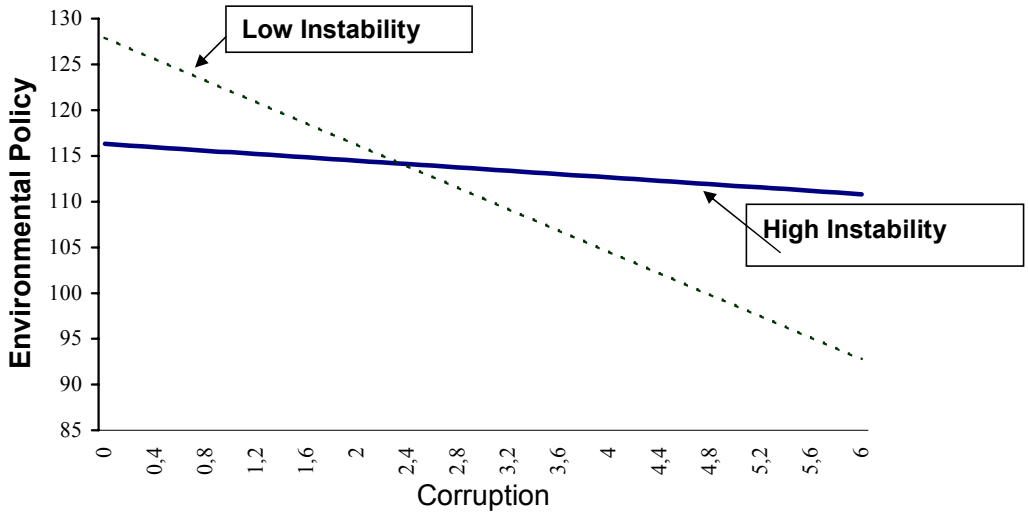
Notes: Heteroskedasticity adjusted OLS.

Table 2: Environmental Policy Regressions – Robustness test

Equation	(1)	(2)	(3)	(4)	(5)
LGDPPC	13.2**	8.9**	14.1***	13.4***	13.5***
AGLAND	-.04	-.2	.08	-.03	-.03
DEVELOPED	37.0***	35.8***	38.8***	40.2***	36.2***
DEMOCRACY	-12.7*	-17.9*	-13.1*	-13.9*	-14.0**
CORRUPTION	-8.2***	-18.1***		-7.4***	-9.4***
INSTABILITY		-120.3**	-31.7***	-46.8***	-49.8**
CORRUPTION INSTABILITY*		59.5**		24.9**	22.5**
INSTABILITY1	-42.7***				
CORRUPTION INSTABILITY1*	19.6***				
CORRUPTION-EIU			-29.2**		
*CORRUPTION-EIU *INSTABILITY1*			62.5*		
Adjusted R^2	.91		.89	.90	.91
Observations	61	60	59	60	59

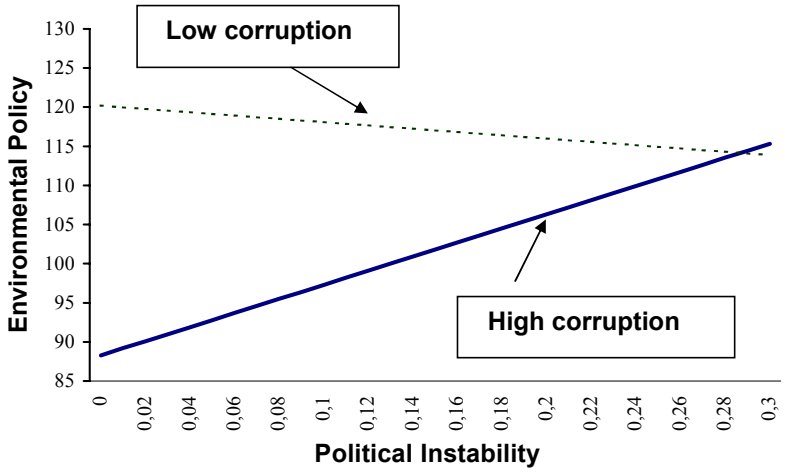
Notes: OLS regressions (cols. 1, 3-5), and 2SLS (col. 2).

The relationship between environmental policy and corruption for countries with <u>high</u> and <u>low</u> political instability



- Corruption has a negative effect on stringency, conditional on low political instability.

The relationship between environmental policy and political instability for countries with <u>high</u> and <u>low</u> corruption



- Political instability has a positive (negative) effect on stringency, conditional on high (low) corruption.

Corruption and Energy Efficiency in OECD Countries: Theory and Evidence

P.G. Fredriksson, H.R.J. Vollebergh, and E. Dijkgraaf
(forthcoming, JEEM)

Issues

- What is the effect of corruption on energy policy in OECD countries?
- Olson's (1965) theory of collective action (free- riding) receives mixed empirical support in the literature.
- How does industry sector size affect:
  (i) capital owners' political influence on energy policy?
  (ii) workers' political influence on energy policy?
- Is there an interaction effect between corruption and industry sector size on energy policy?

MODEL

- Small economy with consumers (suffer disutility from energy related pollution), workers, and capital owners.
- Production technology: $Q = F(K,L,\theta) \Rightarrow Q = Kf(l,\alpha)$, where $\alpha=\theta/K$ is the energy-capital ratio restricted by the government.
- Workers and capital owners form lobby groups that offer prospective bribes to the government.
- Bribery is costly to coordinate (Olson, 1965; Laffont and Tirole, 1991). Coordination costs are assumed increasing with industry sector size.
- The lobbies' net utility functions equal

$$V^W(\alpha) \equiv Lf_l - (1+\lambda^W)C^W(\alpha) \tag{4}$$

$$V^K(\alpha) \equiv K(f - lf_l) - (1+\lambda^K)C^K(\alpha) \tag{5}$$

- The government's utility function equals

$$V^G(\alpha) \equiv \sum_{i=W,K,S} aV^i(\alpha) + \sum_{i=W,K} C^i(\alpha). \tag{7}$$

- 2 stage game (as before). Subgame Perfect Nash Equilibrium.
- Substitute the partials of the gross utility functions into the equilibrium characterization => The equilibrium characterization of energy policy equals

$$\underbrace{\left(\frac{1}{1+\lambda^W}+a\right)lf_{l\alpha}}_{A}+\underbrace{\left(\frac{1}{1+\lambda^K}+a\right)(f_\alpha-lf_{l\alpha})}_{B}-\underbrace{a\beta^S}_{C}=0. \tag{12}$$

=> A lobby's success in influence-seeking depends on a combination of 3 factors:

- The lobby's incentive to offer a bribe depends on the amount "at stake".
- The ability to offer a bribe depends on the coordination costs.
- The government's corruptibility reflects its willingness to sell policy favors.

Differentiating (12) yields:

Prediction 1: Greater corruptibility reduces the stringency of energy policy.

$$\frac{\partial\alpha}{\partial a}=\frac{\beta^S-f_\alpha}{\left(\frac{1}{1+\lambda^K}+a\right)f_{\alpha\alpha}}<0. \tag{13}$$

Prediction 2: Greater lobby group coordination costs cause energy policy to become more stringent.

$$\frac{\partial\alpha}{\partial\lambda^K}=\frac{1}{\left(1+\lambda^K\right)^2}\frac{\left(f_\alpha-lf_{l\alpha}\right)}{\left(\frac{1}{1+\lambda^K}+a\right)f_{\alpha\alpha}}<0. \tag{14}$$

$$\frac{\partial\alpha}{\partial\lambda^W}=\frac{1}{\left(1+\lambda^W\right)^2}\frac{lf_{l\alpha}}{\left(\frac{1}{1+\lambda^W}+a\right)f_{\alpha\alpha}}<0. \tag{15}$$

Prediction 3: In equilibrium, the effects on energy policy stringency of worker and capital owner coordination costs are inversely related.

EMPIRICAL ANALYSIS

- Panel data from 11 sectors in 14 OECD countries for 1982-97.
- GLS, sector-specific fixed effects.
- Dependent variable: Energy units/value added.
- Capital owner lobby group size = sector's share of total value added.
- Worker lobby group size = sector's share of total employment.
- Corruptibility = Transparency International index.

EMPIRICAL RESULTS	(1) All Sectors	(2) Energy Intensive	(3) Energy Extensive	(4) Excl. Italy 1992-96
CORRUPT	2.6***	30***	2.5***	84***
VALUEADDED%	-4.4***	-322***	-3.8***	-106***
VALUEADDED%^{2}	0	57***	-0.01*	0.4
EMPLOYMENT%	3.4***	359***	2.9***	79***
EMPLOYMENT%^{2}	-0.02***	-98***	-0.01***	-0.3
CORRUPT * VALUEADDED%	0.4***	13***	0.4***	17***
CORRUPT * EMPLOYMENT%	-0.5***	-21***	-0.6***	-22***
Controls				
Observations	1506	581	912	321

Adj. R^2 = 0.99

Figure 1. Energy Intensity and Corruptibility

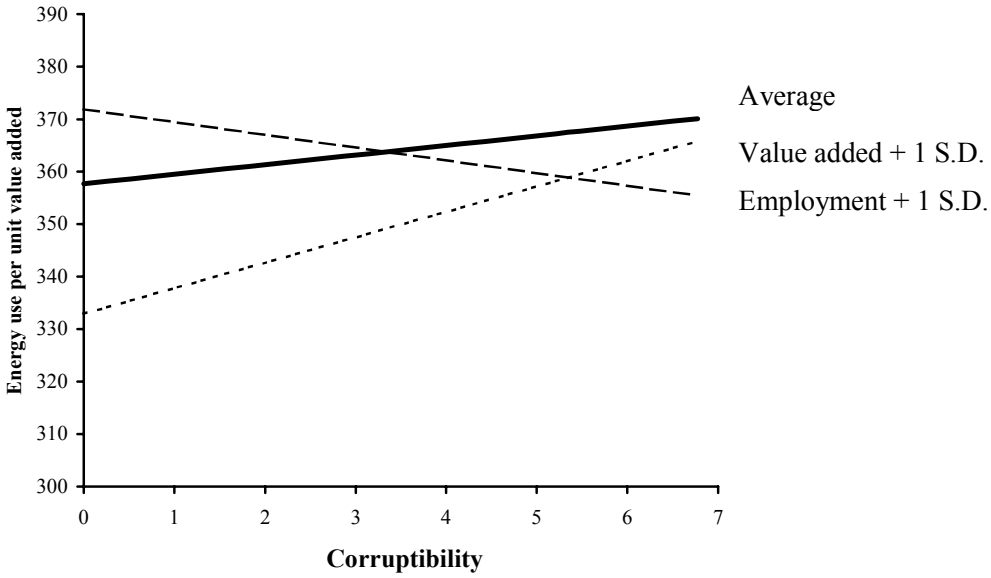


Figure 4. Energy Intensity and Corruptibility: Energy Intensive Sectors

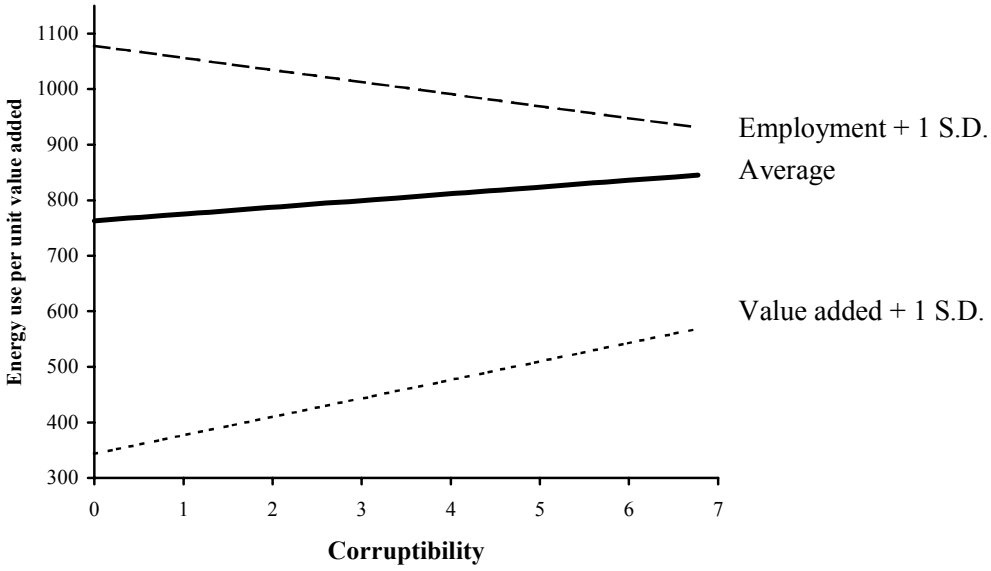
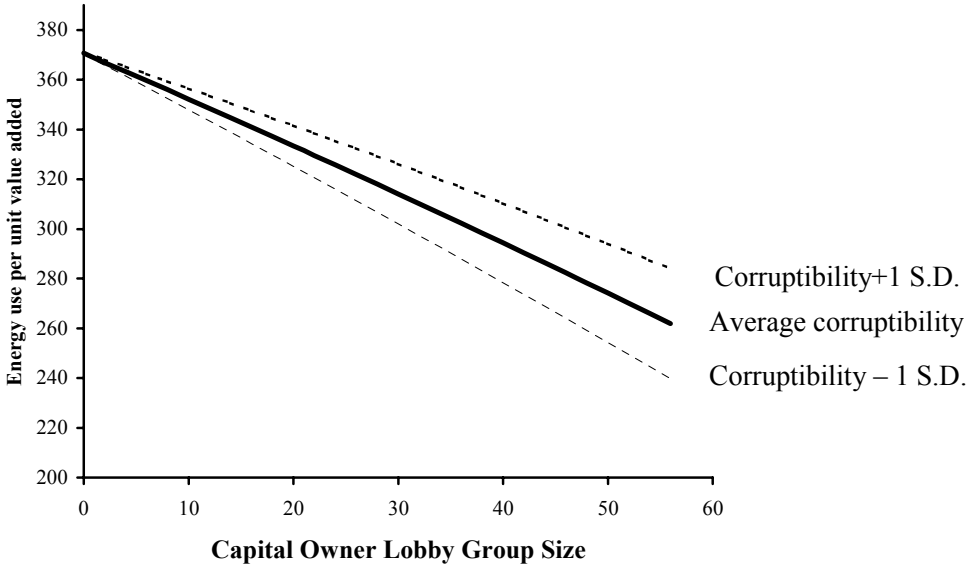
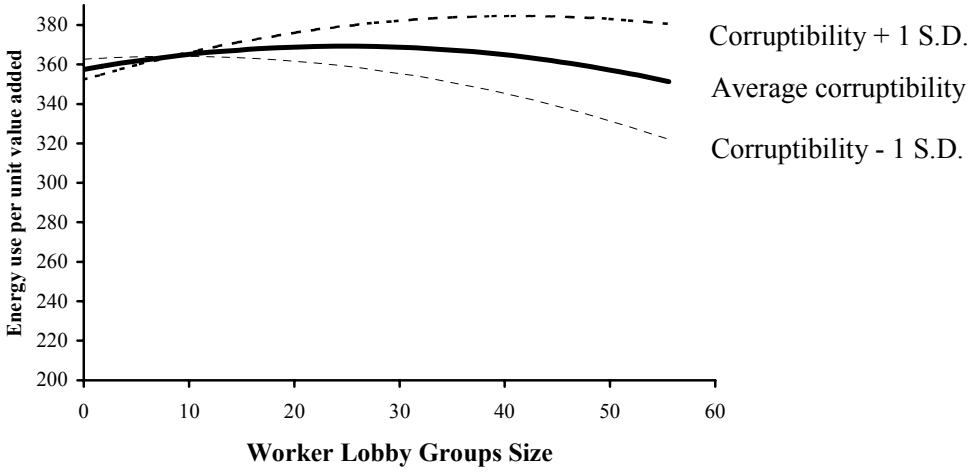


Figure 2. Energy Intensity, Capital Owner Lobby Group Size, and Corruptibility



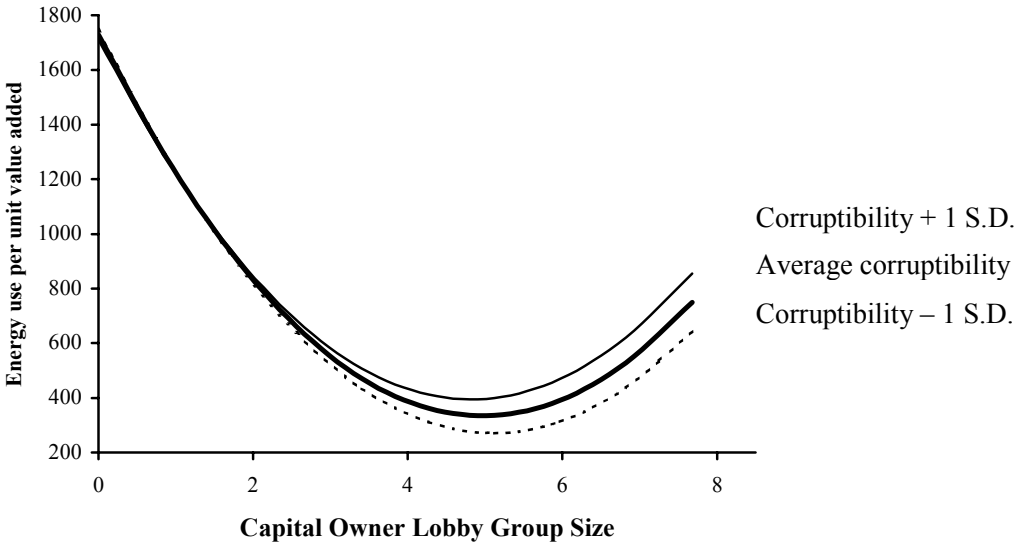
Notes: Capital owner lobby group size is measured by the sector's share of total value added (%).

Figure 3. Energy Intensity, Worker Lobby Group Size, and Corruptibility



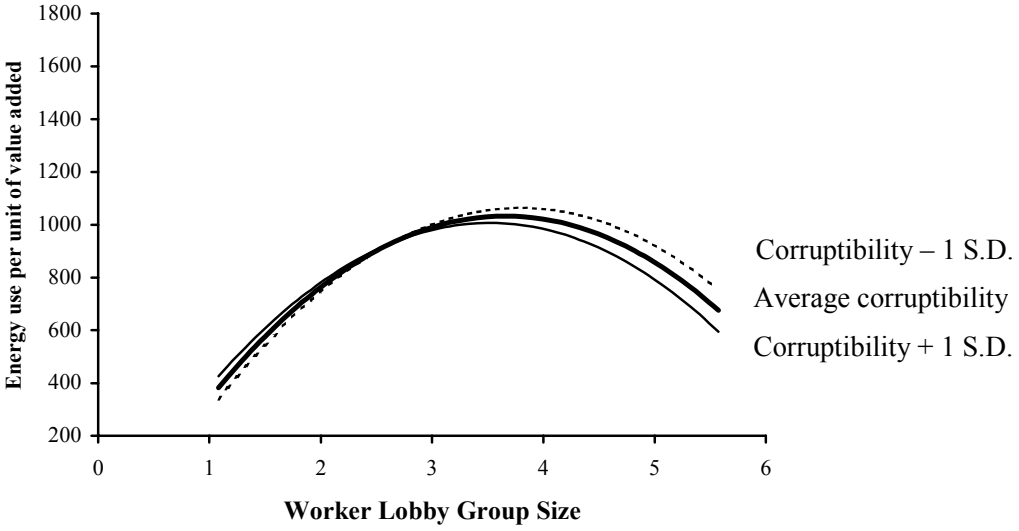
Notes: Worker lobby group size is measured by the sector's share of total employment (%).

Figure 5. Energy Intensity, Capital Owner Lobby Group Size, and Corruptibility: Energy Intensive Sectors



Notes: Capital owner lobby group size is measured by the sector's share of Value Added (%).

Figure 6. Energy Intensity Worker Lobby Group Size, and Corruptibility: Energy Intensive Sectors



Notes: Worker lobby group size is measured by the sector's share of total employment (%).

CONTRIBUTIONS

- Corruption has a negative effect on the stringency of energy policy in OECD countries.
- Industry sector size (coordination costs) has:
  i. a negative effect on capital owners' political influence;
  ii. a relatively small effect on workers' political influence.
- Workers' and capital owners' influence activities appear to be substitutes in energy intensive sectors.
- There is an interaction effect between corruption and lobby group size.