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The Persistence of Corruption and Regulatory Compliance Failures: Theory and Evidence

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Abstract

This paper examines the reasons why corruption and policy distortions tend to exhibit a high degree of persistence in certain regimes. We identify circumstances under which a firm seeks to evade regulations by (1) bribing of local inspectors, and (2) lobbying high-level government politicians to resist legal reforms designed to improve judicial efficiency and eliminate corruption. The analysis predicts that in politically unstable regimes, the institutions necessary to monitor and enforce compliance are weak. In such countries, corruption is more pervasive and the compliance with regulations is low. The empirical results support the predictions of the model.

JEL Classification Numbers: D72, D78, Q28

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Contents Page

I. INTRODUCTION

Corruption, once entrenched, is difficult to eliminate. For example, the World Bank (2002, p. ix) notes that "While much is known about the proximate causes and consequences of corruption, we know little about the economic, political, and historical factors underlying the *persistence* of corruption." Future reform programs designed to combat corruption may thus benefit from an improved understanding of why it tends to persist. In this paper, we propose a new theory for the persistence of corruption and policy distortions, and provide empirical support for our arguments. We address two interrelated questions. First, we examine the reasons why corruption and policy distortions may persist in certain regimes. Second, we explore the interaction between political instability and corruption at different levels of government. In particular, we study how a government (high-level politicians) captured by special interest groups influences the degree of administrative corruption (i.e., corrupt behavior by lower-level officials).[2] Although our argument is presented in terms of environmental policy, we believe our findings may have more general applicability, for example to tax policy.

The model has one polluting firm whose emissions are regulated through a pollution tax. We assume that in order to tax emissions, two levels of government are necessary: high-level government politicians formulate policies and lower-level bureaucrats administer these policies (through inspections). The semibenevolent government determines both the emission *tax rate* (see Grossman and Helpman, 1994) and the *capacity* of the regulatory system through which the tax is administered by the bureaucracy.[3] The true emission levels are assumed to be unobservable, so that environmental inspectors must monitor the firm's emission level. If the inspectors and politicians are assumed to be self interested, then the firm could reduce its emission tax burden by either (1) bribing the tax inspector, or (2) lobbying the government for both a lower tax rate and a more permissive regulatory regime.

To combat administrative corruption, the government may undertake institutional reforms to improve the efficiency of the judiciary and the level of regulatory compliance. However, it is

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[2] The literature on the control of corruption suggests that corruption in the bureaucracy can be eliminated, either by increasing penalties and/or raising the probability of conviction and/or paying efficiency wages, Mookherjee and Png, 1995, Basu and others (1992), Besley and McLaren (1993). See also Rasmusen and Ramseyer (1994), Myerson (1993), and Persson and others (2003) argue that corruption is reduced in electoral systems that promote the entry of new parties and politicians, and Persson and Tabellini (1999) and Persson and others (2000) find that institutional designs with more checks and balances reduce rent extraction. In a two-period model, Svensson (1998) finds that a low reelection probability causes the incumbent government to underinvest in the legal system in the first period. This reduces tax revenues collected in the second period.

[3] Stigler (1971), Peltzman (1976), and Becker (1983) are related seminal works on the political economy of policy determination. See also the literature on rent-seeking developed by Tullock (1967) and Krueger (1974). See also Rowley and others (1988) and Tollison and Congleton (1995). See, for example, Tullock (1996) and Ades and Di Tella (1999) on issues related to the corrupt administrations, and Congleton (1996) for several studies on the political economy of environmental policy.

assumed that such reforms are a gradual process and necessitate investment in legal and administrative infrastructure. Political instability is shown to create an environment in which corruption becomes more pervasive and tends to persist. Specifically, political instability has two reinforcing effects on corruption. First, with greater political uncertainty, the tax rate is more likely to be altered by a future government. However, since reform of the judiciary is a slow process, a *new* government that inherits an inefficient judicial system will be constrained in its ability to enforce compliance with its chosen policy. Political instability, therefore, generates an incentive for interest groups to lobby the incumbent government to underinvest in judicial infrastructure in order to impede future governments from levying higher taxes.

Second, when the incumbent government is confronted with a greater prospect of losing power, it (implicitly) places a relatively lower weight on the future welfare consequences of its policies and a greater weight on current political contributions. Political instability, therefore, makes the government more receptive to lobbying. It follows that corruption is harder to eradicate in politically unstable regimes and becomes self-sustaining.

An important implication of our finding is that regime instability will result in weaker and less effective judicial and administrative institutions. This increases the incentives to offer and accept bribes, and, as a consequence, the level of noncompliance with existing regulations increases. The effect of political instability on noncompliance is thus *indirect*, via its effect on the judicial system.

We test the predictions of the model using a cross-country dataset for the late 1990s. The empirical results provide support for the predictions emerging from the theoretical model. First, we find that increased political instability is associated with a greater judicial inefficiency (a lower level of the rule of law). Second, more inefficient judicial systems are found to be positively correlated with corruption. However, political instability has no direct effect on corruption. Instead, the effect is indirect via the efficiency level of the judicial system. Third, corruption raises the degree of noncompliance. Thus, we have identified a link between political instability and the degree of regulatory compliance that works via judicial efficiency and corruption. To our knowledge, this is a new contribution to the literature.

This paper is related to three distinct strands of the literature. First, in the corruption literature, the persistence and spread of corruption is explained by incorporating mechanisms through which dishonest behavior by one agent generates external effects that makes corruption by others more profitable. The incidence and persistence of corruption, therefore, increases with the number of corrupt agents in the economy (see, e.g., Cadot, 1987; Andvig and Moene, 1990; and Tirole, 1996).[4] Second, the paper is also related to the literature on

[4] Tirole (1996), employs an overlapping generations model in which younger generations inherit the bad reputations of their corrupt predecessors. Reputation effects thus induce corrupt behavior in succeeding generations. Andvig and Moene (1990), demonstrate that corruption tends to spread because the benefits of being corrupt increase with the number of corrupt officials. Similarly in Cadot's (1987), analysis, the payoffs

policy persistence, which argues that once economic policies are introduced, they are likely to stay.[5] Third, the literature on regulatory compliance has focused on whether a firm complies with existing regulations and on the effects of enforcement on a firm's compliance behavior (Magat and Viscusi, 1990; Deily and Grey, 1991; and Laplante and Rilstone, 1995). These studies neglect the role of bribery and other political economy aspects of enforcement and compliance.

The remainder of this paper is organized as follows. Section II outlines the basic model and describes the interaction between a polluting firm and the bureaucracy. Section III outlines the manner in which equilibrium policies are determined and derives the effects of political instability on policy outcomes. Section IV provides empirical evidence in support of the predictions of the model. Section V concludes the paper. All proofs are provided in Appendix I.

II. THE MODEL

The analysis is based on a (sequential) finite-period stage game. In the first stage, the firm lobby determines the political contribution offered to the incumbent government, which relates the size of the contribution to the attractiveness of the environmental and legal policies to be selected. The government then sets its optimal environmental and legal policies to maximize its payoff. In the second stage, the firm and environmental inspector interact to determine the optimum bribe and emission levels, given knowledge of the legal and environmental policy settings. At the end of this second stage, the incumbent is challenged by a rival and is ousted from power with some given probability.

Once the winner of the power struggle has been determined, the lobbying process resumes, with the firm offering the office holder political contributions and the new government announcing its policies. Given knowledge of these policies, the firm and environmental inspector once again determine the optimum bribe and emission levels. The model is solved by backward induction. We thus begin by describing the interaction between the firm and the inspector.[6]

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from corrupt behavior increase with the number of corrupt officials. See Bardhan (1997), for a recent survey on this and related issues.

[5] A common explanation is that lobby groups that benefit from a policy have an economic stake in their existence and will not give up the created transfer without a political fight. An alternative explanation by Coate and Morris (1999) proposes that interest groups will pursue strategies that increase their benefit from the policy and that an interest group's stake in the existence of an economic policy will consequently grow over time. The investments made by the interest groups increase the likelihood that the policy will remain in the future.

[6] The basic structure of the model is similar to that of Mookherjee and Png (1995).

The firm discharges pollution emissions denoted $e \subset R_+$, which result in environmental damage, $D(e)$ ($\partial D/\partial e>0$, $\partial^2 D/\partial e^2>0$). To control pollution levels, the government imposes an emissions tax, which is administered by a regulatory agency. The firm's emissions are thus inspected by an environmental officer who reports pollution levels, $\hat{e}$. The regulator levies an emission tax at rate, t, on the *reported* pollution emissions, $\hat{e}$.

The firm may seek to lower its tax burden by offering the inspector a bribe, B, to underreport emissions. If the inspector accepts a bribe, she reports emission levels of $\hat{e} < e$. The inspector is paid a fixed wage, w, by the regulator.[7] The regulatory authority knows that emissions may be underreported, and thus initiates audits of emission levels. With probability $\lambda \in (0, 1)$ the audit successfully detects the true pollution level and leads to a penalty being imposed on both the firm and the inspector, if taxes have been evaded. Thus λ may be viewed as an indicator of the efficiency of the auditing process and the judiciary. Let $v = (e - \hat{e}) \geq 0$ denote the level of underreporting of emissions (i.e., the level of noncompliance). An inspector found guilty of underreporting emissions is fined an amount $f^I(v, \theta) \geq 0$, while the firm is fined an amount $f^F(v, \theta) \geq 0$, where θ is the penalty rate. The fines for corruption are assumed to be increasing in the level of underreporting, v, and the penalty rate θ, at an increasing rate.[8]

Within this framework, the equilibrium level of emissions will depend on the tax burden and expected penalties for noncompliance. Let $e=e(t, \theta, \lambda)$, be the emission level when a bribe is paid and let $e^h=e(t)$ denote emissions under honest behavior when no bribe is paid. When a bribe is paid, the *gross* profits from emission level, e, are given by $G(e)=P(e)e$, where $P(e)$ is the price of the polluting good, with $\partial P / \partial e < 0$ and $\partial^2 P / \partial e^2 < 0$. The corresponding gross profits under honest behavior are defined by $G(e^h)=P(e^h)e^h$.

If the firm decides to bribe the inspector, an amount $B>0$ in return for reporting emissions $\hat{e}<e$, the expected gains to the firm from bribery are given by

$$\Psi^F = [G(e) - (B + t\hat{e} + \lambda f^f(v,\theta))] - [G(e^h) - te^h], \tag{1}$$

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[7] The results continue to hold if the inspector is assumed to receive some fraction (less than unity) of the tax revenue. However, the assumption of a fixed wage appears simple and realistic. It reflects the lack of performance-based remuneration in the public sector in most countries.

[8] Considering alternative penalty structures, while useful, would substantially expand the range of cases to be considered in the model. More generally, from the first-order condition in (4.1), it can be shown that the assumption of fines increasing in v is optimal in the sense that a nonincreasing penalty schedule results in lower reported emissions.

where $[G(e)-(B+t\hat{e}+\lambda f^F(v,\theta))]$ are the expected net profits when a bribe is paid and emissions are underreported.[9] $[G(e^h)-te^h]$ are the net profits when no bribe is paid. Similarly, the gains to an inspector from accepting a bribe B is given by

$$\Psi^I=[w+B-\lambda f^I(v,\theta)]-w, \tag{2}$$

where w is the fixed salary received by the inspector. A corrupt inspector receives a fixed wage w and a bribe B. With probability λ a successful prosecution leads to a fine $f^I(v,\theta)$ being imposed. Honest inspectors simply receive a payoff equal to the salary w.[10]

Given the policy parameters (i.e., the tax, penalty, and prosecution rate), actual and reported emissions will be chosen to maximize the joint expected payoffs from a bribe of B, i.e.,

$$\underset{\hat{e},e}{Max}\ J\equiv(\Psi^F+\Psi^I). \tag{3}$$

The first-order conditions are:

$$\frac{\partial J}{\partial \hat{e}}=-t+\lambda\frac{\partial f(v,\theta)}{\partial v}=0, \tag{4.1}$$

$$\frac{\partial J}{\partial e}=\frac{\partial G}{\partial e}-\lambda\frac{\partial f(v,\theta)}{\partial v}=0, \tag{4.2}$$

where $f(v,\theta)=f^I(v,\theta)+f^F(v,\theta)$ defines the total penalty for noncompliance. Equation (4.1) reveals that the equilibrium report satisfies the condition that the marginal cost of compliance, t, is equated to the marginal expected cost of noncompliance, $\lambda\partial f/\partial v$. By equation (4.2) the firm emits pollution up to the level where the marginal benefits from production, $\partial G/\partial e$, equal the expected marginal cost of a fine for underreporting emissions, $\lambda\partial f/\partial v$.

Once actual and reported emission levels have been decided upon, the equilibrium bribe is determined by a Nash bargain game between the firm and the inspector, where each party is assumed to have equal bargaining power. The bribe maximizes the following Nash bargain:

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[9] The expression for net profits under corruption may be interpreted as follows. With emissions e, the firm earns gross profits equal to $G(e)$. The remaining terms define expected costs. A bribe of B induces a report $\hat{e}$, so that the firm pays taxes equal to $t\hat{e}$. With probability λ a successful prosecution leads to a fine $f^F(v,\theta)$. The payoffs from honest behavior have a similar interpretation.

[10] For simplicity, we ignore the possibility of corruption further up the hierarchy (e.g., at the prosecution stage). As shown by Basu and others (1992), this alters the equilibrium parameters over which bribery occurs, but does not change the qualitative properties captured in the simpler model of equation (1).

$$\underset{B}{Max}(\Psi^F \Psi^I). \tag{5}$$

Solving for B, the equilibrium bribe can be shown to equal

$$B = \frac{1}{2}\left(G(e) - G(e^h) - t\hat{e} + te^h - \lambda(f^F(v,\theta) - f^I(v,\theta))\right) \tag{6}$$

Equation (6) shows that in equilibrium the firm and inspector equally share the net benefits from underreporting the true level of emissions.[11] Lemmas 1–5 in Appendix I summarizes the comparative static properties of the equilibrium. These show that higher taxes increase the payoffs from tax evasion and lead to lower levels of compliance (i.e., $\frac{dv}{dt} = \frac{de}{dt} - \frac{d\hat{e}}{dt} > 0$ lemma 2). On the other hand, increasing the expected penalties for tax evasion, either through higher fines or a higher prosecution rate, dilutes the gains from corruption. Since the payoffs from corruption are lower, the level of compliance is greater (i.e., $\frac{dv}{d\theta} = \frac{de}{d\theta} - \frac{d\hat{e}}{d\theta} < 0$, $\frac{dv}{d\lambda} = \frac{de}{d\lambda} - \frac{d\hat{e}}{d\lambda} < 0$ lemmas 3 and 4).

III. Policy Determination

Having described the interaction between the firm and inspector, we turn to the policy determination process. Recall that the government determines policy at two levels. It sets both (1) the emission tax rate, and (2) the regulatory system within which the tax is administered (i.e., expenditures on the legal infrastructure necessary to detect noncompliance and prosecute offenders).

We make the following assumptions about the timing of policy determination. The tax rate can be changed instantaneously. However, institutional reforms that improve the efficiency of the judicial and regulatory system necessitate investment in infrastructure and these take time to implement. The efficiency of the regulatory system is determined by the level of compliance with a given tax, which depends on the expected penalty for tax evasion.[12] To capture the notion that improving institutional efficiency is a slow process, we assume that a

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[11] Note that the equilibrium bribe is declining in the fine imposed on the firm, $f^F(v,\theta)$. Suppose prosecutions are costly, i.e., there are costs associated with increasing λ. Then for any arbitrarily chosen level of these costs, all corruption can be eliminated by imposing a sufficiently high fine on the bribe giver. In this paper, we provide an explanation for why there may be upper limits to the fine imposed. The existing literature typically assumes (with little or no justification) that corruption exists because there is some exogenously given upper bound on penalties. This paper thus extends the literature on corruption by endogenizing the penalty.

[12] The crucial factors are the prosecution rate, λ, and the fine, $f(v,\theta)$. See lemmas 3 and 4 in the *Appendix* for a proof.

change in enforcement expenditures, initiated in one period, exerts an impact on compliance in the following period. Thus, there is a one-period lag between changes in enforcement expenditures and the subsequent impact on compliance. The incumbent government's investment decision will have repercussions for future governments' policymaking. The costs of improving the efficiency of the regulatory system are defined by the enforcement cost function $C(\lambda, f(v,\theta))$, with $\partial C/\partial k>0$, $\partial^2 C/\partial k^2>0$, $k= \lambda,v,\theta$.[13]

Politicians are assumed to derive utility from the political contributions (or bribes) received from lobby groups, S, and aggregate social welfare, W (following Grossman and Helpman, 1994). The welfare term captures the government's concerns for the effects of its policies on the public. On the other hand, political contributions yield both personal and political benefits. Given knowledge of the potential political contribution offer, the government sets policies to maximize its payoffs.

The government's current period utility is given by a weighted sum of political contributions and social welfare:

$$U_\tau^i \equiv \left(S_\tau^i + \alpha^i W_\tau^i\right), \tag{7}$$

where superscript i denotes terms relating to the incumbent government, S_τ^i is the political contributions received by i in period τ, α^i is the weight given to social welfare, W_τ^i, when i is in office. Aggregate welfare in period τ is given by the sum of utility of all agents in the model:[14]

$$W_\tau = \int_0^e P(e_\tau)de - D(e_\tau) - C_\tau(\lambda_{\tau,\tau+1}, f(v_{\tau+1}, \theta_{\tau,\tau+1})), \tag{8}$$

where subscripts denote time periods. The second time subscript on λ_τ and θ_τ denotes that the choice of these variables in period τ takes effect in τ+1.[15] The net present value of welfare over T periods is thus $\sum_{\tau=1}^{T} \delta^\tau W_\tau$, where δ is the discount factor.

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[13] Existing models of corruption implicitly assume that enforcing higher penalties is costless. This assumption contradicts a growing legal literature that examines the costs of enforcing alternative penalties. These studies suggest that the costs of administering fines arise from the need to invest in a fine collection infrastructure and to counter the greater propensity to breach penalties as the fine increases, Shapiro (1988).

[14] Welfare is given by the usual utilitarian welfare function and is the sum of consumer surplus, profits, pollution damage, and the costs of enforcing compliance. The enforcement parameter in period τ depends on enforcement expenditures in (τ-1). Furthermore, taxes and the inspectors' wages cancel out since taxes paid by firms are received by the government, and wages paid by the government are received by the inspector.

[15] For notational brevity these are ignored when not required.

We incorporate regime instability into the analysis by allowing for the possibility that the incumbent government is challenged by a rival, and could loose power in any future period. With given probability ρ, the incumbent i wins the political contest, and with probability $(1 - \rho)$, the rival j secures power. Once the power struggle has been resolved, the lobbying process resumes. That is, the firm offers the new office holder political contributions, and the new government implements its optimal policy. Given the sequential nature of events, the firm and the incumbent government will take account of the political uncertainty when formulating their optimal responses. Thus, the discounted expected payoff to the incumbent, when in power, is

$$U^i \equiv \left(S_\tau^i + \alpha^i W_\tau^i\right) + \sum_{\tau=1}^{T} \delta^\tau \rho (S_{\tau+1}^i + \alpha^i W_{\tau+1}^i). \tag{9.1}$$

If the government looses office, its utility is normalized to zero.[16] Similarly, the payoff to rival j from winning power is given by:

$$U^j \equiv \sum_{\tau=1}^{T} \delta^\tau (1-\rho)(S_{\tau+1}^j + \alpha^j W_{\tau+1}^j). \tag{9.2}$$

To capture the notion that a future government could introduce policies that are less favorable to the firm, we assume that $\alpha^i > \alpha^j$. This implies that government j places a greater weight on welfare and will be less receptive to the lobbyists. Hence, ceteris paribus, it is expected to set a tax closer to the welfare maximizing level.[17] More importantly, with an exogenous probability of loosing power, all that is required for the results to hold is that $\alpha^i \neq \alpha^j$. This implies that at some time in the future the firm will eventually confront a new regime that will adopt policies that are less favorable to it than those of the existing government. This assumption also accords with the observation that rivals seeking power, whether by democratic or other means, usually declare an intention to correct the policy failings of previous regimes (Ward, 1989).[18] Finally, the analysis is restricted to the case of $T=2$, though the results extend to any number of finite periods.

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[16] It is, therefore, assumed that a party that loses office receives no political contributions. This assumption is adopted to capture in a simple way the notion that in highly unstable systems the identity and number of rivals may be unknown. In such situations, the firm will not be able to directly lobby potential challengers. Circumstances where the identity of future governments may be hard to determine include: unstable coalition governments, regimes prone to violent changes in government and internal party challenges of incumbent leaders.

[17] Formally, this can be determined by using condition MI below and totally differentiating to obtain $dt^m/d\alpha^m>0$, $m=i,j$.

[18] The assumption is also consistent with a view that over time and with economic development, government policy making may improve, possibly due to increased openness to trade (globalization) or political competition. In addition, if the prospect of gaining power depends upon public support the usual model of political competition would suggest that in a two party contest, a rival can maximize its support by announcing

To explore the effects of political uncertainty on policy outcomes, it is necessary to define the equilibrium policies of the incumbent government. From lemma 2 of Bernheim and Whinston (1986), the policy vector $(t_\tau^i, \lambda_\tau^i, \theta_\tau^i)$, defines an equilibrium of the political game if the following necessary conditions are satisfied,

$$\text{(MI)} \quad (t_\tau^i, \lambda_\tau^i, \theta_\tau^i) \in \text{Argmax } U^i;$$

$$\text{(MII)} \quad (t_\tau^i, \lambda_\tau^i, \theta_\tau^i) \in \text{Argmax } \Delta \equiv E(\Pi) + U^i;$$

where superscripts denote the policies of the party in power, $E(.)$ is the expectations operator, $E(\Pi) = \Pi_\tau^i + \delta(\rho\Pi_{\tau+1}^i + (1-\rho)\Pi_{\tau+1}^j)$ is expected profits of the firm, where $\Pi_\tau^i = G(e_\tau^i) - t_\tau^i \hat{e}_\tau^i - B_\tau^i - \lambda_{\tau-1}^i f^f(v_\tau^i, \theta_{\tau-1}^i) - S_\tau^i$ represents the firm's profits in the current period τ when the incumbent i is in power, $\Pi_{\tau+1}^i$, are profits in period τ+1 when the incumbent i retains power, and $\Pi_{\tau+1}^j$ are profits when the rival j wins power in τ+1.[19]

Since we are concerned with the effects of political uncertainty on current policies, attention is focused on the policies of the incumbent government in period τ. Maximizing MI and MII and performing the appropriate substitutions yield the equilibrium conditions,

$$\frac{\partial \Pi_\tau^i}{\partial t_\tau^i} = \frac{\partial S_\tau^{it}}{\partial t_\tau^i}, \tag{10.1}$$

$$\delta\rho \frac{\partial \Pi_{\tau+1}^i}{\partial \lambda_\tau^i} + \delta(1-\rho)\frac{\partial \Pi_{\tau+1}^j}{\partial \lambda_\tau^i} = \frac{\partial S_\tau^{i\lambda}}{\partial \lambda_\tau^i}, \tag{10.2}$$

$$\delta\rho \frac{\partial \Pi_{\tau+1}^i}{\partial \theta_\tau^i} + \delta(1-\rho)\frac{\partial \Pi_{\tau+1}^j}{\partial \theta_\tau^i} = \frac{\partial S_\tau^{i\theta}}{\partial \theta_\tau^i}, \tag{10.3}$$

where S^{iq} denotes political contributions linked to policy $q = t, \lambda, \theta$.

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policies closer to the welfare maximizing ideal. In the current model, this feature may be captured by assuming that ρ is a concave and increasing function of $(W^i - W^j)$. It can be shown that the main predictions of the model continue to hold in this case for values of α that are sufficiently low for at least one party. For simplicity, we ignore this issue which considerably complicates the proofs without providing further insights into the relationship between corruption and political instability.

[19] Condition MI asserts that the equilibrium policies must maximize the expected payoffs of each party, given the contribution offered. Condition MII requires that the policies must also maximize the joint expected payoffs of the firm and the government in power. Intuitively, if this condition is not satisfied, the firm will have an incentive to alter its strategy to induce the government to change some (or all) of its policies, and capture more of the surplus.

Equations (10.1–10.3) reveal that in a political equilibrium the firm pays contributions to influence each policy up to the point where the change in the firm's political contribution equals the effect of each policy on its marginal expected payoffs. Thus, as noted by Grossman and Helpman (1994), the political contributions are locally truthful and reflect the profitability of government policies.

Having defined the equilibrium of the model, we now investigate the effects of political instability on lobbying incentives, judicial efficiency (the prosecution rate, λ^i, and the penalty, θ^i), corruption, and compliance. All proofs are provided in Appendix I.

Result 1: *As political instability increases, the firm lobbies more intensively for lower expenditures on judicial enforcement.* (i.e., $\frac{dS_\tau^{i\theta}}{d\rho}<0$, $\frac{dS_\tau^{i\lambda}}{d\rho}<0$.)

As the probability of the rival gaining power increases, there is a greater likelihood that more stringent taxes will be introduced. Political instability, therefore, serves as a threat to firm profits. However, if a new government inherits an inefficient judicial system, it will be constrained in its ability to enforce compliance with its chosen tax policy. By lobbying the incumbent government to underinvest in enforcement infrastructure, future tax evasion through corruption is facilitated. Period τ lobbying against legal reforms serves as a device facilitating period τ+1 corruption.

We now investigate the impact of political instability on equilibrium regulatory and judicial efficiency.

Proposition 1: As political instability increases, judicial efficiency falls (i.e., $\frac{d\theta}{d\rho}<0$, $\frac{d\lambda}{d\rho}<0$).

The intuition for this result is as follows. A change in ρ has two effects. First, it alters the firm's lobbing incentives. As the probability of the rival party winning power increases, there is a greater likelihood that higher taxes will be introduced. Thus, the firm lobbies the current government more intensively to underinvest in enforcement infrastructure, so that future taxes can be evaded through bribery (Result 1). Second, political instability also changes the incumbent government's willingness to modify policies in response to political contributions. As the probability of loosing office increases, the incumbent government places less weight on the future welfare consequences of its policies. It is, therefore, more responsive to the lobby's current demands and lowers spending on enforcement infrastructure. Thus, as the prospect of remaining in power, ρ, declines, λ^i and θ^i fall. When policies are uncertain, an inefficient regulatory structure allows firms to evade future regulations through bribery. Thus, in unstable regimes, formal policy settings may bear little relation to the real effects of policies.

Propositions 2 and 3 (below) summarize the natural conclusion that the bribe and the political contribution, as well as the level of noncompliance, are all increasing with political uncertainty. This is a direct consequence of the firm's ability to influence the efficiency of the enforcement regime, so that future regulations can be evaded through bribery.

Proposition 2: *Ceteris paribus, the bribes paid to inspectors are higher in politically unstable regimes* (i.e., $\frac{dB}{d\rho}<0$). *The effect is indirect via the level of judicial efficiency.*

The intuition behind proposition 2 is that political instability leads to a decline in judicial efficiency, thus facilitating bribery. Specifically, greater political instability makes the government more responsive to the polluting sector's demands and leads to less investment in judicial infrastructure, thereby increasing the payoffs from bribery. Hence, the impact of political instability on downstream (bureaucratic) corruption is indirect and operates through its effect on judicial efficiency.

Proposition 3: *Ceteris paribus, the level of noncompliance is higher in politically unstable regimes* (i.e., $\frac{dv_{\tau}}{d\rho}<0$).

Again, political instability reduces compliance via its detrimental effect on judicial efficiency. A less efficient judicial system facilitates corruption at the (lower) level of the bureaucracy (inspectors). Thus, the effect of political instability on regulatory compliance is indirect.

Before we turn to our empirical work, we should note that the determinants of corruption are complex and varied, and hence the theoretical analysis abstracts from several issues that may be of significance.[20]

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[20] For instance, the model ignores the possibility of corruption within the judiciary and at various other stages in the bureaucracy. The problem of corruption in hierarchical monitoring regimes has been extensively analyzed in the literature. This work suggests that hierarchical corruption alters the parameters over which bribery occurs, but does not change the qualitative properties of the model (see, e.g., Basu and others (1992). Hence, for simplicity the complications arising from sequential corruption have been ignored. It is also assumed that when *not* in power, political rivals are not offered support by special interest groups. This assumption may be a reasonable approximation in highly unstable political systems where the identity or number of potential rivals is not known in advance. More generally, our results would hold if there is more intense lobbying of the government than potential challengers. This would be the rational strategy if there is uncertainty about the identity of rivals.

IV. Empirical Work

A. Specification

The theoretical model yields testable implications of the relationships between political instability, judicial efficiency, and environmental compliance. In this section, we test whether: (1) political instability reduces judicial efficiency (Proposition 1); (2) political instability indirectly increases corruption via its impact on judicial efficiency (Proposition 2); and (3) political instability reduces the level of compliance with regulations (Proposition 3).

Our objective is to test these using cross-country data. The test can be formulated as a four-equation model of political stability, judicial efficiency, corruption, and environmental compliance:

$$POLSTAB_i = \boldsymbol{x}'_i\boldsymbol{\alpha} + \alpha_1 JUDICIALEFF_i + \alpha_2 CORR_i + \varepsilon_i, \quad (11)$$

$$JUDICIALEFF_i = \boldsymbol{y}'_i\boldsymbol{\beta} + \beta_1 POLSTAB_i + \beta_2 CORR_i + \phi_i, \quad (12)$$

$$CORR_i = \boldsymbol{z}'_i\boldsymbol{\gamma} + \gamma_1 POLSTAB_i + \gamma_2 JUDICIALEFF_i + \varphi_i, \quad (13)$$

$$COMPLIANCE_i = \boldsymbol{a}'_i\boldsymbol{\delta} + \delta_1 POLSTAB_i + \delta_2 JUDICIALEFF_i + \delta_3 CORR_i + \xi_i, \quad (14)$$

where $POLSTAB_i$ is the level of political stability, $JUDICIALEFF_i$ is the degree of judicial efficiency or enforcement in country i, $CORR_i$ is the degree of corruption, $COMPLIANCE_i$ is the degree of environmental compliance, α_i, β_i, γ_i and δ_i are coefficient scalars, $\boldsymbol{\alpha}$, $\boldsymbol{\beta}$, $\boldsymbol{\gamma}$ and $\boldsymbol{\delta}$ are coefficient vectors, $\boldsymbol{x}_i$, $\boldsymbol{y}_i$, $\boldsymbol{z}_i$ and $\boldsymbol{a}_i$ are vectors of controls, and $\varepsilon, \phi, \varphi$ and ξ are zero-mean error terms. Given the simultaneity of the political stability, judicial efficiency, corruption, and compliance variables, we use an instrumental variable (2SLS) approach to estimate the equations.

B. Data

We begin with a brief description of the main variables used, focusing primarily on the dependent variables. Table 1 summarizes the descriptive statistics of the variables used in the empirical analysis, and Table 2 provides definitions and sources of the variables.

A measure of rule of law has recently been developed by Kaufmann and others (1999), for the years 1997–98. This is a composite index that includes several indicators measuring the extent to which economic agents abide by the rules of society. These include perceptions of the effectiveness and predictability of the judiciary, and the enforceability of contracts. Together, these indicators proxy for the degree to which a society enforces rules and laws as a basis for economic and social interactions. Thus, we believe this index (*judicial efficiency*) can be expected to reflect the degree to which laws are enforced. *Judicial efficiency* takes values from –2.5 to 2.5, where a higher value implies a greater level of enforcement.

We use the Corruption Perceptions Index (*corruption*) developed by Transparency International (see also Persson and others (2000)). It measures the "perceptions of the degree of corruption as seen by business people, risk analysts, and the general public." The index is computed as the simple average of a number of different surveys assessing each country's level of corruption. It ranges from 0 (perfectly clean) to 10 (highly corrupt). In our robustness check, we use The *Control of Corruption* Index developed by Kaufmann and others (1999). It measures the perceptions of corruption, and takes values from –2.5 to 2.5, where a higher value implies less corruption.

Finding an empirical measure of the level of compliance with environmental regulations is difficult, especially for developing countries. A good proxy for environmental compliance should offer reliable information on the extent of breaches of regulations within a country and also provide a high degree of comparability (consistency) between countries. A cross-country measure of compliance with international environmental agreements (*compliance*) was recently compiled by the World Economic Forum, 2002. This makes it possible to test our predictions. Similarly to Congleton, 1992, we, thus, use a measure of international environmental agreements to reflect local environmental compliance.

Perceived political stability is not directly observable. Our measure of political stability is the index recently developed by Kaufmann et al., 1999, for the years 1997–98. The *Political Stability* Index combines several indicators measuring perceptions of the likelihood that the government in power will be destabilized or overthrown. It takes values from –2.5 to 2.5, where a higher value represents greater political stability.

Regression Equations

The Political Stability Equation: Although there is to our knowledge no well-developed theory of the determinants of political stability, it is reasonable to assume that it is to a large extent a function of prevailing economic, political, and social factors. In addition to judicial efficiency and corruption, we express p*olitical stability* as a function of *GDP*, *democracy*, the degree of *racial tension*, *ethnolinguistic fractionalization*, and history of w*ar*, and *civil war*.

Table 1. Variable Definition and Data Sources

Variable	Definition and Source
Political stability	Measures perceptions of the likelihood that the government in power will be destabilized or overthrown. It takes values from –2.5 to 2.5, where a higher value represents greater political stability (Kaufmann and others (1999)).
Corruption	Corruption Perceptions Index published by Transparency International, describes the level of perceived corruption in the public sector using a poll of political risk indexes. Original scores range from 0 (completely corrupt) to 10 (clean). Average of CPI indexes for years 1997, 1998, and 1999. The index is inverted in scale by subtracting values from 10 to make the results more intuitive. Available at: www.transparency.de/documents/.
Control of corruption	Measures perceptions of corruption in a country, or more precisely, the use of public power for private gain. The index takes values from –2.5 to 2.5, where a higher value implies greater control over corruption (Kaufmann and others (1999)).
Judicial efficiency	A composite index that measure the extent to which agents have confidence and abide by the rules of society. Include perceptions of the incidence of both violent and nonviolent crime, effectiveness and predictability of judiciary, and the enforceability of contracts. It takes a value from –2.2 (least stringent) to 2.2 (most stringent) (Kaufmann and others (1999)).
Compliance	Compliance with international environmental agreements is a high priority. Score ranges from 1 strongly disagree to 7 strongly agree (World Economic Forum, (2002)).
GDP	GDP Per Capita (PPP) or Purchasing power adjusted GDP is obtained when GDP is converted to international dollars using purchasing power parity rates. An international dollar thus has the same purchasing power over GDP as the U.S. dollar in the United States (World Development Indicators (2000)).
Openness	Index of trade openness developed by the Heritage Foundation and the Wall Street Journal. It takes a value from 1 to 5. An economy earns a "5" if it has average tariff rate of less than or equal to four percentage points and/or has very few nontariff barriers, and "1" if the average tariff rate is greater than 19 percent and/or there are very high nontariff barriers that virtually prohibits imports. A greater index number indicates a greater degree of openness (O'Driscoll and others (2000).
Democracy dummy	Dummy for countries that have been Democratic in all 46 years between 1950 and 1995, and 0 otherwise. Criteria being: (1) the chief executive is elected; (2) at least one legislature is elected; (3) more than one party contests elections; (4) at least one turnover of power between parties in last three elections (Alvarez and others (1996)).
Democracy index	Index number for countries with varying degrees of democracy. 1 being the most democratic and 7 being the least democratic (Knack and Keefer, 1995).

Table 1. Variable Definition and Data Sources (concluded)

Variable	Definition and Source
Common law	Dummy for countries with company law or commercial code based on English common law (La Porta and others (1997)).
Civil war	Dummy for countries experiencing civil war. It takes values from 1 if the country had experienced a civil war and 0 otherwise (Knack and Keefer (1995)).
Civic freedom	Index that indicates the freedom enjoyed by the civil society. Take a value from 1 (most free) to 7 (least free) (Gwartney and others (2000)), Frasier Institute.
Ethnolinguistic Fractionalization	Index of breakdown of the ethnolinguistic groups within each country (Annet, 2001).
Education	Ratio of number of children of official school age (as defined by education system) enrolled in school to the number of children of official a school age in the population. (World Development Indicators (2001)).
Population density	Population Density in the country as measured by people per square kilo meters of land. (World Development Indicators (2001)).
Percent urban	Percent of urban population in a country (World Development Indicators (2001)).
War	Dummy variable for countries with recent history of war (Knack and Keefer (1995)).
Constitutional changes	Major Constitutional Changes in the last 3 decades: The number of basic alternations in a state's constitutional structure, the extreme case being the adoption of a new constitution that significantly alters the prerogatives of the various branches of government (Knack and Keefer (1995)).
Racial tension	Index of racial tension. It takes values from 1 (high tension) to 6 (low tension) (Knack and Keefer (1995)).
District magnitude	A measure of the average number of representatives elected in each district. The value ranges between 0 and 1, taking a value of 0 for a system with only single-member districts and close to 1 for a system with a single electoral district (Persson and others (2003)).
Federal	Presence of federal constitution (Treisman (2000)).
Party list	Party list measures the percentage of representatives elected on a party ticket. The value ranges between 0 and 1 (Persson and others (2003)).

Source: Authors' calculations.

Table 2. Summary Statistics

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Compliance	75	4.47	1.06	2.7	6.7
Political stability	149	-0.04	0.93	-2.6	1.7
Judicial efficiency	164	0.02	0.92	-2.2	2.0
Corruption	82	5.26	2.34	0.0	8.3
Control of corruption	153	0.01	0.91	-1.6	2.1
Log GDP	157	8.31	1.10	6.1	10.4
$(\text{Log GDP})^2$	157	70.22	18.30	37.5	108.6
Democracy dummy	95	0.22	0.42	0.0	1.0
Common law	95	0.31	0.46	0.0	1.0
Ethnolinguistic fractionalization	148	0.47	0.28	0.0	1.0
Religious fractionalization	148	0.38	0.26	0.0	0.8
Racial tension	106	3.63	1.65	0.0	6.0
Civil war	214	0.16	0.37	0.0	1.0
Education	128	64.52	24.94	10.0	100.0
Civic freedom	188	3.55	1.80	1.0	7.0
Political freedom	188	3.39	2.21	1.0	7.0
Percent urban	199	55.10	24.03	6.1	100.0
Population density	198	246.78	1,251.88	0.2	16,410.0
Openness	150	2.71	1.21	1.0	5.0
Federal	95	0.18	0.39	0.0	1.0
Constitutional changes	144	0.11	0.32	0.0	1.0
Party list	82	0.62	0.89	0.0	7.5
District magnitude	83	0.56	0.39	0.0	1.0

Source: Authors' calculations.

The Judicial Efficiency Equation: Proposition 1 is tested by including *political stability* in the *judicial efficiency* regression. *Corruption* is included in this equation since lower corruption is expected to raise judicial efficiency. In addition, *Log GDP* and its quadratic are used as proxies for economic development. The historically greater protection of property rights embodied in common law systems has been hypothesized to improve judicial efficiency (Treisman (2000)). We use *common law* as a dummy for the prevailing legal system (see La Porta and others (1997). We also hypothesize that judicial efficiency is influenced by the frequency of changes in the legal system. *Constitutional changes* measures the number of major changes in the constitution occurring over three decades. Structural differences across countries are proxied by *democracy dummy*, *political freedom*, and trade openness (*openness*).

The Corruption Equation: We divide the determinants of corruption into three categories: (1) economic factors, (2) social structure, and (3) political, legal, and institutional factors. A prevalent view is that corruption emerges from the presence of potential rents (Rose-Ackerman, 1997, and Tanzi, 1998). Greater trade openness (*openness*) may be expected to depress rents and lower corruption (Ades and Di Tella, 1999). *Log GDP* controls for an expected reduction in the level of corruption as development proceeds. A recent literature argues that democracy (*democracy dummy*) fosters lower levels of corruption (Treisman, 2000). Persson et al., 2003, argue that the size of electoral districts (*district magnitude*) influences the degree of political corruption by creating barriers to entry, and the degree to which party lists are used in elections (*party list*) has an impact on the degree of political competition and thus corruption. A federal structure may be more conducive to corruption, according to Treisman, 2000, and we employ a dummy for federal structures (*federation*).

The Compliance Equation: The literature on the determinants of compliance with regulations is substantial. However, it has focused on whether a firm complies with existing regulations in a given period, and on the effects of enforcement on a firm's compliance behavior (Magat and Viscusi, 1990; Deily and Grey, 1991; and Laplante and Rilstone, 1995). These studies neglect the role of rent-seeking behavior and other political economy aspects of enforcement and compliance. Our theory predicts that the level of compliance with regulations will be greater in politically stable countries, but the effect is only indirect (proposition 3), via lower corruption (which in turn is determined by the level of judicial efficiency).

To control for structural differences as economic development progresses, we include *Log GDP* and (*Log GDP*).[2] Additional factors not discussed in our theory that may influence the level of compliance with environmental agreements include *urban* and *population density*, which capture the level of exposure to pollution damage. Both variables will have a positive sign if greater exposure leads to greater political pressure for compliance. *Civic freedom* and *education* capture informal regulatory pressures on compliance (see Pargal and Wheeler, 1996, and Pargal and Mani, 2000).

C. Results

The estimation results of the four equations are presented in Tables 3–5. The empirical evidence lends support to the theory and the estimates appear robust under alternate specifications of instrumental variables. For all models presented in Tables 3–5, we can reject the null hypothesis of joint insignificance of the regression coefficients at the 5 percent level, based on the F-statistic.

We start by discussing the OLS regressions for political stability, judicial efficiency, and corruption equations, presented in Table 3. To investigate the robustness of our findings, we estimate a number of extensions of the baseline model using alternative specifications.

First, we find that *Political Stability* is strongly determined by *judicial efficiency*. A strong judicial framework increases political stability. *Civil war* increases instability, which is also

the case for *racial tension* (higher value implies greater level of racial tension). Neither *corruption*, nor *Log GDP* appears to have an impact on regime stability, however (see also the first-stage regressions in Table 5).

Second, *political stability* is positive and significant in the *judicial efficiency* equation, indicating greater levels of judicial efficiency in politically stable regimes. This lends support to our argument that political stability plays a significant role in determining judicial efficiency. *Corruption* is significant in both specifications, whereas *Log GDP*, *(Log GDP)*^{2}, *democracy dummy*, *political freedom*, *common law*, *constitutional changes*, and *openness* are all insignificant.

Third, *judicial efficiency* has the predicted positive sign in the *corruption* equation, and is significant in both models. This supports our prediction that strengthening the legal and regulatory framework reduces opportunities for corruption and rent-seeking. *Political stability* is insignificant in the *corruption* equation, consistent with the mechanisms outlined in the model. Thus, political stability has no direct effect on the level of corruption. Instead, greater political instability induces greater lobbying for a weak judicial system, which in turn leads to greater corruption.

Consistent with the literature, the presence of democracy (*democracy dummy*) appears to significantly curtail rent-seeking behavior, as does a federal system of government (*federal*). On the other hand, *Log GDP*, *(Log GDP)*^{2}, *openness*, *party list*, and *district magnitude* are insignificant at conventional levels.

In sum, it appears that we have found evidence that the effect of political instability on corruption is indirect, and operates via the level of judicial efficiency. Political stability has no direct effect on corruption, once judicial efficiency is controlled for.[21]

Turning to the *Compliance* equation in Table 4, we report both the OLS and 2SLS results, but to conserve space we restrict our discussion to the 2SLS estimates.[22] As predicted by the theory, *Political stability* is insignificant, but *corruption* is significant. In politically stable regimes, *Judicial efficiency* is greater and *corruption* is lower. The latter effect increases the degree of *compliance* with regulations. Thus, the effect of political instability on regulatory compliance occurs via (1) judicial efficiency, which in turn affects (2) corruption. There is no direct effect of political instability on compliance.

Judicial efficiency is insignificant, as predicted by our theory. Among the control variables, only *education* is significant. This may reflect that the level of knowledge is important for the

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[21] Note that the analysis does not imply that the absence of political instability would lead to honest governance. Instead, the theoretical and empirical results suggest that political instability induces institutional structures that are *more* conducive to corruption. Hence, ceteris paribus, corruption levels will be higher in politically unstable regimes.

[22] This model has a fewer number of observations owing to the number of countries for which the dependent variable was available.

political pressure for regulatory compliance on environmental issues. Finally, Table 4 reports the first stage regressions.

V. Conclusion

This paper has provided a new explanation for the persistence of corruption. If interest groups can evade regulations through bribery of lower-level bureaucrats, they will, in turn, also lobby higher-level government politicians to resist reforms of the judicial system designed to eliminate corruption. The paper shows that political instability intensifies such lobbying. The analysis predicts that weak institutional structures will be more pervasive in unstable political systems, which, in turn, creates a fertile environment for lower-level bureaucratic corruption. Thus, the effect of political stability on corruption is not direct, but occurs *indirectly* via its effect on institutional quality and the degree of judicial efficiency. In turn, corruption reduces the level of compliance with regulations.

We test the central predictions of the model on cross-sectional data from both the developed and developing world. In general, the empirical results provide considerable support for the theoretical predictions. Political instability appears to create institutional structures under which corruption is more pervasive and harder to eradicate. Political instability thus creates an environment in which corruption *persists*. Political instability also leads to lower levels of compliance with existing regulations, owing to its indirect effect on the legal system and on corruption.

Table 3. Political Stability, Judicial Efficiency, and Corruption Equations

(OLS regressions)

Variables	Political Stability		Judicial Efficiency		Corruption	
Political stability	...	...	0.43	0.44	0.03	0.04
	...	...	(5.3)***	(5.0)***	(0.1)	(0.2)
Judicial efficiency	0.58	0.57	...	...	-1.3	-1.2
	(4.8)***	(4.5)***	...	...	(4.3)***	(4.3)***
Corruption	-0.01	-0.01	-0.17	-0.16	...	...
	(0.4)	(0.4)	(4.7)***	(4.8)***	...	...
Log GDP	-0.71	-0.34	-0.13	-0.03	2.92	3.14
	(0.9)	(0.5)	(0.2)	(0.1)	(1.4)	(1.5)
$(\text{Log GDP})^2$	0.04	0.02	0.01	0.01	-0.20	-0.22
	(0.9)	(0.5)	(0.4)	(0.3)	(1.6)	(1.7)
Common law	...	...	0.10	0.10	...	...
	...	...	(1.0)	(1.0)	...	...
Democracy dummy	...	...	-0.04	...	-1.18	-1.10
	...	...	(0.3)	...	(2.5)**	(2.5)**
Political freedom	...	...	...	0.01	...	...
	...	...	...	(0.4)	...	...
Racial tension	0.09	0.10	...	...	...	...
	(1.7)*	(2.7)**	...	...	...	...
Ethnolinguistic	-0.13	...	...	...	...	...
Fractionalization	(0.4)	...	...	...	...	...
Religious	...	0.22	...	...	...	...
Fractionalization	...	(1.3)	...	...	...	...
Civil war	-0.33	-0.34	...	...	...	...
	(2.7)**	(2.7)**	...	...	...	...
Constitutional	...	...	0.11	0.10	...	...
Changes	...	...	(0.8)	(0.7)	...	...
Openness	...	...	-0.03	-0.02	-0.05	-0.04
	...	...	(0.6)	(0.3)	(0.4)	(0.4)
Federation	...	...	...	...	0.52	0.53
	...	...	...	...	(1.8)*	(1.8)*
Party list	...	...	...	...	-0.18	...
	...	...	...	...	(0.7)	...
District magnitude	...	...	...	...	...	-0.16
	...	...	...	...	...	(0.5)
Constant	3.01	1.10	0.99	0.43	-3.50	-4.20
	(1.0)	(0.4)	(0.3)	(0.2)	(0.4)	(0.5)
$(\text{Adjusted R})^2$	0.812	0.828	0.879	0.879	0.878	0.879
F-ratio	83.4	87.8	96.8	96.9	73.7	74.6
Observations	72	71	72	72	78	79

Note: t-statistics in parenthesis. *** (**) [*] denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 4. Compliance Equations

(OLS and 2SLS)

Variables	Compliance (OLS)			Compliance (2SLS)		
Political stability	0.30	0.31	0.34	0.62	0.66	0.63
	(1.9)*	(1.9)*	(2.3)**	(1.6)	(1.6)	(1.5)
Judicial efficiency	0.15	0.12	0.10	-0.10	-0.01	-0.19
	(0.7)	(0.6)	(0.5)	(0.1)	(0.01)	(0.2)
Corruption	-0.18	-0.18	...	-0.42	-0.42	...
	(2.5)**	(2.4)**	...	(2.6)**	(2.6)**	...
Control of corruption	...	...	0.51	...	...	1.65
	...	...	(2.5)**	...	...	(2.8)***
Log GDP	-2.78	-2.62	-3.14	0.58	0.76	3.03
	(1.7)*	(1.4)	(1.6)	(0.2)	(0.2)	(0.8)
$(\text{Log GDP})^2$	0.16	0.15	0.17	-0.04	-0.06	-0.21
	(1.7)*	(1.4)	(1.6)	(0.2)	(0.3)	(1.0)
Civic freedom	0.07	0.07	0.10	0.22	0.24	0.27
	(0.9)	(0.9)	(1.4)	(1.4)	(1.5)	(1.6)
Education	0.01	0.01	0.01	0.01	0.01	0.01
	(2.3)**	(2.4)**	(2.7)**	(2.7)**	(2.7)**	(2.9)***
Percent urban	0.01	...	...	-0.001	...	...
	(0.4)	...	...	(0.3)	...	...
Population density	...	-2.07e-06	-0.0003	...	0.0001	0.0001
	...	(0.1)	(1.2)	...	(0.3)	(0.2)
Constant	15.8	15.07	16.4	3.49	2.92	-8.0
	(2.2)**	(1.8)*	(1.9)*	(0.2)	(0.2)	(0.5)
$(\text{Adjusted R})^2$	0.838	0.837	0.826	0.788	0.788	0.797
F-ratio	46.3	42.4	45.7	25.6	23.7	25.8
Observations	58	58	61	51	51	51

Note: t-statistics in parenthesis.

*** (**) [*] denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 5. Political Stability, Judicial Efficiency, and Corruption Equations

(First Stage Regressions)

Variables	Political Stability		Judicial Efficiency		Corruption	
Log GDP	-1.80	-2.01	-1.70	-2.10	6.65	6.85
	(2.6)**	(2.6)**	(2.0)**	(2.2)**	(4.0)***	(4.1)***
(Log GDP)^2	0.13	0.13	0.14	0.16	-0.47	-0.48
	(3.0)***	(3.0)***	(2.7)**	(3.0)***	(4.4)***	(4.5)***
Education	0.001	0.003	0.001	-0.0001	-0.004	-0.005
	(0.4)	(0.9)	(0.2)	(0.03)	(0.5)	(0.6)
Civic freedom	-0.14	-0.14	-0.16	-0.22	0.35	0.33
	(1.6)	(1.6)	(2.1)**	(1.9)*	(2.4)**	(2.3)**
Percent urban	-0.005	-0.006	-0.007	-0.008	0.009	0.01
	(1.4)	(1.5)	(1.8)*	(2.0)**	(1.0)	(1.2)
Population density	0.0002	0.0002	-0.0002	-0.0001	0.001	0.001
	(0.7)	(0.9)	(0.6)	(0.4)	(2.4)**	(2.3)**
Common law	...	...	0.01	0.02	...	...
	...	...	(0.1)	(0.1)	...	...
Democracy dummy	...	...	0.19	...	-1.24	-1.20
	...	...	(1.1)	...	(2.4)**	(2.6)**
Ethnolinguistic	...	0.11	...	...	...	...
Fractionalization	...	(0.3)	...	...	...	...
Religious	0.28	...	...	...	...	...
Fractionalization	(1.0)	...	...	...	...	...
Civil war	-0.24	-0.24	...	...	...	...
	(1.5)	(1.5)	...	...	...	...
Racial tension	0.12	0.12	...	...	...	...
	(2.4)**	(2.0)**	...	...	...	...
Constitutional	...	...	0.17	0.17	...	...
Changes	...	...	(1.1)	(1.0)	...	...
Openness	...	...	0.15	0.14	0.17	0.20
	...	...	(1.7)*	(1.6)	(1.1)	(1.4)
Political freedom	...	...	...	0.05	...	...
	...	...	...	(0.4)	...	...
Federation	...	...	...	...	0.87	0.86
	...	...	...	...	(2.4)**	(2.3)**
Party list	...	...	...	...	0.24	...
	...	...	...	...	(0.7)	...
District magnitude	...	...	...	...	...	0.08
	...	...	...	...	...	(0.2)
Constant	6.41	7.16	5.58	6.95	-18.6	-19.2
	(2.1)**	(2.1)**	(1.5)	(1.8)*	(2.7)**	(2.7)**
(Adjusted R)^2	0.700	0.695	0.780	0.779	0.841	0.842
F-ratio	37.0	37.1	35.3	34.5	40.1	43.1
Observations	77	77	69	69	69	69

Note: t-statistics in parenthesis. *** (**) [*] denote statistical significance at the 1, 5, and 10 percent levels, respectively.

I. The Model

The following useful equilibrium properties are used in the paper, and illustrate certain important characteristics. Totally differentiating the system in equations (4.1) and (4.2):

$$\begin{bmatrix} J_{\hat{e}\hat{e}} & J_{\hat{e}e} \\ J_{e\hat{e}} & J_{ee} \end{bmatrix}\begin{bmatrix} d\hat{e} \\ de \end{bmatrix} = -\begin{bmatrix} J_{\hat{e}t} \\ 0 \end{bmatrix}dt - \begin{bmatrix} J_{\hat{e}\theta} \\ J_{e\theta} \end{bmatrix}d\theta - \begin{bmatrix} J_{\hat{e}\lambda} \\ J_{e\lambda} \end{bmatrix}d\lambda \tag{15}$$

where subscripts denote partial derivatives, and $J_{\hat{e}e} = \lambda\frac{\partial^2 f}{\partial v^2} = J_{e\hat{e}} > 0$, $J_{\hat{e}t} = -1 < 0$, $J_{\hat{e}\theta} = \lambda\frac{\partial^2 f}{\partial v \partial \theta} > 0$, $J_{e\theta} = -\lambda\frac{\partial^2 f}{\partial v \partial \theta} < 0$, $J_{\hat{e}\lambda} = \lambda\frac{\partial f}{\partial v} > 0$, $J_{e\lambda} = -\lambda\frac{\partial f}{\partial v} < 0$. To ensure that the second order conditions hold it is assumed that $J_{\hat{e}\hat{e}} < 0$, $J_{ee} < 0$ and that $|J_{e\hat{e}}| < |J_{\hat{e}\hat{e}}|, |J_{e\hat{e}}| < |J_{ee}|$. Let $\Delta = J_{ee}J_{\hat{e}\hat{e}} - J_{\hat{e}e}^2 > 0$ be the determinant of the 2 x 2 matrix in (15).

VI. Lemma 1: $\frac{d\hat{e}}{dt} = \frac{-J_{\hat{e}t}J_{ee}}{\Delta} < 0, \quad \frac{de}{dt} = \frac{J_{\hat{e}t}J_{\hat{e}e}}{\Delta} < 0.$

VII. Lemma 2: $\frac{dv}{dt} = \frac{de}{dt} - \frac{d\hat{e}}{dt} > 0$, since $|J_{e\hat{e}}| < |J_{ee}|$.

Lemma 2 reveals that, *ceteris paribus*, an exogenous increase in the tax rate increases the payoffs from tax evasion. Hence, compliance levels fall.

Lemma 3: $\frac{dv}{d\theta} = \frac{de}{d\theta} - \frac{d\hat{e}}{d\theta} < 0$, where $\frac{d\hat{e}}{d\theta} = -J_{\hat{e}\theta}\left(\frac{J_{\hat{e}\hat{e}} + J_{e\hat{e}}}{\Delta}\right) > 0, \quad \frac{de}{d\theta} = J_{\hat{e}\theta}\left(\frac{J_{\hat{e}\hat{e}} + J_{e\hat{e}}}{\Delta}\right) < 0.$

Lemma 4: $\frac{dv}{d\lambda} = \frac{de}{d\lambda} - \frac{d\hat{e}}{d\lambda} < 0$, *where* $\frac{d\hat{e}}{d\lambda} = -J_{\hat{e}\lambda}\left(\frac{J_{\hat{e}\hat{e}} + J_{e\hat{e}}}{\Delta}\right) > 0, \quad \frac{de}{d\lambda} = J_{\hat{e}\lambda}\left(\frac{J_{\hat{e}\hat{e}} + J_{e\hat{e}}}{\Delta}\right) < 0.$

Lemmas 3 and 4 summarize the result that an increase in the expected cost of a fine dilutes the gains from corruption. Since the payoffs from corruption are lower, there is greater compliance.

Lemma 5: Variations in the probability of the incumbent government loosing power, ρ, have no impact on the intensity of lobbying for lower taxes, i.e., $\frac{dS_\tau^{it}}{d\rho} > 0$.

Proof: In period τ, the firm's contributions to the incumbent government will be set to maximize expected payoffs:

$$E(\Pi) = \Pi_\tau^i + \delta(\rho\Pi_{\tau+1}^i + (1-\rho)\Pi_{\tau+1}^j), \tag{16}$$

with first-order conditions[23]

$$-\left(\frac{\hat{e}_\tau^i + e_\tau^h}{2}\right)\frac{\partial t_\tau^i}{\partial S_\tau^{it}} - 1 = 0, \tag{17}$$

$$-\delta\left(\rho\frac{f(v_{\tau+1}^i, \theta_{\tau+1}^i)}{2} + (1-\rho)\frac{f(v_{\tau+1}^j, \theta_\tau^i)}{2}\right)\frac{\partial \lambda_\tau^i}{\partial S_\tau^{i\lambda}} - 1 = 0, \tag{18}$$

$$-\delta\left(\frac{\rho\lambda_\tau^i}{2}\frac{\partial f(v_{\tau+1}^i, \theta_\tau^i)}{\partial \theta_\tau^i} + \frac{(1-\rho)\lambda_\tau^i}{2}\frac{\partial f(v_{\tau+1}^i, \theta_\tau^i)}{\partial \theta^{I.}}\right)\frac{\partial \theta_\tau^i}{\partial S_\tau^{i\theta}} - 1 = 0. \tag{19}$$

Equations (17–19) show that the firm pays contributions that are linked to the government's choice of each policy instrument.[24] Totally differentiate (17) and rearrange:
$\frac{dS_\tau^{it}}{d\rho} = -\frac{\partial^2 E(\Pi)/\partial S_\tau^{it}\partial\rho}{\partial^2 E(\Pi)/\partial S_\tau^{it^2}}$. Since $\partial^2 E(\Pi)/\partial S_\tau^{it}\partial\rho = 0$, then $\frac{dS_\tau^{it}}{d\rho} = 0$.

Proof of Result 1: (i) Totally differentiate (18) and rearrange:

$$\frac{dS_\tau^{i\lambda}}{d\rho} = -\frac{\partial^2 E(\Pi)/\partial S_\tau^{i\lambda}\partial\rho}{\partial^2 E(\Pi)/\partial S_\tau^{i\lambda^2}} \tag{20}$$

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[23] The first order conditions are further simplified using conditions (4.1) and (4.2).

[24] In particular, the increase in expected profits from greater lobbying equals the marginal cost of lobbying. An interior equilibrium requires that $\partial t_\tau^i / \partial S_\tau^{it} < 0$, $\partial \theta_\tau^i / \partial S_\tau^{i\theta} < 0$, $\partial \lambda_\tau^i / \partial S_\tau^{i\lambda} < 0$, i.e., lobbying will occur only if higher contributions induce more favorable policies in the form of lower taxes and less public investment in compliance. In what follows, this condition for an interior solution is assumed to hold.

In order to ensure that a unique maximum exists, it is assumed that $\partial^2 E(\Pi)/\partial S^{i\lambda 2}<0$. Moreover, differentiating (16) yields $\frac{\partial^2 E(\Pi)}{\partial S_\tau^{i\lambda}\partial p}=-\delta\left(\frac{f(v_{\tau+1}^i,\theta_\tau^i)-f(v_{\tau+1}^j,\theta_\tau^j)}{2}\right)\frac{\partial\lambda_\tau^i}{\partial S_\tau^{i\lambda}}<0$. The sign follows from the fact that for an interior solution of the lobbying equilibrium to exist it has been assumed that $\frac{\partial\lambda_\tau^i}{\partial S_\tau^{i\lambda}}<0$. By construction $t^i>t^j$. Thus by Lemma 2, $v^i<v^j$. Moreover, it is assumed that $\frac{\partial f(v,\theta)}{\partial v}>0$, hence it follows that $f(v_{\tau+1}^i,\theta_\tau^i)<f(v_{\tau+1}^j,\theta_\tau^j)$. Thus, $\frac{dS_\tau^{i\lambda}}{d\rho}<0$.

(ii) Totally differentiating (19) and rearranging yields:

$$\frac{dS_\tau^{i\theta}}{d\rho}=-\frac{\partial^2 E(\Pi)/\partial S_\tau^{i\theta}\partial\rho}{\partial^2 E(\Pi)/\partial S_\tau^{i\theta 2}}, \tag{21}$$

where it is assumed that $\partial^2 E(\Pi)/\partial S_\tau^{\theta 2}<0$ to ensure that a unique maximum exists. Differentiating (16) yields $\frac{\partial^2 E(\Pi)}{\partial S^\theta\partial p}=\left(\frac{-\lambda_\tau^i(\partial f(v_{\tau+1}^i,\theta_\tau^i)/\partial\theta_\tau^i)+\lambda_\tau^i\partial f(v_{\tau+1}^j,\theta_\tau^i)/\partial\theta_\tau^i}{2}\right)\frac{\partial\theta_\tau^i}{\partial S_\tau^{i\theta}}\delta<0$. The sign follows from the fact that for an interior solution of the lobbying equilibrium to exist it has been assumed that $\frac{\partial\theta_\tau^i}{\partial S_\tau^{i\theta}}<0$. Moreover, $f(v_{\tau+1}^i,\theta_\tau^i)<f(v_{\tau+1}^j,\theta_\tau^j)$, and by assumption, $\frac{\partial f(v,\theta)}{\partial\theta}>0$, and $\frac{\partial^2 f(v,\theta)}{\partial\theta^2}>0$. Thus, $\frac{dS_\tau^{i\theta}}{d\rho}<0$.

Proof of Proposition 1: (i) Condition MI and (10.2) imply that the equilibrium prosecution rate λ satisfies

$$\frac{\partial U^i}{\partial\lambda_\tau^i}=\frac{\partial E(\Pi)}{\partial\lambda_\tau^i}+\alpha^i\frac{\partial W}{\partial\lambda_\tau^i}=0. \tag{22}$$

Thus, totally differentiating (22) and rearranging yields $\frac{d\lambda_\tau^i}{d\rho}=-\frac{\partial^2 U^i/(\partial\lambda_\tau^i\partial\rho)}{\partial^2 U^i/\partial\lambda_\tau^{i2}}$. To ensure that a unique maximum exists, it is assumed that $\partial^2 U^i/\partial\lambda_\tau^{i^2}<0$. Moreover, using (16) and the definition of *W*, differentiating:

$$\frac{\partial^2 U^i}{\partial \lambda_\tau^i \partial \rho} = \frac{-\delta\left((f(v_{\tau+1}^i, \theta_\tau^i) - f(v_{\tau+1}^j, \theta_\tau^i)\right)}{2} + \delta\alpha^i \frac{\partial e_{\tau+1}}{\partial \lambda_\tau^i}\left(P(e_{\tau+1}) - \frac{\partial D(e_{\tau+1})}{\partial e_{\tau+1}}\right) > 0 .$$

The sign follows from the fact that $f(v_{\tau+1}^i, \theta_\tau^i) - f(v_{\tau+1}^j, \theta_\tau^i) < 0$, and since the tax rate in a lobbying equilibrium is lower than the welfare maximizing tax, then $\left(P(e_{\tau+1}) - \frac{\partial D(e_{\tau+1})}{\partial e_{\tau+1}}\right) < 0$. From lemma 4, $\frac{\partial e_{\tau+1}}{\partial \lambda_\tau^i} < 0$. Hence, $\frac{d\lambda_\tau^i}{d\rho} > 0$. (ii) Similarly, by MI and (10.2) $\frac{\partial U^i}{\partial \theta_\tau^i} = \frac{\partial E(\Pi)}{\partial \theta_\tau^i} + \alpha^i \frac{\partial W}{\partial \theta_\tau^i} = 0$. Thus, totally differentiating and rearranging:

$\frac{d\theta_\tau^i}{d\rho} = -\frac{\partial^2 U^i / (\partial \theta_\tau^i \partial \rho)}{\partial^2 U^i / \partial \theta_\tau^{i^2}}$, where $\partial^2 U^i / \partial \theta_\tau^{i^2} < 0$, and differentiating yields

$$\frac{\partial^2 U^i}{\partial \theta_\tau^i \partial \rho} = \frac{-\delta\lambda_\tau^i\left((\partial f(v_{\tau+1}^i, \theta_\tau^i)/\partial \theta_\tau^i - \partial f(v_{\tau+1}^j, \theta_\tau^i)/\partial \theta_\tau^i\right)}{2} + \delta\alpha^i \frac{\partial e_{\tau+1}}{\partial \theta_\tau^i}\left(P(e_{\tau+1}) - \frac{\partial D(e_{\tau+1})}{\partial e_{\tau+1}}\right) > 0 .$$

The sign follows from identical reasoning to that outlined above. Thus, $\frac{d\theta_\tau^i}{d\rho} > 0$.

Proof of Proposition 2: For notational brevity subscripts are ignored. Consider first the effect of changes in ρ on the equilibrium bribe B in Eqn. (6). From lemma 5, we know that $dt/d\rho = 0$, and by Proposition 1 we have that $d\lambda/d\rho > 0$, and $d\theta/d\rho > 0$. Furthermore, changes in λ and θ have a direct effect on B and an indirect effect through e and $\hat{e}$. Thus,

$$\frac{dB}{d\rho} = \frac{d\lambda}{d\rho}\left(\frac{de}{d\lambda}\frac{dB}{de} + \frac{d\hat{e}}{d\lambda}\frac{dB}{d\hat{e}} + \frac{\partial B}{\partial \lambda}\right) + \frac{d\theta}{d\rho}\left(\frac{de}{d\theta}\frac{dB}{de} + \frac{d\hat{e}}{d\theta}\frac{dB}{d\hat{e}} + \frac{\partial B}{\partial \theta}\right). \qquad (23)$$

Expanding terms, using the definition of B in Eqn. (6), yields

$$\frac{dB}{d\rho} = \frac{d\lambda}{d\rho}\left(\frac{de}{d\lambda}\lambda\frac{\partial f^I}{\partial v} + \frac{d\hat{e}}{d\lambda}\lambda\frac{\partial f^I}{\partial v} - (f^F - f^I)\right) + \frac{d\theta}{d\rho}\left(\frac{de}{d\theta}\lambda\frac{\partial f^I}{\partial v} + \frac{d\hat{e}}{d\theta}\lambda\frac{\partial f^I}{\partial v} - \lambda\left(\frac{\partial f^F}{\partial \theta} - \frac{\partial f^I}{\partial \theta}\right)\right) < 0 \qquad (24)$$

The sign follows from $\frac{d\lambda}{d\rho} > 0, \frac{de}{d\lambda} < 0, \frac{\partial f^j}{\partial v} > 0, \frac{d\hat{e}}{d\lambda} > 0, f^F > f^I, \frac{d\theta}{d\rho} > 0, \frac{de}{d\theta} < 0, \frac{d\hat{e}}{d\theta} > 0$.

Proof of Proposition 3: Consider next the effect of ρ on the level of noncompliance (v). From lemma 5 we know that $dt/d\rho=0$, and by Proposition 1 we have that $d\lambda/d\rho>0$ and $d\theta/d\rho>0$. Thus, $\frac{dv}{d\rho}=\frac{dv}{d\lambda}\frac{d\lambda}{d\rho}+\frac{dv}{d\theta}\frac{d\theta}{d\rho}<0$. The sign of this expression follows from the fact that $\frac{dv}{d\lambda}<0,\frac{d\lambda}{d\rho}>0,\frac{dv}{d\theta}<0,\frac{d\theta}{d\rho}>0$.

References

Ades, A., and R. Di Tella, 1999, "Rents, Competition and Corruption," *American Economic Review,* Vol. 89, pp. 982–93.

Alesina, A., and G. Tabellini, 1990, "External Debt, Capital Flight and Political Risk," *Journal of International Economics,* Vol. 27, pp. 199–209.

Andvig, J. C., and K.O. Moene, 1990, "How Corruption May Corrupt," *Journal of Economic Behavior and Organization*, Vol. 13, pp. 63–76.

Annett, A., 2001, "Social Fractionalization, Political Instability, and the Size of Government," *IMF Staff Papers*, International Monetary Fund, Vol. 3 (December) pp. 561–92.

Bardhan, P., 1997, "Corruption and Development: A Review of Issues," *Journal of Economic Literature*, Vol. 35, pp. 1320–46.

Basu, K., S. Bhattacharya, and A. Mishra, 1992, "Notes on Bribery and the Control of Corruption," *Journal of Public Economics*, Vol. 48, pp. 349–59.

Becker, G.S., 1983, "A Theory of Competition Among Pressure Groups for Political Influence," *Quarterly Journal of Economics,* Vol. 98, pp. 371–400.

Bernheim, B.D., and M.D. Whinston, 1986, "Menu Auctions, Resource Allocation, and Economic Influence," *Quarterly Journal of Economics*, Vol. 101, pp. 1–31.

Besley, T., and J. McLaren, 1993, "Taxes and Bribery: The role of wage incentives," *Economic Journal*, Vol. 103, pp.119–41.

Cadot, O., 1987, "Corruption as a Gamble," *Journal of Public Economics*, Vol. 33, pp. 223–44.

Coate, S., and S. Morris, 1999, "Policy Persistence," *American Economic Review,* Vol. 89 (5), pp.1327–36.

Congleton, R.D, 1992, "Political Institutions and Pollution Control," *Review of Economics and Statistics* 74(3), pp. 412–21.

———, ed., 1996, *The Political Economy of Environmental Protection*, (Ann Arbor: University of Michigan Press).

Golden, M.A., and E.C.C. Chang, 2001, "Competitive Corruption: Factional Conflict and Political Malfeasance in Postwar Italy Christian Democracy," *World Politics* 53, pp. 588–622.

Gray, W.B., and M.E. Deily, 1996, "Compliance and Enforcement: Air Pollution Regulation in the U.S. Steel Industry," *Journal of Environmental Economics and Management*, Vol. 31, pp. 96–111.

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

Kaufmann, D., A. Kraay, and P. Zoido-Lobatón, 1999, "Aggregating Governance Indicators," Policy Research Working Paper # 2195 (Washington: World Bank).

Knack, S., and P. Keefer, 1995, "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures," *Economics and Politics* 7 (3), pp. 207–27.

Krueger, A.O., 1974, "The Political Economy of the Rent-Seeking Society," *American Economic Review* 64, pp. 291–303.

Laplante, B., and P. Rilstone, 1996, "Environmental Inspections and Emissions of the Pulp and Paper Industry in Quebec," *Journal of Environmental Economics and Management*, 31, pp. 19–36.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1997, "Legal Determinants of External Finance," *Journal of Finance* 52 (3), pp. 1131–50.

Magat, W., and W.K. Viscusi, 1990, "Effectiveness of the EPA's Regulatory Enforcement: The Case of Industrial Effluent Standards," *Journal of Law and Economics* 33, pp. 331–60.

Mookherjee, D., and I.P.L. Png, 1995, "Corruptible Law Enforcers: How Should They be Compensated," *Economic Journal* 105, pp. 145–59.

Myerson, R.B., 1993, "Effectiveness of Electoral Systems for Reducing Government Corruption: A Game Theoretic Analysis," *Games and Economic Behavior* 5, pp. 118–32.

Pargal, S., and M. Mani, 2000, "Citizen Activism, Environmental Regulation and the Location of Industrial Plants: Evidence from India," *Economic Development and Cultural Change* 48 (4), pp. 829–46.

———, and D. Wheeler, 1996, "Informal Regulation of Industrial Pollution in Developing Countries: Evidence from Indonesia," *Journal of Political Economy* 57, pp. 357–70.

Peltzman, S., 1976, "Toward a More General Theory of Regulation," *Journal of Law and Economics*, pp. 211–40.

Persson, T. G., Roland, and G. Tabellini, 2000, "Comparative Politics and Public Finance," *Journal of Political Economy* 108, pp. 1121–41.

_____, and G. Tabellini, 1999, "The Size and Scope of Government: Comparative Politics with Rational Politicians, 1998 Alfred Marshall Lecture," *European Economic Review* 43, pp. 699–735.

_____, and F. Trebbi, 2003, "Electoral Rules and Corruption," forthcoming, *Journal of the European Economic Association.*

Rasmusen, E., and J.M. Ramseyer, 1994, "Cheap Bribes and the Corruption Ban: A Coordination Game Among Rational Legislators," *Public Choice,* Vol. 78, pp. 305–27.

Rose-Ackerman, S., 1997, "Corruption and Development," *Annual World Bank Conference on Development Economics*, B. Pleskovic and J. E. Stiglitz, eds., (Washington: World Bank).

Rowley, C.K., R.D. Tollison, and G. Tullock (eds.), 1988, *The Political Economy of Rent-Seeking* (Boston, Dordrecht, and Lancaster: Kluwer).

Shapiro, M., 1988, *Crimes and Punishments* (London: Lincoln Press).

Stigler, G.J., 1971, "The Theory of Economic Regulation," *Bell Journal of Economics and Management Science,* Vol. 2, pp. 3–21.

Svensson, J., 1998, "Investment, Property Rights and Political Instability: Theory and Evidence," *European Economic Review* 42, pp. 1317–41.

Tanzi, V., 1998, "Corruption Around the World: Causes, Consequences, Scope, and Cures," *IMF Staff Papers* 45 (4), pp. 559–94.

Tirole, J., 1996, "A Theory of Collective Reputation," *Review of Economic Studies* 63, pp.1–22.

Tollison, R.D. and R.D. Congleton (Eds.), 1995, *The Economic Analysis of Rent Seeking*, Aldershot (United Kingdom: Elgar).

Treisman, D., 2000, "The Causes of Corruption: A Cross-National Study," *Journal of Public Economics* 76, pp. 399–447.

Tullock, G., 1967, "The Welfare Costs of Tariffs, Monopolies, and Theft," *Western Economic Journal*, Vol. 5, pp. 224–32.

———, "Corruption Theory and Practice," *Contemporary Economic Policy* 14: pp. 6–13.

Ward, P., 1989, *Corruption, Development and Inequality,* London: Rutledge.

World Bank, *World Development Indicators, 2001* (Washington).

———, 2002, *Anticorruption in Transition: A Contribution to the Debate* (Washington).

World Economic Forum, 2002, *The Global Competitiveness Report 2001–2002* (New York: Oxford University Press).