The B.E. Journal of Theoretical Economics

Advances

Volume 9, *Issue* 1 2009 *Article* 36

Contracting in the Presence of Judicial Agency

Philip Bond*

*University of Pennsylvania, phlpbnd@gmail.com

Recommended Citation
Philip Bond (2009) "Contracting in the Presence of Judicial Agency," *The B.E. Journal of Theoretical Economics*: Vol. 9: Iss. 1 (Advances), Article 36.

Contracting in the Presence of Judicial Agency*

Philip Bond

Abstract

While a key function of contracts is to provide incentives, the incentives of judges to enforce the terms of a contract have rarely been examined. This paper develops a simple model of judicial agency in which judges are corrupt and can be bribed by contracting parties. Higher-powered contracts expose contracting parties to more frequent and more severe corruption, which in turn lessens the incentives actually provided by the contract. Consequently the model predicts that individuals will commonly refrain from writing high-powered contracts, even when such contracts would be valuable absent judicial agency. I show that similar implications can also be obtained by considering other forms of imperfection in contract enforcement, such as variable expenditures on legal representation. I use the model to develop implications for the optimal punishment of individuals who are extorted by corrupt judges, and to establish circumstances under which a right-of-appeal is optimal.

KEYWORDS: judges, courts, corruption, contracting, bribes, extortion, appeal process

*I thank Richard Brooks, Kim-Sau Chung, Michael Fishman, Kathleen Hagerty, Arvind Krishnamurthy, Andrew Newman, Anna Paulson, Ashok Rai, Kathy Spier, Jan Zabojnik, Marco Ottaviani (the editor), and four very constructive referees, for helpful comments, along with seminar audiences at the University of Southern California, Caltech, the Institute for Advanced Study, Northwestern University, the North American Summer Meeting of the Econometric Society, the Southeast Theory and International Economics Meetings, and Stanford Institute of Theoretical Economics. I am grateful to the Institute for Advanced Study for hospitality and financial support (in conjunction with Deutsche Bank) over the academic year 2002-03. Any errors are of course my own.

1 Introduction

Contract theory studies the provision of incentives to economic agents who need to be persuaded to act against their own immediate interests. As such, contracts need to be enforced. However, despite the emphasis on incentive problems very little attention has been paid to the incentives of the contract enforcer, a role that in modern economies is most often played by a judge. Instead, there has been virtual unanimity among contract theorists that judges will enforce contracts exactly as intended.[1] This paper relaxes the assumption that judges behave perfectly, and presents a variant of the standard principal-agent model in which a judge can (at some cost) accept bribes not to enforce a contract.

The basic argument of the paper is that foreseeing that they will be exploited ex post, contracting parties will respond to judicial agency by limiting the power they give to the judge ex ante. In other words, they cease to contract and/or omit contingencies from the contract in order to prevent a judge from extracting a bribe ex post by manipulating how the contingency is enforced. This effect will be more pronounced when the incentives that need to be provided to the agent are high and when corruption is more of a problem within the judiciary. Moreover, since corruption is more likely to go undetected in situations calling for substantial judicial interpretation, it follows that contracts contingent on circumstances hard to unambiguously specify will be harder to write.

Most legal histories suggest that judicial agency was an important phenomenon historically, while both anecdotal and survey evidence suggest that it is still widespread in developing countries today. Below, I review some of this evidence, along with some contemporary instances of judicial agency in the U.S. Moreover, although for the most part I will speak of judges as accepting bribes, the formal model is closely related to one in which contracting parties hire lawyers to represent them, and the more resources they spend on legal representation the more likely it is they win a case independent of its merits (see subsection 3.6 below).

After studying the implications of judicial agency on contracting, the paper turns to a couple of ways in which its effects can be ameliorated.

First, opinion is divided on whether or not to punish an individual who

[1] The incomplete contracting literature (see, e.g., Hart 1995) does of course explicitly allow for the possibility that not all contracts and contract clauses are possible. One reason often given for this restriction is that the underlying economic state is not observable by the judge. However, the possibility that a judge may observe the state but may lack the correct incentives to properly enforce the contract is not discussed.

illicitly pays a judge only in response to a threat of an unfair decision (i.e., extortion). The argument against such punishments is that they make it harder for the party in the right to prevail in court. Conversely, the argument in favor is that punishing extortion reduces its incidence. The analysis shows that under many conditions the first effect dominates, and extortion should not be punished. The key reason is that in litigation between two parties, extortion by the judge is only credible if the party in the wrong tries to bribe the judge, but in this case punishing the party in the right for making competing payments makes matters worse. Thus there is an incentive-based reason to refrain from punishing individuals who pay judges when threatened with bad outcomes, even without considering issues of "fairness."

Second, arguably the most important check placed on judicial discretion is oversight by other judges, and in particular, the possibility of appeal. I use the model to analyze possible appeal arrangements, and show that only the party being incentivized by the contract should enjoy the right of appeal. (This corresponds to widespread protection against "double-jeopardy" for criminal defendants.)

The basic model of the paper is as follows. A principal seeks to contract with an agent, who can take either a good or bad action. The agent prefers the bad action, while the good action generates a greater total surplus. In order to persuade the agent to take the good action, the principal and agent can write a contract in which the agent is punished if she takes the bad action, and/or rewarded if she does not. Given the contract, the principal and agent can make illicit payments to the judge in order to affect the court decision. It is costly (in terms of risk of punishment, reputation, and moral repugnance) for the judge to accept these payments, and also costly for him to change his decision in response, and judges differ in the magnitude of these costs.

Potential bribes are larger when the agent needs to be given stronger incentives. But the availability of larger bribes increases the number of judges who prefer to take bribes rather than behave honestly. Increased corruption in turn decreases the incentives actually provided by any given contract, so the original contract must be amended to provide additional incentives to compensate for the possibility that some judges will behave corruptly. But of course, these additional incentives lead to yet higher potential bribes, which in turn necessitate yet higher incentives.

Consequently, contracts that supply large incentives expose the parties involved to high corruption costs. Moreover, there is an upper limit to the incentives that a contract can supply — attempting to supply further incentives simply increases the expected bribes paid. In general, the model predicts that individuals are more likely to contract ex ante when the value of doing so is high, when the incentives that the contract must supply are low, and when judges face high costs of behaving corruptly. Conversely, there exists a wide range of circumstances in which parties do not contract even when it would be beneficial do so in the absence of judicial agency. One interpretation of this predicted absence of apparently desirable contracts is as an instance of contractual incompleteness.

While some existing work deals with the corruption of law enforcers (see, e.g., Becker and Stigler 1974, or more recently Polinsky and Shavell 2001), the focus of this work has generally been on issues such as how corruption affects the deterrence effect of existing laws, and how one should optimally monitor and compensate law enforcers. Although related, the focus of this paper is on the distinct question of what contracts are worthwhile when the contract enforcer is corrupt. Closer in spirit to this paper are Friedman (1999), Mui (1999), Anderlini, Felli and Postlewaite (2007, 2009), and Glaeser and Shleifer (2002). Friedman identifies the possibility of extortion by enforcing authorities as a reason to limit the size of the punishment. Mui analyzes the standard hold-up problem of the incomplete contract literature in a setting where ex post renegotiation is in part determined by the possibility of litigating in a corrupt court. Anderlini, Felli and Postlewaite consider a court that voids some contracts so as to maximize individuals' ex ante utility, and explore the consequences for relation-specific investments and for insurance against unforeseen contingencies. Glaeser and Shleifer seek to explain the evolution of English Common Law and French Civil Law in terms of the relative power of citizens, self-interested judges and the head of state. Finally, a contemporaneous paper by Immordino and Pagano (forthcoming) studies optimal regulation in the presence of a corrupt enforcer.[2]

On a analytical level this paper is also related to those of Spier (1994), Bernardo et al (2000), and Legros and Newman (2002), all three of which study the interaction between an underlying agency problem and the expenditures parties can make to influence the contract outcome. The current paper differs from the first two of these in that higher-powered contracts lead not only to greater litigation expenditures, but that these expenditures in turn reduce the incentives provided by a contract and necessitate a still higher-powered contract. It is this feedback effect that accounts for why high-powered contracts are particularly expensive to write. Legros and Newman allow for feedback to contract terms, but consider a simple model in which parties either spend

[2]In Immordino and Pagano, the penalty is independent of the regulation, and hence bribes are also. In contrast, many of the results in the current paper stem from the fact that contract terms (determining the penalty) vary, and consequently illicit payments do also.

nothing on litigation, or a fixed amount c. In contrast, much of the analysis and results in the current paper relates to the size of payments that parties make to the judge.[3] Moreover, in focusing on judicial corruption in place of general litigation (or "interference," in the case of Legros and Newman) costs, the current paper gives a distinct explanation for the source of the link between agency problems and the extent to which they can be solved with laws and contracts. In particular, the focus on corruption allows the current paper to address the difference between extortion and bribe-taking.

Finally, the paper is conceptually related to the literatures on influence activities inside a firm (Milgrom 1988) and to collusion in principal-supervisor-agent models (Tirole 1986). In particular, it shares the prediction that high-powered contracts engender collusion/influence-seeking. The current paper adds to this general insight by showing the existence of a vicious circle in which higher-powered contracts lead to more corruption, which undercuts incentives and necessitates even higher-powered contracts;[4] by analyzing a situation in which two parties simultaneously engage in competing influence activities; by comparing extortion and bribe-taking; and by considering appeals rights.

The paper proceeds as follows. Section 2 gives some background examples of judicial corruption. Section 3 presents the basic model of judicial corruption. Section 4 explores several applications of the model. Section 5 examines the comparative severity with which different forms of corrupt activity should be punished. Section 6 analyzes appeals arrangements. Section 7 discusses some robustness issues. Section 8 concludes.

2 Background

The key assumption of the paper is that individuals who enforce contracts are sometimes corrupt. In many cases the contract enforcer is a judge. Although judges occupy a position of unusual respect in many peoples' imagination,[5] and moreover corrupt behavior is always at least somewhat hidden, there is no shortage of evidence of judicial corruption.

[3] The finding that there is an upper bound on the incentives that a contract can provide (see Proposition 2) is an example.

[4] In contrast, in Milgrom's model time spent on influence activities does not reduce incentives. Instead, influence activities are costly simply because they divert time from productive uses.

[5] Even in Tom Wolfe's systematically misanthropic *Bonfire of the Vanities*, Judge Kovitsky is one of a tiny number of characters to be presented in a (more-or-less) sympathetic light. For a more extended discussion of the portrayal of the legal system in the novel, see Posner (1995, pages 481-489).

Instances in which judicial corruption is actually detected provide one source of evidence, albeit anecdotal in character. To give just a couple of examples, within the U.S. (where courts are often assumed to be relatively free of corruption) Judges Victor Barron and Gerald Garson were convicted of corrupt behavior in Brooklyn civil courts, in 2002 and 2007 respectively.[6] One could give many more examples along these lines. The case of *Caperton v Massey* provides a more contentious example with much higher stakes: in 2004, while Massey was in the process of appealing a prior $50M judgement, Massey's CEO made a $3M contribution to the election campaign of Judge Brent Benjamin, who subsequently ruled in Massey's favor.

The various corrupt dealings of Vladimiro Montesinos in Peru provide somewhat more systematic evidence. Montesinos was a powerful chief of Peru's secret police, and required his counterparties in corrupt deals to sign "contracts." Additionally, he videotaped many of the illicit negotiations (see, for example, McMillan and Zoido 2004). Consequently, in this case one has close to a comprehensive catalogue of individuals who entered corrupt deals with Montesinos, and judges figure prominently.[7]

More systematic evidence is provided by surveys conducted in transition economies by the World Bank. Hellman et al (2000) report that in the 22 countries surveyed, an average of 18% of firms interviewed stated that they were significantly affected by the "purchase of criminal courts" and the "purchase of commercial courts." In Azerbaijan, these figures were as high as 44% for criminal courts and 40% for commercial courts. An even more negative view of the court system emerges from a survey conducted by the Taiwanese magazine, the CommonWealth, and cited by Mui (page 250, 1999). Only one third of the 1,215 respondents stated that it was unnecessary "to offer a bribe to the judge to win litigation".

Finally, any reading of legal history makes clear that judicial corruption is very much the historical norm.[8] Perhaps in reaction to this, modern legal systems include a number of features that serve to limit the power and discretion of the judge, such as appeal rights — analyzed in more detail in Section 6 below.

[6]Both cases were widely reported in the media, and are unrelated to each other.

[7]See Table 3 of McMillan and Zoido. One example of Montesinos's activities which attracted particular attention in the U.S. relates to a court case over the ownership of Yanacocha gold mine.

[8]See, e.g., Hoeflich (1984).

3 Judicial Agency

The paper studies the impact of judicial agency on contracting in the context of the following (extremely simple) moral hazard problem. A principal P wants an agent A to take a good action (G) over a bad action (B). The combined surplus of the two individuals when the good action is chosen is s, while the agent prefers taking the bad action by an amount z. To focus the analysis on how judicial agency affects contracting, I assume throughout that the principal observes the agent's action[9] $a \in \{B, G\}$. Both the principal and agent are assumed to be risk-neutral.

In this simple setting, the only function of a contract is to either reward the agent when he takes the good action, and/or punish him when he takes the bad action. So a contract stipulates a transfer t_G to be made from the principal to the agent when the agent takes the good action, and a transfer t_B to be made when the agent takes the bad action. When $t_G < 0$ or $t_B < 0$, then the transfer is understood to be from the agent to the principal. Given a contract (t_G, t_B), let $Z(t_G, t_B) \equiv t_G - t_B$ denote the contractual incentives provided to the agent to take the good action. As we will see, once one takes into account judicial agency the actual incentives provided to the agent will typically be less than the contractual incentives Z.

Whenever the contract stipulates that either the principal or agent make a transfer to the other party, an enforcement authority is required to make sure the transfer takes place. The paper typically refers to the enforcement authority as the judge, although clearly multiple parts of the justice system will be engaged in carrying out the judge's decision.

To keep the analysis as transparent as possible, I assume moreover that the judge observes the agent's action a. It is of course important that the agent's action is not completely publicly observable, since in this case judicial agency would be trivial to deter. Moreover, the assumption that the judge observes the agent's action can itself be relaxed without significantly changing the paper's main results — details are available from the author upon request.[10]

If the judge enforces the contract terms as intended, then the agent takes the good action if the contractual incentives $Z(t_G, t_B)$ exceed the agent's pri-

[9] If the principal observed only a noisy signal of the agent's action, the judicial agency problem would be worsened since the difference between the most and least favorable outcomes mandated by the contract would be increased.

[10] If the judge does not directly observe the agent's action then the contract needs to be designed so as to induce the principal and agent to truthfully report it. It can be shown that this additional complication has relatively little effect on the amount of equilibrium corruption.

vate benefit from taking the bad action, z.

However, the judge may lack incentives to enforce the contract. For example, suppose that the agent has taken the good action. According to the contract, the principal should pay t_G to the agent. But if the principal pays a bribe the judge might be tempted to wrongly rule in his favor and instead impose the transfer $t_B < t_G$.[11] Likewise, the judge might demand a payment from the agent in order to rule correctly for him. Following Lindgren (1993) and Ayres (1997), I will refer to the first case as judicial bribe-taking, and to the second case as judicial extortion. That is, bribe-taking is when a party pays for a better outcome than deserved; extortion is when a party pays to avoid a worse outcome than is deserved.

3.1 Modelling corruption

Judicial corruption can be modelled in many ways. In this paper I follow an approach popular in the rent-seeking literature and model the court's decision as the outcome of an all-pay auction,[12] in which both the principal and agent have the opportunity to make illicit payments to the judge with the aim of influencing him. In an all-pay auction, the "seller" — here, the judge — keeps all payments, and gives the "good" — here, the favorable ruling — to the party who pays the most. In the context of judicial corruption, the "all-pay" assumption captures the idea that, because the payments are illicit, the judge is not contractually obliged to decide the case in favour of a party who pays him, and is free to simply keep all payments. At the same time, the all-pay framework assumes that the judge treats a party who makes a larger payment more favorably, despite the lack of contractual obligation. This favoritism may stem from the need for judges who accept illicit payments to maintain some reputation for "honoring" these payments; from the threat of retribution at the hands of disappointed payers; or may arise simply because the judge is genuinely unsure how the case should be decided, and looks more favorably on a party who makes a generous "gift." Regardless of the exact motive, it is hard to see how judicial corruption can occur at all unless, on average, judges respond to illicit payments.[13]

[11] If the parties contract at all they set $t_G > t_B$; if instead they set $t_G \leq t_B$, the agent takes action $a = B$, which is the same action he takes absent any contract.

[12] See, e.g., Baye et al (1993, 2005), and Siegel (2009).

[13] While the all-pay framework effectively assumes that the judge has some ability to commit, it stops short of assuming full-commitment. If instead the judge were able to fully commit, he would (in terms of notation introduced below) extort $Z - \gamma_e$ from the party in the right whenever $\alpha_e + \gamma_e < Z$. Qualitatively, the paper's main results would remain

Importantly, I assume that the judge responds differently to payments from the two parties, depending on the agent's action a. Specifically, suppose the agent took action $a = G$ (respectively, $a = B$), and so the judge should rule in his favor. In this case, and as formalized below, I assume that if the two parties pay the judge a roughly similar amount, the judge will rule — correctly — in favor of the agent (respectively, the principal). For the remainder of the paper, I refer to a party as being *in the right* if he deserves to win the case, and being *in the wrong* if he deserves to lose, e.g., the agent is in the right after $a = G$ and in the wrong after $a = B$. Thus the party in the right has a "head start" in court over the party in the wrong. When courts are very corrupt, both parties may make large illicit payments, and the value to the agent of taking action G rather than B stems almost entirely from the value of this head start; and is little affected by actual contractual incentives Z (see Proposition 2).

Formally, denote any illicit payments made by the principal and agent as $x_P \geq 0$ and $x_A \geq 0$ respectively. To capture the idea that payments are illegal, I assume there is a fixed cost to each party of making a strictly positive payment, and a fixed cost to the judge of accepting any strictly positive payment. These fixed costs also imply that many contracting parties make no illicit payment, even when dealing with a judge who is very corrupt. At the same time, these fixed costs somewhat complicate the analysis by introducing discontinuities in the all-pay auction: by way of contrast, even Siegel's (2009) otherwise general analysis of all-pay contests assumes continuity.[14]

Suppose first that the agent took action $a = G$, and so is the party in the right. Consequently, any payment from the agent is the outcome of extortion, in the sense discussed above. Let γ_e be the agent's cost of offering a strictly positive payment, $x_A > 0$, and α_e be the judge's cost of accepting the payment. Likewise, any payment from the principal is an instance of judicial bribe-taking. Let γ_b be the principal's cost of offering a strictly positive payment, $x_P > 0$, and α_b be the judge's cost of accepting the payment.

Clearly the judge only accepts payments $x_A \geq \alpha_e$ and $x_P \geq \alpha_b$. Consequently, I assume without loss that the agent (principal) either makes no payment, $x_A = 0$ ($x_P = 0$) or makes a payment $x_A \geq \alpha_e$ ($x_P \geq \alpha_b$), and the payment is accepted. The acceptance costs α_e and α_b affect not only whether a judge accepts a payment, but also how much these payments influence him — other things equal, the more costly it is for a judge to accept an illicit payment, the less that payment is likely to sway him. If both parties make positive

unchanged.

[14]In Section 7 I discuss an alternative specification of costs.

payments the judge rules for the agent if and only if $x_A - \alpha_e \geq x_P - \alpha_b - \alpha_0$,[15] where α_0 is the cost to the judge of ruling wrongly (he may find this morally objectionable, and wrong decisions may hurt a judge's career). If only the principal makes a positive payment, the judge rules in his favor if and only if $x_P - \alpha_b - \alpha_0 \geq 0$. Otherwise the judge rules correctly for the agent.

The principal and the agent have the same "skill" in making payments to the judge, and so the costs associated with payments depend only on which party is in the right. If the agent took action $a = B$ he deserves to lose in court, and the costs are reversed relative to the case $a = G$. Specifically, the costs to the agent and judge associated with making and accepting a payment are γ_b and α_b, since such payments now represent bribe-taking; and the costs to the principal and judge associated with making and accepting a payment are γ_e and α_e,[16] since such payments now represent extortion. The judge bears an additional cost α_0 if he rules for the agent. Consequently, if both parties make positive payments the judge rules for the principal if and only if $x_P - \alpha_e \geq x_A - \alpha_b - \alpha_0$.

Judges are heterogeneous, and differ in their corruption costs $(\alpha_0, \alpha_b, \alpha_e)$. To simplify the exposition, let $\alpha_0 + \alpha_b$ be drawn from a continuous distribution, with $E[\alpha_0 + \alpha_b - \alpha_e | \alpha_0 + \alpha_b]$ continuous as a function of $\alpha_0 + \alpha_b$.[17]

The timing is as follows. First, the principal and agent observe their costs γ_b and γ_e. Both parties observe both costs. Second, the contract is selected to maximize the combined expected payoff of the two parties. Third, the agent takes an action $a \in \{G, B\}$. Fourth, the contract is adjudicated in court: the principal and agent learn the identity of the judge, along with his corruption costs $(\alpha_0, \alpha_b, \alpha_e)$, and then simultaneously choose their payments x_P and x_A.

3.2 Court outcomes

When corruption costs are zero (i.e., $\alpha_e = \gamma_e = \alpha_b = \gamma_b = \alpha_0 = 0$) the equilibrium of the two-player all-pay auction is well-known.[18] Both players play mixed strategies with payments drawn from a uniform density over $[0, Z]$,

[15] Note that the tie is broken in favor of the party in the right.

[16] The costs of making payments, γ_e and γ_b, potentially differ from each other because the penalty incurred if an illicit payment is uncovered may differ according to whether the payer is the party in the right or wrong, i.e., whether the payment is an instance of extortion or bribe-taking. See Section 5 below.

[17] These continuity assumptions are used only in subsection 3.4.

[18] See, for example, Baye et al (1996).

and the "rent" of Z is completely dissipated.[19] Corruption costs complicate the analysis, and modify the conclusion that rents are fully dissipated.

Let $\Pr(P)$ and $\Pr(A)$ be the probabilities that the principal and agent win in court. The principal's expected utility from the court case is thus $-t_G + Z\Pr(P|a) - E[x_P|a] - \gamma\Pr(x_P > 0|a)$, where $\gamma = \gamma_b$, γ_e if the agent took action $a = G$, B, respectively. Note that whether the principal is in the right or not affects his payoff through his probability of winning, through his expected equilibrium payment x_P, and through the cost of making an illicit payment. Likewise, the agent's expected utility from the court case is $t_B + Z\Pr(A|a) - E[x_A|a] - \gamma\Pr(x_P > 0|a)$, where $\gamma = \gamma_e$, γ_b if the agent took action $a = G$, B, respectively. Observe that both parties gain Z from success in court. Define the payoff functions

$$\begin{aligned} V_P^G &= Z\Pr(P|G) - E[x_P|G] - \gamma_b\Pr(x_P > 0|G) \\ V_A^G &= Z\Pr(A|G) - E[x_A|G] - \gamma_e\Pr(x_A > 0|G) \\ V_P^B &= Z\Pr(P|B) - E[x_P|B] - \gamma_e\Pr(x_P > 0|B) \\ V_A^B &= Z\Pr(A|B) - E[x_A|B] - \gamma_b\Pr(x_A > 0|B)\,. \end{aligned}$$

I analyze the equilibrium outcomes if the agent took action $a = G$; the case in which he took action $a = B$ follows symmetrically. Let X_P and X_A be the equilibrium supports of strictly positive payments made by the principal and agent to the judge. As already noted, one can assume without loss that $\inf X_A \geq \alpha_e$, $\inf X_P \geq \alpha_b$, and the judge accepts all payments. Additionally, $\inf X_P \geq \alpha_b + \alpha_0$, since otherwise the principal's payment is too small to affect the judge's decision; and $\sup X_A \leq Z - \gamma_e$ and $\sup X_P \leq Z - \gamma_b$, since the equilibrium payments of both parties are bounded above by the amount at stake in court, net of costs.

The following result summarizes several standard arguments for all-pay auctions, suitably modified for the existence of costs α_0, α_e, α_b:

Lemma 1 ***(Standard all-pay auction results)***
Suppose the agent took action $a = G$.
(A) There are no atoms in the agent's strategy strictly above α_e, and no atoms in the principal's strategy strictly above $\alpha_0 + \alpha_b$.
(B) Suppose X_P and X_A are non-empty. Then $\sup X_P - \alpha_b - \alpha_0 = \sup X_A - \alpha_e$; $\inf X_P - \alpha_b - \alpha_0 = \inf X_A - \alpha_e = 0$; and there are no holes in either X_P or

[19]That is, $E[x_A + x_P] = Z$. Moreover, if corruption costs are zero, the principal and agent's abilities to influence outcomes are independent of the action a taken by the agent. Consequently, the agent has no incentive to take the good action, regardless of the choice of contractual incentives Z. Formally, see Proposition 2 below.

X_A.
(C) Suppose X_P and X_A are non-empty. Then the principal's and agent's strategies both place a uniform density of $\frac{1}{Z}$ over the interior of these sets.

As Proposition 1 below shows, the corruption costs α_b, γ_b and α_0 all have qualitatively similar effects on equilibrium outcomes, since all make it *easier* for the party in the right to win. Likewise, the costs α_e and γ_e both make it *harder* for the party in the right to win. In fact, these costs matter only via their sums, i.e., $\Gamma_b \equiv \alpha_b + \gamma_b + \alpha_0$ and $\Gamma_e \equiv \alpha_e + \gamma_e$. I make the mild assumption that these costs are lower for the party in the right than the party in the wrong:

Assumption 1 $\Gamma_b > \Gamma_e$.[20]

Proposition 1 ***(Equilibrium court outcomes)***
Suppose the agent took action $a = G$. An equilibrium of the payment game exists, is unique, and has the following properties:
If corruption costs are high, i.e., $\Gamma_b > Z$, then neither party makes a payment; the agent wins the case; $V_P^G = 0$; and $V_A^G = Z$.
If corruption costs are low, i.e., $Z > \Gamma_b > \Gamma_e$, then both parties make payments with positive probability; $V_P^G = 0$; and $V_A^G = \Gamma_b - \Gamma_e$.

When corruption costs are low, and so both parties make payments, this result coincides with existing results for all-pay contests — see, in particular, Siegel (2009).[21,22] The incremental contribution of Proposition 1 is to deal with the effect of the fixed costs of making and receiving illicit payments, namely γ_e, α_e, γ_b, α_b. When these costs are high, the parties abstain from making illicit payments.

An increase in the costs associated with bribery (α_0, α_b and γ_b) increases the payoff of the party in the right (i.e., the agent, if $a = G$) because it makes it harder for the party in the wrong to sway the judge. In equilibrium, the party

[20]For completeness, Proposition A-1 in the appendix characterizes equilibrium payoffs when Assumption 1 does not hold.

[21]In detail, in Siegel's terminology the agent's "score" is $s_A = x_A + \alpha_b + \alpha_0$, while the principal's score is $x_P + \alpha_e$. The costs of attaining these scores are, respectively, $s_A - (\alpha_b + \alpha_0) + \gamma_e$ and $s_P - \alpha_e + \gamma_b$. Hence the "reaches" of the agent and principal, respectively, are $Z + (\alpha_b + \alpha_0) - \gamma_e$ and $Z + \alpha_e - \gamma_b$. By Siegel's Theorem 1, the agent's payoff is then the value of the prize, Z, net of his cost of attaining a score equal to the principal's reach, i.e., $(Z + \alpha_e - \gamma_b) - (\alpha_b + \alpha_0) + \gamma_e = Z + \Gamma_e - \Gamma_b$, which coincides with the low-corruption case of Proposition 1.

[22]Related, Assumption 1 simply states that the party in the wrong is — in Siegel's terminology — the "marginal" player.

in the right benefits both because he makes smaller payments to the judge, and (even given these smaller payments) wins the case more often. Conversely, an increase in the costs associated with extortion actually make the party in the right worse off. It is now more expensive for him to compete with bribes paid by the party in the wrong. In equilibrium, he ends up making larger payments; incurring a larger cost (γ_e) to make these payments; and losing the case more often.

3.3 Incentives and contract costs

The actual incentive that a contract Z provides to the agent to take action $a = G$ rather than $a = B$ is simply the difference in the agent's expected payoff across these two actions. I denote the actual incentives by $I(Z)$:

Proposition 2 ***(Contractual versus actual incentives)***
The incentives provided by the contract are

$$I(Z) \equiv Z - ZE\left[1 - \frac{\Gamma_b - \Gamma_e}{Z} | \Gamma_b < Z\right] \Pr(\Gamma_b < Z).$$

An increase in contractual incentives Z affects the incentives $I(Z)$ provided to the agent with an elasticity of less than unity: $I(Z)/Z$ is decreasing in Z. Moreover, $I(Z)$ is bounded above by $E[\Gamma_b]$.

Proposition 2 quantifies the extent to which court corruption reduces the incentives provided below Z. Moreover, increasing contractual incentives Z is partially self-defeating: there is now more at stake in court, so illicit payments are larger, and hence more judges behave corruptly. More formally, increases in contractual incentives have a relatively small effect on actual incentives, in the sense that the elasticity of $I(Z)$ with respect to Z is small. Strikingly, this feedback effect from higher contractual incentives to more corrupt behavior means that even as contractual incentives are increased to arbitrarily high levels, the incentives provided to the agent are bounded above.

Asides from the incentives provided by a contract, the contracting parties also care about the cost of the contract, i.e., the resource dissipation they anticipate from corruption costs and payments to the judge. Let $C(Z)$ be the total cost of a contract Z:

Proposition 3 ***(Contract costs)***
For contracts such that $I(Z) \geq z$, the cost of the contract is $C(Z) = Z - I(Z)$, and is increasing in Z.

3.4 Equilibrium incentives and costs

A contract is only worth writing if it provides enough incentives for the agent to take the good action, i.e., $I(Z) \geq z$. From Proposition 3, the cost $C(Z)$ is increasing in contractual incentives Z. Hence the contracting parties will always choose Z minimally,[23] subject to satisfying the incentive condition $I(Z) \geq z$. Define

$$Z^*(z) = \begin{cases} \min\{Z : I(Z) \geq z\} & \text{if } \{Z : I(Z) \geq z\} \neq \emptyset \\ \infty & \text{otherwise} \end{cases}$$

Thus when subject to the possibility of judicial corruption, the contracting parties will choose the contract (t_G, t_B) to satisfy $t_G - t_B = Z^*(z)$. At this level of incentives, the cost of writing the contract is $C(Z^*(z))$, the combination of direct corruption costs and expected bribes that the contracting parties will end up paying to the judge. In the case that $Z^*(z) = \infty$ (i.e., no level of contractual incentives Z provides incentives z) let $C(Z^*(z)) = \infty$.

The function $C(Z^*(z))$ is the equilibrium cost of providing the agent with incentives z. The next result shows that this cost increases quite steeply in z. The reason is that as z increases, the contractual terms Z needed to incentivize the agent rise more (Proposition 2). This, in turn, causes the costs of contracting to rise (by Proposition 3) quickly:

Proposition 4 ***(Equilibrium cost of providing sufficient incentives)*** *The elasticity of the cost $C(Z^*(z))$ with respect to required incentives z exceeds unity, i.e., $\frac{C(Z^*(z))}{z}$ is increasing in z.*

3.5 Other changes in corruption costs

Corruption levels differ widely across legal jurisdictions. Formally, different levels of corruption are represented by different distributions of corruption costs. How does the overall level of corruptibility of judges affect contract incentives and costs?

To formalize what it means for one pool of judges to be more corrupt than another, it is useful to make the following assumption, which guarantees that judicial populations can be totally ordered in terms of corruptibility:

Assumption 2 $E[\alpha_0 + \alpha_b - \alpha_e | \alpha_0 + \alpha_b]$ *is weakly increasing in* $\alpha_0 + \alpha_b$.

[23] See Glaeser and Shliefer (2003) and Malik (1990) for related observations.

A judge's extortion costs α_e may well be positively correlated with his bribe-taking cost α_b and his cost of ruling wrongly, α_0. Assumption 2, which is used only in Proposition 5, simply says that as α_0 and α_b increase, any corresponding increase in the conditional expectation of α_e is (weakly) less than the increase in $\alpha_0 + \alpha_b$.

Given Assumption 2, I define a pool of judges as being *less* corrupt than a second pool if the corruption costs $\alpha_0 + \alpha_b$ are higher in the first pool, in the sense of first-order stochastic dominance:

Proposition 5 ***(Changes in judicial corruptibility)***
Suppose the distribution of $\alpha_0+\alpha_b$ in one pool of judges first-order stochastically dominates the distribution of $\alpha_0 + \alpha_b$ in a second pool, and that Assumption 2 is satisfied for both pools. Then contractual incentives $I(\cdot)$ are lower for the second pool, while both required incentives $Z^*(z)$ and the cost of contracting $C(Z^*(z))$ are higher for the second pool.

3.6 Alternate interpretation: expenditures on lawyers

Thus far I have interpreted the payments x_A and x_P as illicit payments to judges. The judge decides for the agent after $a = G$ provided that x_P exceeds x_A by less than $\alpha_0 + \alpha_b - \alpha_e$, that is, the cost of deciding wrongly for the principal combined with the difference (if any) of the cost of accepting illicit payments from the two parties.

However, one can also interpret x_A and x_P as expenditures on lawyers, where greater expenditures translate to a greater chance of winning the case. In particular, consider the special case in which $\alpha_e = \alpha_b = \gamma_e = \gamma_b = 0$. Under the alternative interpretation, the judge decides for the agent after $a = G$ provided that x_P exceeds x_A by less than α_0, where α_0 reflects the agent's natural advantage in the case. That is, the principal is only successful in swaying the judge if he spends an amount α_0 more on lawyers than does the agent.[24]

With the exception of the discussion of punishing extortion versus bribery (see Section 5) all of the paper's analysis applies to this alternative interpretation.[25]

[24]Moreover, one can interpret parameter values $\alpha_b > 0$ as indicating that expenditures on lawyers by the party in the wrong are only effective if they exceed α_b.

[25]While many papers in the legal literature analyze legal disputes as contests, relatively few papers consider the consequences for the incentives provided to the parties with regard to the "primary activity." See Sanchirico (2008) for both a discussion of this point, and a prominent exception to it.

4 Discussion

4.1 The costs of judicial agency

In contrast to some models of corruption, judicial corruption in the current model leads unambiguously to worse social outcomes. Specifically, judicial corruption is deleterious to welfare in the following two ways.

First, it leads to the abandonment of productive activity. That is, absent judicial corruption all principal-agent pairs would contract to supply the agent with incentives of z or more, leading to the realization of the surplus s. With judicial corruption however, some principal-agent pairs will find that the private costs $C(Z^*(z))$ exceed the private benefits s, and will cease to contract. The surplus s is thus lost.

Second, the costs borne by judges and litigating parties who behave corruptly are deadweight costs to society. Nothing is gained by other individuals that offsets the moral discomfort judges or litigants may incur in accepting bribes, or the disutility inflicted on corrupt individuals who are subsequently punished. This is true even if one counts the corrupt payments to judges as pure transfers.

Formally, let the joint distribution of contracting opportunities (s, z) be given by F, and let $\mathbf{1}$ denote the indicator function. Let $DW(Z)$ be the expected deadweight social cost associated with a contract Z, i.e., the expected value of all corruption costs incurred in equilibrium.[26] Note that the parties' cost of contracting, $C(Z)$, differs from the deadweight cost, $DW(Z)$, by the

[26] The deadweight cost $DW(Z)$ can be calculated explicitly as follows. In equilibrium, the agent takes action G. If $\Gamma_b > Z$ then no corruption occurs. Otherwise, if $\Gamma_b < Z$ the equilibrium outcomes are as described in the proof of Proposition 1. Specifically, the agent makes a strictly positive payment to the judge with probability $1-\mu_A$, where $\mu_A = \frac{\Gamma_b}{Z}$. The principal makes a payment $\alpha_0 + \alpha_b$ with probability $\eta_P = \frac{\Gamma_e}{Z}$, makes no payment with probability $\mu_P = \mu_A - \eta_P$, and makes a strictly positive payment other than $\alpha_0 + \alpha_b$ with probability $1-\mu_P-\eta_P = 1-\mu_A$. The judge wrongly rules for the principal with probability $\mu_A(1-\mu_P) + (1-\mu_A)\frac{1-\mu_A}{2}$. So the expected deadweight cost is

$$\begin{aligned}
&\left(\mu_A(1-\mu_P) + (1-\mu_A)\frac{1-\mu_P-\eta_P}{2}\right)\alpha_0 + (1-\mu_A)(\alpha_e+\gamma_e) + (1-\mu_P)(\alpha_b+\gamma_b) \\
= \quad &(1-\mu_P)(\mu_A\alpha_0 + \alpha_b + \gamma_b) + (1-\mu_A)\left(\frac{1-\mu_A}{2}\alpha_0 + \alpha_e + \gamma_e\right).
\end{aligned}$$

Hence

$$DW(Z) = E\left[(1-\mu_P)(\Gamma_b - (1-\mu_A)\alpha_0) + (1-\mu_A)\left(\frac{1-\mu_A}{2}\alpha_0 + \Gamma_e\right)|\Gamma_b < Z\right]\Pr(\Gamma_b < Z).$$

expected payments to judges net of the expected corruption cost incurred in equilibrium by judges. Since judges voluntarily accept bribes, it follows that $C(Z) > DW(Z)$.

Using this notation, the total social cost of corruption is

$$\int s\mathbf{1}\left(s < C\left(Z^{*}\left(z\right)\right)\right) d\mathbf{F}\left(s,z\right) + \int DW\left(Z^{*}\left(z\right)\right)\mathbf{1}\left(s \geq C\left(Z^{*}\left(z\right)\right)\right) d\mathbf{F}\left(s,z\right),$$

where the first term is the welfare loss associated with foregone surplus, and the second term is the expected deadweight loss due to corrupt activity by judges.

Consider a small increase in judicial corruptibility. By Proposition 5, this increases the cost of contracting. Suppose that (s,z) is a contracting opportunity that is eliminated by the increase in corruption. Before the increase in corruption, the social surplus net of deadweight corruption costs associated with (s,z) is $s - DW(Z^{*}(z)) > 0$. After the increase in corruption the contracting opportunity is no longer pursued, representing a loss of social surplus.

Indeed, for severe levels of judicial corruptibility almost all the social loss Γ will be in the form of foregone surplus: since a principal-agent pair could only effectively contract at the price of exposing themselves to a large corruption cost, they will simply choose not to. Put another way, low levels of observed corruption are compatible with a high level of corruptibility, for the simple reason that when corruptibility is high no contracts are written and so no judicial corruption is possible.

Finally, increases in corruptibility correspond to lower corruption cost parameters α_0 etc. This generates a partially countervailing effect on the total social cost of corruption, namely that agents find corruption less psychologically costly and/or are punished less often and less severely.

4.2 When are contracts written?

Economists have long appreciated that not all contracts are costless to write.[27] The absence of contracts (or contract clauses) that would be desirable if they could be written at zero cost is often termed "contractual incompleteness." The longest standing explanation is the existence of transaction costs.[28]

[27]For example, contracting costs are central to Coase's (1937) discussion of the boundary of a firm.

[28]See Williamson (1975). Other more recent explanations include those of Simon (1981), Holmström and Milgrom (1991), Bernheim and Whinston (1998), Allen and Gale (1992),

While the contracting costs $C(Z^*(z))$ of this paper are akin to a traditional transaction cost, they also differ in a couple of important respects. First, judicial agency locates the contracting costs with the enforcement of a contract, as opposed to with the contract-writing stage. As such, judicial agency costs are likely to be relevant even when a contract would be very beneficial, or used many times.

Second, the assumption of judicial agency provides more structure on when transaction costs are likely to be large. The key distinguishing prediction of the judicial agency approach (as opposed to a simple transaction costs approach) for contracting decisions is that contracting costs are increasing in the incentives the contract supplies. That is, the most costly contracts to write are those with high-powered incentives.

The next result summarizes the main predictions:

Proposition 6 ***(Implications for contracting)***
A principal-agent pair with a project producing surplus s if incentives z are provided to the agent will contract if and only if the surplus exceeds the cost of contracting, i.e. $s \geq C(Z^*(z))$. When the required incentives z are above some level, $\bar{z}$ say, no contract will be written,[29] *no matter how large the available surplus. Finally, an increase in the corruptibility of the judiciary will lead to a reduction in contracting activity.*

Proposition 6 is consistent with contractual incompleteness having important real consequences. Whenever the incentives z required to produce surplus s are large, then contracts will not be written – even though the loss from the absence of contracting is large.

Contractual incompleteness is often associated with contract contingencies that are hard to describe. If undetected corruption is easier (i.e., corruption costs are lower) in such cases, as seems likely, Proposition 5 implies that contracts are less likely to be written. Hence the analysis predicts that "indescribability" is associated with contract incompleteness.[30]

Spier (1992) and Segal (1999). Simon associates contractual incompleteness with bounded rationality. Holmström and Milgrom and Bernheim and Whinston both suggest that contracting over some subset of actions will actually worsen the agency problems in other dimensions of the action space. Allen and Gale and Spier suggest that contracts are incomplete because if a party suggested the inclusion of an additional contingency he would reveal information he would rather keep hidden. Finally Segal argues that if in any state some characteristics of the desired outcome are very similar to those of other "hold-up" outcomes (a consequence of "complexity"), then ex post renegotiation will prevent an initial contract from being useful.

[29]Recall that Proposition 2 shows that incentives $I(Z)$ are bounded above.

[30]Moreover, this implication is not susceptible to Maskin and Tirole's (1999) critique of

5 Penalties for extortion and bribe-taking

As noted, judicial corruption can take two (closely related) forms. On the one hand, a judge can threaten a party with the imposition of a worse outcome than he deserves, unless a bribe is paid. Alternatively, a judge can accept a bribe from a party to deliver better treatment than is deserved. Consistent both with popular and academic usage, I have termed the first activity extortion and the second bribe-taking.

Both opinion and practice are divided as to whether an individual who pays a judge in response to extortion deserves the same punishment as one found guilty of bribing a judge. For example, Lindgren (1993) notes that "although the morality of giving in to a coercive extortion threat has been debated for centuries, capitulating is often not illegal. Many people would not consider it bribery for a citizen to pay off a public official who is forcing the citizen to buy back what ought to be his for free."[31] The view that bribe-paying in response to extortive threats is acceptable can of course be justified on "fairness" grounds. However, this leniency has the potential cost of making extortion easier and more prevalent.[32]

The model delivers a clear prediction on the comparative merits of punishing extortion and bribe-taking. To see this, note first that analytically a punishment for extortion acts like an increase in α_e and γ_e (depending on whether the judge or litigating party is punished). Likewise, a punishment for bribe-taking acts like an increase in α_b and γ_b. Immediate from Propositions 2 and 3:

Proposition 7 ***(Punishing bribe-taking and extortion)***
Punishing bribe-taking increases incentives $I(Z)$ and reduces the contract cost $C(Z)$. Punishing extortion[33] *decreases incentives $I(Z)$ and increases the contract cost $C(Z)$.*

---

indescribability.

[31]These issues are well-illustrated by recent debates over whether or not "facilitation"' payments are covered by the US's Foreign Corrupt Practices Act and the OECD's more recent Convention on Combating Bribery of Foreign Public Officials in International Business Transactions.

[32]Thus Rose-Ackerman (1999, page 54) notes both that "[f]rom a pure deterrence point of view, either side of the corrupt deal can be the focus of law enforcement efforts" and "[f]rom the point of view of public acceptability, however, bribers who seek legal benefits are likely to arouse public sympathies, not blame."

[33]I assume here that the punishment for extortion is such that Assumption 1 continues to hold.

The intuition behind Proposition 7 is as follows. On the one hand, punishing bribe-taking makes it harder for the party in the wrong to win a court case, and so increases the payoff of the party in the right (see Proposition 1). Since the agent is in the right after action G, and in the wrong after action B, this increases incentives. Conversely, punishing extortion makes it more expensive for the party in the right to win a court case, reducing the agent's incentives to take action G. I comment more on this result in the conclusion.

It is worth comparing Proposition 7 to the related findings of Polinsky and Shavell (2001) and Khalil et al (forthcoming). In common with the current paper, both papers observe that extortion undermines incentives by reducing the agent's gain from taking the socially desirable action. In common with Proposition 7, Polinsky and Shavell (2001) show that punishing extortion may reduce incentives. In the current paper this effect stems from the two-sided nature of court case: punishing extortion makes it easier for the party in the wrong to win the case by bribing the judge. In contrast, Polinsky and Shavell model a contract enforcer dealing with a single agent. In their paper, the problem with punishing extortion is that the contract enforcer switches to "framing" the agent in order to receive a reward.

Khalil et al study a principal-supervisor-agent model in which they show that equilibrium extortion does not occur. Extortion in their model takes the form of the supervisor hiding positive evidence: unlike in the current paper, he is unable to fabricate negative evidence. When extortion occurs, the supervisor extracts a large enough payment so that the agent's utility is the same if there is positive evidence as if there is no evidence.[34] But then the principal can give the agent the same incentives with a contract that rewards the agent equally for positive evidence and no evidence, and in which the supervisor has no scope to extort the agent by hiding positive evidence. Note, moreover, that Khalil et al rule out by assumption the possibility of directly deterring and punishing extortion, so the question of optimal punishments for extortion does not really arise in their paper.

6 Appeals

Many justice systems grant litigants a right of appeal under some conditions. Such rights protect litigants from imperfections in the legal process, including court corruption. How should appeal rights be granted if the objective is to minimize court corruption?

[34] See Appendix C in Khalil et al.

I focus on the case of just one round of appeal. There are three distinct ways in which appeal rights can be allocated. (I) Only the party being incentivized by the contract (i.e., the agent) has the right to appeal. (II) Only the non-incentivized party (i.e., the principal) has the right of appeal. (III) Both parties have the right to appeal.

Formally, the timing of events is as follows. First, parties litigate the case as described in the main model. Following the court ruling, one or both parties (depending on the appeals arrangement) has the right to appeal the case. In this case, the parties return to court with a new judge. The corruption costs of the first and second judge are uncorrelated.

Proposition 8 ***(Corruption-minimizing appeals)***
Corruption costs are lowest under appeals arrangement (I).

The key to understanding Proposition 8 is to recall from Proposition 1 that while judicial corruption affects court outcomes and the expected utility of the party in the right, it has no effect on the expected utility of the party in the wrong. In other words, the judge expropriates any benefit the party in wrong might gain from affecting the court outcome.

Suppose first that only the agent is allowed to appeal, and consider the equilibrium event in which the agent takes action $a = G$. On the one hand, if the principal wins the initial trial the agent can appeal and the principal's expected utility from the second trial (net of bribe payments and corruption costs) is simply $-t_G$. But on the other hand, if the principal loses the initial trial he cannot appeal and immediately pays t_G to the agent. Consequently, the principal has no stake in the outcome of the initial trial,[35] and so does not bribe the judge — but then the judge is unable to extort the agent either. Hence equilibrium corruption is eliminated by agent-only appeal. In contrast, corruption would still occur under agent-only appeal in the out-of-equilibrium event that the agent takes action $a = B$, because in this case the principal has something at stake in the initial trial.

Similar effects arise under principal-only appeal, but with the states reversed: corruption is now eliminated in the out-of-equilibrium event that the agent takes action $a = B$, but still occurs in the equilibrium event that he takes action $a = G$.

Finally, allowing both sides to appeal renders the decision of the first judge irrelevant, and so is equivalent to the basic model with no appeals stage.

[35]More generally, the conclusion of Proposition 8 follows provided that in the single-trial case, court corruption affects the payoff of the party in the right more than the payoff of the party in the wrong. Under this condition, if the party in the wrong is denied appeal rights, he has relatively little at stake in the initial trial.

Many criminal law systems protect defendants against double-jeopardy. That is, while a criminal defendant is allowed to appeal a guilty verdict, the prosecutor does not enjoy the symmetric right to appeal an innocent verdict. This is exactly appeals arrangement (I), which Proposition 8 suggests is optimal from the perspective of minimizing corruption. Hence Proposition 8 both provides a possible rationale for protection against double-jeopardy in criminal law,[36] and suggests that in justice systems afflicted by high corruption levels it may be desirable to extend this protection to civil litigation.

7 Robustness

7.1 Settlement out of court (renegotiation)

Thus far I have assumed that, following the agent's action a, the parties always go to court and have their contract enforced. However, the parties have an incentive to try to settle out of court, since doing so enables them to avoid making payments to the judge and other corruption costs.

Under standard bargaining assumptions, the payoffs to the principal and agent if they settle out of court are determined by their outside options, in this case, what they would get by proceeding to court; their relative bargaining strengths; and the surplus available from reaching agreement, i.e., settling. The surplus available from avoiding going to court is $C(Z)$ after both $a = G$ and $a = B$. Under the standard assumption that the bargaining strengths of the two parties depend only on their identities, and not on the state (here, the agent's action a), it follows that the incentives provided to the agent are unaffected by out-of-court settlement.

If the parties were able to successfully settle out of court all the time, the cost on contracting produced by court corruption would vanish. In this case, the only constraint imposed by court corruption is the upper bound on attainable incentives identified in Proposition 2.

If instead settlement negotiations fail with some probability $\lambda > 0$, then all of the prior results relating to the cost of contracting continue to hold — although, of course, the cost is quantitatively lower.

[36] Here, one needs to interpret the principal as a public-sector prosecutor. Although public-sector prosecutors rarely derive direct monetary rewards from winning a court case, they often benefit from enhanced career prospects (Boylan 2005). Likewise, prosecutors may be able to influence judges in ways other than direct payments. The general conclusion of Proposition 8 does not depend on the specific modelling of the way in which parties influence the judge.

7.2 Different specifications of the corruption process

This paper uses one specific, albeit standard, model of the corruption process, namely an all-pay auction. Clearly different specifications are possible. However, the paper's results are relatively insensitive to the specific model of corruption used. In particular, an earlier draft of the paper instead assumed a form of Bertrand competition in illicit payments, with the judge only accepting a payment from one of the two parties. The results were qualitatively the same.

7.3 Alternate specifications of the cost of making illicit payments

The analysis is based on one specific parameterization of the costs of making illicit payments, namely, there is a fixed cost to making a strictly positive payment. Other parameterizations are clearly possible. In particular, it is possible that the cost of making an illicit payment grows in the size of the payment. Here, I briefly discuss just such an alternative parameterization.

Formally, suppose that after the agent takes action $a = G$, the costs to a judge of accepting payments x_A and x_P are $\varphi_e(x_A)$ and $\varphi_b(x_P)$ respectively, while the costs to the agent and principal of making these payments are $\kappa_e(x_A)$ and $\kappa_b(x_P)$. The functions φ_e, φ_b, κ_e and κ_b are all continuous, and equal 0 when evaluated at 0. Analogous to before, the judge rules for the agent if $x_A - \varphi_e(x_A) + \alpha_0 \geq x_P - \varphi_b(x_P)$.

I assume that larger payments are more valuable to the judge, i.e., both $x - \varphi_e(x)$ and $x - \varphi_b(x)$ are increasing, and write ψ_e and ψ_b for the inverses of these functions. Because the costs are all continuous, Siegel's (2009) analysis then applies directly. Assuming that the cost functions are such that the party in the wrong — here, the principal — is the marginal agent in Siegel's sense, the principal's payoff is $V_P^G = 0$ and the agent's payoff is $V_A^G = Z - (\kappa_e \circ \psi_e)\left(\max\left\{(\kappa_b \circ \psi_b)^{-1}(Z) - \alpha_0, 0\right\}\right)$.

An important property of the main model is that as contractual incentives Z increase, actual incentives are bounded above (Proposition 2). This property holds for the alternate cost structure just described whenever V_A^G converges to a constant as Z grows large, which in turn is the case when the ratio $\frac{(\kappa_e \circ \psi_e)'\left((\kappa_b \circ \psi_b)^{-1}(Z) - \alpha_0\right)}{(\kappa_b \circ \psi_b)'\left((\kappa_b \circ \psi_b)^{-1}(Z)\right)}$ converges to 1. Economically, this condition says that when both parties are making large payments, the marginal cost of further increases in these payments is approximately the same for both parties — regardless which party is in the right. For example, this condition is satisfied if the cost functions φ_e, φ_b, κ_e and κ_b are all linear, with $\varphi_e' = \varphi_b'$ and $\kappa_e' = \kappa_b'$.

8 Conclusion

The paper studies the impact of judicial corruption on the incentives provided by contracts, and, in turn, the response of contracting parties. Judicial corruption forces contracting parties to employ higher-powered contracts, which in turn raise judges' incentives to behave corruptly. Consequently, the cost that corruption imposes on contracting parties (expected payments to judges) is sharply increasing in the incentives that the contract seeks to provide. For the same reason, the total incentives that can be contractually provided are bounded above. The analysis suggests that in some circumstances parties prefer to leave contracts or contract contingencies unwritten rather than subject themselves to litigating the contract in a corrupt court. Moreover, and as discussed, one can straightforwardly reinterpret the model's illicit payments to the judge as lawyers' fees.

The analysis implies that appeal rights should be granted only to the party being incentivized, as is common in criminal law. Moreover, the analysis implies that extortion should not be punished.

The idea that a contracting party should not be punished for making a payment in response to an extortive threat squares well with many people's intuitions. However, the implication that the judge should also not be punished for extortion is more surprising. The main logic behind this result is that punishing extortion — that is, illicit payments from the party in the right to the judge — makes it easier for the party in the wrong to win the case. Of course, there are circumstances in which it is simply too costly for the party in the wrong to influence the judge (formally, if $\Gamma_b > Z$), and in such cases, punishing extortion protects the party in the right. However, in these cases it is not credible for the judge to decide the case incorrectly, and so he is unable to extort the party in the right — independent of how lightly or heavily extortion is punished.

However, one may want to consider a perturbation of the model in which the judge can extort the party in the right even when there is no chance of the party in the wrong paying a bribe. (Of course, this perturbation raises the question of how an extortive threat would be credible in this case.) In such a model, punishing extortion would have some value, although the effect identified by the current model would still be present: punishing extortion disadvantages the party in the right relative to the party in the wrong. Which effect dominates is then a quantitative matter.

Finally, the paper has focused on the case in which judges act to maximize their individual self-interest. As the analysis demonstrates, this makes dealing with the court system costly for contracting parties, and in turn reduces the amount of contracting. An interesting question is then whether judges would wish to ex ante commit to limit the scope for court corruption, in order to increase the amount of contracting and hence increase their total income from corruption (though at the cost of less income per court case). An argument along these lines would generate the possibility that court systems (via unions or guilds of court employees) might be capable of partially policing themselves to limit corruption.[37]

A Appendix

For use in Section 6 on appeals, I establish slightly more general versions of Lemma 1 and Proposition 1 than stated in the main text. Specifically, I consider a slight generalization of the payoff functions, in which the party in the right gains δZ instead of Z, i.e.,

$$\begin{aligned}
V_P^G(\delta) &= Z\Pr(P|G) - E[x_P|G] - \gamma_b \Pr(x_P > 0|G) \\
V_A^G(\delta) &= \delta Z\Pr(A|G) - E[x_A|G] - \gamma_e \Pr(x_A > 0|G) \\
V_P^B(\delta) &= \delta Z\Pr(P|B) - E[x_P|B] - \gamma_e \Pr(x_P > 0|B) \\
V_A^B(\delta) &= Z\Pr(A|B) - E[x_A|B] - \gamma_b \Pr(x_A > 0|B).
\end{aligned}$$

I regularly omit the argument δ for the leading case of $\delta = 1$. Note that the statement in the main text that if $a = G$ then $\sup X_A \leq Z - \gamma_e$ is replaced with $\sup X_A \leq \delta Z - \gamma_e$.

Lemma 1: *As stated in the main text, with the exception that in part (C), the principal's strategy has uniform density* $\frac{1}{\delta Z}$.

Proof of Lemma 1:

Part (A): Standard arguments. In brief, suppose that the agent's strategy has an atom strictly above α_e. Then the principal would never make a payment in the interval immediately below the atom. But then the agent can deviate from the atom to a lower payment.

Part (B): Standard arguments. For the upper bonds, clearly if $\sup X_A - \alpha_e \neq \sup X_P - \alpha_b - \alpha_0$ then one of the parties has a profitable deviation. For the lower bounds, note first that if $\inf X_A - \alpha_e > \inf X_P - \alpha_b - \alpha_0$ then the principal's strategy must have no mass in $(\inf X_P, \inf X_A - \alpha_e + \alpha_b + \alpha_0]$; but then the agent can deviate downwards, giving a contradiction. By a

[37] This argument is similar to those made in other contexts, see, e.g., Olson (1993).

similar argument, $\inf X_A - \alpha_e < \inf X_P - \alpha_b - \alpha_0$ is also impossible. If $\inf X_P - \alpha_b - \alpha_0 > 0$, then the principal can profitably deviate downwards. The argument for the absence of holes is also similar.

Part (C): The principal's payoff to paying x_P is $-x_P - \gamma_b + Z \Pr(x_A - \alpha_e \leq x_P - \alpha_b - \alpha_0)$. Differentiation with respect to x_P implies that the agent's strategy must have a uniform density of $\frac{1}{Z}$ over the interior of X_A. The result for the principal's strategy follows symmetrically. **QED**

Proposition 1: *Suppose the agent took action $a = G$. An equilibrium of the payment game exists, is unique, and has the following properties:*

If corruption costs are high, i.e., $\Gamma_b > Z$, then neither party makes a payment; the agent wins the case; $V_P^G = 0$; and $V_A^G = \delta Z$.

If corruption costs are low, i.e., $Z > \Gamma_b > \Gamma_e + (1-\delta) Z$, then both parties make payments with positive probability; $V_P^G(\delta) = 0$; and $V_A^G(\delta) = -(1-\delta) Z + \Gamma_b - \Gamma_e$.

Proof of Proposition 1:

Case: $\Gamma_b > Z$, i.e., $\alpha_0 + \alpha_b + \gamma_b > Z$

The principal does not make a payment here, since only a payment of at least $\alpha_0 + \alpha_b$ can lead to him winning, and this exceeds the amount at stake Z net of the cost of paying the bribe, γ_b. So the agent does not make a payment either, and wins.

Case: $Z > \Gamma_b > \Gamma_e + (1-\delta) Z$, i.e., $Z > \alpha_0 + \alpha_b + \gamma_b > \alpha_e + \gamma_e + (1-\delta) Z$

Let μ_A and η_A be the masses at payments 0 and α_e in the agent's strategy, and μ_P and η_P be the masses at 0 and $\alpha_0 + \alpha_b$ in the principal's strategy. Note that since $\sup X_A - \inf X_A < Z$, it follows from Lemma 1 that $\mu_A + \eta_A > 0$ and $\mu_P + \eta_P > 0$. Write $\bar{x} = \sup X_A$, so that $\sup X_P = \bar{x} + \alpha_b - \alpha_e + \alpha_0$.

There is no equilibrium in which both X_A and X_P have zero mass, since then paying $x_P = \alpha_0 + \alpha_b$ would be a strictly profitable deviation for the principal. There is no equilibrium in which X_A has zero mass and X_P has positive mass, since in such an equilibrium $X_P = \{\alpha_0 + \alpha_b\}$, but then paying $x_A = \alpha_e$ would be a strictly profitable deviation for the agent. There is no equilibrium in which X_P has zero mass and X_A has positive mass, since in such an equilibrium $X_A = \{\alpha_e\}$, but then paying $x_P = \alpha_0 + \alpha_b + \varepsilon$ would be a strictly profitable deviation for the principal for any $\varepsilon > 0$ sufficiently small.

Suppose that $\mu_P = 0$, i.e., the principal always makes a strictly positive payment. So $\eta_P > 0$, and hence $\eta_A = 0$ (since otherwise the principal has a profitable deviation away from $\alpha_0 + \alpha_b$). So $\mu_A > 0$, and when the agent does not make a payment he always loses. This implies $\bar{x} = \delta Z - \gamma_e$. But then the principal's payoff approaches $Z - (\delta Z - \gamma_e + \alpha_b - \alpha_e + \alpha_0) - \gamma_b$ as $x_P \to \sup X_P = \bar{x}$. By supposition this is strictly negative, implying that the principal would do strictly better making a zero payment.

Hence $\mu_P > 0$, i.e., the principal sometimes makes no payment. Since the principal always loses if he makes no payment, his payoff from all strategies in his equilibrium support must be 0. So $\bar{x} + \alpha_b - \alpha_e + \alpha_0 + \gamma_b = Z$, i.e., $\bar{x} = Z - \alpha_0 - (\alpha_b + \gamma_b) + \alpha_e$. So the agent's payoff from all strategies in his support must be $\delta Z - \bar{x} - \gamma_e = -(1-\delta) Z + \alpha_0 + (\alpha_b + \gamma_b) - (\alpha_e + \gamma_e)$.

Finally, I confirm that an equilibrium actually exists, i.e., that there exist μ_A, η_A, μ_P and η_P such that $\frac{\bar{x}-\alpha_e}{Z} = 1 - \mu_A - \eta_A$, $\frac{\bar{x}-\alpha_e}{\delta Z} = 1 - \mu_P - \eta_P$ (the total probability mass on each player's strategy is 1), and $\delta Z \mu_P \leq \delta Z - \bar{x} - \gamma_e$, with equality if $\mu_A > 0$ (the lefthand side is agent's payoff from making no payment, the righthand side is his payoff from the payment $\sup X_A$). The last of these conditions implies $1 - \mu_P \geq \frac{\bar{x}+\gamma_e}{\delta Z}$, and so $\eta_P > 0$. By prior arguments it follows that $\eta_A = 0$ and $\mu_A > 0$. So $\eta_P = \frac{\alpha_e+\gamma_e}{\delta Z}$, $\mu_P = \frac{\alpha_0+\alpha_b+\gamma_b-(\alpha_e+\gamma_e)-(1-\delta)Z}{\delta Z}$ and $\mu_A = \frac{\alpha_0+\alpha_b+\gamma_b}{Z}$. It is straightforward to check that all three probabilities lie in $(0,1)$. **QED**

The main text refers to the following result:

Proposition A-1 *Suppose the agent took action $a = G$. An equilibrium of the payment game exists, is unique, and has the following properties:*
If $Z > \Gamma_b$ and $\Gamma_e + (1-\delta) Z > \Gamma_b$ and $\Gamma_e > \delta Z$ then only the principal makes a payment, and he wins the case; $V_P = Z - (\alpha_0 + \alpha_b)$; and $V_A = 0$.
If $Z > \Gamma_b$ and $\Gamma_e + (1-\delta) Z > \Gamma_b$ and $\delta Z > \Gamma_e$ then both parties make payments with positive probability; $V_P = (1-\delta) Z + \Gamma_e - \Gamma_b$; and $V_A = 0$. If $\delta \leq 1$ the agent wins with a strictly lower probability than the principal.

Proof of Proposition A-1:
Case: $Z > \Gamma_b$ and $\Gamma_e + (1-\delta) Z > \Gamma_b$ and $\Gamma_e > \delta Z$, i.e., $Z > \alpha_0 + \alpha_b + \gamma_b$ and $\alpha_e + \gamma_e + (1-\delta) Z > \alpha_0 + \alpha_b + \gamma_b$ and $\alpha_e + \gamma_e > \delta Z$.

The agent makes no payment here, since the minimum payment the judge accepts, α_e, combined with the agent's cost, γ_e, exceeds the amount δZ at stake for the agent. Given the agent makes no payment, the principal pays $\alpha_0 + \alpha_b$ and wins the case.
Case: $Z > \Gamma_b$ and $\Gamma_e + (1-\delta) Z > \Gamma_b$ and $\delta Z > \Gamma_e$, i.e., $Z > \alpha_0 + \alpha_b + \gamma_b$ and $\alpha_e + \gamma_e + (1-\delta) Z > \alpha_0 + \alpha_b + \gamma_b$ and $\delta Z > \alpha_e + \gamma_e$.

As in the case $Z > \alpha_0 + \alpha_b + \gamma_b > \alpha_e + \gamma_e + (1-\delta) Z$ analyzed in Proposition 1, both X_A and X_P have strictly positive mass. As in the proof of Proposition 1, let μ_A and η_A be the masses at payments 0 and α_e in the agent's strategy, and μ_P and η_P be the masses at 0 and $\alpha_0 + \alpha_b$ in the principal's strategy. Note that since $\sup X_A - \inf X_A < Z$, it follows from Lemma 1 that $\mu_A + \eta_A > 0$ and $\mu_P + \eta_P > 0$. Write $\bar{x} = \sup X_A$, so that $\sup X_P = \bar{x} + \alpha_b - \alpha_e + \alpha_0$.

Suppose that $\mu_P > 0$, i.e., the principal sometimes makes no payment. Equating the principal's payoff from his maximum payment and and no payment implies $\bar{x} = Z - \alpha_0 - \alpha_b - \gamma_b + \alpha_e$. But then the agent's payoff from paying $x_A = \bar{x}$ is $\delta Z - Z + \alpha_0 + \alpha_b + \gamma_b - \alpha_e - \gamma_e < 0$, and so he would strictly gain from deviating and making no payment.

Consequently, $\mu_P = 0$, i.e., the principal always makes a payment, and hence $\eta_P > 0$ and $\eta_A = 0$, and so $\mu_A > 0$. The agent always loses if he makes no payment, and so equating his payoffs from no payment and the maximal payment, $\bar{x} = \delta Z - \gamma_e$. So the agent's payoff is 0, and the principal's payoff is $Z - (\bar{x} + \alpha_b - \alpha_e + \alpha_0) - \gamma_b = (1-\delta) Z + \gamma_e + \alpha_e - \alpha_0 - (\alpha_b + \gamma_b) > 0$.

Finally, I confirm that an equilibrium actually exists. In order for the probability mass of both parties strategies to equal 1, $1 - \eta_P = \frac{\bar{x}-\alpha_e}{\delta Z}$ and $1 - \mu_A = \frac{\bar{x}-\alpha_e}{Z}$, and hence $\mu_A = 1-\delta+\frac{\alpha_e+\gamma_e}{Z}$ and $\eta_P = \frac{\alpha_e+\gamma_e}{\delta Z}$. It is straightforward to check that both μ_A and η_P lie in $(0,1)$. The principal has no profitable deviation, since his payoff from any payment in his equilibrium strategy is strictly positive (see above), while his payoff from making no payment is zero.

Note that the agent's probability of winning is $(1-\mu_A)\left(\eta_P + \frac{1}{2}(1-\eta_P)\right) = \frac{1}{2}(1-\mu_A)(1+\eta_P)$. Since $\mu_A = 1 - \delta + \delta\eta_P$, this expression rewrites to $\frac{\delta}{2}(1-\eta_P^2)$. **QED**

Proof of Proposition 2: From Proposition 1, $E\left[V_A^G\right] = E\left[\Gamma_b - \Gamma_e | \Gamma_b < Z\right] \times \Pr(\Gamma_b < Z) + Z \Pr(\Gamma_b > Z)$ and $E\left[V_A^B\right] = 0$. The expression for $I(Z)$ follows from $I(Z) = E\left[V_A^G\right] - E\left[V_A^B\right]$.

For the elasticity implication, let $\tilde{\alpha} = \alpha_0 + \alpha_b$, and write H for its distribution function. So

$$\frac{I(Z)}{Z} = 1 - \int^{Z-\gamma_b} E\left[1 - \frac{\tilde{\alpha} + \gamma_b - (\alpha_e + \gamma_e)}{Z} | \tilde{\alpha}\right] dH(\tilde{\alpha})$$

and so for any Z_1 and $Z_2 > Z_1$,

$$\begin{aligned}
\frac{I(Z_2)}{Z_2} - \frac{I(Z_1)}{Z_1} &= \int^{Z_2-\gamma_b} E\left[\frac{\tilde{\alpha} + \gamma_b - (\alpha_e + \gamma_e)}{Z_2} - 1 | \tilde{\alpha}\right] dH(\tilde{\alpha}) \\
&\quad - \int^{Z_1-\gamma_b} E\left[\frac{\tilde{\alpha} + \gamma_b - (\alpha_e + \gamma_e)}{Z_1} - 1 | \tilde{\alpha}\right] dH(\tilde{\alpha}) \\
&= \int_{Z_1-\gamma_b}^{Z_2-\gamma_b} E\left[\frac{\tilde{\alpha} + \gamma_b - (\alpha_e + \gamma_e)}{Z_2} - 1 | \tilde{\alpha}\right] dH(\tilde{\alpha}) \\
&\quad + \left(\frac{1}{Z_2} - \frac{1}{Z_1}\right) \int^{Z_1-\gamma_b} E\left[\tilde{\alpha} + \gamma_b - (\alpha_e + \gamma_e) | \tilde{\alpha}\right] dH(\tilde{\alpha}).
\end{aligned}$$

The first term is negative because if $\tilde{\alpha} \leq Z_2 - \gamma_b$ then $\tilde{\alpha} + \gamma_b - (\alpha_e + \gamma_e) - Z_2 \leq 0$. The second term is negative because $\frac{1}{Z_2} - \frac{1}{Z_1} < 0$ and $\tilde{\alpha} + \gamma_b - (\alpha_e + \gamma_e)$ is positive by Assumption 1. Hence $\frac{I(Z_2)}{Z_2} < \frac{I(Z_1)}{Z_1}$, establishing that $I(Z)/Z$ is decreasing in Z.

Finally, for the upper bound on $I(Z)$, observe that

$$\begin{aligned} I(Z) &= E[Z|\Gamma_b > Z]\Pr(\Gamma_b > Z) + E[\Gamma_b - \Gamma_e|\Gamma_b < Z]\Pr(\Gamma_b < Z) \\ &\leq E[\Gamma_b] - E[\Gamma_e|\Gamma_b < Z]\Pr(\Gamma_b < Z). \end{aligned}$$

QED

Proof of Proposition 3: Note that absent corruption costs and payments to the judge, $V_P^a + V_A^a = Z$, where a is the agent's action. So the total cost of corruption costs and payments to the judge is $Z - E[V_P^a] - E[V_A^a]$, where the expectation is over possible realizations of corruption costs. Note that $I(Z) = E\left[V_A^G\right] - E\left[V_A^B\right]$. Because equilibrium payoffs depend only on whether a party is in the right or wrong, $E\left[V_A^G\right] = E\left[V_P^B\right]$. From Proposition 1, $E\left[V_P^G\right] = E\left[V_A^B\right] = 0$ under Assumption 1. Hence for both $a = G, B$, the cost is simply $Z - I(Z)$.

For the second part, consider any pair of contracts Z_1 and $Z_2 > Z_1$. From Proposition 2, $C(Z_2) > Z_2 - Z_2\frac{I(Z_1)}{Z_1} = Z_2\left(1 - \frac{I(Z_1)}{Z_1}\right) \geq Z_1\left(1 - \frac{I(Z_1)}{Z_1}\right) = C(Z_1)$. **QED**

Proof of Proposition 4: The incentive function I is continuous, so $\{Z : I(Z) \geq z\}$ has a minimum value, and hence $I(Z^*(z)) = z$. So

$$\frac{C(Z^*(z))}{z} = \frac{Z^*(z) - I(Z^*(z))}{I(Z^*(z))}$$

which is increasing in z since Z^* is increasing in z, and $I(Z)/Z$ is decreasing in Z by Proposition 2. **QED**

Proof of Proposition 5: Let $\tilde{\alpha} = \alpha_0 + \alpha_b$, and write H for its distribution function. Then $I(Z)$ can be written in the form $I = \int u(\tilde{\alpha})\,dH(\tilde{\alpha})$, where α is increasing and continuous except for at $\tilde{\alpha} = Z - \gamma_b$. An easy adaptation of standard arguments implies that if the distribution H first-order stochastically dominates the distribution $\tilde{H}$, then $\int u(\tilde{\alpha})\,dH(\tilde{\alpha}) > \int u(\tilde{\alpha})\,d\tilde{H}(\tilde{\alpha})$. The result follows. **QED**

Proof of Proposition 8: Appeals arrangement (III) renders the decision of the first judge irrelevant. Consequently, appeals arrangement (III) is equivalent to the basic model with no appeals stage.

Next, consider appeals arrangement (I). If the agent takes action $a = G$, and the first judge rules for the agent, since the principal cannot appeal the payoffs for the principal and the agent are simply $-t_G$ and $t_G = t_B + Z$ (ignoring any bribes and corruption costs, which at this point are sunk). If instead the first judge rules for the principal, the agent will appeal and the payoffs for the principal and the agent are $-t_G + E\left[V_P^G\right]$ and $t_B + E\left[V_A^G\right]$. Since $E\left[V_P^G\right] = 0$ by Proposition 1, the principal's payoff is independent of the first judge's decision. Consequently, the principal makes no payment to the first judge, and since the agent deserves to win the case he does so with probability 1. Because the agent takes action $a = G$ in equilibrium, no corruption occurs.

Finally, consider appeals arrangement (II). If the agent takes action $a = G$, and the first judge rules for the agent, the principal will appeal and the payoffs for the principal and the agent are $-t_G + E\left[V_P^G\right]$ and $t_B + E\left[V_A^G\right]$. If instead the first judge rules for the principal, the agent cannot appeal and the payoffs for the principal and the agent are simply $-t_B = -t_G + Z$ and t_B. Since $E\left[V_P^G\right] = 0$ by Proposition 1, the principal's gain from winning the initial trial is Z, while the agent's is δZ, where $\delta = E\left[V_A^G\right]/Z < 1$. The equilibrium level of corruption costs is strictly positive here. **QED**

References

Franklin Allen and Douglas Gale. Measurement distortion and missing contingencies in optimal contracts. *Economic Theory*, 2(1):1–26, January 1992.

Luca Anderlini, Leonardo Felli, and Andrew Postlewaite. Courts of law and unforeseen contingencies. *Journal of Law, Economics and Organization*, 23: 662–684, 2007.

Luca Anderlini, Leonardo Felli, and Andrew Postlewaite. Should courts always enforce what contracting parties write? *Working Paper*, 2009.

Ian Ayres. Judicial corruption: Extortion and bribery. *Denver University Law Review*, 74, 1231-1253 1997.

Michael R. Baye, Dan Kovenock, and Casper G. de Vries. Rigging the lobbying process: An application of the all-pay auction. *American Economic Review*, 83(1):289–294, March 1993.

Michael R. Baye, Dan Kovenock, and Casper G. de Vries. The all-pay auction with complete information. *Economic Theory*, 8:291–305, 1996.

Michael R. Baye, Dan Kovenock, and Casper G. de Vries. Comparative analysis of litigation systems: an auction-theoretic approach. *Economic Journal*, 115:583601, July 2005.

Gary S Becker and George J Stigler. Law enforcement, malfeasance , and the compensation of enforcers. *Journal of Legal Studies*, 3(1):1–18, January 1974.

Antonio E Bernardo, Eric Talley, and Ivo Welch. A theory of legal presumptions. *Journal of Law, Economics, and Organization*, 16(1):1–49, April 2000.

B Douglas Bernheim and Michael D Whinston. Incomplete contracts and strategic ambiguity. *American Economic Review*, 88(4):902–932, September 1998.

Richard T Boylan. What do prosecutors maximize? Evidence from the careers of U.S. attorneys. *American Law and Economics Review*, 7(2):379–402, Fall 2005.

Ronald H Coase. The nature of the firm. *Economica*, New Series, 4:386–405, 1937.

David Friedman. Why not hang them all: The virtues of inefficient punishment. *Journal of Political Economy*, 107(6(2)):S259 – S269, December 1999.

Edward L. Glaeser and Andrei Shleifer. Legal origins. *Quarterly Journal of Economics*, 2002.

Edward L. Glaeser and Andrei Shleifer. The rise of the regulatory state. *Journal of Economic Literature*, 41(2):401–425, June 2003.

Oliver Hart. *Firms, Contracts and Financial Structure*. Oxford University Press, 1995.

Joel S Hellman, Geraint Jones, and Daniel Kaufman. Seize the state, seize the day: State capture, corruption, and influence in transition. *World Bank Policy Research Paper 2444*, 2000.

M. H. Hoeflich. Regulation of judicial misconduct from late antiquity to the early middle ages. *Law and History Review*, 2(1):79–104, Spring 1984.

Bengt Holmström and Paul Milgrom. Multitask principal-agent analyses: Incentive contracts, asset ownership, and job design. *Journal of Law, Economics and Organization*, 7(Special Issue):24–52, 1991.

Giovanni Immordino and Marco Pagano. Legal standards, enforcement and corruption. *Journal of the European Economic Association*, forthcoming.

Fahad Khalil, Jacques Lawarrée, and Sungho Yun. Bribery vs. extortion: allowing the lesser of two evils. *RAND Journal of Economics*, forthcoming.

Patrick Legros and Andrew F Newman. Courts, contracts, and interference. *European Economic Review*, 46(4-5):734–744, May 2002.

James Lindgren. The theory, history, and practice of the bribery-extortion distinction. *University of Pennsylvania Law Review*, 141, May 1993.

Arun S. Malik. Avoidance, screening and optimum enforcement. *RAND Journal of Economics*, 21(3):341–353, Autumn 1990.

Eric Maskin and Jean Tirole. Unforeseen contingencies and incomplete contracts. *Review of Economic Studies*, 66:83–114, January 1999.

John McMillan and Pablo Zoido. How to subvert democracy: Montesinos in Peru. *Journal of Economic Perspectives*, 18(4):69–92, Fall 2004.

Paul R Milgrom. Employment contracts, influence activities, and efficient organization design. *Journal of Political Economy*, 96(1):42–60, February 1988.

Vai-Lam Mui. Contracting in the shadow of a corrupt court. *Journal of Institutional and Theoretical Economics*, 155:249–283, 1999.

Mancur Olson. Dictatorship, democracy, and development. *American Political Science Review*, 87(3):567–576, September 1993.

A. Mitchell Polinsky and Steven Shavell. Corruption and optimal law enforcement. *Journal of Public Economics*, 81(1):1–24, July 2001.

Richard A. Posner. *Overcoming Law*. Harvard University Press, 1995.

Susan Rose-Ackerman. *Corruption and Government: Causes, Consequences, and Reform*. Cambridge University Press, 1999.

Chris William Sanchirico. A primary-activity approach to proof burdens. *Journal of Legal Studies*, 37(1):273313, January 2008.

Ilya Segal. Complexity and renegotiation: A foundation for incomplete contracts. *Review of Economic Studies*, 66(1):57–82, January 1999.

Ron Siegel. All-pay contests. *Econometrica*, (1):71–92, January 2009.

Herbert A Simon. *The sciences of the artificial*. MIT Press, 1981.

Kathryn E. Spier. Incomplete contracts and signalling. *RAND Journal of Economics*, 23(3):432–443, Autumn 1992.

Kathryn E. Spier. Settlement bargaining and the design of damage awards. *Journal of Law, Economics and Organization*, 10(1):84–95, 1994.

Jean Tirole. Hierarchies and bureaucracies: On the role of collusion in organizations. *Journal of Law, Economics, and Organization*, 2(2):181–214, Autumn 1986.

Oliver E Williamson. *Markets and Hierarchies: Analysis and Antitrust Implications.* Free Press, 1975.