

# The Logic of Bribes and Corruption: A Game-Theoretic Analysis

D. Filipovich

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# Outline

## What is 'corruption'?

### The Logic of (Traffic) Bribes

A First Scenario: Conditional, Internal Supervision under Perfect Observability

Bargaining

Whistleblowing Rewards

Wages and Bribes

The Role of Honesty

Relaxing Full Observability

Unobservability of Agent-Supervisor Bribe-Sharing

Full Opacity: Unobservable Bribe-Sharing and Bribe-Taking

### Rules' Design and Corruption

A Basic Model of Rules and Rule's Enforcement

Benchmark: A Fully Consistent Rule

An Inconsistent Rule but Consistent Subrules

Evaluating a 'Real World' Anti-bribe Program

### Pending Tasks

# What is (systemic) corruption?

## Some Current Notions

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- ▶ Serial Shirking?
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▶ **Definition Corruption**

Corruption is the use of legitimate norms to sustain illegitimate ones.

⇒ 'Norm Parasitism'



## The basic underlying logic:

Using legitimate norms to punish those who do not comply with the corrupt norm.

*'A los amigos, justicia y gracia. A los enemigos, la ley a secas'*

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- ▶ Family ties vrs. professional norms in professional environments.
- ▶ Friendship vrs. professional obligations.
- ▶ Political loyalties superseding internal hierarchies in enterprises.

## Perverting Internal Norms:

Legitimate norms internal to an organization are exploited to enforce corrupt practices.

⇒ Exploit Both Norm Characteristics and Application Procedures



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- ▶ Application procedure not existent or indeterminate.
- ▶ Application capabilities non-existent.

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Illegal behavior is tolerated, often actively encouraged by corrupt authorities in order to create vulnerable groups that can be manipulated politically.

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- ▶ Pirate Taxis in Mexico City
- ▶ Irregular settlements in urban areas
- ▶ Ambulant sellers.

- ▶ Police Supervisor/Agent collusion as in this paper.

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- ▶ Corruption also can take hold in private organizations.
- ▶ Rules' manipulation implied, but not explicit. Why can't public office be abused for public gain?
- ▶ The focus on private gain is misleading as corruption benefits collectives, often at the expense of some individual members.

# The Logic of (Traffic) Bribes

Apparently a classic, clearcut case of abuse of public office for private gain.

**Key Issues:** Whose gain? Who is involved?

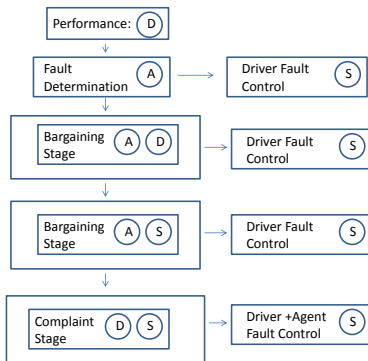
Does it only take two to bribe?

Police Officer vrs. Driver

**Claim:** It takes at least three to bribe persistently.

Police Officer vrs. Driver vrs. Police Supervisor.

## A Basic Scheme for Analyzing Traffic Bribes





## A First Scenario: Conditional, Internal Supervision under Perfect Observability



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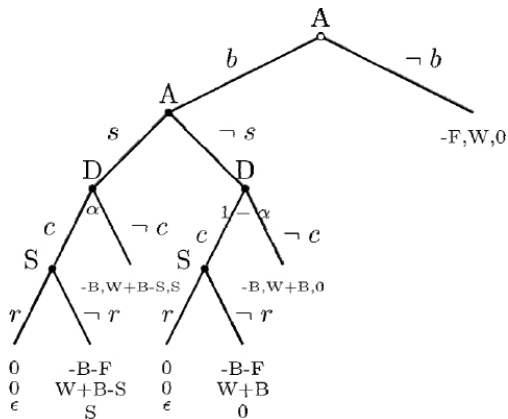
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⇒ Internal control story.



## Game I Perfect Observability



**Note:** Full Whistleblowing Rewards!

The Role of A-D bargaining vrs. A-S bargaining.

- ▶ Assumption 1:  $S > \epsilon$
- ▶ Assumption 2:  $S < B$
- ▶ Assumption 3:  $S > B$

**Claim:** Under Assumptions 1 and 2, in the unique subgame perfect equi. a bribe is imposed, shared and no complaint is filed.

**Claim:** Under Assumptions 1 and 3, in the unique subgame perfect equi. a bribe is not imposed.

**Provisional Lesson 1** *Bargaining terms between the supervisor and the agent (which determine how high  $S$  is relative to  $B$ ) are essential for determining whether bribe-taking will be feasible under full observability.*

**Provisional Lesson 2** *A-D Bargaining (which determines how high  $B$  is relative to  $F$ ) is not an important determinant of bribe-taking?*

**Implicit Assumption:** Relative magnitudes are independent of levels. Else, if say, one takes  $S$  to be fixed in absolute terms, then height of  $B$  will clearly matter.

## The Role of Whistleblowing Rewards

- ▶ Full Rewards: Payoff after history  $\{b, s, c\} = 0$ .
- ▶ Partial Rewards: Payoff after history  $\{b, s, c\}$  either  $-F$  or  $-B$ .
- ▶ No Rewards: Payoff after history  $\{b, s, c\} = -F - B$ .

**Full Rewards:** Payoff after history  $\{b, s, c\} = 0$ .

$\Rightarrow$  A bribe is extracted if and only if  $S < B$ .

**Partial Rewards:** Payoff after history  $\{b, s, c\}$  either  $-F$  or  $-B$ .

If  $-F$ :

- ▶ If  $F > B$  then bribe always extracted.
- ▶ Else, bribe extracted iff  $S < B$ .

If  $-B$ :

- ▶ Multiple equilibria as D now indifferent between complaining and not.
- ▶ Always an equilibrium with bribing (as with no rewards).
- ▶ An equilibrium as with full rewards: Bribe iff  $S < B$ .



**No Rewards:** Payoff after history  $\{b, s, c\} = -F - B$ .

$\Rightarrow$  A bribe is always extracted.

**Provisional Lesson 3** *Augmenting Whistleblowing rewards reduces bribe taking so long as it entails bribe refunds.*

**Caveat:**

- ▶ This works here by allowing the supervisor to exercise his or her bargaining power credibly, resulting in outrageous sharing demands, and only via this *indirect* effect, dissuade bribe-taking.
- ▶ Bribe refunds are difficult!

**Can Whistleblowing ever be counterproductive -i.e., encourage bribe taking?**

⇒ Cannot happen here because supervisors cannot directly pressure agents to impose bribes.

## Wages and Bribes

**Provisional Lesson 4** *Under Full Whistleblowing rewards and full observability, lower  $W$  might dissuade bribe-taking, while higher  $W$  might induce it.*

**Caveat:**

- ▶ This result requires  $W + B - S < 0$ . Still, even if  $W + B - S > 0$ ,  $W$  does not matter (with whistleblowing rewards).
- ▶ However,  $W$  could affect bribe-taking if it increased somehow bargaining power of  $S$  -here just not modelled.

## The Role of Honesty

Honesty as a 'bias' towards doing what is right or as a 'compulsion' towards doing the right thing.

### Assumption:

- ▶  $S < \epsilon$
- ▶ Payoff of agent if no bribe is demanded,  $W + \theta$ , with  $\theta$  a 'moral bonus'.

**Provisional Lesson 5** *Honesty higher up in the hierarchy is more conducive to honest behavior than honesty lower down.*



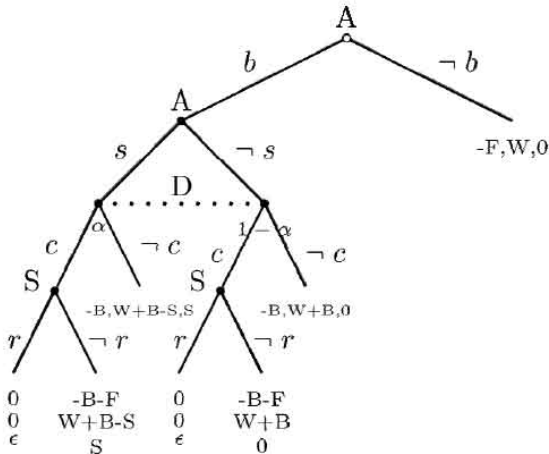
## Relaxing Full Observability

## Unobservability of Agent-Supervisor Bribe-Sharing

Full Observability: Unrealistic!

At the very least, driver should not be able to observe bribe-sharing between agent and supervisor.

## Game II Partial Observability



Full Whistleblowing Rewards.

A key circularity emerges:

- ▶ If driver complains (unconditionally), then agent will want to share the bribe.
- ▶ But if agent shares the bribe, driver will not want to complaint.

⇒ Mixed Strategy Equi.!

If  $W + B - S > 0$  and  $S < \epsilon$ , then

1. Agent will share with probability  $\frac{B}{B+F}$
2. Driver will complain with probability  $\frac{S}{W+B}$
3. So long as  $B - S$ , a bribe will be imposed.



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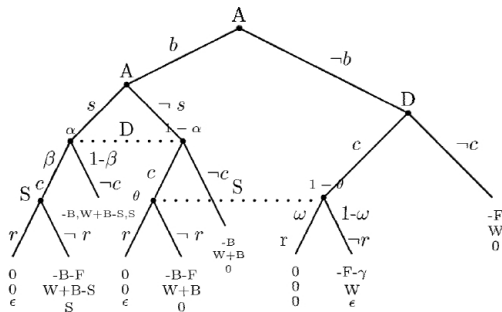
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- ▶ With an honest cop ( $W + \theta$ ), will only bribe if  $\theta < |B - S|$
- ▶ In the absence of whistleblowing rewards, full or partial (recover only bribe), no change from scenario with full observability.

## Full Opaqueness: Unobservable Bribe-Sharing and Bribe-Taking

Supervisor observing bribe-taking is, at least in the case of traffic-bribes, unlikely.

⇒ Extensive form has to be modified to allow for complaints even if no bribe was imposed.

## Game III





If  $W + B - S$  and  $S > \epsilon$ , then there will multiple equilibria as follows,

1. An equi. in mixed strategies just as in the partial observability case.
2. An equi. in pure strategies with pure play such that

$$b \rightarrow \cancel{b} \rightarrow \cancel{c}$$

and  $\omega \in (0, 1)$ .

## Two Observations:

- ▶ Bribing so long as  $W + B - S > 0$  (in partial observability, it was necessary that  $B - S > 0$ )
- ▶ If  $W + B - S < 0$  then only pure play equi.



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- ▶ In the absence of whistleblowing rewards, full absence of rewards eliminates the mixed equi. Partial absence (recover only bribe), ?.

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- ▶ Whistleblowing not a panacea: Often ineffective.
- ▶ Less obvious approaches, i.e., modifying bargaining conditions, will depend on information.
- ▶ Even obvious approaches, i.e., 'injecting honesty', must be handled with care: Better and worse ways of doing it.

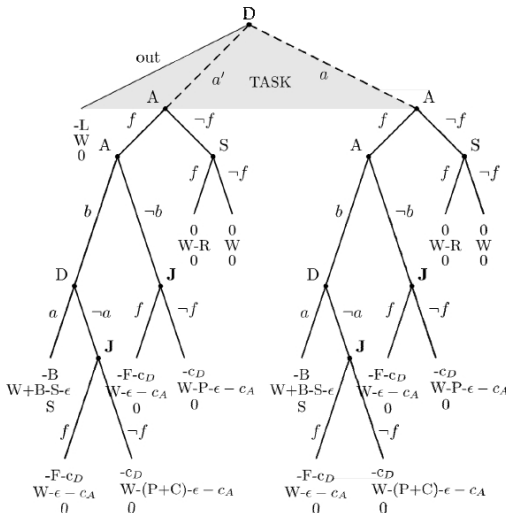


# Rules' Design and Corruption

## Internal Control vrs. External Control

- ▶ Internal control focuses on Supervisor/Agent relation.
- ▶ External control focuses on Agent/Driver relation, and brings in a pseudo-player, a 'Judge'.

## Game IV: Fault Determination Game



## A Basic Model of Rules and Rule's Enforcement

## TASK:

$$a \in R_n^+$$

s.t.

$$\{a | \mathfrak{R}\}$$

## Definition: RULE

A Rule  $\mathfrak{R}$  is an ordered list of  $k$  linear inequalities or logical combinations of linear inequalities  $\{r_i\}_{i=1}^k$ , each called a 'subrule'.

**Truthfull Narrow Enforcement** *The judge's fault assesment is limited to determining whether the driver violated the subrule the agent points out.*

## Assumptions on Payoffs

### Driver Payoffs

$$A1 : L > B$$

$$A2 : B \leq F + c_D$$

$$A3' : B > c_D$$

$$A3'' : P > c_A$$

### Agent Payoffs

$$A4a : B - S \geq 0$$

$$A4b : B - S < 0$$

$$A5 : W + B - S \geq 0$$

Under the assumption A4b that  $B - S < 0$ , some additional assumptions are in order.

$$A6a : |B - S| > P$$

$$A6b : |B - S| \leq P$$

A6a requires additional assumptions.

$$A7 : |B - S| < P + C$$

$$A8 : |B - S| > c_a$$

$$A9a : |B - S| > P + c_A$$

$$A9b : |B - S| \leq P + c_A$$



## Benchmark: A Fully Consistent Rule

Under a fully consistent rule, driver chooses the right action, agent finds no fault and supervisor agrees. No bribes.

## An Inconsistent Rule but Consistent Subrules

$$\mathfrak{R} = \{a \leq 0.5, a \geq 0.7\}.$$

## Two Scenarios:

1.  $B - S \geq 0$
2.  $B - S < 0$

## SCENARIO 1: $B - S \geq 0$

**Equilibrium under Aligned Supervisor/Agent Interests** *The path of play is for the driver to drive, and for the agent to assess fault and demand a bribe, which is accepted.*

**DEFINITION: Individual Guilt Control** The judge just checks whether the violation invoked by the individual agent is justified or not in the one specific episode (i.e., at a specific time, place and by this specific driver).

**DEFINITION: Legality Control** The judge checks whether the rule invoked can and is being consistently applied across time, places, drivers and agents. This entails checking not only that fault is assessed correctly, but also, that no fault is assessed correctly<sup>1</sup>.

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<sup>1</sup>Legality controls need not violate the 'presumption of innocence' principle, as they do not need to involve any guilt determination regarding the behavior of private parties. At most, such controls involve 'guilt determinations' regarding officials in charge of implementing the rule, i.e., here, the supervisor and the agent.

## SCENARIO 2: $B - S < 0$

Interests of supervisor and agent opposed!

**Equilibrium with Non-Alignment of Interests** *Under the assumption that  $c_A < |B - S|$  and an inconsistent rule, the agent in an equilibrium either does not issue a ticket in the first place, or issues one but does not demand a bribe. If the agent plans to issue a ticket and  $F + c_A > L$ , then the driver will opt out; else, the driver will drive.*

Supervisor can now pressure agent into finding fault! But 'scape routes'!

- ▶ Agent can refuse to bribe altogether.

**Note:** Supervisor threat not successful in inducing bribes, but if  $F > L$ , then it might dissuade the driver from driving.



Supervisor can now pressure agent into finding fault! But 'scape routes'!

- ▶ Agent can refuse to bribe altogether.
- ▶ Driver can refuse to bribe or refuse to drive.

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## Directly Binding Rules on the Agent

Agent will have to issue fine.

1. If supervisor/agent interests aligned, nothing changes.
2. If non-aligned, then fine must be levied and if  $F > L$  then no driving.

## Ambiguous Subrules

$$\mathfrak{R} = \{a \in [0.4, 0.5] \text{ or } a \in [0.2, 0.9], a \in [0.4, 0.5] \text{ and } a \in [0.2, 0.9]\}$$

⇒ Now even if agent bound by rule, he or she can find fault at will.  
(assume judge bound by agent's interpretation).

**Key Issue:** Supervisor must block *all* Legal Escape Routes.

**Dilemma:** To block all escape routes simultaneously to agent and driver,

1. Judge must disagree with agent in case no bribe demanded.
2. Judge must agree with agent in case driver refuses to pay the bribe.

⇒ Must have all around punishment!

The blocking can be attained if legal system sufficiently elaborate so that

- ▶ Multidimensional punishment, which allows one agent to be punished along one dimension, while the rival is punished along another (via, say, extremely imprecise rules).
- ▶ Litigation is compelled even if it is a loose-loose proposition for both parties ('mutual accusation traps').

## The Use of 'Legal Messes'

A legal order that is not understood by anyone (symmetric desinformation). Hence, no 'safe responses' (or just refraining from activity altogether).

**IDEA:** If a 'legal mess' is combined with unlimited liability (i.e. potentially very drastic penalties), litigating becomes a lottery no one wants to play. Effectively, all legal exits are blocked!

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## Rights Reversal under Systemic Corruption

**Second Best Rights under Systemic Corruption:** *Under corrupt enforcement, giving up legal and decision rights might be actually beneficial for an individual.*

- ▶ If rule used and designed to damage a party, that party should hope for it to be 'coarse' and ineffective.
- ▶ If decision rights just make one target of extortion, then better not to have them.

## Evaluating a 'Real World' Anti-bribe Program

## The Proposed Measures 2013

1. Traffic policemen will all be women, in distinct uniform.
2. Cars can only be towed away for a substantially reduced number of reasons.
3. Agents cannot force upon the driver the use of a particular towing service.
4. Car and driver's documents can only be retained for a limited number of reasons.
5. A toll-free number is provided which serves both as an information line and a complaints line.
6. Severe penalties for agents who violate the rules are introduced.

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- ▶ Self-contained problem!
- ▶ Take supervisors out of the loop, without judicializing complaints: Traffic courts?
- ▶ Undertake 'legality controls'.
- ▶ Make sure process ends in 'single fault' verdicts.
- ▶ Prohibit police brotherhoods and unions that even out bargaining field between supervisors and agents.

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- ▶ Task effort. Fine levels depend on task outcome.
- ▶ Integrate Internal and External control stories. E.g., supervisor who share bribes might be able to block external control.

What is 'corruption' ?  
The Logic of (Traffic) Bribes  
Rules' Design and Corruption  
Pending Tasks

