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Abstract

Harassment bribes – payments people give in order not to be denied what they are legally entitled to – are common in for example India. Kaushik Basu recently made a 'radical' proposal to reduce its occurrence: *Legalize the act of giving the bribe and double the fine for accepting the bribe!* We develop a formal model and delineate circumstances under which Basu's proposal works well or poorly. We discuss a modified scheme where immunity is conditional on reporting that we argue addresses the main issues raised against the proposal. We highlight complementarities between these schemes and other policies aimed a improving the accountability and performance of the public sector, and of law enforcement agencies in particular. We conclude discussing the implications for the fight of more harmful forms of corruption.

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1   Introduction

Corruption remains an endemic problem in the developing world and has become a central political issue in countries like India. Recent clever empirical work has considerably advanced understanding of how widespread the problem is and of the many ways it can harm society.[1] However, at least on the ground of exactly how to fight corruption, there is the perception that "research has been lagging behind policy" (Banerjee, Hanna and Mullainathan 2011, p.1). While the World Bank has financed hundreds of anti-corruption programs and several international anti-corruption treaties have been signed, economic research did not yet identify a set of concrete anti-corruption tools to propose to policy makers, apart from some (important) general principles on monitoring and incentives.[2]

This paper tries to contribute by analyzing a specific legal tool recently proposed and intensely debated in India. Our starting point is Kaushik Basu's (2011) recent paper "Why, for a Class of Bribes, the Act of *Giving* a Bribe should be Treated as Legal." Basu describes a society (India!) in which bribery is "rampant ... a scourge that deserves to be banished." His proposal is aimed at eliminating "harassment bribes" which people have to pay just to get services they are legally entitled too (think for example of a person getting a passport, or an entrepreneur getting a deserved operating license). It goes as follows:

> *Legalize bribe-giving, double the fine for bribe-taking, and make the bribe-taker in addition have to pay back the bribe if discovered.*

When a citizen bribes a bureaucrat, under standard law the two parties become partners in crime. They may thus lack incentives to report the illegal activity. Under Basu's proposal, which he deems "fairly radical," incentives are provided for the bribe-giver to report the bribe-taker. If this is foreseen the bureaucrat will not accept the bribe in the first place. This is the key idea.

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[1] See Svensson (2005) and Olken and Pande (2011) for excellent reviews.

[2] Olken and Pande (2011), in their review of recent academic work on corruption, explain:

> "On the one hand, there has been a revolution in the measurement of corruption and this has, in turn, led to a blossoming of the academic literature on corruption. On the other hand, if we were asked by a politician seeking to make his or her country eligible for Millennium Challenge aid or the head of an anti-corruption agency what guidance the economic literature could give them about how to tackle the problem, we realized that, beyond a few core economic principles, we had more questions to pose than concrete answers."

Will Basu's proposal be beneficial? Does the answer depend on institutional details? A hot debate is raging in Indian and international newspapers. *The Economist* appeared sympathetic.[3] However, in some quarters the proposal has stirred outrage and commentators have discarded it mainly on moral grounds.[4] More tempered and thoughtful criticism has been encountered from economists. Jean Drèze, in particular, wrote a short but penetrating comment which argues that Basu does not give adequate attention to certain institutional and moral concerns which may overturn Basu's conclusions.[5]

Basu's intriguing and inspirational presentation is informal as is the heated debate that followed. Perhaps one shouldn't expect the issues to be easily settled through such discourse? The proposal is reminiscent of somewhat analogous tools used in other fields such as leniency policies in antitrust and whistleblower protection and reward schemes against fraud and organized crime. Scholars who studied those topics & tools have suggested that these interventions may be very effective if well designed and administered, but highly counterproductive if details are not set right.[6] In our view, deeper understanding of the pros and cons of Basu's proposal requires careful scrutiny within a formal model. The purpose of our paper is to contribute in this regard. We represent the scenarios Basu and his commentators care about as explicit games, and by juxtaposing their equilibria we draw conclusions regarding which legal rules should work well in what setting.[7]

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[3] "Who to Punish," May 5, 2011. See also Paul Seabright's piece on *Le Monde*, May 24, 2011.

[4] Sometimes seemingly without having fully understood the idea; see e.g. the piece "Bribes: a small but radical idea" by P. Saniat in The Hindu, April 21, page 10, 2011, or listen to some of the commentary in the BBC World Debate broadcast (from the World Economic Forum in Mumbai) of "Can India Beat Corruption?" on 1.05 PM on Sunday November 19 (check after 47 minutes).

[5] See "The Bribing Game", *Indian Express*, April 23, 2011.

[6] See Spagnolo (2008) for an overview.

[7] It is worth noting that this sort of game-theoretic approach may be useful also for completely different legal applications. For example, in 1999 Sweden introduced a new law against prostitution that substantially increased sanctions for sex buyers while maintaining the sale of sex legal, much in analogy with Basu's proposal. Similar legislation was passed in Iceland and Norway in 2009. The asymmetry was introduced for moral reasons, but it seems clear that it may also affect behavior (of prostitutes, customer, pimps, and police). The moral, practical, and legal issues that bear on prostitution surely differ from those that bear on corruption, so we do of course not suggest that our insights regarding what legislation is good or bad are portable between these contexts. But an analysis akin to our could shed light on the likely effects of that law as well. For example, consider police treatment of prostitutes. Levitt and Venkatesh (2007) calculate that in Chicago, where both buying and selling sex is illegal, mishandling/extortion by the Police is so common that "a prostitute is more likely to have sex with a police officer than to get officially arrested". Perhaps this pattern would change under the Scandinavian model?

In our analysis, Basu's proposal gets mixed, highly context-dependent, grades as regards usefulness with harassment bribes. We highlight complementarities with other policies; Basu's proposal tends to work best if coupled with measures that increase the costs to bureaucrats of denying citizens what they deserve or which reduce the costs to citizens of getting justice. The subtle institutional and moral considerations brought up by Drèze complicate the picture, but we propose a modification of Basu's proposal which may seem a small twist and yet obviates many of the objections. The idea is inspired by leniency rules in anti-trust. Rather than legalize bribe-giving, only bribe-givers who report are awarded legal immunity.

Harassment bribes may seem relatively innocuous: they are paid for services people are entitled to and which do not hurt (and typically may even benefit) others. Of course, many bribes are not of that sort; they may rather be exchanged for services that are illegal and come at the expense of others. It is natural to wonder how Basu's proposal, and our analysis, might relate to such more harmful forms of corrupt exchange. For the most part we limit our attention to harassment bribes, just like Basu, but in the concluding remarks we address the issue of non-harassment bribes. As it turns out, we can draw more clear conclusions regarding the usefulness of Basu's proposal and its leniency-inspired modification for combatting such more harmful forms of corruption.

Section 2 introduces a stylized one-shot bribery game with entrepreneur-civil servant interaction, which in section 3 is extended to the case where (at least) one of the parties is a 'long-run' player who interacts over and over again with new (or old) co-players. In sections 2 and 3 we highlight externalities associated directly with bribes and the services bureaucrats provide, but abstract away from the considerations brought up by Drèze; these are then addressed in section 4. Section 5 concludes with a summary of the results and a discussion of their policy implications.

2   The one-shot case

We consider an interaction involving an entrepreneur (E) and a civil servant (S). The government has employed S trusting him with the task of issuing a licence to people like E. However, it is within S's power to deny E this treatment. Anticipating this possibility E may offer S a bribe. Figure 1 depicts the game that describes the exact timing:

INSERT FIG 1 HERE!

At the root E either offers a bribe (B) or not $(\rightarrow B)$. In the latter case S responds by either issuing a licence (L) or not doing so $(\rightarrow L)$. If E offers a bribe, then S has three choices: not accept the bribe & not issue a licence $(\rightarrow A \rightarrow L)$; not accept the bribe & issue a licence $(\rightarrow AL)$; accept the bribe & issue the licence (AL).[8] If E chooses B and S responds with AL then the players move once more, simultaneously choosing whether to report (R) or not $(\rightarrow R)$ the exchange of the bribe to the government.

As regards the players' payoffs, assume that we have a society where giving and accepting bribes is illegal and subject to fines. However, the practice is so widespread that there is practically no chance of being convicted and fined unless a party involved in the corrupt exchange reports it to the government. Let b be the amount of the bribe, v the value to E of a licence, c the cost to S of issuing a licence, and F_E and F_S the fines to E and S if government discovers (through a report) that E paid a bribe to S. Assume that $F_E, F_S > v > b > 0$ and that $b > |c|$. Figure 1 shows how these economic parameters shape the players' payoffs.

Some clarifying comments are essential: First consider c. This is not a cost to care about for welfare purposes. Recall, S is hired with the understanding that he should issue the licence to people like E. It is implicit that S is adequately compensated and that the value to society of licensing is (much) higher than c. Hence, if S fails to issue a licence to E this is a bad outcome from society's point of view.

More generally, we propose that one should discount the relevance of all the payoffs in our stylized game, as regards welfare. Why is there public debate about the (negative) effects of bribes and corruption even when they do not appear to distort allocations? The answer has to do with externalities. It may serve the public's interest, somehow that people like E get a licence when they have earnt it. That was our example of the previous paragraph. Similarly, occurrence of bribes may be bad. Why? Perhaps if E has to bribe S to get his licence, then this influences E's propensity to not cheat when filling out his tax return! Or maybe it's something else. The issue may be real but nebulous. We shall not attempt any exact quantification of the related cost. Rather, we will use two qualitative yardsticks to evaluate welfare:

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[8]We assume that when the bribe is accepted E hands it over with one hand at the same time that he receives the licence in the other hand. Hence it is impossible for S to accept the bribe & not issue the licence. This marks a difference relative to Buccirossi and Spagnolo's (2006) analysis of illegal exchanges where decisions are likely not simultaneous and need an enforcement mechanism in their own right (sometimes provided by the strategic use of poorly designed leniency policies).

    – *To what degree are bribes deterred?*

    – *To what degree are licences issued?*

Basu's paper is based on the premise that bribes are bad. Our example above reflected the idea that licences are good.[9] We shall accordingly evaluate outcomes according to whether they have good deterrence (of bribes) properties as well as in terms of how efficient they are in providing licences to all E's.

We will in turn cover each of the cases $c > 0$ and $c < 0$, again not because the level of c matters to welfare. The reason is that the sign of c matters to E's and S's decisions.[10] Note also that each case makes sense. The case $c > 0$ seems relevant to the extent that S has some opportunity cost of not shirking, say filling in paperwork rather than playing Tetris on a computer. The case of $c < 0$ may be relevant in contexts where denying E a licence he is entitled to comes with some small risk of being caught-in-the-act-and-fired by a boss. Of course, both considerations may be relevant to some degree in any given situation so c should be interpreted as reflecting their net effect.[11] Since the second consideration reflects governments ability to catch a shirking servant, we like to think of c as reflecting how well organized government is, a lower value implying better organization.

The case of $c > 0$

Once the reporting subgame is reached each player has a (weakly) dominant choice not to report. Assuming that each player thus chooses $\rightarrow R$ there, the game possesses a unique associated subgame perfect equilibrium: S chooses AL following B. Moreover, S chooses $\rightarrow L$ following $\rightarrow B$. The best response for E at the root is B. Compactly described, walking through informations sets from left to right, the strategy profile in question can be written as $((B, \rightarrow R), (\rightarrow L, AL, \rightarrow R))$. The outcome: E offers a bribe to S who accepts it & issues a licence; no player reports the bribe.

Is this good or bad from society's point of view? That depends. A bribe is paid, which is presumed to be bad. On the other hand, a licence is issued, which is presumed to be good. The overall effect seems unclear. In addition, there is the following consideration (in line with the

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[9]We are following closely Basu in focusing on bribes paid for services people are entitled to, in which case – provided the entitlement rule is sound – more licenses should be unambiguously good.

[10]Assuming that S is an agent of a benevolent government that cares for welfare, c is thus a potential source of "misgovernance" in the sense discussed by Banerjee (1997) (who also develops a model, which however has different focus than ours).

[11]It seems unlikely that the two effects would balance each other exactly, so we neglect the case of $c = 0$.

theory of corruption inefficiency developed by Schleifer and Vishny 1993): As regards the issuing of licences the outcome may actually be substandard much in the same way as monopoly pricing leads to deadweight loss. Imagine that the situation in which this game is embedded is somewhat richer than seen in Figure 1: Relax the assumption that it necessarily holds that $v > b$. Assume that before E decides whether or not to offer S a bribe E's value v is randomly drawn from (say) a uniform distribution on the unit interval ($v \sim U[0,1]$). Assume that E knows v, that S does not know v, and that S chooses b (a posted-price of sorts) before play proceeds as in Figure 1. Note that if $v < b$ then E would never offer a bribe since that is a dominated choice, so in this case society loses a desirable license (given that S chooses $\rightharpoonup L$ in response). Taking this into account, S should now choose b to solve

$$max_b(1-b)(b-c)$$

The optimum is $b = (1+c)/2$. If every citizen in this society plays this game with some civil servant in the role of S, then folks that draw values of v such that $0 \leq v < (1+c)/2$ never offer a bribe and never get a licence, with loss of payoff as described for them and for society.[12] As regards licensing, things could be worse (if the licence were never issued) but they could also be better (if E got his licence even when $v \leq b$).

One the other hand, a similar point applies as regards bribe deterrence. Note that bribes occur when there is a licence, and vice versa. As regards deterrence, things could be better (if bribes were never exchanged) but they could also be worse (if a bribe was exchanged even when $v \leq b$).

We now consider Basu's proposal: *Legalize bribe-giving, double the fine for bribe-taking, and make the bribe-taker in addition have to pay back the bribe if discovered.* This policy implies that the game of Figure 1 changes to the game of Figure 2:

INSERT FIG 2 HERE!

Maintaining that dominant choices are made in the reporting subgame (R for E; $\rightharpoonup R$ for S), this game has two subgame perfect equilibria. Compactly described, as before, they are: $((\rightharpoonup B, R), (\rightharpoonup L, \rightharpoonup A \rightharpoonup L, \rightharpoonup R))$ and $((B, R), (\rightharpoonup L, \rightharpoonup A \rightharpoonup L, \rightharpoonup R))$. That is, E may or may not offer a bribe, but the outcome is essentially the same: S does not accept any bribe & does not issue any license.

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[12]The game of Figure 1, and its solution, could be augmented to make this all explicit. We avoid doing so since the game tree becomes too large to be enjoyable and since the arguments are obvious when stated in words.

Is this outcome good or bad? Again, it depends. On the one hand, bribes do not occur: *corruption is deterred.* On the other hand, *no licences are issued!* (Of course, the players get lower payoffs than in the game of Figure 1, but we argued that this is largely immaterial as regards welfare.) We conclude that, *when $c > 0$ Basu's proposal is successful as regards deterrence but counter-productive as regards to efficiency.*[13]

The case of $c < 0$

Back to the game in Figure 1. Assuming that the dominant choices of $\rightharpoondown R$ are made in the reporting subgame, there is a unique associated subgame perfect equilibrium; compactly described: $((\rightharpoondown B, \rightharpoondown R), (L, AL, \rightharpoondown R))$. The outcome: E does not offer any bribe, but S issues a licence anyway. This is a great outcome on all fronts![14]

Now consider Basu's proposal: *When $c < 0$ Basu's proposal is redundant* in the sense that it does not substantially affect behavior. Consider again the game in Figure 2. Maintaining that the dominant choices are made in the reporting subgame (R for E; $\rightharpoondown R$ for S), this game has two associated subgame perfect equilibria: $((\rightharpoondown B, R), (L, \rightharpoondown AL, \rightharpoondown R))$ and $((B, R), (L, \rightharpoondown AL, \rightharpoondown R))$. The outcome is essentially the same: S does not accept any bribe but issues a licence anyway.

Competition among S's

We found it natural to focus on a civil servant with monopoly power on the delivery of the licenses posting a price/bribe for whoever needs (and is entitled to) them. What would happen if more than one office/civil servant could issue the licences? Clearly, when $c < 0$ our conclusions would not change. When $c > 0$, instead, our conclusions will be affected, although not qualitatively. To see how, suppose that there are two offices/civil servants that can issue the licenses and that act independently. If the two offices are sufficiently homogeneous there will be competition for bribes that will shift bargaining power in favour of entrepreneurs pushing down the bribe, possibly all the way to Bertrand equilibrium $b = c$ (or to $c + \epsilon$ to guarantee acceptance). With $b = c + \epsilon$ there will be more frequent bribe payments of lower bribes and more licenses issued (also when $c < b < \frac{1+c}{2}$).

Introducing Basu's proposal will still have deterrence effects, although it is unclear whether these should be considered larger or smaller than before (the amount of each bribe is lower; the

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[13]The implicit working assumption here is that there is no alternative mechanism to induce S to perform. In the discussion we will consider alternative assumptions.

[14]Note that arguments analogous to those we gave for the $c > 0$ case why the outcome there might be considered suboptimal do not apply when $c < 0$; there are no entrepreneurs to whom licenses are not issued.

number of deterred bribes is higher). On the other hand, since the number of licenses issued is higher when b is lower, the introduction of Basu's proposal will lead to a larger loss of licenses issues than would be the case without competition among S's.

3   Long vs short-run players

Civil servants who deliver licenses or are assigned analogous tasks are often there for long periods. They may serve or harass many citizens/entrepreneurs, who are then likely to talk about the treatment received. A realistic setting in which to analyze Basu's proposal is therefore one in which S is a 'long-run' player who interacts over and over again with new ('short-run') E's in each round, where new E's know the previous history of play.[15]

Other types of public services exist where the natural assumption is that E is a long-run player repeatedly interacting with a sequence of different civil servants. Think, for example, of a large multinational firm trying to obtain long-term concessions or infrastructure procurement contracts from many different local authorities. Each local authority awards one license for many years, hence each S can be thought of as a one-shot player with respect to the firm E. The firm instead tries to get local licenses repeatedly by the many local authorities of the country. This case also captures situations where firms pay bribes through intermediaries or "agents", so that even if each E is a short run player his agent may in fact be a long run player.[16]

In these 'one-sided repeated games,' each stage game is identical to the one shot game of section 1, and the repeated perpetual play (following any history) of the one-shot equilibria discussed in the previous section always corresponds to a subgame perfect equilibrium of the one-sided-repeated game. However, while short-run players are bound to play according to their static best-response strategies, the threat of reversion to a possibly inefficient stage game Nash equilibrium can credibly

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[15]Vannucci and Della Porta (2007) study conversations between corrupt parties recorded by the police when the large Italian corruption network was discovered in the 90s (named Tangentopoli). They note, among other things, that corrupt public official are careful in developing, spreading and maintaining a reputation for being reliable corrupt officials, that accept bribes without reporting the bribery attempts to the police, and reciprocate bribes with performance and hardly perform without a bribe. We are grateful to Elisabetta Iossa who brought their work to our attention.

[16]The important role of intermediaries in facilitating corrupt transactions is documented in Bertrand, Djankov, Hanna and Mullainathan (2007) for driver's licences in India and in Fisman, Moustakerki and We (2008) for international trade and tax evasion in Hong Kong.

be used to sustain also other equilibria where the long run player does not play according to her static best response function (see Fudenberg, Kreps and Maskin 1990). We shall focus in particular on equilibria that involve as much bribery as possible, and explore to what extent Basu's proposal may be expected to reduce such patterns.

Let the game (including the verbally described features where chance selects E's value v and S chooses b) analyzed in the previous section be played an infinite number of periods. One of the players E or S each time interacts with a different co-player who is perfectly informed about the history of play. In each period, E's valuation v of the new licence or contract is an independent random draw from the same uniform distribution on the unit interval. Time is discrete and periods are indexed by $t = 1, 2, 3...$ Let δ denote the intertemporal discount factor, with $0 < \delta < 1$. We consider in turn the four cases that arise depending on whether E or S is the long-run player and whether $c > 0$ or $c < 0$:

Long-run S, short-run E; $c > 0$

Perpetual play of the equilibrium of the one-shot game (starting at any history) is a subgame perfect equilibrium of the one-sided repeated game. That is, the short-run E player of any given round offers a bribe if $v > b$, subsequently relying on strategy $(B, \rightarrow R)$ while S in each stage game chooses $b = (1 + c)/2$ and then $(\rightarrow L, AL, \rightarrow R)$. The associated combination of strategies constitutes a subgame perfect equilibrium of the one-sided repeated game. Any short-run player E best responds to what S does at any history. And given this, the described behavior for S is a best response at any history.

What happens if the Basu proposal is introduced? Since short-term players are not able to commit, each E has a dominant choice to report and claim back any bribe. Therefore S accepts no bribe. As in the one-shot case, the policy change is successful in deterring corruption but has the drawback that no licenses are issued.

Long-run S, short-run E; $c < 0$

Perpetual play of the equilibrium from the one-shot scenario, where E does not bribe and S delivers the licence, remains viable under repetition. However, since S is now a long-run player, other equilibria may emerge where S conditions his stage-game choices on whether or not he was offered a bribe. As long as S is sufficiently patient he may be able to commit not to deliver the licence unless a bribe is paid. This behavior is sustainable in equilibrium as follows (we first consider behavior given b, then endogenize b):

- S: *Accept the bribe and issue a licence if E offers a bribe. Do not issue a license if E does not offer a bribe.*

- Each E: *Offer a bribe if $v > b$ and S always issued a license every time a bribe was offered and did not issue a license every time no bribe was offered. Do not offer a bribe otherwise.*

Note that this equilibrium involves a form of trigger-strategy-combination, executed by the collection of short run E players. S issues a license iff he is bribed. This is sustained by the threat that if at any time a bribe was not offered and S still delivered a license then the 'live' short-run players from then on would forever stop offering bribes, and play would revert to perpetual repetition of the one-shot game equilibrium (with no bribes + licensing).

The long-run player S will not deviate from this strategy profile as long as the following incentive constraint is satisfied:

$$-c \leq \frac{\delta}{1-\delta}\left\{(b-c)\Pr[v \geq b] + c\right\},$$

where $-c$ is S's short-run gain (note: $c < 0$ so $-c > 0$) from unilaterally defecting by delivering the licence even if a bribe is not paid. On the right hand side we have the expected discounted loss of future payoffs caused by such a deviation.[17] Each E will have no incentive to deviate unilaterally as long as they believe all other players stick to the strategy profile.

In such a case, focusing on stationary equilibria, S would optimally choose b to solve

$$max_b(1-b)(b-c)$$

$$s.t.$$

$$ICS^L \quad : \quad -c \leq \frac{\delta}{1-\delta}\left\{(b-c)\Pr[v \geq b] + c\right\}.$$

If δ is high enough, ICS^L, the incentive constraints for the long-run player S will not bind and S's optimal choice of b is then $b = (1+c)/2$.

Suppose now that this equilibrium is relevant and consider the effect of introducing Basu's proposal. Since entrepreneurs are short term players, they cannot commit to not reporting; reporting is a dominant choice if a bribe is exchanged. So, assuming that E would thus report, the

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[17]The expected future undiscounted per-period payoff of sticking to the equilibrium is $(b-c)\Pr[v \geq b]$; the future undiscounted per-period payoff following a deviation is $-c$; the rhs depicts the difference: $(b-c)\Pr[v \geq b] - (-c) = (b-c)\Pr[v \geq b] + c$.

best S can do is to never accept a bribe but to always issue a license anyway. *So, here Basu's proposal works very well, both in terms of corruption deterrence and of efficiency!* It makes it impossible to sustain equilibria with bribes and rationing by undermining S's ability to commit to a conditional licensing strategy, re-establishing the unique efficient static equilibrium.

Short-run S, long-run E; $c > 0$

Perpetual play of the one-shot licensing-conditional-on-bribe equilibrium $((B, \rightarrow R), (\rightarrow L, AL, \rightarrow R))$, with $b = (1 + c)/2$, is a subgame perfect equilibrium of the one-sided repeated game. Suppose that this is the relevant equilibrium to start with, and consider the effect of Basu's proposal. There are multiple equilibria, and no-bribe-no-licence in perpetuity is one possibility. However, when E is the long-run player there may also be equilibria where E commits to withhold his report tactically as a means to make the short-run S's issue licences for bribes. The implicit threat would be that if E were to report then play would revert to no-bribe-no-licence in perpetuity. An intriguing possibility, derived in full in the appendix, is therefore that for certain parameter constellations this equilibrium improves on the outcome without Basu's proposal by constraining the level of b. For intermediate levels of the discount factor the Basu proposal would reduce the maximum bribe that S can ask without forcing a violation of the long-run player E's incentive constraint for not reporting. This would be beneficial in terms of fewer cases where a licence is not issued, it would increase the number of paid bribes and would decrease their (individual and total) amount.

On the other hand, if being a long run player allows E to commit not to report under the Basu proposal, it may also allow him to commit not to pay a too high bribe. That is, being a long-run player able to commit might shift bargaining power in E's favour in the first place! Suppose that all bargaining power thus shifts to E: what would be the relevant outcome without Basu's proposal? Clearly, if E has all the bargaining power and can make a take-it-or-leave-it offer to (each) S he will chose $b = c + \epsilon$ (in analogy with the last two paragraphs of section 2).

We believe this is indeed a plausible scenario for this case, an equilibrium in which many small bribes are paid and many licenses are issued. So, suppose that this is the relevant equilibrium to start with. What would be the effect of introducing Basu's proposal? If the discount factor is sufficiently high, E will still be able to credibly commit not to report paying the bribes and the proposal would be irrelevant. If the discount factor is too low for E to credibly commit not to report, the Basu proposal destroys that and any other equilibrium with bribes. Then the proposal would deter the many small bribes otherwise paid but greatly reduce efficiency by drastically

reducing (to zero) the number of issued licenses.

Short-run S, long-run E; $c < 0$

Again perpetual play of the one-shot equilibrium corresponds to an equilibrium in the one-sided repeated game. E does not bribe but all the S's issue licences anyway. Since E is a long-run player, he will not be interested in committing to any other behavior. The short term players S on the other hand are not able to commit, hence they will stick to the one-shot no-bribes equilibrium.

Consider Basu's proposal. Since no bribe is paid it has no effect as there is no problem to solve in the first place. *Basu's proposal is therefore redundant in this case.*

Long-run S, long-run E

It is finally possible that both E and S are long-run players, effectively playing a repeated game. As regards predictions, the usual folk theorem kicks in so that if discount rates are large enough, 'anything can happen'. In line with our proposed equilibrium selection/focus, we may thus highlight equilibria such that along the path there is perpetual licensing-conditional-on-bribe without Basu's proposal.[18]

Starting from such an equilibrium, Basu's proposal appears again helpful for fighting bribery but unhelpful in producing licences in the following sense: With Basu's proposal the incentives for E to deviate from the proposed equilibrium becomes stronger. The range of discount factors under which perpetual licensing-conditional-on-bribe equilibria are sustainable will thus be smaller with than without Basu's proposal, with a possible consequent reduction in the number of bribes paid and of delivered licenses.

4   Drèze's criticism

In the games of the previous sections Basu's proposal sometimes gets rid of bribery, sometimes does not. Our yardstick for whether the proposal did well, however, was concerned also with whether bribery occurred or not, but also whether or not licences were issued. Wit that aspect taken into account, all in all, the case for Basu's proposal was rather mixed in the one-shot scenarios.

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[18]It is possible for example to sustain efficient equilibria such that S always delivers the licenses and players split their expected gains-from-trade according to relative bargaining power chosing an appropriate (constant) level for b. These equilbria can be supported by the threat to switch to the one shot equilibrium with the most unfavorable price to the party that deviated.

However, it did well as regards both bribery-eliminating and licence-creation in two-out-of-four (arguably quite realistic) scenarios where one of the two parties was a long-run player.

In a thoughtful commentary to Basu's proposal, Drèze (2011) raised a number of subtle objections to Basu's proposal, objections not captured in the streamlined environment of sections 2 and 3. The purpose of this section is to consider the impact of Drèze's objections. We concentrate on the following three main issues that he raised:

First, as we discuss in section 4.1, *if law enforcement is as inefficient and corrupt* as the rest of the bureaucracy, then an individual that blows the whistle might actually expect "litigation costs, possible harassment and little chance of getting justice" (as Drèze puts it). This may mean that the scheme does not deliver the promised corruption-deterrence effects. Second, as we discuss in section 4.2, if there is a positive probability of being convicted for bribing an official even in the absence of a report, *legalizing the act of bribing also reduces the expected cost of bribing and not reporting.* If for some reason that option is still viable (e.g. because reporting would not lead to recovering the paid bribe but to harassment from the police), then Basu's proposal may increase corruption by inducing also people that would otherwise be deterred by the risk of being detected and convicted to pay bribes. Third, as we also discuss in section 4.2, if *legalizing bribe-giving reduces the moral cost of paying bribes* for those who dislike undertaking illegal acts then this may induce these people to also start bribing bureaucrats.[19]

To fix ideas, for the most part we limit attention to our one-shot game scenario with $c > 0$ (where before we had a subgame perfect equilibrium where bribes changed hands) and (following Basu and Drèze) focus on the bribery-deterrence aspect rather than the prevalence of licensing.

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[19]While we will discuss the likely effect of Basu's proposal in the presence of moral concerns and possibly on their erosion or diffusion, we will refrain from commenting on the morality of the proposal itself because even within the Indian or western cultures moral judgements appear rather subjective. For example, in contrast to Drèze some Indian commentators regard it as 'fair' to consider bribe-payers as victims of bureaucrats in the case of harassment bribes (see e.g. *Business News*, April 23, 2011). Drèze, on the other hand, dislikes Basu's proposal because it relies on "bribe-givers being doubly corrupt: by giving a bribe, and by stabbing bribe-takers in the back as they blow the whistle after the event." Judging negatively the act of turning in a (formerly fellow) criminal is common but not necessarily well grounded in ethics. It attributes the same positive value to legal and criminal cooperation, and the same negative value to betraying fellow citizens and fellow mafia members. It is one of the reasons – together with violent revenge – why in some cultures it is so difficult to find witnesses against criminal organizations.

4.1   Inefficient or corrupt law enforcers

In discussing Basu's proposal, for simplicity we have been working under the assumption that it is impossible to induce S to perform if he does not want to while it is costless to convict, fine, and induce S to return the bribe if E reports the corrupt exchange. This (admittedly extreme) assumption captures in a simple way how a delay in the delivery of a licence can be due to so many different incidental reasons (besides harassment to get bribes) that it may be practically impossible to ascertain and discipline S's misbehavior without a bribe. Receiving a bribe, however, is a clearer and arguably documentable crime (say, using a hidden recording device or marking down beforehand the numbers of the bills used to bribe).

Of course in many situations in which corruption is widespread the law enforcement system is also inefficient or corrupt. Consider first the case of *costly law enforcement,* such that E expects to bear substantial costs to have S convicted for bribe-taking and the bribe returned even after reporting relatively hard evidence.[20] We capture this by assuming that, if E reports, he expects litigation and further harassment costs $C \geq 0$ (possibly reduced to kC, with $0 < k < 1$, if S also reports, i.e. admits to be guilty). The game from Figure 2 is now modified as in Figure 3.

INSERT FIG 3 HERE!

It is clear that if these inefficiencies are substantial, so that $C > b$, even after having paid a bribe and received the licence E has no incentive to report and the Basu proposal becomes ineffective. If the cost of law enforcement is large, a reward higher than the bribe may be needed to induce the bribe-giver to report.[21]

Consider now the case of *corrupt law enforcement.* Assume that after the reporting stage but

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[20]As some commentators on Basu's proposal stressed, these 'inefficiencies' are likely to increase substantially for poor individuals if law enforcers and bribe takers belong to the same powerful network or caste. Law enforcers would try to protect bribe takers and possibly further harrass the bribe-givers to deter them from denouncing their friends the bureaucrats.

[21]The high costs of legal action and of further harassment from their employers born by whistleblowers is precisely the reason why in the US the False Claim Act, the IRS whistleblower scheme pays rewards (several secretaries got tens of millions of dollars for turning in their bosses). This might not work for harassment bribes however, as these typically concern a large number of small corrupt payments. The sum of the rewards and the administration costs of the program may be large before the deterrence effects materialize and will have to be financed by costly tax-payer money. This might generate further outrage as well as incentives for information fabrication and attempts to capture/blackmail otherwise innocent bureaucrats.

before law enforcers establish whether there was corruption or not the parties can offer bribes to affect their decision. After a bribe is paid and a party reported, E can offer a bribe $b_E \geq 0$ to law enforcers to convict S and get back the original bribe and S can offer a bribe $b_S \geq 0$ to have instead law enforcers falsely declare that there was not corruption. Suppose further that the bribing competition takes the form of an English auction and that law enforcers have a cost of lying π (possibly because there is some small chance they will be indicted). Then S will win the competition and be declared innocent when willing to pay more than π in addition to the highest bribe that E is willing to offer; otherwise, S is convicted and E obtains the original bribe b back net of the new bribe b_E.

Since at the time of the bribing competition the exogenous cost of starting the legal action C are sunk, they do not affect E's willingness to pay at the bribe competition stage. Hence, E will be willing to pay up to the original bribe b to have it back after a conviction of S. On the other hand, in case of conviction S will have to return the bribe b and pay the fines $2F_S$, hence his willingness to pay will be up to $2F_S + b$. Then, when $2F_S + b > b + \pi$, i.e. $2F_S > \pi$, the bribe competition will be won by S who will not be convicted; the opposite happens when $2F_S < \pi$.

It follows that if sanctions for accepting harassment bribes are larger than the moral cost law enforcers incur in taking a false decision (not of accepting a bribe, the moral cost of that is implicitly assumed zero and would be cancelled out by competition), S will always be expected to win the bribing game and E will not report in the first place. When law enforcers are easily corrupted (π is low) the higher fines needed to deter bureaucrats from accepting harassment bribes will make it hard for the Basu proposal to work.

4.2   The moral and legal costs of bribing and not reporting

In section 2 we assumed that there were no costs associated with paying a bribe (apart from b), if no one reported it. Drèze points out two reasons why this assumption may not hold. First, there may be a positive probability of being detected and convicted for bribing even without any report. Second, conscientious folks may suffer a moral cost of breaking the law when they illegally bribe. In these cases, legalizing bribe-giving may increase corruption. This is because E's, who otherwise would offer no bribe, may now do so while planning on not reporting the bureaucrat. Why would they not report? Drèze gives an example where reporting implies "huge litigation costs, possible harassment, and little chance of getting justice", as discussed in the previous subsection.

Let's see how all of these aspects formally shape the analysis when incorporated in our setting. Let $\alpha < 1$ denote the probability of conviction in the event that no party reports the bribe. Let $M > 0$ be the moral cost of bribe-giving. We assume all of this affects only E's payoff, as shown in Figure 4.

INSERT FIG 4 HERE!

Just as in Figure 1, each player has a dominant strategy in the reporting subgame of not reporting ($\rightarrow R$). However, if α and M are high enough then E will no longer wish to enter that reporting subgame, so he offers no bribe (and no license is issued).

Consider now the effect of Basu's proposal. How does this affect the game in Figure 4? First, since paying a bribe is no longer illegal for E, we get $\alpha = F_E = 0$. Moreover, it would arguably no longer be considered morally reprehensible to bribe, so $M = 0$. On the other hand, we need to add the cost of getting justice (those litigation costs, etc.); let them be $C > 0$ as in the previous subsection. All in all, we get ... again the game in Figure 3!

Just as before, if C is high enough, etc., bribery deterrence is lost. This illustrates the second of Drèze's key objections to Basu's proposal. The proposal may provide disincentives for E to not offer a bribe relative to bribing and reporting, but the side effect is that it makes (in equilibrium) bribing and not reporting the very best option of all. If $v - b > 0 > v - C$, introducing Basu's proposal moves us from an equilibrium where no bribes are paid to one where a bribe is paid (and no one reports it).

4.3   A slightly modified proposal

Here's a new proposal which at first glance looks similar to Basu's, but which is immune to Drèze's critique as exhibited in the previous section. We exploit an idea from so-called leniency laws in anti-trust under which participating in a cartel is not legal but nevertheless immunity from fines is assured to the first culprit that reports the activity to law enforcers.[22]

Let's consider granting E analogous immunity, if he reports a bribe. Apply that idea to the game in Figure 4. That is, if E chooses R then, in the corresponding row, remove b and F_E. Make no change concerning M and α; bribing is still illegal and hence presumably morally costly, and

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[22]In a dynamic model of oligopolistic collusion Spagnolo (2004) shows that - if sanctions are sufficiently severe or rewards can be paid to the first reporting party - these schemes can lead to the first best (i.e. full deterrence with no policing costs).

on not reporting E may still be caught with probability α. On the other hand, court procedures to get back b are presumably costly just as when we moved from Figure 4 to incorporate Basu's proposal – and ended up with Figure 3 – so deduct $C > 0$ just like we did then. We get the game in Figure 5:

INSERT FIG 5 HERE!

If $C < b + \alpha \times F_E$ then, and if players use their dominant strategies in the reporting subgame, then this time E will report. Therefore, S would not accept a bribe. We're back to the outcome with no bribes!

How useful is this leniency-for-E tool more generally? As regards the analysis in sections 2 and 3 it pretty much works just like Basu's proposal. We leave it as an exercise for the reader to verify this.[23]

5   Discussion

Let us now recall our findings on harassment bribes and discuss what can we take away from them, as well as whether we can learn something useful also for other more harmful forms of corruption.

Wrapping up harassment bribes   The results of Sections 2 and 3 are summarized in the following table. Columns 2 and 3 describe the results for the case where $c > 0$, where the organization of government is so poor that – apart from bribes – civil servants face more costs than benefits in doing their job properly. Then, abstracting from the issues raised by Drèze, Basu's proposal tends to deter corruption but at the same time to interrupt the provision of the public service, or vice versa. Columns 4 and 5 show instead that when the organization of government is better, so that civil servants face more benefits than costs from performing their duties ($c < 0$), Basu's proposal will either have very good effects, both deterring corruption and increasing the delivery of license, or have no effects because there is no corruption to begin with.

	$c > 0$	(poor inst.)	$c < 0$	(good inst.)
One shot game	**+deterrence**	-efficiency	**irrelevant**	irrelevant
Long-run S	**+deterrence**	-efficiency	**+deterrence**	+efficiency
Long-run E	**+deterrence**	-efficiency	**irrelevant**	irrelevant

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[23]The analysis changes slightly only in the case with a long-run player E and short-run player S and $c > 0$.

This suggests that introducing Basu's proposal in a country with very weak institutions may have rather poor effects. Some of the objections Drèze raised against Basu's proposal point in the same direction. For example, it may be that bribe-givers may not report the corrupt exchange even if it their behavior was formally legal, if they fear getting harassed by the police to whom they report. This case would be another example of weak institutions (with C large, using the terminology of section 4).

However, if institutions are initially weak (in the sense that $c > 0$ or that C is large) then one may imagine other policies which could complement Basu's proposal and render it more useful. Measures that improve civil servants' incentives and turn the balance towards providing effort (e.g. increased wages, monitoring, and sanctioning of underperformance) could lead to unambiguously positive effects (by making c negative).[24] Or when law enforcement agencies are inefficient or corrupt, implementing schemes aimed at inducing whistleblowing may require creating specialized agencies meeting higher accountability/performance standards able to instill the necessary confidence that harassment will not occur. The general point is that effective anticorruption in countries with weak institutions is likely to require a set of complementary policies that accompany Basu's proposal, measures aimed at improving civil service performance and the accountability of law enforcement institutions.

It is interesting to note that several recent proposals have been made that illustrate the feasibility of such policies with c/C changing potential. Consider, for example, the following customer satisfaction feedback system recently implemented in the Jhang district of Punjab, as described in **The Economist** (Sept 24, 2009):[25]

> "Zubair Bhatti, a Pakistani bureaucrat, asked all clerks in the Jhang district who
> handled land transfers to submit a daily list of transactions, giving the amount paid
> and the mobile-phone numbers of the buyer and the seller. He explained that he would
> be calling buyers and sellers at random to find out whether they had been asked to pay
> any extra bribes or commissions. When charges were subsequently brought against a

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[24] This conclusion is in the spirit of Mookherjee and Png (1995). They analyze an inspection-corruption game showing that if government can use other instruments to induce inspectors to perform (stricter monitoring, higher efficiency wages, or tougher sanctions) and has an unlimited budget, then one can always find an equilibrium without bribes that welfare-dominates one with bribes. In such a world, Basu's proposal would indeed increase welfare by facilitating corruption deterrence.

[25] We thank Husnain Ahmad for alerting us to the Jhang model. Read more about it in *The Pakistani Spectator – A Candid Blog*, at http://www.pkhope.com/incredible-"jhang-model"-of-good-governance/.

clerk who had asked for a bribe, the others realised that Mr Bhatti meant business,
and buyers and sellers reported a sudden improvement in service. Mr Bhatti extended
the scheme to other areas, such as cracking down on vets who demanded bribes from
farmers, and has proposed that the Jhang model, as it is now known, be adopted in
other districts."

This scheme may both reduce c (customer satisfaction information can be used to improve
bureaucrats' incentives) and C (special protected channel for whistleblowing).[26]

Now turn attention to the following potential problem with Basu's proposal, again highlighted
by Drèze and consistent with our analysis: When legalizing bribe-giving, some folks who would
previously not bribe now do so. This requires first of all that conditional on bribes-changing hands,
there would be not reporting (say because C is too large; cf. above). The Drèze effect then may
appear if there is a positive probability of being detected and convicted for bribing even without
any report, or if conscientious folks suffer a moral cost of breaking the law when they illegally
bribe. In section 4 we suggested that a modified version of Basu's proposal where the promise of
immunity is conditional on self-reporting – as in leniency policies extensively used in antitrust –
overcomes this problems, while otherwise having similar properties as Basu's proposal.[27]

More harmful forms of corruption Our analysis so far concerned harassment bribes,
which seem relatively innocuous in that they are paid for things people are entitled to rather
than illegal services that may well hurt others. How do extensions of Basu's proposal, and of our
analysis (including the leniency twist), relate to such less innocuous forms of corruption?

When we set out on this study we conjectured that we would leave this important issue for
future research. However, with all of above analysis in hand, reflecting on the task, we had

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[26]Another example could be the demands raised recently by Anna Hazare, the Indian anti-corruption activist
who through hunger strikes have attempted to force the establishment of new (ombudsmen-based) institution that
can fight corruption. This institution could offer the special protected channel for whistleblowing possibly reducing
C. A third example is Björkman and Svensson's (2009) field experiment documenting positive effects of village
meetings on health service provision; this transparency/disclosure policy arguably reduced c.

[27]Another positive aspect of such a leniency-twisted policy is that we already have some evidence about their
effectiveness and drawbacks in other contexts. See e.g. Miller (2009) for empirical evidence, and Apesteguia,
Dufwenberg and Selten (2007), Hinloopen and Soetevent (2008), and Bigoni, Fridolfsson, LeCoq and Spagnolo
(forthcoming) for experimental evidence. Acconcia, Immordino, Piccolo and Rey (2009) present suggestive evidence
of their effectiveness against mafia-type organized crime.

the following epiphany: How do our above games change if instead of modeling situations with harassment bribes one addresses situations with bribes for illegal services that hurt others? The answer is: *not at all!* As regard the incentives for players E and S, these arguably remain just as indicated. Therefore, all the implications regarding strategic play remain unchanged. The only aspect of the analysis that changes is that whereas before we argued the licenses are good (from a society point-of-view) we now have to assume they are bad.

We can thus examine whether Basu's proposal (or our leniency twist) is good or bad using the above table, except it must be modified so that we switch the signs associated with licenses effects. We get:

	$c > 0$	(poor inst.)	$c < 0$	(good inst.)
One shot game	**+deterrence**	+efficiency	**irrelevant**	irrelevant
Long-run S	**+deterrence**	+efficiency	**+deterrence**	-efficiency
Long-run E	**+deterrence**	+efficiency	**irrelevant**	irrelevant

Actually, we are not done yet. If we maintain the assumption that S is hired to perform legal acts, then the $c < 0$ column must be irrelevant! Too see this, note that whereas before S was hired to issue licences that people deserved, in the new situation the service performed in exchange for a bribe is illegal. Therefore, if S's employment contract is legitimate (which we assume), then he must be hired to do something else. If he nevertheless accepts a bribe and performs the illegal service then the two factors affecting c discussed in section 2 (the opportunity cost of not shirking and the risk of being caught-in-the-act-and-fired by a boss) point in the same direction; both serve to ensure that $c > 0$. Hence, we can drop the two rightmost columns, as well as the reference to poor vs good institutions (via sign of c), and get:

One shot game	**+deterrence**	+efficiency
Long-run S	**+deterrence**	+efficiency
Long-run E	**+deterrence**	+efficiency

To conclude: Basu introduced his proposal only for harassment bribes, and our analysis indicated that its benefits is a mixed bag. When we shift attention to the arguably even more important case of non-harassment bribes, the effect of Basu's proposal (and of our leniency-for-E twist) becomes clearer: *The effects are unambiguously good; bribes are eliminated, and no illegal services are performed!*

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6   Appendix

Short-run S, long-run E; $c > 0$; bargaining power to S

Perpetual play of the one-shot licensing-conditional-on-bribe equilibrium $((B, \rightharpoonup R), (\rightharpoonup L, AL, \rightharpoonup R))$, with $b = (1+c)/2$, is possible as a subgame perfect equilibrium of the one-sided repeated game. Now consider Basu's proposal. Recall first that with long-run S, short-run E, and $c > 0$ Basu's proposal was effective in eliminating bribes but counter-productive as regards getting licences issued. When instead E is the long-run player, perpetual repetition of the no-bribe-no-licence one-shot equilibrium is again a possibility. However, there may also be another equilibrium where E avoids this trap, withholding his report tactically as a means to make the short-run S's issue licences for bribes. The implicit threat would be that if E were to report then play would revert to no-bribe-no-licence in perpetuity. An intriguing possibility is that for certain parameter constellations this equilibrium improves on the outcome that was predicted without Basu's proposal in terms of the number of delivered licences. Consider the following pattern of behavior (again we first consider behavior given b, then endogenize b):

- Each S: *If a bribe is offered, accept it and deliver the licence if in all previous stage games the path of play was $(B, AL, (\rightharpoonup R, \rightharpoonup R))$ or $(\rightharpoonup B, \rightharpoonup L)$, i.e. a bribe was offered and accepted and a license issued and no player reported this, or there was no bribe and no licence. In any other circumstance, do not accept the bribe and do not deliver the licence.*

- E: *Offer bribe (when $v > b$) and do not report after obtaining the licence if in all previous stage games the path of play was $(B, AL, (\rightharpoonup R, \rightharpoonup R))$ or $(\rightharpoonup B, \rightharpoonup L)$. In any other circumstance, do not offer a bribe.*

Note that, as in an earlier case, the collective of short run players are implementing a form of trigger-strategy-combination. Each individual S has no incentive to unilaterally deviate as long as he believes all other players stick to the strategy profile. And E will not deviate as long as the following incentive constraint is satisfied:

$$b \leq \frac{\delta}{1 - \delta} \int\limits_{v=b}^{1} (v - b) dv.$$

The b on the left-hand-side is E's short-run gain from unilaterally defecting by reporting the bribe after the licence was delivered. On the right-hand-side we have the expected discounted loss of

future foregone licence-values-net-of-bribe-costs caused by the switch to the no-bribes-no-licence continuation equilibrium after such a deviation. Assuming that each S will set bribes to maximize revenue, b would optimally be chosen to solve

$$max_b(1-b)(b-c)$$

$$s.t.$$

$$ICE^L \quad : \quad b \leq \frac{\delta}{1-\delta} \int_{v=b}^{1} (v-b)dv.$$

The long-run player E's incentive compatibility constraint $(ICE^L,$ from a few lines earlier) is less tight the higher is δ. If δ is sufficiently large then if as before S chooses b his optimal choice that maximizes per period expected profits is $b = (1+c)/2$. However, if δ is lower than that, so that the incentive constraint is binding, this may be overcome by choosing $b < (1+c)/2$. Hence, in such a case introducing *the Basu proposal reduces the maximum bribe that S can ask* without forcing a violation of the long-run player E's incentive constraint. This is beneficial in the sense that *fewer cases occur where a licence is not issued.* It is not obvious how to evaluate the effects in terms of corruption deterrence, as in this case the proposal *increases the frequency of corruption* (a higher number of bribes are paid) but *decreases its amount* (the size of each bribe and the sum of all paid bribes fall).
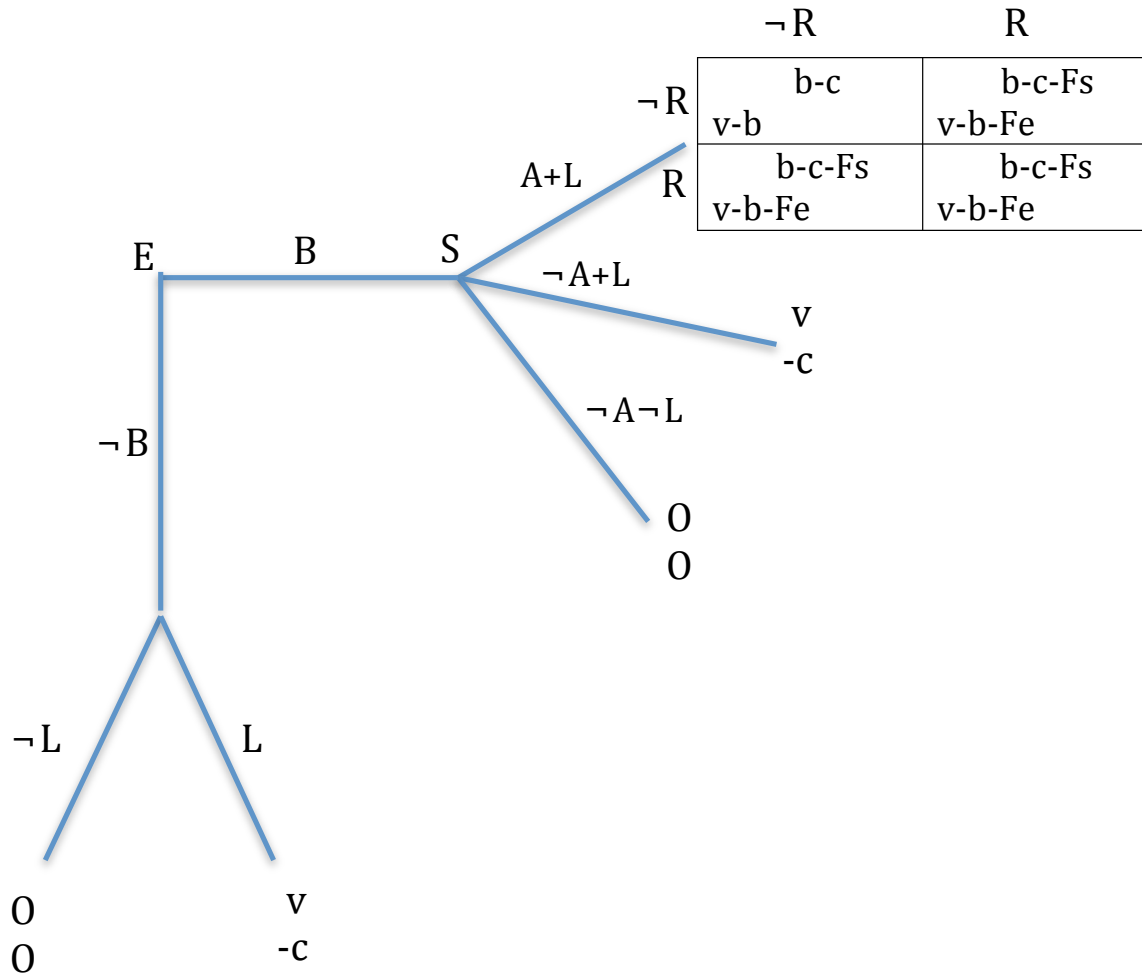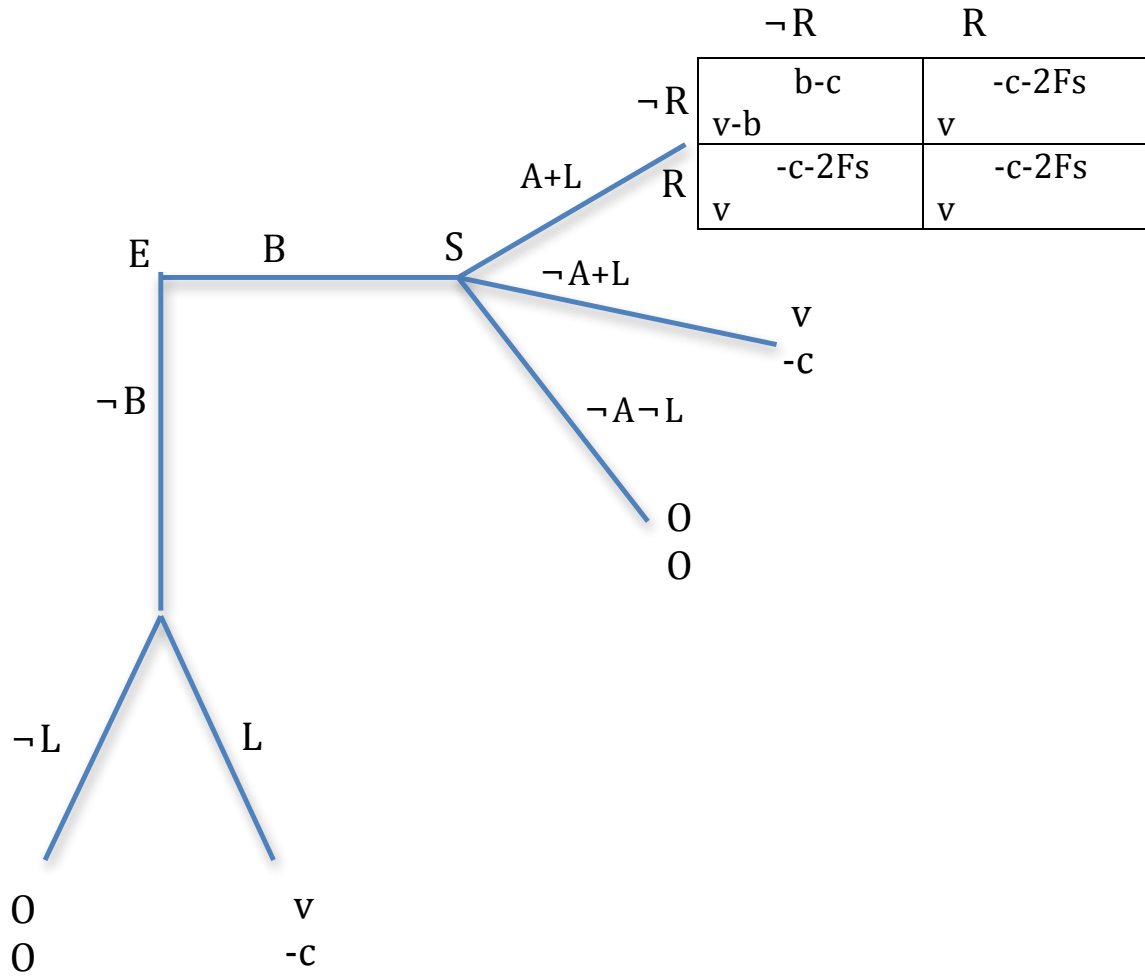
FIGURE 1: STANDARD LAW ENFORCEMENT

	¬R	R
¬R	b-c v-b	b-c-Fs v-b-Fe
R	b-c-Fs v-b-Fe	b-c-Fs v-b-Fe

E —— B —— S

¬R — A+L

R

¬A+L
v
-c

¬A¬L
O
O

¬B

¬L
O
O

L
v
-c

FIGURE 2: BASU PROPOSAL

	¬R	R
¬R	b-c v-b	-c-2Fs v
R	-c-2Fs v	-c-2Fs v

FIGURE 3: POOR LAW ENFORCEMENT

	S	
	¬R	R
¬R	b-c v-b	-c-2Fs v-kC
R	-c-2Fs v-C	-c-2Fs v-kC

E — B — S

¬R (A+L)

R

¬A+L → v, -c

¬A¬L → 0, 0

¬B

¬L → 0, 0

L → v, -c
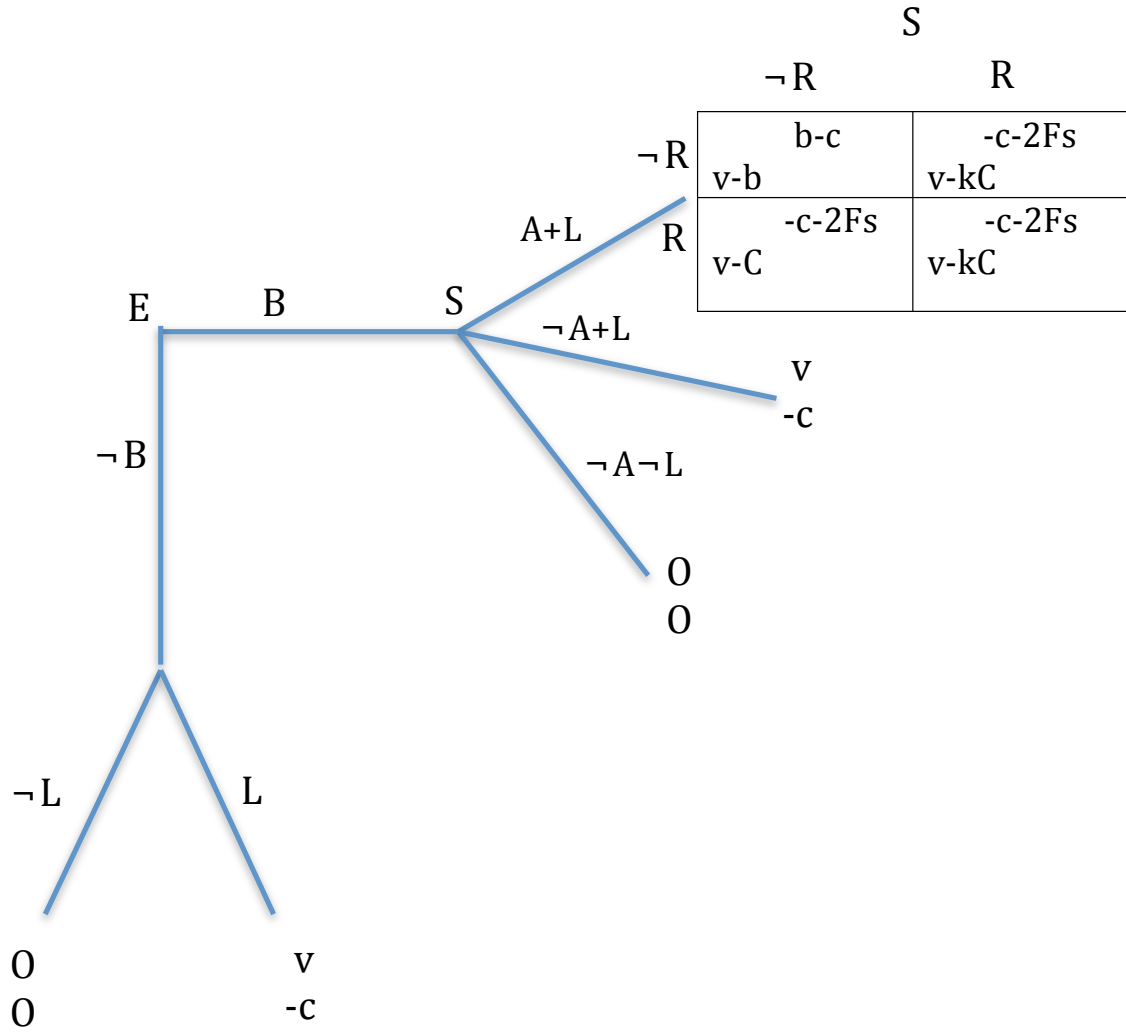
FIGURE 4: MORAL COSTS + EXOGENOUS CONVICTION

S

	¬R	R
¬R	b-c v-b-αFe-M	b-c-Fs v-b-Fe-M
R	b-c-Fs v-b-Fe-M	b-c-Fs v-b-Fe-M

E — B — S

A+L

¬R

R

¬A+L

v
-c

¬A¬L

0
0

¬B

¬L

L

0
0

v
-c

FIGURE 5: LENIENCY

	¬R	R
¬R	b-c v-b-αFe-M	b-c-Fs v-b-Fe-M
R	-c-2Fs v-M-C	-c-2Fs v-M-kC

S