

Corruption and Asymmetric Sanctions: Theory and Evidence from China

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August 18, 2023

Abstract

Asymmetric punishment of partners in crime, intended to incentivize whistleblowing, may increase detection, conviction, and deterrence of gangsters, cartelists, traffickers, or corrupt parties. The idea is age-old but its use in fighting corruption is not frequent despite recent advocacy by some economists. Motivated by a unique large-scale Chinese policy change in 1997, which introduced such asymmetries for some forms of corruption, we use a combination of theory and empirical investigations to explore what general lessons one may draw regarding policy and welfare. We argue that our theory both helps interpret a specific empirical puzzle and carries more general relevance.

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1 Introduction

Corruption is a major problem in many countries. Yet knowledge on how to fight it is lagging.¹ We study the impact of the 1997 revision of China’s Criminal Law (CL-97), the main source of anti-bribery legislation, announced by the Chinese government as an attempt to rein in the deteriorating corruption situation. Our goal is two-fold. First, we seek general insights regarding the policy package involved. Second, the episode itself, as it played out in the world’s second largest economy at a crucial time of transitions, is an important piece of economic history worth understanding.

Our analysis centers on a problem that corruption shares with other forms of organized wrongdoing: partners in crime will cloak in secrecy if discovery spells legal doom. This makes the illegal activity difficult to unearth. However, a way to overcome this hurdle may be to reward select criminals for blowing the whistle on others, as in the Prisoners’ Dilemma story. Exchange of lenient treatment for information or collaboration has been a normal feature of law enforcement in most countries and ages, but suggestions regarding its structured application are more recent. In particular, anti-trust scholars focused on leniency laws, whereby the first cartel confessor is systematically granted amnesty.²

As regards corruption, there is less related work but a lively policy and academic debate emerged after, in a popular note, [Basu \(2011\)](#) suggested legalizing bribe-giving, while punishing (and possibly more harshly so) bribe-taking. Basu proposed his scheme only for so-called “harassment bribes,” i.e., extortionary bribes paid to a public official in exchange for something the briber is entitled to (like a passport or driver’s licence).³ Much like leniency law in antitrust, the idea is to treat culprits asymmetrically and to thereby incentivize revelation of on-going crime and to deter new crime. Also CL-97 involved some asymmetries but, contrary to what has been argued, we maintain that it is different from Basu’s proposal. In particular, it combined two asymmetries, rather than one. It made bribe-giving legal (for a class of bribes) and it gave bribe-takers more lenient treatment if they coop-

¹As [Olken and Pande \(2012\)](#) put it: “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.” For other surveys and policy discussions, see [Bardhan \(1997\)](#), [Aidt \(2003\)](#), [Banerjee et al. \(2012\)](#), [Svensson \(2005\)](#), [Fisman and Golden \(2017\)](#), and [Basu and Cordella \(2018\)](#).

²The success of these programs led to an extensive theoretical, experimental, and empirical literature. See, e.g., [Motta and Polo \(2003\)](#); [Spagnolo \(2004\)](#); [Aubert et al. \(2006\)](#); [Apesteguia et al. \(2007\)](#); [Harrington \(2008\)](#); [Miller \(2009\)](#); [Bigoni et al. \(2012\)](#); [Chen and Rey \(2013\)](#); [Chassang and Ortner \(2022\)](#); and [Kapon \(2022b\)](#), among many others. Related work not focusing on cartels includes, e.g., [Buccirossi and Spagnolo \(2006\)](#); [Gamba et al. \(2018\)](#); [Chassang and Padró i Miquel \(2019\)](#); [Landeo and Spier \(2020\)](#); [Kapon \(2022a\)](#).

³Early analyses include [Abbink et al. \(2014\)](#); [Dufwenberg and Spagnolo \(2015\)](#); [Basu et al. \(2016\)](#); [Hu and Oak \(2022\)](#).

erate with prosecutors. We propose, and show theoretically, that if the goal is to thwart corruption then while invoking one such scheme can be a good idea, combining two of them may backfire. Besides warning against poorly designed anti-corruption policies, our theory offers some potential explanations for the fall in prosecutions we observe after CL-97. This begs the question whether the reform was a mistake or whether the policy intentions were of a different sort. We explore these questions empirically, using our theory to guide our reasoning.

Our overall approach, and an outline of our paper, goes as follows:

- Section 2 sets the stage. We describe CL-97 and the reform’s unique features with respect to bribery. We then present aggregate data showing that prosecutions dropped precipitously around 1997. It is unclear whether this is due to a reduction in corruption or to reduced corruption detection, and we argue that a thorough game-theoretic analysis is needed to pin things down.
- Section 3 develops a game-theoretic model which delivers predictions for the legal rules that we consider.⁴
- Section 4 combines our model with prosecution data. This allows us to identify two distinct candidate ways to reconcile theory and empirics. By exploring an additional hand-collected data set – a randomized selection of Chinese court cases – we single out a favorite explanation of the impact of CL-97. The key tenet is a reduction in government enforcement effort that lowered the probability of corruption revelation, consistent with the objective of CL-97 being to increase tolerance towards small bribes, rather than stepping up the fight against them.
- Section 5 sums up and concludes.

Asymmetric sanctions and leniency policies elicit information from third parties that already have it. As pointed out by [Chassang and Padró i Miquel \(2019\)](#), retaliation against whistleblowers can be a central concern in these schemes and our setup will exhibit this throughout.⁵ By dealing with anti-corruption policies based on whistleblowing, our study contributes to the broader literature on participatory policies using third-party information as a monitoring tool. Variants of these policies are studied, among others, by [Reinikka and](#)

⁴Besides addressing those main objectives, our theory also delivers more specialized game-theoretic insights and has important implications for how sanctions are modelled in the literature on cartels.

⁵This happens because players may interact many times, unlike in [Chassang and Padró i Miquel \(2019\)](#)’s model where the interaction is one-shot but retaliation is possible through players’ ability to make key “commitments.” Their section 6 discuss of how their approach may be seen as a shorthand way to capture repeat interaction intuitions, making our approaches intriguingly complementary.

Svensson (2005) in the context of corruption, and by Pomeranz (2015) and Naritomi (2019) in that of tax evasion. Moreover, studying China is the subject of a lively literature on its own, e.g., Fisman and Wang (2015a), Fisman and Wang (2015b), Chen and Kung (2019), Kong and Qin (2021), to which we contribute.

2 Setting the stage

A prevalent opinion about CL-97 seems to be that the reform was intended to strengthen the fight against corruption. A description in a blog post by Chinese law scholar, Li (2012),⁶ claims that (i) CL-97 implemented Basu’s proposal; (ii) the goal of CL-97 was to deter harassment bribes; (iii) the reform failed to induce reporting by bribe givers due to retaliation from bribe takers. This opinion was, however, not backed by any serious data or analysis. In this section we describe what according to our legal analysis were the fundamental legal changes brought about by CL-97. We differ in our overall evaluation and argue that CL-97 importantly deviated from Basu’s proposal and, for that reason, may have had very different effects. We then consider the evolution of convictions for bribery over time to try describe how these were affected by CL-97.

2.1 The reform

CL-97 involved major legal revisions that include two main provisions:⁷

Provision 1: Legalization of payment (but not receipt!) of “harassment bribes”, i.e., those that do not procure improper benefit but are exchanged for something the bribe-giver is entitled to.

Under Provision 1, in cases where bribe-givers get something they are legally entitled to, they are not considered guilty anymore. This is similar to the asymmetric punishment for harassment bribes proposed in Basu (2011), discussed in the introduction.

Provision 2: Enhanced possibilities to obtain reduced sanctions (leniency) in exchange for cooperation with prosecutors, both for bribe-givers and bribe-takers.

In particular, under Provision 2 bribe-takers that confess and cooperate with an investigation become eligible for lenient treatment, though only if the size of the bribe is below

⁶The description went uncontested, hence we interpret it as expressing a shared view among Chinese observers/legal scholars. We report a copy of the post in Appendix E.

⁷Appendix B offers a more detailed analysis of the reform.

a certain threshold. Bribe-givers that confess are also eligible for lenient treatment (if they are liable, e.g. because they paid a collusive bribe), with no limitations on the size of the bribe. On the other hand, for the giver, but not for the taker, lenient treatment required that the confession be offered before any investigation is conducted (see Table 2 in Appendix B). Concurrently, penalties were by and large reduced (see Tables 4 and 3 in Appendix B).

By adding lenient treatment also for the bribe-taker, Provision 2 moved in the opposite direction as Basu’s proposal, which instead favored *increased* sanctions for bribe-takers. Furthermore, the absence of the prerequisite for leniency that bribe-takers confess before conviction may make bribe-givers more vulnerable than under Basu’s proposal. A bribe-taker who obtains a lenient treatment is more likely to remain in his post and to potentially retaliate in future periods against the bribe-giver who blew the whistle against him.

All in all, we conclude that CL-97 was not in line with Basu’s proposal, or other proposals to introduce leniency in a strongly asymmetric fashion. CL-97 did not implement a scheme that rewards only the (first) party that blows the whistle on the corrupt exchange. Does this matter? How? What would have happened had the law been different? We tackle these question via game-theoretic analysis, in Section 3. Before we get there, Sections 2.2 discusses some preliminary evidence on the actual effect of CL-97 rather than the would-have-been effects of other laws.

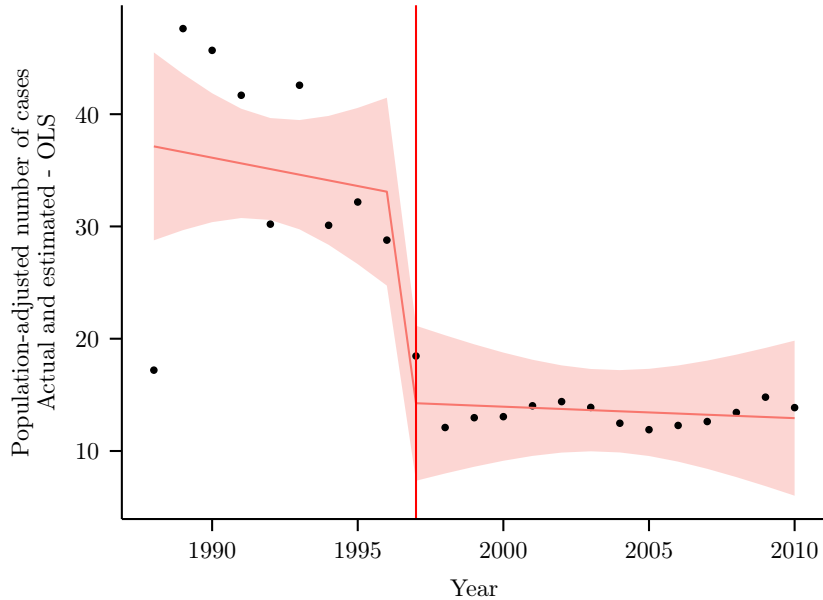
2.2 A structural break

To understand the impact of CL-97, we first present a snapshot of what happened after its implementation. Figure 1 plots the number of corruption convictions by Chinese courts in the period 1986-2010.⁸ The black dots for the raw data are overlaid with two linear trend lines for the pre- and post-reform period, to depict graphically a Chow test for structural break. There is a large, significant drop around 1997.⁹ Something happened; however, it is not easy to pin down exactly what. The structural break cannot be straightforwardly interpreted as a drop in corruption, because it might be due instead to reduced corruption detection. This kind of ambiguity of interpretation is a major problem for the evaluation of policies against crimes like corruption and collusion, whose victims (taxpayers, buyers) often do not report the crime because they are not aware of it, making changes in the overall crime population hard to observe.

⁸We construct this data series using both yearly reports only available in print and digitized reports from the National Bureau of Statistics China (NBSC). Appendix C provides the source of this data and discusses its limitations.

⁹In Appendix C we submit this result to a battery of robustness checks including Poisson and Negative Binomial models, a subset of data and placebo tests. Our conclusion identifying a drop in convictions in 1997 by about 30% stands.

FIGURE 1: TEST FOR STRUCTURAL BREAK



Notes: This figure overlays the number of prosecutions for corruption per 10,000 residents, plotted with black dots with a fitted model with two linear trends in time. The shaded area represents the confidence interval around the fit. The vertical red line shows the year of the reform, 1997.

To address this interpretation problem, [Miller \(2009\)](#) developed a theoretical model of stochastic formation and dissolution of criminal partnerships with inertia that we could apply to our convictions data.¹⁰ According to this model, when a reform enhances (weakens) detection, it generates a sharp positive (negative) immediate change in the number of convicted cases, as the criminal population *does not adjust immediately*. With time, however, the change in detection influences agents' propensity to commit crime, *with gradual effects on deterrence*. Now consider whether those insights apply to CL-97. Looking at Figure 1 we see that this is not the case. We observe a drastic decrease in prosecutions, which, while in the longer run is consistent with increased deterrence, does not have the prerequisite feature of an immediate increase in prosecutions. In fact, the immediate drop in prosecution would suggest, from Miller's model point of view, an immediate fall in detection rate, which however is not followed by a gradual increase in prosecutions linked to reduced deterrence. All in all, Miller's model with inertia does not seem to fit our data, and we cannot use it to evaluate whether CL-97 enhanced or weakened detection rates and deterrence.

¹⁰He focuses on industry collusion, but suggests that his approach "may also be relevant to law enforcement efforts against organized crime" including "long-term corruption" (p. 765).

2.3 The need for game theory

We propose that whereas collusion and corruption may sometimes share the feature that criminal partnerships are long-term relationships, the two categories differ considerably as regards to how quickly the involved players react to new circumstances. In our context, where a bureaucrat may or may not ask for a bribe or deny someone service and a citizen decides whether or not to pay a bribe, each of the interacting parties might be able to adjust their behavior quickly to new circumstances. We believe that game-theoretic analysis can provide an appropriate way to adopt such a perspective. New circumstances correspond to a new game, and new equilibria may be played. The change in behavior may be immediate, and we can gauge the impact of CL-97 by comparative statics between different games and parametrizations. Section 3 is devoted to this approach.

3 Theory

Recall our conclusions from Section 2: CL-97 did not implement Basu’s proposal. Yet, the reform had large effects on the number of prosecuted cases. The interpretation is ambiguous. We adopt a game-theoretic approach to shed light on the likely effects, exploring the impact of different forms of law and parameters. Section 3.1 considers harassment bribes while Section 3.2 collusive bribes. Section 3.3 sums up and draws overall conclusions.

3.1 Harassment bribes

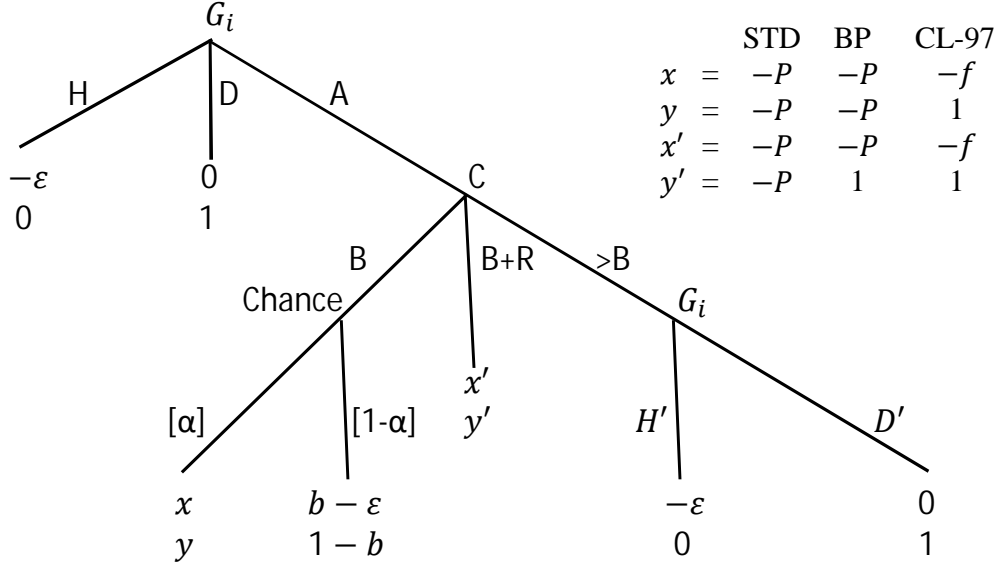
The stage game We examine the interaction between a citizen (C) who regularly needs government services (passport, tax stamp, birth certificate, etc) and government representatives G_i , $i = 1, 2, \dots$ entrusted with the task of providing. The interaction is repeated except that G_i may be fired and replaced. C is initially matched with G_1 , but if G_1 is fired then G_2 takes his place, etc. G_i can demand a bribe under the threat of denying C service. Such bribes, which C have to pay in order to get what he deserves, are called “harassment” (or “extortionary”) bribes. Bribery as well as service-denial is illegal but hard to detect (with small probability α) unless someone reports the activity.

C and the relevant G_i interact in the stage game seen in Figure 2.

G_i has three initial choices: D = “deliver” (the service) leads to payoffs of 0 for G_i and 1 for C ; H = “harass” (e.g., delay service) leads to $-\varepsilon$ for G_i and 0 for C ; A = “ask for a bribe.” Assume that $\varepsilon > 0$, reflecting that G_i incurs a small cost of not carrying out his job properly even if he is not formally caught in the act,¹¹ a natural assumption since C

¹¹This could reflect prep costs necessary to not make discovery imminent, a bad conscience, or a low

FIGURE 2



is entitled and G_i breaks the law. Following A , player C has three choices: B = “bribe,” $B + R$ = “bribe and report” (to the authorities), and $\neg B$ = “not bribe.”

Following B , there is probability $\alpha \in (0, 1)$ that the illegal activity is “discovered,” with payoffs x for G_i and y for C , numbers which depend on the legal regime (see below). Otherwise, payoffs are $b - \varepsilon$ for G_i and $1 - b$ for C , where $1 > b > \varepsilon$. Following $B + R$, discovery is certain; payoffs are x for G_i and y for C (as before). Following $\neg B$, player G_i gets the move again with two choices: D' = “deliver” and H' = “harass,” with payoffs as following D and H .

This stage game is played repeatedly, except that players may be incarcerated or fired, depending on their choices and the law. Players discount future payoffs at rate $\delta \in (0, 1)$.

Three legal regimes:

Standard law (STD) $x = y = -P$ where $P > 0$: This is our default case. If play proceeds A followed by $B + R$ or by B followed by exogenous discovery then both players are severely punished. Namely, *their repeated interaction ends and they are incarcerated forever*. That is, each player’s payoff stream from that point on will be $-P, -P, \dots$, the discounted value of which is $\frac{-P}{1-\delta}$. Note that, for all $\delta \in (0, 1)$, stream $-P, -P, \dots$ is worse than stream $0, 0, \dots$ which a player could guarantee via perpetual choices of D or $\neg B$. So, in this sense, the punishment is harsh. That said, if α and δ are small enough, a player may want to take his chances and engage in corrupt exchange. To rule out the uninteresting case where α is so

probability of being slightly reprimanded by a lower-level boss.

large that this cannot happen for any $\delta \in (0, 1)$, we henceforth assume (also for other legal regimes) that for each $\clubsuit \in b - \varepsilon, 1 - b$ and any sufficiently small δ it holds that

$$\alpha \cdot \left(\frac{-P}{1 - \delta} \right) + (1 - \alpha)\clubsuit > 0 \Rightarrow \alpha < \frac{\clubsuit}{\clubsuit + P}. \quad (1)$$

Basu’s proposal (BP) $x = -P, y = 1$: If play proceeds A then $B + R$, or A then B followed by exogenous discovery, then C gets the bribe back (hence $y = 1$) and remains in the game. G_1 is fired and incarcerated (as in STD, getting $-P, -P, \dots$) and replaced by G_2 who starts a new interaction with C , etc.

CL-97 $x = -f$ where $0 < f \leq P, y = 1$: For C , the situation is as with BP, but leniency rules now apply to G_1 : if bribery is discovered G_1 gets $-f$ in the current period (only), but is not fired, hence never replaced, hence interacts with C in perpetuity.

The solutions Under each law, there are multiple SPE. For example, repetition of stage game profile $(DD', \rightarrow B)$, starting at any history, is always an SPE. However, since our goal is to draw conclusions regarding the scope for bribery we focus on SPE with perpetual bribery. Our results are then as follows:

Proposition 1: *Under STD, for small enough ε , we can find $0 < \underline{\delta}^{STD} < \bar{\delta}^{STD} < 1$ such that a SPE with period-by-period on-path bribery exists iff $\underline{\delta}^{STD} \leq \delta \leq \bar{\delta}^{STD}$.*

The proof of this proposition, and all others, are in Appendix A. Note that Proposition 1 calls for “small enough ε .” The statement cannot be extended to large values of ε ,¹² but we think of “ ε small” as the economically relevant case.

Proposition 1 shows that perpetual corruption is possible if players are neither too impatient nor too patient. The second half of that result may appear counter-intuitive, seemingly contradicting the common wisdom (from many “folk theorems” as well as the literature on cartel enforcement) that if δ is high enough collusive outcomes are possible. Proposition 1 shows a sense in which this is not true for a form of criminal cooperation. The stark result that $\bar{\delta}^{STD} < 1$ draws crucially on our assumption that the penalty associated with discovered bribery is *perpetual*. That is, the players get $-P, -P, \dots$ rather than (say) $-P, 0, 0, \dots$. Is this realistic? We suggest that the answer is *yes* under old Chinese rules, where penalties were sometimes a lifetime in jail (or worse). The answer may be *yes* also in western countries

¹²To see this note that the critical inequality (7) in Appendix A cannot hold if ε is high enough.

with limited jail sentences, if these come with destroyed reputation that rule out lucrative re-entry to the corrupt exchange.¹³

Next, consider BP. We assume that G_i 's strategy depends neither on the history of play nor on i . The interpretation is that when i is hired he is not told (and cannot tell) whether or not he is the first employee at his job. We extend the notion of SPE in the obvious way to embody this strategy restriction, and get the following result:

Proposition 2: *Under BP, a SPE with perpetual on-path bribery does not exist (given our assumptions about feasible G_i -strategies).*

While this result emphasizes the potential power of Basu's proposal, two caveats should be made: First, while (for memoryless G_i 's) all-out bribery is incompatible with SPE under BP, partial bribery is possible: G_i starts off choosing H in k stage games, then plays as in the SPE for STD in Proposition 1. For a range of δ 's one can find k large enough that no player has a unilaterally profitable deviation.¹⁴ Second, assuming that G_i 's choice is independent of i is natural if players do not tell "what happened." This is far-fetched in closer-knit communities where rumors spread, or if the G_i 's are relatives or colluding parties.¹⁵ But even then one may argue in favor of Proposition 2's implication: Maybe there is a chance that G_{i+1} replacing G_i is an "honest type" who chooses D without reflection? Maybe equilibrium selection going forwards favors perpetual $(DD', B+R)$, given the "scary" (to G_{i+1}) fact that G_i was severely punished?¹⁶

Next, consider CL-97: Perpetual corruption is now possible for higher values of δ :

Proposition 3: *Under CL-97, if ε is small enough, we can find integer $\ell > 0$ that supports a SPE with corruption when $\delta > \underline{\delta}^{CL-97} = \max\left(\frac{\varepsilon}{\varepsilon + \diamond}\right)^{\frac{1}{\ell}}, b(1 - \alpha)$.*

That CL-97 allows corruption for more patient players than STD is a consequence of there being no perpetual punishments $-P, -P, \dots$. The (expected) payoffs streams that come instead (labeled $\diamond, \diamond, \dots$ and $\heartsuit, \heartsuit, \dots$ in the proof) are guaranteed to have positive expected

¹³If the payoff stream were instead $-P, -p, -p, \dots$, where $P > p > 0$, obviously, the size of P and p is critical. If p is small enough the constraint $\bar{\delta}^{STD} < 1$ evaporates.

¹⁴ C cannot gain by choosing $B+R$ once G_1 gets going choosing A ; C would immediately get 1 instead of $1 - b$, but this is outweighed by the loss during the following k rounds when G_2 chooses H instead of A .

¹⁵If G_i is able to implement a history-dependent strategy the analysis will resemble that for CL-97 below, allowing all out bribery. We'd get $x = -P/(1 - \delta)$ rather than $x = -f$, but the highlighted SPE is still viable as its construction is independent of f .

¹⁶Under BP, giving bribes is legal so C isn't punished following $B+R$. [Dufwenberg and Spagnolo \(2015\)](#) propose a "modified" law (=MBP) whereby discovered bribe givers get off the hook only if they themselves report the activity. In our setting, the conclusions we obtain for BP (and CL-97 below) extend similarly.

value. It is key that C is deterred from blowing the whistle, which may take multiple rounds of punishment (in which case $\ell > 1$). It must then be incentive-compatible for G_1 to retaliate and carry out that punishment. This is a “small enough ε ” requirement since the condition $\delta > (\frac{\varepsilon}{\varepsilon + \diamond})^{\frac{1}{\ell}}$ (seen in the proof) cannot hold if ℓ is large enough (for fixed ε) but will hold if ε is small enough (for fixed ℓ).¹⁷

The different predictions seen in Propositions 2 and 3 show that BP and CL-97 should be distinguished, calling to question Li’s point (i) (compare Sections 2-2.1). Also, Proposition 3 supports Li’s point (iii), that retaliation (would be H' in the theory) by government officials (G_1) may increase corruption (play A followed by B); however, this happens under CL-97 rather than under BP.

Game-theoretic remark Each of the legal regimes (STD, BP, and CL-97) we have modeled as games, for at least some paths of play, allows for infinitely repeated interaction. It may at first glance seem puzzling that Proposition 3 allows for perpetual collusive bribery for high enough values of δ , whereas Propositions 1 (as noted before) and 2 do not. How can this be reconciled with so-called “folk theorems” that show ways that high values of δ facilitate cooperation in repeated games? The answer is that while CL-97 generates a repeated game, in the technical sense required for folk theorems, STD and BP do not do so. In repeated games, play duration of a stage-game is independent of which actions are chosen in any particular stage, unlike with STD where path A -then- B -then-exogenous-discovery uniquely terminates the interaction. Moreover, there can be no shift of the active players in the stage game, unlike the case with BP where G_i may be replaced by G_{i+1} . In other words, while “folk theorems” show that if the discount factor (“ δ ”) is high enough this facilitates cooperation in repeated games, we prove here by example that such insights do not extend to games which are subtly different from repeated games. If some players can be “replaced,” or if repetition may be halted following some particular path of play, cooperation may be ruled out if δ is too high.

Cartel modelling remark The just-mentioned too-high- δ result has an applied implication that runs counter to the spirit of established results in the literature on antitrust enforcement against cartels. To simplify, in this literature legal sanctions are typically modeled as a one-period monetary fine, in which case a high δ always facilitates illegal cooperation. One might have expected such results to extend to settings with multi-period legal

¹⁷For low values of δ , it is possible that STD could be more conducive to corruption than CL-97. To see this, fix $\delta \in (0, \frac{b}{2-b})$ and study inequality (7) in Appendix A as $\alpha, \varepsilon \rightarrow 0$. We get $1 > 0$, implying (by continuity) that (7) holds if α and ε are small enough. Select α so small that, in fact, $\delta \in (0, \frac{b(1-\alpha)}{2-b(1-\alpha)})$; condition (b) in the proof of Proposition 3 cannot hold. Corruption is possible under STD but not CL-97.

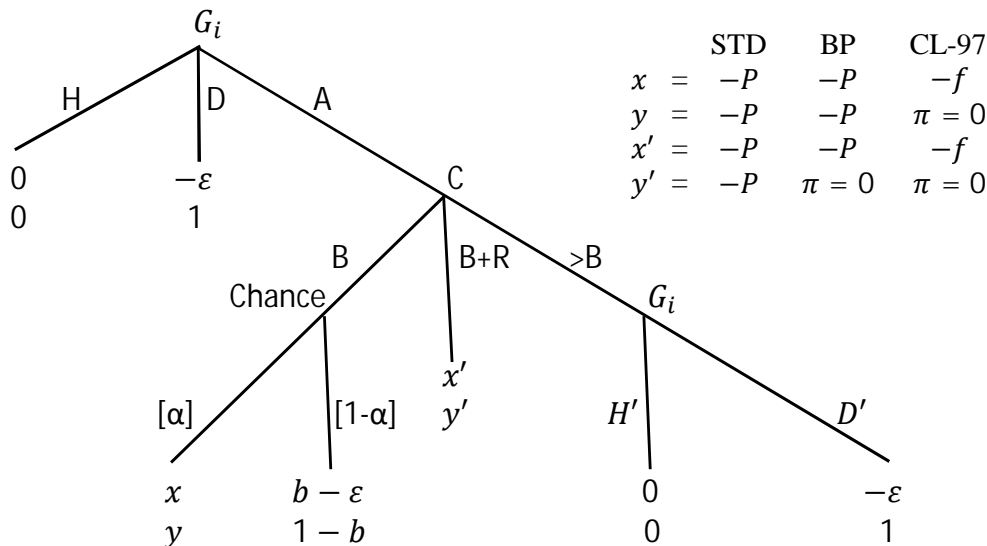
sanctions. Instead, our more realistic model with its too-high- δ result shows that analogous results do not automatically apply to jurisdictions like the US, where multi-period sanctions (jail, managerial disqualification) play a crucial role in antitrust enforcement.

3.2 Collusive bribes

The stage game What happens if we instead consider “collusive bribes,” whereby C gets an *illegal* service he is *not* entitled to (with negative externalities for other citizens)? The stage game changes in several ways relative to Figure 2. First, re-interpret choices H & H' as “honest,” for the action G_i is supposed to take. Second, adjust payoffs such that the cost ε of G_i not doing his job is deducted following his provision of the illegal service. Third, if the law is not STD, rather than follow the rules of BP, we assume that the bribe-giver cannot get lenient treatment unless he blows the whistle (rather than is exogenously discovered to bribe). Also, following $B + R$, while C gets back his bribe he does not obtain the service (since it is illegal and hurts third parties). A legal rule is, however, conceivable where C is compensated for not obtaining the service: his payoff would be $y = \pi \in [0, 1]$, where $\pi = 1$ would correspond to “full compensation.” We concentrate on the case where $\pi = 0$, as this seems consistent with the empirical record, but we will also discuss cases where $\pi > 0$ later. So, for now, C ’s payoff will be 0 following $B + R$, and it will be $-P$ if there is exogenous discovery (following B). We refer to the resulting (non-STD) laws as L-for- C and, of course, CL-97. Basu’s idea to legalize bribe-giving was originally proposed for harassment bribes only, which is why we talk about L-for- C rather than BP in this subsection.

All in all, C and G_i interact as in the stage game in Figure 3.

FIGURE 3



Three legal regimes:

Standard law (STD), $x = y = y' = -P$ where $P > 0$: If play proceeds A followed by $B + R$ or by B followed by exogenous discovery then their repeated interaction ends and they are incarcerated forever (exactly as in the case of harassment bribes).

Leniency-for- C (L-for- C), $x = y' = -P$, $y = 0$: If play proceeds A followed by $B + R$ then C gets the bribe back but is not allowed to keep the illegal service. C furthermore remains in the game. G_1 , meanwhile, is fired and incarcerated (as in STD, getting $-P$ perpetually) and replaced by G_2 who starts a new interaction with C , etc. If play proceeds A followed by B followed by exogenous discovery then both G_1 and C are incarcerated (as in STD, each party getting $-P$ perpetually).

CL-97 $x = -f$, $y = 0$, $y' = -P$ where $0 < f \leq P$: For C the law applies as with L-for- C , but additional leniency rules apply to G_1 : if bribery is discovered G_1 gets $-f$ in the current period (only), but is not fired, never replaced, hence interacting with C in perpetuity.

The solutions We focus on SPE with perpetual bribery and get the following results:

Proposition 4: Under STD, for small enough ε , we can find $0 < \bar{\delta}^{\text{STD}} < 1$ such that a SPE with period-by-period on-path bribery exists iff $\delta \leq \bar{\delta}^{\text{STD}}$. Moreover, for a given P , $\bar{\delta}^{\text{STD}} > \bar{\delta}^{\text{STD}}$ (where $\bar{\delta}^{\text{STD}}$ is as defined in Proposition 1).

When proving Proposition 1, to sustain a SPE it was necessary to satisfy an incentive constraint such that G_1 would be willing to punish C by choosing H' following $\rightarrow B$. When we switch from harassment bribes (Fig. 1) to collusive corruption (Fig. 2) that requirement has no counterpart, the reason being that the choice H' does no longer require G_1 to incur any cost of ε . Therefore, Proposition 4, as opposed to Proposition 1, involves no lower bound on the range of values of δ that can sustain corrupt exchange. The result that $\bar{\delta}^{\text{STD}} > \bar{\delta}^{\text{STD}}$, for a given P , should be interpreted cautiously, since P would typically be larger with collusive bribes than harassment bribes.

Next, consider L-for- C :

Proposition 5: Under L-for- C , for small enough ε , we can find $0 < \bar{\delta}^{\text{L-for-}C} < 1$ such that a SPE with period-by-period on-path bribery exists iff $\delta \leq \bar{\delta}^{\text{L-for-}C}$. Moreover, $\bar{\delta}^{\text{L-for-}C} = \bar{\delta}^{\text{STD}}$ (as defined in Proposition 4).

Judging by Propositions 4 and 5, with collusive bribes, STD and L-for- C offer the same scope for collusion. This hinges on our assumption that following $B + R$, while C will get back his bribe he will not obtain the illegal service; C 's payoff will be 0 following $B + R$. If the law instead offered a reward of π to C following $B + R$, we would get $y = \pi \in [0, 1]$. If $\pi = 0$ we have the case embodied in Proposition 5. If $\pi = 1$ we would have a case of “full compensation,” and Proposition 5 could be replaced by an analog of Proposition 2 that would still be true if $\pi < 1$ were “large enough.” However, as we argued earlier, we believe that $\pi = 0$ is the most natural assumption for capturing the Chinese legislation.

Next, consider CL-97, or leniency for both parties:

Proposition 6: *Under CL-97, for small enough ε , we can find $0 < \bar{\delta}^{CL-97} < 1$ such that a SPE with period-by-period on-path bribery exists iff $\delta \leq \bar{\delta}^{CL-97}$. Moreover, $\bar{\delta}^{CL-97} > \bar{\delta}^{L-for-C} = \bar{\delta}^{STD}$ (as defined in Propositions 4 and 5).*

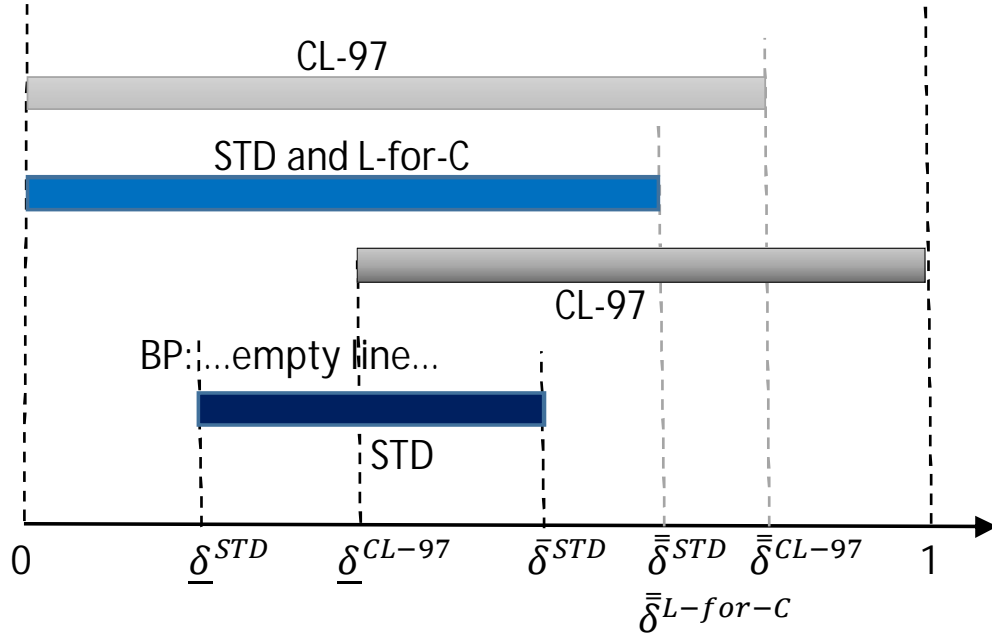
Equilibrium play can involve corruption for more patient players under CL-97 than under STD, as reflected in the fact that $\bar{\delta}^{CL-97} > \bar{\delta}^{STD}$. The reason is that only one of the two players (viz. C) is perpetually punished under CL-97. Because there is more flexibility as regards which values of b may be involved in a corrupt equilibrium, a larger range of values of δ is compatible with equilibrium corruption under CL-97 than STD.

3.3 Scope for equilibrium corruption

Comparisons between Proposition 1 and 3, and Proposition 4 and 6, suggest that CL-97 may *increase* the scope for corruption. This is illustrated in Figure 4, where the range for δ compatible with equilibrium corruption under each legislation are compared. The lower portion represents harassment bribery, the higher one collusive bribery. The ranges corresponding to CL-97, drawn in lighter shades, extend to higher discount factors, implying that corruption in equilibrium is now sustainable for a larger range of high- δ agents.

Our model shows that the assertion that CL-97 implemented Basu’s proposal (and also demonstrated that it is ineffective) is misguided. As regards harassment bribes, comparing Propositions 2 and 3 suggests that CL-97 is crucially different from Basu’s proposal. Namely, the key legal difference (leniency for bribe takers) may have translated to increased the scope for retaliation, and made whistleblowing even less attractive. Similarly, as regards collusive bribes, comparing Propositions 5 and 6 one sees that CL-97 has different behavioral consequences than L-for- C (the legal rule that we proposed as akin to Basu’s proposal adjusted to be relevant for collusive bribes). Again, offering leniency also to bribe-takers

FIGURE 4



increased the scope for retaliation making whistleblowing by bribe-givers less attractive and collusion easier to sustain.

4 The model meets the data

Section 3 provides structure that can help us evaluate the impact of CL-97, as well as the intentions behind the law. In Section 4.1 we draw conclusions solely with reference to the data reported in Figure 1. Section 4.2 then explores additional data (from court cases) that permit a refined understanding. That understanding naturally suggests particular presumptions regarding the Chinese government’s intentions with CL-97, and in section 4.3 we explore the empirical relevance of these. All in all, viewing the data that we have access to through our game-theoretic lens, a favored, clear story emerges.

4.1 Figures 1 & 4 meet

Let us assume that corruption occurs, under various legal rules, if and only if δ falls within the ranges seen in Figure 4. Outside these ranges, we assume that corruption is deterred. These assumptions are admittedly strong, pushing the envelope for how much inspiration one may take from the analysis of Section 3. With that caveat, our conclusions are as follows:

Refer to Figure 4 and note that

$$0 < \underline{\delta}^{STD} < \delta^{CL-97} < \bar{\delta}^{STD} < \bar{\delta}^{CL-97} = \bar{\bar{\delta}}^{STD} < \bar{\bar{\delta}}^{CL-97} < 1.$$

If $\delta \in (\bar{\bar{\delta}}^{CL-97}, 1)$, more corruption is predicted under CL-97 than under STD. More precisely, corruption is deterred for harassment and collusive bribes under STD, whereas corruption is deterred only for collusive bribes under CL-97. The only way to get a conviction, according to our theory, is in an equilibrium where the path of play is *A-then-B-then-exogenous-discovery*.¹⁸ This then happens with probability α (of exogenous discovery). Hence, the more corruption, the more convictions we should observe, so more convictions should be observed under CL-97 than under STD. This is inconsistent with Figure 1.

Consider the other regions of δ (as defined by Figure 4) and reason as in the previous paragraph. In all cases but one, the predicted number of convictions is either higher or the same under CL-97 as compared to STD, hence inconsistent with Figure 1. The only exception is if $\delta \in (\underline{\delta}^{STD}, \delta^{CL-97})$, where more convictions are predicted under STD than under CL-97 and the entire drop in convictions concerns harassment bribes.

Our analysis so far assumed that α , which can be interpreted as a proxy for government enforcement effort, remained constant as a switch was made from STD to CL-97. This is questionable. Refer back to the discussion (Section 2.1) of Provision 2 in CL-97. The general spirit appears to be one of relaxed enforcement against smaller bribes (e.g., our reference to “penalties that were ... reduced”). A lower α , e.g., due to less frequent audits, may be a natural component. If CL-97 was accompanied by a large enough drop in α , the effect could be that the number of convictions dropped, even if $\delta \notin (\underline{\delta}^{STD}, \delta^{CL-97})$.

We find it reasonable that there is a distribution of δ -values, across different actors (citizens and government representatives) in the economy. Hence, depending on how large the CL-97-induced drop in α may be, there may be heterogeneity as regards whose convictions went up or down. Yet the overall effect may be consistent with Figure 1.

All in all, we can reconcile Figures 1 and 4 in two ways. First, it could be the case that the entire drop in convictions seen in Figure 1 is driven by a drop in harassment bribery; this is the “exceptional” $\delta \in (\underline{\delta}^{STD}, \delta^{CL-97})$ case described above. Second, it could be that CL-97 was accompanied by a reduction in enforcement against small bribes. To check which of these possibilities can best capture the impact of CL-97, we need to consider additional data of a different form. That’s the topic of Section 4.2.

¹⁸That is, player G_i asks for a bribe, player C pays the bribe, and then chance “discovers”.

4.2 Engaging micro-level data to pin down what happened

Which of the two possibilities described in Section 4.1 – a drop in prosecutions of harassment bribery *or* a drop in government effort α against small bribes – can best capture the impact of CL-97? What might have been the intentions of the Chinese government? To answer these questions, we collected primary data from a sample of 171 cases of bribery, tried between 1986 and 2010, with a total of 255 defendants.¹⁹ The cases were selected at random,²⁰ stratified by year, from two different archives available to students in Chinese law schools: the PKU Law Database²¹ and the Classical Law Database.²² The case documents have been read and partly translated to extract the information that we need.

Table 1 reports summary statistics for the variables we collected. The caption underneath explain how we measured the data. The entries are complemented by the additional material described in Figures 5-8 and 10-11. Out of all this material, in this subsection we shall refer to the entries on harassment bribery, size of bribe, and bureaucrat rank in Table 1 and to the related Figures 5-6. In subsection 4.3 we shall refer to the remaining entries in Table 1 as well as to Figures 7-8 and 10-11.

Harassment bribery As Table 1 shows, cases of harassment bribes become slightly less common after CL-97, but the change is not significant.²³ This pattern suggests that the drop in convictions seen in Figure 1 is not driven by a decline in harassment bribery, nor due to harassment bribe-givers not being prosecuted any longer; the “exceptional” $\delta \in (\underline{\delta}^{STD}, \delta^{CL-97})$ case described in Section 4.1 does not seem prevalent.

A drop in α The micro data is consistent with the other possibility described in Section 4.1, that the introduction of CL-97 was accompanied by a drop in enforcement, parameterized by α , in situations with small bribes. We present two pieces of evidence in favor of this claim:

¹⁹Since 2014, Chinese courts have made unprecedented numbers of court decisions publicly available, uploading more than 120 million documents to a centralized website called “China Judgments Online.” 133 million documents are available as of June 2022. See <https://wenshu.court.gov.cn>. However, this data does not go a long way back in time, starting in 1996, only one year before our reform. Moreover, for the first few years the data only includes a handful of corruption cases. Therefore our sample is a complement to these now broadly used archives (see, for example [Liebman et al., 2020](#)) covering an earlier time period.

²⁰Specifically, a random number series was generated in our statistical software for each year, of the length corresponding to the total number of cases we wanted divided by the number of years. Then we picked the cases with corresponding order number. Sample size was determined by power and budget considerations, as detailed in a pre-analysis plan, see [Berlin and Spagnolo \(2015\)](#).

²¹<http://www.pkulaw.cn/Case/>

²²<http://corpus.classiclaw.com/search>

²³While the Table does not disaggregate between cases against bribe-giver and against bribe-taker, in the data the (insignificant) reduction in the share of harassment bribes comes, if anything, from cases against bribe-takers. The share of harassment bribes among the trials of bribe-givers is below 1%, both before and after the reform.

TABLE 1: SUMMARY STATISTICS WITH T-TEST OF THE BEFORE-AFTER DIFFERENCES

	Before		After		t-test
	mean	(s.d.)	mean	(s.d.)	p-value
Case against bribe-taker	0.857	0.352	0.733	0.444	0.013
Harassment bribe	0.125	0.332	0.088	0.285	0.364
Leniency	0.371	0.486	0.639	0.482	0.000
Size of bribe (th. yuan)	486	1,570	1,306	4,936	0.061
Prison sanction	25.548	39.519	15.780	30.659	0.036
Death penalty	0.181	0.387	0.087	0.283	0.036
Bureaucrat Rank	10.486	3.282	9.385	3.339	0.035
Total Cases	105	105	150	150	255

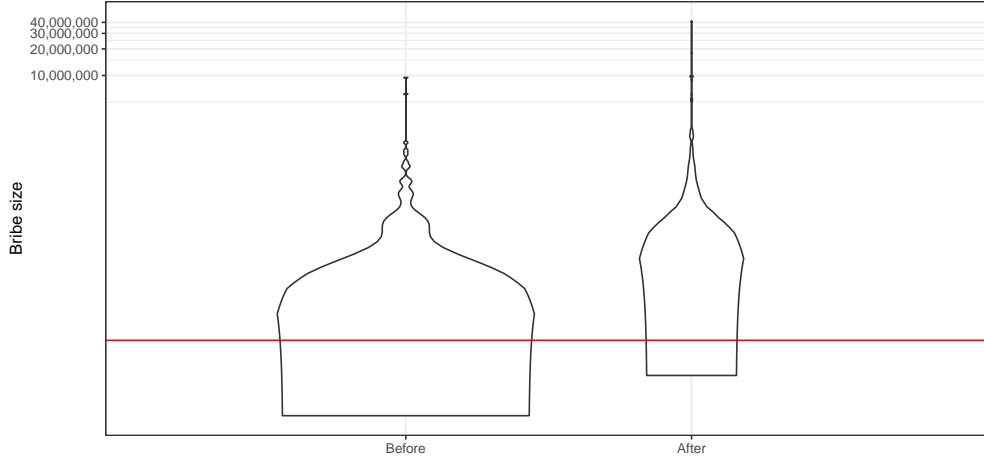
Notes: This table reports the summary statistics of the variables collected from the case files. *Case against bribe-taker* is an indicator taking the value 1 if the case concerns a bribe-taker, and 0 if the case concerns a bribe-giver. *Harassment bribe* is an indicator taking the value 1 if the case is for harassment bribery and 0 if the case is for collusive bribery. *Leniency* is an indicator taking the value 1 if leniency was awarded in the case. *Size of bribe* and *Prison sanction* are continuous variables, reporting the size in yuan of the reported bribe paid and the number of years of the prison sentence awarded. *Death penalty* is an indicator taking the value of 1 if the sanction awarded in the case was capital punishment. The size of bribe is adjusted for inflation. *Bureaucrat Rank* is a numeric indicator of the rank of the public official involved in the case, constructed by the authors and detailed in footnote 24.

First, Table 1 shows that the average bribe size is much larger after the reform, even adjusting for inflation, and the difference is statistically significant. Figure 5 furthermore shows that not only the mean but the whole distribution of exchanged bribes (among those that appear in the court cases) shifted upwards after CL-97. Note that the mass at the bottom of the distribution disappeared from the cases prosecuted after the reform, while the extreme cases at the top are both larger (notice the scale of the y -axis) and more common. This data suggests that smaller bribes were prosecuted less often, implying a reduced α for such bribes.

Second, Figure 6 shows that after the reform the rank of public officials charged of accepting collusive bribes, i.e., in the cases that are *not* harassment bribery, is significantly higher (lower numbers correspond to higher ranks).²⁴ No significant change is observed

²⁴Our rank is coded as follows. We start from six levels for the official cadre: national level or equivalent, provincial level or equivalent, prefecture level or equivalent, county level or equivalent, village level or equivalent, town level or equivalent. For each office at each of these levels, there is one top rank and several deputies. For each of these 6×2 levels, there are three sets of leaders: leaders from the Communist Party, leaders from the government, and leaders from the congresses. Party leaders are more powerful than government leaders, while government leaders are more powerful than congress leaders. This leads to a scale of 1-36, where lower number corresponds to higher rank. Government officials without any leadership or with very low rank are assigned a code 45. Firm leaders could not be assigned a stable rank, although they are defined as public officials when the firm is publicly owned, because of the variability of enterprise status

FIGURE 5: SIZE OF BRIBE



Notes: This figure plots the distribution of bribes exchanged before and after the reform. The scale on the vertical axis is logarithmic to accommodate the spread in bribe size. Bribe values are adjusted for inflation.

for harassment bribes, although the sample is small. Similar to the increase in the size of bribes, assuming that higher rank officials deal with larger bribes, the higher rank of convicted officials is consistent with the reform increasing tolerance for smaller bribes (with a likely fall in enforcement against them, parametrized by our α).

4.3 What was the objective of CL-97?

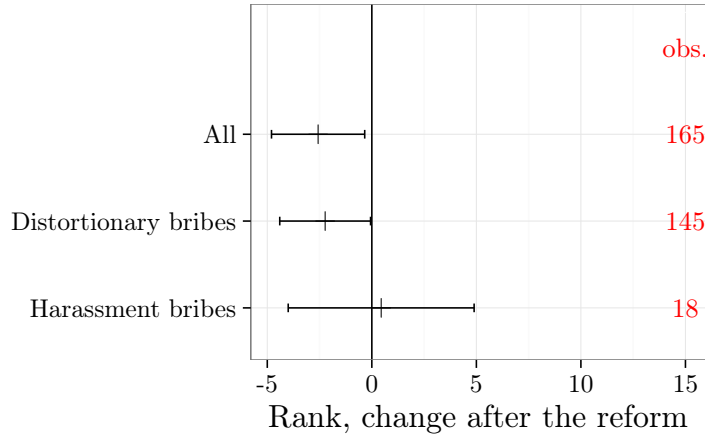
Our conclusion that enforcement intensity (α) against smaller bribes fell casts doubts on the presumption that the objective behind CL-97 was to increase deterrence of these bribes. We propose that – contrary to point (ii) as we described it in the first paragraph of section 2 – the objective of the Chinese government was probably to increase tolerance for smaller bribes, rather than to deter them. In this section, we present data which we take to be consistent with this outlook.

To start with, we have suggestive evidence based on text analysis of speeches of the communist party leaders around 1997 and from some corruption perception indicators. In this data, we don't find any strong sign of a decrease in tolerance for bribery, which one might expect paving the way for an anti-corruption reform. We present details in Appendix D, including Figures 10-11 therein.

Additional evidence is provided by the information we have collected in Table 1 and in Figures 7-8. Consider the allowances for reduced sanctions under the provisions of CL-97 (see section 2.1). These are consistent with a goal to increase tolerance for smaller bribes.

and their positions within them over time.

FIGURE 6: RANK OF PUBLIC OFFICIALS



Notes: This figure plots the coefficient and confidence intervals from regressions of the rank of the convicted public official on the post-reform dummy, for the whole sample and separately for collusive (= distortionary) and harassment bribe cases, respectively. The coefficients thus indicate the change in rank of bureaucrats in the different samples. Note that a low number corresponds to a high rank. The regressions include a time trend. Although this effect is statistically significant at the 95% level, the power of the test is much lower than accepted levels in this case, at 25%. This implies that the size of the estimates might be inflated by a factor of around 2. However, the probability that the sign is incorrect is very low, at 0.02%.

Both in terms of awarding leniency and in terms of the severity of sanctions, the formulation of the law implies discretion for the judicial authority. We ask whether the rules were indeed enforced as written, and in a way consistent with our interpretation and conclusion. The evidence we have suggests this is indeed the case:

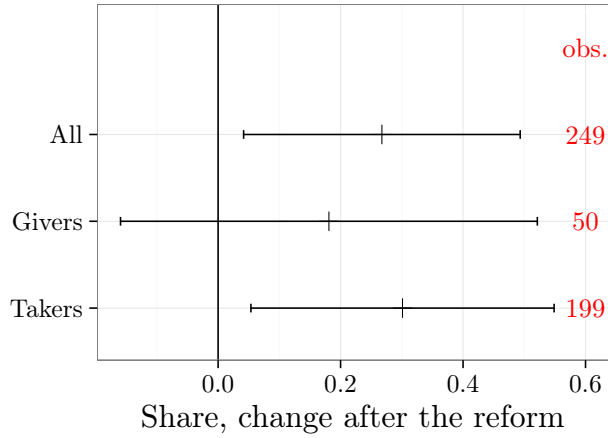
First, in Table 1 we can see that there is a substantial increase in the use of leniency in the period after the reform. This, Figure 7 further attests, is particularly true for bribe-takers, as implied by the details of the legal text²⁵ and assumed in our model in section 3.

Second, a related question concerns awarded sanctions. In the legal text, sanctions are specified in ranges (e.g., “not less than 2 and up to 5 years imprisonment”). It is interesting to verify how severe the sanctions administered after the reform are in practice. Table 1 shows that on average they are indeed lower after the reform, also in terms of likelihood of life sentence and death penalty. Along the same lines, Figure 8 plotting the whole distribution of prison-year sanctions, shows that longer sentences, including life and death sentences, are less common after the reform. This might be a consequence of leniency being awarded more often, or of the reduction in sanctions included in the 1997 reform. In both cases this evidence is consistent with the provisions of CL-97 (see section 2.1) and with our modeling.

We conclude that the goal of the Chinese government was probably to increase tolerance for smaller bribes, rather than to deter them. This conclusion is consistent with all our

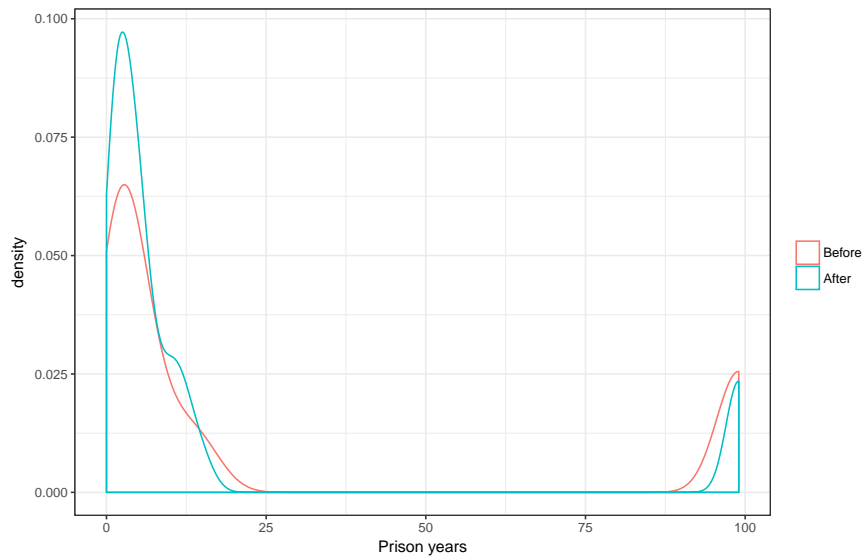
²⁵See Appendix B, Table 2.

FIGURE 7: FREQUENCY OF AWARDED LENIENCY



Notes: This figure plots the coefficient and confidence intervals from regressions of the indicator for whether leniency has been awarded on the post-reform dummy, for the whole sample and separately for bribe givers and takers, respectively. This gives the change in the share of cases awarded leniency for each sample. Although this effect is statistically significant at 95% level, the power of this test is slightly lower at 65%. This implies that the size of the estimate might be inflated by 23%. However the probability that the sign is incorrect is very low, at 0.0016%.

FIGURE 8: DISTRIBUTION OF PRISON YEARS



Notes: This figure plots the distribution of prison sentences before and after the reform. Life sentences and death penalties are indicated by code 99.

findings and observations regarding small bribes: the increase in leniency for bribe-takers, the reduction in sanctions, and the drop in α . Why might the Chinese government have wanted to make these moves? We do not have any evidence that allows us to pin the answer down exactly. However, reasons to increase tolerance for smaller bribes may include: “greasing the wheels” of the economy; saving enforcement costs; and/or shifting focus and resources towards the more damaging “grand” corruption.

5 Concluding remarks

Our paper may be appreciated in two distinct ways. First, we elucidate a piece of economic history. How should we understand the structure of, the intentions behind, and the effects arising from the anti-corruption reform (CL-97) that China rolled out in 1997? Contrary to what claimed by some observers, our legal analysis showed that CL-97 was different from the scheme envisaged by Basu (2011), in particular as bribes below a certain threshold led to lenient treatment also of bribe-takers. Empirically, we found that CL-97 was followed by a significant and permanent fall in the aggregate number of prosecutions. To interpret this fall, we invoked our theoretical analysis of the impact of CL-97. We concluded that the increased access to leniency for corrupt bureaucrats, granted even if they confessed only after being reported, increased the threat of retaliation against bribe givers who blew the whistle. This facilitated rather than hindered the exchange of small bribes. Our theory lead us to infer that a reduction in government’s enforcement effort against smaller bribes seems to also have occurred at the time of the reform, a conclusion supported by the analysis of a random sample of micro-data. We concluded that the goal of the CL-97 reform may not have been to step up the fight against petty corruption. Besides reducing enforcement, CL-97 also reduced overall penalties against bribery, and the story most compatible with our overall findings is one of increased tolerance for the smaller bribes affected by the reform, rather than an attempt to fight them.

Our second contribution is to applied theory. Although the theoretical model was developed to help interpret a specific empirical puzzle, the contributions we offer through it bear more general relevance. Consider the time-honored idea to fight organized crime through asymmetric treatment of criminals. It has found academic proponents, first for the arena of leniency in anti-trust, and then, more recently, Basu (2011) brought related ideas to the fight against harassment bribes. We show that Basu’s approach is sound, as we “prove” its validity for a special setting. Witness our comparison of Propositions 1 vs. 2. The benefits of Basu’s proposal evaporate, however, if additional – “too many” – lenient features are added to the mix. Our comparison of Propositions 2 vs. 3 shows that. So, just because a

policy-mix involves legalized bribes as a component, one should not presume that “Basu’s proposal” is being implemented. Our results on “collusive bribes” (Propositions 4-6) show some degree to which all of these insights extend to collusive bribes.

Our model also shows that, contrary to standard results on collusion, a too high discount factor may make corrupt relations harder to sustain, by increasing the value/cost of future non-monetary sanctions. The specification of our games, and our six propositions, was inspired by the situation in China. However, they are typical enough (we would maintain) that the overall insights reach beyond the Chinese context.

Our insights appear highly policy relevant for many other countries than China. The US, Mexico, and Brazil, for example, recently introduced leniency policies for companies that self-report corrupt behaviour. If forms of leniency for self-reporting public officials are also introduced, these policies may end up facilitating rather than deterring corruption.²⁶

References

- Abbink, K., U. Dasgupta, L. Gangadharan, and T. Jain (2014). Letting the briber go free: An experiment on mitigating harassment bribes. *Journal of Public Economics* 111, 17–28.
- Aidt, T. S. (2003). Economic analysis of corruption: a survey. *Economic Journal* 113(491), F632–F652.
- Apestequia, J., M. Dufwenberg, and R. Selten (2007). Blowing the whistle. *Economic Theory* 31(1), 143–166.
- Aubert, C., P. Rey, and W. E. Kovacic (2006). The impact of leniency and whistle-blowing programs on cartels. *International Journal of Industrial Organization* 24(6), 1241–1266.
- Banerjee, A., S. Mullainathan, and R. Hanna (2012). *Corruption*. Technical report, National Bureau of Economic Research.
- Bardhan, P. (1997). Corruption and development: A review of issues. *Journal of Economic Literature* 35(3), 1320–1346.
- Basu, K. (2011). Why, for a class of bribes, the act of giving a bribe should be treated as legal. Technical Report 172011, Ministry of Finance, Government of India.
- Basu, K., K. Basu, and T. Cordella (2016). Asymmetric punishment as an instrument of corruption control. *Journal of Public Economic Theory* 18(6), 831–856.

²⁶A related effect appears in antitrust, where the extension of leniency to many cartel members can be associated with a fall in leniency applications and cartel detection (Marvao and Spagnolo, *forthc.*).

- Basu, K. and T. Cordella (2018). *Institutions, Governance and the Control of Corruption*. Springer.
- Berlin, M. P. and G. Spagnolo (2015). Pre-analysis plan for the impact of the introduction of leniency on bribery prosecutions in china. *AEA RCT Registry*. Published: 2015-07-17.
- Bigoni, M., S.-O. Fridolfsson, C. Le Coq, and G. Spagnolo (2012). Fines, leniency, and rewards in antitrust. *RAND Journal of Economics* 43(2), 368–390.
- Buccirosi, P. and G. Spagnolo (2006). Leniency policies and illegal transactions. *Journal of Public Economics* 90(6), 1281–1297.
- Chassang, S. and J. Ortner (2022). Regulating collusion. *Annual Reviews of Economics*.
- Chassang, S. and G. Padró i Miquel (2019). Crime, intimidation, and whistleblowing: A theory of inference from unverifiable reports. *Review of Economic Studies* 86(6), 2530–2553.
- Chen, T. and J. K.-s. Kung (2019). Busting the “princelings”: The campaign against corruption in china’s primary land market. *Quarterly Journal of Economics* 134(1), 185–226.
- Chen, Z. and P. Rey (2013). On the design of leniency programs. *Journal of Law and Economics* 56(4), 917–957.
- CL (1997). Criminal law of the people’s republic of china in database of laws and regulations. http://www.npc.gov.cn/englishnpc/Law/2007-12/13/content_1384075.htm. Accessed: 2015-05-20.
- Cohen, J. A., T. A. Gelatt, and F. M. T. b. Li (1982). The criminal law of the people’s republic of china. *J. Crim. L. & Criminology* 73, 138. <http://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=6292&context=jcllc>.
- Dufwenberg, M. and G. Spagnolo (2015). Legalizing bribe giving. *Economic Inquiry* 53(2), 836–853.
- Fisman, R. and M. A. Golden (2017). *Corruption: What everyone needs to know*. Oxford University Press.
- Fisman, R. and Y. Wang (2015a). Corruption in Chinese privatizations. *Journal of Law, Economics, and Organization* 31(1), 1–29.
- Fisman, R. and Y. Wang (2015b). The mortality cost of political connections. *Review of Economic Studies* 82(4).

- Gamba, A., G. Immordino, and S. Piccolo (2018). Corruption, organized crime and the bright side of subversion of law. *Journal of Public Economics* 159, 79–88.
- Gintel, S. R. (2013). Fighting transnational bribery: China’s gradual approach. *Wisconsin International Law Journal* 31(1).
- Harrington, J. E. (2008). Optimal corporate leniency programs. *Journal of Industrial Economics* 56(2), 215–246.
- Hu, L. and M. Oak (2022). Can asymmetric punishment deter endogenous bribery. *Journal of Economics & Management Strategy*.
- Kapon, S. (2022a). Dynamic amnesty programs. *American Economic Review* 112(12), 4041–75.
- Kapon, S. (2022b). Persuasion in evidentiary mechanisms. *Unpublished manuscript*.
- Kong, D. and N. Qin (2021). China’s anticorruption campaign and entrepreneurship. *Journal of Law and Economics* 64(1), 153–180.
- Landeo, C. M. and K. E. Spier (2020). Optimal law enforcement with ordered leniency. *Journal of Law and Economics* 63(1), 71–111.
- Li, X. (2012). Guest post: bribery and the limits of game theory – the lessons from China. <http://blogs.ft.com/beyond-brics/2012/05/01/guest-post-bribery-and-the-limits-of-game-theory-the-lessons-from-china/>. Accessed: 2015-05-20.
- Liebman, B. L., M. E. Roberts, R. E. Stern, and A. Z. Wang (2020). Mass digitization of chinese court decisions: How to use text as data in the field of chinese law. *Journal of Law and Courts* 8(2), 177–201.
- Miller, N. H. (2009). Strategic leniency and cartel enforcement. *American economic review* 99(3), 750–768.
- Motta, M. and M. Polo (2003). Leniency programs and cartel prosecution. *International journal of industrial organization* 21(3), 347–379.
- Naritomi, J. (2019). Consumers as tax auditors. *American Economic Review* 109(9), 3031–72.
- Pomeranz, D. (2015). No taxation without information: Deterrence and self-enforcement in the value added tax. *American Economic Review* 105(8), 2539–2569.

Reinikka, R. and J. Svensson (2005). Fighting corruption to improve schooling: Evidence from a newspaper campaign in Uganda. *Journal of the European Economic Association* 3(2-3), 259–267.

Spagnolo, G. (2004). Divide et impera: Optimal leniency programs. *Discussion paper 4840*. CEPR.

Svensson, J. (2005). Eight questions about corruption. *Journal of Economic Perspectives* 19(3), 19–42.

Appendices

Appendices A-E contain, respectively, proofs of all propositions, legal details regarding CL-97, information regarding the data series presented in Section 2.2, data that sheds light on the Chinese governments intentions behind CL-97, and a reproduction of Li’s blogpost.

A Proofs

Proof of Proposition 1: Let s be the following strategy profile:

- G_1 plays stage game strategy AH' following any history where he has never deviated from doing so,

- C chooses B in response to A as long as G_1 has not deviated from choosing A in any stage game, and

- following any history where G_1 deviated from stage game strategy AH' , the players revert to stage game profile $(DD', \rightarrow B)$ forever.

To check what it takes to sustain s as a SPE, note that the players’ associated payoffs streams would be

$$\underbrace{\clubsuit, \dots, \clubsuit}_{t \geq 0 \text{ times}}, -P, -P, \dots \quad (2)$$

where $\clubsuit \in b - \varepsilon, 1 - b$ depending on whether we consider G_1 or C , and $-P$ occurs in the stream as soon as there is exogenous discovery. If $t = 0$ the associated utility is $\sum_{\tau=0}^{\infty} \delta^{\tau}(-P) = \frac{-P}{1-\delta}$, while if $t \geq 1$ it is

$$\begin{aligned} & \sum_{\tau=0}^{t-1} \delta^{\tau} \clubsuit + \sum_{\tau=t}^{\infty} \delta^{\tau}(-P) \\ &= \frac{(1 - \delta^t) \clubsuit}{1 - \delta} + \frac{\delta^t(-P)}{1 - \delta} = \frac{\clubsuit}{1 - \delta} - \frac{\delta^t(\clubsuit + P)}{1 - \delta} \end{aligned} \quad (3)$$

These outcomes happen with respective probabilities $\alpha(1-\alpha)^t$, $t \geq 0$, so the players' expected utilities equal

$$\alpha \frac{-P}{1-\delta} + \sum_{\tau=1}^{\infty} \alpha(1-\alpha)^{\tau} \left[\frac{\clubsuit}{1-\delta} - \frac{\delta^{\tau}(\clubsuit + P)}{1-\delta} \right] \quad (4)$$

For s to be a SPE, neither G_1 nor C can have a unilaterally profitable deviation at any history. For C a single incentive constraints applies. Since C can enforce payoff stream of $0, 0, \dots$ simply by perpetually refusing to bribe we get $u_C^{\delta} \geq 0$, where u_C^{δ} is C 's utility as given by (4) with $\clubsuit = 1 - b$. Re-arranging this inequality, we get

$$(1-\alpha)(1-b) \geq \alpha P + \alpha \frac{(1-\alpha)\delta(1-b+P)}{1-(1-\alpha)\delta} \quad (5)$$

For G_1 two incentive constraints apply. First, G_1 must be willing to punish C by choosing H' following $\rightarrow B$. That is, he must be willing to incur a current-period payoff of $-\varepsilon$ in order to achieve, from the next period on, $u_{G_1}^{\delta}$ rather than 0, where $u_{G_1}^{\delta}$ is G_1 's utility as given by (4) with $\clubsuit = b - \varepsilon$. That is, $-\varepsilon + \delta u_{G_1}^{\delta} \geq 0$. Second, since G_1 can enforce payoff stream of $0, 0, \dots$ simply by perpetually refusing to ask for a bribe we get $u_{G_1}^{\delta} \geq 0$. Noting that $-\varepsilon + \delta u_{G_1}^{\delta} \geq 0$ implies $u_{G_1}^{\delta} \geq \varepsilon/\delta > 0$, we see that G_1 's first incentive constraint implies the second one which hence can be disregarded. Re-arranging $u_{G_1}^{\delta} \geq \varepsilon/\delta$, we get

$$(1-\alpha)(b-\varepsilon) \geq \alpha P + \alpha \frac{(1-\alpha)\delta(b-\varepsilon+P)}{1-(1-\alpha)\delta} + \frac{\varepsilon(1-\delta)}{\delta} \quad (6)$$

Combine (5) & (6) to get a necessary & sufficient condition for s to be a SPE (for some b):

$$(1-\alpha)(1-\varepsilon) \geq \alpha 2P + \alpha \frac{(1-\alpha)\delta(1-\varepsilon+2P)}{1-(1-\alpha)\delta} + \frac{\varepsilon(1-\delta)}{\delta} \quad (7)$$

Set $\varepsilon = \delta^2$ and study the limits of the lhs and rhs of (7) as $\delta \rightarrow 0$. The lhs tends to $1 - \alpha$ while the rhs tends to $\alpha 2P$. Since $1 - \alpha > \alpha 2P$ (as one can verify using (1)) we can select $(\varepsilon^*, \delta^*) \in (0, 1)^2$ such that the lhs of (7) strictly exceeds the rhs for $(\varepsilon, \delta) = (\varepsilon^*, \delta^*)$. In fact, by continuity, the lhs of (7) strictly exceeds the rhs for many $(\varepsilon, \delta) \approx (\varepsilon^*, \delta^*)$.

Now consider whether (7) holds for different δ , given that $\varepsilon = \varepsilon^*$:

- (7) does not hold if δ is small ($\lim_{\delta \rightarrow 0} \frac{\varepsilon(1-\delta)}{\delta} = \infty$),
- (7) does not hold if δ is large ($\alpha \frac{(1-\alpha)\delta(1-\varepsilon+2P)}{1-(1-\alpha)\delta}$ alone exceeds the lhs),
- (7) holds for many δ (viz., $\delta \approx \delta^*$, as explained),

Combining the just-stated three facts with the observation that the rhs of (7) is strictly convex and U -shaped in $\delta \in (0, 1)$, we conclude that there exists $0 < \underline{\delta}^{STD} < \bar{\delta}^{STD} < 1$ such that (7) holds iff $\underline{\delta}^{STD} \leq \delta \leq \bar{\delta}^{STD}$. ■

Proof of Proposition 2: Perpetual bribery implies that each G_i would start out choosing A . The best response for C would be $B + R$, reaping the stage game payoff of 1 and then perpetually repeating this procedure as G_i is replaced with G_{i+1} who also chooses A . However, G_1 could then improve his payoff by choosing D forever, contradicting the assumption that he chooses A at first. ■

Proof of Proposition 3: Let $s(\ell)$ be the following strategy profile:

- G_1 plays stage game strategy AH' following any history where he has never deviated from doing so and where C didn't choose $B + R$ in the preceding stage,
- if C chose $B + R$ in the preceding stage then G_1 punishes C by choosing H in the next ℓ stages, then going back to AH' as long as C keeps responding to A with B ,
- C chooses B in response to A as long as G_1 always behaved as just described, and
- following any history where G_1 deviated from the pattern just described, the players revert to stage game profile $(DD', B + R)$ forever.

Let $\diamond = \alpha \cdot (-f) + (1 - \alpha)(b - \varepsilon)$ and $\heartsuit = \alpha \cdot 1 + (1 - \alpha)(1 - b)$. To check what it takes to sustain $s(\ell)$ as a SPE, note first that the players' associated (expected) payoffs streams would be $\diamond, \diamond, \dots$ and $\heartsuit, \heartsuit, \dots$, respectively, each of which yields positive utility by (1). Hence no analogue of the upper-bound constraint on δ that applied under STD (i.e., $\delta \leq \bar{\delta}^{STD}$) is relevant.

However, three lower-bound constraints apply to δ :

(a) G_1 must be willing to punish C by choosing H' following $\rightarrow B$; the utility of $-\varepsilon, \diamond, \diamond, \dots$ is no less than that of $0, 0, \dots$, implying $\delta \geq \frac{\varepsilon}{\varepsilon + \diamond}$.

(b) C must not be tempted to choose $B + R$ in response to A ; the utility of $\heartsuit, \heartsuit, \dots$ is no less than that of $1, \ell \times 0, \heartsuit, \heartsuit, \dots$, implying $\frac{\heartsuit}{1 - \delta} \geq 1 + \frac{\delta^{\ell+1}\heartsuit}{1 - \delta}$, or $\delta \geq 1 - \heartsuit(1 - \delta^{\ell+1})$. The higher is ℓ the less stringent is this condition. If $\ell = 1$ we get $\delta \geq \frac{1 - \heartsuit}{1 + \heartsuit} = \frac{b(1 - \alpha)}{2 - b(1 - \alpha)}$. For higher ℓ the condition is guaranteed to hold if $\delta > \lim_{\ell \rightarrow \infty} 1 - \heartsuit(1 - \delta^{\ell+1}) = 1 - \heartsuit = b(1 - \alpha)$.

(c) G_i must be willing to carry out the ℓ -period punishment; the utility of $\ell \times (-\varepsilon), \diamond, \diamond, \dots$ is no less than that of $0, 0, \dots$, implying $\delta \geq \left(\frac{\varepsilon}{\varepsilon + \diamond}\right)^{\frac{1}{\ell}}$.

Note that (c) implies (a). Combining (b) and (c) we see that $s(\ell)$ is a SPE if $\delta > \underline{\delta}^{BP+L} = \max\left(\frac{\varepsilon}{\varepsilon + \diamond}\right)^{\frac{1}{\ell}}, b(1 - \alpha)$. ■

Proof of Proposition 4: Let s be the strategy profile involving perpetual repetition of stage game profile (AH', B) , following any history. To check what it takes to sustain s as a SPE, note that just as in the case with harassment bribes the players' associated payoffs streams would be as in (2) and their expected utilities as in (4). For s to be a SPE, neither G_1 nor C can have a unilaterally profitable deviation at any history. Since either player

can enforce payoff stream $0, 0, \dots$ by perpetually refusing to ask for or give a bribe, we get $u_{G_1}^\delta \geq 0$ and $u_C^\delta \geq 0$, defined as in the proof of Proposition 1. Combining inequalities we get the following necessary & sufficient condition for s to be a SPE (for some b):

$$(1 - \alpha)(1 - \varepsilon) \geq \alpha 2P + \alpha \frac{(1 - \alpha)\delta(1 - \varepsilon + 2P)}{1 - (1 - \alpha)\delta} \quad (8)$$

For small enough ε and δ , (8) holds with strict inequality (as one can see using (1)). For large enough δ , (8) does not hold ($\alpha \frac{(1 - \alpha)\delta(1 - \varepsilon + 2P)}{1 - (1 - \alpha)\delta}$ alone exceeds the lhs). Since the rhs is continuous and strictly increasing in δ , we can find $\bar{\delta}^{STD} \in (0, 1)$ such that (8) holds if and only if $\delta \leq \bar{\delta}^{STD}$. Finally, comparing (8) and (7) it is obvious that, for a given P , $\bar{\delta}^{STD} > \bar{\delta}^{STD}$. ■

Proof of Proposition 5: Substituting $\bar{\delta}^{L\text{-for-}C}$ for $\bar{\delta}^{STD}$, the proof of Prop. 4 applies. ■

Proof of Proposition 6: Let s be as in the proof of Proposition 4, and again players' associated payoffs streams are as in (2), their expected utilities as in (4), and the conditions $u_{G_1}^\delta \geq 0$ and $u_C^\delta \geq 0$ (defined as in the proof of Proposition 1) must hold. G_1 's associated (expected) payoff streams is $\diamond, \diamond, \dots$, defined as in the proof of Proposition 3, which again yields positive utility by (1). Hence we need only check the incentive constraint for player C ; the necessary & sufficient condition for s to be a SPE is now given by (5). For small enough δ , (5) holds with strict inequality (as one can see using (1)). For large enough δ , (5) does not hold ($\alpha \frac{(1 - \alpha)\delta(1 - b + P)}{1 - (1 - \alpha)\delta}$ alone exceeds the lhs). Since the rhs of (5) is continuous and strictly increasing in δ , we can find $\bar{\delta}^{CL-97} \in (0, 1)$ such that (5) holds if and only if $\delta \leq \bar{\delta}^{CL-97}$.

To see that $\bar{\delta}^{CL-97} > \bar{\delta}^{L\text{-for-}C}$, suppose $\delta = \bar{\delta}^{L\text{-for-}C}$ so that (8) holds with equality. The results follows because if b is chosen close enough to ε then for $\delta = \bar{\delta}^{L\text{-for-}C}$ (5) will hold with strict inequality, hence (by continuity) do so also for even higher values of δ . To verify this, fix $\delta = \bar{\delta}^{L\text{-for-}C}$ and inspect (8) and (5) as $b \rightarrow \varepsilon$. The lhs's tend to the same value, while the rhs's tend to $2P$ and P , respectively. Since $2P > P$, and (8) holds with equality, (5) must hold with strict inequality for b close enough to ε . ■

B Details on the anti-bribery legislation in China and CL-97

This appendix describes in more detail the 1997 reform of the Chinese Criminal Law, CL-97, the key elements of which, most relevant to our analysis, were summarized in Section 2.1. We focus on corruption offences, which cover all public-official corruption.²⁷ An earlier

²⁷Bribery by private sector managers is regulated in a separate statute. This however states explicitly that even those should be investigated and punished in accordance with the Criminal Law whenever applicable.

version of the the law was promulgated at the Second Session of the Fifth National People’s Congress on July 1st, 1979. The revised version, CL-97, is much richer in details than the earlier version.²⁸

In CL-97, the levels of punishment are specified in a schedule dependent on the size of the bribe in monetary terms for the bribe-taker, and on generic “seriousness of the circumstances” for the bribe-giver (see Tables 4 and 3). Moreover, two important details are added to the discipline. The first is the introduction of asymmetric punishment, corresponding to Provision 1 of Section 2.1. The crime of giving a bribe is now associated with the intent “to secure improper benefits”. This means either seeking benefits that are in violation of law, regulations, rules, or state policies; or seeking legitimate benefits, but by means of violating laws, regulations, rules, state policies, or industrial norms.²⁹

This provision excludes from the definition extortionary/harassment bribes that do not procure any improper benefit, as they are paid for something the giver had a right to.

The second important difference introduced in 1997 is the extended possibility of leniency, in the form of mitigated punishment or exemption from punishment, corresponding to Provision 2 of Section 2.1. Previously there existed only a generic provision for leniency within the legal system, not specific to the crimes of corruption and bribery. It is noteworthy that there are asymmetries in the eligibility for leniency: bribe-takers are only eligible if the size of the bribe is below a given threshold, while there is no such limitation for the bribe-giver; moreover, only for the bribe-giver the law prescribes that confession must be offered before being investigated (see Table 2). This means that a bribe-taker may obtain a lenient treatment, and thereby potentially remain in his post, by collaborating with prosecutors after having been reported by a bribe-giver.

Regarding changes in sanctions, Table 4 shows the levels of penalty for bribe-takers, dependent on the size of bribe. The thresholds in the size of bribe that correspond to the different punishment levels were increased in 1997, possibly reflecting inflation but in any

Additional sources we examined, that cover bribery and corruption in specific settings, include: the Interim Provisions on Banning Commercial Bribery, issued by the State Administration for Industry and Commerce of the People’s Republic of China on November 15th, 1996; the Interim Measures of Hubei Province on Prevention and Administration of Commercial Bribery in Engineering Construction Fields, issued by People’s Government of Hubei Province on July 11th, 2007; the Supplementary Provisions of the Standing Committee of the National People’s Congress Concerning the Punishment of the Crimes of Embezzlement and Bribery, issued by the Standing Committee of the National People’s Congress on January 21th, 1988 and abolished pursuant to the Criminal Law of the People’s Republic of China promulgated by the National People’s Congress on March 14, 1997.

²⁸English translation in [Cohen et al. \(1982\)](#) and [CL \(1997\)](#).

²⁹The precise definition of improper benefits was clarified in the document *Note of the Supreme People’s Court and the Supreme People’s Procuratorate on Issuing the Opinions on Issues Concerning the Application of Law in the Handling of Criminal Cases of Commercial Briberies*, promulgated by the Supreme People’s Court and the Supreme People’s Procuratorate, 2008. We accessed it as reported in [Gintel \(2013\)](#).

TABLE 2: CONDITIONS FOR LENIENCY

	Before	After
Bribe giver (for collusive bribes)		Confess prior to investigation
Bribe taker	$b \leq 5,000$ plus voluntary confession, repentance and restitution	$b \leq 10,000$ plus voluntary confession, repentance and restitution

Notes: This table reports the conditions necessary to obtain leniency before and after the CL97 reform. Notice that, in the case of the bribe taker, leniency does not exclude the possibility of administrative sanctions. b indicates the size of the bribe.

case making punishment less stringent. For example, a bureaucrat would risk up to two years of prison for accepting up to 2,000 yuan in bribes before 1997, and up to 5,000 yuan after 1997. In order to receive the highest punishment, a bribe of 50,000 yuan would suffice before 1997, while 100,000 is necessary after.

Also for bribe-givers (Table 3), the levels of punishment are slightly reduced (capped) in CL-97. They are not proportional to the size of bribe, but rather are administered in relation to quite generic formulations on the “seriousness of circumstances”.

TABLE 3: PUNISHMENT SCHEDULE FOR BRIBE-GIVERS

Level of guilt	Punishment in years	
	Before	After
Base	$p \leq 5$ or criminal detention	
Serious circumstances or heavy losses to the public	$p \geq 5$	$5 \leq p \leq 10$
Especially serious circumstances	Life imprisonment plus ev. confiscation of property	$p \geq 10$ or life plus ev. confiscation of property

Notes: This table summarizes the penalties for bribe-givers over time. p represents the length of prison sentence, in years. For all levels except the lowest, prison sentences are capped in CL97.

TABLE 4: PUNISHMENT SCHEDULE FOR BRIBE-TAKERS

Size of bribe		Punishment level
Before	After	
< 2,000	< 5,000	$p \leq 2$ or criminal detention; administrative sanctions if not serious
[2,000 - 10,000]	[5,000 - 50,000]	$1 \leq p \leq 7$; $7 \leq p \leq 10$ if serious gov. losses
[10,000 - 50,000]	[50,000 - 100,000]	$p \geq 5$ plus confiscation of property; life imprisonment if serious gov. losses
$\geq 50,000$	$\geq 100,000$	$p \geq 10$ or life imprisonment, plus confiscation of property; death if serious gov. losses

Notes: This table summarizes the penalties for bribe-takers for different size of bribe (in yuan) over time. p represents the length of prison sentence, in years. Higher thresholds for bribe amount are allowed in CL97 for the same levels of punishment.

C Constructions of the macro-level series and robustness checks

In this appendix we explain how we constructed the series of corruption cases discussed in Section 2.2, and we report from a number of robustness checks on the structural break at the time of the reform. All the tables and figure that are not reported here can be provided by the authors upon request.

The construction of Figure 1 and subsample robustness. The macro-data that we use in Section 2.2 contain the number of actual corruption cases tried in courts, at the national and provincial level. The national data are records of convicted cases published by the National Bureau of Statistics China in the period 1998-2010.³⁰ For the period prior to 1998, the national records are not available online. We collect instead the corresponding information from the Procuratorates' Yearly Reports for each of the Chinese provinces since 1988 in printed version.³¹ Reports in printed version are available for almost all provinces up to 1995, after which the number of provinces reporting falls sharply.

Given that we are not able to observe the exact same set of provinces for the period after

³⁰Available in electronic version at <http://www.stats.gov.cn/tjsj/nds/j/>.

³¹Although we have accessed the printed version since 1986, there are only one respectively three reporting provinces for the years 1986 and 1987. We therefore drop the data for those two years and base the analysis on the time frame 1988-2010.

the reform, we run robustness checks in which we i) restrict the sample to the subset of 6 provinces that report every year, both before and after the reform, or ii) use the national-level time series instead of the provincial-level data. The latter provides an upper bound to the actual number of prosecutions in the group of provinces that we observe for the period before the reform, as it supposedly includes all the 31 provinces, rather than the pre-reform subsample. The decrease immediately following the reform is still significant in both these exercises, although smaller in size in the latter case.

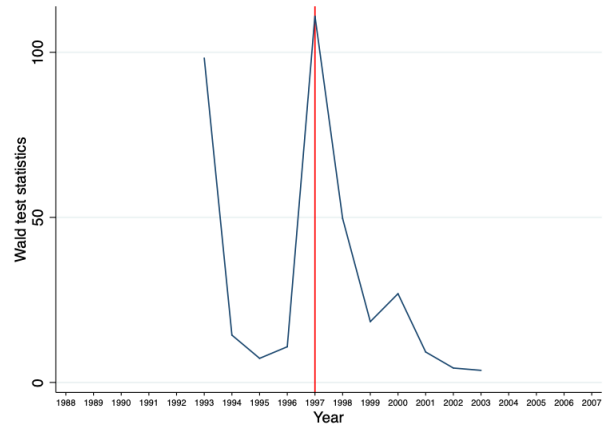
Other polynomials of time. Figure 1 in Section 2.2 tests the structural break in the time series when including two linear time trends, one before and one after the reform. The inclusion of other combinations and higher polynomial orders was also tested. The take away from this exercise is that the coefficient on the reform dummy, which measures the treatment effect, maintains a similar relative size (close to 30% of the mean) and is statistically significant, irrespective of the polynomials of time we include.

Distributional assumptions. The linear regression model rests on assumptions that can be at odds with this particular type of data. The dependent variable is assumed to be continuous, normally distributed (hence symmetric around the mean), and linearly related to the independent variables. Crime data rarely adhere to these assumptions. Most crime incidents are distributed as rare events. In other words, smaller values are much more common across units than larger values, with zero often being the most commonly observed value. Such a distribution violates the aforementioned assumptions of OLS regression. Although these considerations are attenuated through the aggregation and averaging of the data (remember that the dependent variable is the number of cases per one million citizens), it may still be useful to compare the OLS results with regression models that are designed to analyze count data, namely, the Poisson and negative binomial regression models. Generally, OLS and Poisson regressions yield very similar results. Using the Poisson model, the reform coefficient only loses statistical significance when using higher order polynomials. Fitting a negative binomial model to our data, which better than Poisson accounts for overdispersion, delivered identical results, with the exception of slightly inflated standard errors.

Placebo interventions. So far, we have imposed on the data an exogenous break point at the date of leniency introduction. An alternative approach would be to check whether alternative break points – i.e. a different hypothetical timing of the legal reform – fit the data better. If this were the case, then it would be unlikely that the relationship between the reform introduction and the time series of prosecutions is causal. If instead the fit is

FIGURE 9:

Wald test for structural break of unknown timing

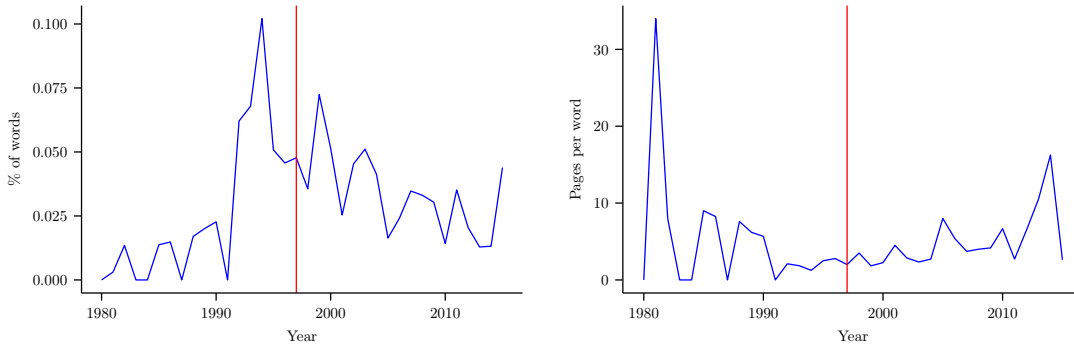


superior when the break point is imposed at the date of the reform, then the data provide support for our hypothesis. Recent literature suggests the Wald test for detecting structural changes of unknown timing.

This test consists of calculating Wald break point tests at every observation, while ensuring that subsample end points are not too near the end points of the general sample. The Wald test is also robust to unknown forms of heteroskedasticity, something that cannot be said of traditional Chow tests.

The results of the test with a 25% trimming of the sample (1994-2003) are shown in Figure 9. The Wald test statistic is maximized in the year 1997: the test rejects the null hypothesis of no structural break and detects a break in 1997. The bump to the left of the spike may indicate a second break, perhaps in connection with the increased focus on corruption in the years following the Tienanmen Square protests. Deng Xiaoping’s “South talk” in the spring of 1992 is regarded as an influential reference point in this respect.

FIGURE 10: Corruption-related words in official speeches



Notes: The left panel of this figure plots the share of words related to corruption and bribery appearing in the yearly presidential speech. The right panel shows how often such words appear, plotting the average number of pages between each appearance: a lower number indicates more frequent occurrence of corruption-related words.

D Government's motivation and citizens' perceptions

D.1 Text analysis of speeches

To better understand the motivations behind the Chinese reform, and in particular distinguish whether the aim was deterrence but the implementation failed, or rather the aim had been increased tolerance all along, we tried to find supportive evidence by looking at public speeches on the subject.

We collected the text of a presidential speech delivered each year during the period 1980-2012 and counted the occurrence of words related to corruption or bribery. We interpret this as a proxy of the intensity of political commitment and general attention to the problem of corruption.

Figure 10 reports the count of such words. In both plots we see a somewhat heightened focus on corruption in the early 90s, followed by a mildly decreasing trend starting already well before the reform. No sharp change around 1997 is present, but the decreasing trend around and after the reform appears consistent with slowly increased tolerance for bribery over time.

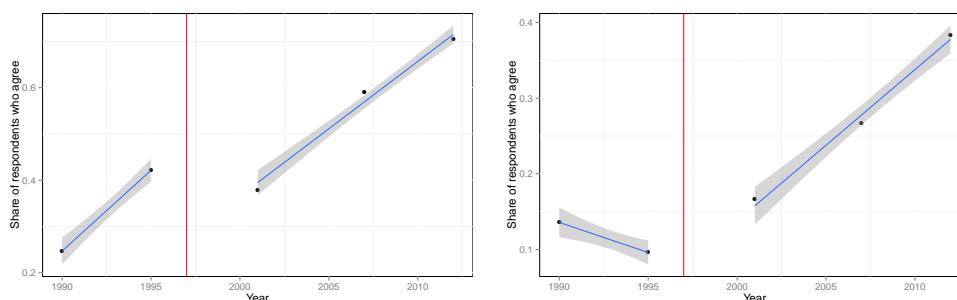
D.2 Corruption perceptions

Surveys are relatively well-suited for evaluating administrative corruption, since they measure the prevalence of corruption as experienced by users of government services.

We look at the available waves of the World Value Survey (WVS), a well-known source of

data on opinions and attitudes around the globe.³² We focus on two variables: the share of respondents supporting the view that it is justifiable to accept a bribe in the exercise of one’s duty, and the share of respondents that think it is justifiable to claim benefits to which one is not entitled. The first one can be thought of as a proxy for how widespread the practice of bribing public officials is in general. The second can instead be related to the practice of using bribery to obtain an illegitimate benefit. While it is impossible to discern any clear impact of the reform, due to short pre-trends, it is clear that the acceptance for bribery and the pursue of illegitimate benefit are increasing over time, which might reflect a perception of increased tolerance.

FIGURE 11: Share of respondents who think behaviour is justifiable



Notes: This figure plots the evolution over time of the attitudes towards accepting a bribe while on duty (left panel) and towards claiming government benefits to which one is not entitled. Data from the World Value Surveys.

Another way to complement conviction statistics and gain a sense of what was happening in the country at the time is to look at expert opinions and perceptions of corruption. Unfortunately, there are too few data points to establish clear pre-reform trends in either of the indicators that we were able to collect.³³

By and large, while expert opinions disagree on the matter, the content of presidential speeches and people’s perceptions appear consistent with a higher frequency of - and an increased tolerance for bribery in the period after the reform.

³²Unfortunately only one year of another well known survey, the World Bank’s Enterprise Surveys, 2012, is available for China.

³³We look at Transparency International’s widely-cited “Corruption Perceptions Index”, the Index of Economic Freedom compiled by the Heritage Foundation, and the World Bank Institute (WBI) “Control of Corruption”. Their disagreement is partly due to the drawbacks of the composite indexes in general. The sources used in constructing them can change over time, which implies that different scores are likely to reflect differing implicit definitions of corruption, depending on what goes into them. The standardization procedure used to place different indicators on a common scale can also impair the ability to track changes meaningfully over time. A final issue with the indexes that use expert sources is their interdependence, which can undermine the main premise of the aggregation methodology, namely that averaging more sources produces more accurate and reliable estimates.

E Li's Financial Times blog post

We here reproduce the blog post authored by Xingxing Li, at the time an associate at Clifford Chance and a JSD candidate at the University of Chicago Law School.

Guest post: bribery and the limits of game theory – the lessons from China. Financial Times, May 1, 2012.

Could legalising the giving of bribes actually help reduce overall bribery levels? The idea is getting attention by academics and game-theorists, but real-world ambiguity, especially in China, may scupper the thesis. A recent policy proposal, initiated by Dr. Kaushik Basu – Chief Economic Adviser to the Indian Government, has been the subject of much debate in India. In his paper *Why, for a class of bribes, the act of giving a bribe should be treated as legal* (PDF here), Basu suggests legalising bribe-giving, while incriminating bribe-taking for bribes made to get what one is legally entitled to. He calls such bribes “harassment bribes”.

Basu expects that his proposal of diverging incentives of bribe-givers and bribe-takers would motivate bribe-givers to whistle-blow bribe-takers and thereby “cause a sharp decline in the incidence of bribery.”

This game-theoretic approach to corruption has not been well-received in India and a moral outrage has erupted over the idea. The public view is that bribing, be it bribe-giving or bribe-taking, should be condemned and banned as such.

Legalising the act of bribe-giving is not novel. Consistent with Basu's proposal, China has been treating acts of bribe-giving and bribe-taking asymmetrically since 1997. Under its Amended Criminal Law of 1997, bribe-giving is a crime only when it is “for the purpose of gaining unjust benefits.” The law encountered fewer moral obstacles than did Basu's proposal since the Chinese tend to sympathise with bribe-givers, who are often extorted by government officials.

Since the first publication in 1995 of the Corruption Perceptions Index by Transparency International, China has been stuck around 75th place among around 180 countries. Clearly, the implementation effects of the law have not been as optimistic as predicted by Basu – and legalising bribe-giving has not yielded noteworthy results. While bribe-givers are treated leniently relative to bribe-takers, it is uncommon for a pardoned bribe-giver to voluntarily whistle-blow.

To understand this disappointing phenomenon, consider the disheartening possibility that a corrupt official, after being reported, is not dismissed from duty. Since the bribe amount in a single case can be small, the official may only be subject to disciplinary sanction. This makes bribe-takers serial players in the bribing game.

The bribe-giver, knowing that they would have to interact with the same official in the

future, would hesitate in speaking out. In the business world, bribe-givers also tend to be serial players, which accentuates their need to guard their reputation so as not to be stigmatised as whistle-blowers. Else, no official would accept their bribes (be it for legal or illegal purposes), robbing them of future benefits.

As per cases reported on ipaidabribe.com, a portal tracking bribes in India, a majority of the instances are of petty corruption or essentially what Basu labels as “harassment bribes”. One World Foundation reports that because of the bribe data collected by ipaidabribe.com, 20 senior officers were issued warnings – an achievement for the portal but ironically a no-win for Basu’s proposal, since a mere “warning” is inadequate to expel the official from the game.

There is also the possibility of substantial delay before a corruption complaint is processed, which delays punitive action against the extorting government official and keeps the official in the game.

If the agency as an institution is corrupt, after an extorting official is dismissed, his fellow conspirators would punish any informant in their subsequent dealings with the agency, in order to send a message to those who dare to challenge the gang’s interests, thereby deterring future whistle-blowing.

Another issue lies in the blurry definition of “services to which one is legally entitled.” Basu suggests contrasting treatments for two kinds of bribe-giving activities: if one bribes to receive what is legally due, the act would be considered legitimate; if to gain illegal benefits, it would be punishable. These seemingly clear-cut distinctions pose a different story in practice.

China’s administration is vested with broad discretionary power, and without meaningful legislative or judicial scrutiny. So an unchecked, bribe-taking administrative agency has the power to draw the line between “just” and “unjust” benefits at its discretion. Consequently, a bribe-giver would find it difficult to ascertain whether the services sought would be characterised as “legal” or “illegal”. Even if the case goes on trial afterwards, as to whether the bribe-giver has a “legal” entitlement, the court is likely to uphold a definition supplied by the defendant official, which can easily be manipulated to retrospectively incriminate the bribe-giver.

This ambiguity is highlighted by the changing position of China’s Supreme Court and Supreme Procuratorate over the spectrum of “just” and “unjust” interests. Back in 1999, the ambit of unjust interests construed by the two branches was limited to acts expressly forbidden by laws, regulations or government policies, such as tax evasion. By 2008, the same branches drifted to specify that bribing to gain competitive advantage in a bidding or government procurement is also seeking an unjust interest. The pre-requisite for Basu’s proposal, ie, before committing a “harassment bribe”, the bribe-giver knows that they will

be immune from punishment, seems to be missing.

In the complex engineering process of policy design, slight overlooking of delicate complications can result in a policy missing its target. Perhaps it is Basu's intentional confinement to the concept of harassment bribes that leads to his proposal tumbling over its architectural flaws.

In the battle against corruption, small steps are not easy to take, even if the economists win the morality debate.