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Evidence from China

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Leniency, Asymmetric Punishment and Corruption Evidence from China

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May 25, 2017

Abstract

Leniency policies and asymmetric punishment are regarded as potentially powerful anti-corruption tools, also in the light of their success in busting price-fixing cartels. It has been argued, however, that the introduction of these policies in China in 1997 has not helped fighting corruption. Following up on this view, the Central Committee of the Chinese Communist Party passed, in November 2015, a reform introducing heavier penalties, but also restrictions to leniency. Properly designing and correctly evaluating these policies is difficult. Corruption is only observed if detected, and an increase in convictions is consistent with both reduced deterrence or improved detection. We map the evolution of the Chinese anti-corruption legislation, collect data on corruption cases for the period 1986-2010, and apply a new method to identify deterrence effects from changes in detected cases developed for cartels by Miller (2009). We document a large and stable fall in corruption cases starting immediately after the 1997 reform, consistent with a negative effect of the reform on corruption detection, but under specific assumptions also with increased deterrence. To resolve this ambiguity, we collect and analyze a random sample of case files from corruption trials. Results point to a negative effect of the 1997 reform, linked to the increased leniency also for bribe-takers cooperating after being denounced. This likely enhanced their ability to retaliate against reporting bribe-givers – chilling detection through whistleblowing – as predicted by theories on how these programs should (not) be designed.

1 Introduction

Corruption remains an endemic problem in the developing world and has become a central political issue in emerging countries like India, Brazil and China. While clever empirical work has considerably advanced our understanding of how widespread and harmful corruption is,

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somewhat less evidence is available on practical tools to fight it.¹ This paper contributes evidence in this direction by focusing on a specific set of legal tools based on being lenient towards one corrupt party to induce it to betray and denounce the other one(s).

The possibility to use leniency to play one party against the other(s) in the fight against corruption has been at the center of a recent intense policy debate after the popular note, *Why, for a Class of Bribes, the Act of Giving a Bribe Should Be Treated as Legal* (Basu, 2011). More precisely, the note proposed to make bribe-giving legal, while strengthening sanctions against bribe-takers — for one particular type of bribes: *harassment bribes* (also called *extortionary* or *discharge-of-duty bribes*), paid to obtain something one is entitled to. As for other forms of leniency, the idea is to create a conflict of interests between the partners in crime by tweaking their incentives. One party (in this case the bribe-giver, in antitrust the first one who applies) can now betray and report the illegal act in order to obtain the benefit of the lenient treatment, no sanctions and the restitution of the bribe.

In the debate sparked by this note, many different arguments have been put forward, both against it and in favor of it. Then, a blog post by a Chinese law scholar, Li (2012), attracted attention to the case of China, where asymmetric punishment (bribe-giver impunity for harassment bribes) has apparently been in place since 1997. She argued, probably reflecting the political debate in the country rather than factual evidence, that the system had not been successful.² We felt this claim granted a deeper investigation into the details of the Chinese legal reform and the changes it introduced, and of course a careful inspection of the data to back it. Given the importance of China in the world economy and the rather limited amount of information available to the non-specialist observer, the reconstruction of the evolution of the anti-corruption legislation and an effort at data collection are contributions in themselves.

Further motivation for this study comes from more recent events. In April 2016, the Fraud Section of the US Department of Justice’s (DoJ) Criminal Division introduced an enforcement pilot program to incentivize voluntary disclosure of Foreign Corrupt Practice Act (FCPA) violations, according to which a company that violates the act can obtain a lenient treatment if it self-reports the violation and fully cooperates all along the ensuing investigation.³ This initiative is likely stemming from the perceived success with the 1993 reform of the leniency policy in antitrust. Implicit exchanges of a lenient treatment against information or collaboration have been a normal feature of law enforcement in most countries and ages.⁴ However, the 1993 introduction of a structured leniency policy has been a real game changer. Through transparent, published rules, the Antitrust Division of the DoJ gave up prosecutorial discretion committing to automatically award immunity to the first cartel member that spontaneously reports information. The increase in the number of convicted cartels since then has been dramatic, and the policy has

¹See for example the excellent surveys by Banerjee et al. (2012), stating that “research has been lagging behind policy” (p.1) in terms of tools to fight corruption; by Olken and Pande (2012), who write “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”; and by Svensson (2005).

²In her view, this was because people interact with bureaucrats repeatedly, and reported bureaucrats are often sanctioned mildly, particularly if they cooperate with enforcement agencies. They, or their colleagues, are therefore in the position to retaliate against the whistleblower the next time he or she needs to interact with the administration. Related arguments were made informally by Dreze (2011) and confirmed by the theoretical analysis in Buccrossi and Spagnolo (2006) and Dufwenberg and Spagnolo (2015), where the dynamic effects of the repeated interaction between entrepreneurs and bureaucrats and the possibility of retaliation are both taken into account.

³<https://www.justice.gov/archives/opa/blog/criminal-division-launches-new-fcpa-pilot-program>.

⁴All forms of organized crime, including collusion and corruption, require cooperation between multiple parties that cannot be enforced by contracts. This implies that there is always a partner that can betray the other, and a witness whose information can be retrieved with suitably structured incentives (Spagnolo, 2004).

been imitated and has become the main instrument to fight cartels worldwide.⁵

Indeed, the pilot program with the FCPA started in 2016 shares many features with the Antitrust leniency policy,⁶ and the US initiative is not entirely new, either: leniency programs for corruption were introduced in 2014 in Mexico and Brazil. The opposite direction has instead been taken in China. Since coming to office President Xi Jinping has famously vowed to crack down on both “tigers” and “flies” — powerful leaders and lowly bureaucrats — who engage in corrupt activities. For the past few years, Mr. Xi has carried out a sweeping, highly publicized anti-corruption campaign. Even a brand new website (*www.ccdi.gov.cn*) was launched recently with a handy online feature for reporting corruption, anonymously or not. Most importantly, a new reform to the Criminal Law, known as Amendment IX, was proposed in October 2014, then voted in August 2015 and is in force since November 1st, 2015. Among other measures, heavier penalties are envisaged, but also restrictions of leniency for those offering bribes. With all these initiatives, there is no empirical evidence as of yet regarding the effects that a similar policy might have in the context of corruption. The 1997 Chinese legal reform offers the opportunity of providing precisely that evidence.

Our analysis of this reform reveals that — besides strengthening the asymmetry in punishment for harassment bribes — it also increased the possibility to obtain leniency against collaboration for all types of corruption, and in particular for bribe-takers. On one hand, this is for us a confounding factor that makes it harder to evaluate the effects of asymmetric punishment for harassment bribes. On the other, this change allows us to learn something about the likely effects of leniency policies against more distortive forms of corruption, rather than confining the analysis to the (for many, marginal) case of harassment bribes. In this study, therefore, we hope to shed light onto whether Li and the Chinese government were right being so dissatisfied with the anti-corruption legislation of 1997, but we also hope to inform the current attempts to improve anti-corruption enforcement in China, the US and South America.

In the next Section we review the literature most closely related to our study, a sizeable part of which stresses the crucial role played by the details of the design of leniency policies as determinants of their success or failure. In Section 3, we offer a summary of the evolution of the Chinese anti-corruption legislation in the last four decades, focused on what changed in 1997 in terms of asymmetric treatment of harassment bribes and of the possibility to obtain leniency by collaborating with prosecutors. In the rest of the paper, we bring the reform to the data. We first create a dataset, described in Section 4, including data from several sources capturing both actual corruption cases tried in courts and corruption perceptions in the years before and after the policy change. In Section 5 we explain and implement our empirical strategy for evaluating the effects of the 1997 policy change, based on a two-part test developed by Miller (2009) for cartels. The test allows to draw inference on the effects of a reform on deterrence (i.e. changes in the overall incidence of a crime) by looking at changes in the number of convictions. According to Miller’s test, empirical evidence is consistent with a successful increase of cartel deterrence if, after the policy change, we observe a spike in the number of detected cartels, linked to the improved detection rate, followed by a persistent fall in that number below the pre-policy level, linked to the downward adjustment in the cartel formation rate (deterrence).

Applying an analogous reasoning to corruption, we find a strong effect of the second type, a significant and persistent fall in convictions after 1997, but no sign of a spike. The failure of the first part of the test leaves the interpretation of what happened ambiguous. Absent the

⁵See e.g. Spagnolo (2008); Miller (2009); Marvão and Spagnolo (2016).

⁶Under the Fraud Section’s Pilot Program Guidance, additional discounts on fines, exemption from having appointed an outside compliance monitor, and even immunity may be granted, but only to business organizations that voluntarily self-disclose criminal conduct prior to any imminent threat of disclosure or investigation, fully cooperate, and remediate flaws in their compliance program, as well as disgorge all profits resulting from the violation.

spike, the measured fall in the number of prosecuted cases is consistent with a decrease in the effectiveness of enforcement (lower rate of corruption detection), linked for example to excessive ex-post leniency in the system. Under specific assumptions, however, this pattern might still be consistent with an increase in deterrence (lower overall population of corrupt crimes): the missing spike could be due to a much shorter duration and faster adjustment of bribe exchanges relative to cartels. We therefore go beyond aggregate data and look in more depth at a sample of cases in Section 6, to better understand which aspects of the legislation mattered and through which channels. Data for this case-file analysis, for which we registered a pre-plan in Berlin and Spagnolo (2015), was obtained by reading documents from the individual cases and was finally ready in December 2016. The analysis shows, among other things, that corrupt relations were not that short lived, and that there is an increase in latency in the convictions after 1997, all of which weakens the case not to expect a spike if the policy was successful. It also shows that the level of administered sanctions decreased and the likelihood of awarding leniency (to bribe-takers *only*) increased after 1997.

This additional evidence appears consistent with a negative interpretation of the drop in the number of convictions we measure in aggregate data. Our preferred interpretation is therefore in line with that of Li (2012), i.e. that the 1997 reform increased leniency for bribe-takers, hence their ability to stay put at their place and retaliate against whistleblowers, with a connected decrease in detection and deterrence of all kind of corruption, including harassment bribes. It is noteworthy that both the Basu proposal and the main academic papers advocating leniency (see next section) instead require that leniency should be awarded to one party only, while sanctions should be increased for the others, the opposite of what seems to have happened with the 1997 reform in China. In the light of this, the 2015 reform in China does well to increase the sanctions to bribe-takers, but is wrong again to indiscriminately reduce leniency: the success of these law enforcement policies depends on how much asymmetry and conflict of interests they create between wrongdoers, to make criminal cooperation harder to sustain. The success of the US pilot will therefore also depend on what happens to bribe-takers' sanctions when leniency is introduced.

2 Literature review

Corruption in China has been the subject of several recent studies, but the focus has mainly been on its symbiotic relation with political connections.⁷ The anti-corruption legislation in general, and this reform in particular, have not been studied as of yet.

Regarding asymmetric sanctions and leniency, there is a rich theoretical literature sparked by the introduction of leniency programs in antitrust, showing that that these tools can be extremely powerful in deterring collaborative crimes like cartels and corruption.⁸ This literature also showed, however, that these programs, if inaccurately designed or implemented, can easily be manipulated or misused, becoming highly counterproductive, so that success depends on the specific details of their design and implementaton.

Although some papers in this literature discuss applications to corruption, specific theoretical analysis of leniency and corruption starts with Buccirosi and Spagnolo (2006). This paper shows that while “high powered” leniency policies (e.g. with rewards for the reporting party) can deter corrupt relationships enforced by repeated interaction, the asymmetry in punishment created

⁷For example, Fisman and Wang (2015a) investigate the underpricing of state asset sales and the subsequent performance of publicly traded firms experiencing such sales in China. Fisman and Wang (2015b) provide evidence that political connections help firms to circumvent costly regulation.

⁸For example, Motta and Polo (2003); Spagnolo (2004, 2008); Aubert et al. (2006); Harrington (2008, 2013); Chen and Rey (2013) among others.

by “low powered” leniency policies (only offering immunity) could be exploited by wrongdoers to solve the hold-up problem of corrupt exchanges that are not simultaneous, making even occasional corrupt deals viable.⁹ This analysis applies to any form of corruption where there is a risk of hold-up in the corrupt exchange. The 2011 note by Basu, instead, circumscribes the proposal to bribes paid to obtain a service one is legally entitled to, often named extortion, and focuses on situations where the exchange is simultaneous, so that no risk of hold-up is present. The proposal is analyzed in a formal model that maintains Basu’s focus and assumptions in Dufwenberg and Spagnolo (2015). Here it is shown that, consistent with the argument in Li (2012), taking into account the possibility of retaliation and dynamic effects linked to repeated interaction are crucial to understand situations where these instruments can be effective.¹⁰

The empirical literature on leniency in antitrust has taught us how difficult it is to evaluate the success of policies against crimes like corruption and collusion, where only changes in discovered and convicted cases are typically observed, and not in their overall number (Spagnolo, 2008). Indirect methods have therefore been developed to estimate the deterrence effects of these policies (Miller, 2009; Harrington and Chang, 2009). By and large, the evidence in antitrust supports the theoretical conclusion that leniency tends to be effective in deterring cartels when accompanied by sufficiently robust sanctions, as in the US (Miller, 2009), but not when sanctions are lower, as in the EU (Brenner, 2009). Our paper is particularly related to Miller (2009), as discussed in depth in Section 5, because we borrow the statistical test it develops for long-term price-fixing cartels and adapt it to the case of corrupt exchanges.

Laboratory experiments are particularly valuable to study the effects of law enforcement policies on these types of crimes, as they allow to observe the overall population of infringements, and have confirmed both the potential and the subtlety of these instruments.¹¹ Engel et al. (2016) study a setting where the corrupt exchange is not simultaneous, and find evidence consistent with the mechanism in Buccirosi and Spagnolo (2006), described above. Bigoni et al. (2012) reveals, among other things, that deterrence is strong only when these schemes allow for a reward to the party blowing the whistle, as suggested in Spagnolo (2004), a result partly confirmed by the more recent experiment by Abbink and Wu (2017). When rewards are not allowed, and the corrupt exchange is simultaneous (no hold-up is possible), Abbink et al. (2014) find that the effectiveness of the asymmetric punishment suggested by Basu depends on the environment, and in particular on the (im-)possibility of retaliation by the bribe-taker, much in line with the results of the present paper.

Finally this study relates to the broad literature on participatory policies and the use of third-party information as a monitoring tool, in the context of corruption (Reinikka and Svensson, 2005) and tax evasion (Kopczuk and Slemrod, 2006; Pomeranz, 2015; Kleven et al., 2016). In both cases, this type of tools, by facilitating the acquisition of information at low cost to the enforcement agency, reduces the number of agents that the principal needs to directly supervise, which is particularly beneficial for resource-constrained developing country governments. The empirical evidence in these literatures is still limited, although growing, and this paper offers a contribution in this respect.

⁹See also Lambsdorff and Nell (2007), where the static version of the corruption game studied in Buccirosi and Spagnolo (2006) is extended to analyse the possibility that different fines are imposed for the acts of paying a bribe, receiving a bribe, giving an illegal advantage (in exchange for the bribe), and receiving the illegal advantage.

¹⁰More analysis of the Basu proposal are being advanced, focusing on different aspects than the risk of retaliation and dynamic effects from repeated interaction. For example, Oak (2015) considers the possibility that deterring harassment bribes could lead bureaucrats to increase the amount of distortive corruption, while Basu et al. (2016) focus on the bargaining game between bribe-giver and bribe-taker and the risk that implementing the Basu’s proposal could increase the size of the bribes if it fails to deter their occurrence.

¹¹See for example Apestequia et al. (2007); Hinloopen and Soetevent (2008); Bigoni et al. (2012, 2015); Engel et al. (2016); Abbink et al. (2014); Abbink and Wu (2017).

3 Anti-bribery legislation in China and the 1997 reform

The major statutes in Chinese anti-bribery legislation are the Criminal Law of the People's Republic of China (CL)¹² and the Anti-Unfair Competition Law of the People's Republic of China (AUCL)¹³. In this paper we focus on corruption offences investigated and prosecuted under the CL, which covers all public official corruption. The AUCL was introduced in 1993 to address bribery by private sector managers as part of a set of practices that distort competition. Art. 22 of the AUCL states explicitly that those guilty of bribery should be investigated and punished in accordance with the CL whenever applicable.

The CL was adopted during the Second Session of the Fifth National People's Congress on July 1st, 1979 and revised during the Fifth Session of the Eighth National People's Congress on October 1st, 1997. This revision is a major reform and is the focus of this study. In the 1979 text, both the crimes of paying and accepting bribes are defined in one single article (Art. 185). Both crimes must involve state personnel to satisfy the definition. The punishment is slightly lower for active bribery: offering bribes could be punished by up to three years imprisonment, while accepting bribes was punishable by up to five years, or more than five in presence of serious losses for the public. Active bribery in the context of elections was also punished to the same extent (Art. 142).

The revised text of the CL promulgated in 1997 is much richer in details than the previous version. The crimes of accepting and paying bribes involving state functionaries, state organs or non-state functionaries are defined and regulated in Chapter VIII. The use of bribery in other contexts is also mentioned in Chapters III, IV and VI regarding the private sector ("Crimes of Disrupting the Order of Administration of Companies and Enterprises"), the electoral context ("Crimes of Infringing upon Citizens' Rights and Democratic Rights") and the judicial context ("Crimes of Impairing Judicial Administration") respectively.

Between those two versions, the definitions of active and passive bribery and the associated punishments were extensively changed in 1988 by the Standing Committee of the National People's Congress (the only institution that has the right to revise laws in China), in an official document called *Supplementary Provisions of the Standing Committee of the National People's Congress Concerning the Punishment of the Crimes of Embezzlement and Bribery*.¹⁴ Such a document has legal effect, but lower status than the CL. In this text, more levels of punishment are specified in a schedule, dependent on the size of bribe expressed in precise monetary terms for the bribe-taker, while according to generic "seriousness of the circumstances" for the bribe-giver, see Tables 8 and 9 in Appendix C. Moreover, two important details are added to the discipline. The first one is the introduction of asymmetric punishment. The crime of giving a bribe is now associated with the intent "to secure improper benefits". This means that a briber either: (1) seeks benefits that are in violation of law, regulations, rules, or state policies; or (2) seeks benefits that are themselves legitimate, but are to be obtained by means of violating laws, regulations, rules, state policies, or industrial norms.¹⁵ In practice, different judicial authorities

¹²English translation in Cohen et al. (1982) and CL (1997).

¹³Available in translation in AUCL (1993). Additional sources 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.

¹⁴Available in Chinese, in SCNPC (1988a) and SCNPC (1988b). Bilingual version available upon request to the authors.

¹⁵The precise definition of improper benefits was clarified in the document *Note of the Supreme People's Court*

have different interpretations of the definition of improper benefit and its importance, and it has never been treated as an absolute prerequisite for a prosecution or conviction on count of bribery (Gintel, 2013; Tanzhuhua, 2011). However, adopting a strict literal interpretation, this provision implies a differentiation in the treatment of extortionary bribes (or harassment bribes), those that do not procure improper benefit but are exchanged for something the giver had right to.¹⁶ Under the new legislation, this bribe-giver is not considered guilty. This likens the asymmetric punishment for harassment bribes proposed in Basu (2011) and discussed in the introduction, but importantly stripped of the second part, the doubling of sanctions for the bribe-taker.

The second important difference introduced in 1988 is the possibility of leniency (mitigated punishment or exemption from punishment) for those who confess voluntarily. 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 to 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 briber, and not for the bribe-taker, the law prescribes explicitly that confession must be offered before being investigated (see Table 1). This means that a bribe-taker may obtain a lenient treatment, and thereby potentially remain at his place, by collaborating with prosecutors after having been reported by a bribe-giver.

The 1997 revision of the CL retains most of the formulations of this 1988 text, although the schedule of punishments is revised in a way that makes punishment less severe: for the bribe-takers, bribe-size thresholds are increased, and for the bribe-givers sanctions are capped (e.g. “not less than 5 years but not more than 10”, see Table 8 and 9 respectively in Appendix C). Notice therefore that asymmetric punishment, whether practically relevant or not, was introduced already in 1988 and not in 1997. However, the CL has stronger status than the 1988 Supplementary Provisions, which constitutes a reinforcement of this provision.

To sum up, in the 1997 reform two new elements were given strongest legal status: the possibility of leniency and the asymmetric punishment for the case of extortionary bribery. To what extent they have been used in practice remains to be investigated. Concurrently, penalties are by and large reduced in 1997, in particular for bribe-takers. The reform was not therefore in line with the recommendation in recent research to increase sanctions for the other wrongdoers when introducing leniency for one of them.¹⁷ It suggests more of a move towards a generally more lenient approach to corruption. Also, this small decrease in penalties can be seen as a confounding factor, that might have reduced the positive deterrence effects of leniency policies and asymmetric sanctions.

On 23 October 2014, the Central Committee of the Chinese Communist Party passed a *Decision Concerning Several Major Issues in Comprehensively Advancing Governance According to Law* which stressed a commitment to “accelerate State legislation against corruption, perfect systems to punish and prevent corruption, create effective mechanisms so no-one dares to be corrupt, can be corrupt and wants to be corrupt, persist in containing and preventing the phenomenon of corruption. Perfect criminal law systems to punish venality and bribes, broaden the scope of criminal bribery from assets to assets and other property-type interests.”¹⁸ A draft amendment

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).

¹⁶The distinction applies to the two situations in which the public official takes the bribe to perform what is her duty (for example, produce a licence the bribe-giver is qualified for) or rather to perform an act in violation of her duty (for example, award a public contract to the bribe-giver); from the point of view of the bribe-giver, in the two situations he would pay for something that is in his right to obtain, or rather something that he has not right to. The first type of bribe is also referred to as extortion.

¹⁷See for example Spagnolo (2004, 2008); Basu (2011) and Bigoni et al. (2015).

¹⁸Source in Chinese and English translation at CCPCC (2014).

Table 1: Conditions for leniency

	Bribe-giver		Bribe-taker	
	Exemption from punishment	Mitigated punishment	Exemption from punishment (only administrative sanctions)	Mitigated punishment
1988	Confess prior to investigation		b ≤ 5,000 plus voluntary confession, repentance and restitution	
1997	Confess prior to investigation		b ≤ 10,000 plus voluntary confession, repentance and restitution	
2014	Confess prior to investigation plus minor circumstances or critical role of confession or major meritorious service	Confess prior to investigation	Voluntary confession, repentance and restitution (if relatively large bribe)	Voluntary confession, repentance and restitution (if huge or especially huge bribe)

to the Criminal Law (Amendment IX) was also submitted to the NPC Standing Committee in October, and subsequently voted on 29 August, 2015 and in force since 1 November, 2015. Heavier penalties are envisaged for those accepting bribes, but the thresholds are made more discretionary, as reported in Table 8 in Appendix C.¹⁹ Penalties for bribe-givers are kept the same but compounded by fines. Moreover, Amendment IX provides restrictions to leniency for the bribe-givers (more conditions specified to be exempted from punishment), as shown in Table 1.

¹⁹Media coverage in English at ChinaDaily (2015) and CCTV (2014). An incomplete translation of the draft can be obtained from the authors upon request.

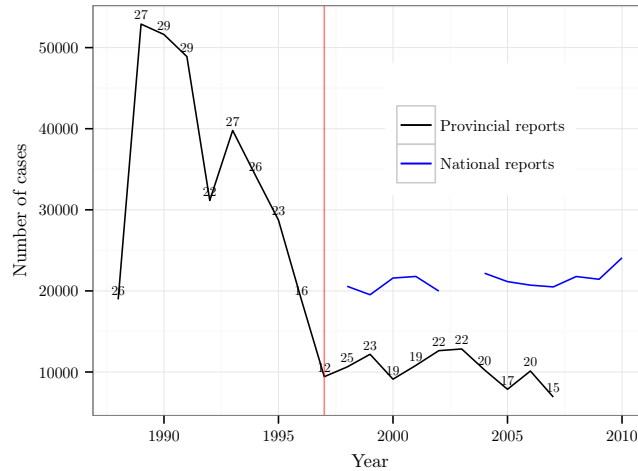


Figure 1: Prosecutions for corruption and bribery

4 Data

Data on the prevalence of bribery are notoriously hard to come by, because of the secretive nature of the activity. We use several data sources which capture on the one hand actual corruption cases tried in courts and on the other hand surveys of corruption perceptions. Records of actual cases are published by the National Bureau of Statistics China, and report in particular:

- the number of arrests and public prosecutions on suspicion of corruption and bribery for the period 1998-2010;²⁰
- the number of bribery cases accepted by the court, registered and settled in the period 1998-2010;²¹
- and the number of first trials (we disregard the appeals) for corruption and bribery accepted and settled by courts in the period 1999-2010.²²

For the period prior to 1998, for which the records are not published online, we have accessed the original source in printed version. We collected the corresponding information from the Procuratorates' Yearly Reports for each of the Chinese provinces since 1986. Reports are available for almost all provinces up to 1995, after which the number of provinces reporting falls sharply. This possibly reflects the switch to electronic reporting. Figure 1 shows the time series of prosecutions for the counts of corruption and bribery from these two sources, with the number of provinces included in each data point. The red vertical line highlights the date of the reform.

If one expects missing reports across provinces to be random, the sum of observations should be rather stable. As shown in the right panel of Figure 2, this is not the case. Especially for the years surrounding the reform in 1997, the number of observations, i.e. the number of provinces which reported data, is fluctuating.²³

²⁰“Offences of Corruption and Bribery”, under “Arrests of Criminal Suspects and Defendants Under Public Prosecution Approved by Procurator’s Offices”. Data missing for 2003.

²¹Of cases under direct investigation by Procurator’s offices. Data missing for 2003.

²²Data missing for 2003.

²³Also, there are only one and three reporting provinces for the years 1986 and 1987, respectively. We therefore drop the data for those two years and base the analysis on the time frame 1988-2010.

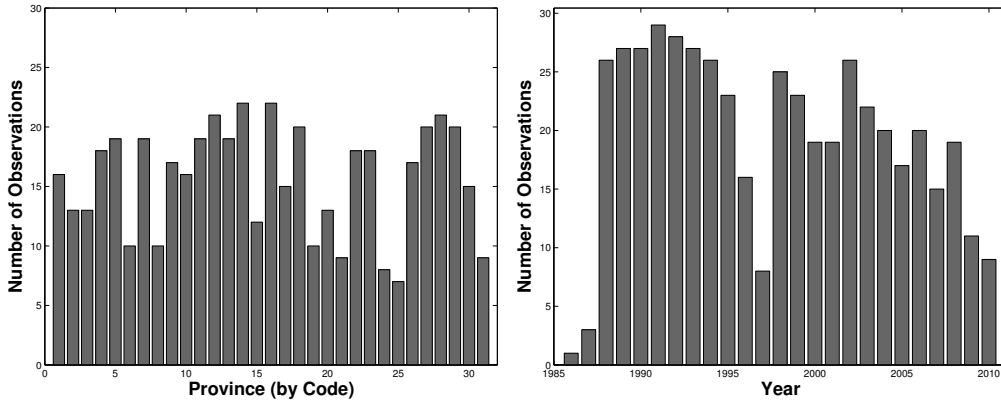


Figure 2: Number of observations for each province (left) and year (right)

We therefore consider the two series as complementary. In particular, the exclusive source of data for the period preceding the reform is the province-level data, which covers a subset of provinces. We are aware that we are not able to observe the exact same set of provinces for the period after the reform. However, we have two different sources for these provinces, namely both the provincial and the national data, which give respectively a lower bound (from a somewhat smaller set of provinces) and an upper bound (from the national level series). For robustness checks we also restrict the sample to the subset of 6 provinces that report every year, these results are reported in the Appendix A.

The dependent variable for the subsequent analysis is expressed as number of cases per 1 million citizens. Having normalized the data by the population size, the remaining variation across the provinces (right panel of Figure 3) can be due to differences in reporting efforts or other province-specific characteristics (for example, level of economic activity), but could also reflect purely random variation.

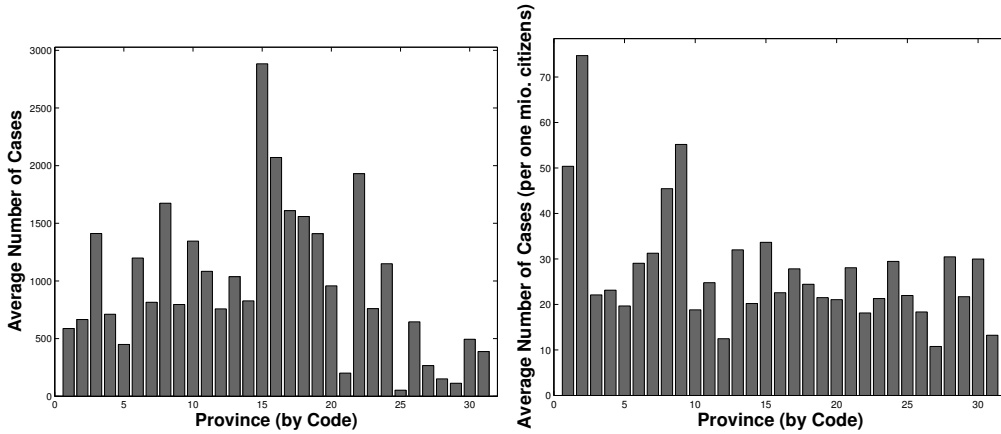


Figure 3: Average number of cases per province without (left) and with (right) controlling for population size

These data present us with an inference problem, common to cartels and other crimes that are not perceived and reported by their victims: they refer only to the detected cases of corruption

and bribery, while the overall pervasiveness of the actual crimes remains unobserved. In the next section, we follow methods and statistical tests applied in Miller (2009) on leniency and cartels, to make inference on trends in (unobserved) actual cases.

Because of the shortcomings of these data, we complement this analysis in two ways. First of all, we look at other available indicators of corruption, widely used indices based on expert assessments and opinion surveys. They are described in Appendix B. More interestingly, we also collect micro-data from a sample of case files, documents and proceedings from trials from before and after the reform. We describe this in detail in Section 6.

5 Structural break tests

The data on prosecutions mix together corruption and anti-corruption activities, as they fail to distinguish occurrence of the criminal activity from detection. A policy that deters crimes but at the same time increases the fraction of those that are detected and successfully prosecuted, will have an ambiguous effect on the number of prosecutions. The complex interaction between detection and deterrence effects of a policy change is typically overlooked in public debates, as if the underlying unobserved criminal behaviour was assumed to be always constant. Observing more detected cases after a new policy is introduced, is compatible both with an increase in the crime detection rate (if total crime did not change much), or with an increase in total crime, i.e. a fall in deterrence.

Miller (2009) develops a theoretical model that helps to bridge observed and unobserved criminal behaviour, in the context of collusion. The model features a first-order Markov process governing the occurrence of criminal activity (cartel formation, in this case) and derives predictions for how changes in the rate of occurrence and the rate of detection affect the time series of detection. This is then applied to test the effect of the 1993 introduction of the antitrust leniency policy on cartel formation and detection rates in the US.

Similar to the collusive behaviour leading to cartel formation, bribery is also based on trust between the corrupt partners. And leniency similarly may undermine this trust, leading to deterrence effects (Bigoni et al., 2015). We exploit this similarity in the two types of criminal activity and apply the empirical tests developed by Miller (2009) to the case of the Chinese anti-bribery reform.

The main results from Miller’s theoretical model are summarized as follows:

RESULT 1: An immediate increase in the number of prosecutions after a reform is sufficient to establish a corresponding increase in the detection rate.

RESULT 2: Given Result 1, a subsequent re-adjustment in the number of prosecutions below initial levels is sufficient to establish an increase in deterrence (decrease in the underlying criminal activity).

Based on this, Miller (2009) expects to observe, if the reform is successful, a peak in discoveries after the reform due to improved detection of pre-existing cartels, followed by a slump, revealing less cartel formation. We now apply the same logic to our data.

The bar graph in Figure 4, showing the number of cases per 1 million citizens from 1988 until 2010, yields some first insights. The average is relatively high in the first ten years of data and exhibits some time variation, before it experiences a major drop in the year 1998, coinciding with the implementation of the reform in 1997. The average levels off in this low state in the subsequent years. Graphical inspection suggests therefore that our data is consistent either with the second part of Miller’s test, but not the first; or with a drop in detection rates with limited negative impact on deterrence.

The box plots in Figure 5 group together observations from before and after the reform,

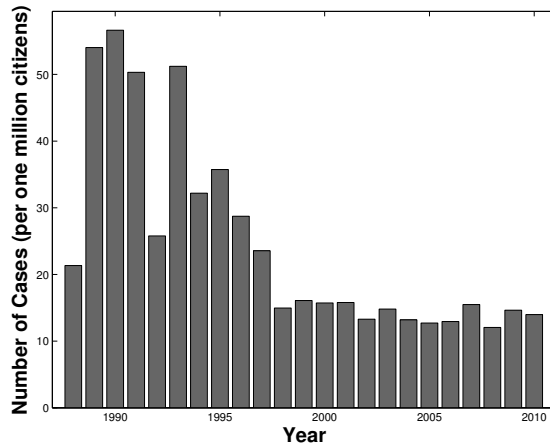


Figure 4: Number of cases over time

illustrating a difference-in-means test. The left panel uses only the province-level data. Both the median – indicated by the red line – and the variance – indicated by the edges of the box, the 25th and 75th percentile – are considerably lower after the reform. In line with this graphical observation, the two-sample t-test of equal means rejects the null hypothesis of equal means (and equal but unknown variances) at any common significance level.

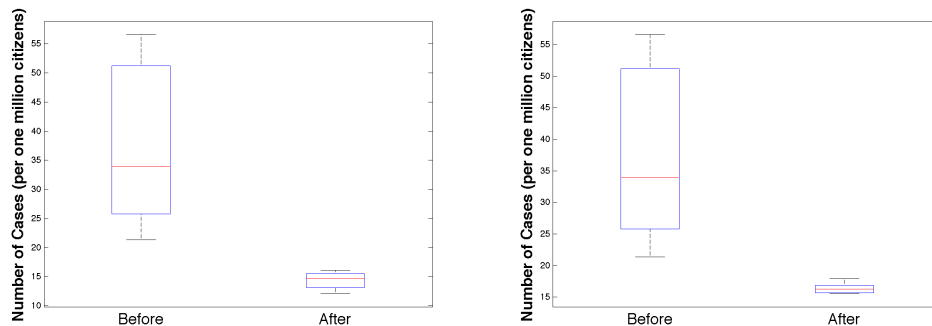


Figure 5: Average number of cases before and after the reform: province-level (left) and national-level data (right)

Since the province-level data have less observations after the reform, we also use the available national data for the post-treatment period as a robustness check. Notice that the absolute number of reported cases on the national level is weighed by the national population size to obtain a measure comparable with the province-level data. The box plot in the right panel of Figure 5 shows similar results. The two-sample t-test of equal means again rejects the null hypothesis at any common significance level. After these first graphical observations and mean tests, we now turn to regression analysis to quantify the effect of the reform. Figure 6 plots the dependent variable, the number of cases per one million citizens (including in red national-level data where available).

In Column (1) of Table 2, we regress the dependent variable only on the reform dummy,

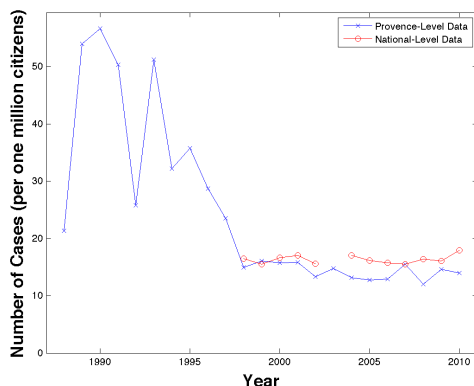


Figure 6: Number of cases - Province- and National-Level Data

which takes the value one for the years after 1997 and zero otherwise. The legal reform resulted in 23.66 fewer cases per one million citizens, corresponding to a $\frac{23.66}{37.95} \cdot 100\% = 62.3\%$ decrease.

In order to take into account potential trends over time, the model is augmented in the other columns to include polynomials of different orders in two separate time trends, one for the whole sample and one for the post-reform period. Specifically, the term TIME1 equals 1 in the first period of the sample (year 1988), 2 in the second period, and so on. The variable TIME2 equals 1 in the first period following the reform (year 1998), 2 in the next period, and so on. 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 in all but one case: column (4), which includes a second order polynomial in both TIME1 and TIME2. This is probably due to the neat fit of the polynomial, as illustrated in the bottom-left panel of Figure 15 in Appendix A.²⁴ As one would expect when looking at Figure 6, using the national-level data for the post-reform period yields almost identical results (see Appendix A).

Figure 7 plots the estimated conditional means (i.e. predicted values) for the regression shown in Table 2, column (3), along with the actual number of cases. Similar plots for the other models are reported in Appendix A. The polynomial approximations are very flat in the post-reform period, at a level nowhere near the pre-reform one.

In Appendix A we submit this main result to a battery of robustness checks including Poisson and Negative Binomial models, limitation to a subset of data and placebo tests. Our conclusion identifying an immediate and persistent drop in prosecutions in 1997 by about 30% stands. This pattern, a lower-level plateau in prosecutions without a short-term spike, is importantly different from what observed in Miller (2009), and instead points towards a worsening of detection or enforcement, not unlike what suggested by Li (2012).

To understand whether the political environment changed substantially around 1997, possibly confounding the effect of the legal reform, we collected supportive qualitative evidence looking at official documents and public speeches, but also press releases and newspapers. In the aftermath of the Tiananmen Square protests, anti-corruption had become a major political objective. Deng Xiaoping’s “South talk” in the spring of 1992 is regarded as an influential reference point in this respect. After this speech, the China Daily has been reporting news related to anti-corruption on a daily basis for the following three years. While the seeds of the 1997 reform certainly emerged

²⁴The inclusion of other combinations and higher polynomial orders was also tested. The treatment effect remains statistically significant with values in the same range.

Table 2: OLS Regression Results

Dependent variable: Number of cases (Prosecutions for corruption and bribery)					
	(1)	(2)	(3)	(4)	(5)
<i>Legal Reform Dummy</i>					
REFORM	-23.66*** (4.31)	-13.66** (6.74)	-14.53*** (4.77)	-3.64 (4.05)	-11.87*** (3.72)
<i>Polynomials in time</i>					
TIME1	None	2nd order	1st order	2nd order	3rd order
TIME2	None	None	1st order	2nd order	3rd order
Constant	37.95*** (4.33)	47.37*** (13.39)	47.63*** (10.62)	29.88** (11.17)	5.96 (16.28)
Observations	23	23	23	23	23
DF	21	19	19	17	15
Adj R^2	0.63	0.64	0.66	0.71	0.74
LL	-82.20	-80.71	-80.30	-77.16	-74.33
F-Statistic	38.8	14.20	15.00	11.60	9.96

Notes: Heteroscedasticity and autocorrelation consistent (HAC) estimates, robust standard errors in parentheses.

TIME1 is a time trend for the whole period. TIME2 is a time trend starting after the reform.

*, **, *** Significant at the 10%, 5%, and 1% level, respectively.

already at this point, we found no evidence of any changes either upwards or downwards in the focus on corruption after the effort of this period, and in particular around 1997. Figure 1 reports the count of words related to corruption or bribery in an important official speech given by the president each year. We can interpret this as the intensity of political commitment and general attention to the problem of corruption. In both plots we see a somewhat heightened focus on corruption in the central years (1991-2008) of the sample, but no particular peak or dip coinciding with the reform.

The slump-without-spike pattern we identified might still be consistent with a success of the reform, if the lack of a spike is due to bribery being different in nature from cartels. Corruption may be occasional, rather than part of a long-term relationship as are cartels, and corrupt exchanges may be instantaneous. If most bribery cases are occasional, instantaneous exchanges, and the adjustment of beliefs in the population to the new policy is immediate, then there would be no reason to expect a spike, and the fall in detection rate would be consistent with a positive deterrence effect. In this scenario, the series of prosecutions would adjust immediately after the reform. Even in this extreme case, though, the retroactivity of the reform might induce a spike anyway, if detection through self-reporting improves, because more “old” cases might be suddenly reported now that more leniency became available.

Another potential explanation for the observed drop in prosecutions is that it is driven by cases against bribe-givers not being carried out anymore for extortionary bribery. The national-level prosecution data do not allow us to distinguish bribery from other corruption offences such as embezzlement, nor giving versus taking of bribes, so we cannot exclude this by looking at these data. We will try to shed light on these issues in Section 6 using micro-data, since the aggregate data hide important details on timing and individual behaviour.

Appendix B provides an overview of all the other data sources on corruption we could find for the relevant time period, including corruption perception surveys and composite indices. The picture that emerges from these is ambiguous. Some indices show a worsening around the year of the reform (implying more perceived corruption), followed by a recovery, others a stable trend.

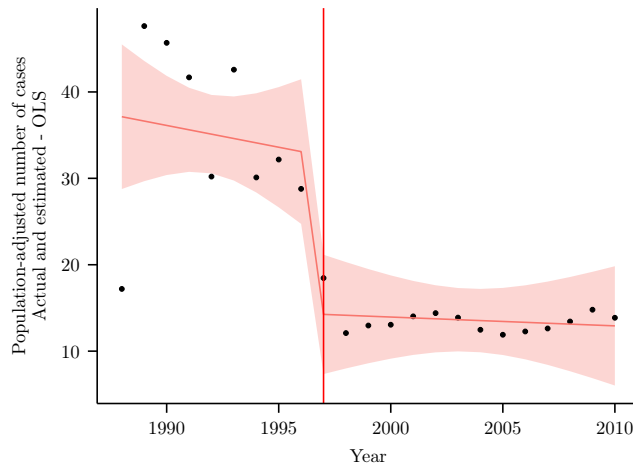


Figure 7: Test for structural break — Model (3)

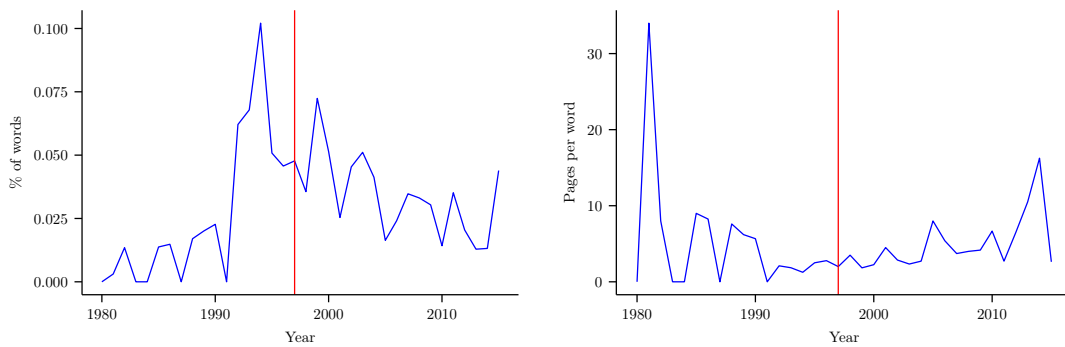


Figure 8: Corruption-related words in official speeches

Surveys reveal a lower frequency of harassment bribery in China compared to other countries in the region and other developing countries, but interestingly at the same time an increasing acceptance of bribery in general and of the pursuit of improper benefits. This would be consistent with a negative interpretation of the effect we measure, in terms of a reduced detection rate.

We cannot however make more progress regarding the interpretation of the fall in the number of cases based on this type of data. The next Section presents stronger empirical evidence based on micro-data, instead.

6 Case-file Analysis

As discussed above, the data on prosecutions are subject to several limitations, both theoretical and practical. For this reason, we analyze here more in depth a stratified random sample of prosecution cases dating between 1986 and 2010. Given that we sample a given number of cases, determined by power and budget considerations, in this part of the analysis we cannot gain any

insight about the incidence of bribery in general. We can instead observe the impact of the legislative reform on specific details of the corrupt behaviour: whether it involves illegitimate benefit or not, the size of the bribe and the favor exchanged, the length of the corrupt interaction, the rank of convicted bureaucrats. Moreover we want to understand whether and how leniency and asymmetric punishment are applied in practice. This way we want to shed light on the mechanisms through which corrupt behaviour has been or failed to be affected.

The main outcomes that we look at were specified in a pre-analysis plan (Berlin and Spagnolo, 2015). In September 2015, we collected a pilot — a small random sample of case files — in order to learn more about what information is available in the case files, while the full data collection was completed only in December 2016.

The sample is composed of 171 cases of bribery, tried between 1986 and 2010, for a total of 255 defendants. The cases were selected at random from two different archives available to students in Chinese law schools, the PKU Law Database²⁵ and the Classical Law Database²⁶. The sample was stratified by year. However it was not possible to stratify the sample by court, given the sample size. This implies that we will not be able to explore potential geographic heterogeneity. Table 3 reports summary statistics for the variables we collected from the case files.

	Before, N=105		After, N=150		t-test (p)
	mean	(s.d.)	mean	(s.d.)	
Harassment bribe	0.125	0.332	0.088	0.285	0.342
Case against bribe-taker	0.857	0.352	0.733	0.444	0.018
Leniency	0.371	0.486	0.639	0.482	0.000
Prison sanction	25.548	39.519	15.780	30.659	0.025
Death penalty	0.181	0.387	0.087	0.283	0.026
Size of bribe (yuan)	486433.926	1570850.208	1306916.463	4936790.965	0.098

Table 3: Summary statistics with t-test of the before-after differences

Composition. A major issue with the national-level prosecution data, as we discussed in Sections 4 and 5, is that they do not allow us to distinguish bribery from other corruption offences such as embezzlement, nor giving versus taking of bribes. This implies that we could not exclude, in the previous analysis, the possibility that prosecutions against bribe-givers are simply not carried out anymore for extortionary bribery, because they are not considered guilty any longer, and that this explains the whole drop in our aggregate statistic. A previous case-file analysis (Guo, 2008) found that 82 to 93% of all corruption cases (between 1978 and 2005) were about bribery, and that only 4 to 9% of cases were against bribe-givers only. Therefore, attributing the whole or even a big part of the drop in cases only to a change in composition seems unlikely. Nevertheless we can gain much more precise insight by looking at the composition of our random sample of cases. As Table 3 shows, cases against bribe-givers, far from diminishing, are relatively more common after the reform. This difference is statistically significant at the 1% level. Cases of harassment bribes, on the other hand, become relatively less common. It could be that fewer such cases are brought to trial. This would in particular concern bribe-giver cases, since they are not guilty any longer. Figure 9 breaks down the effect of the reform on the share of harassment bribes by givers and takers. This reveals first of all that the reduction in the relative prevalence of harassment bribes is not statistically significant (standard errors are clustered at the case level, and the power for this test is very high). Second, the (insignificant)

²⁵<http://www.pkulaw.cn/Case/>

²⁶<http://corpus.classiclaw.com/search>

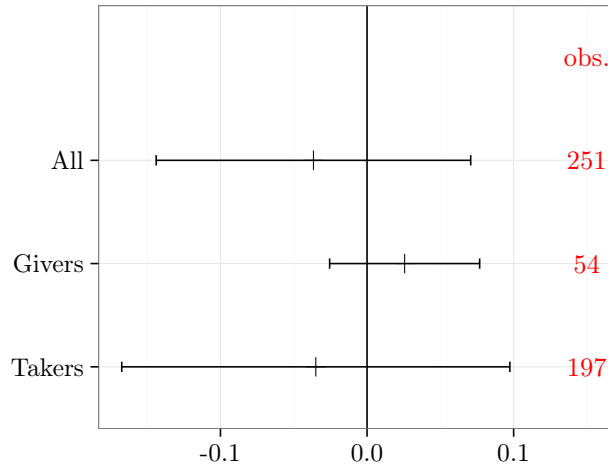


Figure 9: Frequency of harassment bribes

reduction in the share of harassment bribes comes, if anything, from the bribe-takers' side. The change in the share of harassment bribes among the trials of bribe-givers is actually positive, although not significant. This implies that the drop in the number of corruption cases observed at the aggregate level is not explained simply by a drop in prosecutions of harassment bribery or bribe-givers.

The other main outcomes specified in the pre-analysis plan, besides the share of harassment bribes, were the average size of bribes and the proportion of cases initiated by the bribe-giver. The former shows no significant change after the policy, and the latter is reported in such a small share of the cases, that a meaningful statistical analysis is impossible.

In accordance to the pre-analysis plan, we look at some secondary outcome variables, in order to help the interpretation of our finding and clarify the mechanisms at play. In particular, given that there is a measure of discretion in the practice of law enforcement, through these secondary outcomes we have the possibility of verifying whether the expected changes in law enforcement do actually happen in practice.

Leniency. An important information that the aggregate data hide is whether the reform makes the use of leniency more likely in practice. As discussed in Section 3, a weaker, general provision for leniency, not specific to corruption crimes, was already present in the Chinese legal system before 1997. Moreover, the reform does not make leniency automatic, as in current antitrust leniency policies, so even after 1997 the possibility to award leniency is at the discretion of the court. It is an interesting empirical question, therefore, to what extent the use of leniency actually changed after 1997. In Table 3 we can see that there is in fact a substantial increase in the use of leniency in the period after the reform, which is consistent with our interpretation of what the legal reform actually changed. Figure 10 further breaks down this effect, so we can focus on cases that we expect to be more affected by the reform. Looking at Table 1, we can see that, while the conditions for leniency did not change for bribe-givers in 1997, obtaining leniency became easier for bribe-takers, since the threshold for maximum bribe was increased (although this might just reflect an adjustment for inflation). Therefore we expect leniency to become more frequent for bribe-takers. This is confirmed in Figure 10.²⁷ A crucial point here is that

²⁷Notice that, although this effect is statistically significant at 95% level, the power of this test is slightly lower

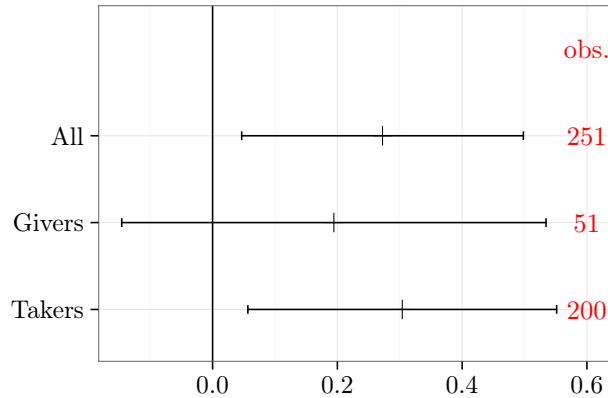


Figure 10: Frequency of awarded leniency

bribe-takers can obtain leniency even during the investigation, for example after having being reported by the bribe-giver. This is consistent with the story in Li (2012), as increased leniency to bribe-takers allowed them to remain in office more often, increasing their ability to retaliate and severely impairing the reporting incentives for the victims. Recall that the theory-backed policies²⁸ require that leniency or full depenalization should be asymmetric, granted only to one party.

Actual sanctions imposed. Sanctions are specified in the legal text in the form of ranges (ex. *not less than 2 and up to 5 years imprisonment*), and imply discretion for the judicial authority. It is hence interesting to verify how severe are the sanctions administered in practice after the reform. Moreover, looking at the prosecution documents we can form a better idea of whether the presence of improper benefit is actually considered in practice, and so whether harassment bribes are effectively set apart and subject to a different discipline. Further, if this is the case, we can observe whether the 1997 reform led to a change in this respect. Perhaps as a consequence of leniency being awarded more often, Table 3 shows that sanctions administered are lower after the reform, including the likelihood of death penalty. In Table 4, we see that sanctions imposed after the reform are significantly lower for harassment bribes, both in terms of prison years — in absolute terms and relatively to the size of bribe — and in terms of likelihood of receiving a death or life sentence.²⁹ Notice that the whole decrease in sanctions comes from bribe-takers. Recall, again from Buccirosi and Spagnolo (2006), that theory-based proposals imply that sanctions for the other, non-reporting parties should be increased when leniency is introduced for the first reporting party.

Time in activity and latency. Most cases report the time in activity of the bribe-takers. Figure 11 shows that the interval during which the convicted bureaucrats accepted bribes is substantial, at 1.4 years. The analysis of cases also allows to some extent to distinguish the time of detection from the time when the corrupt exchange took place. The distance between the two

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%.

²⁸Buccirosi and Spagnolo (2006); Chen and Rey (2013)

²⁹Although these effects are statistically significant at 95% level, the power of the tests is much lower than accepted levels in this case, at 20% to 33%. 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, between 0.07 and 0.5% across the three variables.

	Prison years		Prison years per 1000 yuan		Death sentence		Death or life sentence	
After	0.0358 (0.947)	0.297 (1.011)	-0.120*** (0.0324)	-0.105*** (0.0307)	-0.0937 (0.0576)	-0.0239 (0.0540)	-0.105* (0.0632)	-0.0454 (0.0630)
Harassment bribe		1.233 (1.828)		0.176 (0.204)		0.418*** (0.122)		0.374*** (0.125)
Harassment*After		-3.644* (1.964)		-0.186 (0.204)		-0.515*** (0.126)		-0.493*** (0.130)
Constant	4.691*** (0.872)	4.600*** (0.929)	0.170*** (0.0313)	0.156*** (0.0295)	0.181*** (0.0500)	0.121*** (0.0435)	0.219*** (0.0544)	0.165*** (0.0521)
R^2	0.000	0.021	0.173	0.215	0.019	0.093	0.020	0.074
Observations	209	207	203	201	254	250	254	250

Note: The dependent variable 'Prison years' excludes death or life sentences. All regressions include time trends. Standard errors clustered at the case level in parenthesis.

Table 4: Impact on the reform on administered sanctions

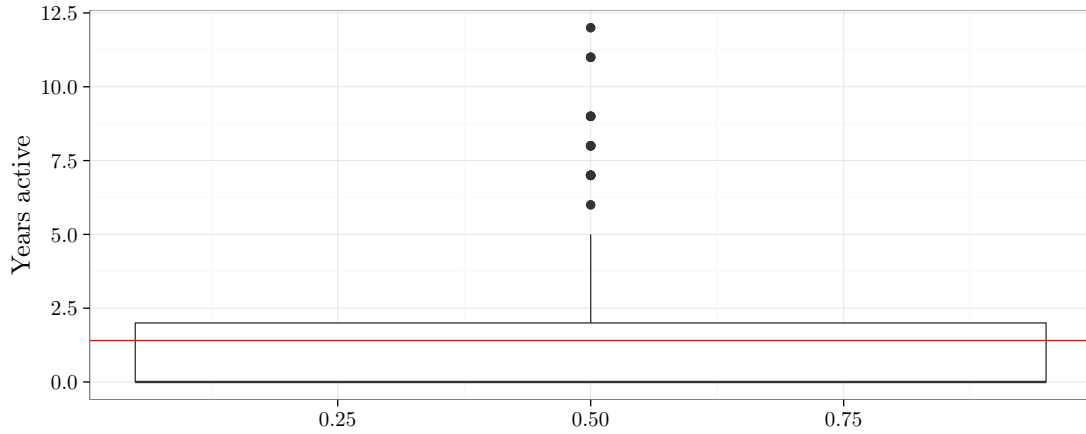


Figure 11: Duration of corrupt activity (only takers)

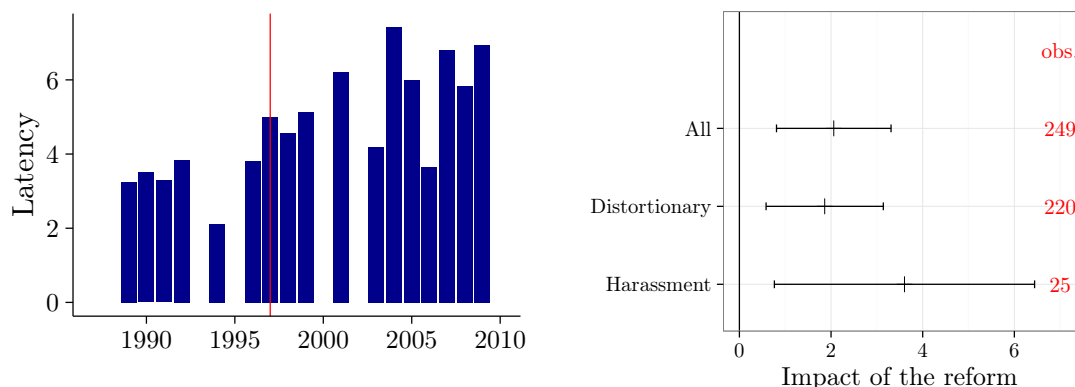


Figure 12: Latency before and after the reform

points in time is called *latency*. In Figure 12, we plot the average distance between the last time of activity of a bribe-taker and the time of discovery, for the cases discovered in each specific year. This shows that latency clearly increases after the reform, and in particular for harassment bribes.³⁰

Going back to the aggregate pattern, we argued that the lack of a spike in the immediate aftermath of the reform could be due to the instantaneous nature of bribe exchanges and the consequently rapid adjustment of crime levels in the population. We have just observed in the micro-data, though, that the time in activity of corrupt, bribe-seeking bureaucrats is rather long. Moreover, the fact that latency increases implies that on average older cases are reported or discovered after the reform, which should include more cases occurred before the policy and reported when the policy is introduced because the policy is retroactive. Both these facts should have led to a spike in discoveries if the policy was minimally successful in increasing detection, while instead we observe a large drop. We therefore conclude that data support the alternative interpretation: that the reform led to a slack in enforcement (more leniency for everybody, in particular for bribe-takers; lower sanctions, in particular for bribe-takers) which in turn led to corrupt bureaucrats staying longer in office and enjoying more opportunities to retaliate against potential witnesses. This implies less incentive to report and therefore lower detection rates (and possibly lower deterrence).

In the pre-analysis plan, we also set out to inspect bureaucrats' characteristics, looking for potential changes in the selection into this career after the reform. Unfortunately the case files do not contain consistent information in this respect across cases. One thing we could figure out reading the cases is the **rank of the public official** involved in the case.³¹ Following Li's logic, if the ability to retaliate is what explains a reduction in reporting and hence detection, since leniency for bribe-takers is only available for low levels of bribes, petty cases would cease to be

³⁰This result is strongly statistically significant and estimated with very high power.

³¹Our rank is coded as follows. We start from 6 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 are 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 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 and their positions within them over time.

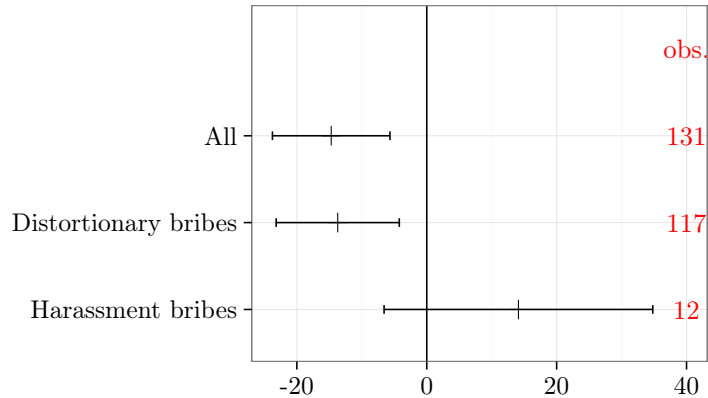


Figure 13: Rank of public officials

reported while a relatively larger share of more serious corruption cases would emerge, for any level of deterrence. This could potentially be reflected in the involvement of higher rank officials, if official rank is correlated with the size of bribe. Figure 13 shows, indeed, that the rank of public officials accepting distortionary bribes is on average higher after the reform, and quite substantially so (almost a third of the rank scale).³² Consistent with Li’s story, the correlation between rank and size of bribe is moderate but positive, at 0.52.

6.1 Discussion

After observing a drop in the aggregate number of corruption prosecutions in coincidence with the 1997 reform to the Chinese Criminal Law, we discussed how this finding can be compatible with different stories. Therefore, we set up a case-file study on a random sample of prosecution cases in order to find supportive evidence that would help disentangle the alternatives. Summing up the results of this analysis, we find that:

- Bribe-givers appear still in prosecution cases, and their share does not decrease. The same is true for harassment-bribe cases. This excludes the possibility that the drop in overall corruption cases is simply due to bribe-givers of harassment bribes not being prosecuted any longer, because they are not considered guilty under the new law.
- The average time in activity of the bribe-takers is substantial. Even if 1.4 years is much shorter than the average cartel length of 5-6 years, a spike in the number of cases right after the policy linked to increased detection should have been expected, and its absence points at the absence of such an effect. This contrasts with the possible interpretation of the drop in aggregate cases in terms of increased deterrence. The fact that the average time to detection increases after the reform, together with the policy being retroactive, is an additional reason why a spike should have been observed if the policy had minimally increased the detection rate, or even left it unchanged.

³²Notice that, although this effect is statistically significant at 95% level, the power of the tests 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%. No significant change is observed for harassment bribes, although this sample is very small.

- The application of leniency increases and the severity of sanctions decreases, both in particular for bribe-takers. This evidence points again at the less optimistic interpretation of the first result, namely at a general relaxation of enforcement and a fall in detection rates, likely linked to improved ability for bribe-takers to retaliate against reporting bribe-givers.

All in all, we can conclude that perhaps the perception expressed in Xingxing Li’s blog post mentioned in the introduction, that “the implementation effects of the law have not been as optimistic as predicted by Basu”, was not so far off. But this lack of success should not be credited to the application of the policy proposed by Basu and many economic theorists, rather to the lack thereof. In fact, the 1997 Chinese reform differs in several crucial details from the recommended policies, which prescribe lack of discretion in the application of leniency or asymmetric punishment; limitation of leniency to only one party and to reports arriving *before* an investigation is open; and reinforcement of penalties for the reported party, to maximize asymmetry of interest among the two. As we already knew from the large theoretical and experimental literature on leniency mentioned in Section 2, we can confirm in this first empirical investigation that, in the design of leniency policy, the devil is indeed in the details.

7 Conclusions

This paper provides the first empirical assessment of the effectiveness of leniency and asymmetric punishment as a policy tool against corruption. Leniency has been used before to undermine the internal trust between partners in crime in other law enforcement areas, and this mechanism has been recently studied theoretically and experimentally also in the context of corruption, but never evaluated empirically. Part of the reason lies in the difficulty to obtain good data on corruption and the rare applications of these policies. We cannot solve completely the issue of data quality, as we also rely on data from detected corruption cases. However we go a step further by collecting and analyzing micro-data from a stratified randomized sample of these cases. Whereas the aggregated data clearly show that something important happened to corruption cases in China in connection with the 1997 Criminal Law reform, and in particular that the number of prosecuted cases fell considerably and persistently, without the micro-data we would not know whether the fall was linked to improved deterrence or worsened detection. Through the analysis of the sample we could instead isolate at a greater level of detail the changes in criminal behaviour, reporting behaviour and prosecution activity and link them to the details of the legal reform, so as to highlight the mechanisms at work. Overall we believe this to be a significant contribution to our understanding of how to best tailor policies to fight corruption.

The conclusion is that the contemporaneous strengthening of leniency for *both* parties and the reduction in sanctions by the 1997 Chinese reform failed to improve deterrence, as predicted by theory, because it did not generate the necessary asymmetry between reporting and non-reporting parties. It also allowed reported bribe-takers to enjoy more lenient sanctions by collaborating with law enforcers, thereby improving their ability to retaliate and reducing bribe-givers incentives to blow the whistle in the first place, as suggested in Li (2012). The implication is that also the 2015 anti-corruption reform in China, while likely beneficial in terms of deterrence where it increased sanctions, went in the wrong direction when reducing the ability to obtain leniency for both parties, again failing to maximize asymmetry of interests between the corrupt partners, which is the core source of deterrence for these policies. The US DoJ and Latin American countries currently experimenting with these programs will hopefully not ignore what theory, and this paper’s evidence, suggest is important, in order for these programs to produce improved detection and deterrence, rather than backfire.

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Appendices

A Robustness checks

A.1 OLS models

As a first robustness check, we estimate the same models as in Section 5 on the subset of 6 provinces which have a report for all the 23 years of the sample. Figure 14 shows that this makes results even stronger. Figures 15 and 16 report a visualization of the other models estimated in Table 2, which fit different order of polynomials in the time trends.

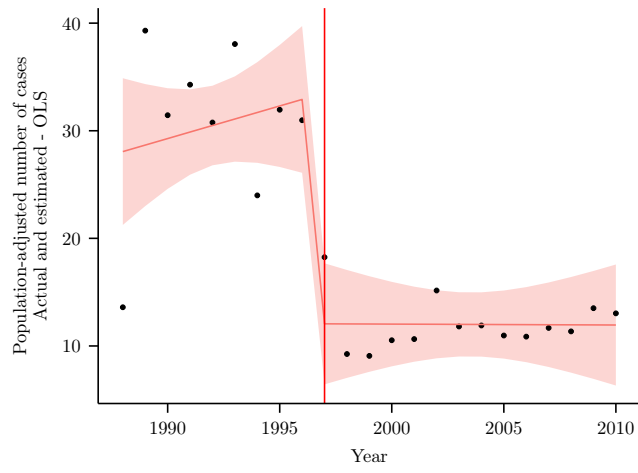


Figure 14: Test for structural break in a subset of provinces

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## Error in smallplot[[5]]: subscript out of bounds
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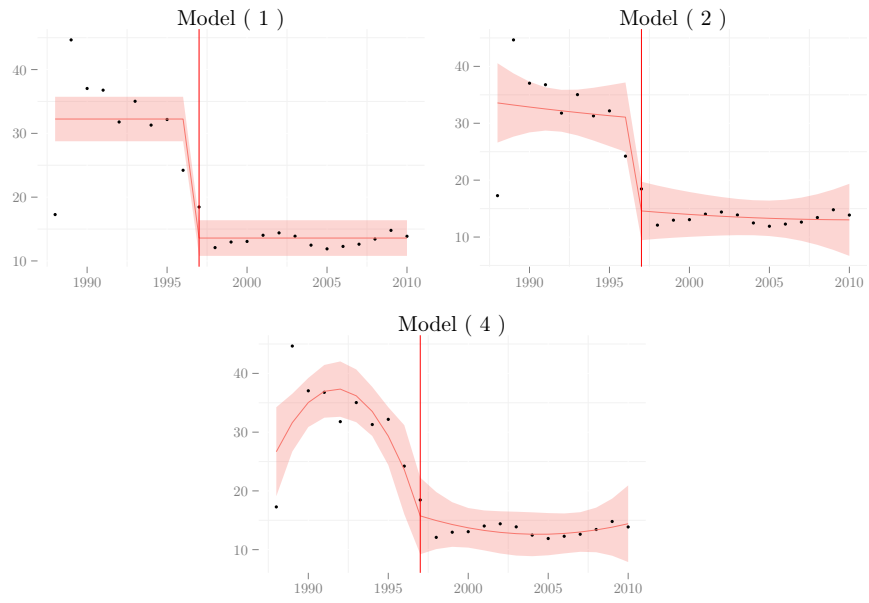


Figure 15: Test for structural break — other polynomials

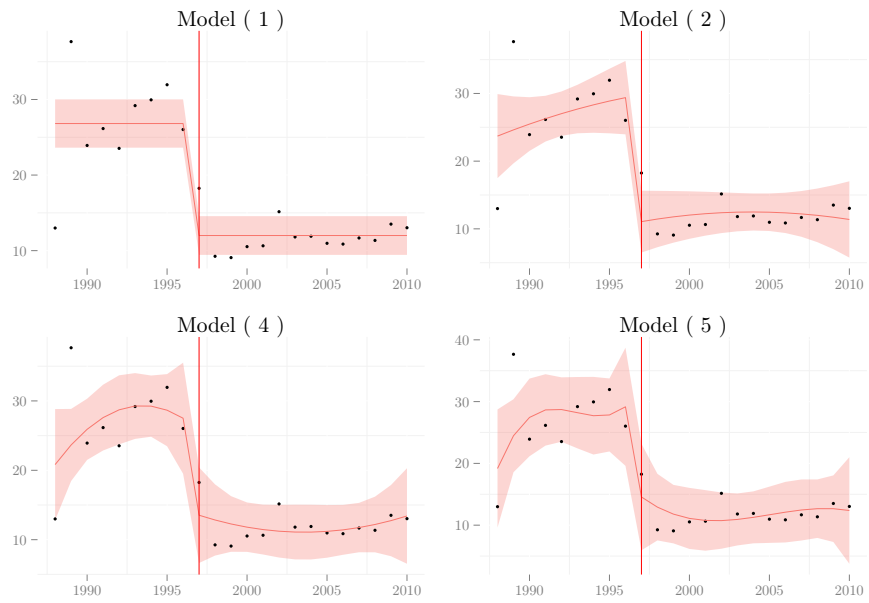


Figure 16: Test for structural break — subset of non-missing provinces

Table 5: Poisson and Negative Binomial models

Dependent variable: Number of cases (Prosecutions for corruption and bribery)					
	(1)	(2)	(3)	(4)	(5)
<i>Legal Reform Dummy</i>					
REFORM	-0.98*** (0.09)	-0.64*** (0.18)	-0.67*** (0.18)	-0.26 (0.29)	-0.56 (0.43)
<i>Polynomials in time</i>					
TIME1	None	2nd order	1st order	2nd order	3rd order
TIME2	None	None	1st order	2nd order	3rd order
Constant	3.64*** (0.05)	3.87*** (0.12)	3.88*** (0.11)	3.39*** (0.20)	2.79*** (0.34)
Observations	23	23	23	23	23
DF	21	19	19	17	15

Notes: Standard errors in parentheses.

TIME1 is a time trend for the whole period. TIME2 is a time trend starting after the reform.

*, **, *** Significant at the 10%, 5%, and 1% level, respectively.

A.2 Poisson regression

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 (McClendon, 1994). Crime data rarely adhere to these assumptions. Most crime incidents are distributed as rare event counts. 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 is worthwhile to compare the OLS results with regression models that are designed to analyze count data, namely the Poisson and negative binomial regression models. The Poisson regression model is often used to model count data and contingency tables. The response variable is assumed to follow a Poisson distribution, and the logarithm of its expected value can be modeled by a linear combination of unknown parameters.

Table 5 reports the results of five Poisson models corresponding to the linear models used in 2. Note that the reported coefficients have to be converted in order to be comparable to the OLS coefficients. The estimated number of cases $\hat{\lambda}$ in model (1) before the reform can be calculated as $\hat{\lambda} = \exp(\hat{\beta}_0) = \exp(3.64) = 38.09$. After the reform, when the treatment dummy takes the value one, the estimated number of cases is $\hat{\lambda} = \exp(\hat{\beta}_0 + \hat{\beta}_1 \cdot 1) = \exp(3.64 - 0.98) = 14.30$. This result is very similar to the model (1) in the OLS case, a 62.4% decrease. The other estimates can be calculated in a similar fashion. Take for instance model (2): in the year 1997, the estimate is $\hat{\lambda} = \exp(\hat{\beta}_0 + \hat{\beta}_2 \cdot 10 + \hat{\beta}_3 \cdot 10^2) = \exp(3.87 - 0.05 \cdot 10 + 0.000929 \cdot 100) = \exp(3.46) = 31.81$, where $\hat{\beta}_2$ and $\hat{\beta}_3$ are the coefficients for the second order polynomial in TIME1. In the year 1998, the estimate amounts to $\hat{\lambda} = \exp(\hat{\beta}_0 + \hat{\beta}_1 + \hat{\beta}_2 \cdot 10 + \hat{\beta}_3 \cdot 11^2) = \exp(3.87 - 0.64 - 0.05 \cdot 11 + 0.000929 \cdot 121) = \exp(2.79) = 16.28$. More generally, OLS and Poisson regressions yield very similar results. However, the reform coefficient loses statistical significance in model (4) and (5) and for higher order polynomials (not reported) when using the Poisson model. The similarity in the results

is not surprising when considering that the normal distribution is a good approximation to a Poisson distribution for data with a mean above (roughly) 30. The linear model assumes that the values are normally distributed around the expected value and can take any real value. Hence, when the mean is large enough, i.e. negative values are highly unlikely, and the variance is in a similar range, the OLS approximates the Poisson regression estimates quite well.

One drawback of the Poisson regression is the inherent assumption of equal mean and variance. Yet, we saw that the data exhibits different degrees of variation, especially when comparing the dependent variable before and after the reform. To handle overdispersed count variables, the negative binomial distribution is often used, since it allows for variance greater than the mean, making it suitable for count data that do not meet the assumptions of the Poisson distribution. Fitting a negative binomial model to our data delivered identical results,³³ except slightly inflated standard errors. The pattern of significance is also unchanged, with models (1) - (3) strongly significant but not (4) and (5).

A.3 National data

Table 6 replicates the specification of Table 2, using the national statistics on prosecutions rather than the province-level ones for the period after the reform as a robustness tests. These data provide an upper-bound to the actual number of prosecutions in the group of provinces that we observe for the period before the reform, as they are supposedly including all the 31 provinces. We see that the decrease immediately following the reform is still significant, although smaller in size.

Table 6: OLS Regression Results - National-level data for the post-reform period

Dependent variable: Number of cases (Prosecutions for corruption and bribery)					
	(1)	(2)	(3)	(4)	(5)
<i>Legal Reform Dummy</i>					
REFORM	-21.60*** (4.34)	-12.99** (7.42)	-13.91*** (4.77)	-3.62 (4.16)	-12.11*** (4.46)
<i>Polynomials in time</i>					
TIME1	None	2nd order	1st order	2nd order	3rd order
TIME2	None	None	1st order	2nd order	3rd order
Constant	37.95*** (4.34)	47.41*** (14.50)	47.63*** (10.49)	29.88** (13.08)	5.96 (17.36)
Observations	22	22	22	22	22
Degrees of Freedom	20	18	18	16	14
Adjusted R^2	0.58	0.59	0.66	0.66	0.70
Log Likelihood	-79.02	-77.71	-77.22	-74.22	-71.48
F-Statistic	30.00	10.90	11.70	9.18	7.92

Notes: Heteroscedasticity and autocorrelation consistent (HAC) estimates, robust standard errors in parentheses.

TIME1 is a time trend for the whole period. TIME2 is a time trend starting after the reform.

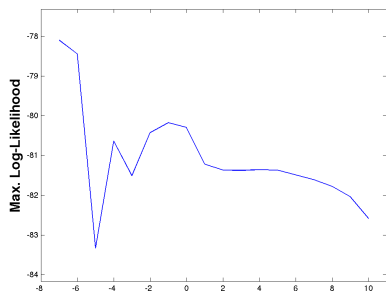
*, **, *** Significant at the 10%, 5%, and 1% level, respectively.

³³Results are not reported but are available upon request to the authors.

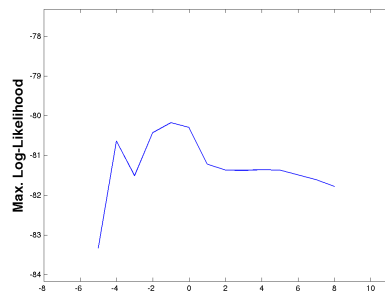
A.4 Placebo Interventions

So far we imposed to the data an exogenous breakpoint at the date of leniency introduction. An alternative approach would be to check whether alternative breakpoints - 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 would be causal. If instead the fit is superior when the breakpoint is imposed at the date of the reform, then the data provide support for our hypothesis. Recent literature suggests the Quandt-Likelihood Ratio (QLR) test for detecting structural changes of unknown timing (e.g., Hansen, 2001). The QLR test consists of calculating Chow breakpoint tests at every observation, while ensuring that subsample points are not too near the end points of the sample.

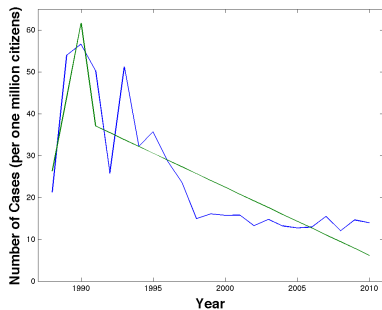
(a) Maximum log-likelihood 1990-2008



(b) Maximum log-likelihood 1992-2006



(c) Fitted Values with Maximizing Breakpoint (1990)



(d) Fitted Values with Maximizing Breakpoint (1996)

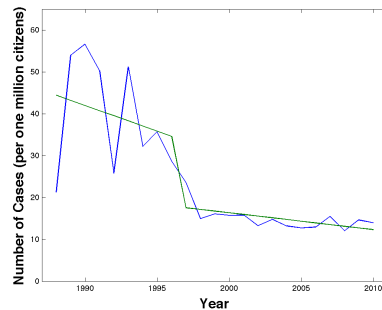


Figure 17: QLR test for structural change of unknown timing

The results are shown in Figure 17. Each point on the graph in panels (a) and (b) represents the maximized log-likelihood of a different regression specification. The x-axis is rescaled with 0 for 1997, the year of the reform. Looking at panel (a), the maximized log-likelihood value is located in 1990, when allowing for breakpoints between 1990-2008 (i.e. a symmetric window, trimming 2 observations from each end of the sample). The corresponding fitted values of the placebo intervention with breakpoint in 1990 are illustrated in panel (c). Looking at panel (c) it becomes evident that 1990 has the highest maximized likelihood because it describes the kink in the dependent variable around 1990. However, looking at the actual data, it is clear that this corresponds to the sharp increase in cases around 1990, which plausibly have very little to

do with the events in 1997. The test is looking for a global maximum, and hence we should be cautious with the interpretation of the results and the choice of an appropriate window for possible breakpoints.

In fact, the results change when a smaller window is chosen. Allowing for breakpoints between 1992-2006 (again a symmetric window, this time leaving out the first and last 4 observations), the log-likelihood is maximized in the year 1996. In particular, the maximized log-likelihood produced by the placebo intervention in 1996 is the only one greater than the one produced by the actual legal reform in 1997. By visual inspection of the bottom panels of the figure, it is clear that the fitted values approximate the data much better in panel (d) compared to panel (c), both before and after the reform. The year 1990 as a breakpoint with the highest maximum log-likelihood of the placebo interventions might therefore just be an anomaly.

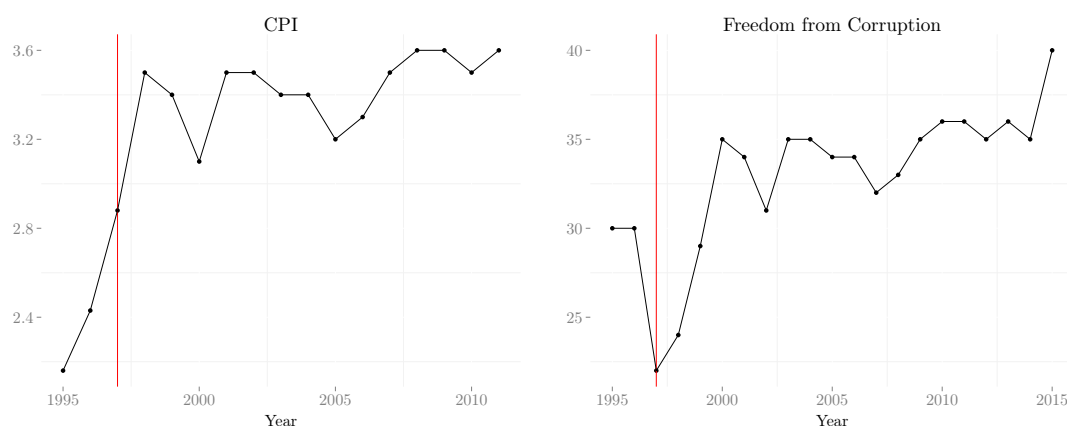


Figure 18: Composite indices of corruption perceptions

B Soft evidence: other corruption indicators

In the literature on corruption, composite indexes have gained popularity. Well known examples include Transparency International’s widely-cited “Corruption Perceptions Index” (CPI) and the World Bank Institute (WBI) “Control of Corruption” index Kaufmann et al. (2009). The CPI scores countries based on how corrupt their public sector is perceived to be on a scale of 0-100, where a lower score corresponds to more corruption. The left panel of Figure 18 shows a sharp improvement in the CPI score for China up to 1998, the year after the reform, followed by a few years drop and then a more moderate but still increasing trend.

The Index of Economic Freedom compiled by the Heritage Foundation is another composite index of corruption perceptions, primarily derived from the CPI and complemented with qualitative and quantitative data from other sources.³⁴ The component of the index called “Freedom from corruption”, also varying on a similar scale of 0 to 100, is plotted in the right panel of Figure 18. It shows an abrupt drop in 1997, followed by a steady improvement. These patterns are consistent with an increased emphasis on corruption fighting around the year of the reform, which might reflect in the public perception of how pervasive corruption is, but also with an actual increase in corruption.

Within their Worldwide Governance Indicators (WGI) research project, covering 212 countries and territories and measuring six dimensions of governance since 1996, Kaufmann et al. (2009) report the aggregate “Control of Corruption” index, varying on a scale from -2.5 to 2.5, and the underlying data from all of their sources. Rather than the original format, though, these are reported in the form in which they enter the governance indicators, namely rescaled on a 0-1 scale. In both scales, a lower score indicates a worse outcome, i.e. more corruption. Figure 19 plots the aggregate index and all the sources that are available for China in all the relevant years. Only one data point is available prior to 1997, making it hard to draw any inference on the impact of the reform. In general, the aggregate index gives a rather negative assessment of the trends in corruption, although all the components seem rather stationary.

³⁴From the Heritage Foundation’s webpage: “Unless otherwise noted, the Index relies on the following sources for information on informal market activities, in order of priority: Transparency International, Corruption Perceptions Index, 2011; U.S. Department of Commerce, Country Commercial Guide, 2009-2012; Economist Intelligence Unit, Country Commerce, 2009-2012; Office of the U.S. Trade Representative, 2012 National Trade Estimate Report on Foreign Trade Barriers; and official government publications of each country.” <http://www.heritage.org/index/freedom-from-corruption>

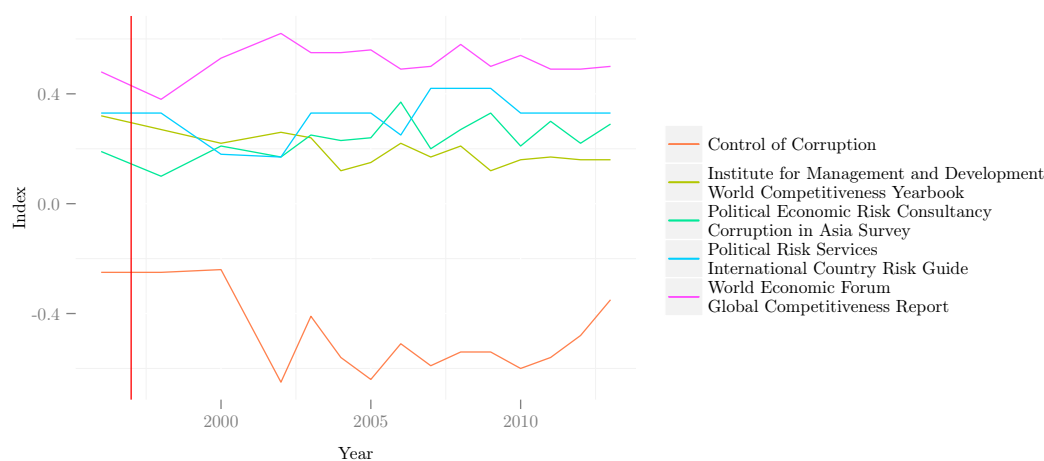


Figure 19: WBI Control of Corruption Index and components

This illustrates one of the main drawbacks of this type of composite indexes. The sources used in constructing them can change over time. This implies that different values 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. If expert assessments display high correlations driven by the fact that they consult each other's ratings – or that they all base their ratings on the same information sources – this can undermine the main premise of the aggregation methodology that averaging more sources produces more accurate and reliable estimates.

We considered separately also the components of the CPI index. These were ultimately not included here due to either not being publicly available, not covering a sufficient number of years, or not referring specifically to bribery. For some sources, though, we were able to access the unpublished firm-level responses that are behind the publicly released country-level index. Surveys are relatively well-suited for evaluating the administrative corruption, as they measure the prevalence of corruption as experienced by users of government services. However, surveys are less effective in assessing the prevalence of corrupt transactions that occur entirely within the state, for example when politicians bribe bureaucrats. The Business Environment and Enterprise Performance Survey (BEEPS) and the World Economic Forum (WEF) “Executive Opinion Survey” are the most research-friendly surveys on corruption-related topics, as they are systematic and comparable across countries and years, have broad coverage and disclose most informations about their definitions and methodology. The BEEPS, funded by the EBRD, are focused on Eastern Europe and Central Asia and not available for China, however, while the WEF includes China as long back as at least 1995.³⁵ In the question of interest, survey respondents were asked how common it is for firms to make undocumented extra payments or bribes connected with imports and exports; public utilities; annual tax payments; awarding of public contracts and licensing; and obtaining favorable judicial decisions. In all of these cases, the assessment is improving with very similar downward trends in the period 2004-2013.³⁶

³⁵Note that the WEF has conducted the Executive Opinion Survey for over 30 years, but due to methodology changes they are unwilling to provide data going further back in time than 2004.

³⁶The results are not reported. The distinction between different circumstances in which a bribe payment might occur can be suggestive about the presence or not of illegitimate benefit, that is relevant for the application of

Another source that similarly elicits the information about what service the bribe was paid for is the World Bank’s Enterprise Surveys, collected since 2002 from 130,000 companies in 135 countries. Unfortunately only one year is available for China. As reported in Table 7 below, according to this source bribery incidence in 2012 is lower in China (11.6% of firms experiencing at least one bribe payment request) both compared to the East Asian and Pacific region (24.2%) and to the whole survey sample (17%). However, bribery associated with illegitimate benefit is more common while extortionary bribery is less common in both comparisons (columns (2) and (3) of Table 7).

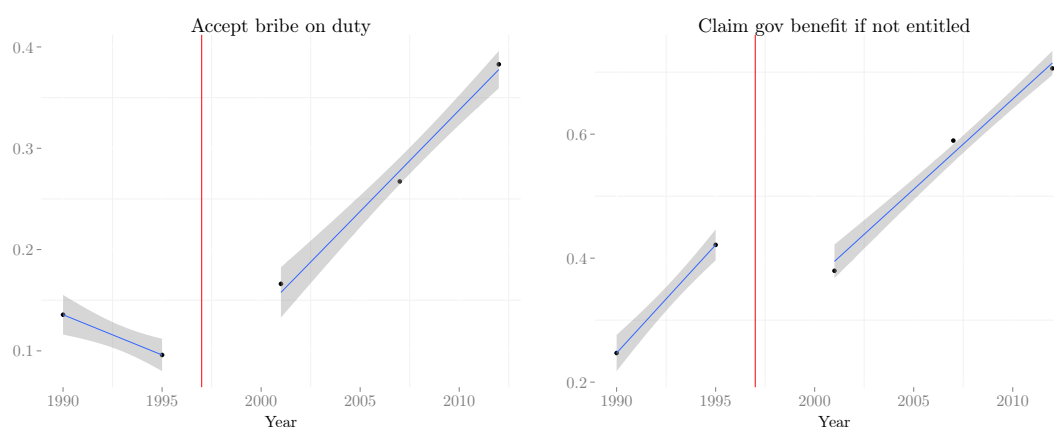
Table 7: Unjust-benefit bribes VS harassment bribes in 2012

	Bribery incidence (percent of firms experiencing at least one bribe payment request)	Percent of firms expected to give gifts to secure government contract	Percent of firms expected to give gifts to public officials “to get things done”
China	11.6	42.2	10.7
EAP	24.2	31.0	20.4
All	17.0	26.4	19.6

Source: World Bank Group Enterprise Surveys

Finally, the World Value Survey is another well-known source of data on opinions and attitudes around the globe. From the WVS 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 or at least supporting the use of bribery to obtain an illegitimate benefit.

Figure 20: Share of respondents who think behaviour is justifiable



impunity according to the law. However, since there is no difference in the trends, no relevant inference can be drawn. Moreover the time horizon of these data does not cover the implementation of the reform.

In the left panel of Figure 20, a decreasing trend in the acceptance of passive bribery seems to have been reverted by the legal change. Even though there are too few data points to actually establish a pre-reform decreasing trend, it is clear that the share of respondents supporting this view increased after the reform. This is somewhat reminiscent of the critique moved to asymmetric punishment as a depenalization of a wrong behaviour, which would over time undermine the moral sense (Dreze, 2011). The left panel shows instead that the acceptance for the behaviour of seeking a benefit one is not entitled to only grew over time since 1990. In this case, the legal change did not impact the secular trend.

C Reforms to punishment over time

Table 8: Punishment schedule for bribe-takers

Penalties 1979	Penalties 1988-1997	Thresholds 1988	Thresholds 1997	Penalties 2014	Thresholds 2014
p <= 5 or criminal detention plus confiscation of property; p >= 5 if serious losses	p <= 2 or criminal detention; administrative sanctions if not serious	b < 2,000	b < 5,000	p <= 3 or criminal detention plus fine; administrative sanctions if not serious	"Relatively large amount"
	1 <= p <= 7; 7 <= p <= 10 if serious	2,000 <= b <= 10,000	5,000 <= b <= 50,000	3 <= p <= 10 plus fine plus confiscation of property	"Huge amount"
	p >= 5 plus confiscation of property; life imprisonment if serious	10,000 <= b <= 50,000	50,000 <= b <= 100,000	p >= 10 or life imprisonment plus fine plus confiscation of property; life imprisonment or death, plus fine plus confiscation of property, if serious losses	"Especially huge amount"
	p >= 10 or life imprisonment, plus confiscation of property; death if serious	b >= 50,000	b >= 100,000		

Notes: p = imprisonment, in years; b = size of bribe, in yuan

Table 8 shows that the two levels of penalty for bribe-takers were increased to four in 1998, and made dependent on the size of bribe. The thresholds in the size of bribe that correspond to the different punishment levels were then increased in 1997, possibly reflecting inflation but in any case making punishment no less stringent. For example, a bureaucrat would risk up to 2 years prison for accepting up to 2,000 yuan in bribes before 1997, or 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 are necessary after. In the more recent reform, showed in the last two columns of the Table, the levels of punishment are simplified to three and the thresholds of accepted bribe are formulated in more generic terms rather than exact monetary terms, which increases discretion.

For bribe-givers, the levels of punishment go from one to three in 1988 (Table 9) and are slightly reduced (capped) in the 1997 reform. They are not proportional to the size of bribe but rather administered in relation to quite generic formulations on the "seriousness of circumstances",

Table 9: Punishment schedule for bribe-givers

Levels of punishment	Penalties 1979	Penalties 1988	Penalties 1997	Penalties 2014
Base	$p \leq 3$ or criminal detention	$p \leq 5$ or criminal detention	$p \leq 5$ or criminal detention	$p \leq 5$ or criminal detention plus fine
Serious circumstances or heavy losses to the public		$p \geq 5$	$5 \leq p \leq 10$	$5 \leq p \leq 10$ plus fine
Especially serious circumstances		Life imprisonment plus ev. confiscation of property	$p \geq 10$ or life plus ev. confiscation of property	$p \geq 10$ or life plus fine plus ev. confiscation of property

Notes: p = imprisonment, in years

which again increases discretion and uncertainty. The current reform did not change anything for the bribe-giver side.