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Corporate Leniency Programs for Antitrust: Past, Present, and Future

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Abstract
This special issue marks the 25th anniversary of the introduction of a leniency program for antitrust in the EU and contains five original papers: Each paper examines the effects of design parameters of leniency programs on their performance. Before introducing each contribution separately, we put them in perspective by introducing readers to the existing theoretical, empirical, and experimental literature on corporate leniency programs for antitrust.

Keywords Leniency programs · antitrust · competition policy · cartel

JEL Codes L41, L44

> I think you'd need a very hopeful view of human nature, to believe that we're close to wiping out cartels. And as long as they exist, we need to make sure our leniency programme is working well.
>
> Margrethe Vestager, EU Commissioner for Competition, 22th October 2021.

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1 Introduction

In 1996 a leniency program was introduced in EU competition law. According to this program, firms that are part of a cartel can qualify for a penalty reduction if they report the cartel to the EU authorities and subsequently cooperate with the ensuing prosecution of the cartel. In 2002, the program was adjusted in that it clarified the conditions under which firms would qualify for full amnesty and no longer excluded companies from full amnesty that instigated or played a determining role in a cartel. The program was further augmented in 2006 to allow reporting firms to improve their case after an initial declaration.

In adopting a leniency program, the EU followed the antitrust practise in the US, where such a program had existed since 1978. That program -- which was significantly augmented in 1993 -- proved to be very successful according to many observers. As Scott Hammond, a former Director of the Criminal Enforcement Antitrust Division of the United States Department of Justice observed (Hammond, 2000): "Over the last five years, the United States' Corporate Leniency Program ("Amnesty Program") has been responsible for detecting and cracking more international cartels than all of our search warrants, secret audio or videotapes, and FBI interrogations combined. It is, unquestionably, the single greatest investigative tool available to anti-cartel enforcers." A substantial body of research on the workings of leniency programs has put Hammond's claim in perspective.

This special issue marks the 25th anniversary of the introduction of a leniency program in the EU. It contains five original papers that examine the effects of design parameters of leniency programs on their performance. To put the contributions of the papers in perspective, we introduce the reader to the existing literature on leniency programs in Sects. 2–4.[1] Section 2 reviews the theoretical literature, Sect. 3 focuses on field studies, and Sect. 4 discusses laboratory experiments. Section 5 introduces the reader to the contributions in this special issue.

2 Theory

An optimal leniency program is designed such that it destabilizes existing cartels -- and hence discourages the formation of new cartels -- and improves the quality of information that is available to antitrust authorities, which enables them to prosecute colluding firms more successfully.

The theoretical literature with regard to the optimal design of a leniency program typically models market interaction between firms as infinitely repeated games. This literature links the features of a leniency program -- such as the penalty reduction that is offered to cartel members that report the cartel, and the number of cartel members that are eligible for leniency -- to cartel characteristics and features: firms' and cartel members' strategic incentives (e.g., to form a cartel, to communicate, and to (pre-emptively) self-report the cartel); and performance measures (including cartel

[1] We provide only a broad overview of the literature. For a more articulate recent survey, see Marvão and Spagnolo (2018).

formation, cartel stability and duration, and a cartel's effectiveness in setting supra-competitive prices).

The key question is how the various features of a leniency program affect the incentive-compatibility constraint for collusion under the assumption that the firms play the grim trigger strategy. Several effects have been identified:

- Leniency programs can have a powerful deterrence effect: Firms apply for leniency in anticipation of getting caught (Motta & Polo, 2003) or concerns that another cartel member reports the cartel (Harrington, 2013).
- Leniency should also apply to firms that reveal information -- even after an investigation has started (Motta & Polo, 2003).
- The "deviator amnesty effect": The optimal leniency program makes cheating on the cartel as tempting as possible and hence restricts leniency to the first firm to come forward and grants this firm full immunity (Harrington, 2008; Chen & Rey, 2013); the first-best solution may even be to give the first applicant a reward that is equal to the fines levied on the other cartelists (Spagnolo, 2004).
- In the short-run, the introduction of a leniency program increases the duration of detected cartels (Harrington & Chang, 2009).
- In a setting where leniency cases induce the competition authority to shift resources away from cases without a leniency application, a leniency program may backfire in the case of low fines (Harrington & Chang, 2015).
- Leniency programs may prove ineffective or even counterproductive when firms can choose their level of collusion and leniency can be applied for after an investigation has been started (Emons, 2020).
- Private damage claims improve the effectiveness of leniency programs if the civil liability of the whistleblower is minimized and the competition authority shares all of the evidence that has been collected against the cartel with the claimants (Buccirossi et al., 2020).
- In the presence of uncertainty about the future, leniency programs may be extremely powerful in unravelling cartels because cartel members have an incentive to pre-empt other cartel members to self-report (Gärtner, 2022).

3 Field Studies

The impact of the introduction of the EU Leniency notice in 1996 and the subsequent reforms in 2002 and 2006 has been investigated in a number of empirical studies. A usual approach is to construct a data set of cartel cases and to examine whether differences exist in the number and nature of cases before and after a policy change.

In this vein, Brenner (2009) considers 61 cartels that were fined by the European Commission in the time period 1990–2003 and finds that after the introduction of the leniency notice in 1996, fines increased and the length of investigations on average decreased by 1.5 years. While this suggests that the introduction of leniency improved the quality of the evidence and reduced the cost of prosecution, Brenner importantly finds no evidence of an increase in the number of detected cartels fol-

lowing the introduction of the leniency program, nor an increase in the duration of detected cartel. In all, this suggests that the deterrent effect of the initial leniency program was limited.

Considering all of the cartel cases that were decided by the European Commission between 2000 and 2011, Hoang et al. (2014) find evidence that the reform in 2002 has been effective in increasing the number of self-reports.

With the use of data on all cartel cases from 1996 to 2014, Marvão (2016) evaluates the determinants of the leniency-related penalty reductions that applicants receive under the different programs. Reassuringly, firms that are first to report in practice indeed receive generous fine reductions. This implies that the programs work as intended: They provide each individual cartel member a strong incentive to run to the courthouse to denounce the cartel. Less reassuringly, her results also show that repeat offenders receive larger fine reductions, which indicates that firms may learn how to use the leniency program to their own advantage.

Heim et al. (2022) present evidence that in countries that adopted an effective leniency program, the number of domestic minority shareholding (MS) acquisitions increased, which suggests that firms may use MS acquisitions to stabilize collusive agreements.

These field studies assess how the different EU leniency policies have changed cartel deterrence, the prosecution and fining of existing cartels, and the considerations that actual cartel members face as to whether or not to reveal the cartel. The evidence that is collected by this type of policy evaluation is important in its own right and also has a role in testing the validity and completeness of the theoretical models that researchers use to design leniency programs.

However, as tests of the optimality of leniency designs, field studies have a number of limitations and need to be complemented with other empirical tools: First, there are many possible designs of leniency; but the effects of only the (very limited) subset of designs that are implemented in practise can be analysed with field studies.

Second, from the perspective of sample size and statistical power, the number of annual cartel cases in a jurisdiction is small. Empirical studies often use the same or a similar set of cases, which significantly limits the possibilities of replicating previous results with new data.

Third, the cartel cases that have been investigated by the European Commission -- whether or not the result of a leniency application -- form a highly selective set. Undetected cartels are by definition not part of any data set. As the quote at the start of this article attests, the Commission is highly aware that the recent drop in leniency applications by no means implies that cartels have been all but wiped out.

Fourth, key variables in data sets on cartel cases are usually based on information that has been published by the European Commission in official decisions and press releases. There is, however, no fixed template that the Commission uses in determining which information it discloses. This implies that empirically identified changes in outcomes may reflect non-uniform reporting instead of genuine policy effects.[2]

[2] A recent example of how changes in the economic and legal landscape can influence the reporting of information is the following: The number of leniency applications in Europe has declined considerably in recent years (OECD, 2022, p. 46). One suggested reason for this is that the 2014 Damages Direc-

Finally, leniency programs and their adjustments have been introduced simultaneously in all EU member states. Field studies hence often lack a clear control group of unaffected but otherwise similar countries. Identification consequently needs to rely on comparisons before-and-after the policy change, rather than using a difference-in-differences approach that is more robust to other, unobserved, systematic changes that happen in the treatment and control group at the same time.[3]

4 Laboratory Experiments

Laboratory experiments have proved to be a very useful complement to field studies as an empirical tool to test and evaluate designs of leniency programs. Competition policy questions -- including the effectiveness of leniency programs -- have attracted substantial attention from experimental economists; see Hinloopen and Normann (2009) for an overview of the literature.

In laboratory experiments, participants -- typically undergraduate students -- play the role of firms in markets. They are paid on the basis of how much profits the firm that they represent realizes in the market. Before the participants interact, the researchers distribute them randomly over experimental conditions. For instance, the researchers vary whether or not the firms are subject to a leniency program. This allows the researchers to compare -- under the various conditions -- outcomes such as: cartel formation; cartel stability; cartel discovery; and market prices. As a result of random assignment and having defined a control group, researchers can identify a clean causal treatment effect:, for example, the effect of the presence of a leniency program on outcomes that are of interest to policy makers.

When evaluating competition policies, laboratory experiments can overcome several of the challenges for field studies that were discussed in the previous section: First, researchers can observe outcomes of interest -- cartel formation, market efficiency, etc. -- without noise in the laboratory, while such data may be only incompletely or selectively available in the field. Second, in contrast to the field, the lab allows researchers to develop proper counterfactuals that allow the researchers to distil the effectiveness of policy instruments. Third, laboratory experiments enable researchers to study policy instruments that are theoretically promising but that have not been implemented yet in practice.

tive (Directive 2014/104/EU) makes it easier for cartel victims to claim compensation, which in turn increases the risks for cartelists to apply for immunity by submitting incriminating evidence. The European Commission has recognized this, stating in the new 2022 guidance on its leniency program (https://competition-policy.ec.europa.eu/system/files/2022-10/leniency_FAQs_2.pdf) that the Damages Directive "…prohibits the disclosure of leniency statements submitted to the European Commission or a national competition authority in damages proceedings before national courts of the EU." Buccirossi et al. (2020) model the interplay between leniency programs and private actions for damages. They argue that the optimal effectiveness of leniency programs does not necessarily require restricting access to leniency statements in subsequent damage actions.

[3] Jochem et al. (2020) present a DID approach to analyze the impact of the 2002 reform on cartel duration and fine levels. They assign cartels to the treatment or control group based on whether they self-reported (treatment group) or were detected by the Commission (control group). This is an assignment process that is most likely to be non-random and hence to violate the other-things-equal condition.

Often, policy makers wonder about the extent to which the results that have been obtained in laboratory experiments are generalizable to practice. Experiments with professionals frequently -- but not always -- obtain similar results as experiments with students (Fréchette, 2015). The same holds true for replications in the field (Camerer, 2015). Of course, like every method, laboratory experiments have their limitations (Falk & Heckman, 2009). The current consensus in the literature is that if a policy instrument does not produce a desired effect in the laboratory -- particularly if economic theory predicts that it should -- there may be a good reason to have reservations with respect to implementing it in practice (Schram, 2005; List, 2020).

Most laboratory experiments that have been conducted in the domain of leniency programs centre on the question of their effectiveness: The most prominent finding in the literature so far is that, generally, leniency programs complement traditional competition policy in that it has the desired effects on cartel formation, cartel discovery, and the price (see Table 1). The experiments also point to a potential downside of leniency programs: They may make surviving cartels more resilient. Other notable findings include:

- Leniency programs are effective when whistleblowers obtain rewards that are financed by fines that are paid by colluding competitors (Bigoni et al., 2012).
- Leniency programs are ineffective in standard auctions (Hinloopen & Onderstal, 2014).
- Leniency programs can be effective even if the baseline detection rate is zero (Bigoni et al., 2015).
- Leniency programs are more effective in the case of a low baseline detection rate combined with a high fine than in the case of a high baseline detection rates and a low fine (Chowdhury & Wandschneider, 2018).
- A leniency policy that excludes ringleaders from amnesty induces firms to become ringleaders (Clemens & Rau, 2019).
- Leniency programs are less effective in the case of free-form communication than in the case of restricted communication (Dijkstra et al., 2021; Andres et al. 2021).
- A private-damages-claims regime reduces cartel formation but stabilizes cartels; the latter effect does not occur if the whistleblower is protected from paying private damages (Bodnar et al., 2023).

5 Contributions to this Special Issue

The papers in this special issue examine the effects of specific design parameters of leniency programs on their performance. They contribute to the rich literature that has emerged since the advent of the EU leniency program in 1996, which were reviewed in the previous sections. Despite its age the EU leniency program still serves as a rich source of inspiration as all of the papers are motivated by distinguishing features of EU competition policy, including: the number of firms that are eligible for leniency; the absence of criminal penalties for managers who are engaged in a cartel; a leni-

Table 1 Effects of leniency programs on price, cartel formation, cartel stability, and cartel discovery, from laboratory experiments

	Market type	# firms	p	Fine reduction			Cartel formation	Cartel stability	Cartel discovery	Price
Article				First	Second	Third				
ADS	Homogeneous Bertrand	3	0%	100%/N	100%/N	100%/N	–°		+*	–**
HS	Homogeneous Bertrand	3	15%	100%	50%	0%	–**	–°		–**
BFLS12	Differentiated Bertrand	2	10%	100%/N	100%/N		–**	–°	+**	–**
BFLS15	Differentiated Bertrand	2	2%	100%/N	100%/N		–**		+**	–**
BFLS15	Differentiated Bertrand	2	0%	100%/N	100%/N		–**		+**	–**
DHS	Homogeneous Bertrand	2	15%	100%	0%		–°			–**
CR	Homogeneous Cournot	4	15%	100%	0%	0%	–*			
CW	Homogeneous Bertrand	3	10%	100%/N	100%/N	100%/N	–**	+**		–°
CW	Homogeneous Bertrand	3	20%	100%/N	100%/N	100%/N	–°	+**		+°
FH	Differentiated Bertrand	2	8%	100%	100%					–*
FH	Differentiated Bertrand	2	8%	50%	50%					–**
ABF	Differentiated Bertrand	3	10%	100%	0%	0%	+°		+°	–°
HO	First-price auction	3	15%	100%	50%	0%	–°	+°		+°
HO	English auction	3	15%	100%	50%	0%	–°	+**		–°

Notes: p is the probability that the antitrust authority discovers a cartel that is not reported. ADS stands for Apesteguia et al. (2007); HS for Hinloopen and Soetevent (2008); BFLS12/15 for Bigoni et al. (2012/2015); DHS for Dijkstra et al. (2021); CR for Clemens and Rau (2019); CW for Chowdhury and Wandschneider (2018); FH for Feltovich and Hamaguchi (2018); ABF for Andres et al. (2021); and HO for Hinloopen and Onderstal (2014); N is the number of cartel members that report the cartel; –/+ is a negative/positive effect of the leniency program relative to traditional competition policy; in the case of empty cells, the comparison is not available (the variable is not part of the experiment or it is not reported). **/* Significant at 5%/10% level; ° Not significant at the 10% level or significance level not reported.

ency program that features 'amnesty plus'; and the possibility to settle cases outside of the court.

In the first paper of this special issue, Juan Luis Jiménez, Manuel Ojeda-Cabral, and José Manuel Ordóñez-de-Haro exploit the feature of the EU leniency program that offers penalty reductions to firms that come forward after the first whistle-blower -- as opposed to, for instance, the leniency practise in the US, where only the first reporting firm can qualify for immunity from prosecution. They empirically examine the characteristics of cartel members that are likely to apply for leniency. Their sample covers the period 1996–2020 – the first 25 years of the EU leniency program – in which 132 cartels were penalized by the European Commission. Jiménez, Ojeda-Cabral, and Ordóñez-de-Haro take firm groups instead of firms as the relevant decision-making unit, with firm groups defined as sets of companies that are controlled by the same firm. The authors find that cartels are more likely to self-report when the expected fines are higher and also the diversity of firm groups within the cartel is greater. At the same time, for ring leaders of a cartel the expected fine works in the opposite direction: The higher is the expected fine, the less likely it is that these firms self-report. Jiménez, Ojeda-Cabral, and Ordóñez-de-Haro also find that under the version of the EU leniency program that was introduced in 2002, repeat offenders were more likely to apply for leniency than during the 1996 and 2006 versions.

Catarina Marvão and Giancarlo Spagnolo warn about what they coin 'leniency inflation': a leniency program's losing its effect because too many firms in the same cartel qualify for penalty reductions. A leniency program that is too generous reduces the incentive for cartel members 'to rush to report'. Marvão and Spagnolo provide supporting data that show a gradual decrease in the number of convicted cartels in the EU over the past several years. They then ask a logical follow-up question: Should the EU introduce criminal penalties for cartel infringements? This question has been the subject of a recent debate in the EU. To answer it, Marvão and Spagnolo empirically examine the recent experience in the US with criminal penalties. An important observation is that individuals are less likely to be sentenced to prison if they are involved in more than one cartel. This is especially relevant for the EU, as records show that in the EU there are relatively many multiple offenders.

Jeong Yeol Kim and Charles Noussair study the effect of the number of firms that are eligible for leniency with the use of a laboratory experiment. As was discussed above, laboratory experiments are particularly well suited to examine the influence of specific details of a regulatory design as they offer researchers the opportunity to vary aspects of a regulatory design independently among treatments. In their experiment, Kim and Noussair vary the size of the fine as well as the number of firms that are eligible for leniency, so as to study how a leniency program's success depends on such design features. In contrast to what is commonly observed in the laboratory, they do not find that leniency programs reduce the extent of cartel formation -- even though the programs expose more cartels. In line with the findings of Jiménez et al., Kim and Noussair observe that higher fines are more likely to induce cartel members to self-report. Also, granting immunity to more than one firm does not improve the leniency program's effectiveness in terms of cartel formation.

Karine Brisset, François Cochard, and Eve-Angeline Lambert examine 'amnesty plus': the option for a cartel member that is investigated to report about possible

involvement in another cartel. The EU leniency program does not encompass amnesty plus: In the EU a reporting firm can apply for leniency only for the cartel that it reports. Brisset, Cochard, and Lambert conduct an experiment to examine the effects of an amnesty-plus program. In their experiment, participants interact in pairs in two distinct, independent markets. In each market they can form a cartel; and in each market they can separately apply for leniency. In the amnesty-plus treatment, participants can apply for leniency in both markets. The authors find that in the case of a high fine, amnesty plus works: in the sense that it leads to more frequent reports before and after a first cartel conviction. However, in sync with Jiménez et al. and Kim and Noussair, they also point to the detrimental effects of a low fine in combination with a leniency program: In this case an amnesty-plus program leads to more cartel activity.

Peter Dijkstra and Jacob Seifert study the possibility for cartel members to settle a case outside of the court after the European Commission has started an investigation while cartels members have not (yet) applied for leniency. This settlement possibility was introduced in 2008 in EU competition policy. Relatively little is known about what this added settlement procedure implies for the performance of leniency programs. Dijkstra and Seifert extend the theoretical framework of Motta and Polo (2003) to examine the interaction between settlement procedures and leniency programs. In their model, an antitrust authority may start a cartel investigation that yields either a strong or a weak preliminary cartel case with concomitant conviction probabilities. Cartel members can apply for leniency, can settle their case, or can choose not to cooperate with the antitrust authorities. Dijkstra and Seifert show that a settlement procedure can be both a substitute for and a complement to a leniency program: Members that do not apply for leniency might choose to settle their case in return for a (reduced) penalty reduction; or cartel members that would otherwise have applied for leniency might now want to settle their case if the preliminary cartel case is strong. The optimal policy mix when the antitrust authority has a limited budget is to grant maximal fine reductions for firms that apply for leniency, and generally to grant minimal fine reductions in the event of a settlement to all firms that did not apply for leniency -- unless the colluding firms don't apply for leniency, in which event the settling firms should be offered maximal fine reductions.

The papers in this special issue illustrate that the optimal design of a leniency program is not straightforward: Its performance depends on complex interactions between: the program's parameters (such as: the size of the fine; the number of firms that are eligible for leniency; the availability of 'amnesty plus'); other competition policy instruments (settlement procedures; criminal penalties); and the characteristics of cartels (the diversity of firm groups). Moreover, these papers show that our understanding of leniency programs has increased considerably since the EU introduced its leniency program in 1996. At the same time, this special issue also shows that there is ample room for future research, and several papers make specific suggestions in that direction.

We hope that the papers in this special issue serve as an inspiration for that future work.

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