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Leniency Inflation, Cartel Damages, and Criminalization

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Abstract

We revisit the pros and cons of introducing cartel criminalization in the EU. We document the recent EU “leniency inflation”, whereby leniency has been increasingly awarded to many (or all) cartel members, which softens the “courthouse race” effect. Coupled with the insufficient protection of leniency applicants from damages (2014 Damages Directive), it may have led to a decrease in leniency applications and cartel convictions. Given the current level of fines, criminalization may have to be introduced. We then explore US criminal sanctions (1990–2015) to highlight potential areas of concern for EU policymakers, of which recidivism appears to be a significant one.

Keywords Antitrust · Cartels · Deterrence · Leniency · Damages

1 Introduction

There has been significant scope for disagreement with regard to the necessity and adequacy of criminal sanctions for individuals who engage in cartel activity in the EU. This issue was actively debated in the past decades—e.g., Simon and Werden (1987), Wils (2006) and Spagnolo and Buccirossi (2006)—and several proposals were put forward. Buccirossi and Spagnolo (2008) suggested that EU fines were too

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low to be a deterrent and that they should be increased before considering criminal penalties.¹

Alongside the suggestions to increase fines or introduce criminal penalties in order to tackle the EU's problem of under-enforcement (Stephan, 2017), other authors suggested an increase in private antitrust enforcement through damage claims (e.g., Bolotova & Connor, 2008; European Commission, 2005).

In the light of an unclear balance between the pros and cons of criminalization in the EU and the relatively unsuccessful implementation of criminal sanctions in the UK, the enthusiasm for criminalization at the EU level considerably diminished. However, a simple comparison with fines and damages in the US suggests that the need for tougher sanctions remained present (Whelan, 2014).

In the US, criminalization is considered a crucial dimension of anti-cartel enforcement, despite its costs (Miller, 2009; Ginsburg & Cheng, 2019). Prison sentences directly target the responsible individuals and cannot be easily reimbursed by corporate employers. The US Department of Justice (DOJ) has significantly increased the number and severity of criminal sanctions (Connor, 2011; Connor & Miller, 2013; Baer, 2014): Individuals who participate in cartels are heavily targeted with prison time of up to nine years,² extradition of non-nationals based solely on antitrust charges has occurred since 2014; and a strong focus on the prosecution of foreign executives has been present since 1999 (Spratling, 1999).

In this article, we revisit whether criminal penalties for cartel infringements should be introduced in the EU—in the light of the changes that occurred in EC fines, leniency inflation, and private damages. Given that criminalization can be subject to enforcement biases (Cremieux & Snyder, 2016; Jaspers, 2017), we then explore data on US criminal enforcement (1990–2015) to highlight potential areas of concern for policymakers, if criminal sanctions are implemented in the EU.

Our contribution to the current literature is threefold: First, we document a recent EU phenomenon that we name “leniency inflation”: the current increasing trend in the number and amount of leniency reductions that are granted in each cartel case. The possibility to obtain substantial leniency—even when the leniency applicant is the second, third, or last firm to cooperate with an investigation—is of course likely to reduce the “rush to report first” that US prosecutors argue is so important.

Second, we document a recent decline in the number of cartels that have been detected in the EU, which the legal debate on the coexistence of private and public enforcement predicted because of the chilling effects of private damage actions on the incentives to apply for leniency. The 2014 Damages Directive was enacted to solve this issue; but it did not do as well as it could have, as it makes private damage actions more difficult by preventing claimants from accessing leniency documents,

¹ This is in part due to the difficulties that criminalization may bring about in a culture such as that of Europe, where cartels were legal and encouraged by governments until a few decades ago. For example, some cartels were legal in Austria until 2006 and in the Czech Republic, Norway, Poland, Sweden, and The Netherlands until 1993.

² For example, Frank Peake, the former president of Sea Star Line LLC, a shipping firm, was sentenced to serve five years in prison in 2013.

while also insufficiently protecting leniency applicants from damage claims (Buccirossi et al., 2020).

Collectively, this evidence is consistent with the antitrust debate's perception of a reduction in cartel enforcement ability of the EC. This suggests that: (i) fines should be increased further, as was argued in the previous debate on criminalization, while the data do not suggest that this has happened in the last 10 years; (ii) the Damages Directive should be amended to make leniency applications more attractive and facilitate private damage claims, as suggested in Buccirossi et al. (2020); or (iii) criminal sanctions should be introduced in the EU.

Third, we explore data on all criminal cartel penalties that were imposed in the US between 1990 and 2015; we use controls at the manager, firm, cartel, and macro-economic levels, in order to highlight any potential enforcement biases. In particular, we show that individuals in cartels where multiple offending firms are involved are less likely to obtain a prison sentence. The remaining results shed some light on the administration of US prison sentences for cartel members, but the discussed biases are unlikely to be serious issues in the EU, where there is no centralized government.

Finally, since the legal antitrust scenery changed dramatically in the past decade and additional EU jurisdictions introduced criminal penalties, we identify and discuss the very few criminal penalties that were imposed: in the UK, Ireland and Denmark.

1.1 Related Literature

Our work contributes to two different strands of literature: We contribute to the literature on the adequacy of criminal penalties for cartels. The recent trend towards cartel criminalization seems to be a reaction to (a perceived) inadequate antitrust law enforcement, and it has led to the re-opening of the debate. Several authors have examined the impediments to the enforcement of criminal penalties such as limited criminal liability, the unwillingness of judges to impose (harsh) criminal penalties, and the lack of whistleblower protection (Shaffer et al., 2011; Calvani & Kaethe, 2013; Whelan, 2014; Jones & Williams, 2014; Stephan, 2017) and its potential to deter collusion (MacCulloch & Wardhaugh, 2012; Stephan, 2014).

A recent empirical study by Ghosal and Sokol (2020) examines, at the cartel-level, the total days of jail per cartel and the number of individuals jailed per cartel, in the US between 1969 and 2016. The authors find that the number of jail days per cartel increased with the introduction of the leniency programs in 1978 and 1993, and it is higher following busy DOJ periods, in terms of the number of cases dealt with. Conversely, the number of individuals jailed per cartel seems to be larger only after the Antitrust Criminal Penalty Enhancement and Reform Act (ACPERA) in 2004.

The scarcity of empirical evidence on criminalization does not allow us to make reassuring claims about its adequacy. We contribute to filling this gap in the

literature by empirically examining the likelihood and length of US prison sentences; we use individual and firm-level data.

We also contribute to the extensive literature on the economics of leniency programs (*LPs*), starting with the contributions by Motta and Polo (2003), Spagnolo (2004), Aubert et al. (2006a), Harrington (2013), Chen and Rey (2013), Dong et al. (2019), and many others.³

Within this literature, recidivism has been a recent focus (e.g. Wils (2012)). Research shows that multiple and/or repeat offenders can learn how to “play the leniency game”, in terms of when and how to report the cartel to the authorities (e.g., (Connor, 2010; Marvão, 2015; Kovacic et al., 2018)).⁴ In the EU, Marvão (2022) identifies 19% of EC convicted firms as multiple offenders—any two offenses—and 2% as true recidivists: firms that enter a new cartel after a previous conviction. In the US, while Connor (2010) identifies 18% of firms as multiple offenders, Werden et al. (2011) argue that true recidivism has been eliminated since 1999.

The remainder of the paper is structured as follows: Sect. 2 documents recent trends on fines and leniency. Section 3 discusses the criminal penalties that were imposed by EU countries. Section 4 empirically examines the criminal penalties that have been imposed in the US. Section 5 concludes.

2 EC Fines, Leniency Inflation and Damages

The previous debate on the introduction of criminal penalties for cartel violations in the EU concluded with three main suggestions: an increase in the level of cartel fines (similar to that of US fines); the strengthening of private antitrust enforcement; or the introduction of criminalization.

In light of these suggestions, we explore the potential causes for the recent decline in the number of yearly EC cartel convictions and convicted cartel members, between 1998 and 2020, as depicted in Fig. 1. In particular, we examine EC cartel fines, leniency reductions, and the possibility that this decline is due to increased deterrence.

We use updated EU data from Marvão (2015a) for the period between the first leniency reduction that was granted (in 1998) and December 2020. The data include 149 cartels (across 117 cartel cases⁵) and 556 unique cartel members. The total

³ A review of the empirical and experimental evidence of the effectiveness of LPs is offered in Marvão and Spagnolo (2015).

⁴ Although the EU LP is not explicit as to whether multiple or repeat offenders should receive a smaller LP reduction, Chen and Rey (2013) suggest that repeat offenders should receive smaller LP reductions, so as to increase cartel deterrence, while Houba et al. (2009) and the Greek Competition Authority suggest the opposite.

⁵ Some cartels are fined within the same case if they involve similar members and/or similar products. For example, the 12 vitamin cartels were all fined under case 37512. They all involved firm F.Hoffman-La Roche but a different set of members in most other cartels and occurred in different periods and for different vitamins.

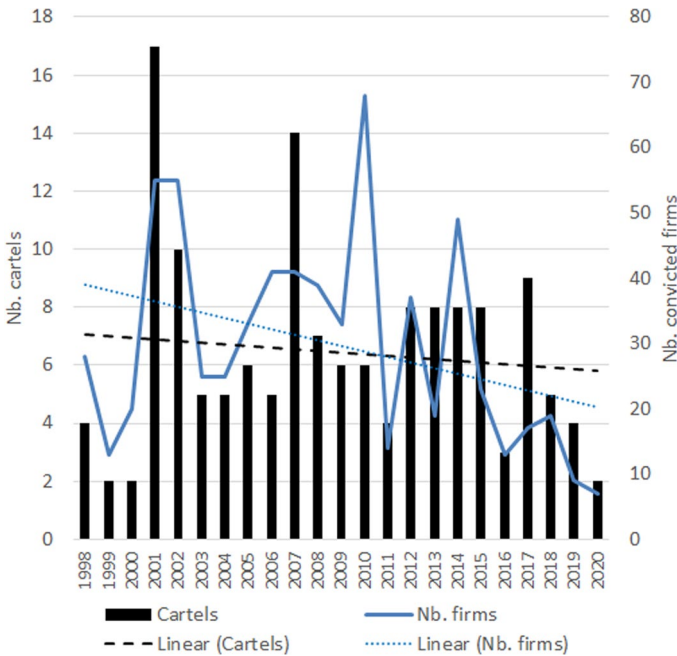


Fig. 1 Number of yearly EC cartels (primary axis) and total (unique) convicted firms per year (secondary axis), and linear trend lines, 1998–2020. Sample includes 149 cartels and 683 fines (total of the number of unique firms fined per year). Slope(cartels) = -0.06 , slope(nb. firms) = -0.90 (the slope coefficients are statistically different from zero and from each other)

sample is composed of 814 observations (due to repeated/ multiple offenses by some firms).

2.1 The Size of EC Fines

The average individual cartel fines that have been imposed by the European Commission—both the amounts that were initially set and the actual amounts paid—have increased dramatically in recent years, particularly after the introduction of the current EU LP of 2006. These trends can be seen clearly in Fig. 2.

Given that this relationship may be due to convicted cartel members having become larger firms over time, Fig. 3 presents the individual cartel fine imposed as a share of each firm’s global turnover (sales revenue). This figure is based on a sub-sample of 33% of the convicted cartels, for which the relevant turnover level was made available in the EC reports. We split the data into two 10-year periods to highlight any changes over time, although the two distributions are not statistically different from each other.

The EU cartel fine guidelines cap fines at 10% of the total turnover in the business year previous to the setting of the fine. However, the vast majority of the fines are set below 1% of the firm’s turnover; and, in the last 10 years, a mere 9% of the

finer are set close to the cap. Wils (2001) and Werden (2009) argue that a deterrent fine should be set around 150% and 200%, respectively, of the annual turnover of the firm *in the relevant market*.⁶ These numbers are however difficult to compare since for large conglomerates the relevant market may represent a small share of its global turnover.

Connor (2015) puts the EC fines in context; he measures the ratio between cartel fines and affected sales, for a subsample of international cartels that were fined in different jurisdictions: EC; national EU authorities; Canada; US; and other nations. Between 1990 and 2015, the most lenient regulator appears to have been the European Commission, whereas national EU antitrust authorities imposed the most severe fines.

There appears to exist a gap between EC and US sanctions, considering that US fines are often accompanied by private-party treble damage lawsuits and severe criminal sanctions for executives. This may suggest that without prison sentences and with rare, single and increasingly difficult damage claims (due to the 2014 Damages Directive that prevents the disclosure of LP documents in private damage actions), EC fines may have to be much larger than those in the US, if the aim is to have a comparable deterrent effect.

2.2 “Leniency Inflation”

The fact that many competition authorities worldwide have adopted LPs that were inspired by the US program is suggestive of the central role that is currently played by these policies in cartel enforcement. By using LPs to elicit crucial information directly from wrongdoers, authorities can gather more and/ or better evidence on cartel infringements, more rapidly. It is therefore natural that competition authorities have fondly embraced LPs.⁷

However, data on EC cartel convictions suggest an increasingly lenient attitude by the EU towards cartel members that apply for leniency only after several others have already done so: 58% of the cartel fines that were set between 1998 and 2020, include an LP reduction, and this number is over 90% in some years. Given an average of five firms per cartel, this translates into around three members per cartel that obtain leniency—even though many cartels in the sample had already been investigated and prosecuted by other antitrust authorities.

⁶ The numbers differ because Werden’s (2009) calculations use a longer estimate of cartel duration. Recently, in November 2019, *Bumble Bee Foods* (a large North American brand of packaged seafood) filed for bankruptcy following a cartel fine of US\$25 million (reduced from an initial fine of US\$81.5 million. This is the only case we are aware of where a firm has declared bankruptcy following a cartel fine.

⁷ In essence, LPs embody the insights of the prisoner’s dilemma, originally framed in 1950. The real puzzle is why it took so long for competition authorities to put LPs in place.

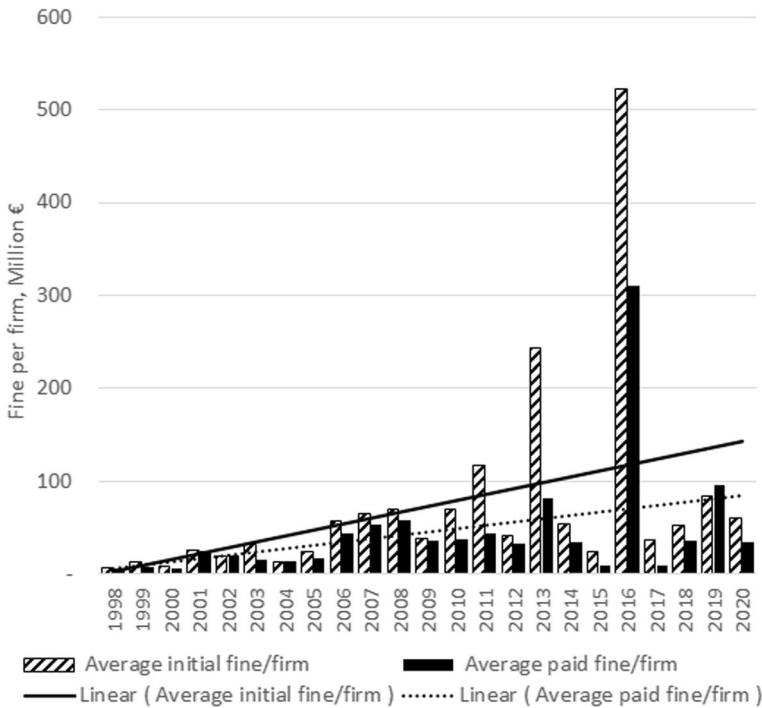


Fig. 2 Average yearly EC fines set (before adjustments for mitigating and aggravating circumstances and leniency) and paid, per firm, and trend lines (million euro) (note that the slope coefficients are statistically different from zero and from each other). 1998–2020. Sample includes 149 cartels with 814 fines (includes multiple fines per firm per year)

The share of cartel members that obtain leniency has increased over time in terms of the number of recipients. Both the number of firms that receive full immunity and a leniency reduction are increasing (Figs. 4, 5). For example, in many of the recent EC automotive parts’ cartels, *all* cartel members obtained leniency.⁸

Furthermore, the size of the average leniency reduction granted to each cartel member is also increasing. Figure 6 shows clearly this “leniency inflation”: The average leniency reduction granted went from around 23% in 1998 to nearly 60% in 2020.⁹

One explanation could be that the EC is using leniency as a substitute for plea bargaining, which is absent in the EU. In the US, plea bargaining negotiations are secret but appear to be present in over 90% of the cartel fines (Hammond, 2006) and

⁸ For example: Occupant safety systems II (2019): 30–100% penalty reductions for all six cartel members; Maritime car carriers (2018; also fined in the US in 2017): 20–100% for all five members; Braking systems (2018): 20–100% for all three members; Lighting systems (2017; also fined in the US in 2012): 20–100% for all three members.

⁹ Note that in Figs. 4, 5, 6, the three slope coefficients are statistically different from zero and from each other.

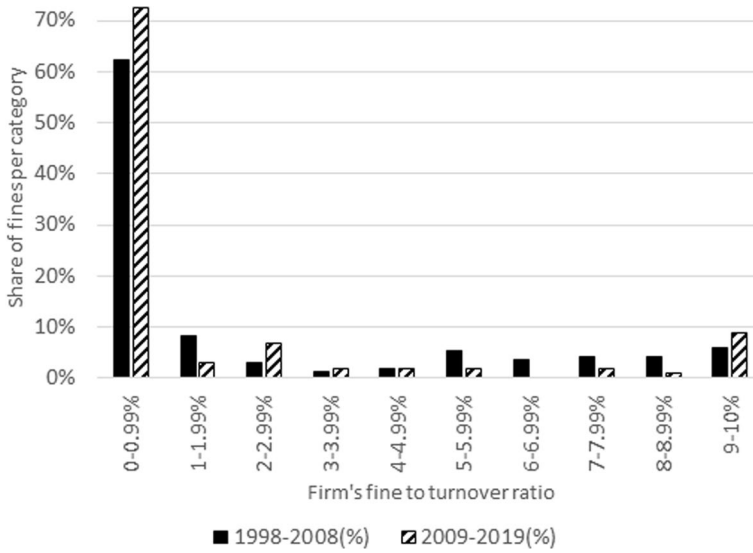


Fig. 3 Final fine per firm, as the share of the firm’s global turnover, 1998–2020 (sub-sample of 33% of the convicted cartels, based on the available turnover information from the EC reports). The distributions are not statistically different from each other

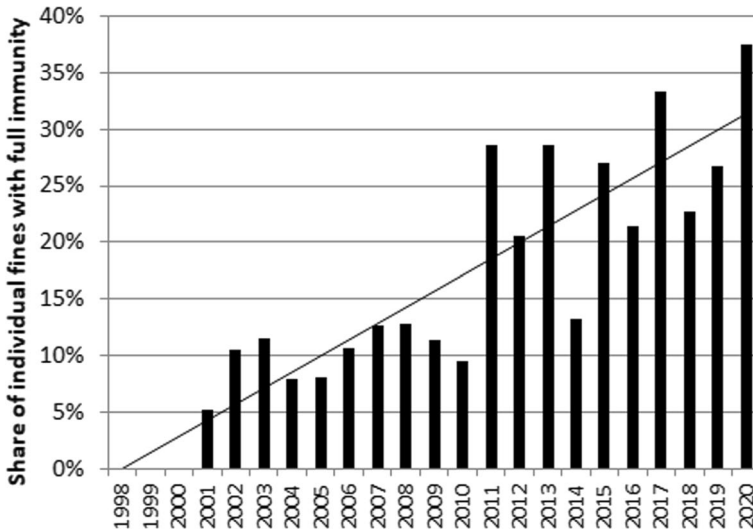


Fig. 4 Share of yearly individual EC fines (per cartel member), in which immunity (100% fine reduction) was granted, and trend line (significant at 1%). EC fines, 1998–2020. Sample includes 149 cartels with 814 fines (includes multiple fines per firm per year)

lead to, on average, 30 to 35% fine reductions (Bloch et al., 2009; Connor, 2008). In the same period, the average EC LP reduction (excluding the immunity recipient)

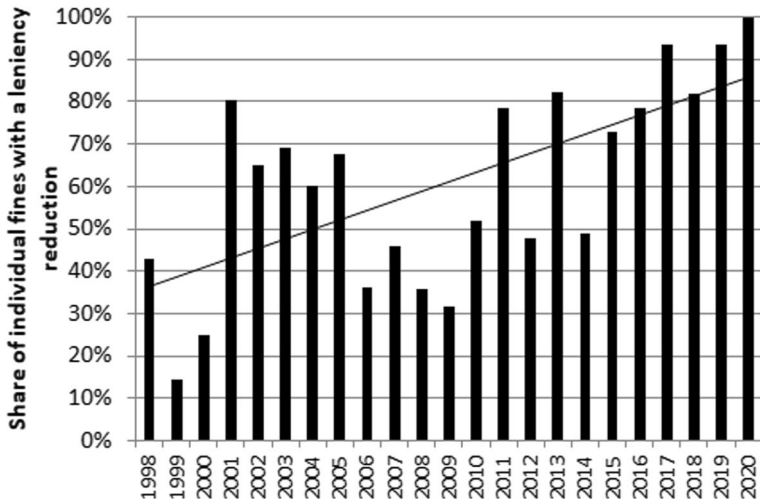


Fig. 5 Share of yearly individual EC fines (per cartel member), in which a leniency reduction (1–100% fine reduction) was granted, and trend line (significant at 1%), 1998–2020. Sample includes 149 cartels with 814 fines (includes multiple fines per firm per year)

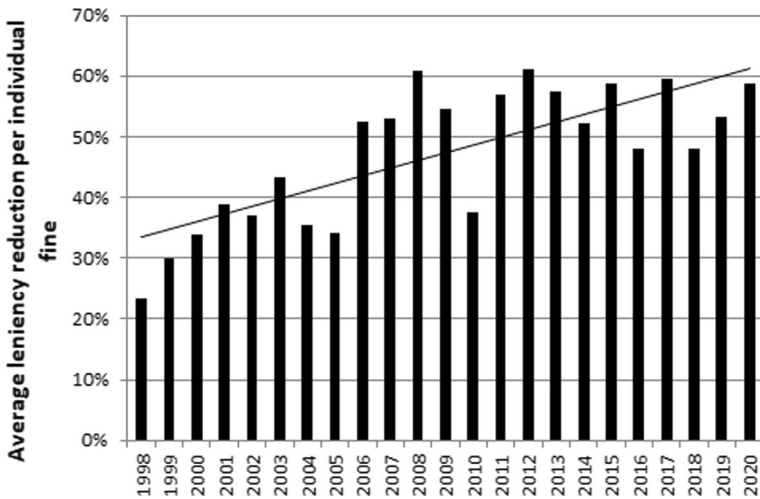


Fig. 6 Average EC leniency reduction per cartel member, per year, and trend line (significant at 1%), 1998–2020. Sample includes 149 cartels with 814 fines (includes multiple fines per firm per year)

Table 1 Cartels convicted in (at least) the EU and the US, 1998–2020, by multiple offender status

Fine US	Fine EC	Cartel	US immunity recipient	EC immunity recipient	RO/MO
<i>Convicted cartels where the immunity recipient was the same in the EU and US</i>					
1998	2003	Cable high-voltage	ABB	(same)	RO
2001	2003	Organic peroxides	Akzo, Crompton	Akzo	RO
2006	2006	Hydrogen peroxide	Degussa	(same)	RO
2011	2010	Trucks	Man SW	(same)	RO
1998	2003	Sorbates	Chisso	(same)	MO
1999	2001	Vitamin A	Sanofi-Aventis	(same)	MO
1999	2001	Vitamin E	Sanofi-Aventis	(same)	MO
2001	2002	Food flavor enhancers	ADM, Takeda C	Takeda Chemical	MO
2001	2002	Graphite, Isostatic	GrafTech, UCAR*	(same)	MO*
2003	2002	Methylglucamine	Merck	(same)	MO
2004	2006	LCD	Samsung	(same)	MO
2012	2018	Occupant safety systems	Takata	(same)	MO
6/2018	3/2018	Capacitors	Sanyo E./Panasonic	(same)	MO
1999	2002	Fuel Surcharge	Lufthansa	(same)	
2001	2003	Marine hose	Yokohama Rubber	(same)	
2001	2005	MCAA	Clariant	(same)	
2001	2002	Refrigeration	Tecumseh	(same)	
2002	2005	Rubber Chemicals	Akzo (Solutia)	Akzo (S., Flexys)	
2003	2002	DRAMs	Micron	(same)	
2015	2019	FOREX	UBS	(same)	
3/2015	6/2015	Parking heaters	Webasto	(same)	
<i>Convicted cartels, first fined in the US, in which a EU leniency applicant obtained immunity</i>					
2004	2006	Methacrylates	Crompton	Degussa,Rohm,PC	RO
2011	2015	Optical disc drives	(not named)	Lite-On/Philips	RO
2013	2016	Alternators, starters	(not named)	Denso	RO
2015	2018	Spark plugs	(not named)	Denso	RO
1997	2002	Cathode ray tubes	(not named)	Samsung	MO
2001	2005	Plastic additives	Metallgesellschaft	Chemtura	MO
2002	2006	Synthetic rubber	Crompton	Bayer	MO
2004	2007	Polychloroprene rubber	Crompton	Bayer	MO
2007	2009	Freight forwarders	—	DHL and Exel	MO
2012	2017	Lightning systems	(not named)	Valeo	MO
2013	2016	Rechargeable batteries	(not named)	Samsung	MO
1997	2002	Auction houses	Artemis	Christies	

RO repeat offender; MO multiple offender

was 30%.¹⁰ Although the numbers are comparable, it is unlikely that this is the intention of the EU legislation.

In addition, many firms in international cartels report the cartel in several jurisdictions. Table 1 describes the cartels that were convicted by both the EC and the DOJ and that correspond to 22% of all of the cartels that were convicted by the EC between 1998 and 2020. The cartels are ordered by the type of immunity recipient firm in terms of repeated (non-contemporaneous), multiple or single cartel fines.¹¹

The first set of (21) cartel convictions in the table includes those in which the same firm received full immunity from fines in both the EU and the US. Four of these cartel members are repeat offenders, and the other nine are multiple offenders. It is worth noting that, had some of these firms not received immunity from fines in the EU, they would have paid a fine that would have been significantly larger due to recidivism and the gravity of the infringement.

The second set of (12) cartel convictions in the table includes those in which the EC granted full immunity to a cartel member, although there was already an ongoing investigation or conviction by the DOJ. In 11 of the cartels, the EC immunity recipient is also a repeat or multiple offending firm.

It is thus not clear if the current extent of leniency granted is needed to discover cartels whose existence was known from previous US investigations. In fact, cooperation amongst antitrust authorities in multi-jurisdiction cartel cases would increase the efficiency of investigations and the deterrent effect of fines.

Together with the evidence on EU firm recidivism—for example, Marvão (2015, 2022)—the EU “leniency inflation” illustrates a trend towards potentially excessive use of leniency as a substitute for investigative effort. This is not an innocent substitution. Leniency should be used, if necessary, to detect and prosecute cartels but should be minimized to avoid having counterproductive effects by reducing expected sanctions and slowing the “race to report”. Ideally, one and only one firm should be granted leniency in exchange for important information that can be used against other cartel members (Spagnolo, 2004; Aubert et al., 2006b; Harrington, 2006; Spagnolo, 2008; Chen & Rey, 2013). Each additional firm that receives leniency tends further to reduce overall penalties and—most importantly—reduce the incentive to rush to an antitrust authority and report first.

2.3 A Note on Private Damages and Settlements

Two additional issues are worth discussing when examining the recent decrease in the number of EC cartel convictions.

¹⁰ These correspond to 49% of 432 fines that were imposed between 1998 and the end of 2008. This number is also currently 30%, corresponding to 46% of the 825 fines imposed between 1998 and 2020. Note that in the convicted cartels where settlements were also in place (starting in 2010), this number increases to 32%—in addition to a 10% fine reduction from the settlement.

¹¹ Multiple offenders are defined as any firm that has been convicted for participation in at least two cartels, whereas repeat offenders are those that continued to collude or entered a new cartel after receiving a fine for another cartel.

The first is settlements. Under the 2008 Settlement Notice,¹² the EC can propose a settlement to some or all cartel members if they acknowledge their liability and the cartel facts. The result is a flat reduction of 10% of the final fine. The first settlement decision was in 2010 (DRAMs cartel); and since then, around 54% of cases involve settlement decisions. While these are obviously attractive for the EC (faster proceedings and lower legal costs), the attractiveness of settlements for firms may be due to lower reputational damages (from not having a full-fledged conviction); greater opportunity to influence the EC's decision; and less information for potential litigants in private damage actions. This further reduction in penalties adds to—and therefore amplifies the effect of—leniency inflation.

The second is private damage actions: Since the last debate on criminalization, many jurisdictions have enhanced their private enforcement tools, and cases of private cartel damages are on the rise. However, the legal debate with regard to the coexistence of private and public enforcement—e.g., Cauffman (2011); Komninos (2011); Bernard (2012); MacCulloch and Wardhaugh (2012)—suggested that a decrease in the number of cartel convictions may occur due to a surge in private damage actions, which may jeopardize LPs. This is because a leniency application may increase the risk of a successful damage claim by the cartel's victims. A prominent example is from 2014, when Deutsche Bahn sued Lufthansa, the immunity recipient in a cartel case on airline freight, for 1.76 billion euros in damages.

The legal debate culminated in the *2014 EU Directive on Damages*, which was fully embedded in the national legislation of all member states by June 2018. The Directive aimed to facilitate private claims by victims, while trying to protect the immunity recipient. However, it did not help as much as it could have.

The Directive has taken for granted that an inherent conflict exists between the proper functioning of an LP and private damage claims, because the risk of the latter may hinder incentives to apply to the LP. As a result, the Directive has introduced three highly questionable “compromise” features: (i) although it reduces the liability of the immunity recipient, it does not eliminate it; (ii) it makes it increasingly difficult for private litigants to access leniency statements and settlement submissions for damage claims¹³; and (iii) it allows only single damages—rather than treble damages as in the US.

Given that the immunity recipient remains liable to pay private damages and is the first cartel member that can be sued for damages, the incentive to apply to the LP is still reduced.

Buccirosi et al. (2020) show formally that there is no such conflict and that a compromise between the functioning of the LP and the right of cartel victims to be compensated is not necessary. The effectiveness of both can be maximized if the immunity recipient's liability is reduced as much as possible—potentially

¹² Commission Notice on the conduct of settlement procedures in view of the adoption of Decisions pursuant to Article 7 and Article 23 of Council Regulation (EC) No 1/2003 in cartel cases, 2008/C107/01.

¹³ It provides that “national courts cannot at any time order a party or a third party to disclose any of the following categories of evidence: (a) leniency statement; and (b) settlement submissions” (Art. 6(6)), and that this evidence “is either deemed to be inadmissible in actions for damages or is otherwise protected under the applicable national rules”. (Art. 7(1)).

eliminated—and victims are granted full access to all of the files of the competition authority, including leniency statements and settlement submissions; treble damages for non-applicants would have further improved the outcome. This is close to what is done in the US, and it is practically the same regime that was implemented in Hungary since 2011: where an immunity recipient was liable to pay only his direct damages in the very unlikely event that all other cartel members went bankrupt. See Bodnar et al. (2023) for experimental evidence that is consistent with Buccirosi et al. (2020). This clearly indicates that a revision of the 2014 Damages Directive in this sense could considerably improve the attractiveness of the EC Leniency Program—and with it, cartel detection and deterrence (also through more effective private damages).

2.4 The Need for Criminal Penalties

In the above discussion, we documented: (i) the low level of fines and the phenomenon of “leniency inflation”, even in cartels that were previously discovered and fined in other jurisdictions, which tends to dampen the “rush to report”; and (ii) a decline in cartel convictions that are connected to leniency, which may be due (at least in part) to the lack of an incentive to report the cartel first, and thus, to report at all (due to leniency inflation), and to the insufficient protection of the immunity recipient by the 2014 Damages Directive.

This suggests that we should strengthen EU cartel enforcement, which could be achieved by: (i) further increasing fines, as was suggested in the previous debate on criminalization (our data do not suggest that the firm’s fine to turnover ratio has increased in the last 10 years); (ii) amending the Damages Directive to increase incentives to report cartels, as suggested in Buccirosi et al. (2020); and/or (iii) introducing criminalization in the form of prison sentences.¹⁴

The balance between the pros and cons of criminalization in cartel enforcement is not clear. In the US, for example, criminalization is a crucial dimension of anti-cartel enforcement; despite all of its costs, it appears to deter collusive behavior (Miller, 2009). Criminal penalties—particularly prison sentences—cannot be easily reimbursed by corporate employers, and the penalties target the responsible individuals directly. They also lower the rate of (repeated) collusion through incapacitation.

There are, however, some clear costs, such as: a higher standard of proof and the involvement of courts and juries, therefore increasing the complexity of the fining procedures; a higher social cost of type I error; and a high direct cost of imprisonment.

In the next section, we consider the European experience with criminalization thus far.

¹⁴ One other option is to introduce more substantial whistleblower rewards: This has been a very effective tool for other forms of corporate crime (Nyrreröd & Spagnolo, 2021).

3 Criminal Penalties in the EU

Despite cartel legislation that includes the possibility of imprisonment in several EU countries (see the list in Table 5 in the appendix), very few individuals have been criminally prosecuted with success (the cases are listed in Table 6 in the Appendix), and even fewer have been imprisoned.

3.1 UK

The apparent success of US criminal cartel convictions was one of the main drivers of the adoption of criminal penalties in the UK. The criminal legislation that was introduced in the UK in 2002—although similar to that in the US—incorporated a “dishonesty” requirement: An individual could be found guilty of an offense only if they were shown to “dishonestly engage in a prohibited cartel activity” (section 188 of the Enterprise Act of 2002).

The first cartel case in which criminal sentences were imposed led to the imprisonment of three members of the marine hose cartel in 2008. However, the subsequent cartel prosecutions developed into a series of unsuccessful convictions, for insufficient evidence linked to the dishonesty clause (OFT, 2008). This clause was then removed in the UK Reform Act of 2013. Since then, the UK Competition and Markets Authority has convicted two individuals to prison sentences of six months to two years, and ordered eight disqualifications from a director’s position for three to 12 years.

Calvani and Kaethe (2013) note that the unwillingness of judges to prosecute cartel members criminally is one of the main difficulties in imposing jail sentences in jurisdictions such as the UK, Ireland and Canada.

3.2 Ireland

In 2006, the Irish heating oil cartel yielded the first ever jury conviction for a price-fixing cartel in Ireland (and in Europe). An oil supplier pleaded guilty and was sentenced to six months in prison. In 2012, another individual was convicted to two years in prison for the same cartel. However, both sentences were suspended, and no prison time was served. One further prison sentence—of one year—was imposed (and later suspended) on one of the members of a cartel of Ford dealers.

A third cartel between six Citroën dealerships also led to eight imprisonment sentences of three to 15 months in 2009, although all of these were suspended. In 2017, one prison sentence of three months (also suspended) was imposed as a result of a cartel investigation in commercial flooring.

Overall, all jail sentences were suspended, and only pecuniary penalties were paid.

3.3 Other Jurisdictions

No jail sentences have been imposed in any other EU countries, despite some efforts in Romania,¹⁵ Denmark (Lando, 2013), and Spain.¹⁶

The introduction of criminal sanctions at the EU level—rather than different national policies—has therefore the potential to increase the success of jail sentences.

4 Criminal Sanctions in the US

It is well known that the legal culture in the US is very different from the legal culture in the EU with respect to cartels. In 2004, for example, the US Supreme Court described cartels as being “the supreme evil of antitrust”,¹⁷ and Werden (2009) states “*our investigators have found that nothing in our enforcement arsenal has as great an effect as the threat of substantial incarceration in a United States prison*”.

Imprisonment of cartel members has been encouraged since the promulgation of the Sherman Act in 1890 and has been used since 1921.

Figures 7 and 8 depict the trends in the numbers of individuals and firms that were charged by the DOJ in cartel cases, between 1999 and 2009, in a total of 497 US individuals, 227 non-US individuals, 268 US firms, and 220 non-US firms. The trends in the figures are partially explained by the abolishment of “no-prison” deals in 1999, as a result of increased international cooperation and the change in focus to individual foreign national executives (Spratling, 1999). The latter dramatically increased the number of individuals actually serving time in a US jail.

Between 1999 and 2009, prison sentences were imposed on 236 individuals, of which 47% were members of international cartels and 45% were US citizens. Figure 9 shows the distribution of prison sentences for non-nationals; the sentences are most frequently imposed on individuals from Japan (21%) and Germany (15%).

Between 2000 and 2013, the average jail time increased from 10 to 26 months, and from 3.7 to 15 months for non-nationals.

Given that criminalization can be subject to enforcement biases, in this section, we explore the criminal penalties that were imposed by the DOJ between 1990 and 2014, so as to highlight potential areas of concern that policymakers should be aware of, if criminal penalties are implemented in the EU.

4.1 US Data

We use Connor’s “Private International Cartel” dataset that includes all criminal penalties that were imposed on cartel members that were fined by the US DOJ (and

¹⁵ See details in Table 6.

¹⁶ In 2016, Spain’s National Authority on Markets and Competition criminally fined four executives, in an adult-diaper cartel, based solely on antitrust charges, for the first time; but no jail time was imposed.

¹⁷ Verizon Communication Inc V. Law Offices of Curtis V. Trinko, 124 US (2004) 879.

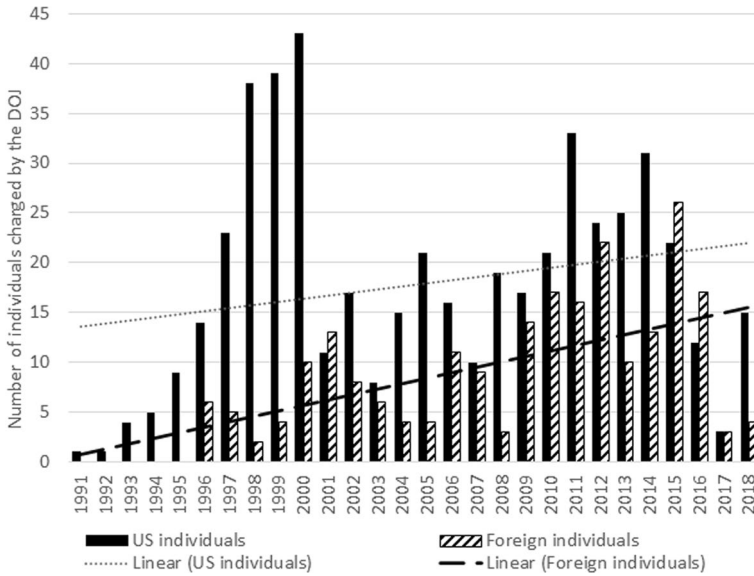


Fig. 7 Defendants: **individuals** charged by the US DOJ (497 US-nationals, 227 foreigners), 1991–2018. Slope coefficients are statistically significant and different from each other at the 1% significance level

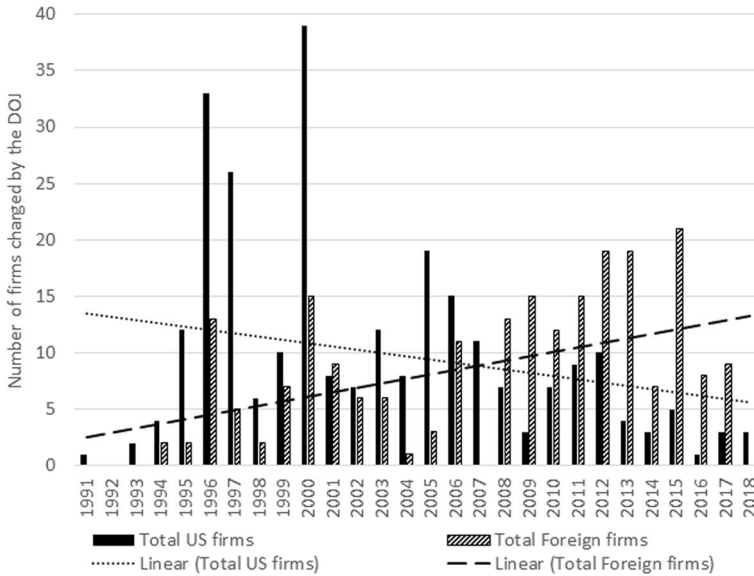


Fig. 8 Defendants: **firms** charged by the US DOJ (268 US-firms, 220 foreign firms), 1991–2018. Note that the slope coefficients are statistically different from zero (but not from each other)

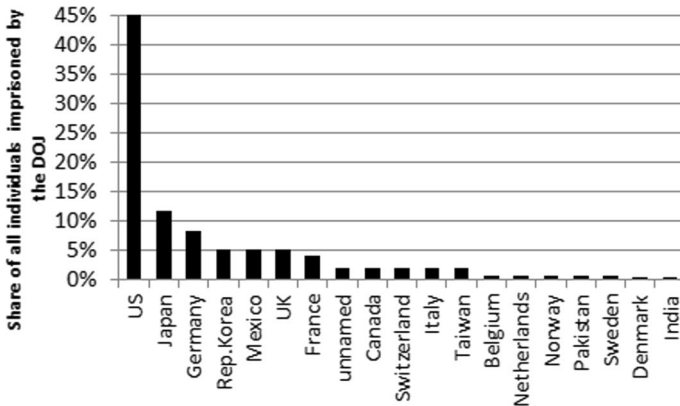


Fig. 9 Distribution of individuals imprisoned by the DOJ, 1999–2009 (236 individuals). Elaboration on Connor’s “Private International Cartel” Dataset (2013)

often, also other jurisdictions) between 1990 and 2015.¹⁸ It covers 146 cartels, and some firms have multiple occurrences in the dataset. In some cases, several individuals from the same firm are criminally prosecuted, which leads to a total of 683 observations. Table 2 describes the variables that are used in the model specifications.

Note that the figures that are presented for the number of cartel convictions may differ slightly from the actual values, due to cases that are/were under investigation and those for which public information was not available.

The individuals in the sample were sentenced to prison terms of up to 108 months (*prison US*, *prison US months*). In US national cartels, the average prison sentence is 43 months for US individuals and 28 months for non-US individuals (significant at 1% level). In global cartels, the average prison sentence is 26 months for US individuals and 18 months for non-US individuals (although not statistically significant). Some individuals in the dataset spent no time in prison and received only monetary criminal penalties (*cartel fine DOJ*).

The data include information on whether the main goal of the cartel was bid-rigging (*bid rigging*), which is the case in 71% of the cartel cases in the data, and on the sales of the cartel in the US and the EU (*affected sales US cartel*, *affected sales EU cartel*). The duration of the investigation (*inv. duration (months)*) is also accounted for; and while most final decisions are reached within one year (33%), around 4% of the cases take over 10 years to reach a final decision.

According to the fining decision, the majority of the cartels in the dataset lasted less than 10 years (84%)—but over 6% lasted more than 20 years (see *cartel duration (months)*). The number of firms that were involved in the cartel and fined in the US is also available (*number firms US*), and it is as large as 30 firms in a single

¹⁸ Note that we measure prison sentences—the strength of a sentence—rather than time spent in prison (which would also capture the ability to extradite). Further, around 25% of the sentences have, at the recommendation of the Bureau of Prisons, partially or fully been converted to sentences in “other confinements” such as house arrest or community service.

Table 2 Summary statistics

Variable	Mean	SD	Min.	Max.
Prison US months	7.665	20.015	0	108
Prison US	0.425	0.495	0	1
<i>Macro control variables</i>				
DOJ real budget (%change) (lag)	0.006	0.045	-0.072	0.202
Nb. cases filed (lag)	52.103	14.745	32	90
Republican	0.532	0.499	0	1
GDP US real (%change) (lag)	0.020	0.019	-0.025	0.048
Old LP (pre-1993)	0.016	0.124	0	1
New LP (1993–2003)	0.246	0.431	0	1
Post-ACPERA (post-2003)	0.739	0.440	0	1
<i>Cartel control variables</i>				
MO cartel (count)	2.394	4.45	0	20
MO cartel (share)	0.173	0.272	0	1
Affected sales EU cartel ('000 \$)	6,254.714	17,817.132	0	151,300
Affected sales US cartel ('000 \$)	9,071.820	25,032.300	0	221,000
Inv. duration (months)	33.528	39.574	0	204
Cartel fine DOJ (million \$)	46.659	157.313	0	1737
Cartel duration (months)	85.592	69.14	0.7	385
Number firms DOJ	5.347	6.611	2	30
Bid-rigging	0.582	0.494	0	1
<i>Firm control variables</i>				
MO firm (count)	7.272	10.026	1	37
Firm HQ US	0.231	0.422	0	1
<i>Manager control variables</i>				
MO manager (count)	1.259	1.022	1	8
Manager origin US	0.226	0.419	0	1

LP leniency program; *ACPERA* Antitrust Criminal Penalty Enhancement and Reform Act of 2004; *MO* multiple offender; *HQ* headquarters

cartel. We also add information on the sector in which the firms colluded: The main sectors were: *machinery (electrical and parts); stone, clay, graphite and glass products; finance, insurance and banking; and other organic chemicals.*

To account for changes in the budget and workload of the DOJ, the variable *DOJ real budget (% change) (lag)* refers to the change in the DOJ's budget in the year previous to the first fine of the cartel, in real terms,¹⁹ and *nb. cases filed (lag)*, refers to the number of cases that were filed by the DOJ in the year previous to the first fine of the cartel.

¹⁹ Two- and three-year lags were also used, but their impact was never statistically significant.

Given that the number of cartel prosecutions can also be influenced by the political party in power, a dummy variable is included to distinguish between Republican and Democrat parties that held the presidency at the time of the first DOJ fine (*republican*). Further, we control for GDP changes in the year previous to the first fine of the cartel, in real terms (*GDP US real (%change) (lag)*) and for the LP regime that was in place at the time of the first cartel fine by including the variables *old LP (pre-1993)*, *new LP (1993–2003)*, and *post-ACPERA (post-2003)*.

We also control for firms with headquarters in the US (*firm HQ US*) and for convicted US-nationals (*manager origin US*).

Multiple offenses are also accounted for: The total number of offenses per manager or per firm are given by *MO manager (count)* and *MO firm (count)*, and the number and share of multiple offending firms per cartel is given by *MO cartel (count)* and *MO cartel (share)*, respectively.

4.2 Concerns

One concern with the data is the possibility of sample selection bias due to unobservable data. At least four possible biases may arise²⁰: First, since cartels are prohibited by US legislation, they are secret. Therefore, the available data include only convicted cartel members.

Second, we include dummy variables that account for multiple offenses; but there may be individual unobservable firm (or manager) characteristics that determine their participation in multiple cartels. A more in-depth discussion of recidivism, how to define it, and the issues that it raises can be found in Marvão (2022).

The third possible bias is also related to recidivism. The number of single offenders may be overestimated if a firm also took part in an undiscovered cartel or in a cartel that was being investigated at the time of the collection of the data.

Last, the variable that accounts for the duration of the cartel may be biased downwards, as it measures the number of months for which the cartel was fined and not the true duration of the cartel.

These issues of selection on the unobservables cannot be overcome, but their existence is acknowledged in the interpretation of the results.

4.3 Method

We want to provide insight into how the DOJ and the courts make decisions with regard to the criminal sentences that are imposed on cartel members, in terms of prison time. For this purpose, we run a regression where the dependent variable is the number of months spent in prison and the explanatory variables are at the manager, firm, cartel, and macro levels.

A Heckman two-stage model (Heckman, 1979) is used to address the possible sample selection bias in the data, as was described above. In the estimation, the first

²⁰ Note that these are not related to the enforcement biases that were discussed above.

stage corresponds to a probit that models the probability of receiving a prison sentence (*prison US*), and the second stage is a fixed-effects model that measures the term of a prison sentence (*prison US months*).

We do not control for sector characteristics—e.g., the number of firms, concentration—but we include sector fixed effects at SIC-1 level that subsume all sector-varying patterns.

The likelihood-ratio test that is reported at the end of the regression tables (*Chi2*) compares the joint likelihood of an independent probit regression for the selection and a regression model on the observed prison data, against the likelihood from the Heckman model. The large values justify the use of a Heckman selection equation with the current dataset.

4.4 Results

Tables 3 and 4 present the Heckman selection regression results for the likelihood (stage 1) and duration (stage 2) of a prison sentence that is imposed by the DOJ on a cartel member.²¹

4.4.1 Macroeconomic Variables

Ghosal and Sokol (2020) find that the total number of cartel cases dealt with by the DOJ decreases during Republican terms, while Rolnik (2016) documents that since the mid-80 s, the term “competition” has been mentioned substantially more in Republican rather than Democratic platforms in the US, thus suggesting that Republicans are more pro-competition. Our estimations suggest that when Republicans are in power (*republican*), the length of a prison sentence for cartel members is shorter.

Green and Porter (1984) suggest that cartels are likely to be less stable during unexpected recessions, as colluding firms cannot distinguish between the effects of members’ cheating and growth shocks. However, the current literature is not clear about whether collusion is pro-cyclical (e.g., Bagwell and Staiger (1997); Suslow (2006); Hyttinen et al. (2018)) or counter-cyclical (e.g., Fabra (2006)). While we cannot say anything about the total (unobservable) number of cartels, our results suggest that following an economic downturn (*GDP US real (%change) (lag)*), prison sentences are more likely to be imposed, but they are shorter. These results may be driven by the cyclical nature of cartels (and their characteristics) rather than by enforcement choices.

The number of cartel cases that were filed in the two years previous to a case’s first cartel fine (*nb. cases filed (lag)* and *nb. cases filed (2nd lag)*) are used as proxies for the workload of the DOJ.

²¹ The inverse Mills ratio (*imr*) is significant, which means that there is a significant selection bias on the observable variables that have been included in the selection step. This means that lambda (the estimated selection coefficient) is significant, and so the firm employees selected into the sample of prison sentences are more likely to receive a longer sentence than is an employee drawn at random from the population.

Table 3 Heckman two-step results (stage 1)

(Prison)	(1)	(2)	(3)	(4)	(5)
Republican	0.657 (0.41)	0.658 (0.41)	0.156 (0.46)	0.873* (0.45)	0.585 (0.47)
GDP US real (%change) (lag)	-15.062** (6.67)	-15.454** (6.70)	-17.249** (7.24)	-13.548* (7.66)	-13.312* (7.76)
DOJ real budget (%change) (lag)	3.443 (2.33)	3.631 (2.35)	3.765 (2.44)	6.076** (2.75)	6.545** (2.78)
Nb. cases filed (lag)	-0.012 (0.01)	-0.014 (0.01)	-0.019** (0.01)	-0.025** (0.01)	-0.026*** (0.01)
Nb. cases filed (2nd lag)	-0.024* (0.01)	-0.025* (0.01)	-0.028** (0.01)	-0.042** (0.02)	-0.042** (0.02)
New LP (1993–2003)	-0.873 (0.88)	-0.934 (0.88)	-1.948* (1.09)	-4.278*** (1.34)	-4.039*** (1.44)
Post-ACPERA (2004)	-1.622* (0.89)	-1.633* (0.89)	-2.691** (1.12)	-5.058*** (1.36)	-4.592*** (1.47)
Firm HQ US	-1.615*** (0.42)	-1.682*** (0.43)	-1.723*** (0.45)	-1.344*** (0.46)	-1.336*** (0.45)
Manager origin US	2.006*** (0.44)	2.109*** (0.46)	2.026*** (0.48)	1.895*** (0.50)	2.003*** (0.50)
Average prison US months (lag)	0.069*** (0.01)	0.070*** (0.01)	0.070*** (0.01)	0.093*** (0.01)	0.090*** (0.01)
Inv. duration (months)	0.018*** (0.00)	0.018*** (0.00)	0.021*** (0.00)	0.020*** (0.00)	0.019*** (0.00)
Cartel fine DOJ	0.012*** (0.00)	0.013*** (0.00)	0.012*** (0.00)	0.025*** (0.00)	0.021*** (0.00)
Affected sales US cartel ('000)	0.108*** (0.03)	0.107*** (0.03)	0.191*** (0.06)	0.328*** (0.06)	0.326*** (0.06)
Affected sales EU cartel ('000)	-0.265*** (0.07)	-0.266*** (0.07)	-0.317*** (0.11)	-0.578*** (0.11)	-0.580*** (0.11)
Bid-rigging	0.875** (0.34)	0.871** (0.34)	1.071*** (0.39)	0.946** (0.41)	0.754* (0.42)
MO firm (count)	-0.006				
MO manager (count)	(0.02)	-0.924 (0.92)			
MO cartel (count)			-0.275** (0.11)		
MO cartel (share)				-5.410*** (1.04)	-4.926*** (1.05)
Number firms DOJ	0.061** (0.03)	0.061** (0.03)	0.060** (0.03)		
Cartel duration (months)					0.003 (0.00)
Sector controls	Yes	Yes	Yes	Yes	Yes
Constant	-0.378 (1.41)	0.712 (1.81)	1.456 (1.70)	3.972** (1.99)	3.776* (2.05)
Imr (lambda)	-1.940* (1.11)	-1.902* (1.08)	-2.131* (1.18)	-2.776*** (0.97)	-1.740* (0.95)
N	617	617	617	640	633
Chi2	6292	6421	6329	6309	7506

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parenthesis

Table 4 Heckman two-step results (stage 2)

(Prison US months)	(1)	(2)	(3)	(4)	(5)
Republican	-14.102*** (1.90)	-14.460*** (1.88)	-14.466*** (1.89)	-13.226*** (1.70)	-14.220*** (1.60)
GDP US real (%change) (lag)	106.091*** (40.24)	97.252** (38.62)	117.484*** (40.09)	115.848*** (39.52)	114.972*** (37.08)
DOJ real budget (%change) (lag)	0.421 (10.19)	0.047 (9.86)	2.877 (10.51)	-4.000 (9.79)	-2.989 (9.14)
Nb. cases filed (lag)	0.028 (0.04)	0.012 (0.04)	0.031 (0.04)	0.059 (0.04)	0.026 (0.04)
Nb. cases filed (2nd lag)	0.072* (0.04)	0.073* (0.04)	0.087** (0.04)	0.082* (0.04)	0.098** (0.04)
New LP (1993–2003)	-83.027*** (3.35)	-83.485*** (3.24)	-79.721*** (4.92)	-84.096*** (2.72)	-80.044*** (2.74)
Post-ACPERA (2004)	-77.592*** (4.15)	-77.909*** (3.91)	-73.417*** (6.03)	-79.171*** (2.88)	-76.464*** (2.76)
Firm HQ US	3.991*** (1.51)	3.433** (1.52)	4.501*** (1.52)	4.742*** (1.44)	3.670*** (1.35)
Manager origin US	-4.102*** (1.48)	-3.498** (1.50)	-3.920** (1.56)	-3.812*** (1.42)	-1.842 (1.39)
Average prison US months (lag)	0.079*** (0.02)	0.079*** (0.02)	0.081*** (0.02)	0.075*** (0.02)	0.083*** (0.02)
Inv. duration (months)	-0.189*** (0.01)	-0.190*** (0.01)	-0.172*** (0.02)	-0.187*** (0.02)	-0.201*** (0.02)
Cartel fine DOJ	0.035*** (0.00)	0.035*** (0.00)	0.035*** (0.00)	0.036*** (0.00)	0.037*** (0.00)
Affected sales US cartel ('000)	0.337 (0.23)	0.292 (0.22)	0.365 (0.22)	0.424** (0.19)	0.854*** (0.21)
Affected sales EU cartel ('000)	2.625*** (0.74)	2.693*** (0.72)	3.269*** (0.90)	2.772*** (0.69)	1.734** (0.69)
MO firm (count)	-0.103 (0.26)				
MO manager (count)		-7.025 (4.33)			
MO cartel (count)			-0.800 (0.83)		
MO cartel (share)				-3.047 (4.25)	-0.354 (3.97)
Number firms DOJ	0.111 (0.14)	0.116 (0.13)	0.257 (0.23)		
Cartel duration (months)					0.022*** (0.01)
Sector controls	Yes	Yes	Yes	Yes	Yes
Constant	102.405*** (6.68)	110.784*** (8.16)	95.761*** (9.56)	100.954*** (6.71)	96.039*** (6.40)
N	617	617	617	640	633

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parenthesis

Given that Ormosi (2014) estimates that only 10 to 20% of cartels are discovered, we assume that the supply of cartel cases exceeds the DOJ's capacity. We therefore use the number of cartel cases that were filed in the two years previous to a case's first cartel fine (*nb. cases filed (lag)* and *nb. cases filed (2nd lag)*) as proxies for the workload of the DOJ.

In line with Ghosal and Sokol (2020)—who measure total jail days per cartel—we find that, following busier periods, an individual's likelihood of a prison term is smaller, but its duration is longer (*nb. cases filed (2nd lag)*). The latter result is in line with Ghosal and Sokol (2020), who measure total jail days per cartel. Although busier periods with M &As may decrease the resources that are allocated to cartel prosecutions, the merger investigations may also serve as a conduit for information about cartels (Ghosal, 2008, 2011).

Finally, we note that before the 1993 leniency program was put in place, the length of prison sentences was longer. However, this result is driven by 8 prison sentences of 108 months each in a total of 14 observations for the same period.

4.4.2 US Firms and Individuals

The results show that the nationality of the individuals and the location of the headquarters of the firm are important in explaining the likelihood and length of prison sentences.

US nationals (23%) are much more likely to be sentenced to prison—potentially due to the difficulties that are linked to extradition. However, their sentences appear to be shorter, in line with the DOJ's shift in focus (Hammond, 2006). Along the same lines, individuals in firms that have their headquarters in the US (23%) are less likely to receive a jail sentence; but where jail sentences are imposed, they are longer.²²

4.4.3 Cartel Variables

There seems to be persistence over time in the length of prison sentences (*average prison US months (lag)*), similarly to what Ghosal and Sokol (2020) find for the number of individuals jailed per cartel.

Longer investigations (*inv. duration (months)*) increase the likelihood of an individual receiving a prison sentence, but lead to shorter sentences. Cartel members who face criminal prosecution may be more reluctant to share information, or they may contest the charges²³—even in the presence of an LP—such that it may take longer to gather sufficient evidence to secure a prison sentence.

The characteristics of a cartel have a large impact on the likelihood and size of prison sentences.

²² Only in 174/901 cases (19%) are both the manager's nationality and the firm's headquarters in the US.

²³ This has been reported for example in Poland, in 2018.

The likelihood of receiving a prison sentence is higher when the severity of the infringement in the US is greater, in terms of the value of the sales of the cartel (*affected sales US*) and the firm's cartel fine (*cartel fine DOJ*). The latter also affects positively the length of prison sentences in the US, which may just reflect the severity of the infringement.

In multi-jurisdiction cartels, when the affected sales of the cartel in the EU are higher (*affected sales EU cartel*), the likelihood of prison appears to be lower, but the length of the sentence is longer. This may reflect both the higher gravity of the infringement and the difficulty in imposing prison sentences on foreign individuals. In fact, the first imprisonment of a foreigner (based solely on antitrust charges) was only in 1995 and imprisonment sentences for foreigners were not part of plea agreements until 1999.

When the duration of the cartel (*cartel duration (months)*) increases by a month, the length of an individual's prison sentence increases, on average, by 0.02 months. It is important to note that this is the duration for which the cartel is fined (given the available evidence) and not the true cartel duration.

The likelihood of receiving a prison sentence is higher for larger cartels (*number firms DOJ*), which may reflect the gravity and extent of a cartel (which is usually greater for larger cartels).

The data allow for distinguishing bid-rigging cartels (*bid-rigging*) from other types of cartel. In the US, bid-rigging cartels are common in the cement or construction sectors, and these are usually local cartels. The results show that the likelihood of a prison sentence is higher in bid-rigging cases. Bid-rigging cartels are often associated with other unlawful activities such as bribery and are often more harshly penalized.²⁴

4.4.4 Multiple Offences

Arguably, the most interesting result is that the larger is the absolute number or share of multiple offending firms per cartel (*MO cartel (count)* and *MO cartel (share)*), the lower is the likelihood that an individual in that cartel receives a prison sentence.

One possible explanation for this result is that multiple and/or repeat offenders may be able to learn how to "play the leniency game", in terms of when and how to report the cartel to the authorities (e.g., Connor (2010); Marvão (2015); Levenstein et al. (2015); Kovacic et al. (2018)). However, a more in-depth investigation of this relationship would be a good avenue for future research.

In the US, the vast majority of the recidivists are multiple offenders, rather than true recidivists (joining/initiating a new cartel after a cartel conviction) which suggests that firms do learn that it is advantageous to report the cartel. However, Werden et al. (2011) argue that there are no true repeat offenders since 1999, which may also suggest a deterrent effect.

²⁴ Even in jurisdictions where cartel activity is not criminalized, bid-rigging may be a criminal offense. In 2020, 10 OECD jurisdictions could enforce criminal penalties solely for bid-rigging cartels (OECD Working Party No 3, 2020).

4.4.5 Lessons for the EU

The length of US prison sentences is directly affected by the cartel's severity in terms of its duration, and the affected cartel sales, not only in the US (as expected) but also in the EU.

The macroeconomic and national biases (in terms of political parties and GDP fluctuations, and US individuals and firms) found in the empirical estimations are unlikely to be a major concern in the EU, since it is an entity with no centralized government.

The result with respect to multiple offenders may also not be problematic in the US as it suggests that once a firm reports a cartel (or is convicted for a cartel), it reports other cartels in which it is involved (often non-contemporaneously and not linked to the Amnesty Plus program). However, in the EU (where there are lower fines, no criminal penalties and fewer and smaller private damage claims) there are many more multiple offenders and several cases of true recidivists and this is a potential area of concern.

5 Conclusion

The previous debate on criminalization at the EU level halted with suggestions that the EU's problem of under-enforcement should first be addressed by through increasing the level of cartel fines (similar to that of US fines), enhancing private antitrust enforcement through damage claims, or introducing criminal penalties.

In the last 13 years, fines have increased, but remain low relative to the target firm's global turnover. Experimental evidence has shown that tough penalties are crucial in generating deterrence; but there appears to exist a gap between EC penalties and US overall expected penalties, considering that US fines are often accompanied by private-litigation treble damages and severe criminal penalties for executives.

The low level of EC fines is, in part, a result of the recent "leniency inflation", where a large fraction of cartel participants obtain some form of leniency. This tends to reduce the rush to report the cartel first. Further, the 2014 Damages Directive does not sufficiently protect the LP applicant that receives no fine but is then liable for (potentially large) private damages. This may further reduce the incentive to report the cartel.

The combination of mild penalties, an overly generous LP, and insufficient protection of the immunity recipient in private damage actions may have (at least in part) led to a decline in the number of EC cartels and firms that have been convicted in recent years.

In addition, many of the immunity recipients in EC cartel investigations were already being investigated for the same cartel in the US, and there is a significant number of repeat offenders in EC cartels, whereas these appear to have been eliminated in the US in recent years (Werden et al., 2011). This evidence suggests that the efficiency of competition law enforcement can be improved by strengthening both penalties and the management of LPs.

In the US, criminal penalties are perceived as essential to antitrust enforcement. Our empirical results suggest that the administration and strength of US criminal sanctions is subject to some enforcement biases, but these are unlikely to be a major issue in the EC, where there is no centralized government. In particular, we show that

individuals in cartels where multiple offending firms are involved, are less likely to receive a prison sentence. This suggests a learning effect; and whether its overall effect is positive (firms reporting several cartels) or negative (lower deterrence) is uncertain.

More empirical research on the effects of criminal penalties is necessary. However, if pecuniary fines cannot (legally) be raised further and the EC Damages Directive is not revised in the sense of Buccirosi et al. (2020), then the introduction of criminalization may be the only viable option to improve cartel deterrence and dissolution. After the financial crisis and the large banking cartels fixing exchange rates, courts may be more willing to impose criminal penalties and the standard of proof may be lower than before, as was suggested by the UK Reform Act, which removed the dishonesty clause.

Appendix

See Tables 5, 6.

Table 5 EU countries with criminal sanctions for cartel violations or convictions against individuals. The table excludes the following 10 (out of the 28 EC) countries: Bulgaria, Luxembourg, Latvia, Slovakia, Croatia, Portugal, Sweden, Spain, Netherlands, Lithuania

Country	Prison		Monetary fine—legal maximum		Date Legislation and amendments
	Convictions	Years (law)	Firm	Individual	
UK	5 (2 suspended)	0–5	No max	No max	2002, 2013
Ireland	12 (suspended)	0–10	Max(10% turnover, €5 M)	€5,000	1996; 2002(prison); 2012
Denmark	0	0–6	No max	Min: DKK 50,000	1996; 2013(prison)
Czech Republic	0	0–8	None	36.5M koruna	2009
Estonia	0	0–3	€16 M or 10% turnover	30–500 days salary	2002; 2010
France	0	0–4	None	€75,000	1986; 2001; 2008(prison)
Greece	0	2–5	None	€100,000–1 M	1977; 2009(prison); 2011
Hungary	0	0–5		None	2005
Malta	0	0.25–0.5	None	€232.93–2,329.30	2004
Romania	0	1–5	None	None	1996; 2014
Slovak Republic	0	0–12	None	None	1993; 2005
Slovenia	0	0.5–5	€50,000–1 M or 200x damage or illegal gain	€5,000–30,000	1995; 2008
<i>Only bid-rigging</i>					
Austria	0	0–3		None	1959; 2002
Belgium			None		2013
Finland		0–0.5	None	None	1998; 2008
Germany	0	0–5		None	1997
Italy	n/a	0.25–5	€25,822	€103,000–1032,000	1930
Poland	0	0–3		None	1932; 2007

Table 5 (continued)

Ireland Irish Competition Act of 2002 and Competition (Amendment) Act of 2012. The latter increased prison time to up to 10 years (previously five), and it was a result of requirements made by the EU and the IMF to “generate more credible deterrence”. *UK* British Enterprise Act 2002, sections 188 and 190. “ERRA13” introduced reforms, which apply to conduct post-dating 1/4/2014. *Denmark* Danish Competition Act 1996 and New Danish Competition Act 2013. *Romania* Romanian Competition Act (Law 21/1996), article 63 and New Romanian Criminal Code (1/2/2014). *France* French Code of Commerce, article L420-6. All criminal cartel cases are discussed in e-Competition Research Program. *Estonia* Estonia Penal Code, section 400, 2002 and amendment of 2010, articles 399–402. *Greece* Law 703/1977, article 29; Law 3784/2009 and Greek Antimonopoly Act (Law 3959/2011). The latter introduced joint liability for senior executives for fines imposed on the firm. *Czech Republic* Czech Criminal Code, article 248 (2009). Imprisonment only if damage or profit above 5 Mio CZK (approx. €18,000) or if the cartel led to insolvency of a third party. Usually three years imprisonment but eight if there are aggravating circumstances. *Slovakia* Slovak Penal Code, article 250. Collusion is a criminal offence if it threatened a competitor or caused him damage larger than €26,000. Maximum of three years imprisonment. However, two to six years if damage exceeds €133,000 or the cartel leads to bankruptcy of a competitor, and a maximum of 12 years if bid-rigging. *Slovenia* Slovenia Criminal Code 1995 and 2008, article 366. *Italy* Italian Criminal Code, article 353 (1930). *Malta* Competition Act, articles 5 and 9 (2004). Applies only to offences related to collusion, such as hindering investigations or supplying incomplete information. *Croatia* The Croatian Criminal Code criminalizes the act of “creating monopolistic position on the market” (Article 288, 27/1998; last correction: 152/2008). *Belgium* Criminal sanctions apply in cases of breaking of seals and removal of seized property from premises during dawn raids, as well as for the spreading of information received pursuant to the Competition Act for other purposes than the application of the Competition Act. *Finland* Imprisonment or fines if a firm provides the authorities with false evidence. Ongoing discussion on cartel criminalization (2 reports Spring 2014)

Table 6 Cartel convictions in EU countries with cases of imprisonment

Country/cartel	Last decision		Individuals prosecuted				Prison	Time	Notes
	Firm	Fines	Amount	Nb	Fines	Amount			
<i>Ireland</i>									
Grain Imports		10/2004	0	6	6	0	0		
Heating Oil		5/2012	9	9	€3,500–12,500	9	€1,000–30,000	2	0.5–2 years
Irish Ford Dealers Assoc		1/2007	0	1	1/2007	1	€30,000	1	1 year
Citroën Dealers Assoc		11/2009	6	8	€12,000–80,000	8	€2,000–80,000	8	3–15 months
Mayo Waste		7/2009	3	5	0	5	0	0	Suspended, 5 years
Irish Rail		5/2010	1	1	0	1	0	0	Suspended, 1–5 years
Commercial Flooring		5/2017	1	1	€10,000	1	€7,500	1	3 months
<i>UK</i>									
Marine Hose		11/2008	0	3		3	£25,000	3	2.5–3 years
Agricultural Sector		8/2011	0	n/d		0	0	0	5–7 years director disq
Automotive Sector		10/2011	0	n/d		0	0	0	
Airline Fuel surcharge		11/2011	0	4		0	0	0	
Commercial vehicles		12/2011	0	n/d		0	0	0	
Galvanized steel tanks		9/2015	0	1		0	0	1	6 months
Posters/frames (non-criminal)		9/2016	1	–	£163,371	–	–	–	Suspended, 12 months
Precast concrete		3/2021	3	7	£4–25million	7	0	1	2 years
Roofing material (non-criminal)		7/2021(open)	–	–		–	–	–	Suspended, 2 years (5) 6.5–12 years director disq
			–	–		–	–	–	Suspended

Table 6 (continued)

Country/cartel	Last decision	Firm		Individuals prosecuted			Prison	Time	Notes
		Fines	Amount	Nb	Fines	Amount			
Bond Trading <i>Romania</i> wheat storage cartel	10/2021(open) 12/2009	17	0	1	0	0	0	n/d	(3) 3–6.5 years director disq

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