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ZEW
Zentrum für Europäische Wirtschaftsforschung GmbH
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Michael Hellwig[*], Kai Hüschelrath[♣] and Ulrich Laitenberger[°]

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Abstract
The introduction of the European Union (EU) Settlement Procedure in 2008 aimed at promoting the procedural efficiency of cartel investigations by the European Commission (EC). We use a data set consisting of 579 firms groups convicted by the EC for cartelization from 2000 to 2015 to investigate the impact of the settlement procedure on the probability to file an appeal. Based on the estimation of a model of the firm's decision to appeal in the pre-settlement era, we subsequently run out-of-sample predictions to estimate the number of hypothetical appeals cases in the settlement era absent the settlement procedure. Our findings of a settlement-induced reduction in the number of appeals of up to 55 percent allow the conclusion that the introduction of the settlement procedure generated substantial additional benefits to society beyond its undisputed key contribution of a faster and more efficient handling of cartel investigations by the EC.

Keywords Antitrust policy, cartels, settlements, appeals, ex-post evaluation, European Union

JEL Class K21, L41

[*] ZEW Centre for European Economic Research and MaCCI Mannheim Centre for Competition and Innovation, Address: P.O. Box 10 34 43, D-68034 Mannheim, Germany, E-Mail: hellwig@zew.de.

[♣] ZEW Centre for European Economic Research and MaCCI Mannheim Centre for Competition and Innovation, Address: P.O. Box 10 34 43, D-68034 Mannheim, Germany, E-Mail: hueschelrath@zew.de; University of Mannheim, L7, 3-5, 68131 Mannheim, Germany; *Corresponding author*. We are indebted to Cung Truong Hoang for excellent research assistance. The usual disclaimer applies.

[°] ZEW Centre for European Economic Research and MaCCI Mannheim Centre for Competition and Innovation, Address: P.O. Box 10 34 43, D-68034 Mannheim, Germany, E-Mail: laitenberger@zew.de.

1 Introduction

Fighting cartels is a major priority of competition policy in the European Union (EU). Acting in concert with national competition authorities, the European Commission (EC) has made considerable efforts to promote competitiveness by detecting and punishing cartels. Based on the fundamental reform of EU competition law as part of Council Regulation (EC) No 1/2003[1], concrete examples of policy reforms include the implementation of a leniency program, a major revision of the fine guidelines, the promotion of the private enforcement of anti-cartel laws and an intensified cooperation between competition authorities, particularly in the fight against international cartels.

The most recent substantial reform of the (public) cartel enforcement process in the European Union was the introduction of a settlement procedure in June 2008. Generally, the EU settlement procedure in cartel cases enables the EC to close investigations faster by eliminating or reducing several procedural steps – such as full access to file, drafting and translations or oral hearings and interpretation – required under the standard procedure. Parties who admit liability and waive these procedural rights receive a discount of 10 percent on the final fine imposed. Although it took the EC until 2010 to close the first two 'test' cases under the new settlement procedure, since then, 16 out of a total of 24 decided cartel cases were (at least partly) settled turning the procedure into an influential cartel enforcement tool.

Despite the fact that the key aim of the introduction of the settlement procedure was seen in the faster and more efficient handling of cartel investigations by the EC, both academics and practitioners have identified and discussed several possible indirect impacts of the settlement procedure on various stages of the cartel enforcement process. Examples include the determination of fines, the operability of the leniency program, the probability and success of appeals, follow-on private enforcement as well as overall deterrence. Although it would generally be desirable to empirically investigate the existence and relevance of all these indirect impacts, the expected clearly negative effect of the decision to settle on the (success) probability of an appeal makes an empirical assessment of this interrelationship a particularly worthwhile exercise. This reasoning is supported by the observation that the years after the introduction of the settlement procedure indeed experienced a substantial reduction in both the absolute number as well as the rate of appeals.

In this context, we use a data set consisting of 579 firms groups convicted by the EC for cartelization from 2000 to 2015 to investigate the impact of the settlement procedure on the

[1] Council Regulation (EC) No 1/2003 of 16 December 2002 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty.

probability to file an appeal. Based on the estimation of a model of the firm's decision to appeal in the pre-settlement era, we subsequently run out-of-sample predictions to estimate the number of hypothetical appeals cases in the settlement era absent the settlement procedure. Comparing these estimates with the actual number of appeals, we find a settlement-induced reduction in the number of appeals of between 20 percent and 55 percent. We conclude that the introduction of the settlement procedure generated substantial additional benefits to society beyond its undisputed key contribution of a faster and more efficient handling of cartel investigations by the EC.

The remainder of the article is structured as follows. The subsequent second section introduces into the cartel enforcement process in the European Union, followed by a characterization of the new settlement procedure and its impact on the cartel enforcement process in general and on the appeals process in particular in Section 3. Our empirical analysis of the impact of the EU Settlement Procedure on the probability to file an appeal is presented in the fourth section. While Section 4.1 provides a detailed description of the construction of our data set, our empirical strategy is explained in Section 4.2. Following the presentation and discussion of our estimation results in Section 4.3, Section 5 concludes the paper with a summary of its major insights and a discussion of selected policy implications.

2 The Cartel Enforcement Process in the European Union

Article 101 of the Treaty for the Functioning of the European Union (TFEU) prohibits agreements between companies which prevent, restrict or distort competition in the EU and which may affect trade between Member States. Although the prohibition generally applies to both (anti-competitive) horizontal and vertical agreements, in the following, we will focus on a brief characterization of the EU enforcement process for horizontal (hard-core) cartel agreements which can broadly be subdivided further into, first, the investigation of and decision on a possible infringement by the EC and, second, the initiation of an (optional) appeals process against the EC cartel decision by the convicted parties.

2.1 Investigation and Decision by the European Commission

In general, the cartel enforcement process within the EC can be subdivided further into six subsequent stages (see, e.g., Laina and Laurinen (2013) and Bellis (2014b)): (1) initial information gathering, (2) preliminary investigations, (3) case proceedings, (4) statement of objections, (5) oral hearings and (6) decision. As cartel members are typically aware of the fact that cartel agreements are illegal, they keep them in secrecy and *initial information gathering* therefore becomes the most crucial step in the enforcement activities of the EC (see

Hüschelrath (2010) for a systematic overview). While a complaint by a competitor, a customer, another agency or a (former) employee used to be the dominant way to initiate cartel investigations in the EU, the introduction of the leniency program in 1996 – in combination with significant reforms of the program in 2002 and 2006 – provided incentives for cartel members to report their involvement in a cartel and therefore gained tremendously in importance as case generator. Furthermore, ex-officio investigations in combination with a closer international cooperation between enforcement agencies play an increasing role in contemporary cartel detection.

Subsequent to the initial gathering of information on an alleged cartel infringement, the EC can decide to open *preliminary proceedings* as part of which it can use certain investigative powers such as, e.g., dawn raids or other information requests to be able to assess whether the rules laid down in Article 101 TFEU have been breached. At the end of the preliminary proceedings, the EC has to make a decision whether the collected material appears sufficient to initiate *case proceedings* – and therefore an in-depth investigation – or alternatively to close the investigation (see EC (2013)).

In case an in-depth investigation is commenced and results in the confirmation of the EC's initial concerns, the EC furnishes a *statement of objections* (SO) in which it – based on the collected pieces of evidence – informs the respective firms in writing of the objections raised against them. According to Laina and Laurinen (2013), this (time-consuming) process regularly leads to SO's with a size of several hundreds of pages (which may additionally have to be translated in different languages). After the submission of the SO to the accused firms, they have certain rights to defense such as 'access to file', i.e., they are allowed to see all non-confidential pieces of evidence collected by the EC during its investigation (implying a time-consuming screening process of the EC beforehand to separate confidential from non-confidential pieces of evidence). Subsequently, the parties have the right to reply to the SO in writing and to request an *oral hearing* with an independent hearing officer (see EC (2013)).

After reconsidering its own analysis and results in light of the feedback of the accused firms, the EC may decide to abandon (part of) its initial objections (or even to close the case). If the EC's concerns are not fully dispelled, it drafts a decision prohibiting the respective infringement. The draft *decision* is then submitted to the Advisory Committee (composed of representatives of the Member States' competition authorities) for a final check. If fines[2] are

[2] In the European Union, cartel fines generally aim at punishment and deterrence thereby reflecting both the gravity and the duration of the infringement. The maximum fine level – which is a function of the percentage of a firm's annual sales of the product concerned in the infringement, the duration of the infringement as well

proposed in the draft decision – as usually the case in cartel investigations – the Committee meets a second time to specifically discuss them (see EC (2013)). Eventually, the draft decision is submitted to the College of Commissioners which adopts the decision.

2.2 The Appeals Process against Decisions by the European Commission

As any decision by either a court or a public authority is made under uncertainty, it is considered a constitutional (or even human) right of the losing party to seek a reconsideration of their arguments as part of an appeals (or judicial review[3]) process (see Hüschelrath and Smuda (2015) for a review of the law and economics literature). Under EU competition law in general, and for EC cartel cases in particular, the appellate court proceedings can be either one- or two-stage. At the first stage, a cartel member that has serious concerns with a (fining) decision of the EC can file an appeal with the General Court (GC) of the European Union (see EC (2013)).[4] The GC – previously known as the Court of First Instance (CFI) – is composed of at least one judge from each EU Member State, however, sits in chambers of usually three or five judges. Substantively, four main categories of argument can broadly be distinguished in an appeal against an EC cartel decision: fine levels, procedural aspects, facts/standard of proof aspects, and substantive assessment issues. In any case, the first-stage appeal must be initiated within two months of the earlier of either the publication of the Commission's decision or the notification of the firm.

Generally, the GC not only has the power to annul, reduce or increase the fines imposed by the EC, it also has full jurisdiction to review the entire Commission decision (including a repetition of the full assessment process). In practice, however, the GC usually focuses on an assessment of the factors linked to the correct application of the respective law provisions, such as cartel duration, the gravity of the infringement or the application of the leniency program (see Geradin and Henry (2005) or Harding and Gibbs (2005)). Typically, the GC does not aim at replacing the Commission's assessment of evidence with its own.

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as aggravating or mitigating circumstances – is capped at 10 percent of the overall annual turnover of a firm (see EC (2013)).

3 From a law perspective, it is important to differentiate between the *appeals process* and the *judicial review process* (see, e.g., Schweitzer (2013) for a discussion of the latter with respect to EU competition law). Technically, the appeals process focuses on decisions by lower courts that are reassessed by higher courts on the merits of the decision under appeal, while the judicial review process concentrates on assessments of decisions by a public authority (e.g., the European Commission or a national competition authority) by one or two court levels that will focus on the legality of the decision under review only. While important from a legal perspective, the economic implications of a differentiation between both processes must be considered as rather minor, thus justifying our approach to simply use the term 'appeals process' in the remainder of this article.

4 See the consolidated version of the Rules of Procedure of the General Court, Official Journal of the European Union, 2010/C 177/02.

At the second stage of the appeals process in EC cartel cases, judgments of the GC can be appealed before the European Court of Justice (ECJ) by the unsuccessful party, i.e., either the convicted firm, the EC itself or both. The ECJ is the highest European appellate court and has the power to annul, reduce or increase the fines imposed by the GC. However, in its proceedings, it limits itself to questions of law and has no jurisdiction to (re-)review the facts and analyze the evidence that the GC used to support its findings and decision.

3 The Settlement Procedure in the Cartel Enforcement Process in the European Union

In this section, we provide an introduction to the settlement procedure and its implementation in European Commission (EC) cartel cases. Following an initial general characterization of the EU settlement procedure as part of the entire EC cartel enforcement process in Section 3.1, we subsequently provide a more detailed discussion of the impact of the settlement procedure on the subsequent appeals process in Section 3.2.

3.1 Characterization of the EU Settlement Procedure

The EU Settlement Procedure was introduced in late June 2008 with Regulation 622/2008[5] and a Commission Notice[6] on the conduct of settlement procedures. It enables the European Commission to close investigations faster by eliminating or reducing several procedural steps – such as full access to file, drafting and translations or oral hearings and interpretation – required under the standard procedure.[7] Parties who admit liability and waive these procedural rights receive a discount of 10 percent on the final fine imposed. Through the introduction of the settlement notice, the EU aims at enabling "… the Commission to handle faster and more efficiently cartel cases …"[8] thus freeing up resources for additional cases and strengthening the deterrence effect of cartel enforcement.

Although it is beyond the scope of this article to present a detailed characterization of the EU Settlement Procedure,[9] it is important for our subsequent empirical analysis to briefly characterize the respective main steps of the procedure (see generally Laina and Laurinen (2013) for a more detailed description). Based on our subdivision of the cartel enforcement

[5] Commission Regulation (EC) No 622/2008 of 30 June 2008 amending Regulation (EC) No 773/2004, as regards the conduct of settlement procedures in cartel cases, OJ L 171/3, 1.7.2008. Commission Regulation (EC) No 773/2004 of 7 April 2004 relating to the conduct of proceedings by the Commission pursuant to Articles 81 and 82 of the EC Treaty (OJ L 123/18, 27.4.2004) lays down rules concerning the participation of the parties concerned in such proceedings.

[6] 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/C 167/01), OJ C 167/1, 2.7.2008.

[7] See Commission Regulation (EC) No 773/2004, OJ L 123/18.

[8] Commission Regulation (EC) No 622/2008, OJ L 171/3, p. 1.

[9] See Bay (2010), Bellis (2014a, 2014b), Olsen and Jephcott (2010) or Vascott (2013) for practitioner's perspectives on the functioning of the EU Settlement Procedure.

process into six subsequent sections characterized above, the first two stages – initial information gathering and preliminary investigations – are largely unaffected by the introduction of the settlement procedure. However, if the Commission decides to commence with case proceedings, the settlement procedure may come into play. Technically, although the parties may express their interest in a settlement, the EC decides whether to send letters to the involved companies informing of the decision to initiate proceedings in view of settlement and requesting them to express their interest in settlement. Although legally such a decision can take place at any point in time before the Commission issues a statement of objections rather the beginning of the case proceedings appears to be the most likely point in time (see Bellis (2014b)).

The settlement procedure as such can broadly be subdivided further into the following five steps:[10] (1) 1st Formal Meeting, (2) Technical Meetings, (3) 2nd Formal Meeting, (4) 3rd Formal Meeting and (5) Settlement Submission. As part of the initial formal settlement meeting, the EC presents its assessment to the parties – in bilateral meetings with EC senior staff, the case team and a settlement unit's representative – and discloses its evidence used to establish potential objections, liability and fines. In subsequent technical meetings with the case team, the parties present their views and arguments to the EC and especially discuss the scope of the infringement (i.e., duration and gravity) as well as the value of affected sales (both key drivers of the level of the fine). Although the EC does not enter any form of bargaining, in practice, these meetings provide possibilities for the companies to influence the EC's views (see, e.g., Hansen and Yoshida (2012) or Bay (2010)).

The second formal settlement meeting is then used to receive verification that an (informal) agreement between the EC and the respective companies exists regarding both the scope of infringement and the value of affected sales. Only in the subsequent third formal settlement meeting, the EC discloses the maximum amount of the fine and confirms the form and timing of the 'streamlined' (i.e., much shorter[11]) settlement submission and eventually the final decision on the settled case (see generally Bellis (2014a, 2014b) for further information).

Comparing the standard cartel enforcement process with the settled enforcement process reveals that there are no apparent differences in the first two stages. However, as soon as the case proceedings are commenced, the usual enforcement process is partly replaced and partly

[10] See generally Dekeyser (2012), Laina and Laurinen (2013), Laina and Bogdanov (2014) and Van Ginderachter (2014) for more detailed information on the EU Settlement Procedure from inside the Commission.

[11] According to Laina and Laurinen (2013), the amount of pages to be written is reduced from 'several hundreds of pages' under the standard procedure to 'on average 20 to 40 pages' under the settlement procedure.

complemented by the settlement process, ceteris paribus, suggesting an increase in EC workload and no apparent increase in procedural efficiency. However, as already indicated above, the respective procedural efficiencies are expected to be realized especially by eliminating or reducing procedural steps required under the standard procedure such as full access to file[12], drafting and translations as well as oral hearing and interpretation. Although parts of these procedures already take place before finalizing the statement of objections, the lion part is scheduled to take place after the SO under the standard procedure and the settlement procedure is therefore expected to reduce the overall duration of EC cartel investigations substantially (see Hüschelrath and Laitenberger (2015) for supporting empirical evidence).

Before we turn to a detailed discussion of a possible impact of the settlement procedure on the probability to file an appeal, it adds value to complement the general discussion of the EU cartel enforcement process in the settlement era with some descriptive empirical evidence. In this respect, Figure 1 below plots the number and types of all cartel cases decided by the European Commission from 2000 to 2015 (excluding three readopted cases[13]).

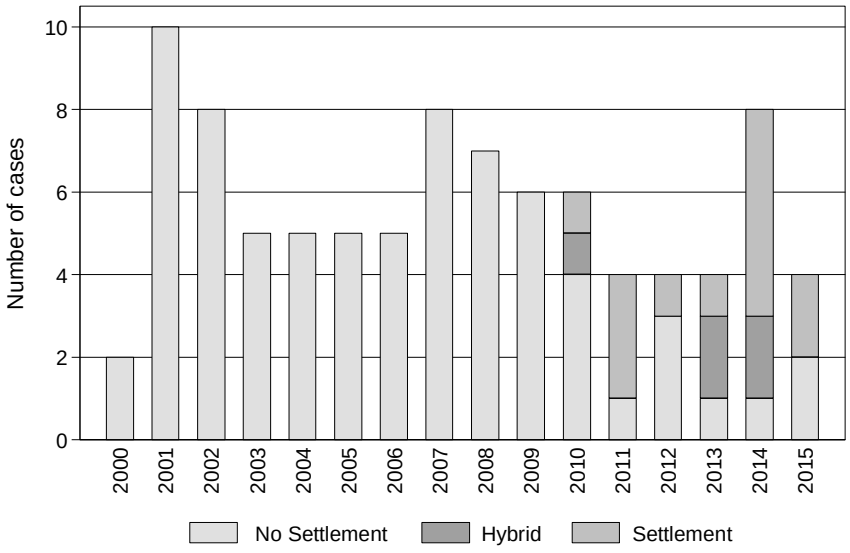

Figure 1: Number and Types of Decided EC Cartel Cases (2000-2015)

As generally shown in Figure 1, the number of decided cases varies quite substantially between the years with 2000 (2 cases) and 2001 (10 cases) delineating the spectrum. With respect to settlements, Figure 1 shows that, between 2010 and 2015, we observe in sum 18

[12] Granting full access to file usually demands resource intensive preparation efforts in the form of screening 'tens of thousands of pages of documents' for confidentiality (see Kroes (2008)).

[13] The cases are Gas Insulated Switchgear (Case COMP/39.966), Steel Beams (Case COMP/38.907) and Manufacture of other Organic Basic Chemicals (Case COMP/39.003).

settled cases out of which 5 cases[14] were so-called hybrid settlements in which typically one of the companies decided to opt out of the settlement procedure (see generally Laina and Bogdanov (2014) for further information). Furthermore, the first two cases[15] – settled in 2010 – were special in the sense that they were converted into settlement cases relatively late in the investigation process (see Vascott (2013)) thus questioning them as suitable cases for an empirical analysis of the settlement procedure. Overall, the fact that 16 out of a total of 24 decided cartel cases since 2011 were (at least partly) settled suggests that the settlement procedure has become an influential cartel enforcement tool.

3.2 The Impact of the Settlement Procedure on the Appeals Process

In addition to the desired direct impact of the settlement procedure – that is, the faster and more efficient handling of cartel investigations by the Commission – both academics and practitioners have identified and discussed several possible indirect impacts of the introduction of the settlement procedure on various stages of the cartel enforcement process. Examples include the determination of fines, the operability of the leniency program, the probability and success of appeals, follow-on private enforcement as well as overall deterrence. Without wanting to play down the relevance of any of these potential effects (see Hüschelrath and Laitenberger (2015) for a more detailed description), in the following, we limit our further assessment to the impact of the settlement procedure on the appeals process.

Although not officially stated as aim of the implementation of the EU Settlement Procedure, the Commission (at least implicitly) expects a reduced probability and success of appeals against its decisions (see, e.g., Laina and Laurinen (2013)). Although technically EC settlement decisions can still be appealed by the firms with either the General Court (GC, as first-stage EU appellate court) or the European Court of Justice (ECJ, as second-stage and highest EU appellate court), various requirements for a successful settlement – in particular admitting liability for an illegal agreement of a certain scope and value of affected sales – reduce the probability that the appeal will generally be successful and, if this is nevertheless found to be the case, that the reduction of the final fine imposed by the EC will be lower than for cases decided under the standard procedure. The expected reduction in the number of appeals is expected to lead to a corresponding reduction of the occasions at which the

[14] The cases are Animal Feed Phosphates (Case COMP/38.866), Yen Interest Rate Derivatives (Case COMP/39.861), Euro Interest Rate Derivatives (Case COMP/39.914), Steel Abrasives (Case COMP/39.792) and Mushrooms (Case COMP/39.965).

[15] The cases are DRAMs (Case COMP/38.511) and Animal Feed Phosphates (Case COMP/38.866). In our empirical analysis below, we therefore exclude the respective two cases.

Commission is forced to defend the legality of its decisions in court thus freeing up additional resources for other enforcement activities.

Although a detailed empirical assessment of a possible impact of the settlement procedure on the appeals process is conducted in Section 4 below, it adds value to cast an eye on initial descriptive evidence. If, for example, recent years did not experience a notable change in the number of appeals, it appears unlikely that such an effect can be identified econometrically. Figure 2 below therefore plots the number and rate of appeals against EC cartel decisions for our observation period from 2000 to 2015.

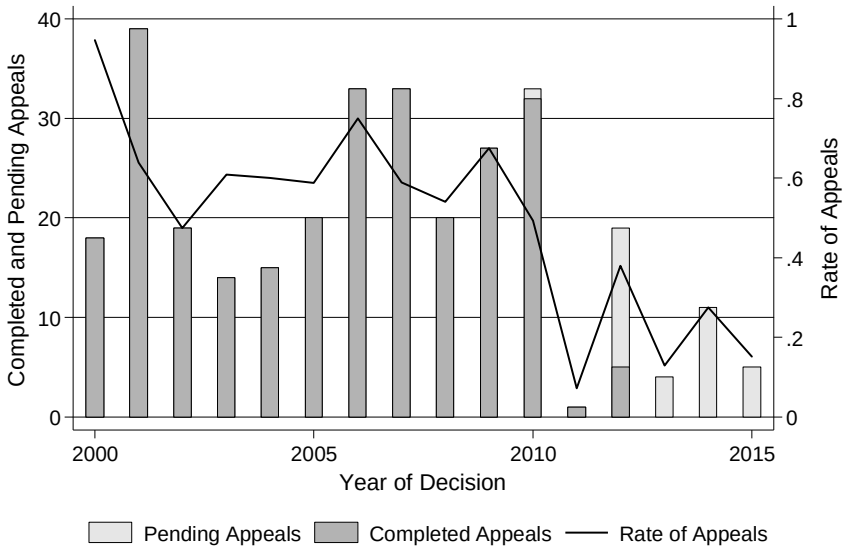

Figure 2: Number and Rate of Appeals against EC Cartel Decisions (2000-2015)

As revealed by Figure 2, in the first eleven years of the observation period, the number of appeals vary substantially with 39 appeals (2001) and 14 appeals (2003) delineating the spectrum. However, providing descriptive support for a possible impact of the settlement procedure, the number of appeals recently experienced a substantial drop. While the average number of appeals in the 2000-2010 period is 25, the corresponding average for the 2011-2015 period is found to be substantially lower at only 8 appeals (a reduction of about 68 percent).

In order to take account of the fact that different years show different numbers of decisions (with varying numbers of involved firms) and therefore different general possibilities to file an appeal, Figure 2 additionally plots the respective shares of firm groups that filed an appeal in the year of the respective EC decision. It is shown that the identified downward trend is confirmed by this alternative measure: while the 2000 to 2010 period saw an average appeal rate of 63 percent, the 2011 to 2015 period witnessed a substantial drop to 20 percent.

Although other factors might have influenced this development – suggesting an econometric analysis – our initial descriptive findings support our claim that the settlement procedure had a measurable impact on the number of appeals cases brought against EC cartel decisions.

However, before we turn to a sophisticated empirical analysis of this relationship, it appears important to study the interrelation between settlements and appeals qualitatively a little further (see Hüschelrath and Laitenberger (2015)). Generally, from an economic perspective, the decision of companies to either settle or appeal depends on the expected returns generated by the two options. In this respect, the outcome of a settlement is fixed at 10 percent of the final fine with only the exact level of the final fine being uncertain at the beginning of the settlement process. The outcome of an appeals process, however, faces a substantially higher amount of uncertainty. Assuming that companies file appeals merely for substantive and not for strategic reasons (such as achieving delays in fine payments or follow-on private enforcement etc.), consulting the statistics of past appeals cases can provide important insights. In this respect, Hüschelrath and Smuda (2015) recently find that, in the period from 2000 to 2012, about 50 percent of 467 firm groups fined by the EC decided to hand in an appeal with the GC. Out of this sub-sample of 234 firm groups, roughly 47 percent were eventually successful in the sense of receiving a reduction of the fine originally imposed by the EC. With an average fine imposed by the EC of about €31 million and an average fine reduction on appeal of about €8.4 million, the expected percentage fine reduction on appeal in the past lied at about 27 percent[16] of the final fine imposed by the EC (and therefore substantially higher than the 10 percent discount offered for settling).[17] However, taking the probability of winning an appeal into account reduces the unconditional expected reduction to about 12.7 percent.

In essence, these findings suggest that the promising appeals cases are still brought (and not settled) as the expected percentage fine reductions on appeal are much higher than for settling the case. Cases with a low appeals success probability, however, can be expected to have a higher probability to be settled simply because the respective companies are better off with the 10 percent fine discount for settling. As a consequence, the existence and size of an effect of the introduction of the settlement procedure on the number of appeals will depend,

[16] Interestingly, referring to a smaller set of (older) EC cartel cases, Ascione and Motta (2008) propose to use the expected fine reduction on appeal as benchmark for the fixing of the percentage discount on the final fine as part of the settlement procedure. They find an average expected reduction of an EC fine on appeal of about 26 percent.

[17] However, it has to be added that the companies on average waited about 57 months from the beginning of the appeals process to the final decision (either by the GC or the ECJ). See Hüschelrath and Smuda (2015) for further information. As this waiting period generates a substantial amount of additional costs, the benefit of an appeals process is reduced.

first, on the shares of higher and highest risk appeals cases before and after its introduction and second, more obviously, on the future development of the relative shares of settled cases versus non-settled (or hybrid) cases.

Further descriptive insights are provided by Figure 3 which plots the percentage shares of firm groups that decided to (1) neither appeal nor settle, (2) only settle, (3) only appeal, and (4) settle and appeal for the respective case decision year[18] from 2000 to 2015.

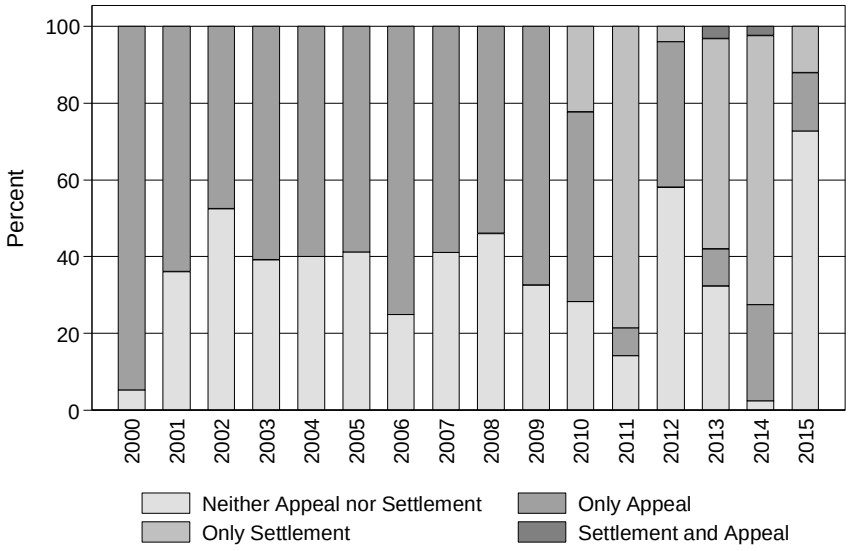

Figure 3: Shares of Settling and Appealing Firm Groups (2000-2015)

As shown in Figure 3, before the introduction of the EU Settlement Procedure in 2010, the share of firm groups that decided to appeal an EC fining decision was quite significant always exceeding the 50 percent threshold and reaching an average of 63 percent. However, the picture changes substantially after 2010. With the exceptions of 2012 and 2015, the share of settling (but not appealing) firm groups was much larger than the share of firm groups (fined under the standard procedure) that either decided to appeal or not to do so. Most interestingly, however, we find that – since the introduction of the EU Settlement Procedure – only two firm groups that decided to settle later appealed the respective EC decision.[19] In this respect,

[18] Please note that the respective settlement and appeal values correspond to the year in which the original EC decision on the cartel was made, i.e., a case decided by the EC in 2001 and finally ruled by a European appellate court in 2004 is counted as appeal in the year 2001.

[19] First, in the Euro Interest Rate Derivatives case (Case COMP/39.914), Société Générale became the first settling party to appeal an EC settlement decision alleging an error in the assessment of the fine (Case T-98/14, Société Générale versus Commission, case brought on 14 February 2014). Bellis (2014a) provides further information on the case. Second, in the Envelopes case (Case COMP/39.780), Printeos became the second settling firm group that decided to file an appeal (Case T-95/15, case brought on 20 February 2015). More generally, companies that decided to opt out of the settlement procedure might have an increased probability to appeal as they might be left with the impression that the Commission eventually punished them with higher fines for refusing to settle (see Bellis (2014a) describing the case of Timab, a company that decided to opt out of the settlement procedure in Animal Feed Phosphates (Case COMP/38.866)).

we find clear qualitative evidence for a substantial reduction of the number of appeals for the sub-group of firm groups that decided to settle.

4 Empirical Analysis

In this section, we present our empirical analysis, subdivided further into a detailed description of the construction of our data set in Section 4.1, the development of our empirical strategy in Section 4.2 and the presentation and discussion of our estimation results in Section 4.3.

4.1 Construction of the Data Set and Descriptive Statistics

The data set used in this article contains detailed information on all cartel and cartel appeals cases decided by the EC, the GC and the ECJ between 2000 and 2015. The data on the EC cartel cases were collected from decisions and press releases published on the EC's online platform[20] in the course of the investigations, while information on the corresponding appeals cases was retrieved from judgment documents available at the online platform *CVRIA*.[21] The data set generally combines case-related, firm group-related and firm-related information.

For our empirical analysis, we use the data on the firm group level – defined as firms within one group that are linked through ownership and are jointly liable for cartel fines – according to the respective EC decisions, rather than on the firm level as most variables do not differ between single firms within one group.[22] Not all types of information were available for all firm groups – resulting in a sample combining information on 579 firm groups that participated in 109 cartels (which were dealt with in 86 separate cases by the EC). Table 1 below presents the descriptive statistics of the data set while Table 4 in the Annex provides a detailed overview of the names, types and descriptions of the variables used in our analysis.

As shown in Table 1, we have subdivided our set of variables into three categories: legal environment-related variables, group-related variables and case-related variables. Furthermore, in addition to the respective descriptive statistics for the entire population of cartel cases decided between 2000 and 2015 ('all'), we provide the corresponding information for two specific subsamples: first, all cases in which the settlement procedure factually could not be applied (the 'pre-settlement era') and all cases in which this was realistically possible

[20] See http://ec.europa.eu/competition/antitrust/cases/index.html (last accessed on 9 January 2016).
[21] See http://curia.europa.eu (last accessed on 9 January 2016).
[22] Using firm level data would therefore result in an unjustified multiplication of the sample size, without providing additional information.

(the 'settlement era').[23] Second, we also report the respective descriptive statistics for all appellants (in the pre-settlement era) and all settling firm groups (in the settlement era).

Table 1: Descriptive Statistics – All Cases from 2000-2015

Variable	All		Pre-Settlement Era		Pre-Settlements Era: Appellants		Settlement Era		Settlement Era: Settling firms	
	Mean	*St D*	*Mean*	*St D*	*Mean*	*St D*	*Mean*	*St D*	*Mean*	*St D*
Legal environment-related variables										
settle_notice	0.26	(0.44)	0.00	(0.00)	0.00	(0.00)	1.00	(0.00)	1.00	(0.00)
fine_glines_06	0.49	(0.50)	0.31	(0.46)	0.28	(0.45)	1.00	(0.00)	1.00	(0.00)
len_notice_02	0.36	(0.48)	0.47	(0.50)	0.46	(0.50)	0.01	(0.12)	0.00	(0.00)
len_notice_06	0.26	(0.44)	0.01	(0.12)	0.01	(0.11)	0.99	(0.12)	1.00	(0.00)
Group-related variables										
g_a1_appeal	0.53	(0.50)	0.63	(0.48)	1.00	(0.00)	0.26	(0.44)	0.02	(0.13)
g_settlement	0.11	(0.31)	0.00	(0.00)	0.00	(0.00)	0.42	(0.49)	1.00	(0.00)
g_no_firms	1.99	(1.44)	1.88	(1.36)	1.98	(1.44)	2.32	(1.61)	2.55	(2.14)
g_dur	76.82	(61.00)	86.69	(64.48)	84.02	(62.20)	48.33	(37.18)	50.53	(36.50)
g_c_acbi	0.15	(0.36)	0.20	(0.40)	0.22	(0.42)	0.01	(0.08)	0.00	(0.00)
g_c_mcbi	0.18	(0.38)	0.19	(0.39)	0.24	(0.43)	0.13	(0.34)	0.13	(0.34)
g_rep_off	0.08	(0.27)	0.10	(0.31)	0.12	(0.32)	0.01	(0.08)	0.00	(0.00)
g_def_fine_final	32.68	(80.48)	33.25	(77.93)	45.54	(92.45)	31.01	(87.67)	36.93	(77.25)
g_lfirst	0.16	(0.37)	0.14	(0.35)	0.03	(0.18)	0.22	(0.42)	0.29	(0.46)
g_lfollower	0.50	(0.50)	0.53	(0.50)	0.59	(0.49)	0.42	(0.49)	0.48	(0.50)
Case-related variables										
c_detect	0.51	(0.50)	0.59	(0.49)	0.64	(0.48)	0.30	(0.46)	0.34	(0.48)
c_g_worldwide	0.12	(0.32)	0.04	(0.20)	0.04	(0.19)	0.34	(0.48)	0.03	(0.18)
c_no_firms	14.41	(11.63)	15.17	(12.86)	15.93	(12.75)	12.21	(6.53)	9.40	(6.76)
Observations	579		430		270		149		62	

Notes: Means are reported with standard deviation in parentheses. The sample consists of all cartel and cartel appeals cases finally decided by the European Commission, the General Court and the European Court of Justice between 2000 and 2015. Data is used on the firm group level, i.e., firms that are linked through ownership and are jointly liable for fines are grouped together.

Starting off a brief discussion of the descriptive statistics shown in Table 1 with the *legal environment-related* variables, we find that for 26 percent of all firm groups in the sample, the settlement procedure was technically applicable. The corresponding results for the other two major reforms in EC cartel enforcement – the fine guidelines and the leniency program – however, look quite different. While the 2006 EC Guidelines for the Method of Setting Fines ('Fine Guidelines') were applicable in 49 percent of all firm groups in the sample, the two most recent leniency programs were applicable for 36 percent or 26 percent of all firm groups, respectively. However, as further revealed by Table 1, the timing of the respective reforms factually determine that all (or virtually all, respectively) convicted firm groups in the settlement era fall under the 2006 Fine Guidelines or the 2006 Leniency Notice, respectively.

[23] Due to the fact that the first two settled cases in 2010 (DRAMs, Case COMP/38.511 and Animal Feed Phosphates, Case COMP/38.866) were rather specific 'test' cases (see Section 3.1 above for further information), our 'settlement era' applies to all cases decided after 2010. Besides disregarding these two 'test' cases we also had to exclude the most recent case (Optical Disc Drives, Case COMP/39.639) from the settlement era as – at the time of this writing – only an EC press release providing incomplete information was available.

Turning to the *group-related* variables, we find that about 53 percent of all 579 firm groups in our data set decided to file an appeal. However, comparing the respective values for the pre-settlement era and the settlement era reveals that appeals rate experienced a substantial reduction from about 63 percent to 26 percent. Furthermore, only 2 percent of all settling firm groups[24] later decided to file an appeal thereby confirming the observations in Section 3 above that the large majority of appeals were filed by non-settling firm groups. Furthermore, we find that for 11 percent of all firm groups in our sample the settlement procedure was actually applied. Conditioning on the subsample of firm groups for which the settlement procedure was technically available, 42 percent of them decided to settle with the EC.

Besides these important structural differences in the appeals and settlement variables between the different sub-periods, the remaining group-related variables mostly show less substantial differences. While the number of firms within a group increases from about 1.88 firms in the pre-settlement era to about 2.32 in the settlement era, the duration of cartel participation by the group experienced a remarkable decrease from about 87 months to 48 months. Furthermore, Table 1 reveals that – although both aggravating and mitigating circumstances[25] generally play a minor role with a presence in only 15 or 18 percent of all firm groups, respectively – especially the aggravating circumstances lose further in significance in the settlement era (being present in only about 1 percent of the firm groups). A very comparable development can be observed for the repeat offender variable experiencing a downward trend from about 10 percent in the pre-settlement era to about 1 percent in the settlement era.

With respect to the average final fine imposed by the EC[26] (deflated, in million EUR), we observe a reduction of about 2 million EUR when comparing pre-settlement and settlement eras. Furthermore, we find that appellants in the pre-settlement era and settling firm groups in the settlement era are characterized by substantially higher final fines (about 45.6 million EUR and about 36.9 million EUR, respectively) than the respective averages. Last but not least, the two leniency-related variables representing the respective first applicant and possible subsequent applicants reveal that about 16 percent of all groups in the data set successfully applied for leniency as first applicant – regularly receiving a fine waiver – while

[24] In our sample, this is only the case for Printeos, a member of the Envelopes cartel (Case COMP/39.780).

[25] Aggravating circumstances considered by the EC are, e.g., repeat offenses, refusal to cooperate with the EC or the role of leader in an infringement. Mitigating circumstances, however, include, e.g., the provision of evidence that the infringement was terminated as soon as the EC intervened or proof that the anti-competitive conduct has been authorized or encouraged by public authorities or by legislation.

[26] We are fully aware of the fact that the final fine is affected by the settlement procedure. In this respect, it would be desirable to, e.g., use the basic fine as a measure for the expected fine. However as this information was often not available in the publicly available case documents, we use the final fine in our empirical analysis (thus assuming that it is highly correlated with the expected fine at the stage of the investigation).

a further 50 percent successfully received a fine reduction as leniency follower. Interestingly, for the sub-sample of settling firm groups, the respective percentage of firm groups that received a fine waiver is particularly high with an average value of 29 percent (compared to the 16 percent value for the entire sample).

Finally, regarding the *case-related* variables, Table 1 above reveals that about half of all firm groups operated in cartels that have been detected while operating. However, analyzing the respective values for the pre-settlement era and the settlement era separately reveals a substantial drop from 59 percent to 30 percent (suggesting changes in the types of cartels being detected by the EC). Furthermore, the settlement era sub-sample shows a remarkable increase in the share of firm groups that participated in cartels where the market was considered worldwide. While this characteristic was attached to only about 4 percent of all firm groups in the pre-settlement era, the respective value increased to about 34 percent in the settlement era. Last but not least, the number of firms involved in a cartel experiences a decrease from 15.2 firms in the pre-settlement era to 12.2 firms in the settlement era.

4.2 Empirical Strategy

Following the initial description of the construction of our data set and the descriptive statistics, we continue with the development of our empirical strategy. Based on our aim to assess the impact of the settlement procedure on the probability to file an appeal, the main empirical challenge lies in the separation of the effect of the settlement procedure and other confounding factors such as, e.g., changes in the composition of firms and cases.

In principle, a suitable empirical strategy to answer our research question would be to take all observations of the settlement era to identify the determinants of a firm's decision to settle with the EC and to subsequently use this information to back-cast the respective decisions for the pre-settlement era. A simple comparison of the predicted shares with the actual shares would then give an indication how an earlier introduction of the settlement procedure would have affected the number of appeals.

Although the described empirical strategy appears straightforward, (at least) two severe obstacles prevent an application in our case. First, the fact that a firm is engaged in a settlement is the result of an iterative decision process with the EC deciding first whether to offer the opening of a settlement procedure – making use of (at least partly) unobservable criteria – and the firm subsequently being left with the final decision whether to settle or not. Second, as already discussed in Section 3 above, factors exist which make firms (or cases) more eligible for an application of the settlement procedure from the EC's perspective (which

are partly perfectly correlated with the observable settlement decisions). For example, we find no case in our data with either a repeat offender or the presence of aggravating circumstances which was eventually settled. As a consequence, estimating a model without taking account of these factors would lead to biased estimates and predictions.

Due to these severe problems with the back-casting approach just described, we simply reverse our empirical strategy in the sense that we start off by estimating a model of a firm group's decision to appeal an EC cartel decision in the pre-settlement era. This model is then taken to conduct an out-of-sample prediction of the firm group's decision to file an appeal for the settlement era under the hypothetical (counterfactual) situation that the settlement procedure would not have been introduced.[27] Subsequently, a comparison of the predicted with the actual shares allows conclusions on the effect of the settlement procedure on the probability to appeal.

Turning to the concrete implementation of our empirical strategy, the first step focuses on the identification of possible determinants of firm groups to file an appeal against a cartel decision by the EC. In this respect, our choice of variables is generally guided by the analysis of Hüschelrath and Smuda (2015), however, we implemented a few adjustments to improve the forecast performance of our models using a longer data set.[28] As already mentioned in Section 4.1 above, we generally differentiate between three sets of independent variables that are likely to influence the probability to file an appeal: legal environment-related, group-related and case-related.

Starting off with the *legal environment-related* variables, we control for the application of the revised 2006 EC Guidelines for the Method of Setting Fines (*fine_glines_06)* and of both the 2002 and 2006 EC Leniency Notice (*len_notice*) as all three reforms are likely to have increased transparency thus reducing the probability to appeal.

With respect to the *group-related* drivers of the decision to appeal, we, first, hypothesize that the larger the number of firms within one group (*g_no_firms)* the more likely it becomes that at least one firm identifies a reason to file an appeal (be it either alleged errors in the decision or other (tactical[29]) motives). Second, the longer the respective firm group participated in the cartel (*g_dur*), the more difficult it becomes for the EC to collect sufficient

[27] An additional advantage of the 'forecasting' approach followed in this paper is that the decision to appeal is entirely with the firm group itself (while a settlement decision is made iteratively by the two (opposing) parties).

[28] These adjustments are driven by quality criteria such as the quality of in- and out-of-sample predictions or information criteria such as the AIC.

[29] As discussed in greater detail in Hüschelrath and Smuda (2015), possible tactical motives to file an appeal include the delay of fine payments (motivated by, e.g., current liquidity problems) or the postponement of follow-on private damage claims into the distant future.

evidence to decide on, e.g., the exact start date of cartel participation thereby increasing the probability that the firm group will disagree and therefore decides to appeal. Third, both aggravating and mitigating circumstances – identified by the EC during their case assessment – may influence the probability to appeal. While the presence of aggravating circumstances (*g_c_acbi*) such as status as ringleader leads to fine increases suggesting an increased probability to appeal the respective decision, the presence of mitigating circumstances (*g_c_mcbi*) such as a (erroneous) prior approval of an infringement by a public authority is expected to reduce the probability to file an appeal.

Fourth, for reasons similar to the aggravating circumstances just discussed, the characteristic as repeat offender (*g_rep_off*) may result in an increased probability to appeal the respective EC decision (e.g., as the respective firms are left with the impression that the EC imposed disproportionate fine levels for both punishment and deterrence purposes (see Hüschelrath and Smuda (2015)). Fifth, we further hypothesize that the larger the fine (*g_def_fine_final),* the larger are the consequences for the respective firms with respect to both share- and stakeholders and the larger, therefore, the desire to reduce the fine through an appeals process. Finally, we assume that cooperating with the EC as part of the leniency program reduces the firms group' incentives to file an appeal. Due to the fact that leniency applicants have to fully cooperate with the EC in order to qualify for a fine reduction or even a fine waiver, the EC can base its fining decision on detailed documentation thereby reducing the probability of error. As only the first firm group that reports an infringement to the EC will receive a fine waiver – however, the following firm groups are still eligible to get (smaller but still significant) fine reductions – we capture the overall impact of the leniency program by two separate variables (*g_lfirst* and *g_lfollower*).

Last but not least, we include three *case-related* variables. First, we expect that it is easier for the EC to collect sufficient evidence for cartels that are caught while operating (*c_detect*) compared to cartels that were already terminated at the point of detection. Ceteris paribus, we therefore expect that a cartel 'caught in the act' have a reduced probability to file an appeal (as it anticipates the reduced success probabilities). Second, we hypothesize that both worldwide cartel markets (*c_g_worldwide*) and the number of cartel firms (*c_no_firms)* make it, on the one hand, more difficult for the EC to collect sufficient evidence. On the other hand, an increasing number of (non-European) countries and firms generally makes it more likely that at least one party decides to file an appeal. Both variables are therefore expected to have a positive effect on the probability to file an appeal.

Turning to our main model to estimate the probability of filing an appeal, the binary character of our dependent variable – being equal to one if a firm group appealed the EC decision and zero otherwise – suggests an application of a Probit model ('model (1)') of the following form:

$$P(Appeal = 1|\boldsymbol{x}, \textit{Pre-Settlement Era}) = F(\beta_0 + \beta_1' X)$$

with $P(Appeal = 1|\boldsymbol{x}, \textit{Pre-Settlement Era})$ indicating the response probability of a firm group in the pre-settlement era[30] to appeal an EC decision and $\boldsymbol{x}$ denoting the set of explanatory variables that determines a group's decision to appeal.

As robustness check, we also conduct the same analysis using the same firm groups from the pre-settlement era plus all non-settled cases from the settlement era to calibrate our model.[31] In this specification (model (2)), we additionally control for the applicability of the settlement procedure thus estimating a Probit model of the following form:

$$P\big(Appeal = 1\big|\boldsymbol{x}, \textit{Non-Settled Cases}\big) = F(\beta_0 + \beta_1' X + \beta_2 settle\_notice).$$

The estimated coefficients are then used to conduct an out-of-sample prediction of (hypothetical) appeals of firm groups in the settlement era absent the introduction of the settlement procedure (model 1) – and for model (2), absent the application of the settlement procedure. More specifically, for model (1), we use the following estimated latent equation to predict the probability of an appeal

$$\hat{P}(Appeal|\boldsymbol{x}, \textit{Settlement Era}) = F(\hat{\beta}_0 + \hat{\beta}_1' X)$$

which is adapted to

$$\hat{P}(Appeal|\boldsymbol{x}, \textit{Settlement Era}) = F(\hat{\beta}_0 + \hat{\beta}_1' X + \hat{\beta}_2 \textit{Settlement Notice}).$$

for model (2). For predicted probabilities $\hat{P}$ above 50 percent, we classify the corresponding firm group as a *hypothetical* appellant. We are particularly interested in the respective predictions for firm groups that settled in order to assess whether the introduction of the settlement procedure was causal for the decline in appeals proceedings.

4.3 Estimation Results

In this section, we present the results of our empirical analysis. Along the lines of our empirical strategy, we start off with a discussion of the results for the probit estimations aiming at identifying important determinants of the decision to appeal an EC cartel decision.

[30] Technically, this means that we use the data of all firm groups whose cases were decided between 2000 and 2010, however, we exclude the first two atypical 'test' settlement decisions DRAMs (Case COMP/38.511) and Animal Feed Phosphates (Case COMP/38.866).

[31] In principle, it would be desirable to exploit the information from firm groups within settled cases that decided not to settle. However, the fact that to date only one such case exists – Animal Feed Phosphates (Case COMP/38.866) – makes such an endeavor unfeasible.

Following a discussion of the predictive power of the two different specifications, we proceed with an assessment of the respective out-of-sample predictions of appeals filings in the settlement era.

With respect to the determinants of the decision to file an appeal, Table 2 below reports the estimation results for our two sub-samples of non-settling firm groups. Subsample 1 includes all firm groups in the pre-settlement era while subsample 2 additionally incorporates all non-settling firm groups in the settlement era.

Table 2: Estimation Results for the Decision to File an Appeal (Avg. Marginal Effects)

	(1) Pre-Settlement Sample		(2) Non-Settlement Sample	
Legal environment-related variables				
fine_glines_06	-0.133**	(0.07)	-0.134**	(0.07)
len_notice	-0.042	(0.07)	-0.041	(0.07)
settle_notice			-0.141*	(0.08)
Group-related variables				
g_no_firms	0.044***	(0.01)	0.048***	(0.01)
g_dur	-0.001**	(0.00)	-0.001**	(0.00)
g_c_mcbi	0.132**	(0.07)	0.116*	(0.06)
g_c_acbi	-0.164*	(0.09)	-0.184**	(0.09)
g_rep_off	0.321***	(0.11)	0.371***	(0.12)
g_def_fine_final	0.003***	(0.00)	0.003***	(0.00)
g_lfirst	-0.566***	(0.07)	-0.575***	(0.06)
g_lfollower	-0.074	(0.05)	-0.076*	(0.04)
Case-related variables				
c_detect	0.102*	(0.06)	0.108*	(0.06)
c_g_worldwide	0.046	(0.08)	0.173***	(0.06)
c_no_firms	0.001	(0.00)	0.001	(0.00)
Observations	*430*		*517*	
McFadden Pseudo R^2	*0.25*		*0.27*	
Correctly classified	*0.73*		*0.74*	
False appeals for non-appellants	*0.53*		*0.44*	

*Notes: For model (1), the sample consists of all cartel cases decided by the EC from 2000 until 2010 (the pre-settlement era). For model (2), the sample consists of all cases from 2000 to 2015 which were not settled. Data is exclusively at the firm group level, i.e., firms that are linked through ownership and are jointly liable for fines are grouped together. The table shows average marginal effects (with standard errors clustered on the case level) for the firm groups for which all information was available; t statistics are in parentheses; * indicates p < 0.1; ** indicates p < 0.05; and *** indicates p < 0.01.*

As the estimation results for the two models presented in Table 2 do not differ substantially in terms of both direction and significance of the explanatory variables, we concentrate our discussion on the results of model 1 and point out differences to model 2 when necessary.[32] Starting off with the *legal environment-related* variables, we find that firm groups fined under the revised 2006 EC Fine Guidelines have a significantly lower probability to file an appeal – compared to groups that were fined under the preceding guidelines from 1998 – thus

[32] The results are comparable to those in Hüschelrath and Smuda (2015) who use a slightly different specification and a smaller sample of EC cartel decisions from 2000 to 2012. While the direction and significance of the respective variables remain unchanged, notable differences are the smaller coefficients regarding the variables *fine_glines_06* and *g_lfollower* found here.

supporting our hypothesis derived above that the reform increased the transparency of EC cartel decisions. Furthermore, although the EC Leniency Program as such is not found to have a significant effect on the probability to file an appeal, the (diverging) results for the two specific leniency-related characteristics (first applicants and followers) will be discussed as part of the group-related variables below.

For the *group-related* variables, we find empirical support for our hypothesis that the probability to file an appeal increases with the number of firms in a group. However, against our prior expectations, the firm group's probability to appeal is reduced with an increasing duration of cartel participation. Equally contradictory to our prior expectations are the results for the presence of both mitigating and aggravating factors. While the presence of the former leads to an increase in the probability to appeal, the coefficient of the latter shows a negative sign. As already argued in Hüschelrath and Smuda (2015), a possible explanation for the positive effect of mitigating factors is that the respective firm groups expected larger fine reductions than actually imposed by the EC and therefore decide with a higher probability to appeal the decision. For the aggravating factors, the substantial reduction in their presence in the settlement era – shown in Table 1 above – generally suggests that the observed effect is driven by a small number of firm groups/cases.

Again confirming our prior expectations, we find that repeat offenders are more inclined to challenge an EC decision through an appeal than first-time offenders. Furthermore, the size of the final fine imposed by the EC has the expected positive impact on the probability of filing an appeal. We also find support for our hypothesis that firm groups that participated in the leniency program have a significantly lower probability to file an appeal. On average, the probability of appealing an EC decision is about 57 percent lower for the first applicants and about 7 percent lower for the followers (compared to firms that did not apply for leniency). However, the latter coefficient is only significantly different from zero for model 2.

Last but not least, for the *case-related* variables, we find – against our prior expectation – that firm groups whose cartel was detected while operating have an increased probability to file an appeal. Additionally, we find support for our hypothesis that that firm groups who are part of worldwide cartels have a significantly higher probability of filing an appeal – however, the respective coefficient is only found to be significant in model 2 (which also includes non-settled cases from 2011 to 2015 who generally show a substantially higher share of worldwide cartels as documented in Table 1 above). Finally, the expected positive effect of the number of firms involved in the cartel on the probability to appeal is neither found in model 1 nor model 2.

Turning to an assessment of the predictive power of the two different specifications, the lower part of Table 2 reports different statistics who provide important further insights in this respect. While the McFadden Pseudo R^2 values indicate that all our models predict the outcome better than the constant, the Pseudo R^2 can only be compared for estimations with the same sample (size). In sum, both models are found to predict around three quarters of all appeal and non-appeal decisions correctly. However, it should also be stated clearly that in model 1 – for about half of the non-appealing firm groups – an appeal is falsely predicted. In that respect, the expanded sample taken as basis for our model 2 estimations provides better results.

Additionally, it is important to mention that the results for the *settle_notice* variable included in model 2 suggest that firm groups in cases that were decided in the settlement era but not settled have an about 14 percent lower probability of filing an appeal. Possible explanations for this result are (at least) twofold: on the one hand, a general time trend might lead to fewer appeals over time.[33] If such a trend exists, the predictions of model 1 would be upward biased. On the other hand, the finding that non-settling firms file fewer appeals might be caused by a selection issue. In particular, it cannot be ruled out that the EC systematically selects cases for a settlement that would have had a high probability of an appeal (if not being settled). If parts of these determinants are unobserved, then model 2 would suffer from endogeneity by an omitted variable and our estimates are biased. Correspondingly, the predicted share of appeals in the settlement era would be downward biased. Taking both sets of arguments into account, it appears reasonable to use the predictions of model 1 as upper bound and those of model 2 as lower bound for the (hypothetical) number of appeals in the settlement era absent the settlement procedure.

Turning from the identification of important determinants of the decision to appeal an EC cartel decision to the respective out-of-sample predictions of appeals filings in the settlement era absent the settlement procedure, Table 3 provides actual and predicted shares of firm groups filing an appeal for both models.

[33] In fact, such a (negative) time trend is found in Hüschelrath and Smuda (2015) for a shorter sample of EC cartel decisions from 2000 to 2012.

Table 3: Prediction of Hypothetical Appellants in the Settlement Era

	(1)	(2)
Actual Shares in Settlement Era		
Appeals	0.26	
Appeals | Settlement	0.02	
Appeals | No Settlement	0.43	
Predictions in Settlement Era		
Appeals	0.58	0.33
Appeals | Settlement	0.53	0.26
Appeals | No Settlement	0.61	0.38
Quality of Out-of-Sample Predictions		
Correctly predicted appeals	0.79	0.66
Correctly predicted non-appeals in non-settled cases	0.44	0.69

As shown in Table 3, for model 1, the prediction for the settlement era is that 58 percent of firm groups would have filed an appeal instead of only 26 percent that actually decided to do so. This can mainly be attributed to hypothetical appeals by firm groups that decided to settle (53 percent would have appealed as opposed to 2 percent that actually have). This substantial difference between actual and hypothetical appeals suggests that the settlement procedure was also applied in cases in which the respective firm groups were rather prone to appeals proceedings. However, our results also show that model 1 predicts more appeals for firm groups in non-settled cases (61 percent in contrast to actual 43 percent). As discussed before, this result might be driven by an additional confounding factor in the settlement era leading to a different probability for firm groups filing an appeal.

Turning to the results for model 2, it is predicted that only 33 percent of firm groups would have filed an appeal in the settlement era (absent the settlement procedure). Furthermore, the model predicts that 26 percent of firm groups that settled the case and 38 percent of the non-settlers would have appealed absent the settlement procedure. Interestingly, the latter number is closer to the actual share of appellants for the non-settling firm groups (which was expected as these firm groups were also included in the calibration of the model).

In sum, we find that our predictions of the hypothetical number of appeals in the settlement era (absent the settlement procedure) lie in a range from 33 percent (lower bound by model 2) to 58 percent (upper bound by model 1). As the actually observed appeals rate of 26 percent is clearly below this range, we can conclude that the introduction of the settlement procedure had a significantly negative impact on the probability to file an appeal. In absolute terms, we can say that out of the 149 firm groups convicted for cartelization in the settlement era, between 49 and 86 firm groups would have appealed the EC decision absent the settlement procedure, compared to the 39 firm groups that actually decided to do so. In other words, our estimation results suggest that the introduction of the settlement procedure avoided the filing

of between 10 and 47 appeals against EC cartel decisions only in the five year period from 2011 to 2015 – a substantial reduction of between 20 and 55 percent.

5 Conclusion

In many jurisdictions, a significant share of legal disputes is not investigated and decided in court but is solved through bargaining as part of settlement procedures. Examples include settlements in patent litigation or – more generally – plea bargaining as settlement procedure frequently applied in criminal cases in the United States. Although the full set of motivations behind the introduction of settlement procedures partly differ, they all aim at saving resources in the form of legal fees, trial costs or the opportunity costs of time associated with a trial.

The 2008 European Union (EU) settlement procedure in cartel cases – allowing the European Commission (EC) to close investigations faster by eliminating or reducing several procedural steps required under the standard procedure – is no exception to this rule. Although the procedure has certain special characteristics as it, first, focuses on the relationship between a public authority and private firms and, second, it does not avoid an official investigation and decision, the key aim behind its introduction was the faster and more efficient handling of cartel cases by the EC.

However, beyond this direct impact of the introduction of the settlement procedure on the procedural efficiency of EC cartel investigations, the question is raised whether a measurable impact on the subsequent (and final) stage of the cartel enforcement process – the appeals process – can be identified. By avoiding a significant share of follow-on appeals cases, the positive overall welfare impact of the settlement procedure would likely increase substantially – given the fact that (in the pre-settlement era) on average 63 percent of all convicted firm groups decided to file an appeal against the respective EC decision triggering follow-on proceedings with an average length of about 57 months.

In this context, we have used a data set consisting of 579 firms groups convicted by the EC for cartelization from 2000 to 2015 to investigate the impact of the settlement procedure on the probability to file an appeal. Based on the estimation of a model of the firm's decision to appeal in the pre-settlement era, we subsequently ran out-of-sample predictions to estimate the number of hypothetical appeals cases in the settlement era absent the settlement procedure. Comparing these estimates with the actual number of appeals, we found a settlement-induced reduction in the number of appeals of between 20 percent and 55 percent – saving not only the associated trial costs for the involved firms but also freeing additional resources at the respective appellate courts and the EC itself (as less time is needed to defend its position in court).

Beyond these rather obvious (additional) savings achieved by the introduction of the settlement procedure through its knock-on effect on the number of appeals, the overall welfare implications demand a more differentiated discussion. First, it is important to remind of the important control and error-correction functions of the appeals process in legal systems. As a consequence, a reduction in the number of appeals can only be considered welfare-enhancing if inefficient appeals proceedings are avoided (but efficient appeals are still brought). Although currently, there is no reason to believe that the settlement procedure deters efficient appeals, future research will have to investigate in greater detail what types of appeals cases are still brought and whether there are indications that the settlement procedure has a negative impact on the overall quality of EC cartel decisions (possibly anticipating that a subsequent (error-correcting) appeals process is much more unlikely).

Second, from an overall deterrence perspective, on the surface, the introduction of the settlement procedure as such could be considered as counterproductive as it reduces the expected fine for cartelization. However, this negative effect can be overcompensated by, first, an increase in the probability of detection by the EC if it invests the freed resources into the detection and prosecution of additional cartels. Second, overall deterrence may experience a net increase in the settlement era as the avoidance of a lengthy appeals process leads to quicker final public enforcement decisions on the respective cases and therefore allows a sooner start of follow-on private enforcement litigation. Although the size of this additional deterrence effect will largely depend on the success of the implementation of the Directive on Antitrust Damages Actions[34] in the Member States of the European Union, it appears likely that the pressures on the cartel firms – and therefore the overall deterrence effect of anti-cartel laws – will increase rather than decrease in the years to come.

[34] Directive of the European Parliament and the Council on Certain Rules Governing Actions for Damages under National Law for Infringements of the Competition Law Provisions of the Member States and of the European Union (PE-CONS 80/14). The Directive was signed into law on 26 November 2014 leaving the Member States two years to implement it in their national legal systems.

References

Ascione, A. and M. Motta (2008), Settlements in Cartel Cases, EU Competition Law and Policy Workshop/Proceedings, Florence.

Bay, M. (2010), EU Cartel Settlements: Theory and (first) Practice, Presentation, IBRAC Seminar, 26 November 2010, Guarujá.

Bellis, J.-F. (2014a), General Overview of the EU Cartel Settlement Procedure, Competition Policy International, 1-6.

Bellis, J.-F. (2014b), Cartel Settlements, Van Bael & Bellis, Presentation, 28 November 2014, Madrid.

Dekeyser, K. (2012), Alternative Procedures in the European Antitrust Legal Framework – Cartel Settlements and Commitment Decisions, Presentation, EU-China Competition Policy (Competition Week 3), Wuxi.

European Commission (2013), Competition: Antitrust Procedures in Anticompetitive Agreements, Brussels.

Geradin, D. and D. Henry (2005), The EC Fining Policy for Violations of Competition Law: An Empirical Review of the Commission Decisional Practice and the Community Courts' Judgments, European Competition Journal 1 (2), 401-473.

Hansen, M. and D. Yoshida (2012), Cartel Settlements & Leniency in the United States and the European Union, Presentation, 21 November 2012, Tokyo.

Harding, C. and A. Gibbs (2005), Why Go to Court in Europe? An Analysis of Cartel Appeals 1995-2004, European Law Review 30 (3), 349-362.

Hüschelrath, K. (2010), How are Cartels Detected? The Increasing Use of Proactive Methods to Establish Antitrust Infringements, Journal of European Competition Law and Practice 1 (6), 522-528.

Hüschelrath, K. and U. Laitenberger (2015), The Settlement Procedure in EC Cartel Cases: An Empirical Assessment, ZEW Discussion Paper No. 15-064, Mannheim.

Hüschelrath, K. and F. Smuda (2015), The Appeals Process in the European Commission's Cartel Cases, Journal of Empirical Legal Studies, forthcoming.

Kroes, N. (2008), Settlements in Cartel Cases, Speech Manuscript, 12th Annual Competition Conference, 19 September 2008, Fiesole.

Laina, F. and A. Bogdanov (2014), The EU Cartel Settlement Procedure: Latest Developments, Journal of European Competition Law & Practice 5 (10), 717-727.

Laina, F. and E. Laurinen (2013), The EU Cartel Settlement Procedure: Current Status and Challenges, Journal of European Competition Law & Practice 4 (4), 302-311.

Olsen, G. and M. Jephcott (2010), The European Commission's Settlement Procedure, Antitrust 25 (1), 76-80.

Schweitzer, H. (2013), Judicial Review in EU Competition Law, in: Lianos, I. and D. Geradin, Handbook on European Competition Law – Enforcement and Procedure, Edward Elgar, Cheltenham.

Van Ginderachter, E. (2014), European Commission's Settlement Procedure – A Success Story, Presentation, 28 November 2014, Madrid.

Vascott, D. (2013), EU Cartel Settlements: Are They Working?, Global Competition Review, published on website on 8 April 2013.

Annex

Table 4: Variables in the Data Set

Variable	Type	Description
Legal environment-related variables		
settle_notice	Binary	=1 if the EC Settlement Notice was applicable
fine_glines_06	Binary	=1 if the EC Guidelines on the Method for Setting Fines (2006) were applied
len_notice	Binary	=1 if the EC Leniency Notice (2002 or 2006) was applicable
Group-related variables		
g_a1_appeal	Binary	=1 if group brought an appeal against the EC decision before the GC
g_settlement	Binary	=1 if group settled
g_no_firms	Integer	Number of firms within group
g_c_acbi	Binary	=1 if aggravating circumstances were taken into account in the EC decision
g_c_mcbi	Binary	=1 if mitigating circumstances were taken into account in the EC decision
g_dur	Integer	Duration of cartel participation by the group, in months
g_def_fine_final	Integer	Final fine imposed by the EC, in million Euros, deflated
g_rep_off	Binary	=1 if group is a repeat offender
g_lfirst	Binary	=1 if group successfully applied for leniency and was the first applicant
g_lfollower	Binary	=1 if group successfully applied for leniency and was not the first applicant
Case-related variables		
c_detect	Binary	=1 if cartel was detected before its end
c_g_worldwide	Binary	=1 if cartel market is worldwide
c_no_firms	Integer	Number of firms involved in the cartel

Sources: Data on EC decisions obtained from EC case database; data on GC/ECJ decisions obtained from CVRIA database