

# On cartel deterrence and fines in the EU\*

Massimo Motta  
European University Institute, Florence and  
Università di Bologna

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## 1 Introduction

The recent adoption by the European Commission of a new Notice on how to set fines,<sup>1</sup> which signals a harsher policy against antitrust violators, as well as some recent Commission decisions which accordingly imposed high fines, have triggered a debate on the role and the effects of fines. In this paper, I try to assess - with the help of some simple quantitative analysis - the European Commission (EC)'s practice against cartels, with particular reference to fines and other instruments to achieve deterrence.<sup>2</sup>

I will first review some statistical evidence on the EC's fight against cartels, as well as some recent econometric evidence on its impact on the share prices of the publicly quoted firms which have been caught infringing EU competition law. Since none of these exercises would tell us much about whether current fines are set at the right level for deterrence purposes, I will then carry out a simple simulation exercise, from which it cannot be unambiguously inferred that current fines - as established by the new 2006 Fining Guidelines - are far from the optimal level. However, I will argue that deterrence can still be improved by (i) introducing a settlement procedure which allows the EC to redirect resources, time and energy now employed in the long process leading to a Decision (and almost always continuing in Courts) towards detection of cartels; (ii) having a properly designed system of private actions for damages;

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<sup>1</sup>"Guidelines on the method of setting fines imposed pursuant to Article 2392(a) of Regulation No. 1/2003." [2006], OJ C210/2.

<sup>2</sup>I stay away from discussing fines for abuse of dominance cases, where the Commission's policy has been more controversial but is likely to undergo some important changes, and I focus instead on fines in cartel cases, where the requirement of documentary evidence to prove infringement makes it unlikely that the Commission will mistakenly impose fines.

(iii) introducing administrative fines and director disqualification for managers, to align personal incentives with firm's decisions; and (iv) promoting (and in case of repeat offenders forcing) the diffusion of antitrust compliance programmes and antitrust codes of conduct in firms.

Finally, I will dismiss some myths about fines. Firstly, the myth that fines will force firms into bankruptcy. Indeed, the existence of a 10% (over worldwide turnover) upper threshold on the fines limits the possibility that an efficient firm may be forced to exit because it has to pay a fine. Further, it may conceivably happen that a firm decided to exit after an infringement decision, but (a) this would likely be due to the fact that the firm expects not to be efficient enough to survive in the more competitive environment likely to characterise the market after a cartel decision; (b) such exit would actually be good, as it would increase efficiency. Secondly, the myth that fines will be eventually paid by consumers through higher prices. This myth is in contrast with both standard economics and common sense: would anybody seriously expect prices to be higher after a cartel has been dismantled than when it was operating? Furthermore, there is indirect evidence that markets expect firms to have lower profits (and therefore lower prices) when they are the object of an infringement Decision.

## 2 Evidence in the fight against cartels

In this section, I briefly review some empirical evidence on the fight against cartels in the EU. Elaborating information obtained from public sources (European Commission's and Community Courts' documents and websites), one can obtain data on the number of cases decided by the Commission, the total number of firms involved, the fines given by the EC and by the Courts, and the cases in which immunity was given under the Leniency Notices of 1996 and 2002.

Figure 1 shows the average fines imposed by the Commission on cartel participants, since 1990. It clearly indicates that from the mid-90s onwards there has been a dramatic increase in the total fines given by the European Commission. It is probably not a coincidence that there seem to be two turning-points in the setting of fines, namely 1998 (the first Guidelines Notice on fines was published in January that year) and, more dramatically, 2007 (the revised Guidelines on fines were published on 1 September 2006, so there was no case in 2006 in which the new method of setting fines was used).<sup>3</sup>

INSERT FIGURE 1 HERE

The same figure also offers an additional information: for the same cases, it tracks the outcome of the Community Courts' Judgment. Obviously, the Judgment for a cartel Decision in a given year will be given by the Courts in later year, but it is the original year of the Commission Decision which is included in

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<sup>3</sup>The 2007 data refers to the period up to 1 August 2007.

the statistics.<sup>4</sup> Note that for cases since 2002 the data on Court Judgments are incomplete or missing altogether because cases referring to recent Commission Decisions are still pending at the CFI: accordingly, the Court fines from 2002 onwards are obviously underestimated. However incomplete, the figure tells us that - at least before the adoption of the new Notice - the Community Courts tend to reduce the fines given by the Commission, although not dramatically so. My reading of the Court Judgments, however, suggests that the Court in general approves the Commission's attitude towards cartels and its fining policy. When the Court's fines diverge from the Commission's fines it is usually because the Court finds that the Commission has incorrectly assessed some of the elements (duration of the infringement, aggravating or mitigating factors) considered in setting the fines, or because it annuls (partially or completely) the Decision on procedural grounds,<sup>5</sup> while I am not aware of any divergence of views on substantive grounds after the *Woodpulp* case.<sup>6</sup>

Figure 2 reports the number of cartel decisions taken by the EC since 1996, when the first Leniency Notice was introduced. The figure makes two points. First, the frequency of cartel cases tends to increase in the last years, although not dramatically.<sup>7</sup> One might have expected that the effects of modernisation (which should have allowed the Commission to focus on the most important infringements), and the leniency policy (see more below) would have increased the number of cartel cases more substantially.

Second, the figure shows the cases where an applicant is given full immunity, i.e. either initiated the investigation or gave a fundamental contribution to the Commission at a stage in which it had not enough evidence for an infringement decision, and in return is given zero fines. Clearly, the Figure indicates that in most of the recent cartel cases the leniency programme exercised a crucial role:

INSERT FIGURE 2 HERE

The EU Leniency Programme, especially after its revision in 2002, has been

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<sup>4</sup>After the introduction of the Court of First Instance, there may be two appeals for the same case: whenever both Judgments have been given, it is the final one which has been used for the figure. In cases where the ECJ Judgment is still pending, it is the fine given by the CFI which is included in the statistics.

<sup>5</sup>In those cases, the Commission can re-adopt the Decision after having redressed the procedural wrongs. To avoid double-counting, though, re-adopted Decisions are not included in the Figures. This explains possible divergences between official Commission statistics and the ones offered here. For instance, the European Commission's (2007) *Report on Competition Policy 2006* states that in the year 2006 the Commission took 7 cartel Decisions. Two of them, however, were cases of re-adoption after the Court had annulled the Decision on procedural grounds.

<sup>6</sup>See Damien Geradin and David Henry (2005), *The EC fining policy for violations of competition law: An empirical review of the Commission decisional practice and the Community courts' judgments*. Bruges: Global Competition Law Centre Working Paper 03/05 for a detailed study of the Court's review of the Commission's antitrust decisions.

<sup>7</sup>If one looks at the four-year periods 1999-2002 and 2003-2006, one can see that there have been twenty cases in each of the two periods. However, the total number of firms - another possible indicator of the Commission's activity against cartels - has increased over these two four-year periods from 119 to 158.

very successful and has enabled the Commission to uncover several large international cartels in the recent years. In the period from February 2002 to end-December 2006, the Commission received 104 applications for immunity and granted (final or conditional) immunity for 56 infringements.<sup>8</sup> Even though the Commission will not pursue all the cartel cases brought to its attention by a leniency applicant, because it will focus its resources on the major cases involving firms operating in several member states, there is still a large number of cartel cases which has been initiated by cartel participants which at a certain point decided to report the cartel to the Commission.

Unfortunately, however, it does not seem to me that the Leniency Programme has been able to cut significantly the time the Commission needs to successfully prosecute the case.

To quantify this statement, Figure 3 shows the average per-firm length of cartel investigations for selected years (a relevant measure of the workload of the Commission since each additional firm involved in the case is likely to absorb additional man-power of the EC). More precisely, this measure has been obtained by computing the length between the starting date of the investigation (proxied by the date of the surprise inspection, unfortunately not always available) and the Commission Decision, and then dividing it by the number of undertakings involved in the case.<sup>9</sup>

INSERT FIGURE 3 HERE

Figure 3 does not seem to show that there has been a clear reduction of the length of cartel cases after the introduction of the leniency notices.<sup>10</sup>

The time that elapses between the moment a leniency applicant first reveals the existence of a cartel to the Commission and the moment the Commission adopts an infringement decision is very long (very rarely less than three years), occupying too many of the scarce resources of the Commission. Currently, however, the Commission is studying the adoption of settlement procedures (similar to the plea-bargaining adopted in the US) which might allow it to use its resources more efficiently. If firms settled and agreed to pay a certain fine and not to appeal the Decision, this would allow the Commission not only to save time and resources in the period until the Decision, but also from court appeals. The Commission's man-power can then be redirected to the investigation, prosecution, and uncovering of new cartels.

<sup>8</sup> *Report on Competition Policy 2006*, op.cit., pp. 12-13.

<sup>9</sup> See Table 2 in the Appendix for the data, obtained from the Commission's decisions.

<sup>10</sup> I have also computed the per-firm length of the cases as number of months divided by the number of *legal entities* involved in the decisions (in some cases, the decision may be addressed to several national subsidiaries - each of them separate legal entities - of the same undertaking). With this alternative indicator decisions seem to be quicker in recent years, albeit not dramatically so (around 8 months per entity in 1997-9, 5 months in 2000-1, 7 in 2002-3, 5 again in 2004-5, and 2 months in 2006-7 - but for the latter year the data are of course incomplete).

### 3 Deterrence

No matter how much evidence one collects on actual cartels discovered and fined by the European Commission, this would represent only very incomplete evidence on the effects of the fight against cartels. Indeed, one piece of information that we cannot have is how many cartels exist in our economies. In other words, we cannot know to what extent the current policy against cartels is preventing firms from forming cartels in the first place, that is how well it performs in terms of deterrence. Indeed, a successful cartel policy is above all one which discourages cartels, as well as one which effectively fights the ones that nonetheless come into being.

For deterrence to take place, it is necessary that a firm perceives that its expected net gain from taking part in a cartel,  $\Delta\pi$ , is lower than its expected cost, which equals the probability that the cartel is being uncovered (and successfully prosecuted),  $p$ , times the fine  $F$  the firm would receive if that case realises. In formal terms, a firm will not take part in a cartel if the condition  $\Delta\pi < pF$  holds.<sup>11</sup>

Competition law and policy can affect this inequality in two ways. First, by establishing an antitrust authority (and more generally institutions) that can effectively operate against cartels, so that the probability  $p$  to uncover a cartel and make an infringement decision is large enough; second, by introducing fines  $F$  which are large enough to discourage prospective cartel members from engaging in the cartel.

On the first instrument, and in particular on how to increase  $p$ , let me come back below. For the time being, let me just note that overall the European Commission is an efficient competition authority which devotes many resources to cartel investigations, defends quite successfully cases in the Community Courts, and has set up a leniency procedure which increases the probability that, if formed, a cartel is uncovered.

It is the second instrument, that is, the level of the fines, that is more controversial and I would like to discuss more at length. Several commentators have argued that the level of the EU antitrust fines is too low.<sup>12</sup> (At least, prior to the fining notice of December 2006: as I will discuss below, some now say that fines are too high.) Also, the fact that in the EU there are several firms which are repeat offenders begs the question of whether such firms have 'paid'

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<sup>11</sup>By considering each firm in isolation, I am obviously make a great simplification, since  $\Delta\pi > pF$  is only a necessary condition for the cartel to exist. As the economic literature has well emphasised (see e.g., Massimo Motta, *Competition Policy. Theory and Practice*. Cambridge University Press, 2004: chapter 4) and European judges have well understood (see the *Airtours* judgment), collusion (whether tacit or explicit) will arise only if none of the prospective cartel participants has a private incentive to deviate from the collusive price. This other necessary condition for collusion - formally called the Incentive Compatibility Constraint for collusion - is assumed to be satisfied here.

<sup>12</sup>For a discussion, see Paolo Buccirossi and Giancarlo Spagnolo, *Optimal fines in the era of whistleblowers*, London: CEPR Discussion Paper No. 5465, January 2006. A OECD study also estimates that only in a minor proportion of cases have the actual fines exceeded the cartel gains obtained by the firms. See OECD. 2002. *Fighting Hard-Core Cartels*. Paris: OECD.

enough for their infringements. Furthermore, the managers of firms which are fined for competition violations rarely lose their jobs for this reason, another possible signal that the firms have not been sanctioned enough.

Although our study cannot answer the question of whether fines are large enough to deter the formation of cartels, in a joint paper with Gregor Langus we use event study analysis (an econometric technique which is well established and widely used, especially in the finance literature) to study the impact of antitrust investigations on the share prices of the firms which have been found to have infringed EU antitrust law. We show that stock markets react to news of, respectively, a dawn raid, an infringement Decision and a Court judgment upholding the Commission's Decision, by reducing the firm's market value on average by respectively 2%, 3,3% and 1.3%.<sup>13</sup>

Overall, therefore, the successful prosecution of a firm might decrease its market value by more than 6% (whether this is a large or a small reaction is debatable: firms' share prices often are very responsive even to minor events). Interestingly, though, most of the drop in the share prices does not come from the fine - which accounts on average for 1% of the capitalization of the firm, roughly 1/6 of the loss in market value - thereby suggesting that the market expects the firm's profits to drop after it will have to discontinue an illegal practice. Note, further, that for firms involved in cartels, this is also offering indirect evidence that antitrust action will decrease prices: the market expects that the disruption of the cartel will bring down market prices and firms' profits.<sup>14</sup>

**Are fines large enough for deterrence purposes?** One possible way to gain some insight on whether EU fines are large enough to discourage cartel formation, is to carry out a simulation exercise. The Appendix describes a simple model which can be used for this purpose.<sup>15</sup> In a nutshell, the model assumes that firms set prices by adding a mark-up over marginal costs, and that when prices increase (because of a cartel) the demand will decrease according to a simple constant elasticity function (the gain from the cartel,  $\Delta\pi$ , is determined by how much the cartel raises prices but also by how much demand will be lost

<sup>13</sup>See Gregor Langus and Massimo Motta. *The effect of EU antitrust investigations and fines on a firm's valuation*. London: CEPR Discussion Paper No. 6176, March 2007.

<sup>14</sup>In theory, there may be other reasons why profits could decrease after an antitrust intervention. For instance, the market may expect an antitrust violator to suffer a reputational damage, or not to be able to carry out certain profitable projects due to reduced financial assets, or it may be caused by legal costs. However, none of these possible alternative hypotheses seem very compelling. Antitrust violators do not seem to suffer from consumers' boycotts; legal costs - however large - are of a much smaller order of magnitude than the fines; and even if financial markets are imperfect, large publicly quoted firms are probably able to raise funds to carry out profitable projects. Obviously though, it would be important to find empirical evidence able to identify the role played by each of such hypotheses and in particular to find direct evidence of whether antitrust intervention does decrease industry prices in a previously cartelised market.

<sup>15</sup>This simulation exercise is not particularly original and follows many similar ones. See for instance Buccrossi and Spagnolo, op.cit., who also mention previous references. The Chief Economist Team at DG Competition has also performed similar exercises, with not too different results.

following that price increase). Next, one has to make some assumptions on the values of the parameters of the model, such as the competitive mark-up (i.e., the level of the mark-up when there is no cartel), the price overcharge (i.e., the price increase caused by the existence of a cartel), the demand elasticity, and the probability that the cartel will be discovered.

Table 1 shows the results of this simulation exercise when the price overcharge is 15% (i.e. the cartel raises prices by 15% with respect to the competitive situation), the probability of discovery  $p$  is 15% and for several values of the competitive mark-up and of the demand elasticity.<sup>16</sup> For instance, the table suggests that the minimum level of fine (relative to market turnover) necessary to deter cartel formation if the competitive mark-up is 50% and the demand elasticity is .6, will be .6784, that is *around 68% per year of the relevant market turnover of the firm*.

INSERT TABLE 1 Here

The question we should ask is how the minimum amount of fine necessary to deter the cartel would compare with the actual fine that a firm should expect to be imposed by the EC if the cartel is discovered. According to the new Guidelines on fines published in September 2006,<sup>17</sup> the Commission will use the following two-step procedure to set fines.<sup>18</sup>

*First step.* The basic amount of the fine will be set, by: (1) determining an initial variable amount of the fine as a percentage (in cartel cases, this will typically be 30%) of the firm's relevant market turnover; (2) multiplying it by the number of years the infringement has lasted; (3) adding a fixed component which equals 15-25% of the annual turnover.

*Second step.* The basic amount of fine resulting from the first step can be modified by taking into account aggravating or mitigating circumstances. Among the first category, there is recidivism (there could be a 100% increase in the fine for *each* previous infringement, also if it took place in Member States' national jurisdictions), obstruction of investigation (such as denying facts which turn out to be supported by objective evidence, or refusing inspections by Commission officials), and for having instigated or policed the cartel. Among the second category, there is evidence of terminating the infringement as soon as the Commission intervened, of a substantially limited role in the cartel, and of the anti-competitive conduct having been authorised or encouraged by national public authorities or legislation.

Finally, note that the fine so computed cannot exceed 10% of the previous business year's total turnover of the firm, and that in exceptional cases the Commission might reduce the fine if the firm could prove inability to pay.

<sup>16</sup>Note that both a higher mark-up and a higher demand elasticity require a lower fine, because they both reduce the profit gains a firm derives from a cartel.

<sup>17</sup>"Guidelines on the method of setting fines imposed pursuant to Article 2392(a) of Regulation No. 1/2003." [2006], OJ C210/2.

<sup>18</sup>See also Wouter Wils (2007), "The European Commission's 2006 Guidelines on Antitrust Fines: A Legal and Economic Analysis", *World Competition*, 30(2), 197-229.

Let us now try to compute the fine that a firm would receive for having been involved in a cartel which lasted for, say, five years, and assume that there are neither aggravating nor mitigating factors. The fine might be calculated as 30% of the relevant product and geographic market per year, to which we should add the pro-rata (1/5) corresponding to the fixed amount. If the latter is 25%, then the *expected yearly fine will be equal to 35% of the relevant market turnover*.

One might therefore be tempted to conclude, on the basis of this example, that the fines are still insufficiently high to deter cartel formation. However, it is important to note that the exercise above is built on a number of assumptions that, if modified, might give very different results.

First, note that the model used is extremely simple, and that to fully understand the expected benefits and costs of a cartel one should keep in mind the complex interactions among the prospective cartel members and the probabilities that a member could apply for leniency and report the cartel to the Commission.<sup>19</sup> None the less, it is unlikely that a firm which is considering the costs and benefits of cartel participation will resort to a model more complex than the one presented in the Appendix.

Second, if any of the aggravating or attenuating circumstances listed in the Commission Notice were present, the fine would be modified accordingly, upwards or downwards. For instance, if the same firm had already been involved in a cartel in the past, the fine might be doubled and become a *yearly 70% of the relevant turnover*, in line with the fine obtained in the simulation. And if it had been involved in *four* previous infringements (which is not so unlikely given that there is a lot of recidivism and also that the Notice adopts a principle of a parental responsibility, so that a business group will be punished for each violation done in the past by any of his affiliates), then the fine might increase by 400%, thus becoming much higher than the optimal fine!

Third, and perhaps even more important, the results obtained in the simulation are extremely sensitive to the parameter values used. For instance, Table 1 shows that - still for the same value for the price overcharge<sup>20</sup> - different pairs of values for the competitive mark-up and the demand elasticity would yield minimum fines varying from 84% to 41% of the yearly turnover. And by changing downwards or upwards the parameter related to the price overcharge, the estimates would also vary greatly.<sup>21</sup>

<sup>19</sup>In other words, the incentive constraint for collusion should be considered, and full account of how leniency could impact upon it should be made. Buccirosi and Spagnolo, cited above, conduct a similar simulation exercise when leniency is accounted for, and argue that fines can be the lower the more generous (for instance, including a reward for whistleblowers) the leniency programme offered. In general, though, it should be noted that leniency will have two contrasting effects: on the one hand, it increases the probability  $p$  of the cartel being discovered; on the other hand, it decreases the fine  $F$  that a prospective cartel participant might expect (as a firm may think that it could resort to leniency as soon as the cartel risks being investigated).

<sup>20</sup>Connor reviews a large number of works which tried to estimate cartel overcharges. He concludes that even a 25% price overcharge would still be a very conservative estimate. See Connor, J.M. 2005. "Price-fixing Overcharges: Legal and Economic Evidence". Purdue University Staff Paper 04-17.

<sup>21</sup>For instance, if the competitive mark-up is 50% and the demand elasticity is .6, the

Unfortunately, there are no reliable estimates for the parameter values to be used in this exercise, and even if there were, they would probably very much depend on the markets, whereas the Commission and the Court could hardly make the fines contingent on the sectors of activity of the firms. The simulation exercise conducted above, therefore, is based on examples and guesswork which is unlikely to give us guidance as to the optimal levels of the fines. If anything, the only sensible conclusion we can draw from this exercise is that the fines as imposed according to the new Notice are not of a significantly different order of magnitude than the optimal fines one could compute by conducting a simple simulation exercise.

It is not clear whether there may be room for further increasing fines anyhow. On the one hand, the literature on optimal penalties emphasises the possible problems associated with imposing fines larger than the minimum level necessary to discourage the crime, and identifies the optimal fine with the minimum fine. Among such problems there are the possible economic costs associated with large fines, such as leading the firm to close or downsize its operations, leading to the disposal of assets. Further, when capital markets are imperfect, a large fine may have the effect of reducing the financial assets available to the firm, which in turn may decrease its ability to borrow from financial markets and the possibility to pursue profitable investment projects. On the other hand, such arguments do not necessarily apply to the EU antitrust institutional framework, where fines cannot in any case exceed the 10% of the worldwide turnover of the firm, and where a safeguard clause exists according to which firms with manifest inability to pay will see their fines reduced.<sup>22</sup>

Moreover, it is possible that Community Judges will not be prepared to accept further increases in fines. The Community Courts have always acknowledged the setting power of the Commission within the framework of Regulation 1/2003, but they have also stated that the fines should be imposed by respecting the principle of proportional justice, according to which the penalty should be proportionate to the crime. According to the new Notice, present aggravating circumstances a firm may receive a fine which is several times larger than the turnover of the relevant market, and it will be interesting to see if the Court will accept this.

**Not only fines: other ways to increase deterrence** However, increasing fines is not the only way to improve cartel deterrence. On the one side, the expected costs of cartel activities may be increased by taking actions that make it more likely that the cartel is discovered (that is, that increase  $p$ ). The combined action of leniency programmes and settlements (or other measures aimed at making shorter the period between the starting of an investigation and the

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expected minimum fine will decrease (respectively increase) from 68% to 25% (respectively 102%) if the price overcharge is 5% (respectively 25%) instead of 15%.

<sup>22</sup> Too large fines would also go against the legal and moral principle of proportional justice, which excludes establishing arbitrarily high penalties which far outweigh the harm done to society. Imposing fines equal to the 10% worldwide turnover for any minor infringement would increase deterrence, but go against this basic principle.

formal Decision) may help in this respect. Resources freed in this way may also be used to monitor the economy and try to identify the existence of collusive schemes by looking at price data or other factors. Clearly, it is unthinkable given the current workload of the Commission to venture into new methods of cartel detection based on the observation of market outcomes and whose practical utility has to be proved, but this is probably a frontier which should be explored further.<sup>23</sup>

Further, if the Commission continued the process of transparency in setting fines which has started with the 1998 Fining Notice and continued with the recent 2006 Notice (where for the first time the basic amount of the fine is calculated with reference to the relevant market turnover, thus making the fines more predictable), it is likely that more Commission resources will be freed. One of the reasons why firms found to have infringed EU antitrust law are nearly always appealing the Commission's Decisions in the Courts is probably the relatively opaque way in which the Commission has imposed fines.<sup>24</sup> The Fining Notices have been giving better insights of the way in which the Commission sets fines, but a certain margin of discretion still exists even under the new Notice. It is inevitable that some discretion will always be exercised (think of aggravating and mitigating factors, they are rarely of a white or black nature, and more often come in different shades of grey), but the Commission should try to reduce its margin of discretion, and make the calculation of fines as predictable and automatic as possible.<sup>25,26</sup> To the extent that the Courts will accept the new fining policy of the Commission, this may have the effect of making litigation less likely, freeing precious personnel time of the Commission.

On the other side, there are additional ways to increase expected penalties for cartel infringement without increasing the fines of the firms. In the US, deterrence is achieved also by criminal penalties for executives found guilty of collusive agreements, and treble damages.

As for criminal penalties, they provide a very strong deterrent as risk averse managers would find it very risky to collude, and it is unlikely that they could find the monetary compensation given by higher wages and bonuses enough

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<sup>23</sup>For hints at how cartel detection could be undertaken by looking at market data, see for instance Joseph Harrington, "Behavioral Screening and the Detection of Cartels", Patrick Rey, "On the Use of Economic Analysis in Cartel Detection", and Paul Groot, "Structural Approaches in Cartel Detection", all three papers in Claus-Dieter Ehlermann and Isabela Atanasiu (eds.), *Enforcement of Prohibition of Cartels*, Hart Publishing, Forthcoming (Proceedings of the Eleventh Annual EU Competition Law and Policy Workshop, EUI Florence, June 2006).

<sup>24</sup>See Geradin and Henry, *op. cit.*

<sup>25</sup>Sometimes the Commission seems to flirt with the idea that keeping the firms in the dark as to the fines they should expect is a good thing. But deterrence can be achieved only insofar as the expected penalties from being discovered are clear and predictable. Further, as argued in the text, an opaque system is one which promotes litigation, which has additional costs.

<sup>26</sup>The experience with the leniency programmes should also be of some use. Several commentators had argued that the 1996 Leniency Notice was unlikely to give rise to many leniency applications because the Commission did not commit to a certain fine reduction until the formal Decision was taken. One of the reasons for the success of the 2002 Leniency Notice is that it fixed this problem by making immunity automatic (under certain conditions, which are spelled out very clearly and are well known to leniency applicants).

to outweigh the risk of spending years in prison. However, it is very unlikely that there will be sufficient support by EU Member States, in the foreseeable future, for a reform of competition law which introduces criminal penalties. Nevertheless, one alternative way to better align managerial incentives with the law could be to give managers responsible for cartel infringements administrative fines, and/or to disqualify them from directors' positions.

Probably more promising, though, is promoting private actions for damages. So far, private actions have been rare in EU competition law, but the Commission has recently taken initiatives to promote them,<sup>27</sup> and recent ECJ's judgments confirm the feasibility of these initiatives.<sup>28</sup> Eventually, if civil actions were likely and led to significant damages being recognised to clients and/or consumers hurt by cartels, the effect will be to substantially add to the fines that firms have to pay, thereby increasing deterrence. It should be noted though that the system for private actions should be carefully designed, so as to discourage unmeritorious actions by claimants, and to avoid excessive litigation.

Deterrence may also be increased, although these are less powerful instruments, through antitrust compliance programmes and codes of conduct. They could be made compulsory for firms which have infringed antitrust law, and help increase awareness among employees and managers of which conducts are unlawful. Provided that they are well designed and not just a facade initiative (the establishment of independent auditors would help guarantee the programmes are serious and in good faith) they may give a contribution to avoiding unlawful behaviour. The adoption of codes of conduct by large firms may also increase the cost in terms of reputation and investors' relationships that they could incur if later they are found to infringe antitrust laws.

## 4 Myths about fines

The stricter fining policy adopted by the European Commission in its 2006 Notice (and its applications) has attracted some criticisms, according to which antitrust fines would now be excessively high. In particular, one can hear claims that high fines would have a negative effect on the economy in general and consumers in particular, mainly because (1) high fines will oblige firms to go

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<sup>27</sup>See the Green Paper on damages actions for breach of the EC antitrust rules, published by the Commission on 20 December 2005. The Commission is expected to release a White Paper indicating its suggested design of antitrust private actions in the EU early in 2008.

<sup>28</sup>See for instance *Courage v. Crehan*, C-453/99, as well as the more recent *Manfredi case* (C-295/04 to C-298/04, *Vincenzo Manfredi and Others v. Lloyd Adriatico Assicurazioni SpA and Others*). Mr. Manfredi and other applicants alleged that they had suffered a damage caused by an agreement between car insurers, agreement sanctioned by the Italian competition authority. The ECJ stated among other things that "the practical effect of the prohibition laid down in article 81(1) EC would be put at risk if it were not open to any individual to claim damages for loss caused to him by a contract or by conduct liable to restrict or distort competition." It also added that any individual can claim compensation for the harm suffered if he can show a causal relationship between the harm and the agreement or practice prohibited under article 81 EC.

bankrupt, with a loss to society and - through more concentrated market structure and subsequent higher prices - to consumers in particular; and because (2) surviving firms would want to recover the fines they have to pay by increasing prices.

Let us discuss each argument in turn.

**Fines and bankruptcy** To start with, it is important to recall that the fining provisions already contain two safeguard clauses which are meant to avoid that fines could lead firms to bankruptcy. First, there is an overall cap to the maximum fines that a firm may be charged, which is the 10% of the world total turnover (which, incidentally, is very rarely hit by the fines imposed by the Commission). Second, there is a specific provision in the fining Notice which clearly states that if a firm can objectively prove that it would be unable to pay the fines, the fine will accordingly be reduced. (Such a provision has been used in at least one case.)

But suppose for the sake of the argument that despite such safeguard clauses we observe that a firm which is fined for a cartel infringement will go bankrupt and exit the market. How should we judge and interpret such an event? Here we have a firm that, despite having enjoyed cartel profits for a certain period of time, anticipates that the effect of the fine and of having to operate in a more competitive market (very likely, a cartel will not be restarted for some time after an infringement decision) will be that the business will not be viable any longer.<sup>29</sup> In other words, the firm is too inefficient to operate in a competitive market, once it is not sheltered by a collusive agreement which artificially removes competition and inflates prices, and hence decides to exit the market. But this is precisely the way in which markets work and should work, that is by selecting the more efficient firms. This process of Darwinian selection is good, not bad, for society, as it increases the productive efficiency of the firms, and pushes them to improve their products, invest, and generally be more efficient.<sup>30</sup>

Furthermore, the fact that a firm which has been involved in a cartel and enjoyed higher prices has not been able to build provisions and increase its assets so as to be able to pay fines and survive in the industry further confirms that the firm will be inefficient.

One might still think that from the point of view of allocative inefficiency society might be worse-off, as the exit of one or more firms would make the industry more concentrated, therefore leading to a rise in prices. Note, though, that it is very difficult to imagine that prices would be higher *after* an antitrust intervention that eliminates a cartel than in the period when a cartel exists, even after the possible exit of one or more industry participants!<sup>31</sup>

<sup>29</sup>The results obtained by Langus and Motta, op. cit., suggest that the fine is relatively less important than the adverse effect caused by the cessation of the extra-profits created by the cartel activity.

<sup>30</sup>Empirical studies of productivity show that it is the process of exit of inefficient firms and growth of more efficient firms which make up for most of the productivity gains of an economy. See Massimo Motta (Chapter 2), op.cit, for references and discussion.

<sup>31</sup>Suppose - for the sake of the argument - that after antitrust intervention there will be

If anything, therefore, efficiency arguments would call for suppressing even the clause that reduces the fine for firms which are in financial difficulties, so that competition could operate better.<sup>32</sup>

**The recovery of fines through higher prices** According to some, the fines will be ultimately paid by consumers, as fined firms will raise prices so as to recover the losses incurred by the payment of the fines.

First of all, this argument runs against standard economic reasoning, according to which fixed sunk costs (which would include fines imposed for antitrust violations) do not modify optimal price decisions which are determined by conditions related to marginal costs and profitability. To help understand this argument, suppose that there is a firm with lot of cash, and faces only three buyers, each of whom is willing to buy one unit of the product the firm sells, but at different prices: consumer A is willing to pay up to 3, consumer B up to 2 and consumer C up to 1 euro for the product. Suppose also that the firm cannot price discriminate among consumers, and for simplicity think that its marginal cost is zero (but one can check this does not change much in the argument, provided the marginal cost is not above 2). The firm's optimal choice will then be to sell at the price of 2 euro, because in this way it will make a profit of 4 euro (it will sell two units at 2, whereas if it chose a price equal to 1 or 3 it would make a profit of 3).

Suppose now we have the same identical market, but with a difference, which is that the firm now has zero cash, for instance because it had to pay a fine. As long as buyers have the same willingness to pay for the product, it will still be optimal to charge the same price as before, i.e. a price of 2. In other words, how much cash you have (how much fixed sunk costs you have paid) does not affect market price decisions.

Possible critics may argue that this is just standard neoclassic thinking, and mention laboratory experiments in which the decisions of individuals are affected by what they had to pay in the past. First of all, let me notice that such experiments (for which, incidentally, I have a lot of respect) refer to play by individuals, who are presumably more affected by psychological motives than firms. But suppose that it is indeed the case that a firm which has just had to pay a large amount of money did *want* to increase prices. The question is: would it be able to increase prices as it wants to? The likely answer is negative. Antitrust intervention has disrupted the cartel, and it is reasonable to think that for at least some time the firms will not be able to coordinate their market decisions any longer. So, when the firm sets its price, it cannot assume any longer

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only one firm operating, so the cartel is replaced by a monopolist, a very extreme and unlikely situation. Then, if all the firms were identical and the cartel was pricing optimally, the cartel price will be identical to the monopoly price. Even under this very pessimistic hypothesis, therefore, prices would not be higher after the cartel.

<sup>32</sup>Fairness arguments are notoriously not at the centre of economic thinking, but let me note that I find it unfair that two firms with similar turnover and equally guilty may receive a different fine because one does not have enough assets. Chances are the firm with troubles is the less efficient and has managed less well its assets. It seems unfair to reward it for this.

that the other firms will not undercut it. Surely, it is conceivable that after the antitrust intervention explicit collusion will be replaced by tacit collusion and prices may not decrease immediately. However, even in this case, as soon as a demand or supply shock will affect the industry, the lack of coordination will likely undermine the tacit collusive outcome and drive prices below the prices that would have been set under the cartel.

Furthermore, if the cartel has collapsed because of a leniency application (which, as we have seen, happens very frequently), there will be an asymmetry in the positions of the firms which were taking part in the collusive agreement. Indeed, the firm which has received immunity will not pay any fine. So, even if psychological motivations pushed fined firms to increase prices, there will be one firm which does not have to increase prices, and this will constrain the ability of raising prices by the rivals.<sup>33</sup>

If these arguments were not enough, let me appeal to common sense. The claim made by critiques of high fines is that after the fine prices will increase. But is it reasonable to expect that after a cartel has been disrupted and competition is restored, consumers will have to pay higher prices than the prices they had to pay when the firms operated as a cartel?

Finally, let me conclude this discussion with an empirical note. Langus and Motta have showed that most of the loss in market valuation that firms incur after being fined is not due to the fine, and they attribute it instead to the market expectation of future lower profits.<sup>34</sup> In the case of a cartel, this likely means that the market expects firms not to be able to sustain the same prices in the future. This is indirect evidence that antitrust intervention has the likely effect of decreasing prices.

## 5 Conclusions

In this paper I have briefly reviewed recent developments in the Commission's policy against cartels, with particular attention to its fining policy. I have argued that the 2002 Leniency Notice has been successful in many important respects, in particular by helping destabilising existing cartels, but it should be supplemented by the introduction of a procedure of settlement (or a different design of the leniency procedure) which could allow the Commission not to waste resources in the long prosecution of cartel members as well as in the following Court appeals.

Deterrence of cartels is influenced both by the probability that a cartel is being discovered (in this sense settlement would help deterrence, as freeing resources might allow the Commission to detect and investigate new cartels), and by the expected fines a firm will receive. The 2006 Notice has the merit of mak-

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<sup>33</sup>See Buccirosi and Spagnolo, op.cit..

<sup>34</sup>For the US, even stronger results were obtained in an empirical study which computed the loss in value attributed to fines and damages to only around 15%. See Jean-Claude Bosch and Woodrow Eckard Jr., "The profitability of price fixing: Evidence from stock-market reaction to Federal indictments." *The Review of Economics and Statistics*, May 1991, 73 (2), 309-317.

ing fines for cartel offenders probably higher than in the past (and of making them more transparent, as they are now explicitly related to the relevant market turnover of the firm), and this will help deter cartels. Maybe for the purpose of deterring cartels fines could be even higher, but they have probably reached a level such that it may make more sense to increase deterrence through other means. One such means could be to promote private actions for damages (recent initiatives in this sense by the Commission are very important and should be encouraged). Others could be to introduce administrative fines and director disqualification for individuals, so that managers' incentive could be more aligned with antitrust laws, and promote the adoption by firms of antitrust compliance programmes and of codes of conduct. Such programmes should be compulsory for antitrust offenders.

Finally, I have argued that concerns about fines being too high are misplaced. Current clauses in the fining policy make it unlikely that firms will go bankrupt because they have to pay fines, but even if some firms will have to exit after having been found guilty for cartel infringement (and in that case exit would be more probably due to cessation of the unlawful cartel extra-profits than the fine itself), this is not necessarily a bad thing: breaking the cartel will bring about more competition in the industry, and competition will inevitably lead to a shake-out of inefficient firms and a growth by the more efficient ones. In turn, this will increase productive efficiency and welfare. Further, there are no solid arguments - whether theoretical or empirical - which support the idea that higher fines might lead to higher prices. Antitrust intervention, and the fines associated with it, can safely be expected to benefit consumers through lower prices.

## 6 Appendix: A simple mark-up model to simulate the minimum level of the fines

Assume we have an extremely simple model<sup>35</sup> with perfectly symmetric firms and where the competitive price (that is, the price at the equilibrium absent collusion) is determined by a mark-up  $m$  over marginal costs. For simplicity, assume away fixed costs and assume that marginal costs are constant and equal to  $c$ . Then the competitive price  $p_c$  is given by:

$$p_c = c(1 + m). \quad (1)$$

In this extremely simple model (in which we abstract from the incentive compatibility constraints for collusion), we assume that the (industry-wide) cartel allows competing firms to increase the market price above the competitive level, by a factor  $k$ , which we call the price overcharge. The collusive price will then be:

$$p_m = p_c(1 + k) = c(1 + m)(1 + k). \quad (2)$$

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<sup>35</sup>See for instance the basic model used by Buccirosi and Spagnolo, op.cit..

Note, however, that an increase in prices will not generally be followed by an equally-proportionate increase in profits, since a price increase will decrease demand.<sup>36</sup> Assume a constant demand elasticity  $e$ , which can be written as:

$$e = -\frac{(q_m - q_c)p_c}{q_c(p_m - p_c)}, \quad (3)$$

where  $q_m$  is the quantity sold under cartel, and  $q_c$  the quantity sold under "competitive" conditions.

Some algebra shows that:

$$q_m = q_c(1 - ek), \quad (4)$$

and the firm's turnover under cartel will be:

$$p_m q_m = c(1 + m)(1 + k)q_c(1 - ek). \quad (5)$$

The firm's "competitive" profits are:

$$\pi_c = (p_c - c)q_c, \quad (6)$$

while the cartel profits will be equal to:

$$\pi_m = (p_m - c)q_m = c(1 - ek)(k + m + km)q_c. \quad (7)$$

It follows that the profit gain from the cartel will be:

$$\Delta\pi = c[(1 - ek)(k + m + km) - m]q_c. \quad (8)$$

In order to have cartel deterrence, expected profits from cartelisation must be lower than expected fines, that is:

$$\Delta\pi \leq pF,$$

where  $p$  is the probability that the infringement is uncovered and  $F$  is the fine in absolute value. In other words, for deterrence to be achieved, the fines must be at least as high as  $F^*$  where:

$$F \geq \frac{\Delta\pi}{p} \equiv F^*.$$

Since we want to express the fines in terms of the actual turnover (which can be observed), the minimum necessary fine in turnover terms,  $f^*$ , necessary to discourage the cartel can be expressed as:

$$f^* \equiv \frac{F^*}{p_m q_m} = \frac{\Delta\pi}{p(p_m q_m)} = \frac{k[1 + m - e(k + m + km)]}{p(1 + k)(1 - ek)(1 + m)}. \quad (9)$$

Finding the minimum ratio of fines over turnover,  $f^*$ , is then a simple matter of replacing values of the parameters  $p, k, e, m$  into expression 9.

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<sup>36</sup>Of course, profits might also be affected through a change in costs (for instance if production falls below optimal capacity) but these are absent here due to the constant marginal costs assumption.

**Figure 1 : Average cartel fines given by the EC (1990-2007) and (for the same cases) by the Community Courts**

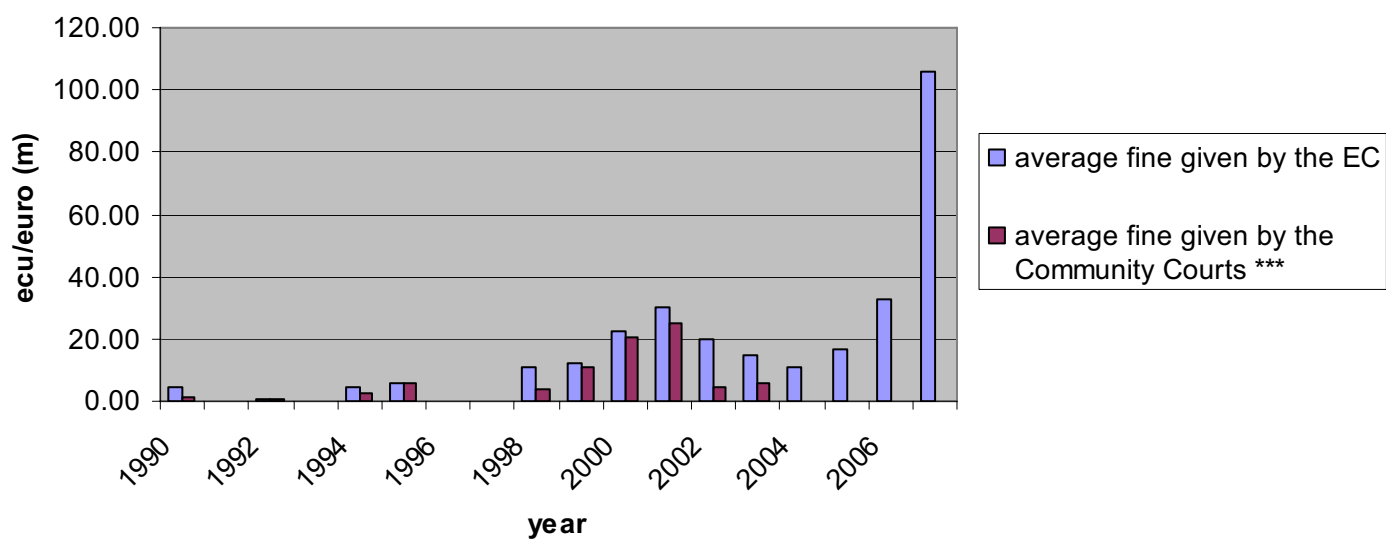


Figure 2 Leniency Program

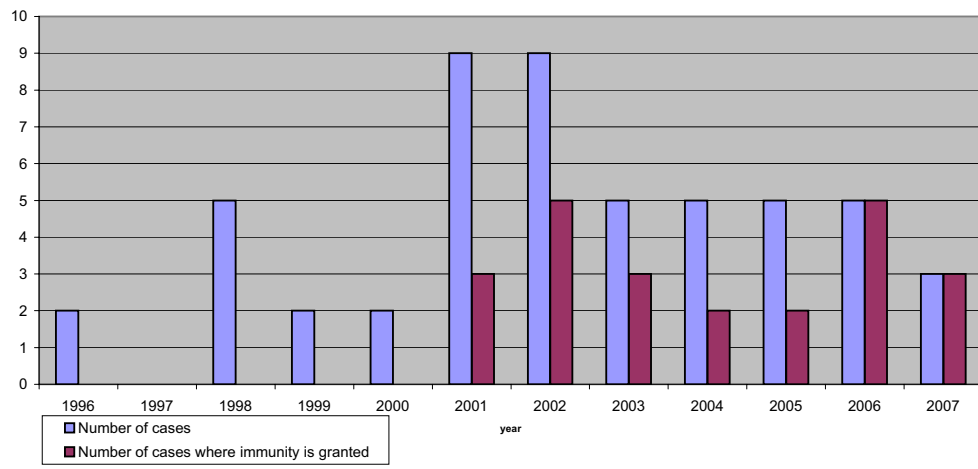


Figure 3. Per-firm Length of Cartel Investigation (months/undertakings)

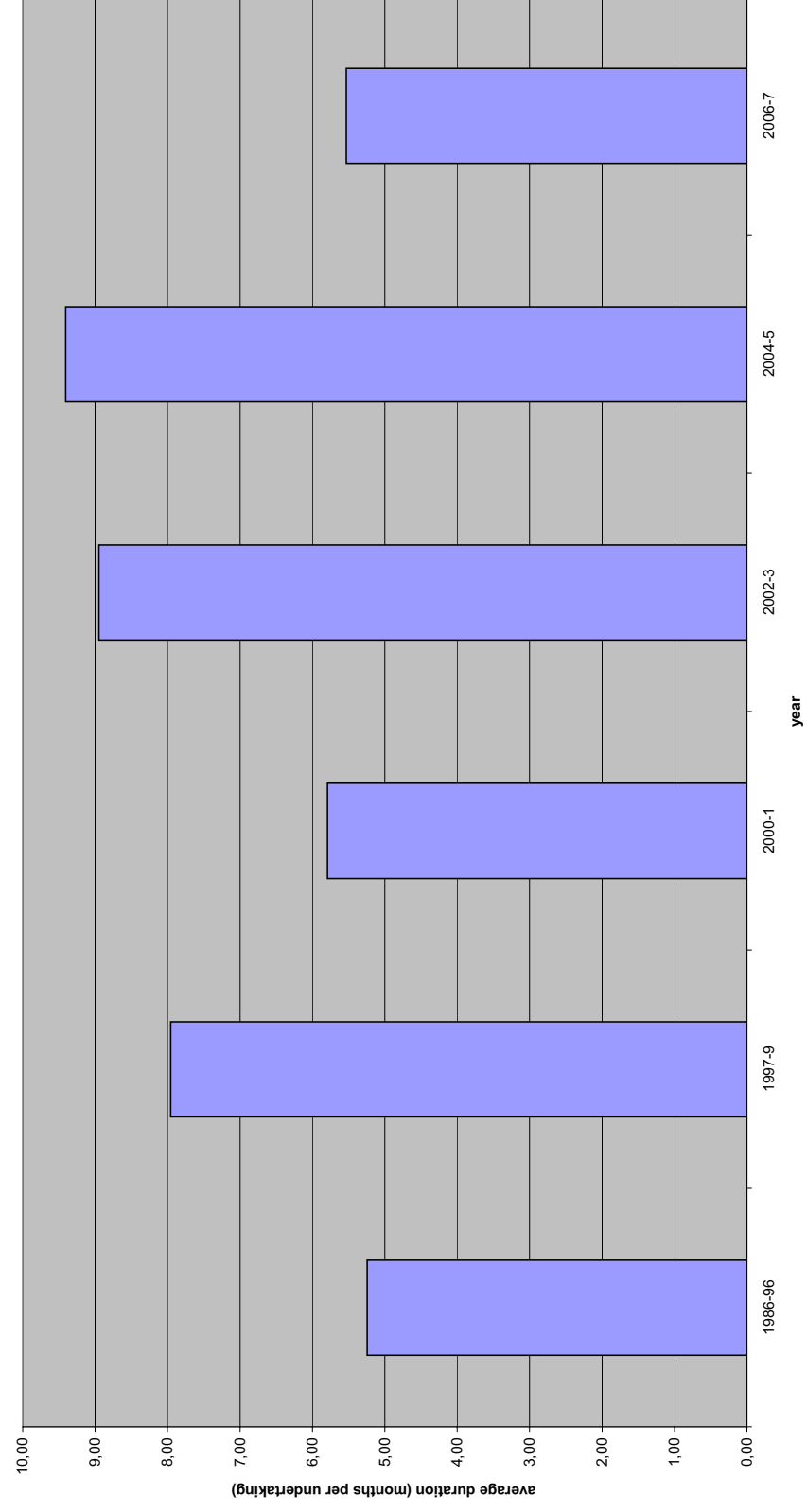


Table 1: Simulation of optimal fines

Values: Price overcharge,  $k=15\%$ ;  $p=15\%$

Elast. Mark-up	.2	.4	.6	.8	1
.2	0.8397	0.8079	0.7740	0.7378	0.6991
.5	0.8098	0.7462	0.6784	0.6061	0.5286
.8	0.7899	0.7051	0.6147	0.5182	0.4149

Name of the case	number of under-takings involved	number of legal entities	dawn raid date	date of decision	length of the investigation (months)	leniency	per-firm length investigation (months/under-takings)	per-firm length of investigation (months/legal entities)
Polypropene	15	15	Oct-83	Apr-86	30	no	2,00	2,00
Flat Glass	3	3	Jul-85	Jul-88	36	no	12,00	12,00
PVC	14	14	Oct-83	Dec-88	62	no	4,43	4,43
Welded Steel mesh	14	14	Nov-85	Feb-89	39	no	2,79	2,79
Solvay/ICI	2	2	Mar-89	Dec-90	21	no	10,50	10,50
Solvay/CFK	2	2	Mar-89	Dec-90	21	no	10,50	10,50
Dutch Building cartel	30	30	Jul-87	May-92	58	no	1,93	1,93
Cartonboard	23	39	Apr-91	Jul-94	39	no	1,70	1,00
Far Eastern Freight	14	14	Apr-93	Nov-94	19	no	1,36	1,36
British sugar	4	4	May-94	Oct-98	53	yes	13,25	13,25
Pre-Insulated pipe	10	10	Jun-95	Oct-98	40	yes	4,00	4,00
Greek Ferries	7	7	Jul-94	Dec-98	53	yes	7,57	7,57
Steamless Steel B	8	8	Dec-94	Aug-99	56	yes	7,00	7,00
Aminoacids	5	9	Jun-97	Jul-00	37	yes	7,40	4,11
Graphite electrodes	8	8	Jun-97	Jul-01	49	yes	6,13	6,13
SAS/Maersk	2	2	Jun-00	Jul-01	13	yes	6,50	6,50
Interbrew	4	5	Oct-99	May-01	19	yes	4,75	3,80
Bank Charges	5	5	Feb-99	Dec-01	34	no	6,80	6,80
Zinc Phosphate	6	6	May-98	Dec-01	43	yes	7,17	7,17
Carbonless paper	11	11	Feb-97	Dec-01	58	yes	5,27	5,27
Vitamins	13	13	May-99	Nov-01	30	yes	2,31	2,31
Austrian Banks	8	8	May-98	Jun-02	49	yes	6,13	6,13
Methionine	3	4	Jun-99	Jul-02	37	yes	12,33	9,25
Industrial Glass	7	7	Dec-97	Jul-02	55	yes	7,86	7,86
Plasterboard	4	4	Nov-98	Nov-02	48	yes	12,00	12,00
Methyglycamine	2	3	Jan-01	Nov-02	22	yes	11,00	7,33
Fench Beef	6	6	Dec-01	Feb-03	14	no	2,33	2,33
Industrial tubes	3	6	Mar-01	Dec-03	33	yes	11,00	5,50
Copper plumber tubes	9	21	Mar-01	Mar-04	36	yes	4,00	1,71
Needles	3	6	Nov-01	Oct-04	35	yes	11,67	5,83
Raw Tobacco Spain	9	13	Oct-01	Oct-04	36	yes	4,00	2,77
French Brewers	2	4	Jan-00	Sep-04	56	no	28,00	14,00
Monochloroacetic acid	5	12	Mar-00	Jan-05	58	yes	11,60	4,83
Thread	10	17	Nov-01	Sep-05	46	yes	4,60	2,71
Industrial Bags	16	26	Jun-02	Nov-05	41	yes	2,56	1,58
Rubber Chemicals	4	8	Mar-02	Dec-05	45	yes	11,25	5,63
Raw tobacco Italy	6	8	Apr-02	Oct-05	42	yes	7,00	5,25
Butimen Netherland	14	31	Oct-02	Sep-06	47	yes	3,36	1,52
Methacrylates	5	14	Dec-02	May-06	41	yes	8,20	2,93
Hydrogen peroxide	9	17	Mar-03	Mar-06	36	yes	4,00	2,12
Synthetic Rubber	6	13	Mar-03	Nov-06	44	yes	7,33	3,38
Gas Insulated Switchgear	11	20	May-04	Jan-07	32	yes	2,91	1,60
Elevators and Escalators	5	26	Jan-04	Feb-07	37	yes	7,40	1,42

**Table 2: Cartel cases, and their length**