

# Cartels in the European Union: Economics, Law, Practice\*

Massimo Motta<sup>†</sup>

European University Institute, Florence and  
Università di Bologna

17 September 2007

## Abstract

In this paper, I first briefly analyse the economics of collusion, explaining what collusion is, what are the main ingredients necessary for the firms to sustain it, and which factors facilitate it. I then review the European Union experience in fighting cartels, by focusing in particular on the standards of proving infringement of EU competition law, and on its enforcement policy. In this part, I will argue that to a large extent EU cartel policy is in line with economic thinking.

## 1 Introduction

Collusive practices allow firms to exert market power they would not otherwise have: they artificially restrict competition and increase prices, thereby reducing welfare. Accordingly, they are prohibited by any anti-trust law, and a large part of the Anti-trust Authorities' (AA) efforts are devoted to fighting such practices. However, there might be divergences across jurisdictions (and within the same jurisdiction there may be changes over time) as to the standard of proof required to prove the infringement of the law. Indeed, while any AA would agree that a written agreement or the creation of a central office to fix prices, allocate quotas of production, or share markets would be illegal, differences often exist as to how to treat situations in which firms manage to keep industry prices high without overtly colluding.

---

\*Paper written for the Conference on "Fifty years of the Treaty: Assessment and Perspectives of Competition Policy in Europe", IESE Business School, Barcelona, 19-20 November, 2007. Comments from Barbara Gabor and Mario Marniello on a previous draft are gratefully acknowledged. I am also very grateful to Dimitrios Magos for his superb work as research assistant.

<sup>†</sup>Section 2 of this paper is based on Chapter 4 of my book *Competition Policy. Theory and Practice*, published by Cambridge University Press, 2004. For a formal analysis, please refer to that Chapter.

The main purpose of this article is to identify the main mechanisms behind collusion, to study the factors which facilitate it, and to explain which behaviour should be treated as an infringement of the law and which one should not. I shall also analyse what actions anti-trust authorities should take in order to deter and break collusion, and more particularly I shall analyse EU cartel law and experience in this respect.

This article is structured in the following way. Section 2 briefly sketches the main features of collusion from an economic point of view, and briefly reviews factors that make collusion more likely to occur. Section 3 instead deals with the ‘practice’ of collusion in the EU. First, I will briefly describe the EU institutional and legal framework, then I will discuss the legal standards for finding firms guilty of collusion and argue that to a large extent the EU practice coincides with what economic thinking recommends. Finally, I will review some empirical evidence in the EU fight against cartels, and discuss what could be done to increase deterrence. Section 4 will conclude the paper with some summarising notes and a brief discussion of the policy initiatives that the European Commission might undertake in the domain of cartel law.

## 2 Economic analysis of collusion

In this section I will briefly characterise the economic concept of collusion. In economics, collusion is a situation where firms’ prices are higher than some competitive benchmark.<sup>1</sup> In other words, for economists collusion coincides with an outcome (high enough price), and not with the specific form through which that outcome is attained. Indeed, as I explain below, collusion can occur both when firms act through an organised cartel (explicit collusion), and when they act in a purely non-cooperative way (tacit collusion).

To avoid misunderstandings, let me emphasise that in this Section I will not use the term “collusion” as synonym for “collusive agreement that should be outlawed”, but in the economic theory sense, that is, “high prices”. Later, in Section 3, I will argue that although in economic theory collusion is defined as a market outcome, anti-trust authorities and judges should consider illegal only those practices where firms *explicitly* coordinate their actions to achieve a collusive outcome.

### 2.1 What are the main ingredients of collusion?

Firms may be unable to achieve a collusive outcome, even if they could freely agree on the prices they should set. This is because each firm would have the temptation to unilaterally deviate from a collusive action, as by doing so it would increase its profit.

---

<sup>1</sup>In technical terms, the benchmark is usually the equilibrium price of a game where firms meet only once in the marketplace (a situation where collusion would not arise). For instance, in a homogenous goods game where firms choose prices, a collusive outcome would exist whenever prices are higher than the one-shot Bertrand equilibrium price; where firms choose quantities, whenever they are lower than the one-shot Cournot equilibrium quantities.

Consider an industry consisting of two fruit sellers in a street market. Imagine they both sell pears of identical quality, and that they each pay 1\$ per kilo to their suppliers. Imagine also that each seller thinks that 2\$ per kilo is the monopoly price, and believes the other thinks in the same way. When a seller arrives at his stall, he has to decide the sales price. Suppose that he thinks the rival is setting a price of 2\$. If he charges 2\$ for his pears, he will get roughly half of the buyers, as people who want to buy pears are indifferent between buying from him or from the other vendor. But he will have a strong temptation to *deviate*, that is to charge a lower price than his rival: if he sets a price of, say, 1.9\$, consumers will all buy from him (why pay more for an identical product?). As a result, he will still enjoy a high unit margin but he will sell more units: in short, he will make more profits than if he sold at the “collusive” price of 2\$.<sup>2</sup>

The acknowledgment that any collusive situation naturally brings with it the temptation to *deviate* from it and therefore to break collusion, leads us to the identification of the two elements which must exist for collusion to arise. First, its participants must be able to *detect* in a timely way that a deviation (a firm setting a lower price or producing a higher output than the collusive levels agreed upon) has occurred.<sup>3</sup> Second, identifying the deviation is not enough: there must also be a *punishment*, which might take the form of rivals producing much higher quantities (or selling at much lower prices) in the periods after the deviation, thus depressing the profit of the deviator.<sup>4</sup>

Only if a firm knows both that a deviation will be identified quickly and that it will be punished (i.e., it will have to forego enough profits because of the market reaction of the cartel members), might it refrain from deviating, so that the collusive outcome will arise.<sup>5</sup>

To continue our example, after having seen why a fruit seller has a temptation to cut prices below the collusive level of 2\$, let us see under which conditions he will deviate. If the street market is small enough, and if the sellers post the prices of the fruit they sell, detection of the price cut will be immediate. After the price cut has been identified, one can bet that a seller who has so far sold at the price of 2\$ will immediately retaliate, and likely will start to sell at a price lower than 1.9\$ per kilo. The result will be a price war which will reduce the profit of both. A seller contemplating a deviation will certainly expect that the rival will retaliate. As a result, the prospect of selling for much of the day

---

<sup>2</sup>A necessary assumption for this simple example to hold is that at the collusive price of 2\$ the seller does not manage to sell all the pears he comes to the market with. Otherwise, he would not have an incentive to cut his price in order to increase sales.

<sup>3</sup>As noted by Stigler (1964), detection of a deviation is not always easy: in many markets, firms’ prices and outputs are not directly observable.

<sup>4</sup>Note that a punishment should be thought of as a more aggressive market behaviour, and not as a direct monetary (or physical!) punishment. A punishment also hits the punishing firms, and not just the deviating firm, precisely because it has to rely on market mechanisms (a low price affects all the firms’ profits). It is therefore crucial that firms are willing to take part in the punishment.

<sup>5</sup>In turn, this implies that collusion can be sustained only if firms meet repeatedly in the marketplace. Otherwise, a punishment cannot take place. In technical terms, collusion will never arise in a one-shot game. This is why collusion should be modelled through dynamic (repeated) games.

at very low prices will deter him from deviating in the first place. In other words, the awareness that a deviation will be easily detected and that a market punishment will ensue, will make each seller refrain from deviating and convince him to stick to the collusive price instead.

To summarise, for collusion to occur, firstly, there must be the possibility to *detect* deviations from a collusive action in a timely way. Secondly, there must be a credible *punishment* which follows a deviation.

It is important to stress that in the example, the two fruit vendors do not talk to each other, neither directly nor through intermediaries: collusive prices will arise through purely non-cooperative behaviour of the sellers. In other words, if detection of deviations is rapid, and if (market) punishments of deviations are likely and credible, then *tacit collusion* can arise: firms do not necessarily have to talk to each other, let alone agree on complicated schemes, for a collusive outcome to be sustainable. All that is needed is the awareness that a deviation will be identified, and that a “punishment” will follow.

## 2.2 Coordination: The difference between tacit and overt collusion

A difficulty in the example above is that it is not clear how the “collusive price” is chosen. Imagine that, for some reason, each seller thinks that the other would set a price of 1.5\$, rather than a price of 2\$. Then, again a collusive situation might occur in equilibrium, but this time with sellers setting a price lower than the monopoly price. In other words, the collusive mechanism I have described works for many different prices and results in firms getting quite different levels of profits.<sup>6</sup>

This result raises the important issue of *coordination*. Firms that are tacitly colluding might arrive at the fully collusive price, but this is just one of the many possible equilibrium outcomes (one of these also being the competitive outcome, i.e., the one-shot game equilibrium price). So, is there an outcome that is more likely than the other? And, since firms have an interest in coordinating on an outcome with the highest possible profits, how can they achieve that outcome? Under *tacit collusion*, it is difficult for the firms to solve the coordination problem. If firms cannot communicate with each other, they can make mistakes, and select a price (or a quantity) which is not jointly optimal for the firms, and which might be difficult to change. Using the market to signal intentions to coordinate on a different price might be very costly. If a firm believes the “right” price for the industry is higher and increases its own price to signal it, it will lose market share in the adjustment period. If a firm decreases its own price to try and coordinate on a lower equilibrium price, this move might be understood as a deviation and trigger a costly price war. Therefore, experimenting with price changes to coordinate on another collusive equilibrium might be too costly.

---

<sup>6</sup>The ‘folk theorem’ (Friedman, 1971) says that in games with infinite horizon if the discount factor is large enough, firms can have any profit between zero and the fully collusive profit at the “collusive” equilibrium.

Under *explicit collusion*, instead, firms can talk to each other and coordinate on their jointly preferred equilibrium without having to experiment with the market, which is costly. Furthermore, if there are some shocks which modify market conditions, communication will allow the firms to change to a new collusive price without the risk of triggering a period of punishment.

Suppose for instance that, in the example above, one seller knows that demand for pears has decreased, so that he thinks the optimal price is now lower, say 1.8\$. Absent communication with the other vendor, our seller faces a problem: if he reduces the price to 1.8\$, as new market conditions suggest, collusion might break. Indeed, the rival vendor might have a different perception of market demand, and/or misinterpret the new low price as a “deviation”, and start a price war as a punishment. However, if he sticks instead to the usual price of 2\$, he will make lower profits, because demand is lower.

Explicit collusion avoids this problem: our vendor could simply tell his rival that he thinks it would be better to decrease the price, and communication will allow them to decide on a new price that suits them both, without risking any price war or a lengthy adjustment period.

Market allocation (or market-sharing) schemes - according to which a firm sells in a certain region (or serves customers of a certain type), whereas the rivals sell in other regions (or serve customers of a different type) - whether achieved by explicit collusion or historical accidents, have the advantage of allowing for prices to adjust to new demand or cost conditions without triggering possible price wars. A market allocation scheme avoids the possibility that, if a shock reduces production costs or market demand, a price reduction might trigger a price war. As long as each firm does not serve segments of demand (explicitly or tacitly) allocated to rivals, prices can change without the collusive outcome being disrupted. This probably explains why such collusive schemes are often used.<sup>7</sup>

I shall come back to the issues of communication and coordination among firms, and on why competition policy should focus on explicit collusive practices (that is, when some communication and coordination exists) in Section ???. Before doing that, however, I would like to conclude this part on the economics of collusion by briefly discussing the practices which facilitate collusion.

## 2.3 Factors that facilitate collusion

The analysis of collusion in modern industrial economics is based on the so-called *incentive constraint* for collusion: each firm compares the immediate gain it makes from a deviation with the profit it gives up in the future, when rivals react. Only if the former is lower than the latter will the firm choose the collusive strategy. In general, collusion is more likely to arise the lower the profit that a firm would obtain from deviating, the lower the expected profits it would make once the punishment starts, the more weight firms attach to the future (i.e., when the “loss from deviation” occurs).

---

<sup>7</sup>Market allocation schemes are particularly frequent in the EU, as we shall see below: in many cartel cases, firms have simply divided the European markets along the national borders.

A large part of the literature on collusion studies the factors which foster collusive outcomes, by relying on the framework just delineated (that is, the condition that says that a firm is better off colluding than deviating): if a given factor relaxes the incentive constraints of the firms, then it facilitates collusion; if it makes it more binding, it hinders it; if the effect is ambiguous, then the factor does not have a clear impact on collusion.

The study of facilitating factors is important for two reasons. First, it allows to identify the practices that facilitate collusion so that anti-trust authorities can intervene so as to eliminate them whenever possible. Second, in merger analysis, it allows to evaluate whether a particular industry is prone to a collusive outcome or no, and therefore it gives indications as to whether a given merger should be prohibited or not. For the purpose of this paper, however, since we are interested on how to act against cartels, we can restrict attention only to those facilitating factors that can be controlled by the firms themselves, and we do not need to dwell upon *structural* facilitating factors that are exogenous to the firms, and which therefore are less relevant for detection and deterrence of cartels.<sup>8</sup>

In what follows, I first (in Section 2.3.1) emphasise the role played by agreements to exchange information about past and current individual data; such agreements allow firms to improve observability of prices and quantities, and therefore to *enforce* collusion. Next (in Section 2.3.2) I discuss the role of communication among firms, stressing as announcements on future actions helps firms to *coordinate* on a particular collusive outcome. Finally, I will make some brief considerations on pricing clauses that may also facilitate collusion.

### 2.3.1 Observability of firms' actions

Detection of deviations is a crucial ingredient for collusion, and Stigler (1964) argued that collusive agreements would break down because of *secret* price cuts. In fact, Green and Porter (1984) show that if actual prices (or price discounts) are not observable, collusion would be more difficult to sustain, but it could still arise at equilibrium. Their important contribution can be summarised in the following way. Imagine an industry where sellers cannot observe the prices charged by rivals and where market demand levels are also unobservable. Then, a seller would not know if a lower than expected number of customers served is due to a negative shock in demand or to a price cut by a rival which has stolen some (or all) of his business. Green and Porter show that if the discount factor is high enough, there exists a set of collusive strategies that represent an equilibrium. The strategies are such that each firm sets a collusive price (which might be the price that maximises joint profits) as long as every firm faces a high level of demand. When a firm faces a low (or zero) demand, then the punishment is triggered and each firm sets the one shot equilibrium price for a finite number of periods. After this finite punishment phase, all firms revert to the collusive price.

---

<sup>8</sup> Among such structural factors which facilitate collusion there are industry concentration, difficulty of entry, regularity and frequency of the orders, lack of buyer power, symmetry, and multi-market contacts. See Motta (2004: Sect. 4.2) for a discussion of such factors.

Therefore, the model implies that collusion can be sustained at equilibrium, but unlike the standard model with perfect observability, collusive prices and profits will never be observed forever, even if no firm deviates. Indeed, the punishment is triggered whenever a low level of demand is observed, and will last for a certain number of periods, after which firms revert to the collusive prices.<sup>9</sup> The model has therefore an important implication. The observation of some periods with low prices is not sufficient to exclude that the industry is at a collusive equilibrium. Rather, price wars simply are the indispensable element of a collusive strategy when rivals' prices and market demand realisations are unobservable.<sup>10</sup>

Since observability of prices and quantities helps firms to reach the most collusive outcomes (under perfect observability, price wars that are costly for the firms would not occur), competition policy should pay special attention to practices that help firms monitor each other's behaviour. One example of such a practice is given by information exchange agreements, that is being discussed next. In section 2.3.3, I shall also address other pricing practices that increase observability of firms' actions, such as resale price maintenance and best price clauses.

### **Information exchange, I: Data on past or current prices and quantities**

It is often the case that via trade associations or in other ways, firms in a given industry exchange data on prices, quantities, or other variables such as capacities, customer demand, cost and so on. In the light of the discussion above, it becomes important to identify the collusive potential of such communications among firms.<sup>11</sup>

First, we have seen above that exchange of information on past prices and quantities (or of verifiable information on prices and quantities set in the current period) of each individual firm facilitates collusion, as it allows to identify deviators and better target market punishments, that become then more effective and less costly for the punishing firms.

In the absence of disaggregate information on past prices and quantities, availability of more precise estimates of aggregate (market) demand would also help, as it allows firms to see whether a decrease in individual demand is due to cheating of rivals or to a negative shock in market demand. In turn, this implies that there would be no need for punishment phases which are triggered not by deviations but by a general decrease of market demand.<sup>12</sup>

---

<sup>9</sup>Playing price equal to marginal cost forever, that is an infinite punishment, would clearly be suboptimal here: since the punishment is triggered even if nobody has actually deviated, it would not make sense to condemn the industry to zero profit forever whenever a low level of demand is observed.

<sup>10</sup>On the other hand, as I discuss below, the alternance of high and low price levels is no proof either of a collusive outcome, since an industry at a non-collusive equilibrium might have lower prices under negative demand (or common input) shocks or increased capacities.

<sup>11</sup>On collusion and exchange of information between competitors, see Kühn (2001).

<sup>12</sup>Porter (1983) shows that exchange of private information about market demand reduces demand uncertainty and allows more collusive outcomes to be sustained. In a similar vein, Kandori (1992) shows that as demand uncertainty decreases, firms can attain higher collusive

Exchange of information about past (and current) prices and quantities helps firms sustain collusion, but it is possible that there might also be efficiency effects behind exchange of such data. For instance, better information about demand might allow firms to increase production in markets, times, and areas where demand is higher. The literature on information exchange has ambiguous findings.<sup>13</sup> Theoretically, it is possible in certain circumstances that exchanging information helps welfare. However, it is unlikely that firms need to exchange individual and disaggregate data in order to achieve whatever efficiency there might be. Kühn (2001) also argues that information about the industry might help firms devise incentive schemes for their personnel, based on relative productivity, but again, for such schemes to work firms do not need detailed data at a disaggregate level.<sup>14</sup>

Kühn (2001) convincingly concludes that while both types of information exchange help firms to collude, the observation of past and present quantities and prices of firms is a more effective collusive device than the exchange of private information about market demand. Further, if efficiency gains of information exchange exist, they would be reaped already with the exchange of aggregate data. This should lead competition policy to a more severe treatment of agreements concerning exchange of information about individual prices and quantities (especially the more disaggregate and the more recent). Indeed, his conclusion that communication between firms about such individual firm data should be forbidden is compelling.

### 2.3.2 Coordination issues: The role of communication

When firms repeatedly meet in the marketplace, if the discount factor is large enough, any price between marginal cost and fully collusive price might be sustained. This raises the issue of which price is likely to arise as the market outcome. Habit, history, or particular events might provide firms with a *focal point* on which to coordinate.

Consider for instance a situation where two firms are told by a regulator that their prices cannot be higher than a certain level, say 100. In this case,

---

outcomes (and punishment phases become more severe), and Kandori and Matsushima (1998) also find that communicating information about past realisations helps collusion. Technically, the last paper differs from Green and Porter (1984), Porter (1983) and Kandori (1992) in that it assumes that firms receive private rather than public signals, so that each firm might have a different belief of what has happened in the industry (has there been a demand shock, or has somebody deviated?). Other papers that deal with collusion under imperfect monitoring and private signals are Compte (1998) and Athey and Bagwell (2001).

<sup>13</sup>The incentives for firms to exchange private information, and more importantly the welfare effects of such exchange are not robust, as they crucially depend on whether the firms compete on prices or quantities, or whether the uncertainty concerns costs or demand. See Kühn (2001) or Raith (1996).

<sup>14</sup>Some exceptions about detailed data might occur in particular sectors. In banking and insurance, for instance, markets are characterised by asymmetric information. If firms had information about clients' solvency history, this would be efficiency enhancing as it would lessen adverse selection problems and foster competition by helping customers to switch firms. See Padilla and Pagano (1999). Note, however, that although disaggregate, this is not information about prices set or quantities produced by firms.



this price will provide a clear benchmark (the focal point) for the firms, and one can bet that 100 will be the price that they will set.<sup>15</sup>

History might also provide hints. Many European markets have been protected from foreign competition for a long time, resulting in several national monopolies in many industries. Once tariff and non-tariff barriers started to fall, this created a potentially pan-European market. However, a situation where each firm stays in its own market without entering foreign ones would provide a good collusive equilibrium, which is just the continuation of something which has happened for a long time. Instead, starting to export might be considered a deviation and might trigger a retaliation in the home market, with rivals exporting in turn. Therefore, the *status quo* might be a focal point, and only when demand and technology conditions substantially change, might firms be tempted to break the current situation.<sup>16</sup>

Whatever the reason, if firms have coordinated in the past on a certain collusive price or divided markets in a certain way, it might be too risky for them to experiment so as to change it. Firms might simply update such a price more or less mechanically with inflation or when raw materials commonly used in the industry become more expensive.

If firms were colluding explicitly they would simply communicate with each other and they could achieve higher collusive prices (provided that firms are symmetric enough, they would have similar preferences over prices), and/or more efficient market sharing rules. But even if they did not overtly collude, they could still try to overcome coordination problems by transmitting information to each other, as I discuss in what follows.

**Information exchange, II: Announcements of future prices** Announcement of future prices (or production plans) might help collusion, in that it might allow firms to better coordinate on a particular equilibrium among all the possible ones.<sup>17</sup> Farrell (1987) was the first to show the role of non-binding and non-verifiable communication (known as “cheap talk”) in achieving coordination among players in games with multiple equilibria.<sup>18</sup> Since then, both theory and experimental evidence seem to indicate that announcements about price intentions might help firms to coordinate, although not under all circumstances.<sup>19</sup>

---

<sup>15</sup>Schelling (1960) was the first to introduce the notion of focal points (or conventions) and show how they can help people to coordinate.

<sup>16</sup>See below for a discussion of the *Soda-Ash* case, which can be interpreted as a tacit collusive outcome with history providing an easy focal point for firms.

<sup>17</sup>Unilateral announcements help players to select a jointly optimal price, on which it would otherwise be difficult to coordinate if a focal price (that is, an obvious price to be chosen) does not exist.

<sup>18</sup>Farrell (1987) analysed a game with different features from supergames. He looked at a “battle of the sexes” situation, where there are two asymmetric equilibria, as in an industry where at equilibrium only one of two firms could profitably enter, whereas if both entered they would make losses.

<sup>19</sup>See Farrell and Rabin (1996) for a non-technical discussion of the possible role of cheap talk in different games, and of the conditions one should expect it to affect equilibrium outcomes or equilibrium selection. A number of experiments have been performed on this issue, see for instance Cooper et al. (1992). See Kühn (2001) for other references on experiments on the

However, not all announcements about future actions should be treated in the same way. One should distinguish two different situations, according to whom the announcements are directed to: (1) “*private*” announcements directed to competitors only (these include communication in auctions); (2) “*public*” announcements with commitment value to consumers.

**“Private” announcements** In the first case, announcements are directed to competitors only. To help fix ideas, think of a firm sending a fax to rivals where it is stated that from next month it intends to set a certain price. As Kühn (2001) remarks, it is hard to imagine any efficiency reason behind such announcements. Most likely, they just help rivals to coordinate on a particular collusive price, and therefore helps them collude by avoiding costly periods of price wars and price instability.

*Advance notice* of price changes, as long as it does not fully commit the firm to the price announced, might also be a tool to avoid costly experimentation with the market.<sup>20</sup> A firm might announce a price increase effective, say, in 60 days, but then revert to the current price if the other firms did not follow suit with similar announcements of price changes.<sup>21</sup> This way, firms might arrive at a commonly agreed price without incurring the risk of losing market shares or triggering price wars during the period of adjustment to the new prices.<sup>22</sup>

**“Public” announcements** In the second case, price announcements are public, and therefore seen by rival firms as well as consumers. Think for instance of a firm advertising the prices of its products in newspapers. On the one hand, it might be argued that transparency of prices still helps collusion, for the reasons indicated above. On the other hand, though, market transparency is good for consumers, as it allows them to “shop around” for the best offer. The latter positive effect is generally considered stronger than the collusive effects of the announcements. Both theoretical arguments and empirical evidence suggest that price advertising in this sense is generally beneficial and brings prices down.<sup>23</sup> Therefore, when prices are “transparent” for both consumers and firms, this should not be considered as an anti-competitive practice.

To conclude, whereas announcements directed to rivals only should be forbidden, announcements about current and future prices which carry commitment value vis-a-vis consumers should be regarded as welfare enhancing.

---

collusive effects of information.

<sup>20</sup>However, advance notice of *effective* price changes could be in the interest of consumers, who might want to know in advance the prices they will have to pay, and so reduce uncertainty.

<sup>21</sup>See Hay (1999) for the *Ethyl* case, where this was one of the allegedly anti-competitive prices used by the firms.

<sup>22</sup>See Borenstein (1999) for an account of the *Airline Tariff Publishers* (ATP) case in the US, example of how firms can manage to coordinate on prices through a succession of announcements which do not have commitment value with respect to consumers. See also Klemperer (2001) and Cramton and Schwartz (2001) for a discussion of how firms manage to ‘communicate’ in auctions, managing to achieve collusive bidding.

<sup>23</sup>For a survey of both the theoretical and the empirical literature on price advertising, see Fumagalli and Motta (2001).

### 2.3.3 Pricing rules and contracts

Firms might be able to write contracts and adopt pricing rules that help them sustain collusion. In what follows, I will briefly discuss some examples of such practices.

*Meeting-competition clauses* state that if the buyer receives a better price offer from *another* seller, the current seller will match that price.<sup>24</sup> In this case, the potential for collusion is high, and twofold. First, the clause works as a device to exchange information: whenever a buyer is offered a better price, it will have an incentive to report that information to the current seller. This will make firms immediately aware of a deviation from a collusive outcome in the industry, and we know that timely detection of deviations is a crucial element for collusion. Second, the clause reduces the incentives to deviate in the first place: if rivals can retain their current customers due to a meeting-competition clause, the price decrease can only attract new buyers, but cannot steal existing buyers from other firms.

Meeting-competition clauses might have efficiency explanations,<sup>25</sup> but the pro-collusive impact of meeting-competition clauses seems so strong that anti-trust agencies should probably put them under a *per se* prohibition rule.

*Resale price maintenance* (RPM) is a vertical agreement whereby a manufacturer imposes upon its retailer(s) the price at which the good should be sold in the final market. There are a number of reasons why RPM can be pro-competitive,<sup>26</sup> but RPM might also facilitate collusion among manufacturers. The intuition is clearly conveyed in the following quote:

“With a competitive retail market and stable retail cost conditions, manufacturers could assume agreed-upon retail prices by fixing their wholesale prices appropriately. In reality, however, variation over time in the costs of retailing would lead to fluctuating retail prices. If wholesale prices are not easily observed by each cartel member, cartel stability would suffer because members would have difficulty distinguishing changes in retail prices that were caused by cost changes from cheating on the cartel. RPM can enhance cartel stability by eliminating the retail price variation.”<sup>27</sup>

Jullien and Rey (2001) have recently formalised this argument, and showed that indeed RPM allows manufacturers to better identify deviations from a collusive action, as the quote above suggested, and therefore to better sustain collusion.

---

<sup>24</sup>A *meet-or-release* clause gives the seller the possibility to match the price or free the customer from the contract.

<sup>25</sup>If gathering information about prices is a costly process, these clauses might speed up purchase since they insure the early buyer that it is not missing better deals. They may also introduce some price flexibility in long-term contracts, by ensuring that shocks that affect outside options are internalised in the contracts. See Salop (1986: 283-284) and Crocker and Lyon (1994).

<sup>26</sup>See Motta (2004: Chapter 6) for a discussion.

<sup>27</sup>Mathewson and Winter (1998: 65).

*Uniform delivered prices* might also facilitate price observability among rivals. Consider a situation where producers are located in different geographic areas, and serve consumers that are also spread out over the territory. In these circumstances, it might be difficult for firms to compare prices and to detect price changes, since prices vary with transportation costs. Under uniform delivered pricing, a firm would set the same price inclusive of transportation cost throughout its territory, and independent of the customers' locations. Somebody located next to a firm's plant would pay exactly the same as somebody located hundreds of kilometres away. The practice, however, would make it much easier for competitors to check the prices charged to the clients, thereby fostering collusion.<sup>28</sup>

### 3 Cartels in the European Union: Law and Practice

In this Section, I will first briefly describe cartel law in the European Union, and then discuss the way it has been enforced by the European Commission (EC), which is an administrative authority whose decisions can be appealed to the European Community Courts, i.e., the Court of First Instance (CFI) and the European Court of Justice (ECJ).<sup>29</sup>

First, I will briefly describe the legal framework and the general enforcement of the law (section 3.1). Then, I will turn to some crucial substantial issues, such as how the EU case-law has dealt with the standards of proving collusive infringement (section 3.2). Finally, I will provide some empirical evidence on the way cartel law has been enforced in the EU, and in particular discuss the issue of deterrence (section 3.3).

#### 3.1 Legal framework

The main EU law provision on cartels is represented by article 81 of the EC Treaty,<sup>30</sup> which recites:

- (1) The following shall be prohibited as incompatible with the common market:  
all agreements between undertakings, decisions by associations of undertakings  
and concerted practices which may affect trade between Member States and  
which have as their object or effect the prevention, restriction or distortion of

---

<sup>28</sup>A similar effect is achieved by *basing point pricing*, a system whereby each producer sets the final price as the mill price at the common basing point (which might be the seat of plants of one or more firms or it might be completely arbitrary) plus transport cost from that point to the final destination. Again, this allows to increase transparency on the producers' side, in that it allows to better compare prices.

<sup>29</sup>Obviously, the discussion of how the National Competition Authorities and National Courts of the 25 Member States of the EU deal with cartels it is beyond the scope of this paper. To a large extent, however, national laws and policies follow EU law and case-law.

<sup>30</sup>Note, however, that article 81 covers both horizontal and vertical agreements; furthermore, not all horizontal agreements are cartels, and indeed article 81(3) gives conditions for agreements among competitors to be accepted.

competition within the common market, and in particular those which: (a) directly or indirectly fix purchase or selling prices or any other trading conditions; (b) limit or control production, markets, technical development, or investment; (c) share markets or sources of supply; (d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage; (e) make the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

(2) Any agreements or decisions prohibited pursuant to this Article shall be automatically void.

(3) The provisions of paragraph 1 may, however, be declared inapplicable in the case of: any agreement or category of agreements between undertakings; any decision or category of decisions by associations of undertakings; any concerted practice or category of concerted practices, which contributes to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit, and which does not: (a) impose on the undertakings concerned restrictions which are not indispensable to the attainment of these objectives; (b) afford such undertakings the possibility of eliminating competition in respect of a substantial part of the products in question.

A full discussion of article 81 is not within the scope of this paper, but a few remarks are in point.

Firstly, one should note that the European legislator does not restrict attention to *agreements*: indeed, the reference to *concerted practices* allows the EC to possibly deal with collusive situations where firms have not explicitly agreed with each other. This term is deliberately vague enough so as to capture very different situations and institutional arrangements, including cases where firms have not explicitly agreed on, or even discussed, prices, quotas, or market-sharing: most of the discussion on the standard of proof (see below) could be rephrased as a discussion of what elements define a concerted practice.

Secondly, article 81 refers to agreements and practices that either have the effect or the *object* of distorting competition. This implies that once a cartel or a concerted practice has been identified, it is not necessary to investigate whether it has had any anti-competitive effect. If for instance firms have set up a collusive scheme to fix prices, it is completely irrelevant to EU law whether firms have been successful in their design or not: even if it was proved that firms did not manage to affect prices at all, this would not spare them a finding of infringement, nor would this conceivably have much effect on the fine they should pay (as we shall see below, fines are not calculated in proportion of actual damages to clients and consumers).

Thirdly, article 81(3) admits the possibility that some agreements among competitors may be allowed under EU competition law. However, both the Commission and the Courts have been clear that agreements to fix prices, outputs or markets will very rarely benefit of any exception: they are considered

restrictive of competition by their object, and therefore it would be very hard for firms to escape a finding of infringement. In other words, cartels are (almost) *per se* prohibited. However, very restrictive agreements that contain some perceived beneficial elements may exceptionally be authorised by the European Commission.

For instance, the Commission has granted exemptions from competition rules for so-called *crisis cartels* - namely, agreements where firms engage in reciprocal reductions in capacity and output - provided such reductions in over-capacity are permanent, favour specialisation and are implemented in such a way that they minimise the social costs of the unemployment which results from the cut-back of production (Goyder, 1993: 162-165). Here, the EC has considered that competition can be sacrificed to avoid the social costs that industry restructuring left to the market would cause.<sup>31</sup>

Another example where a restrictive agreement has been allowed because of perceived environmental gains is provided by the *CECED* decision, concerning an agreement among producers and importers of washing machines which together account for more than 95% of European sales. The agreement aims among other things at discontinuing production and imports of the least energy-efficient washing machines, which represent some 10-11% of current EC sales. The agreement removes one of the dimensions along which sellers compete, and as such it might negatively affect competition and increase prices (as a general rule, the most polluting machines are also the least expensive ones). However, the Commission considered that the agreement will benefit society in environmental terms, allowing to reduce energy consumption, and that such an objective would not have been attained without the agreement. This is because consumers do not properly take into account all the externalities involved in their purchase and consumption decisions, and firms would not give up a tool of market competition unless bound by an agreement.

A final example of the same nature is given by agreements of *shipping conferences*, which have benefited for a long time from a block exemption. By virtue of this exemption, ship-owners have been able to operate as a cartel along some specific routes. According to the EC, the counterpart of allowing the shipping companies to operate as a cartel should have been the establishment of stable and certain shipping services: the provision of regular scheduled maritime services on routes to and from the EU would otherwise have been at risk due to the possibility of having to operate well below capacity.<sup>32</sup> This unusually lenient treatment of maritime transportation services was however put to an end last year (but the abolition of shipping conferences will enter into effect only in

---

<sup>31</sup>Although crisis cartels allowed by the EC are far from being a frequent phenomenon, Goyder (2003: 153) argues that in bad periods they may have a comeback, and mentions the *Stichting Baksteen* as a recent decision (1995) where the EC has authorised an agreement in the Dutch brick industry to cut down excess capacity.

<sup>32</sup>This does not appear as a particularly compelling economic argument: after all, there are many industries which have not been granted any exception and in which firms might have to operate below capacity in some periods. More probably, the explanation is historical: shipping conferences have existed for a very long time and in many jurisdictions, and the EU might have found it politically difficult to break with past rules.

October 2008).<sup>33</sup>

Apart from the aforementioned cases which are to some extent exceptional and which arguably are only partly collusive, the EC (and the European Courts) have consistently found them illegal since the early cases (such as the *Quinine* cartel and the *Dyestuffs* cartel, both decisions dating from 1969).

**Enforcement of cartel law** As indicated above, the EC is the main enforcer of the law against cartels in the EU. The EC's powers are established by Regulation 1/2003 (which replaces Regulation 17/1962). The EC has extensive investigatory powers, which include the possibility to conduct inspections not only on the firms' premises but also on the homes (and private vehicles) of the firms' managers and employees, the latter possibility not being allowed under the old Regulation 17/1962, and introduced because experience showed the EC that often compromising cartel documents have not been kept in offices but in private homes.

**Fining policy** Under EU competition law, fines can be imposed only on firms (although national laws in some European countries do allow for criminal penalties, and/or administrative sanctions to be imposed on firms' managers), and Regulation 1/2003 establishes that fines may not exceed 10 per cent of the firm's turnover (although actual fines rarely go anywhere close to such a ceiling), and that they should be fixed with regard to the gravity and the duration of the infringement of the law.

The Commission has still considerable discretion in the determination of the fines, but it has progressively been more transparent about the way it imposes fines. In January 1998, it released a Notice which established some of the criteria that it uses to set the fines. In September 2006, it published new Guidelines on its fining policy.<sup>34</sup> According to the new Guidelines, the Commission will use a two-step procedure to set fines. As a first step, the basic amount of the fine will be set. To do so, the Commission will: (1) determine 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) multiply it by the number of years the infringement has taken place; (3) add a fixed component of the fine which equals 15-25% of the annual turnover. As a second step, the basic amount of fine thus obtained might be modified taking into account aggravating or mitigating circumstances. Among the first category, there is recidivism (a firm might receive 100% increase in the fine for each instance of earlier infringement of the same type, whether at the EU level or in national member states), obstruction of investigation (for instance, denying facts which turn out to be supported by objective evidence, or refusing inspections by Commission officials<sup>35</sup>), and for having played the

---

<sup>33</sup>See Benini and Bermig (2007).

<sup>34</sup>"Guidelines on the method of setting fines imposed pursuant to Article 2392)(a) of Regulation No. 1/2003." [2006], OJ C210/2. For a discussion, see also de Broca (2006).

<sup>35</sup>For instance, in the *Bitumen Netherlands* case, the Commission increased the fine imposed on KWS by 10% for having twice denied Commission inspectors access to its premises. In *Copper Fittings*, Advanced Fluid Connections (and other cartel participants) received a 60%

leading role in instigating or policing the cartel. Among the second category, there may be evidence that the firm had terminated the infringement as soon as the Commission intervened, that it had a substantially limited role in the cartel, and that the anti-competitive conduct had been authorised or encouraged by national public authorities or legislation.<sup>36</sup> In any case, the resulting fine cannot exceed 10% of the previous business year's total turnover. Note that for large multi-product and multinational firms the risk that the fine may be higher than the 10% threshold will be much lower than in the case of smaller and more 'specialised' firms. In exceptional cases, which presumably could take place only for the latter type of firms, the Commission might also reduce the fine if the firm can prove inability to pay, that is if it could offer "objective evidence that imposition of the fine as provided for in these Guidelines would irretrievably jeopardise the economic viability of the undertaking concerned and cause its assets to lose all their value" (Guidelines, at para. 35).

As an example of how the EC will calculate the fine, consider a firm which has been found involved in a cartel which lasted for six years. Suppose the Decision is taken in August 2007 and that in the relevant product and geographic market within the European Economic Area it had a value of sales of 100 million euro in 2006. The basic amount of the fine might be calculated as  $(30\%)(100)(6) + (25\%)(100) = 180 + 25 = 205$  million euro. If any of the aggravating or attenuating circumstances listed above is present, the fine would be modified upwards or downwards. For instance, if the same firm has been involved in a cartel in the past, the fine might be doubled and become 410 million.

However, if the total fine thus obtained is above the 10% of the worldwide turnover of the company, then the fine would be capped at that level. Suppose for instance that the relevant product market is at the EU level and that the worldwide turnover of the company in the previous year was 1000 million euro, then the firm could not receive a fine higher than 100 million euro.

In practice, and as we shall see below the available evidence supports this claim, it is widely believed that the Commission has toughened its stance against cartels over time (whether fines have reached a level at which they are a real deterrent for cartels is subject to debate, though, as we shall also discuss below). Increased fines have not been the only sign that - from the second half of the 1990s - fighting cartels has become the priority for the EC. Indeed, two other important changes which are worth stressing have occurred in the EU competition law. First, the Commission has started a process of 'Modernisation' which has led to some of its powers being given to national competition authorities and national courts, with the aim of better employing its resources and devoting them to important cases (such as cartels) rather than on minor agreements. Second, it has introduced a leniency policy which has arguably been the main

---

increase in the fine for having continued the infringement even after the Commission's inspection. The same firm received a further 50% increase because of giving misleading information to the Commission.

<sup>36</sup>For instance, in *French Beef* the Commission reduced the fines by 30% because of the role played by the French Minister of Agriculture in promoting the agreement.



novelty in the fight of cartels.

**Leniency policy** “Leniency programmes” grant total or partial immunity from fines to firms that collaborate with the authorities. They work on the principle that people who break the law might report their crimes or illegal activities if given proper incentives.<sup>37</sup> In competition law, the Antitrust Division of the Department of Justice (DOJ) in the US have been the first to introduce such a law, in 1978, granting immunity from criminal sanctions if certain conditions occurred. (In August 1993, this scheme was thoroughly redesigned by the DOJ, giving rise to a stream of firms applying for leniency and giving evidence which permitted to uncover a number of cartels.).

The EU introduced a leniency policy in 1996. It established that a fine might have been very substantially (75-100%) reduced if a company informed the European Commission before an investigation started; and substantially (50-75%) reduced if co-operation took place after an investigation had started, but before the EC had obtained sufficient grounds for initiating the procedure; in both cases, the company had to be the first to report, terminate all cartel activities and must not have been the instigator of the cartel. The fine might have been significantly (10-50%) reduced if the company cooperated with the EC in the investigations (for instance by not challenging the EC findings and allegations) without the previous conditions for more generous reduction of fines being met.

However, this policy did not give the results the EC hoped for, mainly for two reasons. First, leniency was given in a discretionary way by the EC (rather than being automatic like in the US), and firms did not know what fines they would get until the final Decision was adopted by the Commission. This clearly reduced the benefit from disclosing evidence. Second, firms did not receive immunity if an investigation had already begun.

In February 2002, the EC adopted a new leniency policy. It improves on the first point since it introduces transparency and certainty: complete immunity from fines is given to the firm first reporting a cartel and, upon providing evidence, the firm will receive (conditional) immunity in writing from the EC.<sup>38</sup> Further, the new rules specify that any firm can apply for immunity as long as it had not coerced other firms to participate in the cartel (the previous condition, requiring a firm not to be an “instigator” of the cartel, left room for

---

<sup>37</sup>Similar schemes are routinely used in several fields other than antitrust, such as fiscal law and environmental law. In Italy, the so-called “turncoat laws” (*“leggi sui pentiti”*) have been successfully used to fight organised crime such as the mafia and terrorist organisations such as the Red Brigades. Of course, there are ethical issues involved because punishment is abandoned in exchange for deterrence of further crimes: criminals might be set free (and sometimes even rewarded) in exchange for information that allows to imprison other criminals.

<sup>38</sup>Immunity in the final decision will be confirmed if the firm has fully cooperated throughout the process. For instance, in the *Raw Tobacco Italy* case, the firm Deltafina saw its conditional immunity (granted at the beginning of the procedure) withheld because in breach of cooperation: it had informed its competitors of its leniency application and that an investigation was open before the surprise inspection. Eventually the firm was still given a 50% reduction in fines.

interpretation).

It also improves on the second point, since immunity is given to a firm that provides evidence that enables the EC to establish an infringement even when the EC is already in possession of enough information to launch an inspection (but not to establish an infringement).<sup>39,40</sup> The Leniency Notice was further revised in December 2006, but without substantial changes relative to the 2002 Notice.

The use of leniency programmes in anti-trust has been studied first by Motta and Polo (1999, 2003).<sup>41</sup> They show that such programmes might have an important role in the prosecution of cartels provided that firms can apply for leniency *after* an investigation has started. This is because as soon as an investigation starts, a firm's expected probability of being found guilty suddenly increases, thus modifying the balance between cost and benefit from a cartel. If given the possibility to apply for leniency, the firm might then decide to give up its participation in the cartel in exchange for a total or partial reduction of the fine.

Leniency also helps in that it saves resources of the authority: building up a convincing enough case to be defensible in courts is very costly, but the cost of this prosecution stage can be avoided or greatly reduced by leniency, since the firms would bring themselves enough evidence to the authority.

In practice, there is no doubt that the 2002 Leniency Programme has been an extremely effective device in uncovering cartels and in facilitating the Commission's task to prosecute the companies involved in such cartels. In the period from its entering into force in February 2002 to end-December 2006, the Commission received 104 applications for immunity (i.e., for a zero fine) and granted (final or conditional) immunity in 56 cases, rejected 34 applications, while the remaining were still pending in early 2007.<sup>42</sup> However, not all conditional immunity granted by the Commission will necessarily translate into a Final Commission Decision. In many cases, the Commission might decide not to pursue the cartel because the infringement is very minor or long past, because it believes that it would not have enough elements for successful prosecution, or because it prefers to let a National Competition Authority prosecute the case, focusing instead only on major international cartels. Even so, it is remarkable that a number of cartel cases in the last years have been initiated by cartel participants which at a certain point decided to apply for leniency.

---

<sup>39</sup>A reduction of fines is granted to firms that do not fulfill the previous conditions, but provide evidence that has *significant value added* for the investigation.

<sup>40</sup>For an assessment of the EC leniency policy, see also Geradin and Henry (2005). See also Van Barlingen and Barennes (2005) and Suurnakki and Tierno Centella (2007) for a discussion on how leniency works in practice.

<sup>41</sup>See also Spagnolo (2000), Rey (2000), and Harrington (2005).

<sup>42</sup>See European Commission (2007): pp. 12-13. When more firms involved in the same cartel apply for immunity, only the first one is entitled to receive it, and the other firms will be classified by the EC as applying for reduction of fines. The statistics reported are therefore not inflated by the fact that several cartel participants might report more or less simultaneously to the Commission.

### 3.2 Standards of proof: which practices violate EU law?

In Section 2 above I have already stressed that a collusive outcome might arise without firms agreeing or communicating to coordinate their behaviour. This raises the crucial issue of whether 'tacit' collusion, and not only explicit collusion, represents a violation of competition law.<sup>43</sup> In what follows, we discuss how the European Commission and the Courts have dealt with this important issue.

**Parallel behaviour is not per se unlawful.** Perhaps the prototypical case of 'tacit' collusion is given by a situation where firms behave in a parallel way over time, that is tend to imitate each other in their price decisions. Suppose for instance that - even without common shocks on demand or input prices - one day a seller increases prices by 10%, and that the next day a rival follows suit. Absent any other documentary evidence (such as proof that the firms have agreed on prices), does this price parallelism represent evidence that firms have infringed article 81? Or, in the terms of EU law, is this evidence that the firms have engaged in a concerted practice?<sup>44</sup>

The answer is that the Commission has been tempted to answer positively this question, but the European Court of Justice, especially in its *Wood Pulp* judgement, which is the most recent on this issue, seems to exclude this possibility.

**The Wood Pulp judgment** In 1984, the EC adopted a decision (*Wood pulp*) that found that forty wood pulp producers and three of their trade associations had infringed article 81 (then art. 85) of the Treaty by concerting on prices. In 1993 the European Court of Justice issued a judgment (*Ahlström and others v. Commission*) that annulled most of the EC decision, partly on procedural grounds and partly on substantive issues.

The Commission found an infringement of article 81 due (among other things) to parallel behaviour, which consisted of: (i) a system of quarterly price announcements; (ii) the simultaneity or quasi-simultaneity of the announcements; (iii) the fact that announced prices were identical. As the ECJ rightly argues, absent documents which *directly* establish the existence of collusion between the producers concerned, the problem was to understand whether the

---

<sup>43</sup>In Motta (2004: Section 4.4) I discuss the issue more in detail. I argue there that there should be infringement of the law only when firms explicitly coordinate their behaviour. In other words, tacit collusion does not run against article 81, and evidence on market data (for instance, that prices are 'too high', that there is parallel behaviour and so on) can represent only complementary evidence: only hard evidence (such as minutes of agreement, faxes, recording of phone calls and meetings and so on) should constitute a proof of violation of competition law. The suggested approach is consistent with the EU practice as indicated by the discussion in the text below.

<sup>44</sup>The ECJ defines the term of 'concerted practice' in the *Sugar Cartel* judgment as follows: "The concept (...) refers to a form of coordination between undertakings which, without having been taken to the stage where an agreement properly so-called has been concluded, knowingly substitutes for the risks of competition practical co-operation between them..." ([1975] ECR 1916).

three elements (i), (ii), and (iii) are proof of collusion (“constitute a firm, precise and consistent body of evidence of prior concertation”) or can instead be explained by normal competitive behaviour:

“In determining the probative value of those different factors, it must be noted that *parallel conduct cannot be regarded as furnishing proof of concertation unless concertation constitutes the only plausible explanation for such conduct*. It is necessary to bear in mind that, although article 85 (now article 81) of the Treaty prohibits any form of collusion which distorts competition, *it does not deprive economic operators of the right to adapt themselves intelligently to the existing and anticipated conduct of their competitors.*” (*Ahlström and others v. Commission*, para. 71; emphasis added)

To establish whether parallel conduct was in this case proof of collusion, the ECJ commissioned two expert’s reports, whose conclusions were devastating for the European Commission, in that they indicated that parallelism could well have been the result of the normal oligopolistic interdependence among competitors.

(i) The EC believed that the system of quarterly price announcements and the fact that all firms quoted prices in the same currency were practices expressly adopted by the wood pulp producers so as to increase the transparency of the market, thus rendering collusion easier. The experts found that it was the purchasers who, after World War II, demanded the introduction of that system of announcements, in order to better estimate their costs. Further, they found that the US dollar was first introduced by the North American producers during the 1960s (before the period of the alleged concerted practices), and subsequently adopted by other producers; they also found that this development was welcomed by the buyers.

(ii) According to the EC, the close succession of price announcements could only be explained by a concerted practice. However, it had another, innocent, plausible explanation according to the expert’s reports. Several market features, including the existence of common agents that work for several producers, implied that information on announced prices would spread very quickly.

(iii) The third element in the EC’s construction was that the prices announced by the wood pulp producers involved were the same (or very similar) although they had different production costs, different rates of capacity utilisation, different costs of transportation to a given market; and they were at an artificially high level in some years, whereas the low prices in two particular years corresponded to a punishment phase. However, the experts and the ECJ noted that same pattern of prices could also be consistent with an alternative explanation, that is competitive behaviour in an oligopolistic industry. First, the fact that (average) prices were high in some years and low in others might be explained by specific demand and supply shocks (such as the introduction first - and discontinuation later - of storage subsidy schemes by the Swedish government, the evolution of the Canadian and US market, and relative exports

to European markets). Second, the experts argued that the fact that prices over the economic cycle were the same (or similar) across producers was compatible with the firms behaving independently: a competitor decides to set the same price as its rivals simply because it fears the reactions that would take place if it did not so.<sup>45</sup>

In the light of the experts' reports, the ECJ arrives at the conclusion that "*concertation is not the only plausible explanation for the parallel conduct.*" (*Ahlström and others v. Commission*, para. 126, italics added)<sup>46</sup>

At this point, one can ask the broader question of whether one can ever find an infringement of anti-trust laws by simply looking at parallel conduct. The answer is that this is possible, but the standard of proof is (rightly) high, as one should prove that communication and/or coordination of some kind among the firms must be the *only plausible explanation* for parallelism. In another important case, *Dyestuffs*, price rises were so simultaneous that it is impossible that they had not been previously agreed upon:

"In Italy, apart from Ciba who had already ordered its Italian subsidiary to increase prices, all other producers, with the exception of ACNA, sent by telex or fax - from their headquarters, seated in places very distant from each other - instructions to their respective agents in the afternoon of 9 January: Sandoz at 17.05, Hoechst at 17.09, Bayer at 17.38, Francolor at 17.57, BASF at 18.55, Geigy at 19.45, and ICI at an undetermined time, since instructions were given by phone." (*Dyestuffs*: 2. My translation.)

Therefore, in that case, even absent documentary evidence the Court agreed with the Commission's finding of a concerted practice.

**Tacit market-sharing schemes?** Another example of possibly tacit collusion is given by situations where each firm limits itself to selling in one particular market. Indeed, a market outcome where two (or more) firms sell in, say, their domestic markets only may be the result of an explicit market-sharing agreement but could also be due to 'tacit collusion': each firm is happy to limit its sales to the domestic territory because it anticipates that if it started to sell also abroad a retaliation would follow, resulting in overall competition and the loss of the domestic monopoly.

---

<sup>45</sup>The experts referred to the kinked demand curve hypothesis, according to which there is price rigidity in the markets because a firm expects that if it increases prices the rivals will not follow and therefore will lose market shares, and that if it decreases prices the rivals will immediately follow and therefore will not benefit from the price cut. Therefore, the same price would continue to hold unless major shocks have intervened. Nowadays, we would rephrase the arguments by appealing to the tacit collusion model described in Section 2. No firm would light-heartedly want to change prices relative to its competitors, fearing that this would trigger a reaction which would be detrimental to its profits.

<sup>46</sup>This is not the only case in which the Court disagreed with the Commission about evidence of a concerted practice. In *Compagnie Royale Asturienne des Mines and Rhein zinc v. Commission* (Cases 29-30/83 [1984] ECR 1679), the Court finds that the reason why two suppliers refused to sell to a buyer, Schlitz, was the poor credit record of the latter, not a concerted behaviour.

An important case in this respect is *Soda-Ash*, which deals with an alleged concerted practice of market-allocation. (Note that the Commission decision was taken after the *Wood Pulp* Commission decision, but before the *Wood Pulp* judgement.) Soda-ash is a commodity used as a raw material in the production of glass. ICI, a British company, and Solvay, a Belgian company, are the main producers in the industry. The two firms had a long history of *explicit* market-sharing agreements (at times when cartels were not illegal), started in the 1870s and renewed immediately after the 2nd World War with a so-called ‘Page 1000’ agreement, which divided Europe (and some overseas markets) into spheres of influence: for instance, ICI was to sell in the United Kingdom and Solvay in Continental Europe.

The agreement (that the defendants indicated as being out of date since 1962) was terminated as of 31 December 1972, when the UK entered the European Community (so as to comply with the anti-trust rules of the Treaty), but as the EC said in its decision:

“The alleged desuetude of the ‘Page 1000’ arrangement did not however manifest itself in any significant change in the commercial policy of Solvay or ICI in the soda-ash sector, either in 1962 or at any later stage. Neither ever competed with the other in their respective home markets in the Community. Similarly in overseas export markets each continued to respect the other’s sphere of influence.”  
(*Soda-Ash*: 27)

What is noticeable is that each firm admitted that it had no intention of invading the other’s home market, but simply because it feared retaliation if it had done so (*Soda-Ash*: 43-44). They therefore justified a collusive outcome as the result of independent decisions that made sense from a business viewpoint. In this case, continuing to share markets was an easy way to reach tacit collusion.

The other interesting point here is whether tacit collusion is an infringement of article 81 (ex-85). In this case, the Commission decided that it was, and that the term ‘concerted practice’ mentioned in article 81 among the prohibited practices covered also tacit collusion:

“The Commission fully accepts that there is no direct evidence of an express agreement between Solvay and ICI to continue to respect the ‘Page 1000’ cartel in practice. However, there is no need for an express agreement in order for article 85 to apply. A tacit agreement would also fall under Community competition law.” (*Soda-Ash*: 55)

The Court of First Instance annulled the Commission Decision but on procedural grounds, while being silent on the merits of the question.<sup>47</sup> Interestingly, the EC later re-adopted the decision, and the case is still pending at the Court. In the light of the *Wood Pulp* judgment, absent documentary evidence it would be difficult for the Commission to persuade the Court, since - in the words

---

<sup>47</sup>Judgement of 29 June 1995, Case T-30/91. European Court Reports 1995 Page II-01775

of the Court - article 81 "*does not deprive economic operators of the right to adapt themselves intelligently to the existing and anticipated conduct of their competitors.*"

To sum up, the EU jurisprudence requires documentary evidence for the finding of a cartel law infringement. Absent documentary evidence, proof of a concerted practice can be found from market outcomes (such as parallel behaviour) only to the extent that the coordination of competitors' decisions is the only plausible explanation for those outcomes.

This approach based on observable elements which are verifiable in a court of law seems very sensible to me, in that it privileges legal certainty and avoid the uncertainty that would inevitably follow if firms had to constantly second-guess what would happen if they behaved independently but in a similar way to their competitors. Clearly, though, not everybody might be happy with this approach, which minimises Type I errors (the possibility to find "guilty" firms which are not), but permits Type II errors (as firms which are colluding but do not leave traces behind would not be found in violation of the law).

One may argue that such an approach is too lenient with the firms: since they know that they could reach a collusive outcome even without an explicit agreement, and that such tacit collusion is not unlawful, how could one ever believe that collusive outcomes could be successfully avoided? There are at least two answers to this concern.

First, it is true that tacit collusion *might* be sustained by firms. However, we have also seen that there are very good reasons why firms would like to communicate and/or to coordinate their actions. They might want to avoid unnecessary and costly experiments with the market and choose instead the best (for the firms) prices, or they might want to create facilitating practices and more generally an environment which improves observability of firms' actions so as to favour collusion. This will lead firms to try and communicate among themselves so as to coordinate their actions, thereby leaving traces of hard evidence behind them. Firms have known for a long time that they will be found guilty if there is any written proof of their coordination, and yet anti-trust authorities keep on uncovering such hard evidence in cartel cases.<sup>48</sup>

Second, in order to make sure that cartel violations do not persist, anti-trust authorities (and more generally governmental institutions) have also another instrument, which is to intervene so as to render the market environment less prone to collusive outcomes. A tough stance on practices that allow firms to exchange information so as to monitor each other's behaviour is an example of this approach.<sup>49</sup>

---

<sup>48</sup>Noteworthy are a stream of high profile international cartels prosecuted by both US and EU authorities in the late 1990s, among which *Citric Acid*, *Lysine*, *Vitamins*, and *Graphite Electrodes*.

<sup>49</sup>Merger control may also play an important role in that it could prevent the formation of industrial structures where collusion would be likely sustained. Further, in Motta (2004: Section 4.4) I argue that there are a number of initiatives that authorities could take in order to prevent collusion, from the careful design of public procurement auctions to the outlawing of certain business practices which foster collusion.

**Agreements to exchange information as a concerted practice.** According to a very authoritative commentator, "[a]n important element in establishing the existence of concerted practices is contact between the parties, which must involve intentional communication of information between them, either directly or through an intermediary" (Goyder, 2004: 75).

It is important to note that such exchanges of information which would give rise to a concerted practice do not necessarily take the form of communications on the prices that firms intend to charge, nor do they need to be part of a precise agreed-upon scheme. In the *Peroxygen* judgment (1985), for instance, the ECJ finds that the firms had engaged in a concerted practice:

"Full exchange was made of information about production, so that each knew the others' general commercial policy. It was held that these arrangements constituted a concerted practice: although the parties had not necessarily agreed a precise or detailed plan in advance, it was sufficient that by their mutual involvement they had departed from the basic requirement that each must determine independently the policy which it intended to adopt on the market" (Goyder, 2004: 76-7).

As emphasised in Section 2 above, the ability to observe the market decisions of competitors is a crucial ingredient to sustain collusion, and this calls for a prohibition of the exchange of sensitive commercial information among rivals. The EU jurisprudence seems entirely consistent with this approach, since the presence of exchange of information of a detailed and disaggregate nature is sufficient to a finding of concerted practice. In *Fatty acids*, three producers of oleine and stearine were fined for having set up a system to exchange information on market shares, prices, and orders.<sup>50</sup> In *VNP/Cobelpa*, Belgian and Dutch paper manufacturers exchanged - through their national trade associations - detailed data at the individual firm's level on prices, discounts, terms of supply, sales, and payments.<sup>51</sup> In *UK Agricultural Tractors*, the Commission fined seven UK producers or importers of agricultural tractors for a sophisticated agreement to exchange information on sales at a very disaggregate level, both in geographic terms (sales were broken down at such a fine level that one could even in some cases identify the buyers) and in product terms (information was provided on which type of tractor was sold). Both the CFI and ECJ upheld the Commission's decision, clearly establishing the principle that setting up a scheme to monitor each other's sales data amounts to a concerted practice.<sup>52</sup>

These judgments are important, because they indicate that it is possible to prove infringement of the law even absent documentary evidence of meetings and agreements, provided that there is enough evidence that firms have intentionally

---

<sup>50</sup>[1989] 4 CMLR 445.

<sup>51</sup>[1977] 2 CMLR D28.

<sup>52</sup>Of course, this does not mean that firms cannot exchange any statistical information. What the Commission and the Courts object to is, rightly, the exchange of very detailed and individual (pricing or sales) data.



created an environment where collusion can be more easily sustained.<sup>53</sup>

Interestingly, there also seems to exist some awareness that transparency is bad when it takes place on the supply side only, whereas transparency which involves also the demand side should be positively looked at - as argued in Section 2. In *Covisint*, a decision which concerns the creation of an automotive internet marketplace (set up by agreement of six car manufacturers), the Commission dismissed objections that the agreement could have made collusion easier by making prices more transparent, and found instead that B-2-B marketplaces would have pro-competitive effects.

### 3.3 Evidence in the fight against cartels

In this section, I briefly review some empirical evidence on the fight against cartels in the EU, and discuss enforcement issues.

Table 1 - obtained from information collected from European Commission and Community Courts' documents and websites - details for each year since 1969 (when the first cartel cases were decided by the Commission) the number of cases decided by the Commission, the total number of firms involved, and the average fine. For the same cases, it then tracks the outcome of the Community Courts' Judgment. Obviously, the Judgment for a given case will be given by the Courts in a later year, but it is the original year of the Commission Decision which is included in the statistics. 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 is included in the Table. In cases where the ECJ Judgment is still pending, it is the fine given by the CFI which is included in the statistics.

The last-but-one column of Table 1 also provides the names of the cartel cases for each year and indicates with a star (\*) those cases where leniency applications were granted. One can therefore see at first sight that from the year 2000 onwards the Leniency programme has played a crucial role in the fight against cartels.

The data in Table 1 are also used to draw some figures which should illustrate at first sight some relevant information. Figure 1 indicates the number of firms which have been found to have infringed cartel law in the EU. This shows that the frequency of cartel cases tends to increase in the last years, although a large number of firms have been involved in cartel cases also from the mid-80s. Figure 2, however, clearly indicates that from the mid-90s onwards there has been a dramatic increase in the total fines given by the European Commission. Figure 3 confirms this data by looking at the average fines imposed by the Commission on cartel participants, but it also reveals that the turning-points seem to be 1998 (the year in which the first Guidelines on fines was published) and, above all, 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

---

<sup>53</sup>In the Court's language, the exchange of information allowed the firms to "replace practical co-operation for the normal risks of competition."

used).<sup>54</sup> Figure 3 also offers additional information, namely the fines imposed in appeals by the Community Courts. (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 the Community Courts tend to reduce the fines, although not dramatically so. A reading of the Court Judgments, however, shows that the Court in general approves the Commission's attitude towards cartels and its fining policy. In general, when the Court fines diverge from the Commission fines it is because the Court has decided to annul a Commission Decision on procedural grounds, or because it thinks that the Commission has not given proper consideration to all the factors which should affect the calculation of the fines.<sup>55</sup> On issues of substance, however, there does not seem to be divergence between the Commission and the Court on the way to treat cartels. The Woodpulp case discussed above is to my knowledge the last one where the Court's Judgment diverges from the Commission Decision on substantive grounds.

Finally, Figure 4 shows that in most of the recent cartel decisions the leniency programme exercised a crucial role: the figure shows the cases where an applicant was given full immunity, i.e. had either initiated the investigation or given a fundamental contribution to the Commission at a stage in which it had not enough evidence for an infringement decision.

Some additional evidence on the fight against cartels come also from an empirical paper (Langus and Motta, 2006) which estimates the effect of EU antitrust fines and investigations on the share prices of the firms which have violated antitrust laws. By using event study methodology, this paper shows that on average the stock market reacts to a surprise inspection by lowering the valuation of the firm by about 2%, to a Commission infringement decision by lowering it by about 3%, and to a Court Judgment upholding the Commission's Decision by lowering it by about 1%. What is perhaps more noticeable, though, is that the fine - averaging 1% of the firm's capitalisation - accounts only for a small part of this 6% loss in the valuation of the firm. It seems likely, therefore, that most of the loss in market value is due to the market anticipating that the firm will not be able - after the EU investigation - to earn the same profits as it would make when the cartel was operating. Indirectly, therefore, this is evidence that after a cartel investigation the firms will not be able to sustain such high prices as during the cartel.

---

<sup>54</sup>The 2007 data refers to the period up to 1 August 2007.

<sup>55</sup>In those cases, however, 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 either the Table or the Figures. This explains possible divergences between official Commission statistics and the ones offered here. For instance, European Commission (2007) reports 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.

**Deterrence** Clearly, the EU Leniency Programme is one of the reasons why the Commission was able to uncover several large international cartels in the recent years. Unfortunately, however, it does not seem that the Programme has been able to cut significantly the time the Commission needs to successfully prosecute the case: still too long a time 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, 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 the Commission to use its resources more efficiently to the discovery of new cartels.

If leniency programmes might be (as indeed they appear to) crucial to break existing cartels, their effect on the prevention of cartels is more ambiguous. On the one hand, to the extent that they simplify the collection of the evidence necessary for the successful prosecution of cartels (but we have seen that this effect does not seem to have been extremely important so far), a leniency programme could help a Competition Authority to devote more resources to the discovery and investigation of new cartels, therefore increasing the probability of discovery and prosecution, and hence (*ceteris paribus*) deterrence. On the other hand, however, the very nature of leniency implies that one or more firms will receive a reduction in fines in exchange for cooperation with the Authority (in most cartel cases, several firms end up receiving significant reductions in the fines, although no more than one can receive full immunity). *Ex-ante*, therefore, a firm might expect that when leniency programmes are in place the average expected fine will decrease, making the trade-off between expected benefits and expected costs of cartel participation tilt towards the former.

Motta and Polo (2003) argue that when Competition Authorities have tight budget constraints the effect of freeing resources from prosecution onto investigation and discovery is the dominant effect, thus suggesting that - in the real world where authorities are severely constrained - leniency programmes will also help deter formation of cartels. However, if due to procedural issues it is difficult to free an Authority's resources, leniency programmes might help disrupt existing cartels while increasing the chances that new ones will be formed. A tightening on the fining policy (an increase in the fines) might therefore be a useful complementary measure to be taken after the introduction of leniency programmes. In this sense, the recent increase in fines imposed by the Commission helps avoid that leniency might come at the cost of lower deterrence.

Whether fines are now large enough to deter cartels is, however, an open question. On the one hand, until the recent revision of the Guidelines, the Commission's fines were probably much lower than they should be, as argued by several commentators,<sup>56</sup> and as revealed also by the number of repeat offenders that one finds when looking at the EU cartel cases. On the other hand, the 2006 Guidelines impose sizeable fines, especially to firms which have already been involved in cartel cases in the past (both under EU law or in national

---

<sup>56</sup>See Buccirossi and Spagnolo (2006) for a discussion.

jurisdictions of EU's member states): under the new rules, a firm which have been caught violating cartel law four times in the past, and which has been now involved in a cartel for five years, may receive a yearly fine equal to 140% of affected commerce,<sup>57</sup> to be multiplied by the five years of the duration of the infringement. Even considering the most pessimistic hypotheses on the price overcharges that a cartel is able to sustain (see e.g. Connor, 2005, which estimates them to be not less than 25%), and the fact that a cartel will not be uncovered with a probability close to 1, such a large fine is likely to provide a good deterrent.

Certainly, it would be difficult to argue that fines should be increased further, for at least two reasons. The first one is that setting fines arbitrarily high may run against the legal principle of proportionality (it would be unfair to impose an extremely large penalty for a minor infringement, for instance); the second is that imposing very large fines might also entail social costs, for instance if the firm had to give up profitable projects because after paying the fines it would not have enough financial assets to secure financial funds from outside investors.<sup>58,59</sup>

Therefore, it would be advisable to use other mechanisms, rather than further increasing the fines, in order to increase deterrence. In the US, unlike the EU, deterrence is substantially increased by by prison sentences and by treble damages in private actions.

Making collusion a criminal offence would provide a stronger deterrent of collusion as managers would find it very risky to collude. However, it is unlikely that there will be sufficient support by EU Member States for a reform of competition law which introduces criminal penalties. Perhaps something could still be done, though, to give managers incentives to respect antitrust laws. For instance, they could be given administrative fines (and firms should be forbidden to reimburse them) and be disqualified from top managerial positions for some years. Otherwise, those who are taking the decisions to participate in a cartel would not pay any consequences for their violations of the antitrust laws.

A well-designed system of private actions for the recovery of antitrust damages may also represent a complementary instrument to increase deterrence. If buyers and final consumers have the right to obtain compensation for the loss they have incurred, and appropriate steps are taken to make it easy for them to sue for damages, this will add to the costs that a firm faces when it is involved

---

<sup>57</sup>The basic fine may be up to 30% of the relevant market turnover, plus a fixed component which could be up to 25% of the relevant market turnover, which means a yearly pro-rata of 5%. This yearly 35% may be then increased by 400%, as each previous infringement may raise the fine by 100%.

<sup>58</sup>The literature on imperfect financial markets stresses that the ability of a firm to borrow funds from outside investors crucially depends on the assets it owns. Therefore, if the payment of a large fine considerably reduces its assets, its borrowing ability will accordingly be reduced, and some profitable projects may not be financed.

<sup>59</sup>In principle, it is also possible that the payment of a large fine may lead the firm to bankruptcy. However, recall that under EU law no fine can be above 10% of the firm's worldwide turnover (which for large multinational and multiproduct firms can be much higher than the turnover of the relevant market) and that a firm may be granted a fine reduction if it can prove inability to pay.

in a cartel, and should help increase deterrence. Note, however, that the excess of the US system, which leads to excessive litigation, should be avoided. For instance, awarding of treble damages is likely to invite unmeritorious claims, and should accordingly be avoided.

Finally, it would be recommendabl for antitrust authorities to improve deterrence by fostering competition culture. Among other things, firms should adopt antitrust compliance programmes and codes of conduct. Firms often write 'codes of conduct' where they commit to follow environmental, social, and labour laws, and such codes form a sort of "contract" with consumers and investors, that they would find it costly to violate. Making sure that compliance with antitrust laws is also included in such codes could help increase deterrence.

## 4 A brief summary

In this paper, I have briefly analysed the economics of collusion, explaining what collusion is, what are the main ingredients necessary for the firms to sustain it, and which factors facilitate it. I have then reviewed the European Union experience in fighting cartels, by focusing in particular on the standards of proving infringement of EU competition law, and on its enforcement policy. In this part, I have argued that to a large extent EU cartel policy is in line with economic thinking, and that the requirement to rely on documentary evidence to prove infringement of article 81 is well motivated.

I have also reviewed the recent experience of the European Commission with a particular view to understanding what can be done to break existing cartels and deter the formation of new ones. I have argued that the EU leniency programme has been very successful in uncovering cartels, but it has unfortunately not allowed the Commission to make the prosecution of cartels quicker. Accordingly, whether in the form of a settlement procedure, or a different design of leniency programmes, the Commission should try to speed up the dealing of cartel cases, so as to free precious resources and energy that it could use to investigate new cartels (for instance by identifying sectors where cartels are more likely to exist).

Finally, I have argued that after the introduction of the recent 2006 Guidelines, fines are probably reached a high enough level to have some deterrence effect on the formation of cartels. However, deterrence could still be dramatically improved not only by trying to raise the probability that they will be investigated (see above), but also by increasing the costs that firms incur when a cartel is uncovered. From this perspective, the recent initiatives taken by the European Commission to promote private actions for the recovery of damages look particularly promising (although care should be taken not to induce excessive litigation, which would be inefficient).

## References

- [1] Athey, S. and K. Bagwell. 2001. "Optimal Collusion with Private Information." *Rand Journal of Economics*. 32: 428-465.
- [2] Benini, Fabrizia and Carsten Bernig. 2007. "Milestones in maritime transport: EU ends exemptions". Competition Policy Newsletter, No. 1, (Spring 2007): 20-22.
- [3] Borenstein, S. 1999. "Rapid Price Communication and Coordination: The Airline Tariff Publishing Case (1994)." in Kwoka J.E. and L.J. White eds. *The Antitrust Revolution*. (Third Ed.). Oxford: Oxford University Press.
- [4] de Broca, Hubert. 2006. "The Commission revises its Guidelines for setting fines in antitrust cases". Competition Policy Newsletter, No. 3 (Autumn 2006): 1-6.
- [5] Compte, O. 1998. "Communication in Repeated Games with Imperfect Private Monitoring." *Econometrica*. 66: 597-626.
- [6] Connor, J.M. 2005. "Price-fixing Overcharges: Legal and Economic Evidence". Purdue University Staff Paper 04-17.
- [7] Cooper, R., D.V. DeJong, R. Forsythe, T.W. Ross. 1992. "Communication in Coordination Games." *Quarterly Journal of Economics*. 107: 739-771.
- [8] Cramton, P. and J. A. Schwartz. 2001. "Collusive Bidding: Lessons from the FCC Spectrum Auctions." *Journal of Regulatory Economics*. 17: 229-252.
- [9] Crocker, K.J., and T.P. Lyon. 1994. "What Do Facilitating Practices Facilitate? An Empirical Investigation on Most-Favored Nation Clauses in Natural Gas Contracts." *Journal of Law and Economics*. 37: 297-322.
- [10] European Commission. 2007. *Report on Competition Policy 2006*. Brussels, 25 June 2007.
- [11] Farrell, J. 1987. "Cheap Talk, Coordination and Entry." *Rand Journal of Economics*. 18: 34-39.
- [12] Farrell, J. and M. Rabin. 1996. "Cheap Talk." *Journal of Economic Perspectives*. 10: 103-118.
- [13] Friedman, J. 1971. "A Noncooperative Equilibrium for Supergames." *Review of Economic Studies*. 28: 1-12.
- [14] Fumagalli, C. and M. Motta. 2001. "Advertising Restrictions in Professional Services." in Amato, G. and L. Laudati. eds. *The Anticompetitive Impact of Regulation*. Edward Elgar Publishers.

- [15] Genesove, D. and W. P. Mullin. 2001. "Rules, Communication, and Collusion: Narrative Evidence from the Sugar Institute Case." *American Economic Review*. 91: 379–98.
- [16] 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". Brussels: Global Competition Law Centre W.P. 03/05.
- [17] Goyder, D.G. 1993. *EC Competition Law*. Second Edition. Clarendon: Oxford University Press.
- [18] Goyder, D.G. 2003. *EC Competition Law*. Fourth Edition. Clarendon: Oxford University Press.
- [19] Green, E.J. and R.H. Porter. 1984. "Noncooperative Collusion Under Imperfect Competition." *Econometrica*. 52: 87–100.
- [20] Harrington, J. 2005. "Optimal Corporate Leniency Programs". Available at <http://www.econ.jhu.edu/People/Harrington/amnesty11-05.pdf>.
- [21] Hay, G.A. 1999. "Facilitating Practices: The Ethyl Case (1984)." in J.E. Kwoka, Jr. and L.J. White. eds. *The Antitrust Revolution*. (third ed.) Oxford University Press.
- [22] Jones, A. and B. Sufrin. 2004. *EC Competition Law* (2nd Edition). Oxford: Oxford University Press.
- [23] Jullien, B. and P. Rey. 2001. "Resale Price Maintenance and Collusion" (<http://www.idei.asso.fr/Commun/Articles/Rey/resale.pdf>).
- [24] Kandori, M. 1992. "The Use of Information in Repeated Games with Imperfect Monitoring." *Review of Economic Studies*. 59: 581–593.
- [25] Kandori, M. and H. Matsushima. 1998. "Private Observation, Communication and Collusion." *Econometrica*, 66: 627–652.
- [26] Klemperer, P.. 2002. "What Really Matters in Auction Design." *Journal of Economic Perspectives*. 16: 169-89.
- [27] Kühn K.-U. 2001. "Fighting Collusion by Regulating Communication between Firms." *Economic Policy*. 16(32): 167–204.
- [28] Mathewson, F. and R. Winter. 1998. "The Law and Economics of Resale Price Maintenance." *Review of Industrial Organization*. 13: 57-84.
- [29] Motta, M. 2004. *Competition Policy. Theory and Practice*. Cambridge and New York: Cambridge University Press.
- [30] Motta, M. and M. Polo. 1999. "Leniency programs and cartel prosecution." Florence. Unpublished Manuscript.

- [31] Motta, M. and M. Polo. 2003. "Leniency programs and cartel prosecution." *International Journal of Industrial Organization*. 21: 347-379.
- [32] OECD. 2002. *Fighting Hard-Core Cartels*. Paris: OECD.
- [33] Padilla, A.J. and M. Pagano
- [34] Porter, R. 1983a. "Optimal Cartel Trigger Strategies." *Journal of Economic Theory*. 29: 313-338.
- [35] Posner RA. 1976. *Antitrust Law: An Economic Perspective*. Chicago: University of Chicago Press.
- [36] Raith, M. 1996. "A General Model of Information Sharing in Oligopoly", *Journal of Economic Theory*, 71: 260-88.
- [37] Rey, P. 2000. "Towards a Theory of Competition Policy". Toulouse: IDEI. Unpublished Manuscript.
- [38] Salop, S.C. 1986. "Practices that (Credibly) Facilitate Oligopoly Coordination." in Stiglitz J. and G. Mathewson. eds. *New Developments in the Analysis of Market Structure*, Basingstoke: MacMillan.
- [39] Schelling, T.C. 1960. *The Strategy of Conflict*. Cambridge: Harvard University Press.
- [40] Spagnolo, G. 2000. "Optimal Leniency Programs". Milano: FEEM, Note di lavoro 42/2000.
- [41] Stigler, G.J. 1964. "A Theory of Oligopoly." *Journal of Political Economy*. 72: 44-61.
- [42] Suurnakki Sari and Maria Luisa Tierno Centella. 2007. "Commission adopts revised Leniency Notice to reward companies that report hard-core cartels". Competition Policy Newsletter, No. 1 (Spring 2007): 7-15.
- [43] Van Barlingen Bertus and Marc Barennes. 2005. "The European Commission's 2002 Leniency Notice in practice." Competition Policy Newsletter, No. 3 (Autumn 2005): 6-16.



### Cartel Decisions and Court Judgements: number of firms and fines

year	number of cases	total number of firms involved	total fines given	average fine given by the EC	total fines as confirmed by Community courts ***	average fine given by the Community Courts ***	name of cases (parties involved)	notes
1969	2	16	0.99	0.06	0.95	0.06	Quinine (6), Dyestuffs (10)	
1970	0	0	0.00	0.00	0.00	0.00		
1971	0	0	0.00	0.00	0.00	0.00		
1972	0	0	0.00	0.00	0.00	0.00		
1973	1	23	9.00	0.39	1.59	0.07	European Sugar (23)	two firms also fined under art 82 (cannot distinguish)
1974	1	4	0.36	0.09	0.00	0.00	Belgian Wallpaper (4)	collective boycott (collective refusal to supply) referenced by 'Jones and van der Woude' as cartel
1975	1	6	0.10	0.02		0.00	Tinned Mushrooms (6)	no appeal
1976	0	0	0.00	0.00		0.00		
1977	1	9	0.12	0.01		0.00	Vegetable Parchement (9)	no appeal
1978	0	0	0.00	0.00	0.00	0.00		
1979	0	0	0.00	0.00	0.00	0.00		
1980	0	0	0.00	0.00	0.00	0.00		
1981	0	0	0.00	0.00	0.00	0.00		
1982	2	8	2.38	0.30	1.43	0.18	SSI -Dutch Tobacco (6); Zinc (2)	
1983	1	26	1.25	0.05	1.25	0.05	Cast Iron Steel Rolls (26)	no appeal
1984	4	62	20.43	0.33	17.68	0.29	Flat Glass -Benelux (8); Zinc Producer Group (6); Peroxide Products (5); Woodpulp (43)	Flat Glass -Benelux, Zinc Producer Group, Peroxide Products no appeal
1985	0	0	0.00	0.00	0.00	0.00		
1986	4	31	65.57	2.12	62.28	2.01	Polypropane (15); Roofing felt (8); Meldoc (5); Fatty Acids (3)	Polypropane two appeals; Meldoc and Fatty acids no appeal
1987	0	0	0.00	0.00	0.00	0.00		
1988	3	34	74.00	2.18	6.02	0.18	Flat glass (3); PVC (14); LdPE (17)	Flat glass three firms infringed art 82 (but fines are for infringement of art 81); PVC two appeals (second initiated by the Commission);
1989	1	14	9.50	0.68	7.47	0.53	Welded Steel Mesh (14)	Welded Steel Mesh two appeals
1990	2	4	18.00	4.50	4.00	1.00	Solvey/ICI (2); Solvay/CFK (2)	Solvay/CFK two appeals; readopted in 2000 no appeal since
1991	0	0	0.00	0.00	0.00	0.00		
1992	4	48	44.76	0.93	39.76	0.83	Dutch Building cartel (28); Eurocheques-Helsinki (2); French African Shipping (17); Railway Tickets Lloyd's (1)	Dutch Building cartel two appeals; French African Shipping no appeal; Railway Tickets Lloyd's two appeals (second initiated by the Commission)
1993	0	0	0.00	0.00	0.00	0.00		

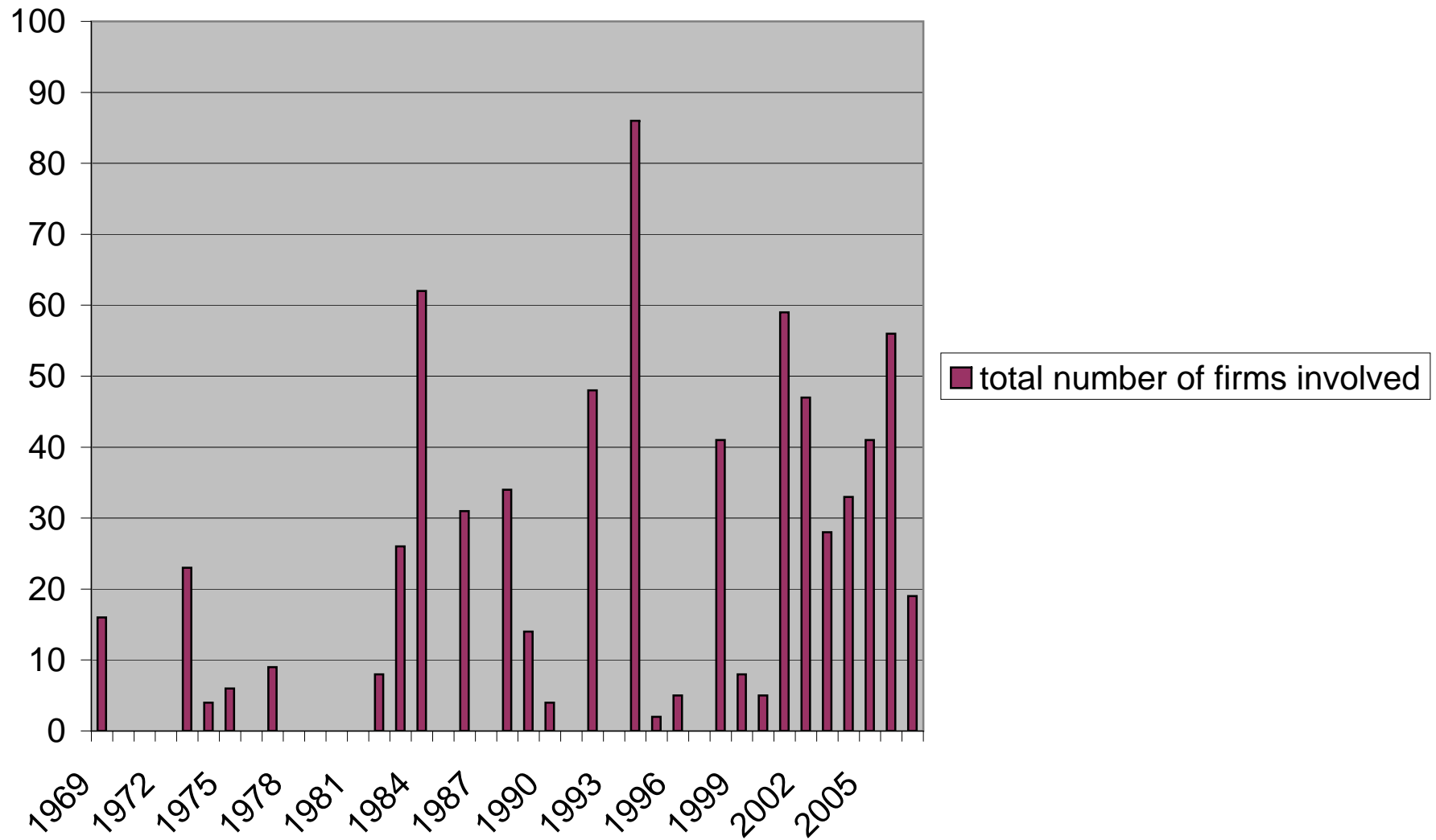
1994	5	86	399.106	4.64	236.81	2.75	Carton board (19); PVC II (12); Cement (41); Far Eastern Freight(13); Ford Agricultural UK tractor (1)	Carton board, PVC II two appeals; Ford Agricultural no fine imposed, no appeal
1995	1	2	11.80	5.90	11.60	5.80	Dutch cranes (2)	
1996	1	5	0.65	0.13	0.65	0.13	Ferry services (5)	no appeal
1997	0	0	0.00	0.00	0.00	0.00		
1998	5	41	451.89	11.02	162.09	3.95	Alloy surcharge (6)*; British Sugar II (4)*; Pre-Insulated Pipe (10)*; Trans Atlantic Conference Agreement (15); Greek ferries (7)*	Alloy Surcharge, British Sugar II, Pre-Insulated Pipe cartel, Greek ferries two appeals; Alloy surcharge readoption for one party in 200,6 pending first appeal (3.8m); Alloy surcharge under art.65 of ECSC;
1999	1	8	99.00	12.38	86.22	10.78	Steamless steel B (8)*	two appeals
2000**	1	5	112.90	22.58	102.58	20.52	Aminoacids(5)*	Aminoacids two appeals;
2001	9	59	1780.29	30.17	1483.69	25.15	SAS/Maersk (2)*; Graphite Electrodes (8)*; Vitamins (13)*; Citric Acid (5)*;Luxembourg Brewers (4)*; Bank Charges(5); Interbrew and Alken Maes (5)*; Zinc Phosphate (6)*; Carbonless Paper (11)*	pending second appeal: Citric Acid; Graphite Electrodes, Interbrew and Alken Maes, Zinc Phosphate, Carbonless Paper two appeals
2002	9	47	944.87	20.10	212.60	4.52	Industrial Glass (7)*; Austrian Banks (8)*; Methione (4)*; Fine art auction houses(2)*; Methyglycamine (2)*; Food Flavour Enhancers (4)*; Specialty Graphite (8)*; Plasterboard (4)*; Concrete Reinforcing Bars (8)*	pending second appeal: Austrian Banks (37m); Methione (118m); pending first decision: Plasterboard (478m); Concrete Reinforcing Bars (85m); Fine art auction houses, Methyglycamine, Food Flavour Enhancers no appeal
2003	5	28	404.78	14.46	153.34	5.48	Industrial Tubes (5)*; Organic Peroxides (6)*; Sorbates (5)*; French Beef (6); Electrical and Mechanical Carbon and Graphite Products (6)*	pending first appeal: Industrial Tubes (39m); Organic Peroxides (0.001m); Sorbates (99m); Electrical and Mechanical Carbon and Graphite Products (96m); pending second appeal French Beef (16m)
2004	5	33	354.20	10.73			Copper Plumber Tubes (13)*; Choline Chloride (6)*; Spanish Raw Tobacco (9)*; French Brewers (2); Needles (3)*	pending first appeal: Copper Plumber Tubes, Choline Chloride, Spanish Raw Tobacco, Needles; French Brewers no appeal
2005	5	41	682.32	16.64			Monochloroacetic Acid (5)*; Thread (10)*; Italian Raw Tobacco (6)*; Industrial bags (16); Rubber chemicals (4)*	pending first appeal: all cases
2006**	5	56	1833.11	32.73			Synthetic Rubber (11)*; Copper Fittings (12)*; Butimen Netherland (14)*; Methacrylates (5)*; Hydrogen Peroxide (14)*	pending first appeal: all cases
2007	3	19	2014.81	106.04			Gas Insulated Switchgear (11)*; Elevators (5)*; Dutch Beer (4)*	

\* denotes cases where leniency has been granted and therefore fines after leniency are reported

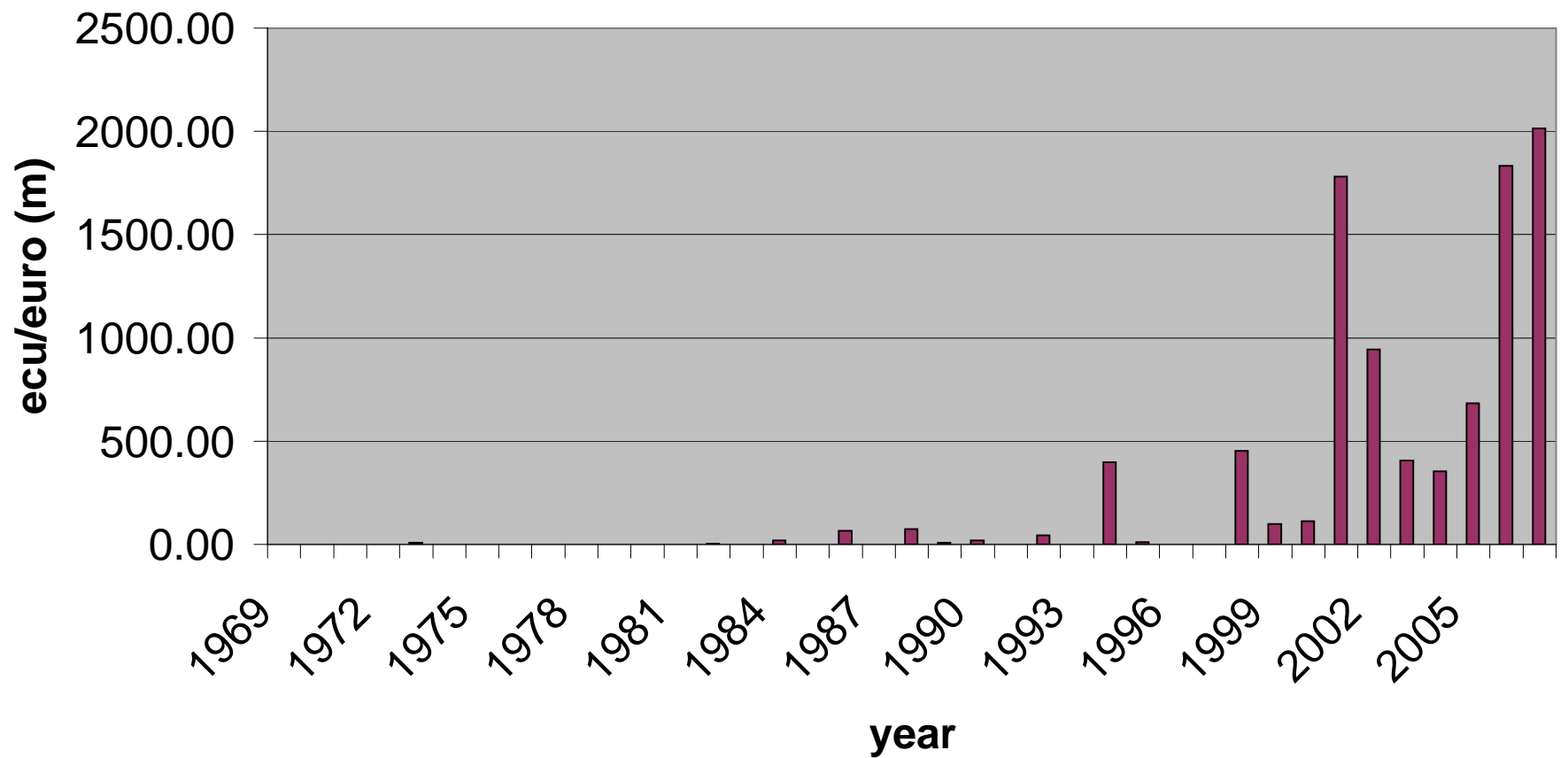
\*\* denotes a year where there are readoption decisions; readoption decisions are not included in the count

\*\*\*For the Commission Decisions taken since 2003 Court data are incomplete because most cases are still pending

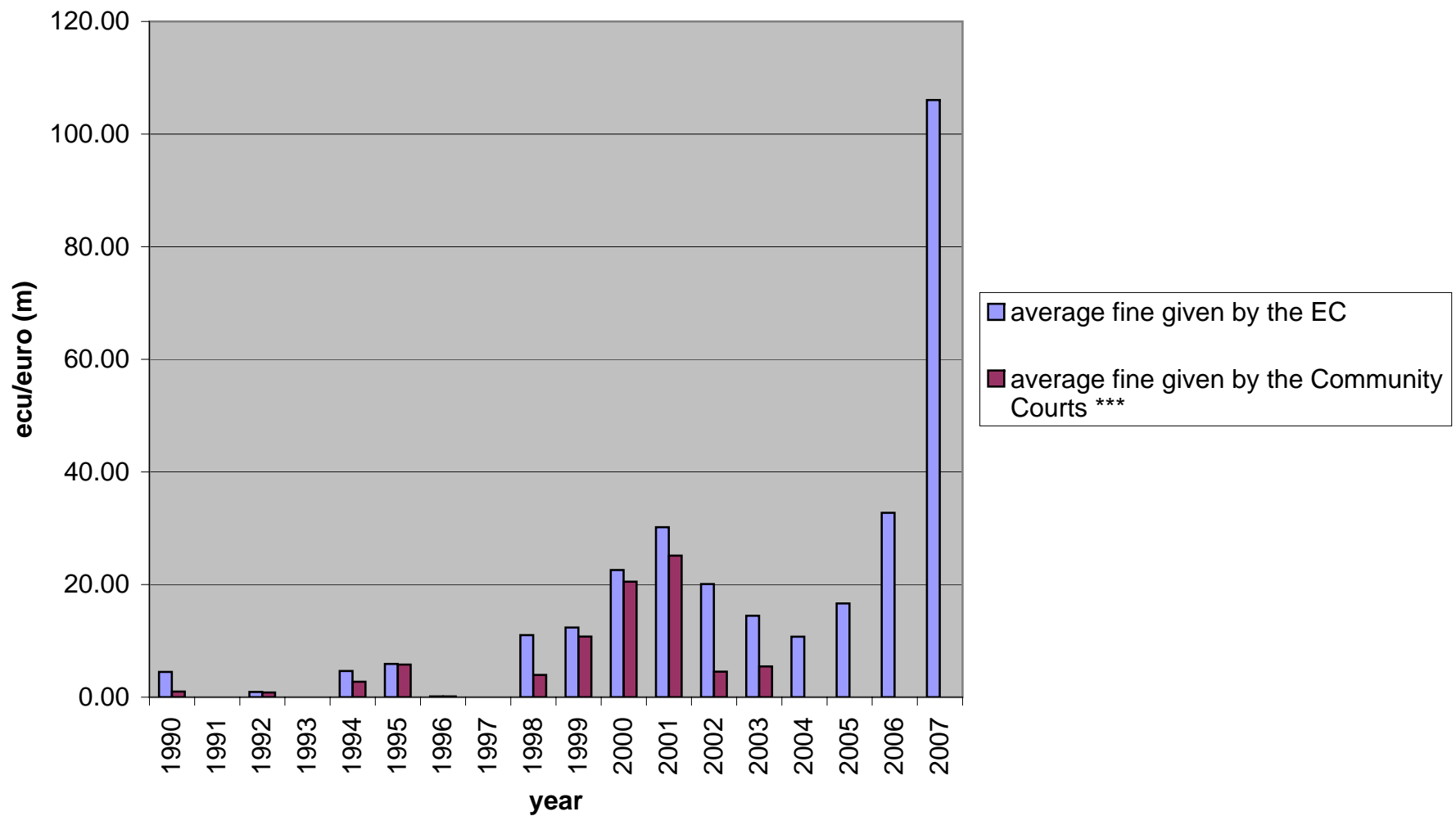
**Figure 1: Cartel Infringements in the EU: total number of firms involved**



**Figure 2: Cartels in the EU: total  
fines given**



**Figure 3 : Average cartel fines given by the EC (1990-2007) and (for the same cases) by the Community Courts**



**Figure 4 Leniency Program**

