Competition policy, cartel enforcement and leniency program

Samà, Danilo

LUISS "Guido Carli" University

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Competition Law, Cartel Enforcement & Leniency Program

Danilo Samà[*]
LUISS "Guido Carli" University of Rome

Abstract
The present assessment focuses the attention on the antitrust action in detecting and fighting oligopolistic collusion, analyzing the development of the innovative and modern leniency policy. Following the examination of the main conditions and reasons for cartel stability and sustainability, our attempt is to comprehend under which circumstances leniency program represents a functional and successful tool for preventing the formation of anti-competitive agreements. The problem statement that follows is therefore: how can *Law&Economics* approach help competition authorities to achieve and realize this form of enforcement?

Keywords
Antitrust Law, Cartel Enforcement, Competition Law, Game Theory,
Industrial Organization, Law&Economics, Leniency Program, Oligopolistic Markets.

JEL Classification
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SUMMARY: 1. Introduction: the economic theory; 2. Oligopoly: imperfect competition and intermediate market structure; 3. The "trust" in the anti-competitive cartels: formation, stability and sustainability; 4. The leniency policy: perspectives on anti-cartel enforcement.

«People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices».

Adam Smith, "*The Wealth of Nations*" (1776)

1. *Introduction: the economic theory*

The neoclassical economic framework is criticized by the modern industrial organization since it presupposes purely the existence of two extreme and opposite market regimes, that are designed and identified as perfect competition and monopoly, both, in reality, rarely observable and verifiable in the ordinary daily life. In the first instance, the assumption of validity, for each participant to the exchange, of the *price taker* condition does not allow economic agents to control or, at least, to influence the price determination of the product or the service demanded and offered in the market: it follows the irrelevance of any intentional attempt direct to try modifying the level of price intrinsically set, instead, by market forces. In the second instance, on the contrary, only one producer holds a dominant position that permits the firm to behave as *price maker*, that is to say being able to determine and impose, without any kind of restraint, the profit maximizing sell price[1]. In both the cases, therefore, individual choices are not affected by other players' conduct, given that it is possible to deduce and predict in an exact and unequivocal way the behaviour of each undertaking, without being altered and compromised by this: in other terms, enterprises are not called to monitor and worry about competitors' reaction.

[1] A monopolistic market structure contemplates the existence of only one seller: the product or the service exchanged does not present, within the relevant geographical or product market, substitutable products. Thus the consumer price elasticity results equal to zero: the demand, consequently, appears infinitely inelastic and vertical. Reasons that cause the creation and sustainment of a monopoly could be absolutely different, although are mainly three: 1) exclusive availability of essential productivity factors; 2) assignment of government concessions and licences or ownership of industrial patents, which represent examples of *de jure* monopolies, otherwise defined *legal*; 3) presence of economies of scale, that occurs when the level of average production cost decreases with increases in the quantity of the good being produced. Actually, it is important to underline how a common justification for the regulation of public utilities infrastructures is the recognition of the *natural monopoly* status, which represents the principal cause of the so-called *market failures*. Nevertheless, since decreasing returns to scale are a necessary but not sufficient condition for having one, for its complete qualification it is fundamental to meet a further requirement, that is the subadditivity of the cost function, found when the total cost of a certain volume of output is lower if it is produced by one company rather than by two or more that share together the same amount of production.

For the competitive firm, on one hand, what matters is only the aggregate behaviour of the industry to which it belongs to, so much that adversaries' actions and initiatives do not generate any particular interest, or better do not provoke any significant impact on market price[2], while for the monopolistic firm, on the other hand, the reasoning is even easier because it comes down to the simple observation of the absence of rivals. Now, although absolute monopoly and perfect competition models describe appropriate reference points for the economic theory, empirical observation demonstrates continuously how in the real world the most part of industrial markets is positioned at an intermediate level between the above-mentioned polar and radical cases. In general, in fact, market competition is established through a number of players undoubtedly considerable, but not so elevated that makes possible to assert that the behaviour of each competitor presents a negligible effect on dynamics of price formation. Even though the challenge inside an industrial sector is frequently based on a limited amount of companies that, on paper, and hence formally, appear as reciprocal competitors, it emerges openly the advantage and convenience of colluding, explicitly or tacitly, through the creation of a cartel. Coordinating the respective distribution and sales policies, it is possible to fix a price or production level in correspondence of which all the enterprises, behaving like an unique monopolist, would gain a superior profit (to exclusive consumers' disadvantage), respect that one they would obtain fighting obstinately each other. Regarding this last aspect, it is essential to remind how the revolutionary *games theory* has assumed the role of economic tool par excellence for analyzing market forms characterized by industrial concentrations. Its specific object of analysis is, in fact, the problem of the *strategic interaction*, that is to say the phenomenon according to which in a contest of mutual conflictuality and interdependence, the rational behaviour of each firm can change, due to a retraction mechanism, the optimal decision process implemented by rival subjects. As a result, this discipline of the mathematical sciences finds its natural field of application in oligopolistic markets, systematically distinguished, as it will be possible to notice in the following sections, by the presence of anti-competitive cartels.

[2] In the traditional economic theory a perfect competition market structure is defined when the following conditions are simultaneously satisfied: 1) homogeneity of the product or the service exchanged; 2) absence of information asymmetries and therefore complete and perfect information available for each market operator, consumers and producers, about prices and productive factors; 3) absence of barriers to entry and to exit; 4) absence of externalities and transaction costs; 5) perfect substitute factors of production, utilizable again for the realization of different products, maintaining anyway the same marginal productivity; 6) atomization of economic agents, that is to say fragmentation of the market in a high number of small buyers and sellers who, being *price takers*, must accept the price as given by the market. In truth, to be more precise, the oligopoly theory demonstrates how, under certain circumstances, perfect competition scenario could be achieved even only with two firms (cf. *Bertrand oligopoly model*). However the hypothesis according to which the only two producers do not realize how would be more convenient to collaborate each other, for example colluding, is somewhat unrealistic (as we will see better**,** this is a further demonstration of how perfect competition, which anyway has to be considered by competition authorities as a pole star for the achievement and the guarantee of efficiency, is only an idealized market form that is not observable in real economic systems).

«Game theory means rigorous strategic thinking.
It's the art of anticipating your opponent's next moves,
knowing full well that your rival is trying to do the same thing to you».

Avinash Dixit & Barry Nalebuff, "*Thinking Strategically*" (1991)

2. *Oligopoly: imperfect competition and intermediate market structure*

Oligopolistic market forms, as in part already mentioned, are characterized by a supply configuration and structure that are distinguished by the presence of a limited number of undertakings: offering analogous or even identical products, firms are conscious of the existence of a mutual strategic dependence. For this last reason, the optimal price and production level depends, for each enterprise, also on how other adversaries choose to *play the game* in terms of price and quantity setting. Thus each firm, being able to exploit an appreciable market power, through its decisions and preferences is capable to affect sensibly other competitors' profit margins. The concept of strategic interaction[3], more exactly, must be considered according to a temporal horizon: as it is easily deducible, there is a substantial difference between the case in which companies choose simultaneously the above-said key variables and that one in which a single firm is in the privileged position to move first, anticipating opponents' decisions and hence influencing their conduct. Consequently, unless particular assumptions about rivals' reaction against choices of one focal firm can be presupposed, it is not possible to build the specific demand curve for a generic oligopolist, that, instead, remains undetermined. For each behavioural hypothesis contemplated, we reach a different solution: this is the motivation why, contrary to the aforementioned market forms, a general and universally accepted theory for oligopoly does not exist, but only a variegated set of models proposed by econometrics and economic theory that make the effort to translate in formal terms, with results more or less acceptable and satisfactory, the most possible number of imperfect and intermediate competition structures that firms can regularly meet.

[3] Example of antonomasia constantly reported in the game theory textbooks to indicate the strategic interdependence typical of the oligopolistic, or better in this case, duopolistic competition is that one about the rivalry between Coca-Cola Company and PepsiCo: "*Changing its strategy in the United States, Coca-Cola is increasing the price of its drinks about 5%. The rise of the price charged should permit Coca-Cola to raise its total profit level. A key point for the success of this strategy is how Pepsi will react. Certain analysts think that the firm number two in the soft drink market could choose to sacrifice its profit margins to gain market shares at Coca-Cola's expense*" (The Wall Street Journal, November 16, 1999, article reported in Cabral L.M.B. (2000), *Introduction to Industrial Organization*, The MIT Press). Observe also the eloquent and symptomatic anectode indicated in the incipit of the third chapter about the poor competitive nature of the air transport sector, that, together with automotive, energetic, insurance and telecommunication markets, represents another classic example of oligopoly.

Putman (Braniff Airlines): *«Do you have a suggestion for me*?*»*
Crandall (American Airlines): *«Yes. I have a suggestion for you. Raise your goddamn fares twenty percent. I'll raise mine the next morning.»*
Putman: *«Robert, we…»*
Crandall: *«You'll make more money and I will too.»*
Putman: *«We can't talk about pricing.»*
Crandall: *«Oh, Howard! We can talk about any goddamn thing we want to talk about. »*
(transcripts of a telephone call between Robert Crandall, President of American Airlines, and Howard Putman, President of Braniff Air Lines, regarding competition at the Dallas Fort Worth Airport, which Putman recorded and turned over to the US government in 1982)

3. *The "trust" in the anti-competitive cartels: formation, stability and sustainability*

The expression "trust", coined by the anglo-saxon tradition, embodies in a very efficacious manner the concept of anti-competitive cartel since it alludes to the relationship of mutual confidence and reliance that must be necessarily instituted among the adherents to the market sharing, production limitation, or, more straightforwardly, price increase agreement. The deal, according to several theorists, could be effectively evaluated equal to a horizontal sales consortium or might be compared to a single monopolistic firm with multiple plants, although enterprises would anyway remain economically and financially independent. However collusive behaviours, allowing cartel firms, through a distortion of free market forces, to achieve and share monopolistic profits, are forbidden and persecuted by (not by chance called) "anti-trust" legislations. As a matter of fact, the administrative authorities' ultimate aim is the competition safeguard against any practice that appears harmful to customers and opposite to fair and free trading. As it will be likely to observe better in the following chapter through the analysis of the most recent leniency programs, competition authorities are increasingly trying to create incentives direct to persuade potential cartel members to reciprocally defect. Only through a workable competition[4] is, in fact, possible to benefit from an efficient resource allocation, the only one that can guarantee to consumers the lowest possible market price and to producers the most democratic market economy.

[4] The principal losses for the society caused by the lack of competition are: 1) *inefficient allocation of resources* in consumption, distribution and production (allocative efficiency and maximization of consumer welfare represent the guiding principles, although formal and theoretical, of modern competition policies or, at least, important instruments for comparing and evaluating economic systems and public choices); 2) *dead-weight welfare loss*: as a consequence of a price increase, whose level becomes higher than marginal cost (and not equal, like in perfect competition), part of consumer surplus is lost and not transferred to producers; 3) *super-normal profits*: thanks to a monopoly rent, profit exceeds the opportunity cost of productive factors, generating an unequal distribution of social welfare, to producers' benefit and to consumers' disadvantage; 4) *X-inefficiency*: monopolistic or oligolistic firms, for the absence or mitigation of competition pressure, produce goods exceeding the lowest and minimum average cost of production; 5) risk of *anti-competitive practices*, as for example, bundling and tying, dividing territories, exclusive dealing, limit and predatory pricing, price fixing, refusal to deal, resale price maintenance, all categories of potential restrictions that could be punished, if turn into abuses of dominant position or competition restrictive agreements, by antitrust authorities (Cf. Lipczynski J., Wilson J., Goddard J. (2005), *Industrial Organization: Competition, Strategy, Policy*, Financial Times - Prentice Hall).

3.1 *Formation*

Let's continue our treatment analyzing the factors conducive to cartel formation, which depend mainly on structural conditions characteristic of oligopolistic markets. It is indubitable that the principal motives for undertakings to collude and form trusts are the profit maximization and the uncertainty reduction, lessening the competitive pressure and the risk of potential entry in the business by new players.

- *number of the firms and supply concentration*

Cartel construction is more probable to appear and occur in a concentrated than in a fragmented industry. The lower is the number of firms in the market, the easier is for the trust members to control and detect the conduct of other partners. In a concentrated market, besides, the typical firm gets a greater share of benefits if prices become higher: the deviator's short term gain is in fact smaller since it started with a larger market share. Thus, the more concentrated is the market, the larger are the benefits from collusion and the smaller is the cost of cooperation[5]. Instead, in a fragmented market, given that observing a price cut becomes harder because the number of enterprises increases, superior are the earnings from cheating. In fact the higher is the number of undertakings, the more likely is one of those acting as a *maverick*, that is, a firm acknowledged for practicing aggressive pricing strategy (actually, even in the circumstance of a concentrated industry with few enterprises, the presence of such a firm could threaten the collusive nature of the agreement). All this is confirmed, anyway, by the fact according to which, with an increasing number of participants to cartel or more generally to oligopolistic structure, the market tends progressively to assume a perfection competition form: consequently, the price comes up to the marginal cost and the production to the efficient level.

- *characteristics of products and behaviour of demand*

Cartel formation depends also on the nature of the products sold, which can result homogeneous or differentiated. In fact, in presence of identical goods, if trust members report a market share reduction, it is almost surely justified by a quantity increase or a price cut by a cheating firm: therefore, being cheat detection easier, it is more probable to have a cartel. On the contrary, in presence of differentiated goods, changes in the quantity of production sold may be due to variations in consumer preferences or more generally in demand patterns: from this point of view, if there are demand fluctuations, monitoring becomes more difficult.

[5] To check the presence of strategic interdependence in any market structure it is possible to utilize several industrial concentration ratios, starting from the basic and intuitive market shares and arriving to more complex instruments as the Lorenz Curve or the most employed Herfindahl-Hirschman index (Cf. Besanko D., Dranove D., Shanley M., Schaefer S. (2006), *Economics of Strategy*, John Wiley & Sons).

- *asymmetries in cost structure and quantity capacity*

Analogous and comparable cost structures make the cooperation among cartel members more straightforward and stable since firms present an identical maximizing behaviour, offering the same price and quantity. Instead, if the marginal costs are not similar, different is the monopoly price preferred by each of the firms: it is so extremely problematical to have an unique price fixation and an unique joint profit distribution that are able to satisfy all the parts involved (all the more so if the number of undertakings raises). Therefore, without a single monopoly price to serve as a focal point, coordination becomes more difficult. For this reason, changes in cost structure, for example due to the introduction of a new technology, provides an advantage over competitors, making cartel sustainability more complex and uncertain. Anyway, other asymmetries among firms may create equivalent obstacles to coordination. In regard to the asymmetry in quantity capacity, for instance, the cheating threat could derive especially from small firms, which have a sizeable set of potential customers to attract by price cutting: larger firms, in fact, get a considerable share of benefits from collusive pricing and could have weak incentives to punish small deviators.

- *characteristics of orders and sales*

Cartel configuration depends also on the frequency and the amount of orders and sales. If these last are lumpy and rare (think, for example, to airframe or ship manufacturing industries) competitive interactions are reduced: lag between orders makes the gain from price cutting more valuable relative to the cost imposed by rival's retaliation. In other words, if there are infrequent transactions or huge amounts of output sold, it takes time to retaliate: therefore it is possible to enjoy deviation for longer period, with the final result of a more intense competition regime.

- *number of buyers*

Another important element for cartel formation is the number of buyers. When firms set prices in secret, deviation from cartel pricing is easier to detect if there are many small buyers than when there are a few large buyers: increasing, in fact, the number of consumers raises the chance that these last will communicate price cuts to competitors. Thus with a large number of customers it is harder to do secret price cuts: deviation becomes not profitable and retaliation fast to apply. Therefore in these conditions collusion can find fertile ground for its generation and preservation.

3.2 *Stability*

However the most critical problem for a trust, as in part already mentioned, is its (in)stability, given that each member is continuously attempted to *break the rules*, and hence to disobey and violate the agreement obligations: cooperating, in fact, means maintaining prices at a pre-fixed minimum level, while cheating stands for selling under this last, stealing rapidly consumers and profits from other cartel partners. Therefore charging a lower price respect to that one predeterminated by the alliance, or symmetrically offering a production quantity higher respect to that one maximizing the aggregate industry profit, the cheating firm would meet a demand curve, in theory, infinitely elastic, or at least such to permit to subtract large market shares from cartel allies. In other terms, oligopolistic firms punctually come up against a *dilemma*, that consists of a *trade-off* between two alternatives: to opt for collusion, replying a coordinate monopolistic regime that consents the joint profit maximization, or to opt for competition, rising the own net income and market share to detriment of adversaries. Therefore in the assessment of the convenience of cheating a cartel, an oligopolistic firm should estimate and compare the financial results that it would achieve respecting or infringing the established duties. Two are, in fact, the inversely proportional effects that should be taken in consideration if a single firm decides to infringe the cartel arrangement, decreasing the price and increasing the production level: 1) the quantity effect, since, expanding the production quantity, total revenues raise (being in oligopoly, unlike perfect competition, marginal revenue is greater than marginal cost); 2) the price effect, since, growing the production quantity, number of sold product units raise but, at the same time, the price, not only of the last marginal unit sold but of all other units sold before, diminishes. If the quantity effect prevails on the price one, the single firm will meet the advantage of decreasing price and increasing production, cheating the cartel; *vice versa*, if the quantity price is dominated by the price one, the single firm will not benefit from violating the bargain. Anyway which one of the two effect prevails depends substantially, as it will be now easier to understand, on competitors' reaction.

3.3 *Sustainability*

The famous *prisoner's dilemma*, otherwise called in some monographs more generally and not by chance *oligopolist's dilemma*, schematizes, in regard to the problem of cooperation and sustainability in cartels, the divergence between the principle of collective rationality and the individual one. In the model, as it is known, for both criminals to admit own guiltiness is

the *dominant strategy*, as well as the *Nash equilibrium of the game* (each player is making the best choice that it can, taking into account the decision of the other one). Nevertheless if both do not confess, that is to say if both collaborate, they would end up in a better condition: hence individual interest makes the situation for each prisoner worst. As a result, how is it possible to apply this model to oligopolistic markets? As remembered, we know that between the two cartel members the profit gained by each one depends not only on its decisions but also on the other's choices. According to the renowned dilemma, each oligopolist has an incentive to infringe the agreement: the own interest makes difficult to achieve and maintain the deal, that, if actually respected, would maximize participants' aggregate profit. The way of acting and behaving inside the market by oligopolists is so perfectly comparable and parallel to that one followed by the two prisoners which must decide to confess or to cooperate, not knowing what the other is doing. Evaluating individually the profit obtainable in case of confession, that is to say release from prison or reduction of penalty, both opt for this last alternative, maximizing the own individual profit to detriment of the other: therefore, any bilateral agreement drawn up a priori by the two prisoners would not be respected, exactly like in an oligopolistic market in which a generic cartel is created by two or more actors. Anyway, in real economic life, firms generally are able to avoid the difficulties and obstacles typical of the prisoner's dilemma and to maintain steady the agreements, since it is extremely improbable that oligopolists that belong to the same market compete only once (being continually called to interact strategically each other) and do not recognize how would be more profitable to avoid bloody price wars and consequently to collude. In order to insurance long-term cartel sustainability, it is so necessary that any deviation is timely discovered and punished, neutralizing the destabilizing behaviours put into action by those firms that, acting like "free riders", could be attracted to the convenience of secretly cheating. Thus one of the most efficient and suitable remedy for cartel stability is, as we were mentioning, the retaliation threat, consisting in a profit reduction for the cheating enterprise that does not respect the collusive agreement (the other firms, in fact, after having detected the deviation, would start an aggressive price competition against the cheating one). In this way non-cooperative, no-repeated, simultaneous and static models cannot explain how firms are able to maintain prices above competitive levels without formal collusion. It is required, therefore, to study the *iterated prisoner's dilemma*, in which the two prisoners play *repeated games*, so more than once and having memory, in each stage of the game, of the previous actions. The dynamic and sequential character of the game, whose conclusion is not known in advance, makes easier the cooperation between the parts thanks the implementation of *contingent strategies*, especially through its main typology that is called *tit-for-tat*.

Concepted during the eighties by professor Robert Axelrod, who asked himself the question whether the prisoner's dilemma logic was also valid in a repeated game, *tit-for-tat strategy* can demonstrate, in the case in which two or more firms compete over several periods (oligopolistic markets), how *cooperative pricing* (tacit collusion) results possible. As mentioned, in most countries explicit collusion to maintain prices at monopoly levels is illegal, so cooperative pricing occurs if prices persist above competitive levels without collaborative behaviuor from the firms (the equilibrium that results is the same as if there was an explicit collusion to hold the prices above competitive levels). Play *tit-for-tat* means to collaborate or not with the competitor if this last, in the previous stage, has chosen to cooperate or less: thus the punitive stage lasts until the rival continues to opt for confession. There is, in fact, the risk that, if a firm deceives, the other could react and never trust the deviating one ever again, competing forever in the future: when the rival retaliates, the market share is back to the original level and the price is lower making both firms worse off (the economist Edward Chamberlin said in fact: "*When there are a small number of sellers, each seller will recognize that the profit from price cutting will be short lived*"). So since each firm knows that its rival will match any price cut, neither has an incentive to engage in price cutting: a tit-for-tat strategy make so cooperative pricing possible and firms will not commit to deviate from the monopoly outcome. According to the *Folk Theorem*, therefore, any price at or above marginal cost and at or below monopoly price can be sustained if the discount rate is sufficiently small, given that it makes the present value of the annuity from colluding pricing larger, favoring so a cooperative outcome: in other words, the present value of the annuity exceeds the one time gain from refusal to cooperate. Axelrod, in particular, explained the success of the principle of reciprocity in an experiment in which he invited to participate the most illustrious games theory experts of that period. Three the behaviours suggested that followed the test: 1) thou shalt not be the first to deviate; 2) thou shalt not begin instantly without cooperating; 3) thou shalt return always cooperation with cooperation and deviation with deviation. In brief, the indication was "do start cooperating, if your adversary deviate let it do it for a few rounds, and then copy the rival's moves in the next stages". It is not a case if, from the Axelrod's initial contribution, more than one thousand scientific articles have been written about prisoner's dilemma and tit-for-tat strategy: this last in fact, presenting still today fields of application nearly infinite, appears as the most empirically valid principle for analyzing and evaluating the (in)stability of anti-competitive trusts.

«Enforcement of a collusive agreement consists basically of detecting significant deviations from the agreed-upon price. Once detected, the deviations will tend to disappear because they are no longer secret and will be matched by fellow conspirators if they are not withdrawn».

George J. Stigler, "*A Theory of Oligopoly*" (1964)

4. *The leniency policy: perspectives on anti-cartel enforcement*

The most important contribution of recent years to the global fight against cartel formation and sustainability derives from the adoption of leniency programmes by a growing number of national jurisdictions: since the European Commission, following the example of the U.S. Department of Justice[6], has designed and published its initial and primordial document on the non-imposition or reduction of fines in cartel cases ("the Leniency Notice"[7]), several member states have developed and implemented a national legal leniency system. Consequently legislations prohibiting collusive agreements among oligopolistic competitors are now accompanied by a helpful instrument that endeavors to intensify the anti-cartel enforcement, strengthening its powers and sanctions: nonetheless, ultimate aim always continues to be the removal of the harmful and negative effects on consumer and social welfare originated by these prohibited arrangements. The lenient treatment, otherwise defined and known as corporate amnesty or immunity policy, is in fact instituted to encourage and persuade firms associated and involved in anti-competitive cartels to reciprocally defect, denouncing and revealing the illegal practices in question to the antitrust authorities. However, Adam Smith's lesson about the nature of the *homo economicus,* according to which this last embodies and represents an incentive-driven and utility-maximizing creature, was and is still valid: it has appeared therefore necessary to create a real incentive, direct to affect and persuade potential cartel members to report, or better to "confess". Thus the solution has been found in guaranteeing and offering, as reward for firms which cooperate with competition authorities in collusion prosecution, total immunity or partial reduction of the fines and penalties, which would otherwise be imposed if the cartel was really detected. Logically, leniency programs are based on particular conditions which must be achieved and respected in order to qualify for such a treatment: in brief, complete immunity is granted to the first cartel member (successive members get only a progressive penalty reduction) which furnishes and submits in detail all

[6] *Corporate Leniency Policy*, U.S. Department of Justice - Antitrust Division (1993).

[7] *Commission Notice on the non-imposition or reduction of fines in cartel cases*, Official Journal of the European Communities (1996/C 207/04), after which follows the updated version *Commission Notice on immunity from fines and reduction of fines in cartel cases*, (2002/C 45/03 - 2006/C 298/11).

information available on the trust, terminating naturally its infringement and collaborating continuously throughout the antitrust investigation[8]. Until now, the policy has been extremely effective and successful in helping and sustaining the process of fighting cartels in each of its four stages: 1) prosecution, making conviction and penalization more frequent and strict; 2) detection, making discovery more probable; 3) desistance, making cartels less stable, seeding mistrust and suspicion among cartel partners; 4) deterrence, making cartels less profitable. In particular, collusion detection is, historically speaking, all along the weakest activity for competition authorities. Now, through the functioning of amnesty programs, this stage has increased to such an extent that currently most cartel inspections start and take place thanks to the immunity requests coming from the defecting firms: this is a critical and decisive aspect for secret cartels, which remain difficultly distinguishable without the cooperation of one of the participants. Besides, as analyzed in the previous chapters, we know that the success of a cartel depends mainly on the level of "trust" existing among the cartel members: hence, a leniency program has the concrete possibility to reduce and undermine the duration of a cartel because provides to its members a further instrument to cheat on each other. Again, also here each cartel member faces a coordination game as in the prisoner's dilemma, since it must contemplate whether or not to apply for leniency. In a dynamic perspective two are the possible solutions: 1) do not report in the hope that other members will play the same; 2) to report, if a firm believes it is imminent that another partner will report. The policy challenge for antitrust authorities is, for this reason, to induce cartel members to stop waiting and start the "race to confess". Another relevant aspect is that most dangerous cartels operate today at an international level: leniency program can so provide evidences that the regional authority would otherwise be unable to obtain or, at least, to judge because located outside their jurisdiction. Nevertheless, it appears more and more evident how a successful anti-cartel enforcement, nowadays, requires inevitably to be accompanied by an influential lenient treatment: a strategy of amnesty and immunity, in fact, balances and improves the collusion detection by destabilising existing cartels through the construction of an environment of distrust and tension. In conclusion, corporate leniency program has therefore the chance to relaunch and strength the role of the competition authorities in fighting cartels towards the implementation of a more efficient and powerful "anti-trust" policy.

[8] A firm participating in a cartel which it wishes to denounce may request total immunity from fines if it is the first firm to provide evidence of a cartel hitherto unknown to the European Commission or, if the Commission is aware of the cartel, if the firm is the first to provide it with crucial information enabling it to establish its existence. Companies which do not qualify for immunity may benefit from a reduction of fines if provide evidence that represents "significant added value" to that already in the Commission's possession and have terminated their participation in the cartel. Evidence is considered to be of a "significant added value" for the Commission when it reinforces its ability to prove the infringement. The first company to meet these conditions is granted 30 to 50% reduction, the second 20 to 30% and subsequent companies up to 20% (European Commission).

Bibliography & References

Textbooks

Besanko D., Dranove D., Shanley M., Schaefer S. (2006), *Economics of Strategy*, John Wiley & Sons.

Cabral L. M. B. (2000), *Introduction to Industrial Organization*, The MIT Press.

Carlton D.W., Perloff J.M. (2004), *Modern Industrial Organization*, Addison Wesley.

Gibbons R. (1992), *Game Theory for Applied Economists*, Princeton University Press.

Lipczynski J., Wilson J., Goddard J. (2005), *Industrial Organization: Competition, Strategy, Policy*, Financial Times - Prentice Hall.

Motta M. (2004), *Competition Policy (Theory and Practice)*, Cambridge University Press.

Tirole J. (1988), *The Theory of Industrial Organization*, The MIT Press.

Varian H.R. (1992), *Microeconomic Analysis*, W.W. Norton & Company.

Publications

Danish Competition Authority (2007), *Guidelines on leniency for cartel activities*.

Nash J.F. Jr. (1951), *Non-cooperative Games*, Annals of Mathematics, Vol. 54, N. 2.

Phlips L. (1996), *On the Detection of Collusion and Predation*, European Economic Review, Vol. 40, N. 3.

Röller L.H. (2005), *Economic Analysis and Competition Policy Enforcement in Europe*, in Kloosterhuis E., van Bergeijk P.A.G., *Modelling European Mergers: Theory, Competition Policy and Case Studies*, Edward Elgar.

Shapiro C. (1989), *The Theory of Business Strategy*, Rand Journal of Economics, Vol. 20, N. 1.

Stigler G.J. (1964), *A Theory of Oligopoly,* Journal of Political Economy, Vol. 72, N. 1.