



Are cartel fines optimal? Theory and evidence from the European Union



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ABSTRACT

Deterring the formation or continuation of cartels is a major objective of antitrust policy. We develop a dynamic framework to characterize the compensation and deterrence properties of fines, based on the fact that cartel stability depends on the ability to prevent deviation, which itself depends in part on fines imposed in case of detection and conviction. We show that the proper consideration of cartel dynamics plays a major role in determining optimal deterrent fines. Our results suggest that fines imposed by the European Commission in recent years meet the deterrence objective in a significant number of cases.

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1. Introduction

Though a number of countries have adopted criminal sanctions against individuals who engaged in hardcore cartels,¹ antitrust authorities rely mainly on financial penalties to enforce laws against cartels. The European Commission (EC) 2006 Guidelines clearly indicate the importance of properly setting the fines for deterrence purposes:² “The Commission’s power to impose fines [...] is one of the means [...] to carry out the task of supervision entrusted to it by the Treaty. [...] For this purpose, the Commission must ensure that its action has the necessary deterrent effect

[...] not only in order to sanction the undertakings concerned (specific deterrence) but also in order to deter other undertakings from engaging in, or continuing, behavior that is contrary to Articles 81 and 82 of the EC Treaty (general deterrence).”

There is evidence that the amount of fines imposed on convicted cartels has dramatically increased in recent years. In the US, the total amount of fines imposed on convicted cartels thus rose from 889 million dollars over the period 2000–2004 to 3.4 billion dollars over the period 2005–2009.³ In Europe, it rose from 293 million euros over the period 1995–1999 (for 10 cartel cases) to 3.5 billion euros over the period 2000–2004 (for 30 cartel cases), 9.4 billion euros over the period 2005–2009 (33 cartel cases), and 8.7 billion euros over 2010–2014 (26 cartel cases).⁴

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¹ For example, the US, Canada and Japan, and only a few countries within Europe (principally Austria, Norway, Ireland, the United Kingdom and, in relation to bid-rigging, Germany).

² European Commission Guidelines on the method of setting fines imposed pursuant to Article 23(2)(a) of Regulation No 1/2003 (2006/C 210/02).

³ Source: Antitrust Division of the Department of Justice. Source: Antitrust Division of the Department of Justice.

⁴ These statistics are from the European Commission, Directorate General for Competition, <http://ec.europa.eu/competition/cartels/statistics/statistics.pdf>. These fines are not adjusted for Court decisions, and the preliminary statistics for 2014 cover only the first six months.

In this context the question is: are fines properly deterrent? To answer this question, one must define the appropriate deterrent level of fines and compare this level to the actual fines imposed. In a recent contribution, [Combe and Monnier \(2011\)](#) analyze 64 European cartels. Their main conclusion is that only one fine imposed by the European Commission (EC) lies above the deterrent benchmark they define. It is important to mention that their analysis is done at the cartel level not at the firm level.

In [Allain et al. \(2011\)](#) we challenge the Combe and Monnier assertion on several grounds. While Combe and Monnier consider a static framework and wrongly define the minimum deterrent fine as the total illicit profit accumulated during the cartel's lifetime n divided by the annual probability of detection (in their static multi-year framework, the proper deterrent fine should be the total illicit profit accumulated during the cartel's lifetime divided by the probability of detection over the same period, which is lower by a factor of n),⁵ we rely on a repeated game model of cartel stability and obtain a significantly lower deterrence benchmark. Our analysis suggests that the proportion of the same cartel level fines within the proper deterrence range is well above 60%!

In this paper, we go further by running a firm-level analysis for all EC cartels between 2005 and 2012. For each cartel case, we collect data on each firm involved: the duration, the size of the firm's annual sales in the relevant market, the fine imposed before mitigating and aggravating factors and before leniency reductions. Altogether this gives a database with 138 firms. For each individual firm we compare the actual fine with our deterrence benchmark, using a spectrum of reasonable values for the cartel overcharge, the competitive but-for mark-up, and the demand elasticity. We find that a rather large proportion of recent fines in the EU is above the relevant benchmarks (between 30% and 80% according to the various scenarios). We also point out the heterogeneity between the deterrence properties of actual fines, as some seem far too low, while others are far above the benchmark.

The paper is organized as follows. In Section 2, we develop a dynamic game theoretic model of cartel formation and stability, leading to the characterization of deterrence and compensatory benchmarks. We then compare in Section 3 the recent EC-imposed firm level fines to those benchmarks. We conclude in Section 4.

2. Characterizing internal cartel stability

The economic theory of crime suggests that a firm joins a cartel if the expected net gain is positive, based on the expected economic environment, and reassesses regularly such net gain as its environment changes, thereby continuing or deviating. The characteristics and conduct of antitrust policy, in particular the setting of fines, obviously influence the firm's environment, hence cartel stability.

2.1. The model and the fine benchmarks

We consider an infinitely repeated game. This game involves a given number of symmetric firms, say I , which may or may not be part of a cartel, and the antitrust authority featured as "nature", which may detect the cartel.⁶ Firms are assumed to maximize their discounted payoff using the same discount factor δ .

⁵ [Harrington \(2014\)](#) shows that if penalties are "increasing in duration within the infinitely repeated game framework, penalties do not need to be as severe as previous research would suggest."

⁶ We assume a cartel of a given size I . We determine the condition for cartel stability. Clearly, our analysis applies if there are more than I firms in the industry. [Schwalbe \(2010\)](#) surveys the literature on partial cartels and shows that the size of cartels has an ambiguous effect on their stability and on their welfare effects.

In each period, firms first choose whether to communicate or not; communication by all firms is a necessary condition for the cartel to exist. If the cartel is formed or maintained, each firm can then either follow the cartel strategy or deviate. For each firm, we denote the one-period cartel profit as π^M , the one-period deviation profit as π^D and the one-period but-for profit as π , with $\pi^D \geq \pi^M > \pi$.⁷ Let $\Delta\pi = \pi^M - \pi$. The payoff for a colluding firm in case one firm deviates is irrelevant. Independently of the strategies adopted by the firms, there is a probability α that the cartel will be detected in the period and if so, each firm pays a fine F , including deviators if any.

The communication stage is the main difference with the baseline model of [Allain et al. \(2011\)](#). As in [Aubert et al. \(2006\)](#), the role of communication is to draw the frontier between licit tacit collusion and illicit cartel.⁸ It is the exchange of information that creates the infringement.⁹ As in any infinitely repeated game, tacit collusion can emerge as a non-cooperative equilibrium and yield supra-competitive prices and profits. The same structural factors that facilitate or hinder the emergence of cartel equilibria are likely to affect the emergence of tacit collusion equilibria. We will assume that Competition Authorities do not treat tacit collusion as an infringement, but base their decisions on the existence of illicit information exchange. This assumption is common in the literature.¹⁰

We make the following simplifying assumptions. If at least one firm decides not to communicate, all firms adopt the but-for competitive strategy; if all firms communicate, each player plays the cartel strategy as long as no player has deviated previously; if a cartel member deviates from that strategy at some time, all players play the but-for strategy from then on (trigger strategy). The antitrust authority may detect the infringement (that is, the communication) on the "spot" (if and when the cartel is active) but not retroactively. This implies that, once the cartel has ceased to exist without being discovered, no firm will be fined in the future. But if a firm deviates after the communication stage and the cartel is detected in the same period, the deviating firm is fined.¹¹

Proposition 1. *The trigger strategies sustain an equilibrium such that a cartel is formed or maintained if and only if F is smaller than*

$$F_2 \equiv \frac{\pi^M - \pi^D + \delta(1-\alpha)(\pi^D - \pi)}{\alpha\delta(1-\alpha)}.$$

Proof. Assume that the cartel has been going on up to period $t - 1$. Assume that in period t all firms but firm i play the trigger strategy. If firm i plays the cartel strategy, that is, if it communicates and then

⁷ The profit π is assumed to be achieved in a non-cooperative equilibrium.

⁸ [Ivaldi et al. \(2003\)](#) define tacit collusion as follows: "Tacit collusion need not involve any 'collusion' in the legal sense, and in particular need involve no communication between parties. It is referred to as tacit collusion only because the outcome (in terms of prices set or quantities produced, for example) may well resemble that of explicit collusion or even an official cartel."

⁹ If firms could make illicit agreements that cover several periods without communicating, they could try to do this in order to reduce the risk of detection. The deterrent level of fines would adjust to firms communicating less often.

¹⁰ See [Motta \(2004\)](#) or [Kühn \(2001\)](#) for instance. Moreover, since the wood pulp case, the European Commission mostly relies on proofs of communication to convict cartel members. In the wood pulp decision, the EC considered that the parallel evolution of prices between 1971 and 1981 constituted an evidence of collusion, but the European Court of Justice overruled this decision, thereby establishing that purely tacit collusion cannot be deemed illicit.

¹¹ By contrast, in [Allain et al. \(2011\)](#) we assumed that a deviating firm cannot be fined, thereby making deviation more profitable and cartels less stable. The minimum deterrent fine is therefore lower than it is here.

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