

Economic Efficiency of Fines Imposed on Cartels

Jurgita Bruneckiene, Irena Pekarskiene

Kaunas University of Technology

K. Donelaicio st. 73, LT-44029, Kaunas

E-mail. jurgita.bruneckiene @ktu.lt, irena.pekarskiene @ktu.lt

crossref <http://dx.doi.org/10.5755/j01.ee.26.1.7763>

A discovery of an active cartel represents only one stage in antitrust enforcement. Another important stage, which is quite widely discussed among scholars, is the imposition of fines against cartels. The main problem, which occurs on the practical and theoretical level is the estimation of the optimal size of fines. Although propositions stating that today's fines are possibly too low, more and more often appear in the scientific literature and public space, the concept of the optimal fine is not fully analyzed and discussed among academic society yet. It is important that the size of the fine allows to find the compromise among damage settlement, deterrence from other violations of competition law, punishment of violators and practical possibilities to pay the fine.

In this article the main attention is paid to the concept of the optimal fine in the country of small economy with developing culture of competition. The empirical analysis is based on Lithuanian cases. This country is chosen because it corresponds to the features of the small economy with the developing culture of competition. In Lithuania, the Law on Competition became effective in 1999 and the competition has not been treated as a value yet. The empirical analysis of two Lithuanian cartels cases allowed to assess and identify the specifics of the economic efficiency of fines imposed on cartels. According to the theoretical and practical analysis, the recommendations pointed to the improvement of the fining system, are presented in the article as well.

Keywords: cartels, fines, optimal fines, fine deterrence, economic efficiency, Lithuania.

Introduction

The scientific literature is unambiguous about the existence of the relationship between antitrust policy and cartel effects. However, scholars appear to have arrived at different conclusions about the very nature of the relationship that can be direct, neutral or inverse. (Crandall & Winston, 2003) assessed the effects of antitrust policy and enforcement on consumer welfare and found no evidence that discovery of collusive agreements in a market stopped anti-competitive practices and provided much benefit to consumers and, in some instances, there was evidence that it might have lowered consumer welfare. If a cartel raises prices, then antitrust enforcement authorities should lower them. However, the authors relied upon Sproul's analysis (1993) of a sample of 25 price-fixing cartels active between 1973 and 1984 which, by controlling other influences on prices, raised the prices by an average of 7 % four years after the indictment. Sproul (1993) also found that prices usually rose during the period from the opening of investigation but before the indictment. In addition, in the most successful cases, prices fell only by some 10 % as a result of antitrust enforcement, whereas cartel overcharges often were considerably higher. Other empiricists (Bolotova, 2006; Clarke & Evenett, 2003; Feinberg, 1984) opposed the findings of Sproul's research (1993) and proved, in their words, considerable price reductions in the market after the initiation of an investigation by antitrust authorities. (Clarke & Evenett, 2003) pointed out that effectively functioning antitrust policy even leads to the reduction of overcharges of unprosecuted cartels. (Bolotova, 2006) concluded that

overcharges fixed by cartels are lower in the case of active antitrust policy enforcement. To sum up, an unambiguous assessment of research results and conclusions produced by the research authors is a rather hard task due to the uniqueness of each cartel's situation. Interestingly, the findings of research studies of cartels active 30–40 or more years ago appear to be at odds with the latest research. This can be explained by better opportunities for obtaining information data and better reliability thereof, the use of advanced technologies making it possible to apply more complicated calculations in research. Notwithstanding the contrasting research findings, there are more and more studies proving the direct relationship between antitrust policy and cartels: the more extensive and stricter is the development of antitrust enforcement, the greater is the deterrent effect it produces, the greater influence it has on overcharge reductions, the more it increases the number of cartels discovered in a current period, and the more it reduces the number of cartels to be formed in the future.

It is admitted by many scholars (Utton, 2011; Combe & Monnier, 2010, 2009; Bolotova & Connor, 2008; Connor 2008; Connor & Lande, 2007, 2006; Crandall & Winston, 2003) and competition enforcement authorities that today's fines¹ are possibly too low. The scholars arrived at such a conclusion on the basis of the economic calculations performed. (Combe & Monnier, 2009) concluded from the analysis of a sample of 64 cartels convicted by the European Commission from 1975 to 2009 that the fines imposed by

¹ In compliance with European Union and Lithuanian laws, an undertaking found to be a present or former cartel member shall be imposed a fine of up to 10 % of total annual revenues.

the European Commission were overall suboptimally low (whatever is the assumed level of the probability of detection). The empirical study of cartel sanctions by (Bolotova & Connor, 2008) suggests that modern antitrust policies are unlikely to be effective in their deterrent function. One key reason is the weak link between the concept of optimal fines and the fine calculation methods actually applied by competition authorities. These authors have also found out that the relationship between cartel fine and cartel overcharge is negative, implying that cartels imposing higher overcharges (i.e., harm customers to a larger extent) tend to pay smaller fines.

Unlike foreign scholars (especially the US scholars who are leading by the number of research studies on this topic), scientists from countries with developing culture of competition, such as Lithuania, pay insufficient attention to the issue of the economic efficiency of fines against cartels, and there is a lack of relevant research. Instead, these scholars (Novosad, 2012; Stanikunas, 2009) focus their analyses mainly on the procedure for determining the amount of fines imposed for the breach of the Law on Competition, the problematic issues of mergers (Sedlacek *et al.*, 2014) or concentration (Hussain, 2014), as it also affects the competition in the market. Therefore, research into the economic efficiency of fines in Lithuania is not only relevant and timely, but also involves scientific novelty. Although it is frequently heard in the public domain that fines imposed by the Competition Council of the Republic of Lithuania for cartel agreements are constantly growing (due to a growing number of violators and increasing level of fines), the maximum statutory fine was first imposed only in 2010 in the case of the travel agency cartel. Both the European Union and Lithuania seek to improve the procedure for calculating fines imposed for the infringements of competition laws², paying greater attention to individual circumstances, related to the activities of economic entities and their participation in infringements, to ensure the transparency and clarity of the determination of fines and to develop a stronger deterrent effect. The problem of economic efficiency of fines, nonetheless, remains unresolved and relevant. Taking into account that the economic efficiency of fines plays an important role not only in the compensation of damages and punishment of infringers, but also in deterring from other potential violations of competition law, the problems at issue should attract greater attention from the academic society (especially among scholars of the European Union).

The aims of the article - to identify the critical aspects of the concept of the optimal fine imposed on cartels and empirically evaluate the economic efficiency of fines imposed on cartels of small economy with a developing culture of competition.

Research methods: systematic, logical and comparative analysis of the concepts, methodologies and conclusions, published in the scientific and applied literature. Methods of mathematical and statistical treatment were applied for the empirical evaluation.

This research was funded by a grant (No. IEP-01/2012) from the Research Council of Lithuania.

The Theoretical Concept of Optimal Fine Imposed to Cartel

The latest scientific works (Berber *et al.*, 2014; Petrokaite & Stravinskiene, 2013; Ubius & Alas, 2012) state, that businesses should be socially responsible, as this is the only way to be competitive for an enterprise, industry and even the whole country. The cartel agreement, which makes the negative impact or harm to the customer, industry and the whole economy and competitiveness, shouldn't be tolerated by the participants of the market and the penalty for creating a cartel should be imposed.

The optimal size of fines has been the focus of scientific and legal discussions for more than 30 years. It is agreed in the modern literature that fines should have a threefold effect: to deter future cartel agreements, to punish existing cartels, and to compensate harms to those injured by cartel. Research studies have shown that most discussions rise about the point of reference for the calculation of fines, relationship between fines and the probability of proving the infringement, and the purpose of fining. However, the fiercest discussions are about the very issue of determining the size of fines.

The beginning of searches for optimal fines is associated with the works by William M. Landes suggesting that, in order to deter antitrust violations, an optimal fine should be equal to the violation's net harm divided by the probability of detection, and proof of the violation (Connor & Lande, 2006). The total amount of compensable harms should be measured at the real value. This aspect is of particular importance from the economic point of view, as studies have shown that cartels have an average duration of 6–7 and post-cartel effects last for additional 2–4 years. Therefore, the determination of optimal fines should be based on the following principle: a fine imposed on a cartel should be equal to the "cartel's net harm". Moreover, since not every cartel is detected, the "net harm to others" from cartels should be multiplied by a number that is larger than 1 (the multiplier should be the inverse of the probability of detection and proof). Such multiplier (>1) is also supported by the existence of undetected cartels in a market. Although not a single research is capable of determining the exact percentage of cartels that remain undiscovered. Different estimations found in the academic literature (Europe Commission 2013; Davies & Ormosi; 2010; Bolotova *et al.*, 2007; Connor & Lande, 2006; Connor & Bolotova, 2005; OECD 2002; Bryant & Eckard, 1991) give reasons to believe that only about 20 % of all cartels are detected on average. Although the improving efforts of antitrust enforcement might have raised the figures above in the recent years or are likely to raise them in the near future, multiplication of sanctions (fines and compensations) against cartels by a number equal to 1 will probably be not sufficient to deter future violations.

Despite Prof. Landes works and their major role in the formation of optimal fine methodology, there are two well-established views in the academic literature towards the fine benchmarking: some scholars emphasize cartel's revenues/gains, while others - the net harm to others. (Connor & Bolotova, 2005) relied upon (Cohen & Scheffman, 1989) to argue that the average size of overcharges fixed by a cartel is a critical issue in

² The new procedure is in effect in Lithuania from 27 January 2012.

evaluating cartel fines. (Wils, 2006), on the contrary, preferred the harm-based view and singled out one fundamental advantage of the harm-based fine over gain-based fine: the former would not deter those types of efficient conduct which cause more gain to the offender than harm to society and should therefore not be deterred (but punished) from a welfare perspective. (Page, 1980) noted that fines imposed on undertakings are inefficient unless they are connected to social costs or inefficiencies induced. (Utton, 2011) goes to a compromise stating that an optimal fine should be equal to illegally gained profits connected with the probability of being caught and the amount of deadweight loss compensation. Despite the ongoing fierce discussions between economists and lawyers in order to find out whether “gain” or “harm” better fits to determine the optimal fine, studies by (Souam, 2001) have shown that fines calculated using one or another approach reach similar deterrence levels. However, the author noted that in industries in which the likelihood of collusion is small, a gain-based fine has certain advantages over a harm-based fine, while in industries with high possibilities of collusion, a harm-based fine reaches slightly better performance.

(Utton, 2011) argues that the optimal fine depends on the probability of getting caught, i.e., the lower the probability of being prosecuted and convicted, the higher the expected fine has to be. Although this proves that the better is antitrust enforcement, the higher is the probability of getting caught, the authors of this article, however, are of the opinion that it is not reasonable to associate the size of fines with the efficiency of antitrust enforcement authorities.

Notwithstanding wide-ranging discussions in the academic literature about methodological aspects of fine determination, the very size of the optimal fine remains to be unsolved. (OECD, 2002) considered that because not all cartels are uncovered and punished, effective deterrence requires imposing a fine against organizations participating in a cartel that is a multiple of the estimated gain on those cartels that are uncovered. Despite the difficulty or impossibility of detecting all cartels active in a market, research studies suggest that the harm inflicted by one cartel should be multiplied by 7, 10 or a bigger number so that world-wide losses from a cartel would be covered in full and the size of fine would be adequate to achieve the deterrence. According to (Werden & Simon, 1987), an average optimal fine for all conspirators together should be 1 billion US dollars, that is, more than 100 times the fines actually imposed by courts. Moreover, these authors argue that cartel’s harm to a society is higher than deadweight loss and, therefore, even paying out of illegal profits in taxes, dividends or salaries would be insufficient. However, the imposition of large fines on firms provokes new considerations amongst economists. Large fines may drive the firms into bankruptcy, and this involves additional economic and social problems in the relevant region. Economists (Utton 2011; Motta 2008) provide the following interpretation of this problem: if the cartel firms enjoyed supra-competitive profits for the duration of the cartel but, following the cartel demise, are unable to survive under competitive conditions, a clear inference is that they are too inefficient. Despite economic and social losses caused by a bankruptcy (especially dismissal of

employees), this is precisely the essence of the competition process to leave the most efficient firms in the market, and this is a natural phenomenon of economic life. Although it is contended that the elimination of one or more firms from the market will increase the level of concentration and may lead to higher than competitive prices, the authors insist that the prices that emerge will be nonetheless below the cartel price. The authors rely upon the same arguments to counter the claim that punished cartel firms will have to raise prices to fund the amount of sanction which is due now, while supra-competitive profits earned in the past might have been already spent for other purposes. Although some empirical studies (Marshall & Marx, 2012; Connor, 2008; Bolotova *et al.*, 2007; Harrington, 2006, 2004) indicate that post-cartel prices remain at somewhat higher level, this is usually not due to funding the fine but rather to other reasons.

Despite nearly 30 years of discussions about the optimal fine, the question remains unanswered. So far, no compromise has been found among the size of fines, the scope of compensation for damages and the capability of cartel firms to pay the fine so that the process would bring maximum economic benefits and involve minimum economic and, at the same time, social losses. Therefore, it is a task for economists to keep searching for an answer to the question of the size of optimal fines and looking for economic evidence to justify a multiplier which, according to the authors, should be above 1.

The Critical Aspects of Deterrent Nature of Fines

According to the latest academic literature (Allain *et al.*, 2011), the essence of current fines should transform from being restitutive or compensatory (as advocated by Landes, the father for optimal fine determination) to being dissuasive. It means that the optimal fine should be such that criminal activities are unprofitable. Although it is often emphasized in legal practice that the size of fines should encompass both the compensatory and punitive aspects, as well as produce a deterrent effect, some scholars (Easterbook, 1981; Page, 1980) emphasize that the fine should primarily be oriented towards deterrence rather than to the compensation of damages. These scholars note that the fine will not deter from further violations unless its size is sufficient to compensate the inflicted damages in full. In addition, (Page, 1980) referred to Court conclusions, some of which indicated that it was more important to punish the violator than to compensate damage, whereas others stated that those injured by the violators should receive compensations.

In spite of legal efforts³ to strengthen the deterrent nature of fines and the variety of sanctions for cartel agreements, the academic literature is nonetheless full of criticism for underdeterrence. The literature and information sources (Competition Council of the Republic of Lithuania 2012; OFT 2011, 2007; Davies & Ormosi,

³ Efforts to transit from compensatory fines to deterrence have been implemented from 2006 when the European Commission approved the Guidelines on the method of setting fines imposed pursuant to Article 23(2)(a) of Regulation No 1/2003.

2010) point out that the deterrent effect of fines is rather a theoretical aspect which is difficult to measure. Based on questionnaire surveys and expert analyses, detection of one cartel deters other 5, 16 or even 28 cartels. Although information sources provide highly divergent assessments, taking into account the average deterrence ratio (approx. 10 cartels) and presuming that all non-formed cartels would have caused similar harm, fines appear to have a substantial deterrent effect and to create additional benefits to an economy as a whole.

According to the chairman of the Competition Council of the Republic of Lithuania, (Keserauskas, 2013), fines are not the most efficient deterrent in Lithuania where competition does not enjoy a great value and violators are not seen as serious offenders. The chairman of the Lithuanian Competition Council says that the threat of criminal liability or even imprisonment would allow achieving considerably better and more efficient deterrence. Some countries (like Estonia, which is one of the Baltic States) provide for criminal liability of executives who participate in cartels. This is said to help think better before forming a cartel and serve as a strong dissuasive measure. (London Economics, 2011) notes that, basing on US and Danish law enforcement systems, the threat of imprisonment as a possible sanction against an individual for being in cartel agreement produces a very strong deterrent effect. However, the very fact of imprisonment of individuals for a cartel agreement as a deterrent and a punishment tool raise a lot of discussions among scholars. (Utton, 2011) quoted (Breit & Elzinga, 1986), who concluded that the threat of imprisonment was not a strong deterrent. This is, *inter alia*, determined by its comparatively infrequent use in judicial practices, as well as leniency and amnesty programmes. Other scholars (Werden & Simon, 1987) believe imprisonment to be the most efficient deterrent from cartels, especially as small and medium-sized firms are financially incapable to pay fines against them. According to research studies, scholarly discussions about imprisonment as a form of punishment for cartel agreements cannot give a precise answer as to the length of imprisonment. However, (Werden & Simon, 1987) are in favour for relatively short sentences. In addition, it is not always easy to distinguish between the initiators and mere executors of cartel agreements. In the context of analysis of the optimal fine, scholars (Utton, 2011; Bryant & Eckard, 1991) usually assume that managements of cartel firms are risk neutral. However, recent financial studies point to an increasing number of executives willing to take risks and, consequently, to form cartels. According to (London Economics, 2011), employees' incentives to take risks may differ from those of shareholders, *i.e.*, employees usually do not have a sufficiently strong preference for profit maximization and are less likely than shareholders to accept the gamble associated with cartel activity. This view is opposed by (Aubert, 2009), who argues in his works that employees may in some cases have a stronger preference for collusion than shareholders. Despite an increasing number of scholars and antitrust enforcement representatives speaking in favour of imprisonment as an efficient deterrent, and identification of initiators (not only of executors) of cartel agreements being a matter of investigatory and judicial proceedings, the authors of the

article stick to the opinion that if harms inflicted by cartels on a society and economy are mainly financial or possible to be monetized, sanctions for cartel agreements should also involve financial penalties rather than custodial sentences. Moreover, imprisonment from the economic point of view is not only detrimental to the efficiency or strategic decision-making of firms, but also incurs additional costs on society (maintenance of imprisoned individuals). This, although not significantly, even more increases social harm caused by cartels.

Studies and surveys have shown that such measures as antitrust compliance programmes and leniency programmes have a direct impact on deterrence. Yet, these programmes are viewed not without ambiguities by scholars. (Huschelrath, 2009) explains the popularity of antitrust compliance programmes⁴ as an indicator of an increasing deterrent effect of fines. The efficiency of the programmes above is also ascertained by Rogers' research studies (2005) demonstrating that significant increases in investigatory and fining powers of the competition authorities in the late 1990s led to increased compliance efforts in the UK industry.

Although leniency programmes are considered as reinforcing the deterrent effect, they seem to provoke more discussions in the academic literature than antitrust compliance programmes. The major discussions relate to the impact of leniency programmes on the probability of cartel detection. Theoretically, the leniency programmes are designed to destabilize cartels endogenously through reducing mutual trust amongst cartels members, *i.e.*, to implement prisoner's dilemma in each cartel, thus creating preconditions for the cartel to uncover itself. However, scholars raise a question why incumbent firms should withdraw from a profitable agreement in exchange for exemption from fines. Some scholars (Aubert *et al.*, 2005; Ellis & Wilson, 2001) argue that leniency programmes come into use when a cartel is on the verge of breaking up or fines are relatively strict and thus have an insignificant impact on detection probability. Other scholars (Motta & Polo, 2003) express even more criticism over leniency programmes arguing that such programmes, by giving fine reductions in case of squealing, may induce firms to collude more frequently. (Huschelrath, 2009) supports a more neutral opinion noting that leniency programmes, together with fines, have an important value for an overall strategy of antitrust authorities to detect and to prove hard core cartels. However, modern scholarly works tend to defend leniency programmes against the avalanche of critique. (Miller, 2009) developed a theoretical model of cartel behaviour and proved that leniency programmes had a positive impact on deterrence and detection capabilities. The direct estimation of the model yielded a 59 % lower cartel formation rate and a 62 % higher cartel detection rate due to leniency programmes. (Brenner, 2009) conducted an empirical study of the European corporate leniency programme and found strong evidence that the programme provides incentives to reveal information on the conspiracies, *i.e.* competition

⁴ *The purpose of antitrust compliance programmes is to make employees and owners of firms familiar with competition law and culture by means of various measures (e.g., methodological guidelines, training courses, workshops, seminars, etc.).*

authorities are better informed about the cartel conduct than they would be absent the programme. (Chang & Harrington, 2010) found that leniency has a deterrent effect because it reduces the cartel rate.

The academic literature (Huschelrath & Weigand, 2010; Lande & Davis, 2008) highlights that active private enforcement activities are likely to enhance the deterrence effect. Despite scarce EU-wide empirical studies, findings of US scholars suggest that private litigation actually does a better job than the government in deterring illegal corporate behaviour. The forty cases analyzed by (Lande & Davis, 2008) provide greater deterrence against anticompetitive behaviour than imposed criminal fines and prison sentences since 1990. These works simply reaffirm that competition policy, especially in the European Union, should be aimed at harmonizing the systems of public and private enforcement in order to improve the deterrence effect.

It is important to note that the overall punishment for a cartel agreement is not limited to fines or sanctions against firms. Research studies have shown that firms face reductions in post-cartel value and reputation of the firms, lower customer confidence and poorer opportunities to hire high potential employees, etc. (Huschelrath & Weigand, 2010) pointed out that firms not only suffer direct costs such as litigation costs and counsel fees⁵, but also employees need to invest part of their working time in the provision of information for the investigation which collection and processing is time-consuming. Furthermore, the remaining employees are under stress of the initiated investigation and uncertainty. This directly affects their labour efficiency. All the above-mentioned losses can be considered as other components in the fine package (considering public fines and private damages) that follow the prosecution of a cartel. Sanctions have another, related purpose in the cartel context - that of providing an incentive for cartel participants to defect from the cartel, or not to form it in the future, and provide information to the investigators of the cartel. (OECD, 2002) indicates that the optimal sanction should be based on the “carrot and stick” approach: the “stick” - the possible sanction - should be sufficiently severe to give effect to the “carrot” - the opportunity to avoid the sanction by cooperating with competition policy authorities. Accordingly, the severity of sanctions has a direct impact on leniency programmes and cooperation of firms or individuals with competition policy authorities. This is also ascertained in the latest empirical research. (Connor, 2011) concludes that leniency discounts under the 2006 Guidelines caused pre-leniency fines to decline by 36,3 % as compared with the leniency discounts under the EC’s 1998 Guidelines. (Veljanovski, 2011)

⁵ *There is scarce EU-wide information on litigation costs suffered by cartel firms. According to Connor (2008), litigation costs of the lysine, citric acid, and vitamins cartels amounted to approx. 180 million dollars. Law firms/lawyers representing private damage claims probably received 15–20% of awarded damages. As for the European Union, Neven (2005) reports that the costs and fees spent by Airtours in the EC merger investigation of Airtours/First Choice add up to more than EUR 2,2 million overall with about 80% of these costs referring to the work of lawyers and the remaining 20% - to the work of economists. Considering that merger cases are more complex and therefore need more resource input than cartel cases, costs and fees still become impressive, and legal industry receives quite significant sums paid by both cartel firms and those requiring compensation of damages.*

indicates that the average pre-leniency fine is 23 % of cartel sales and the final fine (taking into account reductions for leniency and ability to pay) is 19,3%.

In sum, any measures aimed at combating competition infringements can be subject to criticism. However, as long as there is no universally established more efficient method, all the measures are appropriate if they contribute to deterrence of would-be cartels, punishment or compensation of damages. Fining systems, leniency programmes, and antitrust compliance programmes are complementary, and, therefore, a combination of all of them is required to enhance cartel detection efficiency and deterrent effect. The assessment of deterrence of sanctions conducted by London Economics (2011) has shown that Corporate Fines appear to produce the highest deterrence effect in the European Union, while Effective Leniency Programme, Extra Deterrence from Private Actions, and Penalties on individuals (incarceration) appear to be most efficient in the United States. Therefore, it can be concluded that the optimal sanction should comprise both monetary and nonmonetary sanctions - focused on both the corporations (for example, payment of fines, publicity) and individuals involved in cartel activity (for example, dismissal, salary reductions or downgrading, director disqualification from the board of directors or similar bodies).

Empirical Research of Fines Imposed to Cartels in Practice

Case-law has shown that fines actually imposed on cartels tend to highly contrast in the magnitude with theoretical considerations of the size of optimal fines due to both social-economic effects of enforcement (not all cartel firms would be able to pay theoretically optimal fines without going bankrupt) and the very practical applicability. For example, basing on the conservative model, where only one third of cartels with an average duration of 6 years and a 20–30 % overcharge are detected in the European Union, the optimal fine should range from 360 to 540 % (3 x 20 x 6 and 3 x 30 x 6) of annual revenues. Basing on the data from the European Commission, (Huschelrath, 2009) calculated the optimal fines to be by 1,6 –115,5 times higher than those imposed in practice. Connor (2006) concluded that in order to ensure optimal deterrence of global cartels total financial sanctions should be 4 times expected global cartel profits (the overcharge). In the case of followers, deterrence would require penalties in all geographic regions to be equal to 8 times global cartel overcharges. Even though it is possible to calculate the optimal fine theoretically, its practical applicability appears to be prejudiced. According to (Huschelrath, 2009), it is neither possible, not economically desirable to completely deter cartelization. Even if practically imposed fines are lower than theoretically optimal fines, they still benefit consumers and economies in terms of compensation of the fines paid and the deterrent effect produced. This once again proves that the determination of optimal fines is not as important in practice as is the assessment of economic efficiency of fines.

In view of the changing economic environment, in 2006 the European Commission approved the new Guidelines on the method of setting fines imposed pursuant to Article

23(2)(a) of Regulation No 1/2003 replacing the Guidelines approved in 1998. Although being praised by scholars (Connor, 2011) as more transparent, predictable, and a big step forward toward optimally deterring fines, the revised guidelines left the question of economic efficiency of fines unanswered.

Empirical studies on the effects of the revised Guidelines have revealed a substantial increase in fines imposed in the European Union from 2006. (Connor, 2011) indicated that the EC fines under the 2006 Guidelines averaged 76,2 % of affected sales, whereas under the 1998 Guidelines the mean severity was 11,3 % of EU affected sales during 1999–2009. Thus, the new Guidelines produced hard-core cartel fines that were more than six times as severe as comparable fines imposed under the 1998 Guidelines. Although (Veljanovski, 2011) agreed to a dramatic increase in aggregate fines, he noted that this was due not only to the severity of fines, but also due to lower fine discounts under leniency programme. Despite more severe fines, scholars keep coming back to the question of reasonability of the fine cap (up to 10 % of annual revenues), which has been unchanged since 1960, in view of cartel's harm. According to some recent research studies (Veljanovski, 2011), estimated fine-to-sales ratios together with new research on overcharges and detection rates suggest that fines may be closer to those for optimal deterrence than previously thought. Yet, considerably more studies (London Economics, 2011; Connor 2011; Connor 2008; OECD 2002) suggest that the level of fines is too low.

The economic efficiency of fines has been analyzed in the academic literature in different ways - using complicated econometric calculations (Allain *et al.*, 2011; Combe & Monnier, 2010), assessing each case of cartel individually (Huschelrath & Weigand 2010, Connor 2008, Veljanovski 2007, OECD 2002), or assessing the efficiency of fine-related decisions (Connor 2011).

(Connor, 2008) analyzed the efficiency of fines imposed on the vitamins cartel, as one of the most world's harmful cartels, basing on two indicators: penalties⁶ relative to affected sales and penalties relative to injury. In the case of the vitamins cartel, the total unadjusted global sanctions relative to affected sales were 20,4 %, being higher in the countries where sanctions resulted from government and private legal actions. In the United States, the total sanctions relative to affected sales amounted to 55,3 %, of which only 12,1 % of sanctions resulted from public (government) legal actions and the remaining 43,2 % – from private legal actions. In Canada, this indicator was 36,5 %, representing 15,1 % and 21,4 % of sanctions resulting from public and private legal actions respectively. This ratio in the European Union was only 8,2 % and represented public legal actions only. From the point of view of deterrence, relative sanction/injury ratios enjoy a considerably greater value than relative sanction/sales ratios. From the point of view of deterrence, penalties relative to injury are far more meaningful than the sanctions/sales ratios. As the overcharges paid by customers are close to the amount of profits garnered from

cartel agreements, the sanctions/overcharge ratios are a perfect indication of damage settlement. A ratio of 100 % or higher means that all of cartel's illegal profits were passed on to taxpayers or purchasers. Ratios higher than 100 % are indicative of a punitive and deterrent element. Ratios lower than 100 % indicate that members of a cartel retained a portion of their collusive profits after payment of fines and settlement of damages. According to (Connor, 2008), in the case of the vitamins cartel, the total unadjusted global sanctions relative to injury were 72 %, being higher in the countries where sanctions resulted from public and private legal actions. In the United States, the total sanctions relative to injury amounted to 194 %, of which 40% of sanctions resulted from public legal actions and the remaining 154 % - from private legal actions. In Canada, this indicator was 121 %, representing 50 % and 71 % of sanctions resulting from public and private legal actions respectively. This ratio in the European Union was only 30 % and represented public legal actions only. The low ratio in the EU can be explained by the underdeveloped system of private damages suits.

(Connor, 2008) pointed out that, in addition to sanctions/revenues ratios, it is important to take into account the difference between the time the injury was caused and the time the fine was paid, i.e., monetary flows should be adjusted to calculate the real sanctions/sales ratio. Basing on research findings, the adjusted ratios are about 40% lower than the unadjusted ratios. This aspect is of high relevance in terms of the assessment of economic efficiency of sanctions, as both in the European Union and in Lithuania damage settlement litigation is a long process. In the case of the vitamins cartel, the real sanction/injury ratio was only 12 %, meaning that only one eighth of illegal profit was disgorged to taxpayers and purchasers. Despite the sky-high fines imposed on the cartel firms (915 million dollars in the US, 100 million dollars in Canada, 847 million dollars in the EU, and 17 million dollars in other countries), economic computations show that the fines neither provide full settlement nor produce a deterrent effect. Studies on cartel fines and compensation of damages (Combe & Monnier, 2009; Veljanovski, 2007; Gerardin, 2005) similarly demonstrate that fines imposed by the European Commission are insufficient and underdeterrent; the fines are most of the time far below the illegal profit made by the cartel or consumer harm.

Empirical studies (Smuda, 2014; Khumalo *et al.*, 2014; Huschelrath *et al.*, 2013; London Economics, 2011; Connor, 2010, 2008; Combe & Monnier, 2010, 2009; Connor & Lande, 2006; OECD, 2002) have shown that cartel overcharges are well above 10 % and can range from 20 to 50 %, or even more. Therefore, relying upon the 10 % overcharge presumption in the fining process is inadequate, not justified empirically, and implying the need for a dramatic increase in fines. Having analyzed 25 cartels for which information was available in court documentation, (Connor & Lande, 2006) found out that these cartels increased prices by an average of 30 % and concluded that the 10 % overcharge presumption is definitely too low. London Economics (2011) took the view that an average overcharge can be 40 % and also considered the 10 % benchmark to be too low. Connor & (Lande, 2006) pointed out that an average overcharge

⁶ Penalties comprise fines and settlements.

ranges from 18 to 37 % in the United States and from 28 to 54 % in the European Union. Therefore, the current presumption of 10 % should be raised to at least 15 % for domestic cartels, and to at least 25 % for international cartels, or, without distinction, to 20 % for all cartels. The low level of fines of up to 10 % of the total annual revenues for infringement of competition law is also substantiated by econometric calculations conducted by (Allain *et al.*, 2011; Combe & Monnier, 2010). In order to determine the optimal size of fines, these authors introduced to their calculations different parameters, such as economic restrictions on overcharge, price elasticity of demand, affected market, cartel duration, and detection probability. The authors found that, considering a 2 price elasticity of demand, a 20 % overcharge, a 10 % competitive mark-up, a 15 % probability of detection, and 6 years' of duration, the fine would range from 28 to 65 % (Allain *et al.*, 2011) or, even, from 465 to 923 % of the annual revenues (Combe & Monnier, 2010). The significant difference in the results obtained shows that the optimal fine depends on a variety of factors and ascertains that fines of up to 10 % of the total annual revenues for infringement of competition law are obviously too low.

In sum, the determination of the optimal fine is a complicated process: theoretical interpretations of the problems are far different from practical applicability. The economic calculations provided by scholars have justified that the level of fines of up to 10 % of the total annual revenues for infringements of competition law is too low under current economic conditions. Although the unique nature of each cartel is indisputable, it is suggested, based on the conservative assessment of empirical findings, that the rate of fine would be raised to at least 15 or 20 % of gross annual revenues. Therefore, the problem of the economic efficiency of fines requires not only the attention from economists, but also the political initiative to raise fine rates and update a legal framework.

The Main Data and Consumptions of Empirical Analysis of Economic Efficiency of Fines Imposed on Cartels in Lithuania

The empirical analysis is based on Lithuanian cases. This country is chosen because it corresponds to the features of the small economy with developing culture of competition. In Lithuania, the Law on Competition became effective in 1999 and the competition has not been treated as a value yet.

The information about the detected cartels in Lithuania is publicly announced only after the investigation is completed and the fact on breaching competition is established. The review of Lithuanian cartel cases proves, it can take 2–3 or even more years until the final decision is made, calculating time from the start of the investigation; also, considering all the judicial procedures, the time required for investigation may be even longer. Besides, only after the Competition Council's of the Republic of Lithuania investigation is completed, the starting year of the cartel activity is specified. For example, in 2011 an investigation was completed, and penalties for the Shipping agency's cartel were imposed, although its activity began in 1998. The specificity of the data retrieval

explains why the data of older periods are used in most scientific research about the cartels and also justifies, that in economic analysis various time information is valuable.

For the assessment of economic efficiency of fines imposed on cartels two different Lithuanian cartels were selected: cartel in the paper sales market (hereinafter - the Paper Cartel) and cartel in the production and sales of orthopedic technical articles (hereinafter - the Orthopedic Cartel). The choice of different cartels was prompted by the type of a cartel (see Figure 1) and the availability and completeness of the data. The Paper Cartel was chosen also for its possible international impact: although an investigation with respect to it was discontinued, there were suspicions about an alleged impact on trade between the EU Member States – Lithuania, Latvia, and Estonia. One of the reasons for choosing the Orthopedic Cartel is its relations with a public authority.

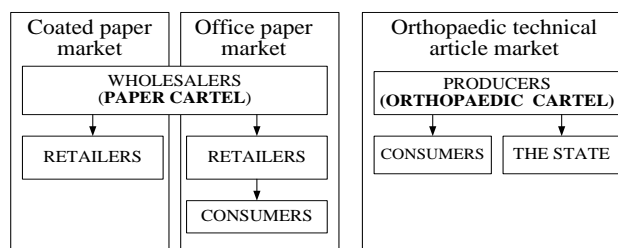


Figure 1. Cartels analyzed in empirical study

The characteristic of Paper cartel. The cartel consisted of 6 coated and office paper wholesale companies. Cartel duration was from 1999 to May 2004. The Paper Cartel concerns two products which are not considered to be substitutes for each other and for other kinds of paper: coated and office paper. The cartel was only at the national level. Coated paper cartel covered around 94 % of the total market, thus office paper cartel - 97 % of the total market. For data insufficiency the assessment of the Paper Cartel's impact employed the following simplified mechanism of cartel functioning: undertakings within the Paper Cartel were selling coated paper to printing-houses and office paper to retail undertakings (selling office supplies). Due to competition in the printing-house market (competition was active not only in the national market but also with Polish, Latvian and Russian markets) printing-houses included the inflated price of paper (overcharge) in their expenses, whereas retail undertakings (selling office supplies) included part of the overcharge (50 %) in their own costs and passed on its remaining share to the final customers. Although the cartel covered nearly the whole market, non-cartel undertakings also raised prices to their customers due to the umbrella effect, thus benefiting from cartel existence. After the Lithuanian Competition Council detected the cartel, the undertakings hired lawyers to protect their interests and paid fines imposed following investigation completion (total 199,52 thousand Euro). Because of the lack of information about the price increase level, it is assumed in consistent with the international good practice, that the cartel overcharge represented 10 %.

The characteristic of Orthopedic cartel. The cartel consisted of 11 undertakings and institutions, a public authority and 2 associations. Cartel duration was from September 2006 to November 2010. The Orthopedic Cartel

concerns an orthopedic technical article necessary for a patient. The cartel was only at the national level. The Orthopedic Cartel covered around 100 % (96–97 %) of the total market. For data insufficiency the assessment of the Paper Cartel's impact employed the following simplified mechanism of cartel functioning: an orthopedic technical article necessary for a patient is produced by a Lithuania-based producer of orthopedic technical articles, while the National Health Insurance Fund reimburses part of the price of article acquisition. The assumption was done, that the amount of compensation seeks 80 % of the final product price to patients, while the remaining share of the price was paid by the patient himself. After the Lithuanian Competition Council detected the cartel, the undertakings hired lawyers to protect their interests and paid fines imposed following investigation completion (total 854,47 thousand Euro). It was found, that the cartel overcharge was 20 %. The main source of the data used in the calculation appears to be Lithuanian Competition Council cases and the Department of Statistics of the Government of the Republic of Lithuania. During the assessment of Lithuania's cartels the period of their impact was identified

with the period defined by the Competition Council of the Republic of Lithuania in cartel cases.

The Results of Empirical Analysis of Economic Efficiency of Fines Imposed on Cartels in Lithuania

The calculation of the Paper Cartel's net impact on the economy is presented in Table 1. The Paper Cartel's aggregate net impact, including legal costs and fines is presented in Table 2. The net impact of cartel is calculated by subtraction of negative and positive impact of cartel. The negative impact of cartel consists of damage caused by overcharge, additional costs, loss of profit, lost and/or not produced GDP, not paid taxes. The positive impact of cartel consists of additional profits and paid taxes. The aggregate net impact is calculated by the subtraction of net impact and net income (after-tax profit) earned by a law firm, paid taxes of a law firm, fines paid by the cartel.

The integrated assessment of the Paper cartel impact has shown that the cartel inflicted damage to the economy in excess of Euro 15 million. The fines imposed on cartel was of Euro 0,2 million.

Table 1

Paper cartel's net impact, Euro thou

	1999	2000	2001	2002	2003	May 2004	TOTAL
Negative impact							
Impact on the coated paper market	-2107,22	-2234,27	-2528,79	-3313,57	-3211,42	-1465,94	-14861,24
Impact on the office paper market	-695,99	-827,73	-980,74	-1168,18	-1532,73	-718,63	-5923,97
Total:	-2803,20	-3062,01	-3509,50	-4481,75	-4744,15	-2184,57	-20785,22
Positive impact							
Impact on the coated paper market	477,67	506,52	536,17	898,52	632,27	288,64	3339,78
Impact on the office paper market	198,36	294,43	331,15	379,72	619,73	290,55	2113,94
Total:	676,03	800,94	867,33	1278,24	1252,00	579,18	5453,72
NET IMPACT (NEGATIVE)	-2127,14	-2261,09	-2642,17	-3203,52	-3492,15	-1605,39	-15331,53

Table 2

Paper cartel's aggregate net impact including legal costs and fines, Euro thou

IMPACT	TOTAL, thousand Euro
Net impact (negative)	-15331,53
Net income (after-tax profit) earned by a law firm	20,85
Paid VAT(19 %)	3,96
Fines paid by the cartel	199,52
AGGREGATE NET IMPACT (NEGATIVE)	-15107,18

The calculation of the Orthopedic Cartel's net impact on the economy is presented in Table 3. The Orthopedic cartel's aggregate net impact, including fines is presented in Table 4.

The integrated assessment of the Orthopedic cartel impact has shown that the cartel inflicted damage to the economy in excess of Euro 10 million. The fines imposed on cartel was of 0,09 million Euro.

Table 3

Orthopedic cartel's net impact, Euro thou

	2006	2007	2008	2009	2010 November	TOTAL
Negative impact:	-2001,08	-2668,10	-3300,72	-2561,79	-2141,79	-12673,48
Positive impact:	400,21	533,62	660,15	512,36	428,36	2534,70
Net impact (negative)	-1600,86	-2134,48	-2640,58	-2049,43	-1713,43	-10138,79

Table 4

Orthopedic cartel aggregate net impact inclusive of fines, Euro thou

IMPACT	TOTAL, thousand Euro.
Net impact (negative)	-10138,79
Fines paid by the cartel	854,47
AGGREGATE NET IMPACT (NEGATIVE)	-9284,32

Systemized results of the assessment of economic efficiency of fines imposed on cartels are presented in Table 5.

The cartels' negative impact or economic harm is undoubtedly much greater than its positive impact (gains). In the case of the Paper Cartel harm caused to the economy

by the cartel is by 3,8 times greater than gains, i.e. positive impact offsets a mere 26,2 % of the adverse impact made. Harm caused to the economy by the Orthopedic cartel is by 5 times greater than benefit, i.e. positive impact outweighs only 20 % of the negative impact made.

Table 5

Assessment results of the impact of three cartels

Indicator	Paper cartel	Orthopedic cartel
Cartel duration, months	65 months	51 months
Number of cartel members (<i>associations excluded</i>)	6	11
Fines paid by cartel, thousand Euro.	199,52	854,47
AGGREGATE NET IMPACT (NEGATIVE), thousand Euro.	-15107,18	-9284,32
Harm/gain, times	3,8 times	5 times
Aggregate net impact (negative)/Cartel profit, times	1,11 times	1,1 times
Harm/Cartel profit, times	1,5 times	1,38 times
Fines/ Discounted aggregate net impact, %	1,29 %	7,20 %
Fines/ Discounted harm, %	0,96 %	5,76 %
Fines/ Cartel profit, %	1,44 %	7,93 %

Calculations have shown that Paper cartel undertakings may derive 13829,98 thousand Euro in after-tax profit during the cartel period, and the Orthopedic cartel members may earn 10772,45 thousand Euro in post-tax profit. It can be stated on the basis of calculation results that the net (negative) impact on the economy was by 1,11 times in Paper cartel case and 1,1 in Orthopedic cartel case greater than cartel undertakings' profit, i.e. one Euro of post-tax profit earned by the cartel had an aggregate negative economic impact around 1,1 Euro. Upon excluding the cartel's positive impact and assessing only its adverse impact, harm to the economy was by 1,5 times in Paper cartel case and 1,38 in Orthopedic cartel case greater than cartel undertakings' profit, i.e. one Euro of cartel's post-tax profit inflicted damage to the economy from 1,38 to 1,5 Euro.

The efficiency of fines for cartel agreements can be evaluated through the comparison of the discounted net impact of the cartel and fines paid by it. The amount of fine levied on the Paper cartel accounted for 1,29 % of the aggregate negative impact on the economy or 0,96 % of the harm caused to the economy (excluding a positive impact). The amount of fines levied on the Orthopedic cartel accounted for a mere 7,20 % of the aggregate negative impact on the economy or 5,76 % of the harm caused to the economy (after eliminating positive impact). It therefore follows from the above that fines imposed on the cartel members were unreasonably small in terms of the impact on the whole economy.

Based on calculations, fines imposed on the Paper cartel accounted for 1,44 % and on the Orthopedic cartel accounted for 7,93 % of the post-tax profit possibly derived by the cartel within the cartel period, i.e. illegal net profit obtained due to cartel agreements significantly outweighed the amount of paid fines. Consequently, it can be concluded that fines imposed on the cartels' undertakings also were nearly inefficient on a cartels scale.

Hence fines levied for competition infringements in the paper wholesale market and Reimbursable orthopedic technical article production and sales market were unreasonably low: they did not outweigh the aggregate

(negative) impact made on the economy and, due to obtained profit less taxes and fines, possibly did not prevent potential future cartel agreements in both the market concerned and other markets.

The authors of article doubt whether it is appropriate equate the magnitude of fines with the cartel's aggregate discounted impact because of the possibility of paying fines of such magnitude and due to social and economic consequences for the cartel's undertakings and the market, whereas the equation of the magnitude of fines with the cartel's post-tax profit within its entire duration would not only partially offset harm to the economy but would also more efficiently deter from other cartel agreements which, if detected, wouldn't be profitable any longer. Building on this proposal fines levied on the Paper cartel undertakings should be raised to 13829,98 thousand Euro, i.e. by 69,32 times and on the Orthopedic cartel undertakings should be raised to 10772,45 thousand Euro, i.e. by 12,61 times.

Therefore it can be stated, that in theory and in practice the concept of the optimum fine differs: the levels of fines imposed on cartels in practice are much lower than the theoretically calculated optimum amount of the fine. While addressing the problem of the economic efficiency of fines it is important to combine the aspects of damages compensation, deterrence from other competition law infringements and the punishment of violators with the practical possibility of paying fines and resulting economic and social consequences. The fining system, the leniency system and antitrust compliance programmes supplement each other. Only an integrated employment of different measures enhances the effects of cartel detection, punishment and deterrence.

Conclusions

The performed studies provide grounds for doubts whether it is appropriate to equate the magnitude of fines to the cartel's aggregate discounted impact due to the possibility of paying fines of such magnitude and due to social and economic consequences for the cartel's undertakings and market in small economy with developing

culture of competition, whereas the equation of the magnitude of fines to the cartel's post-tax profit over its entire duration would partially offset harm to the economy and would also more efficiently deter from other cartel agreements which, if detected, would be no longer profitable. The theoretical and empirical research done by the authors allowed to formulate and justify the necessity and practical viability of the recommendations, pointed to the improvement of the fining system. Recommended measures are related to the practical application of deterrent sanctions to cartels:

- Although the scholarly literature (Connor 2008; Connor & Lande, 2006) recommends raising fine rate to 20 %, it is recommended to the Competition Council of each European country to apply the maximum rate of fines for the members of cartels and impose stiffer fines for the purpose of deterring from both individual and collective infringements. It is recommended to start the discussions of the possibility of increasing the rate of fines to 15–20 %.

- Studies have shown that the associations of producers and traders create favorable conditions for the formation of cartel agreements; however, an association that was involved in a cartel, generally, receives a nominal fine (e.g. in the Orthopaedic Cartel case, the Orthopedic and Rehabilitation Service Providers' Association was fined 289,62 Euro. Meanwhile the total amount of fines reached 854465,94 Euro). Imposition of relatively low fines results from the fact that fines levied on associations, like on undertakings, are calculated from their total annual income in the preceding business year, which is relatively small (associations derive their main income from membership fees and other activities which typically generate meagre income). Considering the extent of influence made by associations on cartel formation these organizations should be punished more severely and should be treated as influential members of a cartel.

In order to impose higher fines on associations and thus deter them from taking part in prohibited agreements and creating favorable conditions for their formation, it is recommended:

- To consider in each European country the application of the pattern for imposing fines on associations established in Articles 23(2) to (4) of Council Regulation (EC) No 1/2003: to impose a fine on an association of undertakings taking into account the total turnover of its all

members rather than the turnover of the association (like is presently done in Lithuania). When an association is not solvent it should be obliged to call for contributions from its members to cover the amount of the fine.

- Include the competition law observance criterion in Business Awards Regulations published by the associated structures of undertakings.

- Considering that there occur cases when national authorities or state officials actively help undertakings to enter into prohibited agreements, thus contributing to the harm caused to consumers, undertakings and the national economy, it is recommended to impose sanctions on public authorities and their managers and officials who contributed to the formation of prohibited agreements between undertakings.

- Theoretical studies have shown that since competition authorities often lack human, time and financial resources, frequent court appeals against their resolutions concerning the fining of cartel undertakings not only place an additional financial burden on them but also divert their attention and effort from new investigations possibly detecting new cartel cases. In order to undermine undertakings' incentives to lodge appeals against Competition Council resolutions, it is recommended that the Law on Competition be supplemented by a provision stipulating that the undertaking whose appeal against the Competition Council's final resolution was dismissed shall pay the fine levied on it by the Competition Council plus interest awarded by the court. Interest should accrue for the period from the date of appeal against the Competition Council's fining resolution until the end of the judicial procedure.

- Studies have shown that after a cartel is detected customers lose trust in part of its members and it is therefore recommended to publish a list of cartel members in the Competition Council's website, under the heading Hall of Shame.

- Empirical studies have shown that in Lithuania, unlike in many other EU Member States, nearly no information is disseminated on the leniency programme. It is recommended that the competition policymakers should intensify after coordinating with the Competition Council and by using other countries' experience the dissemination of information on the leniency programme and the benefits it brings to undertakings.

References

- Allain, M. L., Boyer, M., Kotchoni, R., & Ponsard, J. P. (2011). The Determination of Optimal Fines in Cartel Cases: The Myth of Underdeterrence. Retrieved from <http://ssrn.com/abstract=1987107>.
- Aubert, C. (2009). Managerial Effort Incentives and Market Collusion. Retrieved from http://neo.univ-tlse1.fr/2540/1/wp_io_127_2009.pdf.
- Aubert, C., Kovacic, W., & Rey, P. (2005). The Impact of Leniency and Whistle-Blowing Programs on Cartels. *International Journal of Industrial Organization*, 24, 1241–1266. doi:10.1016/j.ijindorg.2006.04.002. <http://dx.doi.org/10.1016/j.ijindorg.2006.04.002>
- Berber, N., Stangl Susnjar, G., Slavic, A., & Baosic, M. (2014). Relationship between Corporate Social Responsibility and Human Resource Management - as new management concepts – in Central and Eastern Europe. *Inzinerine Ekonomika-Engineering Economics*, 25(3), 360–369. doi: <http://dx.doi.org/10.5755/j01.ee.25.3.4222> <http://dx.doi.org/10.5755/j01.ee.25.3.4222>
- Bolotova, Y., & Connor, J. (2008). Cartel Sanctions: An Empirical Analysis. doi: [org/10.2139/ssrn.1116421](http://dx.doi.org/10.2139/ssrn.1116421).

- Bolotova, Y. (2006). Cartel overcharges: An empirical analysis. doi: org/10.2139/ssrn.931211.
- Bolotova, Y., Connor, J., & Miller, D. (2007). Factors Influencing the Magnitude of Cartel overcharges: An Empirical Analysis of Food-Industry Cartels. *Agribusiness*, 23 (1), 17–33. doi: 10.1002/agr.20111. <http://dx.doi.org/10.1002/agr.20111>
- Brenner, S. (2009). An Empirical Study of the European Corporate Leniency Program. *International Journal of Industrial Organization*, 27, 639–645. doi: org/10.1016/j.ijindorg.2009.02.007. <http://dx.doi.org/10.1016/j.ijindorg.2009.02.007>
- Bryant, P. & Eckard, E. (1991). Price Fixing: the Probability of Getting Caught. *Review of Economics and Statistics*, 73, 531–536. <http://dx.doi.org/10.2307/2109581>
- Chang, M. H., & Harrington, J. E. (2010). The impact of a corporate leniency program on antitrust enforcement and cartelization. Available from internet: http://academic.csuohio.edu/changm/main/research/papers/Palgrave_2013.pdf.
- Clarke, J. L., & Evenett, S. J. (2003). The deterrent effects of national anticartel laws: evidence from the international vitamins cartel. *Antitrust Bulletin*, 689–717.
- Combe, E., & Monnier, C. (2009). Fines Against Hard Core Cartels in Europe: the Myth of Over Enforcement. Cahiers de Recherche PRISM-Sorbonne Working Paper. Retrieved from: <http://ssrn.com/abstract=1431644>
- Combe, E., & Monnier, C. (2010). Fines Against Hard Core Cartels in Europe: The Myth of over-enforcement. Available from internet: <http://congres.afse.fr/docs/2010/160865optimalsanctionsapril2010afse.pdf>
- Competition Council of the Republic of Lithuania. (2012). Retrieved from //<http://kt.gov.lt/index.php?show=ataskaitos>.
- Connor, J., & Bolotova, Y. (2005). Cartel Overcharges: Survey and Meta-analysis. *International Journal of Industrial Organization*, 24, 1109–1137. doi: org/10.2139/ssrn.788884
- Connor, J., & Lande, R. (2006). The Size of Cartel Overcharges. *Antitrust Bulletin*, 51, 983–1022.
- Connor, J., & Lande, R. (2007). Cartel Overcharges and Optimal Cartel Fines. doi: 10.2139/ssrn.1285455. <http://dx.doi.org/10.2139/ssrn.1285455>
- Connor, J. (2006). Optimal Deterrence and Private International Cartels. Working Paper, Purdue University. Retrieved from http://www.aeaweb.org/annual_mtg_papers/2007/0106_1430_1001.pdf.
- Connor, J. (2008). Global Price Fixing. (Studies in Industrial Organization). 2nd edition, Springer. http://dx.doi.org/10.1007/3-540-34222-2_2
- Connor, J. (2010). Recidivism Revealed: Private International Cartels 1990–2009. *Competition Policy International*, 6 (2). doi: 10.2139/ssrn.1688508. <http://dx.doi.org/10.2139/ssrn.1688508>
- Connor, J. (2011). Has the European Commission Become More Severe in Punishing Cartels? Effects of the 2006 Guidelines. Available from internet: <http://businesslawblog.eu/wp-content/uploads/2012/04/EC-Fines-Severity-World-Competition-draft-2011-08-223.pdf>.
- Crandall, R. W. & Winston, C. (2003). Does Antitrust Policy Improve Consumer Welfare? *Journal of Economic Perspectives*, 17(4), 3–26. <http://dx.doi.org/10.1257/089533003772034871>
- Davies, S., & Ormosi, P. L. (2010). Assessing Competition Policy: Methodologies, Gaps and Agenda for Future Research. CCP Working Paper, 10 (19). doi: 10.2139/ssrn.1723115. <http://dx.doi.org/10.2139/ssrn.1723115>
- Easterbrook, F. H. (1981). Predatory Strategies and Counterstrategies. *The University of Chicago Law Review*, 48 (2), 263–337. Available from internet: <http://www.jstor.org/stable/1599465> <http://dx.doi.org/10.2307/1599465>
- Ellis, C., & Wilson, W. (2001). What Doesn't Kill us Makes us Stronger: An Analysis of Corporate Leniency Policy. Working Paper, University of Oregon, Eugene.
- European Commission, (2013). Report on Competition Policy 2012. Available from internet: http://ec.europa.eu/competition/publications/annual_report/2012/part1_en.pdf
- Feinberg, R. M. (1984). The Timing of Antitrust Effects on Pricing. *Applied Economics*, 16, 397–409. <http://dx.doi.org/10.1080/00036848400000046>
- Gerardin, D. (2005). The EC fining policy for violations of competition law: An empirical review of the Commission decisional practice and the Community courts' judgments. The Global Competition Law Centre Working Papers Series, GCLC Working Paper, 03/05. Available from internet: <https://www.colEurope.eu/content/gclc/documents/GCLC%20WP%2003-05.pdf>.
- Harrington, J. E. (2004). Post-Cartel Pricing during Litigation. *Journal of Industrial Economics*, 52(4), 517–533. doi: 10.1111/j.0022-1821.2004.00238.x. <http://dx.doi.org/10.1111/j.0022-1821.2004.00238.x>
- Harrington, J. E. (2006). How Do Cartels Operate? *Foundations and Trends in Microeconomics*. doi:10.1516/0700000021.
- Huschelrath, K., & Weigand, J. (2010). Fighting Hard Core Cartels. Discussions Papers 10–084. ZEW. Retrieved from <https://ftp.zew.de/pub/zew-docs/dp/dp10084.pdf> .
- Huschelrath, K. (2009). Detection of anticompetitive horizontal mergers. *Competition Law & Economics*, 5 (4), 683–721. doi: 10.1093/joclec/nhp008. <http://dx.doi.org/10.1093/joclec/nhp008>
- Huschelrath, K., Muller, K., & Veith, T. (2013). Concrete shoes for competition: the effect of the German cement cartel on market price. *Journal of Competition Law & Economics* 9 (1), 97–123 doi:10.1093/joclec/nhs036 <http://dx.doi.org/10.1093/joclec/nhs036>

- Hussain, I. (2014) Banking industry concentration and net interest margins (NIMs) in Pakistan. *Journal of Business Economics and Management*, 15(2), 384–402. doi: 10.3846/16111699.2012.732105 <http://dx.doi.org/10.3846/16111699.2012.732105>
- Jaroslav Sedlacek, J., Valouch, P., Hyblova, E. & Krizova, Z. (2014). Changes in Property and Ownership Structure of Companies as a Consequence of Mergers in the Czech Republic. *Inzinerine Ekonomika-Engineering Economics*, 25 (2), 152–159. doi: <http://dx.doi.org/10.5755/j01.ee.25.2.4030> <http://dx.doi.org/10.5755/j01.ee.25.2.4030>
- Keserauskas, S. (2013). Milijonines baudos ne visuomet atgraso konkurentus tartis del kainu. Available from internet: <http://www.lrytas.lt/verslas/izvalgos-ir-nuomones/s-keserauskas-milijonines-baudos-ne-visuomet-atgraso-konkurentus-tartis-del-kainu.htm?p=2>.
- Khumalo, J., Mashiane, J., & Roberts, S. (2014). Jeffrey, harm and overcharge in the South African Precast concrete products cartel. *Journal of Competition Law & Economics* 00 (00), 1–25. doi: 10.1093/joclec/nhu005 <http://dx.doi.org/10.1093/joclec/nhu005>
- Lande, R., & Davis, J. (2008). Benefits from Private Antitrust Enforcement: An Analysis of Forty Cases. *University of San Francisco Law Review*, 42, 879–918.
- London Economics (2011). The Nature and Impact of Hardcore Cartels. A report to the Danish Competition Authority. London Economics. Retrieved from <http://londoneconomics.co.uk/wp-content/uploads/2011/09/7-The-nature-and-impact-of-hardcore-cartels.pdf>.
- Marshall, R. C., & Marx, L. M. (2012). *The Economics of Collusion: Cartels and Bidding Rings*. Cambridge, Mass: MIT Press.
- Miller, N. (2009). Strategic Leniency and Cartel Enforcement. *American Economic Review*, 99, 750–768. doi: 10.1257/aer.99.3.750. <http://dx.doi.org/10.1257/aer.99.3.750>
- Motta, M., & Polo, M. (2003). Leniency Programs and Cartel Prosecution. *International Journal of Industrial Organization* 21, 347-379.
- Motta, M. (2008). On Cartel Deterrence and Fines in the European Union. *European Competition Law Review*, 29(4), 209–220.
- Novosad, A. (2012). Baudu, skiriamų uz Lietuvos respublikos konkurencijos įstatymo pazeidimus, dydzio nustatymo tvarkos naujovės. *Societal Innovations for Global Growth*, 1(1). Available from internet: http://socin.mruni.eu/wp-content/uploads/2012/12/A_2012-12-261.pdf#page=176.
- OECD (2002). Fighting Hard Core Cartels: Harm, Effective Sanctions and Leniency Programmes. OECD Reports. Available from internet: <http://www.oecd.org/competition/cartels/1841891.pdf>.
- OFT (2007). The Deterrent effect of competition enforcement by the OFT. Available from internet: www.of.gov.uk/shared_of/reports/Evaluating-OFTs-work/of962.pdf.
- OFT (2011). The impact of competition interventions on compliance and deterrence. Available from internet: http://www.of.gov.uk/shared_of/reports/Evaluating-OFTs-work/of1391.pdf.
- Page, W. H. (1980). Antitrust Damages and Economic Efficiency: An Approach to Antitrust Injury. *The University of Chicago Law Review*, 47(3), 467–504. Available from internet: <http://www.jstor.org/discover/10.2307/1599404?uid=3738480&uid=2&uid=4&sid=21103741605303>. <http://dx.doi.org/10.2307/1599404>
- Petrokaite, K., & Stravinskiene, J. (2013). Corporate Reputation Management Decisions: Customer's Perspective. *Inzinerine Ekonomika-Engineering Economics*, 24(5), 496–506. doi: <http://dx.doi.org/10.5755/j01.ee.24.5.3920>
- Rodger, B. (2005). Law Compliance Programs: A Study of Motivations and Practice. *World Competition*, 28, 349–376.
- Smuda, F. (2014). Cartel overcharges and the deterrent effect of EU competition law. *Journal of Competition Law & Economics* 10(1), 63–86. doi:10.1093/joclec/nht012 <http://dx.doi.org/10.1093/joclec/nht012>
- Souam, S. (2001). Optimal Antitrust Policy under Different Regimes of Fines. *International Journal of Industrial Organization*, 19, 1–26. [http://dx.doi.org/10.1016/S0167-7187\(99\)00007-7](http://dx.doi.org/10.1016/S0167-7187(99)00007-7)
- Stanikunas, R. (2009). Konkurencijos politika: teorija ir praktika. Vilnius: TEV.
- Ubius, U., & Alas, R. (2012). The Impact of Corporate Social Responsibility on the Innovation Climate. *Inzinerine Ekonomika-Engineering Economics*, 23(3), 310–318. doi: <http://dx.doi.org/10.5755/j01.ee.23.3.193>
- Utton, M. A. (2011). Cartels and Economic Collusion: The Persistence of Corporate Conspiracies. Northampton: Edward Elgar Pub. <http://dx.doi.org/10.4337/9781849807715>
- Veljanovski, C. (2007). Cartel fines in Europe: law practice and deterrence. *World Competition*, 29, 1–30.
- Veljanovski, C. (2011). Deterrence, Recidivism and European Cartel Fines. *Journal of Competition Law and Economics*, 11, 1–22. doi: [org/10.2139/ssrn.1758639](http://dx.doi.org/10.2139/ssrn.1758639).
- Werden, G., & Simon, M. (1987). Why Price Fixers Should Go to Prison. *Antitrust Bulletin*, 32, 917–937.
- Wils, W. P. J. (2006). Optimal Antitrust Fines: Theory and Practice. *Concurrences*, 3, 1–13. Available from internet: www.concurrences.com/spip.php?...pdf%2F08Wils

The article has been reviewed.

Received in August, 2014; accepted in January, 2015.