The Relationship between Cartels and Economic Fluctuations

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Various actions of market players, which violate fair competition, are harmful to the economy. But the most dangerous are cartels. It is recognized that cartels make a great harm to all market players and adversely affect national economy and its competitiveness. The question is whether the companies are more likely to make the cartel agreement in growing economy, or on the contrary – in recession? Various authors' studies present different conclusions: 1) the economic downturn and demand uncertainty promotes the formation of cartels and 2) the economy increases, especially in emerging markets, firms tend to increase profits by making cartels. Probably there is no single answer, what relationship exists between the cartels and economic fluctuations, as it can be affected by various factors. This paper analyzes the situation of cartels in the country of small economy with developing culture of competition and evaluates the relationship between the cartels and the economic fluctuations. 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. The specific of Lithuanian cartels justifies the necessity of evaluation the relationship between the cartels and the economic fluctuations. The lack of information is an obstacle to efficient and successful implementation of strategic decisions directing to the minimization of the number of cartel agreements and their negative impact on the economy. The research has shown that there is a moderate linear correlation between the cartels and the Lithuanian economic fluctuations.

Keywords: *cartels, competition, economic fluctuations, gross domestic product, correlation analysis.*

Introduction

In a market economy, competition is the essential and necessary condition for the functioning of the market. Only the competition shows, which business idea and its implementation is successful, and which is not. According to (Hayek, 2010), competition is as important tool for entrepreneurs to find the new business possibilities. The honest competition is a public value, because it allows reaching the allocative efficiency and increasing public welfare. Competition is one of the main factors of economic policy and the basis for the efficient functioning of the market and essential prerequisite for ensuring the national economic growth. However, not all undertakings act fairly. Often, business participants, in pursuit of their selfish purposes (to get more profit, gain a bigger share of the market, reduce market risk, limit the number of competitors, etc.), by their unfair actions distort the "healthy" competition, thus undermining the welfare of both the consumers and other market participants, and in the end, it has a negative effect on the overall economy. Despite the competition protecting laws, the undertakings often risk to conclude prohibited agreements - cartels, whose primary goal is to obtain maximum profit and eliminate competition between them. It is cartel that is considered the most harmful form of competition restricting actions, regardless of the nature of the agreement. Cartel hazard is evidenced by prosecution of physical and legal persons and the increasing debate on cartel criminalization in the European Union law.

In the recent decade scientists and practitioners have particularly focused on the problems of cartels. Academic and applied papers contain a number of fundamental works analysing the problems of cartels which were mainly carried out by United States of America, Canada and European Union scholars and practitioners. The spectrum of research done by the most prominent authors (Marshall & Marx, 2012; Connor, 2011, 2010; Veljanovski, 2011, 2009; Utton, 2011; Huschelrath, 2009; Bolotova *et al.,* 2007; Connor & Lande, 2007; Levenstein & Suslow, 2006, 2004) is wide covering the economic and managerial aspects of cartel practices as well as the efficiency of enforcement of competition policy against cartels. There is the lack of the analysis of the cartel problematic in Lithuania. Most of the research (Novosad & Moisejevas, 2012; Stanikunas, 2009; Ginevicius & Krivka, 2009; Klimasauskiene, 2006) focuses on the aspects of the legal regulation of competition The lack of economic research of antitrust problems in Lithuania naturally forms the need to perform the antitrust analysis in Lithuania in order to highlight the characteristics of "Lithuanian" cartels and the relationship between the cartels and the economic life cycle. The absence of information about the specifics of the cartels and the relationship between the existence of cartels and the economic fluctuations in Lithuania is one of the main obstacles, reducing the effectiveness and successfulness of implementation of strategic decisions, directed to the reduction of emergence of cartels and theirs negative impact on the whole economy. This justifies the novelty and timeliness of the analysis of problematic and also the actually of practical applicability in Lithuania.

The objective of the article - to highlight the characteristics of cartels in the country of small economy with developing culture of competition and to determine the relationship between the economic fluctuations in the country and cartels emergence, which is important to the formulation and implementation the strategic measures directed to the reduction of the number of cartels and theirs negative impact on the national economy.

Methods of the research: a systematic and comparative analysis of literature and statistical data; statistical analysis; logical analysis; correlation analysis.

The Definition and the Key Indicators of the Cartel

The term "cartel"[1] originated in the 19th century from German kartell, French cartel, Italian cartello, and Latin carta, meaning paper, written notice. Around 1880, this term was used in Germany to denote alliances of firms. Later, cartels referred to associations, unions, groups of companies. At the beginning of the 20th century, cartels came to mean trade agreements. Studies have shown that the term "cartel" was used in various contexts (economic, legal, political), so the definition of cartel should be provided in every research, reflecting the specific view of the author to this economic object.

In the scientific literature, the cartels are defined in many different ways. Some authors (Rothbard, 2009; Stanikunas, 2009; Pepall *et al.,* 2008; Lipchinsky, Wilson & Goddard, 2005; Yu, 2003; Salin, 1996) give abstract definitions of a cartel emphasising only combined activities of firms in an attempt to achieve certain goal, while others (Connor, 2008; Veljanovski, 2006; Samuelson & Marks, 2006, Connor & Bolotova, 2006) provide more detailed and particularised definitions, which identify specific aims and measures and/or forms to achieve them. It has been observed that researchers tend to give definitions related to the outcome of the impact of cartels (for example, overcharge) rather than to emphasise certain cartel behaviour (for example, information on price rise). The authors of the article, summarizing the definitions provided in various scientific and legal sources, provides the following definition of the cartel, which is used throughout the article. Cartel is defined as an agreement or concerted practice between two or more legally independent firms operating on the same market on the fixing of prices (consumer overcharging or reductions in prices for suppliers), the restriction of output or sales quotas, and the allocation of markets in order to generate higher profits, restrict competition and autonomy of decision making. This definition of cartels is in accord with the concept of hard-core cartels.

The mere definition doesn't characterize the specific of the cartel enough. In the scientific literature (Gunster, Carree, & van Dijk, 2011; Connor 2008, Levenstein & Suslow, 2006, 2004; Veljanovski, 2006, Connor & Bolotova 2006, 2005) the cartel is analysed by various individual indicators. Among the most common indicators used by the academic society are:
- Cartel duration (or longevity);
- Overcharges;
- Cartel profitability.

Other indicators used to describe cartels include the size of a cartel expressed by the number of cartel member, participation of cartelists in several cartels, cartel member countries, cartel products, cartel markets, etc. Connor and (Bolotova, 2005) evaluated cartel performance applying a combined effectiveness indicator comprised of longevity, stability and high overcharge indicators.

Theoretical analysis of the scientific literature has shown that the average duration of cartels varies depending on the cartel cases used in analysis from 3,7–7,5, or up to 5 to 6 years, sometimes up to 10 years. Basing of European Commission's documents (Veljanovski, 2011) pointed out that cartels have an average duration of 7,5 years (according to the analysis of data for 1999–2006) or 8,9 years (according to the analysis of data for 2006–2010 conducted in 2011). Having analysed more than 395 cartels in the latter 125 years, (Connor & Bolotova, 2006) concluded that cartels had an average duration of 8,61 years, while (Smuda, 2012), basing on the analysis of 191 cartels in Europe, suggested that they had a duration of 8,35 years.

Empirical studies have revealed different durations of cartel practices. Considering this, it may be concluded that cartel duration should be viewed as a conditional factor, which determination is rather complicated. Due to the secret and illegal nature of cartel agreements, not a single study has been so far conducted or answered the question of an average duration of cartels, which were not detected by competition authorities. In the academic literature, the dates of the formation and termination of cartel practices are frequently considered to coincide with the cartel life-spans defined by official investigations initiated by competition authorities. In addition, research studies containing calculations of average cartel durations often rely upon randomly selected cartel examples or cases, or upon cartels that provide required information. For instance, having analysed 49 European cartels active from 1983 to 2007, (Guenster *et al.,* 2011) concluded that cartels had an average duration of 6 - 7 years, taking the dates indicated in the European Commission's documents as the dates of the formation and termination of cartels.

Bolotova *et al.,* (2007) suggest that the overcharge is a direct measure of cartel success. Empirical studies conducted by or for the (European Commission, 2011) have revealed that in 93 % of all cartel cases considered, cartels do lead to an overcharge with a considerable spread (with some cartels even having an overcharge of more than 50 %). In the majority of cases, overcharges range between 10 % and 40 %. The average overcharge observed in these cartels is around 20 %. This is also confirmed in research studies by (Connor, 2010), suggesting that only 6,8 % of cartels do not elevate prices.

According to surveys (Marshall & Marx, 2012; Boyer & Kotchoni, 2012; Beyer, 2010; Bolotova *et al.,* 2007), the geographical location of cartel operation influences the magnitude of overcharges. Global cartels impose higher overcharges relative to domestic cartels and overcharges

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[1] *The terms "cartels" and "cartel agreements" are used as synonyms.*

are higher when one firm has a considerably higher market share compared to the rest of the firms. International cartels are expected to generate higher overcharges relative to domestic cartels because geographic price overcharge discrimination is possible. Also, international cartels do not have import competition that domestic cartels may face. Also, international cartels are more difficult to convict. (Connor & Lande, 2005) concluded that international cartels raise prices by 25–35 % on average. For example, the MSG and Nucleotide cartel had an overcharge of 12–43 %, Bulk Vitamins - 25–30 % (except for Vitamin C), Microcrystalline Cellulose - 35 %, and Marine Hoses - 30 %. Compared to domestic cartels, overcharges imposed by international cartels are higher by 14,35 % on average. Other authors (Bolotova *et al.,* 2007) note that international cartels increase prices by 4 % more than domestic cartels.

Although it is uniformly agreed in the academic literature that one of the objectives of colluding firms is profit maximization, empirical studies addressing this topic are fewer compared to studies of other indicators characterizing cartels. This can be explained by difficulties in measuring cartel profits. Financial information of cartel firms is confidential and, therefore, quantification of profitability is complicated or impossible at all due to the lack of financial data. Moreover, cartels can and do survive as de facto organizations without having a significant effect on price. Connor (2008) found that pre-tax profits of Archer Daniels Midland Company (ADM), a member of the Lysine Cartel, were between 6,5 and 9,3 % of revenues during the cartel period (from June 30, 1992 to June 30, 1996). However, post-cartel pre-tax profits (from 1996 to 1997) averaged below 5 %. (Beyer, 2010) used a discounted profit as a percent of discounted profit without the cartel to measure cartel effectiveness. The author found that profitability (or effectiveness) of global cartels is higher (in percentage) than cartel's price increase (in percentage). The fact of increased profits of incumbent firms during cartelisation is also confirmed by various economic models. For example, (Marshall & Marx, 2012) have analysed a model of price competition without buyer resistance. Using mathematical calculations, they justified that higher benefits are achieved through coordinated interfirm price practices than through rivalry. This conclusion is also supported by other models: joint profit maximization in industry-wide cartels, joint profit maximization in cartels covering a part of the industry, the Fog's model (negotiations).

Increases in profits or revenues as a result of cartel agreements have been proved by empirical studies conducted by a number of scholars. However, just a few of them measured specific profit margins, focusing instead on the very fact of profit increase. Speaking about the lysine cartel (Connor, 2008) noted that ADM's pre-tax profit rate (in the fourth quarter of 1992) soared to 25 % of ales; in 1994–1995, ADM's profits averaged 33 % of sales, or more than six times its pre-cartel profits before tax. In case of the vitamins cartel, the profit margin grew from two to six times compared to the period when firms were in rivalry. (Madhavan *et al.,* 1994) showed that even a large cartel (the US Associated Milk Producers with 30,000 members) can result in increased profit margins, until an antitrust consent. (Roller & Steen, 2006) analysed legal

cartels in the Norwegian cement industry and found that cartel members were able to raise profits, but overinvestment in capacity and export-directed production eroded those profits. (Combe & Monnier, 2009) conducted a study of 64 cartels active from 1975 to 2009 and found guilty by the European Commission. They concluded that generated profits exceed the fines paid. (Guenster *et al.,* 2011) found that profitability is higher and productivity and R&D investments are lower during the cartel period than in the absence of the cartel. Beyer (2010) argued that global cartels have higher profit rates than national cartels. In addition, the longer cartel exists, the more profitable it is for cartel firms.

The analysis of key indicators of cartel performance gives grounds to sum up that in spite of abundant analyses of individual cartel cases, comparisons and generalisations of several cartels or cross-sectional studies providing considerable data on a large number of cartels seen in the academic literature, it is nonetheless very difficult to make generalisations about cartels. Mean cartel indicators and trends characterising cartel performance identified in the academic literature are aligned, in time, with relevant market changes. Therefore, each cartel should be regarded as a unique case with its specific indicators and analysed as an individual entity with effects on country's economy.

Cartels and the Economic Fluctuations

The question often arises: whether the companies are more likely to make the cartel agreement in growing economy, or on the contrary – in recession? There is no unanimous answer in neither academic nor practitioners research, as each case depends on various factors, for example the specifics of the country, it's economic situation, the intensity of the competition policy implementation, etc. On the one hand, under the conditions of growing economy, the business people can take the advantage of the fact that all market participants are optimistic and conclude prohibited agreements, hoping that the cartels (especially the price once) will be less noticeable. On the other hand, under the conditions of the economic downturn, the business people seek to avoid the competition in order to survive in the market. There is no unanimous answer in neither academic nor practitioners research, despite the fact that economists, lawyers and politicians for many years are trying to understand the reasons of the emergence of the cartels, identify the factors of theirs success and failure. Despite the fact that the success of each cartel's operation in the market depends upon the totality of various factors, existing on different levels and in different areas - from exogenous political-legal or macroeconomic level to endogenous organisational level or corporate management culture - it is important to determine the relationship between economic fluctuations and the number of cartels. Only the information about this relationship provides the information about the economic conditions under which the possibilities of cartel emergence are higher. And this information is a necessary condition for the government and competition authorities to take well-timed strategic decisions that reduce the emergence of cartels in the economy. The actuality of the analyzed problem is also justified by the latest scientific

research (Gutmann &Voigt, 2014; Buccirossi *et al.,* 2013; Peterson, 2013; Clougherty, 2010), showing that the effective mechanism of the competition law enforcement and supervisory has a positive impact on the country's economic growth; this is particularly important for Lithuania, recovering from the economic downturn.

The scientists (Connor, 2011; Levenstein & Suslow, 2006; Zimmerman & Connor, 2005; Marquez, 1994) found that there is the relationship between the cartel longevity and the structure of the market, the cartel's organizational structure, the specifics of the industry, macro-economic conditions and the antitrust laws. The potential impact of the macroeconomic factors on the duration of the cartel (stability) is presented in Table 1.

Table 1

Relationship between the cartel duration and macroeconomics conditions

Factor	Indicator	Effect	Description
Macroeconomic conditions	Business cyclical fluctuations index	Positive/ Negative	Stable or reducing demand promotes formation of cartels and contributes to cartel duration. However, extra quantities sold encourage cartel members to cheat.
	Economic downturns and demand uncertainties	Positive/ Negative	Economic downturn and demand uncertainty promote formation of cartels and contribute to cartel duration. However, extra quantities sold encourage cartel members to cheat. Demand uncertainty is subversive to cartels due to market uncertainty.
	Demand growth	Negative	(Marquez, 1994) points that an increase in demand growth has a negative effect on duration, but not a significant one.
	New entry or competition from substitutes	Negative	The greater is the probability of competitors or product substitutes, the grater is the probability for cartel to collapse.
	Technological change	Negative/ Positive	Studies have shown that technological progress has an ambivalent effect on cartel duration.

Made by the authors on the basis of Connor 2011; Levenstein & Suslow, 2006, 2004; Zimmerman & Connor, 2005; Marquez 1994.

It should be noted that there is a relationship between the size of the cartel overcharge and the general economic situation. (Connor, 2008; Bolotova & Connor, 2008; Connor & Lande, 2007) have concluded that buyers in low-income countries are usually applied higher overcharges than those in countries with higher income. For example, global cartels set lower overcharge for Asian countries, as compared to the global average, but higher than for North America and EU countries. A meta-analysis conducted by (Boyer & Kotchoni, 2011) has revealed that overcharges differ in the United States of America and in the European Union. London Economics (2011) pointed to correlation among overcharge, good economic times and probability of breaking a cartel agreement. In good times, cartels should set lower prices than in economic downturns due to a higher probability of violating a cartel agreement in good economic times.

The research has shown that the relationship between the cartel profitability and economic fluctuations is examined the most rare among the scientist. This can be explained by difficulties in measuring cartel profits. Financial information of cartel firms is confidential and, therefore, quantification of profitability is complicated or impossible at all due to the lack of financial data. In addition, profitability statements or financial data for the targeted product are seldom available, particularly for many years in the past. In case of differentiate activities or production, not all products or services fall within cartel's domain. Hence, total corporate profit is not a proper indicator to judge on profit maximization as a result of cartel agreement. Moreover, cartels can and do survive as *de facto* organizations without having a significant effect on price. According to the fact, that the cartel's profitability is closely linked to the cartel overcharge, it can be concluded that the country's economic situation also make the impact on the overcharge. Thus, studies have confirmed that the main indicators of cartels activity are affected both by microeconomic and macroeconomic factors.

The research done by the scientists (Utton, 2011; London Economics, 2011; Huschelrath, 2009; Connor, 2008; Pepall *et al.,* 2008; Rey, 2006; Klimasauskiene, 2006; Lipczynski *et al.,* 2006; Veljanovski, 2006; Bouwens & Dankers, 2005; Levensteinn & Suslow, 2002) identified the main factors indicating higher risks of market exposure to cartelisation as compared to other markets. Such factors as the size of the market, the fluctuations of economic, and changes in demand also justify the claim that there is a relationship between the formation of cartels, their stability and the country's economic situation.

So, in order to determine the relationship between the existence of cartels and economic fluctuations in Lithuanian, first it is important to identify the peculiarities of Lithuanian cartels.

The Peculiarities of Lithuanian Cartels

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. In 1999 the Competition Council of the Republic of Lithuania became active also. In the period of 2000–2012, the Competition Council detected 31 prohibited collusive agreements among undertakings (see Figure 1). There were not detected cartels in 2013.
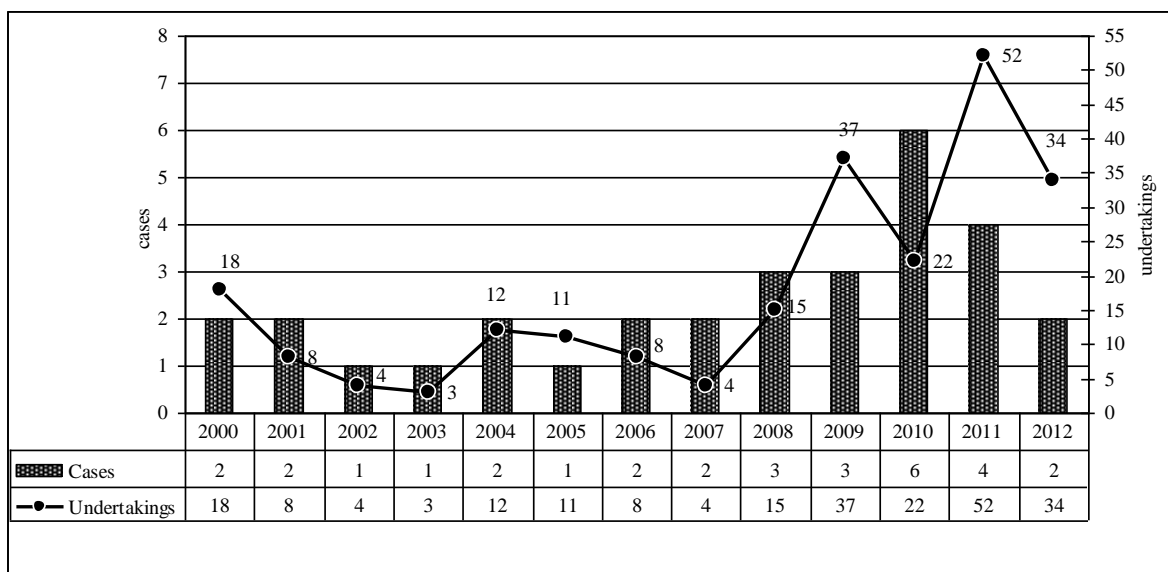
Figure 1. Number of cartel agreements in Lithuania
(Made by the authors on the basis of annual reports of the Competition Council of the Republic of Lithuania)

The statistical analysis of the data confirmed that the cartels were established each year in Lithuania. The 2010 year was a record year - during this period the investigations completed and fines were imposed on 6 cartels.

One third of the detected prohibited agreements being related to the participation in public tenders. This proves the existence of favourable conditions in this area in Lithuania for tenderers to enter into agreements and distort, through unfair behaviour, the very essence and transparency of tenders.

The number of undertakings engaged in cartel practices has been fluctuating year to year in Lithuania showing, however, an upwards trend. This evidences that an increasing number of undertakings (especially in the downturn period from 2008) have been seeking to restrict competition between themselves and gain profits from illegal agreements. During the analysis period, 228 undertakings, including 6 associations, were detected to have been participating in prohibited agreements and punished. The highest number of undertakings participating in prohibited agreements (52 undertakings) was recorded in 2011. In 2009, this number was 37 and in 2012–34. One cartel had 7 undertakings on average (an average of three undertakings participated in agreements on public procurement organisation and ten undertakings/associations had collusive agreements unrelated to public procurement).

The empirical research in Lithuania confirmed, that the membership in associations or in other organisations representing professional interests often, by itself, facilitates undertakings to form cartels. And this is common both in the European Union and in Lithuania[2].

However, undertakings sometimes take autonomous decisions that are in breach of the principles of free competition[3]. In some cases, associations not only create conditions for their members to exchange sensitive information, but also, in concert with their members, take certain decisions restricting competition. In the period at issue, 6 associations were fined for the participation in prohibited agreements in Lithuania: the Lithuanian Chamber of Auditors (in 2007), the Lithuanian Association of Communication Agencies KOMMA (in 2009), the Association of Packaging and Electronic Waster Processors (in 2009), the Lithuanian Cynological Society (in 2010), the Association of Orthopaedic and Rehabilitation Service Providers (in 2011), and the Lithuanian Shipbrokers and Agents Association (in 2011).

The analysis of cartels detected in the period from 2000 to 2012 served as a basis for identifying the main features of "Lithuanian" cartels covering market segments, the number of cartelists, cartel duration and the subject of cartel agreements (see Table 2).

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[2] *For example, major Lithuanian milk processing companies and manufacturers of dairy products AB Kelmės pieninė, UAB Marijampolės pieno konservai, AB Pieno žvaigždės, AB Rokiškio sūris, and AB Vilkyškių pieninė used to exchange information every month via the Lithuanian Dairy Association Pieno centras,*

and, as a result, where in the position of identifying sale or output volumes and market share of each specific undertaking, as well as monitoring the dynamics of these indicators.

[3] *For example, in 2010 the Lithuanian Cynological Society (LCS) established the prohibition in respect of its members to sell puppies with pedigree documents issued by the LCS to natural or legal persons with the view to reselling the puppies. Such actions of the LCS restricted competition between dog breeders in selling puppies. Another example detected in 2007 involved infringement of the Law on Competition by the Lithuanian Chamber of Auditors by establishing the minimum audit rates, minimum labour costs and the minimum hourly rates in respect of the EU structural support funds. Announcement of such information created preconditions for restricting competition in the provision of audit services for the EU structural support funds in Lithuania.*

Table 2

Basic features of cartels in Lithuania

	Market	Cases	Members	Duration	Purpose		Subject of agreement			
					B to B	B to C	Price	Market	Information	Other
Cartel agreements										
1	Fuel market*	1	2	<1		+	√			
2	Fuel market**	1	6	1	+			√		
3	Photo services market	1	16	< 1		+	√			
4	Non-life insurance market***	1	4	< 1	+	+	√			√
5	Non-life insurance market****	1	2	6	+		√			√
6	Driver training services	1	10	1		+	√			
7	Taxi services	1	11	< 1		+	√			
8	Paper market	1	5	6	+			√	√	
9	Audit services market (association)	1	1	4	+		√			
10	Milk purchasing and processing market	1	7	7	+				√	
11	Advertising and media planning services	1	26	8	+		√			
12	Event organisation services	1	5	2	+		√			
13	Waste handling, utilisation and processing	1	6	2	+		√			
14	Production and trading in audiovisual articles	1	10	2	+		√			
15	Prohibition by the Lithuanian Cynological Society (association)	1	1	3	+					√
16	Sale of decoupage, needlework and other related goods	1	4	3		+	√			
17	Production of orthopaedic articles	1	12	5	+	+	√	√		
18	Ship agency and other shipping services	1	33	13			√			
19	Online travel sales services	1	30	< 1		+	√			
20	Cash collection and handling services	1	4	4.5	+			√		
	Total:	**20**	**195**							
	Mean:		**9.8**	**4.5**						
Agreements in the field of public procurement										
21	Agreements related to public procurement	11	33	< 1	+		√		√	

* Agreement between two undertakings on fuel price fixing in the local market (in the town of Akmene).
** Vertical agreement on the restriction of fuel imports to Lithuania entered between the manufacturer AB Mažeikių nafta and five top distributors of petroleum products.
*** Agreement among four top insurance companies concerning prices for car theft insurance and other conditions of insurance.
**** Agreement between two insurance companies on compulsory third party liability insurance in the construction market.

In Lithuania, the cartels are usually formed in the "business to business" market and cover the service sector. The subject matter of the agreements is usually associated with price, market sharing and/or entry restrictions. Cartels oriented towards end-users were aimed at price fixing and appeared to have been dominant in the service market.

Although information on cartel duration is insufficient in Lithuania, the analysis of the annual reports of the Competition Council of the Republic of Lithuania conducted by the authors of the article gives grounds to conclude that Lithuanian cartels (not related to public procurement) have an average duration of 4,5 years (the shortest-lived lasted less than a year, and the longest-lived subsisted for 13 years). Cartels have 10 members on average.

The statistical analysis of cartels active in the period from 2000 to 2012 has revealed the following basic characteristics of cartels in Lithuania:

- Most cartel agreements are "naïve" due to two reasons: 1) they have short-term goals, are "visible" and thus soon discovered; 2) by exchanging certain information businesses are sometimes not even aware that they violate provisions of competition law.

- Lithuanian cartels are usually formed by small or, rarer, medium-sized business. Therefore, most of detected cartels are small in terms of annual sales. Yet, participation of larger (in terms of sale) undertakings in cartels has been also observed.

- The average cartel duration of 4,5 years in Lithuania is shorter than theoretical cartel duration (6 years) or average cartel duration calculated by different theorists (5–

7 years). This indicator, however, should be judged upon with reservation due to the lack of information.

- An average cartel has about 10 members in Lithuania.

- Most cartels are formed by undertakings entering into a prohibited agreement for the first time.

- In Lithuania, most cartels have effects on the national or local markets.

- Rather many agreements are consciously or unconsciously formed via business associations. This proves that associations not only create conditions for cartels to occur, but also attract quite many undertakings and cover almost the whole market.

- The spectre of markets with identified cartels is quite broad, but the biggest number of cartels detected to date is in the service market.

- "Business to business" cartels are dominant in the market. The main subject matter of such cartel agreements is price, market sharing or entry restrictions.

- As a rule, "business to end-users" cartels are price cartels. Some of them are active in narrowly defined geographical markets (e.g., agreements between fuel traders in Akmene, taxi service providers in Vilnius, driver training service providers in Klaipeda).

- The lack of competence and culture of competition law seen not only in Lithuanian undertakings but also in national authorities may create conditions for cartels to occur or to fail to prevent cartel practices.

The above-analysed features of Lithuanian cartels are based on purely official information. It is impossible to pinpoint the number and types of cartels active in Lithuania *de facto*. Yet, there are no doubts that only a small portion of cartels are discovered, whereas large cartels with huge effects (harm) on the national economy still remain undiscovered. Although attempts to structure and analyse Lithuanian cartels are only at their initial stage, cartel-related problems are believed to attract greater attention of Lithuanian researchers and scholars in the near future. Joint attention and efforts of researchers, economists, lawyers and competition authorities in the creation and implementation of methodological basic principles of competition economics and policy in Lithuania will undoubtedly contribute to development of the competition culture and higher cartel detection rates.

The Methodology of Empirical Research of Relationship between Cartels and the Economic Fluctuations in Lithuania

As the Lithuanian cartels dominate in the domestic market, it will be analysed, whether the viability of Lithuanian economy has the impact on the emergence of the cartels in the market. The correlation analysis will be used. Due to the lack of the data and the complexity of theirs receipt, the correlation analysis will be based on these indicators: number of cartels and gross domestic product. The main source of the GDP used in the calculation appears to be the Department of Statistics of the Government of the Republic of Lithuania. The main source of the cartels number used in the calculation appears to be the Competition Council of the Republic of Lithuania.

Information about the detected cartels is publicly announced only after the investigation is completed and the fact on breaching competition is established. As the Lithuanian cases proves, it can take 2–3 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. Given the specificity of the data retrieval, in this empirical study, the number of cartels existing each year is specified by the year of starting their activities. Such availability of information has determined the period of time of this empirical study, i.e. 1998 - 2010 (The first cartel started its operational activity in 1998, and the last year of the most recently detected cartel is 2010).

As the variables used in the study are of interval nature, therefore, before starting the correlation analysis, it has been examined, whether the investigated variables are distributed by normal distribution. For this purpose the Jarque - Bera (*JB*) criterion is used. Based on this criterion, the following hypotheses are formulated:

H_0: Values of the variable are distributed by normal distribution (zero hypothesis);

H_1: Values of the variable are not distributed by normal distribution (alternative hypothesis).

The zero hypothesis (H_0) is verified under the following valid condition:

$$JB < \chi^2_{(\alpha=0.05)} \qquad (1)$$

Where: JB - the statistical (estimated) value of Jarque-Bera criterion; $\chi2$ - the theoretical value of normal distribution; α - the relative error of statistical reliability.

For assessing normal distribution of the data on the number of cartels, the Jarque - Bera criterion value is estimated ($JB = 1{,}203$), and of the selected significance level - the theoretical value of normal distribution ($\chi2_{(\alpha=0.05)} = 5{,}991$). This verifies the H_0 hypothesis, i.e. the data on the number of cartels are distributed by normal distribution.

For verification of normal distribution of data on the gross domestic product, the Jarque - Bera criterion is calculated ($JB = 1.031$), and of the selected significance level - the theoretical value of normal distribution ($\chi^2_{(\alpha=0.05)} = 5{,}991$). This verifies the H_0 hypothesis that the GDP data are distributed by normal distribution.

As the data of both variables, at the existing 95 % statistical reliability, are distributed by normal distribution, for determining the strength of relationship between the selected variables, the correlation analysis can be applied. For this purpose, the following hypotheses are formulated:

H_0 - there is an existing interdependence between the number of cartels and GDP (zero hypothesis);

H_1 - there is no interdependence between the number of cartels and GDP (alternative hypothesis).

The Result of Empirical Research of Relationship between Cartels and the Economic Fluctuations in Lithuania

In order to verify the significance of the correlation coefficient, the Student criterion will be used, at the reliable error not exceeding 0,05.

The trends of changes in Lithuanian cartels (by their operational start-up) and GDP are illustrated in Figure 2.
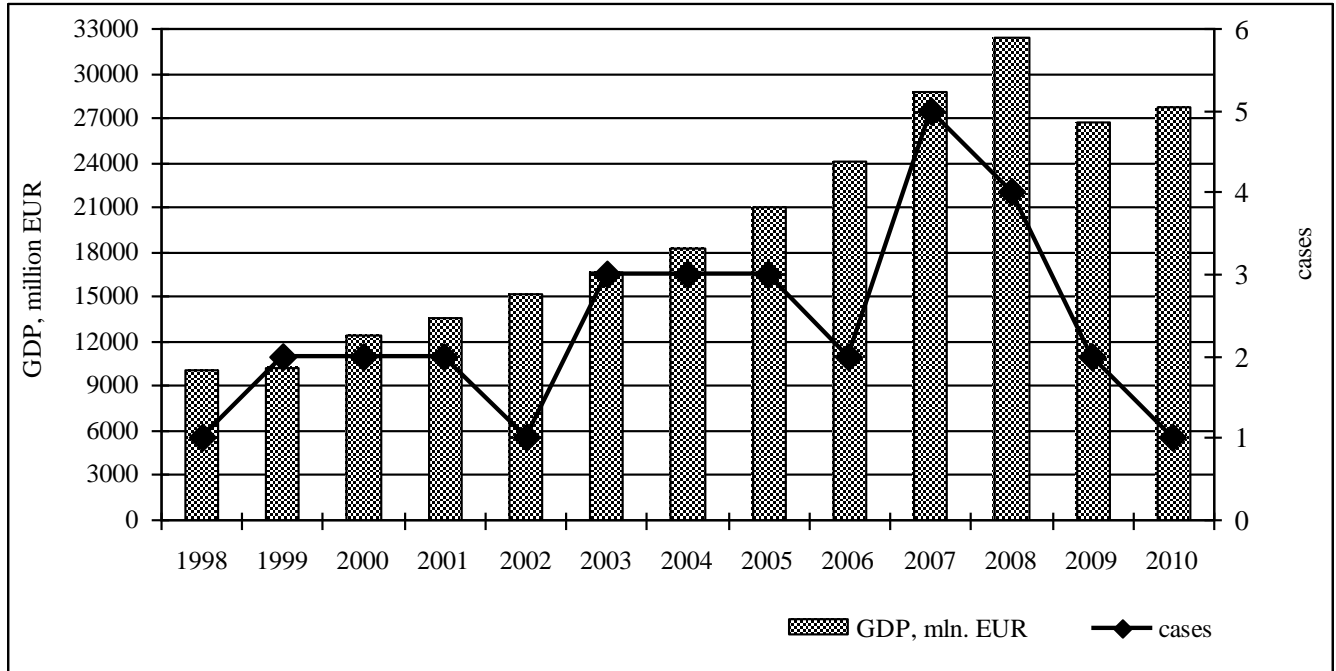

Figure 2. The dynamics of GDP and number of cartels in the period of 1998–2010.

Statistics data reveal the increase in both GDP and the number of cartels. Before 2008, GDP was growing quite rapidly, and the biggest growth of 19,2 % was observed in 2007. The emerging global financial crisis has slowed down the economic growth in Lithuania in 2008, and in 2009, the decrease of 12 % in GDP was recorded. In assessing the number of cartels, it should be noted that it is characterized by fluctuations; however, we can also observe the increase tendencies. The average of cartels concluded each year equaled to more than 2 cases, the largest number of cartels concluded was reached in 2007, i.e. during the economic boom.

In order to establish a more accurate relationship between cartels and GDP, the correlation analysis was conducted, and the results are presented in Table 3.

Table 3

The results of interaction between the number of cartels and GDP indicators

Indicators	Value
Correlation coefficient (r)	0,511
Actual Student criterion ($t_{stat.}$)	9,453
Critical Student criterion ($t_{kr.}$)	1,782
Actual error (p)	0

The selected level of statistical reliability is 95 % (the probability of error p = 0,05). A direct relationship of a moderate strength is identified between the number of cartels and GDP (the correlation coefficient r = 0,511). The estimated correlation coefficient is significant, since the Student coefficient value (t_{Stat} = 9,4533) is bigger than the critical value (t_{kr} = 1,7823). As the estimated margin of error is equal to zero, it can be said that the calculation of the correlation coefficient is not random, and this verifies the zero H_0 hypothesis, proving the existing interdependence between the number of cartels and GDP. Therefore, the findings of this study suggest that the Lithuanian economic undertakings are more likely to conclude prohibited agreements during the economic growth rather than when the economy shrinks. Given the fact that further Lithuanian economic growth is forecasted, it is possible to conclude that the occurrence of cartel agreements in the national economy will intensify. Therefore, currently the Government of the Republic of Lithuania and the competition supervising authority are offered the most favorable time for making and implementing strategic measures directed towards protection of competition within the market, as the efforts would be timely and act as a preventive measure enabling to achieve the maximum efficiency.

Conclusions

1. The research done justified the actuality, necessity and timeliness of examination the cartels problematic in countries of small economy with developing culture of competition.

2. The theoretical analysis justified the tight relationship between the economic situation in the country and the cartel operation (duration, overcharges, and profitability).

3. The overview of Lithuanian cartels in the static aspect has shown that by the subject-matter of agreements (mainly price, market sharing and entry restrictions) and the number of members, cartels of small economy with developing culture of competition are similar to cartels of large economy with developed culture of competition. The main differences between Lithuanian cartels and theoretical as well as foreign cartels are the following:

- Lithuanian cartels are "young": an average duration is 4,5 years. The average duration of Lithuanian cartels is shorter than theoretical cartel duration (6 years) or the average determined by the EC (10–11 years);

- Most cartels in Lithuania are formed in the "business to business" market and cover the sphere of services;

- Most cartels are formed by undertakings entering into a prohibited agreement for the first time;

- The geography of cartel operation does not transcend the national market and often is limited to the domestic market.

4. The empirical research done in the article is an attempt under the conditions of limited information to determine the relationship between cartels emergence and economic fluctuations in countries of small economy with developing culture of competition. The correlation analysis between the number of cartels and Lithuania's gross domestic product showed that Lithuanian undertakings are more likely to conclude prohibited agreements under the conditions of growing economy. The favorable economic situation in Lithuania more often than the opposite situation establish the conditions to business people for reaching theirs goals (higher profits, restrict access to the market, etc.) by implementation the uncompetitive practices.

5. The recovery of small economy determines higher probability that the number of emergence cartels will increase in the markets. The given time is the best time for the Government of country of small economy with developing culture of competition. and the competition authority to implement various strategic measures directed to the protection of competition in the market. The implementation of the measures under the recovery phase of small economy is well-timed and let achieving maximum effect and will work as preventive measure.

6. The strategic directions and measures, directed to the reduction of cartels emergence in the market are formulated as the outcome of the theoretical and empirical research:

- Improve cartel detection rates: 1. To introduce a system of rewards to individuals for the provision of information about the cartels. 2. Regularly perform economic markets and post-cartel markets surveys. 3. To publish on the websites of the competition authorities of the EU, or at least of Lithuania, Latvia and Estonia, a uniform standard of the supply of information on cartel agreements in both the national and the English language.

- Apply deterrent sanctions on cartels in practice; 1. To discuss the possibility of increasing the rate of fines to 15–20 %. 2. To consider the application of the pattern for imposing fines on associations established in Articles 23(2) to (4) of Council Regulation (EC) No 1/2003. 3. To impose sanctions on public authorities and their managers and officials who contributed to the formation of prohibited agreements between undertakings. 4. 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. 5. To publish a list of cartel members in the Competition Council's website, under the heading Hall of Shame.

- Enhance the efficiency of the cartel informant leniency programme: 1. To disseminate widely the information on the leniency programme and the benefits it brings to undertakings.

- Raise the level of competition culture: 1. To develop a plan for improving the level of competition culture to include areas of development, measures, outcomes, authorities in charge of implementation of the plan, and funds for efficient dissemination of competition culture. 2. To consider the possibility of including a chapter on competition in the economics curriculum of general education schools. 3. To add competition law and culture themes to a training course for students (Bachelor and Master degree students) or invite Competition Council representatives to give practical lessons. 4. To supplement the civil servant qualifications advancement programme with a training course on the essential requirements of competition law and on how to recognise a cartel in public tendering procedures. 5. To encourage undertakings to actively implement the competition law compliance programme in undertakings.

- Strengthen private enforcement of competition law with regard to cartels: 1. To regulate in legislation a collective redress mechanism. 2. To take measures laid down in the Proposal for a directive of the European Parliament and of the Council on certain rules governing actions for damages under national law for infringements of the competition law provisions of the Member States and of the European Union.

The practical implementation of these measures would reduce the negative impact of the cartel on the economy through.

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