

SOME ISSUES CONCERNING SECTOR CONCENTRATION. EVIDENCE FROM ROMANIA

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Abstract. This paper examines the dynamics of sector concentration in Romania starting from two basic questions: how concentrated the economic activities are and what factors determine the economic concentration. The lack of availability of concentration ratio series for Romanian economy has limited the research in this field. The paper reports the concentration ratios dynamics in Romania during the period 1996–2004, looking at the differences between industries and offers some possible explanations. We use the simple concentration ratio (CR) for the largest 5 and 20 companies to measure concentration in 25 industries according to the sales figure and the number of employees. Our study has been limited to the processing industry, because the mining industry continues to have a very high level of concentration, without any significant changes in the analysed period; commerce, services and constructions are sectors with low entrance barriers and a strong geographic concentration character, thus their analysis can become irrelevant for the national level. Based on the average values of the concentration coefficients that it was determined for the period 1996–2004 we proposed the map of Romanian industry concentration, as a graphical tool for a synthetic view of the general concentration level in a national economy.

Keywords: concentration, concentration ratio, regional, sector, industry, Romania.

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1. Introduction

The structural reforms of East-European economies during the last 20 years had a consistent impact on the level of concentration in most industries, due to the privatization processes, foreign direct investments or new firms creation. The degree of concentration is a key factor in appreciating the business environment locally, nationally and globally. Many theoretical and empirical studies proved in the last 50 years that micro and macroeconomic competitiveness is strongly related to the competition and market structure.

Trying to become more efficient and more competitive, Romania made important reforms during the 1990s and the changes in business environment affected the concentration dynamics in all industries. This paper is focused primarily on a descriptive and dynamic analysis of concentration ratios in Romania from year to year. There are two commonly used measures of concentration: concentration ratio (CR) and Herfindahl-Hirschman Index. Although many studies show some advantages of using HHI to examine the trends in market structure and cross-industry analysis, we finally choose to use CR for some reasons: concentration ratio series are available for Romania beginning with 1996, while HHI data are not available; we also considered CR a more relevant tool for macroeconomic trends and policies. The survey shows a significant reduction of CR₅ across a wide range of industries (19 from 25) and rising trends in concentration for 6 industries, and also a rising trend in productivity of the first 20 firms comparing to the average productivity in the industry (in 1996 for 15 industries from 25 the percent of industry employees is higher comparing to the percent of sales of the industry, but in 2004 we have only 6 industries from 25 in this situation).

2. Market concentration and industry structure: from microeconomic causes to macroeconomic effects

Analysing concentration in different industries or sectors is important from two points of view: (1) at microeconomic level, the performance of the firm is influenced by the characteristics of the industry, by competition and specific market structure; (2) at macroeconomic level, a competitive national economy is based on the competitiveness of the industries, which is related to the competition and concentration of every sector.

The importance of industry structure on microeconomic performance is based on structure – conduct – performance paradigm which began with Mason (1939) and Bain (1956). This paradigm rested on two ideas (Sutton 2007): (1) the existence of one-way chain of causation that ran from structure (concentration) to conduct (the pricing behaviour of firms) to performance (profitability) – high concentration facilitate collusion and lead to high profits; (2) high level of concentration could be traced to the presence of certain barriers to entry. SCP paradigm explains concentration by entry barriers and measures of product differentiation and, more recently (Ilmakunnas 2008) in the open economy context concentration ratios were explained also by export and import intensities and foreign direct investments. Recent researches (Tushaj 2010; Yeyati, Micco 2007), focused on banking sectors have proved concentration level to be major determinant of banking system efficiency and showed the contribution of foreign capital penetration on concentration changes of these markets. The original SCP literature sought to establish a systematic relationship between price and concentration. A modern approach to SCP by Sutton (Perloff, Karp, Golan 2007) uses a game theoretic approach to examine what happens to competition and concentration when market size grows.

As a general tendency, concentration tends to increase in all countries and all sectors. The data for 1992–1997 show a considerable increase in concentration ratios in manufacturing and retail trade sector in USA, and the merger boom during the 1990s is the

leading factor (Pryor 2002). Studies on health care industries (Boutsoli 2007), brewing industry (Tremblay *et al.* 2005), innovative activities (Fornahl, Brenner 2009) and manufacturing industry (Fedderke, Szalontay 2009) show rising trends in concentration. Industries matter in many ways (Sako 2008): industries matter as a methodological approach that favours a contextually rich description as a starting point; industries matter because they provide an institutional context that helps interpret how various practices fit together in a specific industry with implications for performance; industries matter because there are a number of different ways in which an industry may be conceptualized and these differences affect our interpretations of industry effects. Inter – industries differences in concentration could have various sets of explanations, from barriers to entry to market contestability (Kessides, Tang 2010) or consumer’s rationality (Yanagita, Onozaki 2010).

Another important direction in studying concentration is geographic concentration and spatial aspects. Catin, Luo and Van Huffel (2005) examine the regional differences and the polarization/dispersion enforces in the case of the developing countries on three levels: stage 1 – pre-industrial, where the income per capita is reduced and there is a weak urban concentration; stage 2 – where the industrialization process forced the urban concentration and the polarization of the activity; stage 3 – where together with the high technology industry’s concentration and the reduction of the industries intensive in labour, the extent of the regional inequalities and the concentration of the activity in urban areas decrease when GDP per capita closes to the level of 5000 USD. International opening accents the economic concentration in certain geographical areas. Empirical studies (Williamson 1965; Wheaton, Shishido 1981; Hansen 1990; Mac Kellar, Vining 1995; Henderson 2000, 2002; Henderson *et al.* 2001; Lafourcade, Mion 2007) analyse the level of urban concentration during the developing process and suggest that in spite of the level of the GDP per capita of 5000 USD, urban concentration tends to reduce.

Different models highlight the major forces of polarization and regional urban dispersion of the activities in three stages of development, from many points of view: the centre outskirts (Krugman 1991), which take into consideration the congestion and the dynamism of the external growth and examines different stages of development; the multi regional model of the industrial congestions (Fujita, Thisse 2001, 2002); the urban economic geographical model applied to developing countries (Krugman, Elizondo 1996); a historical typology (Duranton 1997, 1999).

At macroeconomic level, causes, effects and trends are the main directions of concentration studies. Mitton (2008) shows that concentration in countries with higher entry costs for new firms, with weaker antitrust policy, with less financial development is higher. Weak institutions are associated with higher concentration in industries that do not have naturally high level of concentration. From this point of view, higher concentration means less competition, means weak overall performance of the economy. Countries with high levels of concentration may suffer from economic distortions that limit growth; higher levels of economic concentration could lead to greater economic volatility; the concentration of economic activity in a country could lead to potential political distortions. Looking at the effects of concentration, recent empirical studies

have pointed to a negative correlation between concentration ratios and employment (Fedderke, Szalontay 2009). The correlation-regression analysis has revealed a strong relationship between the industrial activities' concentration and the financial activities, overall profitability and sales income (Ginevičius *et al.* 2010).

The lack of competition and the high degree of concentration are the reasons for bad economic performance of many East-European countries in the early 90's. The interest for market concentration dynamics in East European countries is justified by the numerous changes in the market structure in all sectors. In their research on business concentration in the main sectors of Lithuanian economy, Ginevičius and Krivka (2009) identify oligopolistic industries and evaluate their weight in the economy. Privatisations, market liberalisation, foreign direct investments, creation of new firms are the sources of great transformation in all East-European countries, including Romania. Using Lerner index as a measure for market power, Asaftei and Parmenter (2010) investigate the pro-competitive effects of trade integration and ownership changes; they argue that increases in markups are due to privatization in sectors where product market concentration is high and due to import penetration where product market concentration is low; the progressive removal of tariff barriers required by the FTA, combined with increasing FDI inflows led to the erosion of market power of domestic companies.

3. Methods of measuring the sector concentration

The concentration of an industry or a sector is mostly measured through two methods: concentration ratio (CR) and Herfindahl-Hirschman index (HHI).

Concentration ratio (CR) represents the market share which is held by the biggest “*n*” companies from a sector of activity. The concentration ratio for the biggest “*n*” companies from all sectors of activity is calculated by simply summing up the market shares, using the formula (1):

$$CR_n = S_1 + S_2 + \dots + S_n, \quad (1)$$

where: S_i is the market share of company $i = 1 \dots n$.

The market share of a company is determined as a percentage ratio between the company's sales figure and the total sales figure in that sector. In the USA it has been determined since 1997 the concentration ratios for the first 4, 8, 20 and 50 companies respectively CR_4 , CR_8 , CR_{20} and CR_{50} .

Starting with 1997 the concept of concentration appears in the official statistics of Romania, in the chapter “Result and performances of the companies” of the Statistical Yearbook. The concentration in the sector of activity is analysed starting from the percentage of the first 5 respectively 20 national level companies listed according to the sales figure and the number of employees.

Generally, if CR_4 or CR_5 have values under 40 (which means that the percentage of the first 4 respectively the 5 companies from the sector have less than 40% from the total sales figure or from the total number of employees), the sector is considered to be highly competitive, because there is a high enough number of companies which com-

pete, without any of them to hold an important share on the market. On the opposite end if CR_1 is over 90, that market is a monopoly one.

The main problem related to the concentration ratio is that it shows the degree in which a company dominates the market. By definition it doesn't take into consideration the market share of every company from that industry. Furthermore, it does not give any information related to the distribution of the companies in the sector: if there are any changes of the ratio changes between the companies taken into consideration in order to determine the concentration ratio (the first 4 or 5) the value of the coefficient of concentration will remain constant.

Herfindahl-Hirschman index (HHI) was developed by the economists Hirschman (1945) and Herfindahl (1950).

The index is calculated by summing up the squares of the individual market shares of all the companies in the sector of activity, using the formula (2):

$$HHI = S_1^2 + S_2^2 + \dots + S_n^2, \quad (2)$$

where S_i is the market share of company $i = 1 \dots n$.

When HHI is under 1000 we can say that the market has a decreased degree of concentration; if HHI has values between 1000 and 1800 the degree of concentration is moderate, and the values over 1800 show a market with a high level of concentration.

In the USA this index is used in decisions concerning competitive policies and related to mergers and acquisitions: when HHI is under 1000, this type of operations are allowed because it is considered there is no risk for anticompetitive practices; if HHI is between 1000 and 1800, the USA Justice Department will carefully evaluate the impact of a merger or acquisition compared to the effect that the operation has over the value of this index; when the value is over 1800, the antitrust laws will be applied because it is considered that free competition is in danger. If such operation generates growth with more than 100–200 points of HHI the market analysis will be extremely rigorous and circumspect.

Hall and Tideman (1967) discuss measures of industry concentration – concentration ratio, Herfindahl-Hirschman index – both analytically and empirically. The analytical analysis consists of developing a set of properties which they argue all measures of concentration should possess. Although the concentration ratio is shown to be deficient on analytical grounds it appears to yield estimates of concentration not too different from the HHI index.

The main two *advantages* of the HHI index comparing to the concentration ratio are:

- HHI reflects both the distribution of the market shares for the first companies and the market composition for all companies;
- HHI gives more importance to the market share of the biggest companies and thus it acknowledges the relative importance of the large companies in competitive interactions.

In the international literature of concentration measures, most of the *critiques* regarding the HHI index are empirically grounded. Borenstein *et al.* (1999) have shown that at least in the case of electricity markets the HHI is a poor measure of competitiveness. Gi-

roud and Mueller (2010) consider that the HHI is an imperfect measure of competition, arguing with the classic example of the cement company, more generally this concern applying whenever markets are regionally segmented. Other authors (Lioukonyte 2007) have questioned the use of this index even for analyzing mergers. For empirically test the extent to which the effectiveness of the market for corporate control is dependent upon the size of the firm, Offenber (2009) calculated HHI for each calendar year within each of the 48 industries, using the universe of firms with sales and industry data available on Compustat. But calculating the HHI in this manner does not give an exact measure of the concentration of market power in each industry, because private and foreign firms are not included in Compustat. Ginevičius and Čirba (2009) show that all currently used measures, including the most widely used Herfindahl-Hirschman index, have some limitations and, therefore, cannot adequately describe the market state. They consider that additive measures, evaluating the whole concentration curve, assess market concentration most effectively.

Because concentration ratios possess a shortcoming because they do not identify the distribution of industry output among the largest firms, most economists prefer to use HHI when the necessary data are available to measure the degree of industry concentration. The disadvantage of HHI is that market share data are needed for all of the firms in the industry with shares of more than 1% while CR₄ requires only market share data for the largest four companies (Santerre, Neun 2010).

The methods of measuring the sector concentration come to complete the classical economic theory contributing to determination of competition type. Figure 1 shows the general relationship between the type of competition (the market structure), the concentration of the sectors of activity, profits and revenues.

Fig. 1 expresses the traditional vision related to the existed correlation between the three elements. As we move from left to right, from perfect competition to monopoly, the level of sector concentration increases. While the level of concentration grows, the company’s market power grows as well. Usually, the profit rate grows when the company’s market power is bigger.

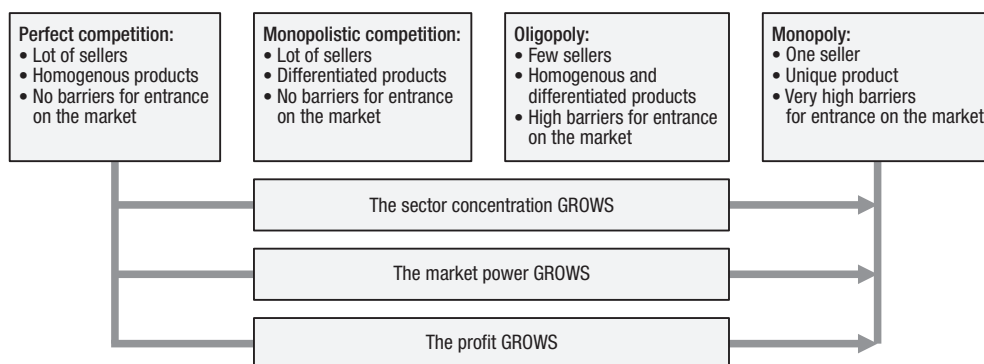


Fig. 1. Competition, concentration and profit

Source: Gwin, C.R. 2001. A Guide for Industry Study and the Analysis of Firms and Competitive Strategy. Available at: <<http://faculty.babson.edu/gwin/indstudy/index.htm>>

The reason that supports the idea of incorporating an industry in a certain type of competition starting with the concentration level is the following: the number of companies is an important differentiating factor between the types of competition. When the number of companies from an industry is high, usually a level of concentration tends to be low. The exception is the oligopoly, where the number of important competitors counts and not the total number of companies (for example, an industry with 100 companies can be considered as an oligopoly structure if the first six companies own 95% of the market).

The interference between the measuring of the concentration level and a classical economic theory can be illustrated as shown Gwin (2001) and Table 1.

Table 1. The classification of the sectors of activity considering the CR and HHI

Type of competition	
CR₄'s value	
CR ₄ = 0	Perfect competition
0 < CR ₄ < 40	Monopolistic competition or effective competition
40 < CR ₄ < 60	Weak oligopoly or monopolistic competition
CR ₄ > 60	Strong oligopoly or dominant company with competitive edges
CR ₄ > 90	Monopoly or dominant company with competitive edges
HHI's value	
HHI < 1000	Monopolistic competition or effective competition
1000 < HHI < 1800	Monopolistic competition or oligopoly
HHI > 1800	Oligopoly, dominant company with competitive edges or monopoly

Evaluation of the concentration level will take into account the relevant market for every company. Generally, the market is represented by all potential clients that have the same need or desire and those are willing and have the capacity to engage in a relation of exchange in order to satisfy that need or desire. The relevant market is defined as the minimal geographical area in which a hypothetical monopoly could durably (almost one year) impose and maintain a profitable growth of its prices (almost 5%) without affecting the consumers' behaviour. This definition, known as "the rule of 5%" is used in law sciences, but we can not say that it brings a lot of clarity in defining the relative market. Nonetheless we can say that measuring the level of concentration can be irrelevant in the following situations:

- Competition of the imported goods is significant in certain sectors of activity.
- Geographical distribution is uneven: dates from the statistical year books have a national character and do not reflect the situation in which a certain industry has a high level of geographical concentration.
- Competitors can enter on the market: generally, studies regarding the level of concentration have a static character which makes it unable for the information to be extrapolated in sectors with low entrance barriers or are not relevant to long term.

- Competition can take place not only intra-sector but also inter-sector: the presence of indirect substitutes for goods and services can be as important as the presence of direct substitutes.

4. Causes and effects of sector concentration

Preoccupations determined by measuring the level of concentration are fully justified taking into consideration the effects of concentration over the competitive environment. Studies made in different periods and countries show that the occurrence of concentration and its effects can be explained by different causes.

Therefore an industry can reach a high level of concentration resulting from the presence of entrance-exit barriers on that market. That is why Porter (1998) considered that these factors contribute to reach a high level of concentration in industry:

- **The presence of entrance barriers:** economies of scale; differentiating by product; need of capital; costs of exchanging a business partner; access to distribution channels; disadvantages of cost independent from economies of scale: technology property; favourable access to raw materials; favourable placement; favourable governmental subventions; evolution in learning and experience; governmental policy.
- **The presence of exit barriers:** specialized long-term assets; fixed costs of exit; strategic exit barriers: interdependence, access to financial markets, vertical integration; informational barriers; emotional and managerial barriers; governmental and social barriers.

We can also consider the nature of the sector a factor which influences decisively the level of concentration. The presence of scale economies is influenced by the nature of industry. Additionally, concentration may be the natural result of competition (Gilligan 1993): the sale of certain products will satisfy the consumers, will lead to market shares far higher. Mergers are a cause of concentration and they may also be a cause of cooperation and deal among companies which generally leads the price rise in that sector.

The means used by companies to obtain a market rise far higher to that of the competitors, respectively the share which can influence directly the degree of sector concentration may be:

- acquisitions – buying partial or total assets;
- mergers;
- joint-ventures that can lead to new products in competition to the existing ones what reduce the market power. But, however we can meet situations in which a dominant company can use a joint venture to cope with a competitor. There is a way by which two companies can cooperate in view to gain some potential profits, maintaining though control over both activity and organisation under discussion. The most common way is that when a new founded company focuses on research in which the two partners have equal shares;
- licences: a licence gives a company the possibility to access a technology by paying a licence tax. It is important a distinction between exclusive and non-exclusive

licence: when a company gets a non-exclusive license it gets the right to use official technologies; when the company gets an exclusive licence it makes the promise not to allow broadcast or to hand over the licence;

- strategic alliances: competition, agreement in the research field and alliances.

No matter the causes and the ways in the process the concentration, it has several effects:

- *Concentration may raise the prices*: when a product is sold by only few companies they will deal with the prices.
- *Concentration may raise the profits*: out of 48 articles published by the beginning of the 1970s concerning sector concentration in the USA, 42 concluded that the more concentrated an industry is, the higher the profits are. The statistic correlation is weak. Recent research discovered that there is no significant statistic relationship between profits and industrial concentration: if there is any relationship between concentration of sellers and profitability it is statistically weak and effects are low. The relationship is unstable in time and space.
- *It may influence in a negative way the market efficiency*: extreme cases of concentration define monopoly.
- It may raise the preoccupation for equity or rightness of the market.
- It may have positive effect by economies of scale.
- The power on the market may be maintained on view to block the entrance of new competitors.
- The intellectual property rights restrict the number of owners on the market in order to stimulate innovation.
- Takeover of small companies by the multinational ones.

Generally speaking the market efficiency depends on the competition level of that market and not on the number of competitors. Market concentration does not always mean market power and a big number of companies do not always mean a powerful competition. If the markets are geographically bordered, the presence of a big number of companies does not guarantee the competition: each can control a certain market for which it will be the dominant company.

5. Sector concentration in Romania

In Romania, preoccupation regarding the analysis of the degree of sector concentration is relatively recent. Legally speaking, economic concentration is brought under regulation by the Law of Competition no. 21/1996, which states that an operation of economic concentration takes place when (art. 11):

- a. two or more business organisations, formerly independent, merge;
- b. one or more individuals who already have control over at least one business organisation or one or more business organisations acquire, directly or indirectly, the control over one or more business organisations or over some of their parts, either through participating in the capital, or through purchasing elements of assets, by a contract or by other means.

Also, the law states which are the prohibited operations of concentration (art. 13), respectively the ones effective in creating or consolidating a dominant position, leading to the restriction, removal or significant distortion of the competition on the Romanian market or on a significant part of it.

The law also defines the **criteria** through which the compatibility of the economic concentration operations with a normal competitive environment is measured:

- the necessity to maintain and develop the competition on the Romanian market keeping in mind the structure of all markets concerned and the existent or potential competition between business organisations in Romania or elsewhere;
- the market level held by business organisations, their economic and financial power;
- the available alternatives for the provider and the user, their access to markets and sources of provision, as well as all other barriers instituted through normative documents or of any other nature concerning entering the market;
- the course of the request and offer for the goods involved;
- the degree in which the beneficiary's or the consumer's interests are affected;
- the contribution to the technical or economic progress.

According to the mentioned criteria, the operations of concentration can be admitted if the operation contributes to the growth of economic efficiency, to the amelioration of production, to the growth of export competitiveness, or if the favourable effects compensate for the unfavourable effects of the reduction of competition or if the consumers are favoured, by price cutting.

The limit from which one can start talking about economic concentration presumes that the business organisations involved in the operation sum up a business figure of more than 10 billion lei. Crossing this limit, any operation must be notified at the Competition Council (art. 16).

The statements of the Law of Competition concerning economic concentration allow us to make the following **appreciation**:

- the institution able to analyse the operations of economic concentration in Romania is the Competition Council;
- the extended vision of the market and the consciousness of the fact that in the present the competition is often developed at a global level represents in our opinion a merit of the law;
- the presence on national markets of strong multinational companies imposes the rising of some Romanian firms of the same range, which can also impose as the global competitors. Thus, each operation is analysed through the ratio to other national markets and to the global market;
- outside the limit of 10 billion lei as a business figure the Romanian law does not mention other indicators, whose values can be measured and used in analyzing the operations of concentration;
- till nowadays, since the law was passed, most of the fines have been established by the Council of Competition for the lack of notification and there have not been

many cases in which the operation of concentration was not allowed. Although, afterwards, after accomplishing economic concentration, there have been situations in which the partners on the market have appealed to anticompetitive practices, proven and punished, in the stage of realizing concentration, it has been allowed. The example from the cement industry is known, where there are only 3 big companies which dominate the market (initially, there were at least 9 companies with significant market shares). After the industry was stabilized on an oligopoly structure in which the three actors have approximately equal market shares, 30–34% each, they started settling prices and produced quantities, transforming into a co-operating oligopoly. The Council of Competition gave one of the highest fines, 28.5 million euro.

The main issue will remain judging the situations in which the disadvantages tied to the reduction of competition are weighed against the advantages created by the growth of power on the market of the companies involved (scale economies, the growth of competitiveness on external markets).

There are few studies about sector concentration in the Romanian literature that is specialised on economy, mentioning the following.

In the study “Degrees of concentration of the system and the main and secondary subsystems of companies” (Dinu *et al.* 2001), the authors calculate the degree of concentration of the system of companies by grouping them in deciles, in descending order of the market shares and calculating the **Gini Indicator**. The variation area of the indicator is between 0 and 1, and the authors establish the following limits of meaning (Table 2).

The degree of concentration of the national companies system was $G_c = 0.88$ in 1999, class 5 – very high concentration. The study covers 1995–1999 period with no significant changes in the degree of concentration. Scaling based on concentration classes of the secondary subsystems of companies shows that there are 4 secondary subsystems of companies (the coal mining industry, the tobacco industry, the metallurgical industry and production, transport and distribution of electric and thermal energy, gas and warm water) that have concentration degrees higher than 0.95. The most important conclusion of the study is that these subsystems established at that particular time, the source of the

Table 2. The concentration degrees after the Gini Indicator

Class	Gini Indicator	Explanation
5	$0.8 < G \leq 1.0$	Very high concentration
4	$0.6 < G \leq 0.8$	High concentration
3	$0.4 < G \leq 0.6$	Medium concentration
2	$0.2 < G \leq 0.4$	Reduced concentration
1	$0.0 < G \leq 0.2$	Very reduced concentration

most complex issues from the standpoint of efficiency, privatization, social convulsions and price policies. Among these industries, the metallurgical industry and the coal mining industry are diagnosed as having an unfavourable condition concerning economic performance, in relation with the national companies system.

Another important study is “Concentration/deconcentration in the Romanian industry after 1990” (Russu 2003). The criteria used for characterising the degree of concentration are **the number of companies, the size of the company** (determined as an average number of employees) and **the CR₅ and CR₂₀ level** (the concentration ratios). The study is realised at the level of the year 2000 and is concerned exclusively with the analysis of concentration in industry. The conclusions complete the above mentioned study. So, the author determines that in the analysed time frame, the Romanian industry has got through two opposite processes at the same time, one of **concentration** and the other of **deconcentration** of economic activity. **The industries characterized by a high level of concentration have not been significantly modified in 1990–2000:** the level of the CR₅ and CR₂₀ has been very high in the mining industry. In the processing industry, they show lower levels, crude oil processing, coal coking and nuclear fuel treatment industry, means of transport industry, metallurgical industry, cars and equipment settle at the higher level, whereas the IT and office means industry, the publishing houses, poligraphy and recording reproducible registrations, the wood manufacturing industry, the food and beverages industry, the rubber and plastic masses processing industry, the metallic constructions and metal products industry, the textile industry, the clothing industry, the leather and footwear industry settle at a lower level (with low concentration).

The Romanian economy as a whole is characterized by a high degree of concentration: from the total of the 35,000 registered companies in 1996, 3.12% covered approximately 80% of the total business figures. **The inefficiency in using the social capital by the big companies** is reflected by the score of the companies which concentrate 80% of the social capital (0.25%) or by the number of employees (1.72%) compared with the one of the companies which is responsible for 80% of the total business figure (3.12%). This obviously shows that the companies with the highest social capital or with the highest number of employees have inferior performances to the branch average. **The concentration of 80% of the Romanian export in 650 companies** (0.17% of the total) reflects its fragility and vulnerability after Romania’s integration in the European Union. **Generally, there is a proportional relation between the degree of concentration and the degree of privatization in the industry.**

The mentioned studies constitute in our opinion guide marks for any following analysis in the area. To complete the image of sector concentration at a national level, we considered necessary to analyse **the dynamics of concentration ratios**. The period observed was 1996–2004 for which CR₅ and CR₂₀ are available at national level. Taking into account the observations concerning the situations in which the analysis of the concentration may not be relevant, our study has been limited to the processing industry, for the following reasons: the mining industry continues to have a very high level of

concentration, without any significant changes in the analysed period; commerce, services and constructions are sectors with low entrance barriers and a strong geographic concentration character, thus their analysis can become irrelevant.

Fig. 2 (CR_5 evolution – sales figure during 1996–2004), Fig. 3 (CR_{20} evolution – sales figure during 1996–2004), Fig. 4 (CR_5 evolution – number of employees during 1996–2004) and Fig. 5 (CR_{20} evolution – number of employees during 1996–2004) are showing the results obtained.

Evolution at a national level of the evaluated degree of concentration based on the concentration ratios allows us to state that:

- There are **no significant differences** nor between the positions of the involved industries for the determination of concentration compared to the business figure or the number of employees, neither between the positions of the industries compared to the concentration of activity in the first 5 or first 20 companies in the branch.
- Following the analysis, 3 **significant barriers** were set, corresponding to which are 3 classes of concentration (1 – the lowest degree of concentration, with high competition; 3 – the highest degree of concentration, with low competition) as shown in Table 3.

The distribution of the 25 analysed industries based on classes of concentration looks as follows in Table 4.

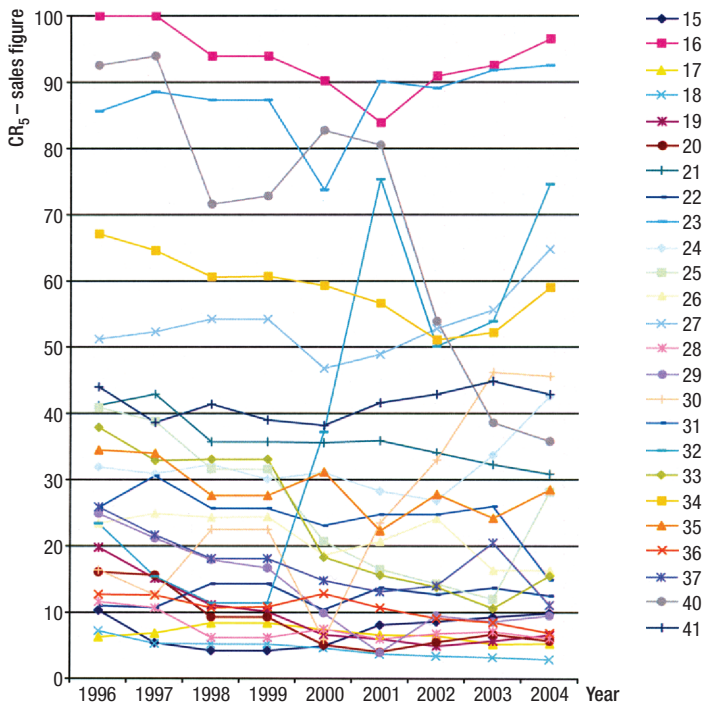


Fig. 2. CR_5 evolution – sales figure during 1996–2004

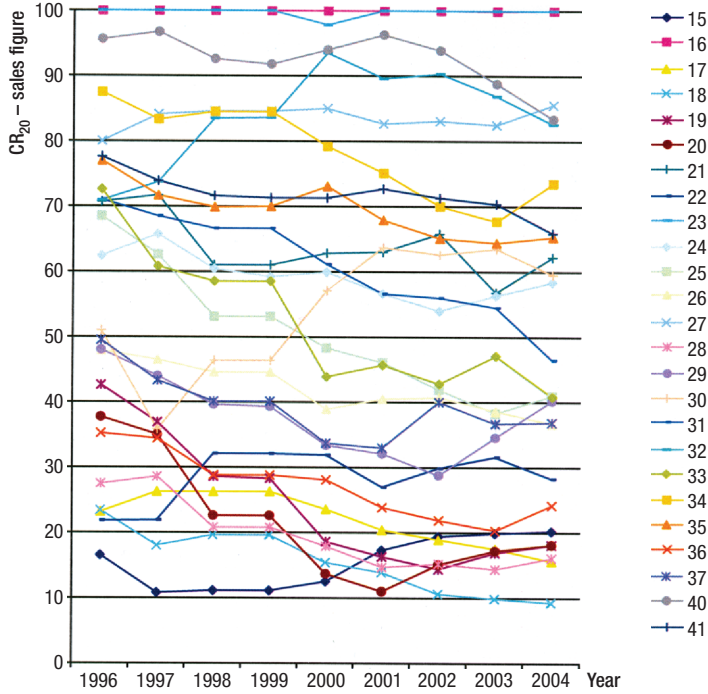


Fig. 3. CR₂₀ evolution – sales figure during 1996–2004

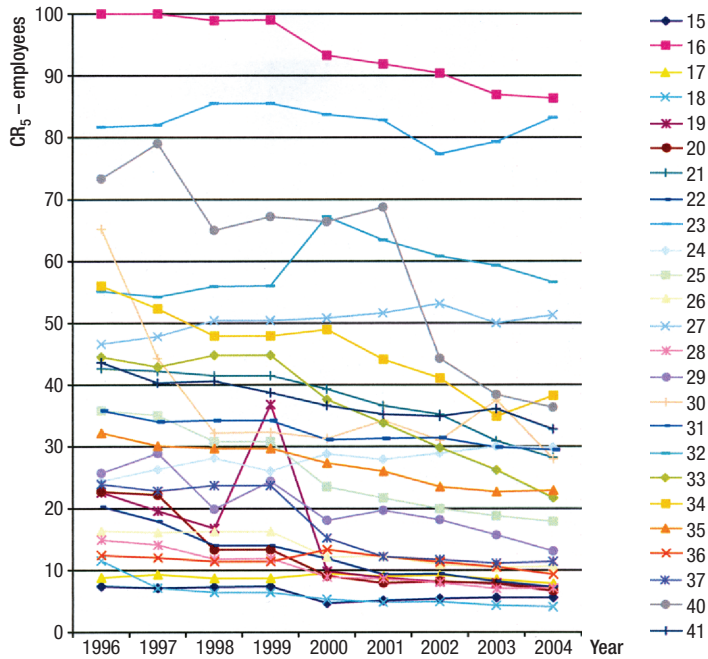


Fig. 4. CR₅ evolution – number of employees during 1996–2004

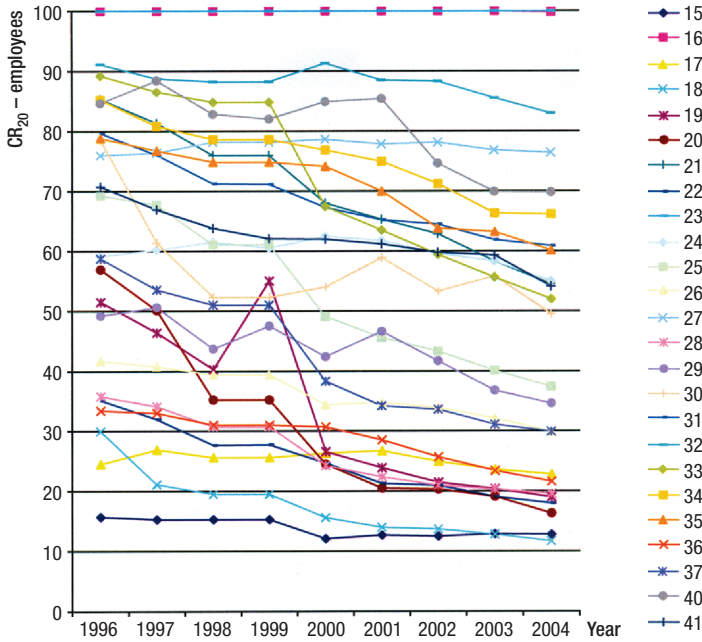


Fig. 5. CR₂₀ evolution – number of employees during 1996–2004

Table 3. Classifying competition in Romania considering the value of the concentration coefficients

CR value	Type of competition	Class
0 < CR < 40%	Reduced degree of concentration	1
40% < CR < 90%	Medium degree of concentration	2
CR > 90%	Very high degree of concentration or monopoly	3

Table 4. The distribution of the sectors of activity considering the value of the concentration coefficients

Number of sectors												Class
Year 1996				Year 2004				Average				
CR ₅ – sales figure	CR ₅ – number of employees	CR ₂₀ – sales figure	CR ₂₀ – number of employees	CR ₅ – sales figure	CR ₅ – number of employees	CR ₂₀ – sales figure	CR ₂₀ – number of employees	CR ₅ – sales figure	CR ₅ – number of employees	CR ₂₀ – sales figure	CR ₂₀ – number of employees	
17	15	7	6	17	21	10	12	19	19	11	9	1
6	9	15	16	6	4	13	11	5	5	11	14	2
2	1	3	3	2	0	2	2	1	1	3	2	3

– 1st class – low level of concentration

In this category we include: Construction material and other non-ferrous minerals industry (code 26), Leather goods and footwear industry (code 19), Wood manufacturing industry (code 20), Furniture and other industrial activities unclassified elsewhere (code 36), Metallic constructions and metal products industry (code 28), Textile and textile products industry (code 17), Publishing houses, poligraphy and recording reproducible registrations (code 22), Clothing industry (code 18), Food and beverages industry (code 15).

– 2nd class – average level of concentration

In this category we include: Equipment, radio, television and telecommunication industry (code 32), Production, transport and distribution of electric and thermal energy, gas and warm water (code 40), Metallurgical industry (code 27), Means of road transport industry (code 34), Medical, precision, optical and watch making instruments industry (code 33), Other means of transport industry (code 35), Cellulose, paper and cardboard industry (code 21), Machines and electric devices industry (code 31), Managing the water resources, collecting, treating and distributing water (code 41), Chemical, synthetic and artificial fibres industry (code 24), IT and office means industry (code 30), Rubber and plastic masses processing industry (code 25), Machines and equipment industry (code 29).

– 3rd class – very high level of concentration

In this category we can include two industries with a level of concentration of almost 100%: Crude oil processing, coal coking and nuclear fuel treatment industry (code 23) and Tobacco industry (code 16), which in the period 1996–2004 have maintained on the first places, regardless of the method of calculating used for the concentration ratios.

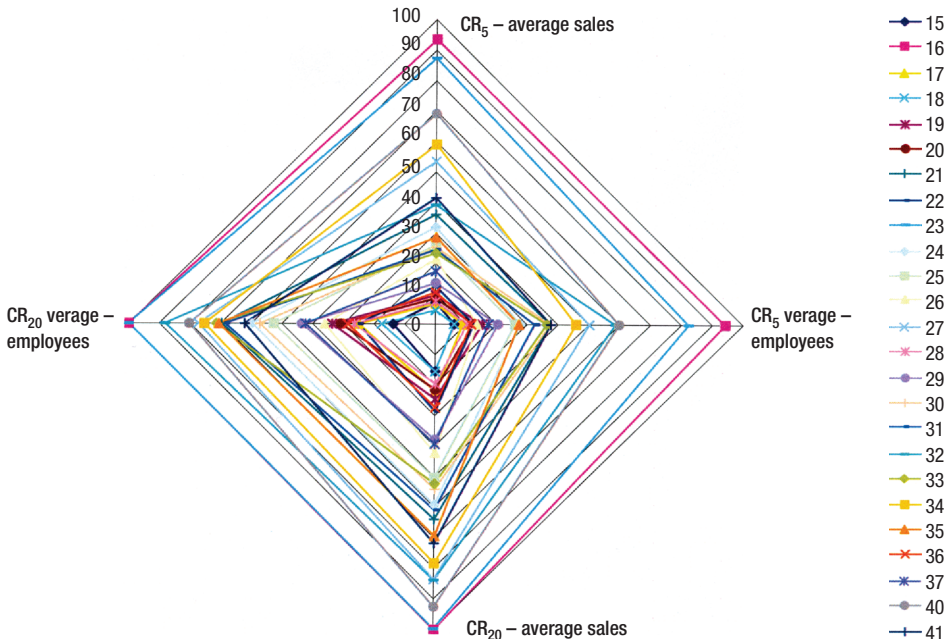


Fig. 6. The map of Romanian industry concentration

Inclusion in one of the concentration classes has been made by comparison with the value of the average concentration ratios for the period 1996–2004. It was determined for all 4 mentioned indicators: CR_5 – sales figure, CR_{20} – sales figure, CR_5 – number of employees and CR_{20} – number of employees.

Based on the average values of the concentration coefficients we obtained **the map of Romanian industry concentration** (Fig. 6).

We consider that the interpretation of information related to sector concentration using this graphic instrument offers the possibility of a synthetic image for the structure of economy, at national or local level.

6. Conclusions

The main conclusions that are drawn from the analysis of Romanian industry concentration during 1996–2004 are the following:

- The general tendency was the reduction of the level of concentration, the growth of the number of industries from the **1st class of concentration**, in the disadvantage of the ones in the 2nd and 3rd class. The phenomenon can be explained through the reformation of the Romanian economy, which, on the path towards functional market economy, has come to competitive industries, with a high score of the private capital, characteristic valid for most industrial sectors; there have been situations in which concentration increased temporarily, after which it decreased (Leather goods and footwear industry in which CR_5 increased in 1998 from 40% to 52%, only to reach 20.4% in 2004).
- The main exceptions from this tendency of reduction of concentration have been industries like IT and office means industry (code 30), Equipment, radio, television and telecommunication industry (code 32), Chemical, synthetic and artificial fibres industry (code 24) or Metallurgical industry (code 27) in the case of which at least one of the concentration coefficients has increased during the analysed time frame. In these cases we talk about **repositioning in a leading rank**, because the score of the first 20 companies as in employees or business figure does not modify in a significant way. Another possible explanation is the rehabilitation of some big companies following some privatisation programmes (metallurgy, for instance), companies which have reached important market levels at the end of the analysed time frame.
- Structural changes of concentration in the industry are tied to the **important privatisations in the Romanian economy** in the analysed period, as well as the entrance of multinational companies, which became buyers or competitors of the companies with Romanian state capital.
- During the studied period **some industries have passed from one concentration class to another**. So, one of the most significant reduction of the level of concentration is registered in the sector Medical, precision, optical and watch making instruments industry (code 33), in which the level of concentration is lowered from 90% (class 4) to less than 60% (class 2). Evolutions as spectacular as this one can be found in Wood manufacturing industry (code 20) or Rubber and plastic masses processing industry (code 25), industries that level down from 1st class to 2nd or 3rd. The expla-

nations for this type of behaviour are given by the strong entrance of private capital in the involved industries, the increase of the number of companies and so forth.

- **The industry concentration map shows a crowding in the central area**, which proves a higher score of the competitive industries, with a low level of concentration. Usually, these industries are characterized by a large number of companies, low entrance barriers and a higher score of the private capital.
- Also, on the same map we can observe a certain decentralization of the polygons towards the left, showing that the **score of the first 20 companies as the number of employees is concerned is higher than the score of the same 20 companies as the sales figure of the sector is concerned**. The direct consequence of this phenomenon is a lower labour productivity of the first 20 companies than the average per branch.
- The industries that are closest to the origins of the axes are Clothing industry (code 18) and Food and beverages industry (code 15), which by their nature correspond to fragmented sectors of activity, with a large number of participants in the transactions and with low barriers for entrance on the market, in which the score of the strongest companies is not very high.

As a general conclusion, we can state that the analysis of the level of concentration in the Romanian industry can be a useful instrument of evaluation for the ones involved in economical policy and in the reformation of Romanian economy. Also, it can be an instrument of evaluation of the allowance of the respective industry, an aggregate indicator which offers a much more relevant image than the number of companies in a sector of activity.

The graphic instrument suggested, the *concentration map* allows the static evaluation of the structure regarding the sectors of activity and the comparison between them and can suggest working hypothesis in studies regarding productivity at industry or company level and can be used in investment decisions or can enter on an industry or a certain market. Also, it could become a working instrument in the comparative analysis of the Romanian economy structure, opposing the sector concentration of the activity sectors from the European Union countries.

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VALDYMO SISTEMA DIDŽIOSIOSE MADEIROS SALOS ĮMONĖSE: REZULTATŲ APSKAITOS SISTEMOS NAUDOJIMO PAVYZDŽIU

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Santrauka

Nagrinėjama tam tikrų Rumunijos pramonės sektorių koncentracijos dinamika, atsakant į du pagrindinius klausimus: kokia yra ekonominių veiklų koncentracija ir kokie veiksniai lemia jų pasiskirstymą. Tačiau dėl kai kurių ekonominių apribojimų tyrimo metu nebuvo galimybės įvertinti tam tikrų aspektų, nuo kurių ir buvo atsiribota. Straipsnyje pateikiamas pramonės sektorių koncentracijos santykis, apimantis 1996–2004 metų laikotarpį, buvo nustatyti pramonės šakų skirtumai ir pateikti komentarai. Autoriai daugiau dėmesio skiria apdirbamajai pramonei, nes kasybos pramonė ir toliau išlieka viena iš labiausiai koncentruotų veiklos rūšių, didelių pokyčių tuose pramonės sektoriuose analizuojamu laikotarpiu nebuvo pastebėta. Prekybos, aptarnavimo ir paslaugų bei statybos sektoriai turi nedidelius ribojimus, ir geografinė koncentracija yra gera, todėl jų analizė buvo nustatyta kaip nereikšminga. Gauti tyrimo rezultatai naudoti sudarant Rumunijos pramonės koncentracijos žemėlapi ir nustatant lyginamąjį svorį bendroje nacionalinėje ekonomikoje.

Reikšminiai žodžiai: koncentracija, koncentracijos santykis, regioninis sektorius, pramonė, Rumunija.

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