Review article
UDC 338.45.01: 339.564: 339.5

Changes in the competitive advantages of Croatia's manufacturing industry*[1]

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Abstract

The aim of this research is to analyse the position and detecte competitive advantages of Croatia's manufacturing industry in foreign exchange trading. The methodology of this research is based on the application of indices of openness to foreign trade and detected competitive advantages, as well as the complete analysis of the manufacturing industry structure of the Republic of Croatia. In order to analyse the competitive advantages of the manufacturing industry in the Republic of Croatia the following quantitative methods were used: Revealed Comparative Advantage (RCA), as a method for detecting comparative advantages of exporting goods of some countries, Export Competitiveness Indices (XS), as a method for measuring export competitiveness of the observed countries, Export Specialization Index (ES), as a method for comparing export activities of the manufacturing industry in the Republic of Croatia and the European Union, and the Relative Trade Advantage Index (RTA) that incorporates the RCA and the RMA indices. The main results of the research indicate competitive advantages detected by measuring, evaluation of the Croatian manufacturing industry particularly on foreign markets, recommendations and proposals in order to reach a higher level of export competitiveness. The main conclusion of this research is that there is a need to establish prerequisites and to define measures for structural changes in the Croatian manufacturing industry.

Key words: *Manufacturing industry, comparative advantages, export competitiveness, foreign exchange trade*

JEL classification: *O18, O12, F18, R11*

* Received: 01-04-2011; accepted: 29-11-2011

[1] *The presented results are part of the research project (Innovation, technology transfer and competitiveness of the Croatian export, No. 081-0811403-1414) supported by the Ministry of Science, Education and Sports of the Republic of Croatia.*

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1. Introduction

From the 1990s Croatian economy and manufacturing industry have encountered exceptionally complex internal, external, political and economic factors. Internal factors as aggression, the Croatian War of Independence and the establishment of independence – crucial political events – have had a severe impact on the economic activity of the Republic of Croatia. Moreover such factors have had a significant impact on the activity of the manufacturing industry in the Republic of Croatia. The events of the war have considerably stopped the growth and progress of the manufacturing activity and have limited the effective use of comparative and competitive advantages of the manufacturing industry. At the same time the process of establishing public infrastructure of the new and independent country has been initiated - from legislation to government administration and diplomacy.Thereupon a continuous search for our own developmental model and a concept of economic policy has been initiated as to achieve this goal. However, this search has been without great success until now.

External factors include the spread of the process of globalisation. It is an important segment that certainly has an effect on the world economy as well as the manufacturing industry in the Republic of Croatia. Thanks to the enormous effect of globalisation, the changes made at that time were more significant than they had been five decades before. Simultaneously, with the process of liberalization a more progressive opening of markets has started. Liberalization followed by privatization has encouraged many structural changes in the industrial production.

The question is raised, how to achieve a higher level of export competitiveness and detect competitive advantages of the manufacturing industry, which would secure a sustainable progress in the home market, a presence in the regional and the international markets, like the market of the European Union. At the same time, survival conditions should not be ignored in a very demanding economic environment. Croatia's manufacturing industry participates in a large proportion in the gross domestic product, employing a large proportion of the entire workforce, is one of the greatest generators of tax revenues in the country, and is one of the most propulsive export industrial branches of the economy of the Republic of Croatia.

Croatia's manufacturing industry faces many problems and obstacles that have a large impact on its competitiveness. Using the Stabilization Programme, Croatian economy has had the aim to maintain price stability and a stable exchange rate. In such an environment, the plan has been to restructure the economic subjects efficiently and to become competitive enough in order to compete efficiently in the domestic as well as in the export markets. Unlike projections, the Croatian manufacturing industry has not been completely and efficiently restructured, as the fragile development and the unsatisfactory dynamics of the industrial export during the last ten years prove. The reasons for the export stagnation in that period are

obvious, for example the loss of some anticipated export markets in some countries of former Yugoslavia, conditions in Croatia and the broader region during the war, the inefficient privatization, a low level of investment activity, the too slow integration into the European and global economy as well as the unsatisfactory export competitiveness.

The basic hypothesis of this research is that it is possible to assess the current condition of export competitiveness and comparative advantage of the Croatian manufacturing industry by applying the structural analysis of applied indicators. The basic aim of this research is to systematically examine the main features of the manufacturing industry in the Republic of Croatia, to analyze, measure and objectively assess export competitiveness and comparative advantages of the manufacturing industry in the Republic of Croatia and to propose measures to strengthen the Croatian and European manufacturing industry.

The research consists of four related parts. After the introduction, the second part of the research introduces recent studies of the manufacturing industry, its comparative advantages and competitiveness. The third part outlines the methodological frameworks of the research. The fourth part of the research outlines the economic and analytical frameworks and results of export competitiveness and comparative advantages based on the empiric analysis of the foreign exchange trading activity and the comparative advantages of the Croatian manufacturing industry. The research ends by outlining proposals and recommendations, as well as final reflections.

2. Recent research

Definitions of competitiveness provided by the Organisation for Economic Co-operation and Development (OECD) and the Department of Trade and Industry (DTI) indicate the importance of technological factors in achieving competitiveness. The Department of Trade and Industry (DTI, 1994) defines company's competitiveness as an ability to produce certain goods and services, at the right time and price. The definition of the Organisation for Economic Co-operation and Development (OECD, 1992), from the micro aspect, includes competitiveness that refers to the company's ability to compete, maximize the profit and to achieve growth based on costs and prices by using technology, quality improvement and effeciency maximization of its products.

There are many scientists who research the relation between competitiveness and technological abilities. Scientists like Fagerberg (2001), Kaldor (1971), Porter (2001), Lall (2001) and Wignaraja (2003) and institutions like the Organisation for Economic Co-operation and Development (OECD) have confronted attitudes of other scientists who are trying to define competitiveness only from the aspect of price factors by emphasising non-price factors, like technology. The discussion has

led towards revision of traditional theories within the framework of the topical issues of competitiveness.

There are two different aspects that define the term competitiveness more closely. The general macroeconomic aspect shows international competitiveness in frameworks of price factors. The microeconomic aspect, on the other side, is trying to define competitiveness at company level with non-price factors with an emphasis on the research of rivalry between companies.

The macroeconomic aspect is accompanied by internal and external economic balance where a special focus is put on the effects of non-price factors on competition. The microeconomic aspect considers the internal company dynamics which has an impact on the company's strength.

The microeconomic aspect refers to competitiveness at company level. The perspective as such includes rivalry between companies and its strategies. In the last few years the microeconomic aspect has implied influence of technology and innovation as new dimensions. Lall (2001) criticizes the neoclassical theory whose assumptions are based on the thesis that technology is accessible to all companies that have the ability to use technology at a technically "high" level. However, it is a long-term learning process which starts with export of technology and proceeds to innovations.

Most of the experts are partly or completely familiar with two theoretical frameworks from trades which are based on comparative advantages, and those are Ricardo's theory and Heckscher-Ohlin's (H-O) theory. Ricardo's theory deals with comparative advantages which are achieved based on different technologies, while H-O's theory uses the same level of technology in all countries as an example. At the same time, H-O's theory emphasizes the importance of comparative advantages in relation to different cost levels which are derived from different prices of product factors of observed countries. Presumptions of traditional trade theories are based on the principle of relative prices, comparative advantages, in other words on the price disparity which is influenced by supply and demand factors.

According to H-O's theory comparative advantage of economics is defined by the relative scarcity factor. However, empirical analysis determined discontinuities in measuring comparative advantages and in proving Heckscher-Ohlin's theory due to the inability of viewing relative prices which are influenced by autarky (Balassa, 1989:42). Considering these conclusions, Balassa (Balassa, 1965) suggests to avoid complete integration of every components which are impacting on comparative advantages various economies. Instead of that, in the framework of Balassa's analysis it is emphasized that comparative advantage is "revealed" and that it is in tune with theoretical settings, apart from one exception, the inability of viewing relative prices. Drawing conclusions from the analysed data, Balassa denotes the results of his research as the Revealed Comparative Advantage (RCA) and the

Index of Revealed Comparative Advantage respectively. The RCA is also an accepted method for analysing the trades of observed countries. Furthermore, Balassa creates an index (known as Balassa's Index of Revealed Comparative Advantages) whose main aim is to measure comparative advantages of countries. Balassa's index manifests in the identification of revealed comparative advantages instead of detecting "hidden" elements of comparative advantages of economies.

However, the first version of Balassa's index of revealed comparative advantages has been modified and revisioned so today there are different measurement indices of comparative advantages. Some research measures RCA at a global level (Vollrath, 1991), while others measure RCA at a regional level. There are some cases where Balassa's index of comparative advantages is used as a measurement of bilateral trade (Dimelis and Gatsios, 1995).

In reviewing literature, it was noted that the usage of RCA index prevails only in some research of Croatian scientists. Teodorović and Butorac (2006) determine industrial production using indices of entropy, openness, comparative advantages, specialization in the intra-industry exchange and the marginal intra-industry exchange. Their conclusion is that Croatia has revealed comparative advantages in international exchange in the framework of seven sub-sectors. The authors emphasize that it is possible to ensure a greater progress in industrial production by activating crucial factors of productivity and competitiveness. That relates to encouraging new investment projects, adopting innovations by enhanced investments in development research and in human capital as well as implementing new technologies. Butorac (2007) supports the previous research with empirical analysis that throughly investigates Croatian manufacturing industry minutely using besides the RCA index, the indices of dispersion and concentration, comparative advantages, specialization levels of intra-industry exchange, horizontal and vertical specializations and export competitiveness. The author concludes that a stagnation or fall of export competitiveness has been noticed in many sectors and that Croatian manufacturing industry has not enhanced export competitiveness in the markets in the EU 25. Conclusions are given related to the position and the development perspectives of Croatian textile and clothing industry in international exchange.

Export activity and revealed comparative advantages of the manufacturing industry have also been viewed by foreign researchers. Bender and Li (2002) examine the structural export activities through revealed comparative advantages of the East Asian and Latin American regions throughout the period from 1981 to 1997.

Yoon and Kim (2006) analyze the manufacturing industry activity in China, Japan, Korea and five other countries using RCA and trade specialization indices. In addition to the manufacturing industry, the emphasis has also been put on its main sub-sectors of the chosen countries. With the aim to achieve a higher level of competitiveness, the authors have drawn conclusions which imply putting greater

effort into integrating into the free trade zone, reducing trade barriers, increasing productivity and encouraging foreign direct investments.

Batra i Khan (2005), Veeramani (2006) analyze a chosen product group in sub-sectors of the manufacturing industry in India and China using the index of the revealed comparative advantages. Batra and Khan (2005) conclude that comparative advantages mutually fluctuate due to given product characteristics. Influences on the manufacturing industry activity such as the factors of work and capital, demand, technology and economies of scale stand out. Their research has been fulfilled with empirical results of the research done by Palit and Nawani (2009). Palit and Nawani (2009) emphasize the bilateral trade imbalance and a higher competitiveness level in India than in China.

Shinyekwa and Othieno (2011) examine the comparative advantages of the export activities in Uganda as an East African Community member. The authors conclude that preferential agreements do not have a direct effect on product expansion of the manufacturing industry and emphasize the limited competitiveness of Uganda in relation to China.

3. Methodology

Analytical approach is based on scientific results of key indicators measuring the competitiveness level of the manufacturing operations in the Republic of Croatia. The abovementioned indicators have been often used in modern economic research which evaluate and underline the importance of trade regimes and specialization of countries that have comparative advantage in certain goods subject to foreign trade exchanges.

One of the frequently used indexes is the Revealed Comparative Advantage Index (RCA Index). Balassa suggests that the realized export values can be used to detect comparative advantages of a certain economy with the exception of production cost factors (Balassa, 1965:93).

The Revealed Comparative Advantage Index (RCA) has been calculated using the following formula (Balassa, 1978:203):

$$RCA_{0} = [(X_{ij}/ X_{nj}) / (X_{it}/X_{nt})]$$

where:

X_{ij} – export of "i" product of "j" country,

X_{it} – world export of "i" product,

X_{nj} – total export of "j" country,

X_{nt} – total world export.

RCA index measures a comparative advantage in "i" goods export of "j" country. If the value is higher than 1, then the analyzed country has revealed comparative advantages in export of certain goods. Vice versa, if the value is lower than 1, then there is an obvious lack of comparative advantage in export of certain goods.

RCA index indicates the status of a certain economy, together with the expansion of certain products which have market potential. Additionally, the potential of foreign trade exchange is also put into perspective. Countries with a similar RCA profile have highly intense bilateral trade, except the inclusion of intra-branch trade.

Amir uses the Export Competitiveness Index (XC) to identify production successfulness or unsuccessfulness when faced with competitive growing markets (Amir, 2000:123). The Export Competitiveness Index indicates export efficiency of a product or a group of products. Increase of values derived from the index in an observed period shows export successfulness of a product in competitive growing world markets. The Export Competitiveness Index has been calculated using the following formula:

$$XC_0 = (X_{ij} / X_{it})_t / (X_{ij} / X_{it})_{t-1}$$

where:

X_{ij} – export of "i" product of "j" country,

X_{it} – world export of "i" product,

$_t$ - observed period,

$_{t-1}$- previous period.

Export competitiveness of "i" product of "j" country can be explained as the ratio of participation of "j" country at the world market with "i" product in a observed period (t) against the participation in a previous period.

If the Export Competitiveness Index is higher than 1, then it indicates growing export competitiveness. Contrary, a realized value lower than 1 indicates a negative trend of export competitiveness. XC index can be interpreted as a ratio of increased export rate for "i" product of "j" country and growth rate of "i" product at world markets.

According to the World Bank (2011), the Export Specialization Index is a slightly modified Balassa's Revealed Comparative Advantage Index. RCA index compares sector's participation in country's export with the export in which the denominator was measured within the context of specific markets. ES index provides an overview of a revealed production export specialization of a country's sector and is calculated as a product export participation in the total country's export, in comparison to the product import participation in the total country's import.

$$ES = (x_i^A/X^A) / (m_i^K / M^K)$$

where:

x_i^A – export of "i" product of "A" country

X^A – total export of "A" country

m_i^K – import of product and K country

M^K – total import of products in K country

If the value is higher than 1, then the analyzed country has revealed comparative advantages in export of certain goods and at the same time it is export-specialized country. Vice versa, if the value is lower than 1, then there is an obvious lack of comparative advantage in export of certain goods.

Edwards, Mlangeni and van Seventer use the ratio between export and total trade to measure country's trade effects which include possibility of export and import within certain product categories (Edwards et al., 2000:75).

The indicator is shown in the following formula:

$$\text{Net export } RCA_{ij} = (X_{ij} - M_{ij})/(X_{ij} + M_{ij})$$

where:

X_{ij} – export of "i" product of "j" country

M_{ij}- import of "i" product of "j" country

The abovementioned ratio shows results in intervals from -1 to +1. Values indicate a lack of comparative advantage if the value is between 0 and -1. When the value is between 0 and +1, comparative advantage is indicated. However, when the value equals 0, it means that the product export and import are equal. Thus, the index represents country's specialization level in export of a certain product.

Results obtained via RCA measuring are especially useful when they are used with other indicators (such as Net export RCA_{ij}) in order to overcome limitations given by the Revealed Comparative Advantage Index.

The issue with similar RCA indexes is that the analysis of trade example can be unreliable due to country's intervention. The assumption is that state measures such as an import ban, export subsidies and other government protection measures can have impact on reliability of RCA measurements.

Vollrath (1991) recommends using RC index more since demand and supply are balanced in the index. However, deficiencies of Vollrath's three indexes are highlighted. Vollrath admits that RXA index (Relative Export Advantage), which neutralizes distorted effects, is used more in practice.

Relative Trade Advantage (RTA) is calculated as a difference between relative export comparative advantage, which is equivalent to the original Balassa index (Vollrath, 1991:270) and relative import comparative advantage. However, Vollrath's RXA differs from Balassa index since it prevents double calculation.

$$RTA=RXA-RMA$$

where $RXA=RCA=(X_{ij}/X_{it}) / (X_{nj}/ X_{nt})$, and

$$RMA=(M_{ij}/M_{it})/ (M_{nj}/M_{nt})$$

where M represents import.

$$RTA=RXA-RMA=(X_{ij}/X_{it}) / (X_{nj}/ X_{nt}) – (M_{ij}/M_{it})/ (M_{nj}/M_{nt}).$$

In relative trade advantage the original Balassa index of revealed comparative advantage is taken into consideration and its second extremity, the revealed (import) comparative advantage index.

For example, in manufacturing industry, the following index will be used:

$$RCA\text{-}2 \text{ (Relative Trade Advantage)} = RXAi – RMAi$$

where:

$RXAi = (Xi/X) / (Xiw/Xw)$

$RMAi = (Mi/M) / (Miw/Mw)$

RXAi: Relative export comparative advantage for "i" product

RMAi: Relative import comparative advantage for "i" product

X: Total country's export

Xw: Sector (or world) total export

M: Total country's import

Mw: Sector (or world) total import

The Relative Trade Advantage Index (RTA) is calculated as a difference between relative revealed comparative advantages (RXAi) and relative revealed (import) comparative advantages (RMAi). RXAi index actually represents Balassa's comparative advantage index (RCA_0) which has been analyzed in a previous part of the elaborate methodology. RMAi index has been analyzed as an additional dimension, i.e. variable which is used to show a realistic situation of comparative advantages of the Croatian manufacturing industry. RMAi index is characterized by an almost identical calculation method, except the import activity is analyzed instead of export activity as in the case of RXAi index.

RTA results (RCA-2) can be higher or lower than 0 value. Positive values indicate revealed comparative advantages of the analyzed subject, whereas negative values indicate a lack of comparative advantage.

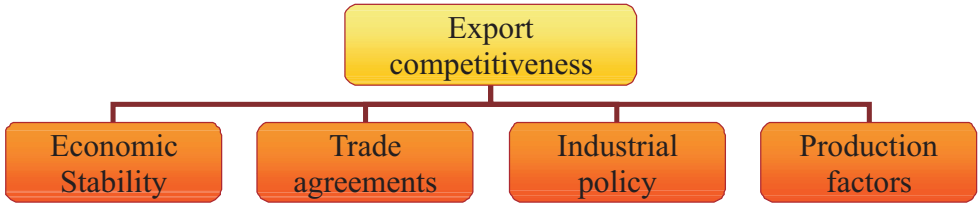
The applied model of this research is based on the combination of indicators which measure export competitiveness of the Croatian manufacturing industry. Balassa's Revealed Comparative Advantage Index represents the starting point in measuring export competitiveness. The accepted statistical data are presented as the key elements in calculation of export competitiveness, via exact identification of comparative advantages. The Revealed Comparative Advantage Index plays an important role in measuring comparative advantages of the tested area. The Index was also used as an integral part of other indicators in Amir and Mlangeni's research of comparative advantages. The relevant link between Balassa, Amir and Mlangeni's indexes is the common use of export competitiveness parameters such as product export on national and global level.

4. Economic frameworks and results of export competitiveness analysis for manufacturing industry of the Republic of Croatia

4.1. Economic frameworks of the Croatian manufacturing industry

Since mid 1990s the industry has been strongly influenced by an inappropriate exchange rate policy and continuous increase of tax and non-tax duties. Due to the inadequate exchange rate policy the manufacturing industry has lost half of its assets only on exchange rate differences since mid 1990s. At the same time, business costs have increased rapidly and without any control. Such slashing results have decreased profit and competitiveness of the manufacturing industry. On the other hand, the global financial crisis is cutting the crucial basis of the Croatian manufacturing industry. Anti-recession measures have not brought any concrete positive results for the purpose of liquidity increase. Moreover, due to the restrictive tax policy, i.e. VAT increase, the liquidity of the manufacturing industry has additionally been undermined. Principally, it is of outmost importance to determine factors which impact the export competitiveness of the manufacturing industry.

Chart 1: Factors of the export competitiveness of the manufacturing industry in the Republic of Croatia



Source: Author's analysis

Economic stability represents the primary prerequisite for economy's export competitiveness. Concurrently, it is directly and indirectly connected to other factors which have an impact on the export competitiveness of the manufacturing industry. Direct foreign investments are a very important factor for increase in manufacturing industry's competitiveness. By improving production processes and products, the manufacturing industry increases its export competitiveness – on a regional, as well as global level. Trade agreements represent factors that enable growth in trade volume, which strengthens the position of the manufacturing industry. Appropriately and responsibly managed industry policy has also impact on its export competitiveness. Well designed and realized measures and actions on macro and micro levels, as well as good cooperation between the government and business sector, result in increased export competitiveness that is reflected in increased productivity, decreased general price levels and production costs, as well as increased export and investments. Foreign competition also plays an important role, since it can motivate companies in the manufacturing industry to work on innovations, thus increasing the export competitiveness level. Production factors are featured in work, capital and technology.

For example, it has been stated that wages have grown excessively fast in comparison to the industry productivity, which made the production in Croatian manufacturing industry too expensive, thus having negative impact on its competitiveness. Additional obstacle to the relatively low competitiveness of the manufacturing industry is insufficient implementation of modern and sophisticated technology in production, due to relatively low investments in the past. This environment and consequences indicate insufficient attention paid to export competitiveness of the manufacturing industry.

Competitiveness of the manufacturing industry depends on many aspects classified by (Vedriš, 2005):

cost-effectiveness,

production differentiation level,

market structure where a company operates and
market penetration level, and into special market niches.

a) Production cost-effectiveness can be realized in the following manners: innovating production process so as to reduce production costs or relocate the production to another region or even country where prices of production factors, principally work and capital, are lower. Work-intensive industries have mostly been used as en example of relocating production to countries where workforce is relatively cheaper. The first variant includes production rationalization and modernization, where these two business processes correlate with the reduction of headcount and import, namely transfer of modern production technologies.

b) Production differentiation, expansion of assortment volume and depth as well as increased product quality is the second element important for increase in total competitiveness level of a certain industry. Three elements are a key to the production differentiation process: innovation, reputation and production architecture. Innovation enables enrichment of the production range with new products and expanded assortment of related products. Product reputation is created through coordination of market activities whose aim is to raise product awareness, i.e. need for product consumption, and finally create brands, superior regional and global product brands.

c) Production architecture is an aggregate term for company's overall internal organization and its relations with vendors, customers and competition which enables company's growth and development, in line with building or keeping of company's competitive position.

d) Competitiveness aspect which relates to the "offering" side refers to structural characteristics of the market niche to which the company belongs. In other words, either the company is a part of a monopole, monopolistic competition, oligopolies, or it is horizontally and vertically integrated into a complex industrial compound with other similar industries, etc. Integration gives companies an opportunity to use results of the volume economics, i.e. to distribute their fixed costs to more organizational units, thus bettering their competitive position, to user synergy effects by integrating different complementary knowledge and skills of different parts of the integrated company, and finally pursuant to the increased competitive market position to raise their negotiating position with regard to vendors and other distribution companies. Company's production strategy is based on one or a combination of several key principles. The fact is that an industrial company has either specialized in its operations, differentiated production assortment in order to increase its competitiveness, or it is building a regional, and global production-distribution network.

In consequence, the ability of the manufacturing industry to reach and keep its competitiveness at the domestic and international market shall depend on quality of accepted strategies on one hand, and quality of available external and internal factors on the other hand.

4.2. Results

In the analysis of this issue, the first step is to identify the comparative advantage and export competitiveness of the manufacturing industry of the Republic of Croatia. Table 1 shows the analysis of comparative advantage of the Croatian manufacturing industry and its sectors in the period between 2005 and 2009. The research has also included total results of comparative advantage of the European manufacturing industry for comparison purposes. Variables of RCA_0 formula are not much different compared to the first model: the total world export variable remains unchanged whereas the total country export variable "j" includes total export of the Croatian manufacturing industry. Table 1 shows comparative advantages of the Croatian and European manufacturing industry.

Table 1: Revealed comparative advantage index (RCA) of the food industry, 2005-2009

Products Croatia/RCAi*	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	1.012	1.010	1.009	1.012	1.006
Food and live animals	1.562	1.908	1.649	1.432	1.616
Drinks and tobacco	2.818	2.524	2.390	2.406	2.510
Raw materials, except fuels	1.745	1.736	1.786	1.713	1.720
Mineral fuels and lubes	1.020	1.054	0.916	0.756	0.918
Animal and plant oils and fats	0.585	0.496	0.450	0.459	0.480
Chemical products	0.954	0.903	0.907	0.959	0.839
Products classified by material	1.079	1.068	1.081	1.128	1.173
Machinery and transport equipment	0.778	0.782	0.861	0.996	0.866
Various finished products	1.481	1.370	1.352	1.268	1.240
Products EU/RCAi*					
Manufacturing industry (SITC 0-9)	0.988	0.0009	0.993	0.998	0.989

*RCAi = RCA index for products of the manufacturing industry

Source: Author's analysis according to data in Table 6

Results of the revealed comparative advantage index derived from the data from Table 6 (in the appendix) show revealed comparative advantage of the Croatian manufacturing industry in the observed period. On the other hand, the European manufacturing industry is marked with a lower index of revealed comparative advantages, which indicates a lack of comparative advantages.

By analysing the trend of RCA index, we can conclude that the highest value of RCA index for the Croatian manufacturing industry was calculated in 2008, whereas the lowest RCA index was calculated for 2009. On the other hand, animal and plant oils and fats represent a sector with the highest lack of revealed comparative advantages within the analysed sectors. Sectors with insufficient revealed comparative advantages include mineral fuels and lubes industry, chemical industry, production of machinery and appliances. Revealed comparative advantages are significant for other sectors of the manufacturing industry.

The following table (Table 2) analyzes export competitiveness of the Croatian manufacturing industry in the period between 2005 and 2009.

Table 2: Export competitiveness of the Croatian manufacturing industry, 2005-2009

Products Croatia/XC*	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	-	1.023	1.032	0.994	0.956
Food and live animals	-	1.250	0.893	0.860	1.085
Drinks and tobacco	-	0.917	0.978	0.998	1.003
Raw materials, except fuels	-	1.019	1.063	0.950	0.966
Mineral fuels and lubes	-	1.058	0.897	0.819	1.167
Animal and plant oils and fats	-	0.868	0.937	1.011	1.006
Chemical products	-	0.969	1.037	1.048	0.841
Products classified by material	-	1.014	1.045	1.034	1.000
Machinery and transport equipment	-	1.029	1.138	1.147	0.835
Various finished products	-	0.947	1.019	0.929	0.941
Products EU/XC					
Manufacturing industry (SITC 0-9)	-	0.982	1.007	0.963	0.994

*XC= Export competitiveness index for products of the manufacturing industry

Source: Author's analysis according to data in Table 6

The obtained results clearly show systematic decrease in export competitiveness of the Croatian manufacturing industry. In 2009 export product effectiveness was the lowest, which also implies negative trend of export competitiveness of the Croatian manufacturing industry. We need to point out that export competitiveness in the first half of the observed period was on a relatively satisfactory level, whereas negative trend was recorded in the second half. Namely, the reason lies in an uneven dynamics between export of Croatian and world processing activities.

Furthermore, by comparing Croatian and European processing activities, there is an obvious difference in flow of export competitiveness. In 2009 the European manufacturing industry had the highest export competitiveness level, but such a result is insufficient when talking about a positive trend of export competitiveness. The analysis has to exclude a sector under the name of "products classified by material" whose production was the only one which realized a production success

at competitive markets. When analysing other sectors, we can conclude that most of them have weakened export competitiveness due to values lower than level 1.

Hereafter, Table 3 measures revealed export specialization of Croatian and European processing sector. Data based on the results of the export specialization index were obtained from Table 6 (in the Appendix).

Table 3: Flow of export specialization index of the Croatian and European manufacturing industry, 2005-2009

Year/ES	2005	2006	2007	2008	2009
Croatian manufacturing industry (SITC 0-9)	0.00220	0.00228	0.00235	0.00242	0.00233
EU manufacturing industry (SITC 0-9)	0.97639	0.00098	0.98306	0.98736	0.98273

ES= Export specialization index for products of the manufacturing industry

Source: Author's analysis according to data in Table 6

The analysis of the export specialization index suggests that the Croatian manufacturing industry is significantly lagging behind the European processing activities in the export specialization. Moreover, there is an obvious lack of comparative advantage of the Croatian, as well as European manufacturing industry. The main reason for this situation lies in a relatively higher ratio of manufacturing industry import in the total import, in comparison with the export ratio in the total export of the Republic of Croatia.

The answer to the question on net export RCA level of the Croatian manufacturing industry can be found in Table 4. Export and import values of the manufacturing industry in the period between 2005 and 2009 have been taken into consideration (Table 6, in the appendix).

Table 4: Net export RCA values of the Croatian manufacturing industry, 2005-2009

Products Croatia/ NET EXPORT RCA	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	-0.358	-0.348	-0.352	-0.370	-0.338
Food and live animals	-0.318	-0.239	-0.275	-0.347	-0.288
Drinks and tobacco	0.194	0.169	0.125	0.116	0.114
Raw materials, except fuels	0.126	0.228	0.276	0.156	0.309
Mineral fuels and lubes	-0.394	-0.370	-0.421	-0.495	-0.453
Animal and plant oils and fats	-0.457	-0.497	-0.463	-0.541	-0.533
Chemical products	-0.405	-0.420	-0.416	-0.398	-0.441
Products classified by material	-0.464	-0.461	-0.456	-0.451	-0.417
Machinery and transport equipment	-0.413	-0.397	-0.373	-0.357	-0.322
Various finished products	-0.189	-0.234	-0.259	-0.283	-0.270
Products EU/ NET EXPORT RCA					
Manufacturing industry (SITC 0-9)	-0.0098	-0.0189	-0.0167	-0.0232	-0.0066

Source: Author's analysis according to data in Table 6

Croatian and European manufacturing industries are faced with a lack of comparative advantage. Negative flow of net export RCA results below the limit of value 0 confirms this assumption. When comparing values from Table 3 and Table 4, we can observe an almost identical position of Croatian and European industries. Negative values of indicators show slower dynamics in export growth in comparison with the import dynamics of the food industry in the observed period. However, in certain periods, net export RCA values of the Croatian and European manufacturing industry are significantly lower than zero due to lower export and significant decline in comparison with the import of manufacturing industry products. The exceptions are industries such as drink production and tobacco industry, raw materials (except fuels) whose values confirm the results from previous tables, and where revealed comparative advantages are present.

In order to calculate the relative trade advantage index, hereafter the revealed comparative advantage index (RCA) is shown as the relative export advantage index (RXAi). The relative trade advantage index (RCA-2) can be calculated by subtracting indicators of the relative import advantage shown below from the obtained indicators of the relative export advantage (RXAi). More detailed calculation is shown in Table 7 (in the appendix), whereas the final results are shown in the following table.

Table 5: Relative trade advantage of the European and Croatian manufacturing industry, 2005-2009

Products Croatia/RCA-2*	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	-0.0075	-0.0053	-0.0062	-0.0006	-0.0049
Food and live animals	0.1702	0.4401	0.2942	0.1063	0.1824
Drinks and tobacco	1.9519	1.6740	1.5133	1.5435	1.5340
Raw materials, except fuels	1.1635	1.2481	1.3472	1.2137	1.3051
Mineral fuels and lubes	-0.1294	-0.0562	-0.1882	-0.2620	-0.2750
Animal and plant oils and fats	-0.1271	-0.1942	-0.1455	-0.2487	-0.2754
Chemical products	-0.0853	-0.1371	-0.1207	-0.0442	-0.2204
Products classified by material	-0.3396	-0.3677	-0.3347	-0.2693	-0.2724
Machinery and transport equipment	-0.1232	-0.1107	-0.0575	0.0088	0.0350
Various finished products	0.4762	0.3209	0.2725	0.2253	0.1603
Products EU/RCA-2*					
Manufacturing industry (SITC 0-9)	-0.0104	-1.0031	-0.0086	-0.0041	-0.0074

*RCA-2 = Relative trade advantage index of the manufacturing industry

Source: Author's analysis according to data in Table 7

The analysis of calculated relative trade advantages suggests that the analyzed index does not include more significant deviations from previously defined models. Croatian and European processing activities are characterized mostly with a

negative trend which indicates a lack of comparative advantages in the last years of the observed period. The essence of the issue lies in the fact that the Republic of Croatia is mostly import-oriented country with regard to processing activities. Recent situation is linked with a lack of export competitiveness which is manifested as a result of unsatisfactory price competitiveness and insufficient technological development of the manufacturing industry on global markets.

5. Conclusions

The basic hypothesis of the research has been confirmed, which claims that "the structural analysis of comparative advantage indicators and export competitiveness can be used to evaluate export competitive position of the Croatian manufacturing industry". Since it is based on the conducted analysis, through an appropriate scientifically-based methodology, the export competitive position and comparative advantages of the Croatian manufacturing industry have been evaluated. The confirmation of the basic hypothesis derives from the below-stated conclusions.

Main research results indicate that the Croatian manufacturing industry is characterized by the lack of comparative advantages. One of the main reasons of the weakened export competitiveness is insufficient investment in production which would speed up adjustment of the Croatian manufacturing industry to the competitive conditions at the international market. This weakened connection results in reduced innovating competences of the companies. Additionally, export competitiveness of the Croatian manufacturing industry is not conditioned only by internal factors, but also by the quality of their institutional environment. Research results clearly show that the Croatian manufacturing industry is faced with accumulated issues whose consequences had destructive proportions in 2010. Activities of the Croatian processing sector have been slowed down due to decreased foreign and domestic demand, and strengthened competitive forces of Asian countries. Lower productivity and innovation level has left a significant mark on Croatian export activity flow.

With the derived results, the research has contributed to the scientific approach to the competitiveness analysis of the Croatian manufacturing industry, by presenting new facts (overview of the current status, possibilities and guidelines for further development of the Croatian manufacturing industry and related areas) interpreting them, and adopting methodological approach (applying both RCA indicators and the indicators of export competitiveness and relative trade advantage).

Limitations of this scientific research are shown, principally, in more difficult detection of comparative advantages and export competitiveness of main sub-sectors of the manufacturing industry, due to a large number of areas and branches

of the manufacturing industry. Furthermore, there are obstacles in diagnosing the actual situation of the export competitiveness of the Croatian manufacturing industry. Namely, RCA index calculations may indicate growth, stagnation and decrease of manufacturing industry activities, however there is no identification of the causes of the Croatian processing activities trend.

Pursuant to the conclusions of the conducted research, the following guidelines have been brought forward for improvement of export competitiveness of the Croatian manufacturing industry.

– firmer integration and complementarity of Croatian economic policies (monetary, exchange rate and fiscal) is needed in order to achieve better competitive position of the Croatian manufacturing industry in the international economy,

– revision of companies' strategies and plans, identification of structural issues of the Croatian manufacturing industry and their prompt solving,

– financial restructuring of insufficiently competitive companies and stimulation of joint collaboration with foreign partners,

– creation of an environment attractive for investments and technology transfer by foreign partners,

– realization of defined, but still unrealized goals of the Croatian industrial policy, and

– establishment and more active inclusion of companies into clusters in the aim of more certain placements at the international market.

Application of the results in this research can contribute to improvement of competitiveness in the Croatian manufacturing industry, but certain measures are required in institutions of the economic system, principally in the economic and industrial policy. Without the complementarity of economic and industrial policy, there is almost no way out of the current economic situation. In this sense, a comprehensive approach is needed to overcome the issues related to export competitiveness, on the macro-environment and micro-environment levels. In other words, makers of political and economic decisions should create an environment encouraging for higher competitiveness level, and companies should ensure all prerequisites required for adjustment to the competitive environment.

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Promjene u konkurentskim prednostima prerađivačke industrije Hrvatske[1]

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Sažetak

Cilj istraživanja je analizirati poziciju i otkrivene konkurentske prednosti hrvatske prerađivačke industrije u vanjskotrgovinskoj razmjeni. Metodologija istraživanja zasniva se na primjeni skupine pokazatelja vanjskotrgovinske otvorenosti i otkrivenih konkurentskih prednosti, kao i cjelokupnoj analizi strukture prerađivačke industrije Republike Hrvatske. Za potrebe analize izražene konkurentske prednosti prerađivačke industrije Republike Hrvatske koristile su se sljedeće kvantitativne metode; Indeks izražene komparativne prednosti (RCA), kao metoda otkrivanja komparativnih prednosti u izvozu robe pojedinih zemalja, zatim Indeks izvozne konkurentnosti (XC), kao metoda mjerenja izvozne konkurentnosti promatranih zemalja, Indeks izvozne specijalizacije (ES), kao metoda usporedbe izvozne aktivnosti prerađivačke industrije Republike Hrvatske i Europske unije, te Indeks relativne trgovinske prednosti (RTA) koji objedinjuje RCA i RMA indekse. Glavni rezultati istraživanja uključuju činjenice u mjerenju otkrivene konkurentske prednosti, ocjenu položaja hrvatske prerađivačke industrije osobito na vanjskom tržištu, te preporuke i prijedloge radi dosega više razine izvozne konkurentnosti. Glavni zaključak istraživanja ogleda se u potrebi stvaranja preduvjeta i definiranja mjera za strukturne promjene hrvatske prerađivačke industrije.

Ključne riječi: *prerađivačka industrija, komparativne prednosti, izvozna konkurentnost, vanjskotrgovinska razmjena*

JEL klasifikacija: *O18, O12, F18, R11*

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Appendix

Table 6: Export and import of the Croatian, European and world manufacturing industry, 2005-2009

(000 000 USD)

EXPORT and (Croatia) / Year	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	8772.5	10376.9	12360.2	14123.7	10473.7
Food and live animals	689.1	952.6	1019.4	1051.7	1032.3
Drinks and tobacco	192.6	195.0	224.2	247.5	228.5
Raw materials, except fuels	488.1	609.7	787.1	866.0	644.1
Mineral fuels and lubes	1218.7	1567.6	1598.7	1821.5	1348.6
Animal and plant oils and fats	18.7	18.8	24.2	35.7	25.6
Chemical products	872.4	951.9	1164.8	1395.4	1014.3
Products classified by material	1290.7	1545.2	1902.7	2161.3	1580.4
Machinery and transport equipment	2538.2	2990.4	3839.8	4725.7	3099.2
Various finished products	1462.6	1544.0	1794.4	1816.0	1496.4
Σ EXPORT (Croatia)	8772.5	10376.3	12364.3	14111.7	10473.8
EXPORT and (World) / Year	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	10379609.9	12001796.3	13845349.3	15914731.2	12335011.5
Food and live animals	528034.6	583590.1	698972.4	837509.7	757068.6
Drinks and tobacco	81828.9	90300.7	106119.9	117361.3	107936.2
Raw materials, except fuels	334786.2	410355.7	498303.3	576633.8	443848.7
Mineral fuels and lubes	1430327.6	1737675.2	1974190.1	2746098.5	1741083.6
Animal and plant oils and fats	38339.7	44320.7	60921.1	88711.5	63188.6
Chemical products	1094131.9	1231783.6	1452455.4	1659196.6	1433312.0
Products classified by material	1431385.3	1690032.8	1990884.5	2185419.3	1597133.2
Machinery and transport equipment	3905783.8	4469270.9	5040885.7	5408425.7	4242768.3
Various finished products	1182006.9	1316524.1	1500463.7	1633940.5	1430488.5
Σ EXPORT (WORLD)	10504579,5	12128596.0	13986000.1	16099612.0	12419054.4
EXPORT and (EU) / Year	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	3968076.537	4507.4	5240795.6	5806445.4	4474400.8
Σ EXPORT (EU)	4064021.5	4587453.4	5331089.9	5880997.0	4553022.3
IMPORT and (Croatia) / Year	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	18560.3	21502.4	25829.4	30726.9	21202.6
Food and live animals	1332.7	1554.0	1795.9	2174.4	1871.0
Drinks and tobacco	129.9	138.5	174.1	195.9	181.5
Raw materials, except fuels	378.6	382.6	445.7	630.9	339.3
Mineral fuels and lubes	2806.0	3415.9	3929.0	5399.1	3585.2
Animal and plant oils and fats	50.3	56.1	66.1	120.1	84.1
Chemical products	2060.9	2331.1	2827.9	3245.7	2620.3
Products classified by material	3533.3	4193.1	5099.3	5712.6	3843.6
Machinery and transport equipment	6115.4	6929.1	8419.9	9986.9	6048.7
Various finished products	2144.3	2491.7	3053.7	3250.8	2604.9
Σ IMPORT (CROATIA)	18560.4	21488.3	25829.5	30728.4	21202.6

IMPORT and (World) / Year	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	10585244.1	12188865.1	14017392.7	16236552.8	12443840.0
Food and live animals	556458.7	609654.3	730496.4	877645.2	774549.9
Drinks and tobacco	87207.3	93836.5	109531.6	121454.9	110455.1
Raw materials, except fuels	378099.5	450879.7	559213.3	676136.2	485049.4
Mineral fuels and lubes	1419096.8	1771075.9	1961979.9	2837252.7	1783855.2
Animal and plant oils and fats	41094.6	46768.9	61247.2	90829.7	66059.5
Chemical products	1152171.5	1290239.7	1517049.0	1731236.0	1468478.4
Products classified by material	1447459.4	1681068.2	1985949.8	2188304.5	1578681.3
Machinery and transport equipment	3944650.9	4469554.3	5050770.9	5411839.3	4321856.5
Various finished products	1240131.4	1366680.9	1558708.7	1669063.4	1432258.0
Σ IMPORT (World)	10792228.3	12374816.1	14242525,4	16451141.6	12590407.7
IMPORT and (EU) / Year	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	4046797.5	4681350.3	5419029.4	6082831.2	4534528.2
Σ IMPORT (EU)	4131559.1	4732953.3	5496989.3	6145165.6	4602518.4

Source: www.unctad.org (11-1-2011)

Table 7: Results of RCA and RMA indexes, 2005-2009

Products Croatia/RCAi	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	1.01204	1.01063	1.00983	1.01248	1.00681
Food and live animals	1.56288	1.90807	1.64987	1.43273	1.61686
Drinks and tobacco	2.81852	2.52424	2.39000	2.40689	2.51007
Raw materials, except fuels	1.74581	1.73686	1.78673	1.71339	1.72064
Mineral fuels and lubes	1.02032	1.05452	0.91602	0.75677	0.91843
Animal and plant oils and fats	0.58551	0.49646	0.45021	0.45949	0.48085
Chemical products	0.95477	0.90329	0.90712	0.95949	0.83910
Products classified by material	1.07975	1.06869	1.08108	1.12826	1.17335
Machinery and transport equipment	0.77816	0.78210	0.86164	0.99686	0.86613
Various finished products	1.48169	1.37088	1.35276	1.26804	1.24035
Products EU/RCAi					
Manufacturing industry (SITC 0-9)	0.98815	0.00099	0.99305	0.99879	0.98943

Products Croatia/RMAi	2005	2006	2007	2008	2009
Manufacturing industry (SITC 0-9)	1.01955	1.01593	1.01606	1.01317	1.01178
Food and live animals	1.39265	1.46795	1.35564	1.32642	1.43444
Drinks and tobacco	0.86662	0.85020	0.87668	0.86335	0.97600
Raw materials, except fuels	0.58221	0.48877	0.43949	0.49962	0.41545
Mineral fuels and lubes	1.14977	1.11075	1.10423	1.01879	1.19348
Animal and plant oils and fats	0.71266	0.69071	0.59578	0.70824	0.75628
Chemical products	1.04008	1.04048	1.02787	1.00371	1.05958
Products classified by material	1.41937	1.43645	1.41585	1.39760	1.44577
Machinery and transport equipment	0.90145	0.89280	0.91922	0.98798	0.83108
Various finished products	1.00541	1.04993	1.08027	1.04273	1.08002
Products EU/RMAi					
Manufacturing industry (SITC 0-9)	0.99864	1.00419	1.00165	1.00294	0.99683

Source: Author's analysis as per www.unctad.org (11-1-2011)