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COMPETITIVENESS OF CENTRAL EUROPEAN COUNTRIES IN THE EU FOREST PRODUCTS MARKET WITH THE EMPHASIS ON SLOVAKIA

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ABSTRACT

The aim of this paper is to analyse the competitiveness of selected central European countries in the EU forest products market with the emphasis on Slovakia. The competitiveness is studied in the sectors of raw wood material and the products of primary wood processing. A set of competitiveness indicators is used to analyse the changes in competitiveness of the respective countries. Results of the analyses pointed out that the comparative advantages are changing with the level of wood products processing and, in particular, they decline with the increasing value added to the products. Trade specialisation is also influenced by the level of wood processing. While on the raw material level and the level of semi-finished mechanical wood products with low added value, such as sawnwood, the country is inter-industry specialised, with the increasing added value of products its trade turns to be intra-industry specialised.

Key words: competitiveness, international trade, forest products.

INTRODUCTION

Globalization is affecting all industries, including forest based industry. Therefore, new strategies and advantages are required to face international competitors. Timber companies must continually strive to improve or at least maintain its market share (OBLAK and GLAVONJIĆ 2014). The process of globalisation has led to the gradual reduction in trade barriers, so more emphasis is now being placed on promoting export competitiveness. Competitiveness has become key issue in international markets as it can be considered as the major source of export development. Due to growing global demand for wood and wood products it is crucial to be competitive on international market in order to make use of the potential gains of increased demand. The path of raw wood material from its production to giving the final product to a consumer is relatively long, as it passes several stages of production and different types of markets until the final product fulfils the needs of the consumers (PAROBEK *et al*. 2014). In case of environmentally sensitive markets the competitiveness of forest products can be influenced by factors related to the origin of wood material from sustainable and renewable sources (PALUŠ and KAPUTA 2009).

The concept of competitiveness is rather complex. WOLFF *et al*. (2007) argue that this term is used at different levels of aggregation (level of products, business units and firms, industry, national or regional). A major difference between the competitiveness of business

units and national economies is in the ultimate objective. In the first meaning it is the success or in several cases the very survival of a company, while in the second meaning the objective is to raise living standards (JANSIK *et al*. 2014). A nation's competitiveness can be described as the degree to which it can, under free and fair market conditions, produce goods and services which meet the test of the international markets, while simultaneously maintaining and expanding the incomes of its people over the longer term. In a broader context, LATRUFFE (2010) defines competitiveness in two perspectives: (i) as the ability to face competition and to be successful when facing competition, and (ii) as the ability to sell products that meet demand requirements and at the same time, ensure profits over time that enable the firm to thrive.

According to NOOR *et al*. (2008) the theory of competitiveness is based on comparative and competitive advantage, both of which are related, but one is often mistaken for the other. The concept of comparative advantage is derived from traditional theory of international trade. The term competitiveness goes beyond comparative advantage as no country can be competitive in every economic activity. PORTER (1990) claims that productivity is the only meaningful concept of competitiveness. According to KAGOCHI (2007) some of the underlying factors that influence competitiveness include technology, human capital, product quality and differentiation, exchange rate, and other external factors. Traditional trade theory understands international competitiveness via the comparative advantage of nations. A nation engages in trade and gains a comparative advantage not because it can produce a good or service absolutely cheaper, but because it is relatively more efficient than other nations in producing this good or service (RICARDO 1911; CARVALHO *et al*. 2009). The Heckscher- Ohlin theorem (OHLIN 1933) assumes that especially the relative endowments of production factors such as natural resources, labour and capital determine a nation's comparative advantage. The theorem states that each country exports the commodity which requires for its production relatively intensive use of the factor in relative abundance in that country (GONUGUNTLA 2007). The measurement of competitiveness in this sense stresses a country's performance on international markets and refers e.g. to trade flows, net exports, or countries' shares of the world market (WOLFF *et al*. 2007).

For small and vulnerable economies, exports are essential in sustaining growth and external viability. Their long-term survival is dependent on their ability to compete with exports of similar products from other countries in the international market. Export industries can contribute significantly in terms of capital inflows, employment, utilisation of domestic resources and widening the manufacturing base. Exports can also allow domestic industries to achieve some economies of scale, which otherwise would not have been possible due to the limited domestic market size (PRASAD, 2004). There have been several indicators developed to measure the competitive situation of a specific sector or country. According to GRIES and HENTSCHEL (1994) these can be classified into two groups: (i) result-oriented indicators (such are terms of trade, revealed comparative advantage, constant market shares, etc.) a (ii) determinant-oriented indicators (e.g. the legal and institutional framework of a country, its infrastructure, social security system etc.)

There have been many studies using the result-oriented indicators to evaluate competitiveness of forest based and related agricultural sectors in different countries. CARVALHO *et al*. (2009) used the revealed comparative advantage (RCA) and relative position in the market (RPM) indices to evaluate competiveness of Brazilian wood pulp in the international market. GONUGUNTLA (2007) used the RCA index to analyse New Zealand's forestry sector comparative advantage in some forestry products. The study showed that New Zealand's comparative advantage decreased in low value products but increased in high value products within the forestry sector. PRASAD (2004) used the revealed comparative advantage (RCA) index and revealed symmetric comparative advantage (RSCA) to measure Fiji's competitiveness in comparison to a set of reference countries. A comprehensive study on the

competitiveness in the global forest industry sector with the emphasis on the German forest industry was elaborated by DIETER and ENGLERT (2007). The study considered competitiveness of different wood commodities according to the level of processing using the revealed comparative advantage (RCA) index and the constant market share (CMS) analysis. MÄKELÄ (2009) studied the competitiveness of the Russian forest industry and the influence of export taxes on competitiveness of individual wood commodities. NOOR *et al*. (2008) used the approach of revealed comparative advantage to analyse the strength of Malaysia in exporting wood and forest products to world market. A similar study was elaborated by ZHANG *et al*. (2012) who evaluated the competitiveness of Chinese industries, including the competitiveness of wood products. Similarly, several studies were elaborated by FERTO and HUBBARD (2001), GIURCA and SERBANESCU (2000), YERCAN and ISIKLI (2006), HAJDÚCHOVÁ and HLAVÁČKOVÁ (2014) to evaluate competitiveness of agricultural and wood products in the international markets.

The objective of this study is to analyse the competitiveness of selected central European countries in the EU forest products market in the sectors of raw wood material, products of primary mechanical and primary chemical wood processing. A set of competitiveness indicators is used to analyse the changes in competitiveness in related sectors of the respective countries with the emphasis on Slovakia in different time periods.

MATERIAL AND METHODS

Based on the classification of the World Factbook (THE WORLD FACTBOOK 2015) the central European countries included in the analysis are represented by Slovakia, Poland, Slovenia, Czech Republic, Austria, Germany and Hungary. The EU 27 represented the reference market. As for the definition of forest products, the FAO classification of forest products (FERTO and HUBBARD 2001) was used to set up the main categories of products according to the type and level of processing and added value (tab. 1). For the evaluation of competitiveness cross-sectional data for the years 2007 and 2012 have been analysed.

Tab. 1 Categories of examined wood and wood products.

Category	Product groups	Products included
Raw wood material	Roundwood	Industrial roundwood Fuel wood
Semi-finished mechanical wood products	Sawnwood	Sawnwood Sleepers
	Wood based panels	Veneer Plywood Particle board Fibreboard
Semi-finished chemical wood products	Wood pulp	Chemical wood pulp Semi-chemical wood pulp Mechanical wood pulp Dissolving wood pulp
	Paper and paperboard	Newsprint Printing and writing paper Other paper and paperboard

The study adopts the widely accepted competitiveness indicators (Market Share (MS), Revealed Comparative Advantage (RCA), Net Exports Revealed Comparative Advantage (NERCA)) based on forest products trade data in 2007 and 2012 available from the FAO Forest

Products Statistics (FORESTRY PRODUCTION AND TRADE, 2015) and the UN COMTRADE DATABASE (2015).

Market Share

An indicator of competitiveness is market share, the percentage of a world (a set of selected countries) commodity market held by an exporter. Shifts in market share between two time periods reflect changing competitiveness across countries. A positive difference reveals an overall growth in market share; a negative difference reveals the failure to maintain market shares. Market share can be defined as:

$$MS_j^A = X_j^A / X_j^W \quad (1)$$

where:

X_j^A - country A's export of product j,

X_j^W - world exports of product j (exports of a set of referenced countries).

As market share can change due to different reasons such as export subsides, changes in the total world market, changes in commodity markets etc., this indicator should be used in measuring competitiveness especially when used with other related indicators shown below.

Revealed Comparative Advantage Index

The revealed comparative advantage index was proposed by BALASSA (1965) to demonstrate whether a country has comparative advantage in producing a given product, comparing its share to the volume of domestic and international exports. According to CARVALHO *et al*. (2009), an index greater than unity indicates that a country has comparative advantage in producing product, while an index less than unity indicates that the country has revealed comparative disadvantage. Higher index means greater comparative advantage of the country in international trade. The Balassa's RCA index is defined as:

$$RCA_j^A = \frac{X_j^A / X^A}{X_j^W / X^W} \quad (2)$$

where:

X^A - total exports of country A,

X^W - total world exports (exports of a set of referenced countries).

GONUGUNTLA (2007) argues that although RCA reveals a country's resource based comparative advantage. It is quite likely that a country's comparative advantage is influenced by other variables such as changes in resource endowment, technology and demand. Another problem with the RCA index is that large differences in country sizes can cause problems when applying the RCA across countries and therefore LAURSEN (1998) adjusted the RCA index to make it symmetric (RSCA), such that the adjusted index values are between – 1 and +1. This RSCA index is defined as:

$$RSCA_j^A = (RCA_j^A - 1)/(RCA_j^A + 1) \quad (3)$$

Positive values of RSCA show a comparative advantage and negative values of RSCA show a comparative disadvantage in exporting product j.

Net exports Revealed Comparative Advantage Index

The index helps to reveal the real comparative advantage as it considers simultaneous exports and imports of a particular product category. This ratio is calculated as:

$$NERCA_j^A = \frac{X_j^A - M_j^A}{X_j^A + M_j^A} \quad (4)$$

where:

M_j^A - country A's import of product j.

This ratio ranges from -1 when there are no exports ($X_j^A = 0$) to +1 when there are no imports ($M_j^A = 0$). The values indicate comparative disadvantage when it is between –1 and 0 and comparative advantage when the value is between 0 and +1. However, if it is equal to 0, it indicates that exports and imports of a particular product are equal. More specifically, this index measures the degree of specialisation of a country in exporting a particular product (PRASAD 2004).

RESULTS AND DISCUSSION

An overview of competitiveness indicators for roundwood is shown in tab. 2. The market share of the analysed countries in roundwood exports was 42% in 2007 and increased by 3% to 45% in 2012 mainly because of the growth in market shares of Czech Republic, Poland, Slovenia and Slovakia. An overall increase was recorded in spite of a significant drop in Germany's market share that decreased by more than a half to 10.7% in 2012 from 22.6% in 2007. On the other hand, there was an increase in the shares of small countries (Czech Republic, Slovakia, Slovenia), and, in particular, in Slovakia where it increased by almost 140% and reached 7.7% in 2012. An increase in Slovakia's market share was reflected in revealed comparative advantages, where RCA rose by 64% to 4.874 (RSCA = 0.660) in 2012. All other countries except of Germany and Austria showed comparative advantages on the roundwood market in 2012 as the values of their RSCA indexes were greater than 0. The highest comparative advantages in 2012 were revealed for Slovenia (0.731) followed by Slovakia (0.660) and Czech Republic (0.587). As for the NERCA indicator, this is influenced only by the export and import of a country. Relatively high negative values were recorded in 2012 for Austria (-0.788) and Germany (-0.268) as both increased their imports of roundwood while other analysed countries showed positive values.

Tab. 2 Competitiveness indicators of selected countries for roundwood in 2007 and 2012.

Roundwood	MS	RCA	RSCA	NERCA	MS	RCA	RSCA	NERCA
	2007				2012			
Austria	0.031	1.034	0.017	–0.768	0.028	0.897	–0.054	–0.788
Czech Republic	0.075	3.263	0.531	0.547	0.119	3.839	0.587	0.341
Germany	0.226	0.892	–0.057	0.187	0.107	0.380	–0.449	–0.268
Hungary	0.024	1.359	0.152	0.510	0.025	1.246	0.110	0.644
Poland	0.014	0.545	–0.295	–0.507	0.062	1.742	0.271	0.248
Slovakia	0.033	2.964	0.495	0.554	0.077	4.874	0.660	0.732
Slovenia	0.018	3.553	0.561	0.191	0.035	6.440	0.731	0.421

Competitiveness indicators for sawnwood are illustrated in tab. 3. The market share of the central European countries is more than a third of all EU exports and in 2012 accounted for 34% after it dropped from 39% in 2007. The reason for this can be found in rising domestic consumption of sawnwood either by further processing industries such as furniture production or construction sector in Germany, Austria and partially in Poland, as well as in the increase of exports of other EU traditional sawnwood exporters. All other countries increased their market share between 2007 and 2012 led by Slovenia's 7% and Slovakia's 6% increase. In spite of a decrease in Austria's market share, the country still showed the second biggest value of RCA indicator (3.381) after Slovenia (3.818). In 2012 comparative advantages were also revealed for the Czech Republic and Slovakia while the negative value of RSCA indicates comparative disadvantages for Hungary, Poland and Germany. Except of Slovenia, all other net exporters

showed decreasing value of NERCA in 2012 compared to 2007. In case of Slovakia the value of this indicator decreased by 37% to 0.36, however the country still has a comparative advantage in the trade of sawnwood and it is a net exporter. NERCA values for Hungary, Germany, Slovenia and Poland point out a significant intra-industry specialisation of these countries.

Tab. 3 Competitiveness indicators of selected countries for sawnwood in 2007 and 2012.

Sawnwood	MS	RCA	RSCA	NERCA	MS	RCA	RSCA	NERCA
	2007				2012			
Austria	0.128	4.289	0.622	0.571	0.107	3.381	0.544	0.399
Czech Republic	0.028	1.223	0.101	0.523	0.032	1.383	0.222	0.415
Germany	0.183	0.725	–0.160	0.283	0.138	0.492	–0.341	0.152
Hungary	0.005	0.285	–0.557	–0.377	0.007	0.363	–0.467	0.012
Poland	0.014	0.538	–0.300	–0.115	0.013	0.377	–0.453	–0.187
Slovakia	0.016	1.441	0.181	0.560	0.021	1.923	0.309	0.360
Slovenia	0.014	2.794	0.473	–0.018	0.021	3.818	0.585	0.112

The values and changes in competitiveness indicators for wood based panels are illustrated in tab. 4. This product group is aggregated and incorporates veneer sheets, plywood, particle board including OSB board and fibreboard. In 2012 the exports of the analysed countries accounted for 48% of all EU exports and due to a great variety of products within the product group, which are used in different industrial sectors, this market share stayed unchanged compared to 2007. The greatest market share values were recorded by Germany (23.6%), Austria (11.3%) and Poland (6.6%) in 2012. However, RSCA index revealed comparative advantages for Austria (0.565), Slovenia (0.331) and Poland (0.298), thought Slovakia and Czech Republic turned from comparative advantages in 2007 to disadvantages in 2012.

Slovakia and Hungary are net importers (NERCA<0) of wood based panels while other countries are net exporters. This is valid for the whole group of products, however situation may differ for individual products according to the country specific production and consumption. All countries except Austria show relatively high intra-industry specialisation. However, the reasons for such performance of individual countries would require more detail analysis of a specific country conditions. In Slovakia, for example, the NERCA value was -0.153 in 2012 and it was the result of the intensive foreign trade with different dimension and quality classes of particle boards used for different purposes.

Tab. 4 Competitiveness indicators of selected countries for wood based panels in 2007 and 2012.

Wood based panels	MS	RCA	RSCA	NERCA	MS	RCA	RSCA	NERCA
	2007				2012			
Austria	0.103	3.465	0.552	0.544	0.113	3.598	0.565	0.499
Czech Republic	0.028	1.222	0.100	0.183	0.030	0.977	–0.012	0.178
Germany	0.248	0.981	–0.009	0.247	0.236	0.841	–0.086	0.152
Hungary	0.014	0.769	–0.130	–0.062	0.012	0.611	–0.242	–0.012
Poland	0.057	2.170	0.369	0.118	0.066	1.847	0.298	0.234
Slovakia	0.015	1.370	0.156	–0.104	0.012	0.761	–0.136	–0.153
Slovenia	0.013	2.651	0.452	0.167	0.011	1.990	0.331	0.084

An entire market share of the analysed countries in wood pulp export on the EU exports was 21.8% in 2012, which is significantly less compared to the market shares of mechanical primary processed products exports (tab. 5). Comparative advantages in wood pulp trade measured by RCA (RSCA) in 2012 were revealed only for Austria (0.300) and Slovenia (0.208) even if the positive RSCA value showed also Slovakia (0.110) yet in 2007. These three countries are also the only net exporters of wood pulp led by Austria (NERCA = 0.447). On the other hand the greatest negative trade deficit was recorded in Germany (NERCA = 0.635).

The NERCA values of Hungary (-0.146), Czech Republic (–0.121) and Slovakia (–0.129) indicate significant intra-industry specialisation with prevailing imports over exports. As wood pulp is an input material for paper manufacturing, an intra-industry specialisation of individual countries is given by the respective paper production capacities. For example, Slovakia is a producer and net exporter of chemical wood pulp for printing and writing paper production on one hand and a net importer of pulp of waste paper used for household paper production on the other hand.

Tab. 5 Competitiveness indicators of selected countries for wood pulp in 2007 and 2012.

Wood pulp	MS	RCA	RSCA	NERCA	MS	RCA	RSCA	NERCA
	2007				2012			
Austria	0.058	1.945	0.321	0.463	0.059	1.858	0.300	0.447
Czech Republic	0.012	0.517	–0.318	–0.164	0.013	0.417	–0.411	–0.121
Germany	0.088	0.347	–0.485	–0.676	0.083	0.294	–0.545	–0.635
Hungary	0.009	0.475	–0.356	–0.260	0.010	0.475	–0.356	–0.146
Poland	0.023	0.855	–0.078	–0.273	0.034	0.944	–0.029	–0.182
Slovakia	0.014	1.247	0.110	0.289	0.011	0.667	–0.200	0.129
Slovenia	0.008	1.525	0.208	0.376	0.008	1.525	0.208	0.288

An overview of competitiveness indicators for paper and paperboard products is shown in tab. 6. The market share of the analysed countries in paper products export was 28% in 2007 and increased by 2% to 30% in 2012.

Tab. 6 Competitiveness indicators of selected countries for paper and paperboard in 2007 and 2012.

Paper and paperboard	MS	RCA	RSCA	NERCA	MS	RCA	RSCA	NERCA
	2007				2012			
Austria	0.026	0.885	–0.061	–0.369	0.030	0.953	–0.024	–0.310
Czech Republic	0.026	1.150	0.070	0.232	0.026	0.849	–0.082	0.353
Germany	0.216	0.856	–0.078	0.112	0.228	0.813	–0.103	0.130
Hungary	0.000	0.001	–0.998	–0.994	0.001	0.025	–0.951	–0.867
Poland	0.002	0.060	–0.887	–0.927	0.001	0.035	–0.933	–0.954
Slovakia	0.010	0.897	–0.054	–0.129	0.014	0.888	–0.059	–0.046
Slovenia	0.000	0.002	–0.997	–0.999	0.000	0.024	–0.953	–0.982

However, 77% of the market share was held by Germany only. In 2012 none of the countries had comparative advantage in exporting paper products, even if RSCA calculated for Austria (-0.024), Slovakia (-0.059), Czech Republic (–0.082) and Germany (–0.103) indicate values close to zero. NERCA revealed Germany and Czech Republic to be net exporters and pointed out a significant Slovakia's intra-industry trade specialisation in paper products.

In order to evaluate the competitiveness of countries in individual sectors of primary wood processed products it was furthermore necessary to carry out additional analysis for the defined aggregated categories. Competitiveness indicators for the group of semi-finished mechanic wood products are shown in tab. 7. Based on 2012 RCSA values only Slovenia (0.487), Austria (0.227) and Poland (0.006) had comparative advantage in foreign trade with sawnwood and wood based panels, even if these three countries supplemented by Slovakia and Germany were net exporters of these products. Apart from Germany and Austria, values of net exports RCA of other countries indicate strong intra-industry trade.

Tab. 7 Competitiveness indicators of selected countries for semi-finished mechanic wood products in 2007 and 2012.

Semi-finished mechanical wood products	MS	RCA	RSCA	NERCA	MS	RCA	RSCA	NERCA
	2007				2012			
Austria	0.034	1.131	0.062	0.558	0.050	1.588	0.227	0.448
Czech Republic	0.015	0.632	–0.225	0.332	0.021	0.660	–0.205	0.289
Germany	0.130	0.514	–0.321	0.262	0.165	0.585	–0.262	0.152
Hungary	0.014	0.773	–0.128	–0.175	0.012	0.585	–0.262	–0.003
Poland	0.033	1.232	0.104	0.062	0.036	1.012	0.006	0.134
Slovakia	0.012	1.079	0.038	0.146	0.016	0.995	–0.003	0.116
Slovenia	0.012	2.466	0.423	0.064	0.015	2.829	0.478	0.102

When taking into account summarised competitiveness indicators for semi-finished chemical wood products (tab. 8) it can be stated that all countries except Poland had comparative disadvantage in trading pulp and paper products and similarly, as in the case of mechanical wood products, the trade is mainly of intra-industry nature.

In general, forest industry in Slovakia is divided into the forestry and wood processing industry. A long history of the forest industry is based on the rich wood resources. According to MPARVSR (2013) the total area of forests was almost 2 mil. ha and the growing stock in the Slovak forests continued to rise and reached 452 mil. m^3 in 2012. The main output of forestry is roundwood production. Total felling in 2012 was 8.2 mil. m^3. In spite of the sufficient domestic wood processing capacities (mainly for softwood logs) a significant part of roundwood production is exported (over 2.4 mil. m^3 in 2012).

Tab. 8 Competitiveness indicators of selected countries for semi-finished chemical wood products in 2007 and 2012.

Semi-finished chemical wood products	MS	RCA	RSCA	NERCA	MS	RCA	RSCA	NERCA
	2007				2012			
Austria	0.028	0.928	–0.037	0.364	0.031	0.989	–0.006	0.339
Czech Republic	0.018	0.786	–0.120	–0.100	0.018	0.595	–0.254	–0.041
Germany	0.223	0.883	–0.062	–0.007	0.233	0.828	–0.094	0.018
Hungary	0.015	0.833	–0.091	–0.289	0.014	0.692	–0.182	–0.182
Poland	0.043	1.642	0.243	–0.326	0.057	1.589	0.227	–0.252
Slovakia	0.009	0.809	–0.106	0.239	0.011	0.665	–0.201	0.095
Slovenia	0.006	1.118	0.056	0.138	0.007	1.245	0.109	0.102

The primary wood processing industry consists of the three main sectors represented by sawmilling, wood based panels and pulp and paper sector. The secondary wood processing industry is represented by furniture sector. Due to the low domestic consumption of final

products the whole industry is strongly export oriented. The primary processing sectors have been traditionally using the domestic wood resources, however the increasing pulp and paper production resulted in a growth in imports of hardwood pulpwood. Sawmilling sector is very heterogeneous and mostly oriented to production of low value construction coniferous sawnwood (PALUŠ and PAROBEK, 2013). In 2012 the Slovak sawmills produced 1.56 mil. m^3 of sawnwood out of which 40 % was exported. Wood based panel industry is represented mainly by particle board producers that produced 0.53 mil. m^3 of boards in 2012. At the same time over 64 % of production was exported and nearly 0.23 mil. m^3 of particle board imported to Slovakia. Pulp and paper industry is one of the most powerful sectors in the Slovak economy (ŠUPÍN, 2011). In 2012 the production of the main paper categories - printing and writing paper was 0.54 mil. tons, out of which nearly 96% was exported. The future development of the industry is depending on the level of utilisation of wood resources, investments into wood processing capacities and innovation activities of the industry (LOUČANOVÁ, 2004).

In evaluating Slovakia's forest based industry competitiveness it was necessary to analyse the calculated indicators for each product category individually as mentioned in the concept of WOLFF *et al*. (2007). In general, Slovakia's market share on the EU exports for semi-finished products in 2012 was between1.1% to 2.1% and was declining with the value added in production chain of primary wood processing sectors. The highest market share of 7.7% in 2012 was recorded for roundwood when it rose from 3.3% in 2007. This increase was caused mainly by a significant increase in fuel wood exports, which production had been driven by the increasing demand for renewable energy resources as a result of the EU renewable energy policy (EREC, 2008). Likewise other former transition countries in the group, Slovakia has a comparative advantage in export of raw wood material as its RCA (0.660) is one of the greatest. At the same time the country is a net exporter of roundwood with a strong specialisation on export (NERCA = 0.732) and thus inter-industry trade oriented. Similarly, comparative advantages increased for sawnwood trade when RCA almost doubled from 0.181 in 2007 to 0.309 in 2012. The exports were driven mostly by the emerging construction markets for coniferous sawnwood as a result of the post crisis recovery at some foreign markets. Slovakia is also a net exporter of sawnwood with a strong export specialisation (NERCA = 0.360). The country has no comparative advantages in wood based panel trade (RCA = -0.136) and NERCA value (-0.153) indicates significant intra-industry specialisation with imports prevailing over exports. This trend is also obvious from the development of statistical data published by FAOSTAT (2015). This is a result of the existing domestic production capacities dominated by particle board manufacturing and thus domestic consumption depending on imports of all other products in the category such as plywood and fibreboard. The sector producing semi-finished chemical wood products – pulp and paper industry in Slovakia has comparative disadvantage in trading for both wood pulp products (-0.200) and paper and paperboard products (-0.059). Due to the specialised production of certain products from the entire product group Slovakia is a net importer of these products and the country is intra-industry specialised.

Based on the analysis of competitiveness indicators for the Slovak forest based industry it can be concluded that the comparative advantages are changing with the processing level and they decline with the increasing value added to the products. Trade specialisation is also influenced by the level of processing. The same relations were concluded by MÄKELÄ (2009) as he realised that the Russian forest sector is competitive primarily in products with a low added value. Our research proved that the Slovakia is inter-industry specialised in the raw material level (roundwood) and semi-finished mechanical low added value wood products (sawnwood) level and it turns to be intra-industry specialised with the increasing added value of products (wood based panels, wood pulp, paper and paperboard). The results of our analysis can also be compared to those by DIETER and ENGLERT (2007) who concluded that it is typical for industrialised countries to be intra-industry specialised and also that there is a continuous

increase and specialisation in trade along the entire production process which can be explained by the obviously higher variety of finished products than of preliminary products.

CONCLUSIONS

As globalization is affecting all aspects of economic and social environment and increases competitiveness, it is necessary for the industries to face these challenges and implement innovative strategies to gain market advantages. A nation's competitiveness can be evaluated through the ability of a nation to produce goods and services meeting the requirements of the international markets, while simultaneously maintaining and expanding the incomes of its people over the longer term. Forestry and forest industry are based on the production and utilisation of raw wood material in the entire supply chain and the wood origin from renewable and sustainable sources can be considered as one of the competitive factors on the present environmentally sensitive markets and under the pressure of the global green initiatives.

The objective of this study was to analyse the competitiveness of selected central European countries in the EU forest products market with the emphasis on Slovakia in the sectors of raw wood material, products of primary mechanical and primary chemical wood processing. A set of commonly used competitiveness indicators was adopted to analyse the position and changes in competitiveness of the respective countries in different time periods. It can be concluded that the study results confirmed that comparative advantages and specialisation of a country is changing with the level of processing. In particular, Slovakia has the highest comparative advantage in trade with raw wood material among the analysed countries and the increase in values of adopted indicators was caused mainly by a significant increase in fuel wood exports driven by the increasing demand for renewable energy resources as a result of the EU renewable energy policy. A comparative advantage has also been revealed and has been increasing for sawnwood trade during the examined period. Sawnwood exports were driven mostly by the recovering construction markets for coniferous sawnwood. Wood based panel trade of Slovakia is characterised by revealed comparative disadvantage and a significant intra-industry specialisation with imports prevailing over exports as a result of the domestic production specialised in particle board manufacturing and import dependence of all other products in the product group. In case of semi-finished chemical wood products no comparative advantage was revealed. On the raw material level (roundwood) and semi-finished mechanical low added value wood products (sawnwood) level Slovakia is inter-industry specialised and with the increasing added value of products (wood based panels, wood pulp, paper and paperboard) the country turned to be intra-industry specialised.

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