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ANALYSIS OF THE ECONOMIC PERFORMANCE AND COMPETITIVENESS OF THE EUROPEAN UNION COUNTRIES

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Abstract

The main purpose of this study is to identify the dynamics of economic performance and competitiveness in the European Union (EU-28) countries and their convergences over the two periods, 2008-2015 and 2015-2019. The comparative analysis is used to answer the research question with applied the hierarchical cluster analysis, Ward's method, and t-test to test the set hypothesis. Eurostat and World Economic Forum data were used for the period 2008-2019.

The empirical results confirmed our hypothesis that there are convergences in the key indicators of trade openness, exports as % of gross domestic product (GDP), market shares as % in world trade, GDP per capita, and global competitiveness index. The study contributes to the empirical analysis on the existence of convergences in a group of indicators of economic performance, trade openness, and global competitiveness of the EU-28 countries. The common clusters were formed, and the set hypothesis was tested regarding the convergences of the EU-28 countries by means of a hierarchical cluster analysis. Trade openness and export market shares in world trade, and competitiveness of EU-28 countries are important for trade policies improving global competitiveness and improving convergences in the heterogeneity among the EU countries.

Keywords: trade openness, export market shares, level economic development, global competitiveness, European Union

1. INTRODUCTION

This article aims to examine the evolution in dynamics and differences in key economic performance and competitiveness indicators.

Its main purpose is to identify changes and assess the convergence in economic performance and global competitiveness of the European Union (EU-28) countries. Their position is assessed according to the

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set criteria of economic performance and competitiveness indicators over the two sub-periods, 2008-2015 and 2015-2019.

The objective of the comparative analysis is to identify the groups of EU-28 countries according to their economic and competitiveness performances. The EU-28 countries are compared in terms of trade indicators, gross domestic product (GDP) per capita, and a classic measure of global competitiveness. Comparatively, we were interested in the pattern in the dynamics of GDP per capita, the volume of trade (exports and imports), exports as a share of GDP, export market share in world trade and global competitiveness index (GCI). To assess changes and convergences between the EU-28 countries, the indices were calculated as the percentage change between the indicators in the two sub-periods 2008-2015 and 2015-2019.

The global competitiveness of countries is the set of institutions, policies and factors that determine a country's level of productivity (WEF, 2016). Porter (2000) defines global competitiveness in relation to productivity on the microeconomic foundations of social welfare that a country's standard of living depends on productivity. Aiginger (2006) defines competitiveness as the ability of a country or location to create the well-being and standard of living of its population. Krugman (1994) argues that national competitiveness is a "dangerous obsession" that can lead to protectionism and trade wars by restricting trade through measures (quotas, tariffs, and other import restrictions), since countries are importers of goods. However, economic liberalization can be an important factor in the areas of international competitiveness (Fagerberg, 1988).

Increasing global and regional linkages,

e.g., macro-regional linkages at the EU level, allow exports to become both more intensive and more competitive at the global level. European Commission (2010) is already in the Lisbon Strategy clearly emphasized that the main goal is to make Europe the most competitive, dynamic and knowledge-based economy in the world, being capable of sustainable economic growth with more and better jobs, greater social cohesion.

With globalization and entry of new global players on world markets, especially Brazil, Russia, India, China, and South Africa (or BRICS) countries and some other emerging market economies, the EU-28 countries have faced several competitiveness problems (Bojnec et al., 2014; Malý, 2018; Xinzhong, 2021; Simionescu et al., 2021). The market share of the advanced EU-28 economies has declined, but there are also differences between the EU-28 countries in the light of global competition (Neverauskienė, 2020; Marčeta & Bojnec, 2021). Moreover, the divergence between the EU-28 countries was manifested in inadequate volume or inconsistency of exports across the EU-28 countries geographical areas (Iyke, 2017; Breuss, 2018). The heterogeneity between the EU-28 countries is also in terms of GDP per capita and global competitiveness (Kacprzyk & Doryń, 2017; Marčeta & Bojnec, 2020; Fedajev et al., 2021). These heterogeneities between the EU-28 countries have raised our research problem and has motivated our research aiming to answer the question regarding differences and possible catching up processes in economic performance and global competitiveness between the EU-28 countries.

Brunet (2013) points out that Europe's competitiveness challenges are concentrated at the periphery due to the productivity

deficit gaps in competition. Since 2008, most European countries have experienced a series of structural weaknesses, financial and economic crises, market imbalances and uncertainties in a globalized space. Increasing global interdependence in an open and interconnected economy is affecting economic development processes and national competitiveness.

Global competitiveness levels vary widely across the EU-28 countries, and the gap within them is widening. Economic convergence is therefore not a general phenomenon across the EU countries. This has its consequences in terms of weakening EU cohesion and emergence of disintegration tendencies in some EU countries (Malý, 2018). The divergence is due to the debt recession, especially in the countries of South-Eastern Europe. The challenges in the EU-28 countries are trade openness and productivity gap, especially for the newer EU Member States. According to WEF (2020), trade openness can be important for the creation of more competitive markets. The WEF (2019) shows an improvement in the EU-28 countries competitiveness, especially for the South-Eastern European economies. The EU Member States showed serious imbalances in the form of huge surpluses in the robust Nordic-EU economies and huge deficits in the less efficient Southern EU economies (Brunet, 2012).

The article fills the gap in the literature contributing to the investigation of the economic heterogeneity of the EU-28 countries and their grouping according to the similarity in terms of economic performances and competitiveness. According to Richard (2012), in 2010, there was a large development gap between European countries. According to Dicken's

(2011) research, between 2000 and 2007, the average economic growth rate in the old EU-15 countries was 2.3%, significantly lower than the world average (3.2%) and that of Asia and Eastern Europe. The EU countries have been hit hard by the debt crisis and the strong inequality in the economic performances.

The rest of the article is organized in the following way. The next section, based on the review of previous literature, derives hypothesis. The third section presents the methodology and data used. The fourth and fifth sections present and discuss the results of cluster analysis and t-test with implications. The final section concludes.

2. LITERATURE REVIEW

Trade theories emphasize the importance of productivity and competitiveness for trade as a driver of export-led economic growth (Trošt & Bojnec, 2015, 2016). There are several studies on trade openness starting from Smith (1776) and the role of trade openness in international development (Nannicini & Billmeier, 2011), trade openness and export diversification with fast trade growth in products and varieties of extensive trade margin (Agosin et al., 2012; Balavac & Pugh, 2016), and the relationship between trade openness and economic growth (Huchet-Bourdon et al., 2018). Another group of studies represent the convergence of competitiveness in the EU-28 countries (Barbosa & Alves, 2011; Brunet, 2012, 2013; Balcarová, 2016; Iyke, 2017; Breuss, 2018; Malý, 2018; Gräbner et al., 2021). Since the 2004 enlargement, the EU-28 countries have been divided into 15 'rich' and homogeneous old EU Member States and 13 'poor' new EU Member States

(Breuss, 2018). However, some new EU Member States have made substantial progress. Simionescu et al. (2021) found that the main drivers of GDP per capita variation and competitiveness in the EU-28 countries are human and physical capital, foreign direct investment, and research and development expenditure.

The results of the analysis by Balcarová (2016) show that although the competitiveness gap between the EU Member States narrowed in the period 2003-2012, it did so very slowly. Iyke (2017) defines an open economy as one that displays a relatively high share of trade in total economic activity with significant interaction and integration with the rest of the world in international competitiveness. The North-Western to South-Eastern EU polarization can be identified in particular in the dimensions of governance and institutions and competitiveness, while in other dimensions, such as the single market and openness or symmetry and convergence, the new EU countries have converged considerably (Rozmahel et al., 2013).

Economic performance is increasingly dependent on a globalized economic environment due to the growing importance of trade and finance and interconnections between countries (Marçal et al., 2020). A lack of competitiveness is in areas such as trade and finance causes disparities or imbalances. According to Aiginger (2013), between 2008 and 2012, peripheral EU countries experienced a significant improvement in their trade balance. Both trade deficits as well as current account deficits were halved. In the peripheral countries of the Quartet (Greece, Spain, Portugal, and Ireland), exports improved significantly, especially within EU. Ireland turned a trade deficit into a surplus as

imports declined. Richard (2012) for the EU showed that peripheral areas have a 30-50% lower level of GDP per capita than central areas because their economic structure is weak due to specialization in standardized services (trade and non-tradable activities) and low value-added in industry. According to Bojnec and Fertő (2009) the EU enlargement has increased agri-food trade, and particularly, Poland has made substantial improvements because of trade openness with the EU-15 countries. Pierluigi (2012) concluded the pervasive effects of trade openness on poverty and inequality, even in the long run. Gräbner et al. (2021) points out that various alternatives to the label "trade openness" have been proposed, such as trade dependency ratio, trade openness index, trade share or trade ratio. Iyke (2017) defines an open economy as one that has a relatively high trade share in total economic activity and significant interaction and connectivity with the rest of the world. An open economy should trade intensively in the global marketplace and should contribute significantly to global competitiveness. According to Cvijanović et al. (2012), competitiveness in foreign trade is also the ability of producers, processors, and exporters to conquer new markets and gain them for the permanent purchase of their products.

According to Squalli and Wilson (2007) an index of trade openness should capture two dimensions: the share of a country's trade in its income, and the interaction and connectivity of the country with the rest of the world. Frankel and Cavallo (2008) note that trade openness makes a country more vulnerable. A country that is heavily integrated into world markets is more exposed to shocks coming from abroad. Marčeta and Bojnec (2021) note that an

important task for the EU-28 countries is the increasing cohesion of economies, trade openness, the pursuit of higher levels of competitiveness and economic growth.

Balcarová (2016) noted that there are convergence trends in competitiveness in the EU countries, with initially less competitive economies catching up with initially more competitive countries, while at the same time the competitiveness is increasing for individual countries as well as the EU as a whole. The empirical results confirmed real convergence in productivity, labour market indicators, and output, but the pattern of convergence in economic structures was less clear (Marelli & Signorelli, 2010). Breuss (2018) for the EU-28 countries argues a positive association between trade openness and real GDP per capita growth. Neverauskienė (2020) argues that GDP measures are the cornerstone of competitiveness based on productivity principles. Xinzhong (2021) posits new trade theories arguing that not only factor endowment, technology, and economies of scale (i.e., concepts emphasized by traditional trade theories) but also institutional factors can have an impact on exports and trade developments. Fedajev et al. (2021) concluded for the GDP per capita that the differences between the EU countries were reduced during the last decade. The EU average, however, was much higher in 2020 than in 2008, whilst the catching-up process was in some new member states such as Cyprus, the Czech Republic, Estonia, Lithuania, Slovenia, and Malta.

Based on the literature review, we set the objectives and hypothesis of the research to define the position of the EU-28 countries using trade variables, to assess trends and convergences based on groups of variables

defining competitiveness, GDP per capita, and different measures of trade openness, namely trade volume, exports/GDP or imports/GDP, and market shares as % of world trade.

The first objective of the research is to analyze trends over the period 2008-2019, namely changes over time in trade openness, considering exports, imports, exports as % of GDP, market shares in world trade, and GDP per capita. In doing so, we aim to highlight the essential characteristics of the individual EU-28 countries and, by comparing them, we aim to show which countries have experienced the most significant changes in the dynamics of trade and competitiveness performances.

The second objective is to identify the groups of the EU-28 countries according to the similarity in the set of criteria and the pattern in the dynamics of convergences between the EU-28 countries.

Based on the literature review and for the purpose of the research, we aim to answer the following research question (RQ):

RQ: Are there significant heterogeneities within the EU-28 countries in the variables that distinguish the performers from the underperformers? What have been the trends over the period 2008-2019? How are common clusters formed, and what is the homogeneity and division of the EU-28 countries?

We want to test a set hypothesis regarding the heterogeneities, and convergences in terms of trade openness of exports, imports and market shares, and GDP per capita. We define the following hypothesis:

H1: Over the observation period 2008-2019, there are heterogeneities and

convergences in the EU-28 countries in terms of trade openness, trade market shares and hence in economic performance and competitiveness.

3. METHODOLOGY AND DATA

3.1. Methods

In this paper, we analyze trade performances, as this is one of the main drivers of globalization and global competitiveness. Sample of the EU-28 countries is considered to identify their position over time and possible convergence. A hierarchical cluster analysis is used to test the division of the EU-28 countries into groups. This allows assessing the position of the EU-28 countries in the economic performance and competitiveness, and the heterogeneities between them. The hierarchical cluster analysis, Euclidean distances, Ward's method, and t-test were used to test the hypothesis. SPSS software was used to analyze the data and combine economic performance indicators. According to the compared trends or moving of economic performance indicators over time is assessed the convergence at a given level of economic development of the EU-28 countries.

3.2. Data and summary statistics

We use secondary data in the empirical analyses. The sources of the secondary data are: World Economic Forum (WEF, 2008/2009; WEF, 2015/2016; WEF, 2017/2018; WEF, 2018-2019; WEF, 2019/2020) for Global Competitiveness Index (GCI), which variables are scaled from 1 to 7 for the sub-period 2008-2015 and from

1 to 100 for the sub-period 2015-2019; and Eurostat (2014, 2016, 2017, 2019, 2021) for other analyzed variables.

We first explore the summary statistics across the EU-28 countries in terms of trade openness, economic performance, GDP per capita and competitiveness as measured by the GCI. Tables 1 and 2 present summary statistics on trade openness, export share in GDP, export market shares in total world exports, and GCI as an indicator of competitiveness of the EU-28 countries for the two sub-periods.

We use for trade openness the following four indicators: index of volume of exports goods and index of volume of imports of goods, exports of goods as % of GDP, and export market shares in (%) of world trade. Eurostat statistics were also used for real GDP per capita (chained linked volume in 2010 euro). We calculated constant on the initial year-based indices of variables of economic performances for variables: GDP per capita, value export and import, exports as % of GDP, and export market shares in world trade (%).

The growth rates of all variables were calculated for the two sub-period 2008-2015 and 2015-2019. According to Eurostat (2021), the export market share refers to the export market share in world trade at current prices. Trade openness is measured as exports divided by the country's GDP. Real GDP per capita is calculated as the ratio of real GDP to the average population in a given year. It is often used as an indicator of the level of economic development or how prosperous a country is, as it is a measure of the average real income in that country. GDP measures the value of total final output of goods and services produced by an economy within a certain period. It includes goods and services that have markets (or which could

have markets) and products which are produced by general government and non-profit institutions.

Over the period 2015-2019, there have been significant changes, with the South-Eastern European economies showing a convergence. In the WEF Global Competitiveness Scoreboard, the EU-28 countries between the years 2015 and 2019 show significant improvements in their competitiveness. The GCI scores of the Netherlands and Germany stand out, followed by Sweden, Finland, Denmark, Ireland, and Luxembourg. By contrast, the

Central and Eastern European countries – the Czech Republic, Estonia, Lithuania, Latvia, Poland, and Bulgaria – have lower GCI scores. However, Slovakia, Slovenia, Hungary, and Croatia were significantly more competitive in 2019 compared to 2015, followed by the Mediterranean countries Greece, Italy, Spain, Cyprus, and Malta, which have experienced significant improvement as a possible result of enlargement and adjustments to new trade policies, as well as improvements in market efficiency. The competitiveness gap between the EU-28 countries tends to narrow with a

Table 1. Changes in economic performance and competitiveness, 2008-2015

	GDP per capita	Export	Import	Export/ GDP	Export market share	Global competitiveness index GCI 2019
Belgium	102	120	120	104	84	5.2
Bulgaria	113	135	104	122	107	4.4
Czech	105	138	133	131	95	4.5
Denmark	100	109	104	102	77	5.3
Germany	106	122	123	108	90	5.5
Estonia	105	135	122	119	113	4.7
Ireland	128	185	152	147	141	5.0
Greece	75	98	67	136	67	4.0
Spain	95	120	91	131	89	4.6
France	101	119	120	109	85	5.1
Croatia	93	114	91	130	86	4.1
Italy	91	106	97	111	79	4.4
Cyprus	85	110	87	122	86	4.3
Latvia	108	131	101	149	114	4.5
Lithuania	115	151	125	133	107	4.5
Luxembourg	99	137	142	121	115	5.2
Hungary	107	127	116	114	83	4.3
Malta	125	137	124	97	100	4.5
Netherlands	98	129	119	115	86	5.5
Austria	100	111	112	100	80	5.2
Poland	122	146	126	131	108	4.5
Portugal	96	129	105	131	93	4.5
Romania	108	168	125	153	121	4.3
Slovenia	94	114	97	118	84	4.2
Slovakia	113	140	125	117	95	4.6
Finland	92	88	98	82	62	5.4
Sweden	106	113	117	92	82	5.4
United Kingdom	103	112	114	103	94	5.4

Note: GDP per capita (constant based index of the initial year on volume at 2010 euro), export (constant based index of the initial year on volume in current prices), import (constant based index of the initial year on volume in current prices), Export/GDP (%), Export market share (% world trade), Global competitiveness index (score WEF from 1 to 7).

Source: Eurostat (2016), WEF (2016).

Table 2. *Changes in economic performance and competitiveness, 2015-2019*

	GDP per capita	Export	Import	Export/ GDP	Export market share	Global competitiveness index
Belgium	105	112	113	105	110	70.4
Bulgaria	118	130	1289	100	120	64.9
Czech	113	125	125	92	106	70.9
Denmark	109	115	113	105	102	81.2
Germany	105	111	116	100	99	80.8
Estonia	118	124	123	95	114	70.9
Ireland	122	136	130	103	100	75.1
Greece	105	131	132	125	118	62.6
Spain	109	117	118	104	102	75.3
France	105	112	114	104	100	78.8
Croatia	117	132	136	112	114	61.9
Italy	105	117	115	106	100	71.5
Cyprus	117	104	129	103	100	66.4
Latvia	116	127	128	100	114	67.0
Lithuania	121	129	126	113	123	68.4
Luxembourg	103	95	103	94	107	77.7
Hungary	118	124	130	94	104	66.1
Malta	109	114	116	93	100	68.5
Netherlands	107	123	123	101	104	82.4
Austria	106	116	117	105	105	76.6
Poland	119	133	134	113	121	68.9
Portugal	112	121	133	107	103	70.4
Romania	125	126	137	98	112	64.4
Slovenia	115	139	146	109	119	70.2
Slovakia	111	118	122	100	105	66.8
Finland	108	122	121	114	108	80.2
Sweden	103	114	114	108	102	81.2
United Kingdom	104	101	110	114	70	81.2

Note: See note to Table 1. Global competitiveness index (score WEF from 1 to 100).
Source: Eurostat (2021), WEF (2016, 2020).

sign of convergence.

The export performance was calculated as the share of exports of goods and services in GDP and represents trade openness in integration or globalization processes. Tables 1 and 2 show the changes in trade openness over the period 2008-2019. The lowest export share in GDP was in Estonia, the Czech Republic, Hungary, Romania, and Luxembourg. The share of exports in GDP over the period 2008-2019 grew mainly in the newer EU Member States, namely Croatia, Slovenia, Latvia, and Poland. The ratio has improved in the Mediterranean

countries (Greece and Italy), in the Nordic countries (Finland and Sweden), and in the United Kingdom (UK).

A comparison of export (in goods and services) market shares as % of world trade for the EU-28 countries between the years 2015 and 2019 shows that the largest economies such as the UK, Germany, and France, as well as Ireland, have lower changes in export market shares in world trade. Despite their favorable geographical location, the Mediterranean countries (Spain, Portugal, Italy, Cyprus, and Malta) have lower export market shares in world trade. A

significant increase in export market shares is found for Bulgaria, Latvia, Lithuania, Estonia, and Romania, as well as for Greece and Croatia. In 2019, the gap between the old EU-15 countries and the South-Eastern EU countries had narrowed.

The patterns in GDP per capita can be used as an approximation in economic development levels between the highest and lowest GDP per capita. The Mediterranean countries (Greece, Spain, Italy, Cyprus, Portugal, and Malta), the Netherlands, and Belgium were with a lower GDP per capita growth in comparison to the faster growth in Central and Eastern European EU countries (Romania, Hungary, Poland, and Slovakia), Luxembourg, Ireland, and the Baltic countries (Estonia, Lithuania, and Latvia).

4. RESULTS OF CLUSTER ANALYSIS AND T-TEST

4.1. Cluster Analysis

The grouping of the EU-28 countries is based on the changes in export volume, import volume, exports as a share (in %) of GDP, export market share, and GDP per capita indices. We want to identify clusters of the EU-28 countries that have experienced similar changes in the analyzed variables and contribute to their homogeneity or convergence. The focus is on assessing the evolution of the level of homogeneity by identifying clusters over time in the sub-periods 2008-2015 and 2015-2019 for the selected five indicators.

We want to answer on the set hypothesis: over the period 2008-2019, the EU-28 countries experienced changes that show convergences in the dynamics of the observed variables. Our research hypothesis

is related to the distribution of the EU-28 countries and their possible convergences.

We use a dendrogram to assess the EU-28 countries' clustering position, average distance, and convergences. The closer distance among clusters with prosperous countries is important for the development of neighboring countries. Hierarchical cluster analysis is carried out using Ward's method and Euclidean distance as a measure of similarity using the SPSS statistical software platform. Clustering is based on Euclidean distances that reveal greater distance and less homogeneity, and vice versa, smaller distances reveal greater homogeneity. Average Euclidean distances among clusters are a measure of homogeneity and of the division of countries into clusters.

Figure 1 shows the distances or differences and the distribution of the EU-28 countries into the three groups of similarities or clusters of countries according to the observed trade and economic performance indicators and their changes between the years 2008 and 2015.

The first similar group consists of the North-Western countries with the highest values for Belgium, France, Denmark, Austria, Sweden, Germany, the UK, the Netherlands, Luxembourg, and Finland. The second similar group consists of the Mediterranean countries with low values for Spain, Portugal, Croatia, Cyprus, Slovenia, Italy, and Greece. The third similar group, except for Ireland, consists mostly of new EU Member States from Central and Eastern Europe with the lowest values for Latvia, Romania, Lithuania, Poland, the Czech Republic, Slovakia, Estonia, Bulgaria, Hungary, and Malta.

In Figure 2 we can see the changes between the years 2015 and 2019 in the distribution of the EU-28 countries into the

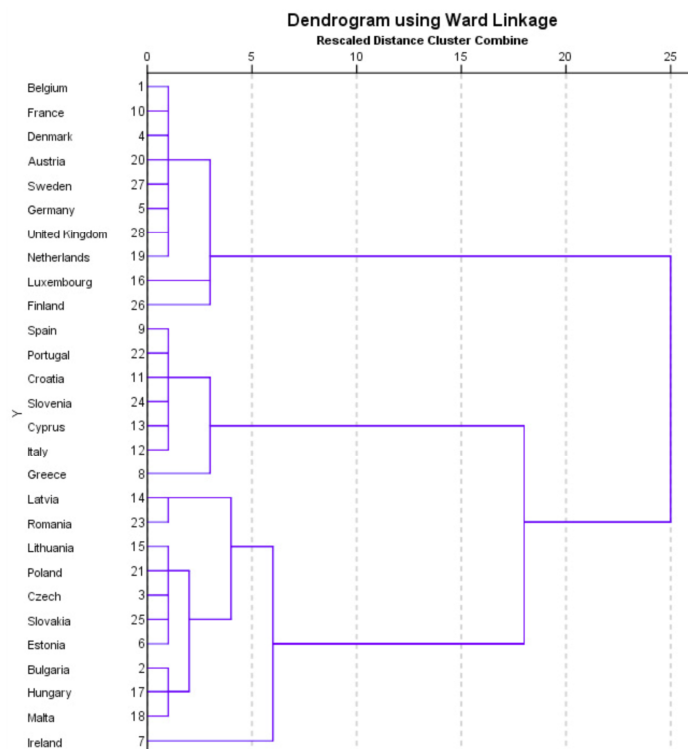


Figure 1. Dendrogram, 2008-2015

two similar groups according to the observed trade and economic performance indicators, i.e., the trade openness indices.

The dendrogram in Figure 2 shows a more homogeneous group of the EU-28 countries. Smaller distances imply smaller differences and, consequently, a decrease in heterogeneity. The first similar group, except for Portugal, Italy, Ireland, Greece, Cyprus, and Malta, includes most of the Central and Eastern European EU countries: Lithuania, Poland, Slovenia, Romania, Slovakia, the Czech Republic, Estonia, Latvia, Hungary, Bulgaria, and Croatia. The second similar group includes Belgium, Austria, Spain, Italy, Finland, Germany, France, Denmark, Sweden, Netherlands, Luxembourg, and the UK. The differences between two sets of countries are linked to the differences in GDP per capita that can be related to gaps in

quality of trade and competitiveness institutions (Bojnec et al., 2014). The comparison of the results in Figures 1 and 2 based on the hierarchical grouping method according to trade variables, GDP per capita and GCI, shows significant changes for the second similar group in the years 2015-2019, as confirmed by the highest average values of the variables. Thus, in the sub-period 2015-2019, a shift has taken place, and the first similar group includes particularly the Central and Eastern European countries, which have been with lowest values and convergences tendencies are visible. In the first group, Malta is also moving ahead. Therefore, our results confirmed the set hypothesis that there are convergences, for Latvia, Romania, Lithuania, Poland, the Czech Republic, Slovakia, Estonia, Bulgaria, Hungary, and Malta are moving ahead and

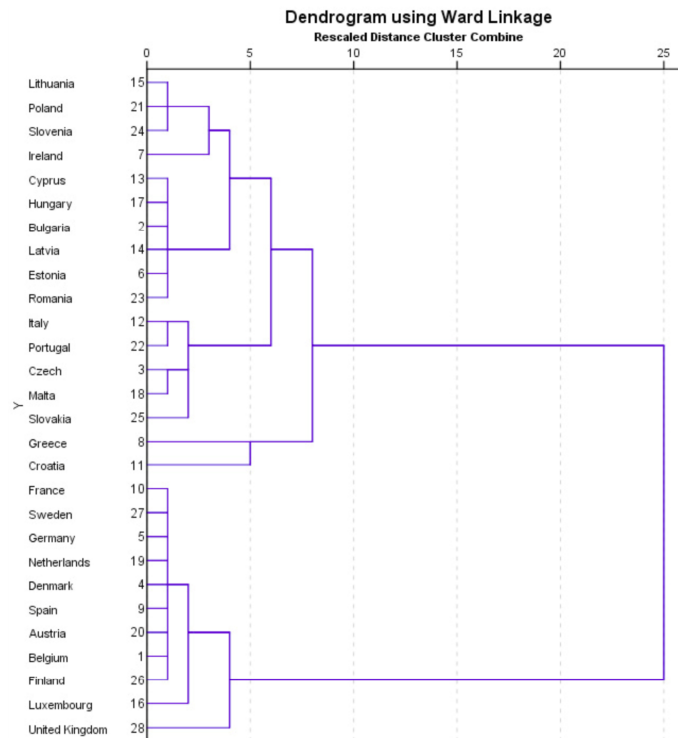


Figure 2. Dendrogram, 2015-2019

catching up with the successful EU countries. So, there has been a process of convergence in the 2015-2019 sub-period among the EU-28 countries.

4.2. T-Test

The purpose of the t-test is to determine whether there is statistical evidence that the mean difference between paired samples is significantly different from zero. A t-test and a one-way analysis of variance were used to test for differences between the samples and whether there are statistically significant differences between the means of the variables used to measure competitiveness.

Table 3 shows that all the variables separating the EU-28 countries groups are statistically significantly different, namely GDP per capita, exports, imports, exports as

% of GDP, and % of export market shares in world trade. Since the t-test is small, $p < 0.05$, the null hypothesis is rejected, and we confirm that the group means are significantly different over the period 2008-2015. The situation is similar in the period 2015-2019, and we also find that the EU-28 countries' groups of trade openness is statistically significantly different, $p < 0.05$.

5. DISCUSSIONS

The identified dynamics of trade openness and competitiveness indicators such as volume of exports, the volume of imports, trade as % of GDP, export shares in world trade, GCI, and the evolution of GDP per capita in the EU-28 countries over the two sub-periods 2008-2015 and 2015 -2019

Table 3. One-sample *t*-test

2008-2015		Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
GDP per capita	46.976	27	.000	103.036	98.54	107.54
GCI	54.087	27	.000	4.74714	4.5671	4.9272
Export	32.830	27	.000	126.571	118.66	134.48
Import	33.253	27	.000	112.750	105.79	119.71
Export share in GDP	36.340	27	.000	118.857	112.15	125.57
Market share in world trade	28.884	27	.000	93.679	87.02	100.33
2015-2019		Test Value = 0				
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
GDP per capita	90.307	27	.000	111.607	109.07	114.14
GCI	59.490	27	.000	72.418	69.92	74.92
Export	35.315	27	.000	118.964	112.05	125.88
Import	29.917	27	.000	105.036	97.83	112.24
Export share in GDP	72.060	27	.000	104.179	101.21	107.14
Market share in world trade	54.784	27	.000	106.500	102.51	110.49

Source: Authors' estimations based on Eurostat (2016, 2021) and WEF (2016, 2020) data.

confirmed a slight convergence of the new EU Member States. Trade flows are increasing in importance in the EU-28 countries due to the growing trade of the newly acceded countries (Latvia, Estonia, Lithuania, the Czech Republic, Slovakia, Poland, and Malta). On the other hand, Spain and Portugal have reduced trade flows. In terms of GCI and GDP per capita levels, the old EU-11 countries (Belgium, Denmark, Germany, Ireland, France, Luxembourg, the Netherlands, Austria, Finland, Sweden, and the UK) are in the best position. It has been confirmed that there are significant differences and disparities in the variables that separate the performers and the underperformers within the EU-28 countries. Over the observation period 2008-2019, there are found differences across the EU-28 countries in terms of trade openness and

trade shares. This is consistent with Breuss (2018) that the EU-28 Member States vary considerably in their levels of trade openness, economic performance, and competitiveness.

A hierarchical cluster analysis and country clustering identified clusters according to the selected dimensions, differences, or convergences, in the two consecutive sub-periods 2008-2015 and 2015-2019. We identified clusters and their structure in the selected dimensions, composed of trade indicators, GDP per capita and GCI. It is important, that within one cluster is similarity and difference between groups from each other of the EU-28 countries. The similar groups are confirmed according to the criterion of trade openness and economic performance. A similar group of countries is Portugal,

Ireland, Greece, Cyprus, Malta, Lithuania, Poland, Romania, Slovakia, Slovenia, the Czech Republic, Estonia, Latvia, Hungary, Bulgaria, and Croatia. In the period 2015-2019, there are two similar groups of the EU-12 countries and the EU-16 countries. So, it is confirmed that the major difference is between the EU countries in the North-Western and the South-Eastern parts.

The results described in the dendrograms contribute to answering the questions of what changes are taking place and what is the position of the EU countries. Comparing the cluster structure in the two consecutive sub-periods gives some evidence of the evolution of the clusters over time. Thus, we find greater heterogeneity in the evolution of clusters over time, particularly more heterogeneity in the period 2008-2015, which can be contributed to the EU enlargement. However, in the sub-period 2015-2019, there are convergences for Latvia, Romania, Lithuania, Poland, the Czech Republic, Slovakia, Estonia, Bulgaria, Hungary, and Malta. All of them are new EU member states. This finding confirmed the hypothesis that the changes and the homogeneity tendencies in the newer EU, mostly Central and Eastern European countries, have been greater than in the core EU old countries with respect to the variables considered.

The results of the analysis show a division, namely into the three groups of the EU-28 countries in the sub-period 2008-2015 and then a division into the two groups of the EU-28 countries in the sub-period 2015-2019. The EU countries with relatively low values have improved their positions: Spain, Portugal, Croatia, Cyprus, Slovenia, Italy, and Greece (Figure 1). The second group consists of the significant changes in the cluster structure in the sub-period 2015-

2019, when the new EU South-Eastern countries have had catching up in trade. Consequently, the evolution of trade and competitiveness growth contributed to convergences of the EU-13 new member countries: Bulgaria, Croatia, the Czech Republic, Hungary, Estonia, Lithuania, Latvia, Poland, Malta, Cyprus, Slovenia, Slovakia, and Romania.

We found that convergence in the sub-period in 2008-2015 is low for the following indicators: export market shares as % world trade, export and import volumes, GDP per capita and exports as a share of GDP. The results indicate differences in global competitiveness in the EU-28 countries. In the period 2015-2019 convergence is fast because of growing market share in GDP per capita growth. However, In EU-28 countries, there are not still significant heterogeneities despite enlargement. Breuss (2018) argues that the new EU member states are continuously growing faster than the old EU member states. The comparison of the old EU-15 countries and the new EU-13 countries indicates some catching-ups of the new EU-13 countries, but they are still lagging the levels of most of the old EU-15 countries.

Convergence performance in recent years, over the entire period 2008-2015 among the EU-28 countries has been significantly higher than between EU-28 countries entire period 2015-2019. The new EU-13 countries grew faster than old EU-15 countries but change of trade openness was sluggish. This has deteriorated global competitiveness. The reasons for such heterogeneity between EU countries in the two subperiods, are differences in GDP per capita, developments in trade openness and market share in new EU countries requiring further efforts from actors in increasing its competitiveness. As a

striking finding, convergences at a slow pace were driven by export market share. However, the new EU Member States still has a long way to go before the catching-up process leads to a more homogeneous EU-28 or EU-27 since the Brexit of the UK.

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The implications of the research findings are important for the governance of trade policies and the promotion of trade openness for a more harmonized and coordinated development of the EU countries at different levels of economic development. It is important, that national economic policy contributes to faster convergence by instruments of the EU cohesion policy.

6. CONCLUSIONS

This article contributes to the analysis of the dynamics in economic performance, focusing on trade, GDP per capita, and competitiveness. The research contributes

the results and findings of the empirical analysis of the EU-28 countries' heterogeneities and convergences and the importance of trade openness for the EU-28 countries, which is also related to competitiveness. The specific relevance for the literature is the estimated rates of changes in each of the sub-periods 2008-2015 and 2015-2019, and then demonstrating the existence of the convergences within the EU-28 countries.

We restrict our analysis to measures of trade openness expressed by exports as % of GDP and export market shares as % of world trade as an extension of previous research and to gain a clear picture of country performance. The convergence and heterogeneity of countries and the division of the EU-28 countries into the groups was confirmed by means of hierarchical cluster analysis, namely the partitioning of a set of indicators into clusters. The results show that the eastern EU-28 countries have experienced faster changes between the years 2008 and 2015, more likely due to a positive effect from enlargement.

In future studies, the challenging research issues can be regarding heterogeneity in innovation, technology, and human resources among the EU-27 countries as well as possible further enlargement of the EU towards South-Eastern Europe. Future studies should include relationships between trade openness and GCI.

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АНАЛИЗА ЕКОНОМСКИХ ПЕРФОРМАНСИ И КОНКУРЕНТНОСТИ ЗЕМАЉА ЕВРОПСКЕ УНИЈЕ

Milja Marčeta Štefan Bojnec

Извод

Основна сврха ове студије је да идентификује динамику економских перформанси и конкурентности у земљама Европске уније (ЕУ-28) и њихове конвергенције у два периода, 2008-2015 и 2015-2019. Компаративна анализа се користи за одговор на истраживачко питање уз примењену хијерархијску кластер анализу, Вордову методу и т-тест за тестирање постављене хипотезе. Коришћени су подаци Евростата (Eurostat) и Светског економског форума (World Economic Forum) за период 2008-2019. Емпиријски резултати су потврдили нашу хипотезу да постоје конвергенције у кључним показатељима отворености трговине, извоза као % бруто домаћег производа (БДП), тржишних удела као % у светској трговини, БДП по глави становника и глобалног индекса конкурентности. Студија доприноси емпиријској анализи постојања конвергенција у групи индикатора економског учинка, трговинске отворености и глобалне конкурентности земаља ЕУ-28. Формирани су заједнички кластери, а постављена хипотеза је тестирана у погледу конвергенције земаља ЕУ-28 помоћу хијерархијске кластер анализе. Отвореност трговине и учешће извозног тржишта у светској трговини, као и конкурентност земаља ЕУ-28 важни су за трговинске политике које унапређују глобалну конкурентност и побољшавају конвергенције у хетерогности међу земљама ЕУ.

Кључне речи: трговинска отвореност, удео на извозном тржишту, ниво економског развоја, глобална конкурентност, Европска унија

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