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EU ENLARGEMENT 2004 – TEN YEARS AFTER*

The aim of this paper is to analyze the key economic indicators of EU-10 MS during the last 10 years and to identify the leaders 10 years after the enlargement. We base our analysis on the macroeconomic performance of the EU-10 MS to form the groups with similar characteristics. We come to the conclusion that 1 year prior to accession to the EU, Lithuania performed best of all 10 MS under study, while Slovakia performed the worst. The situation changed in the following decade with Lithuania performing the best only in GDP growth, but averaging in other indicators, while Estonia and Latvia performed the worst in 2 out of 4 observed indicators.

Keywords: Central and Eastern Europe; the European Union enlargement; GDP growth; inflation; unemployment rate.

JEL classification: C38; E24; F15.

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РОЗШИРЕННЯ ЄС 2004 РОКУ – 10 РОКІВ ПОТОМУ

У статті проаналізовано ключові економічні індикатори ЄС-10 протягом останнього десятиріччя, виявлено лідерів та аутсайдерів у даній групі до та після входження до ЄС. Аналіз та групування на кластери спираються на макроекономічні показники, які виявили, що до приєднання до ЄС Литва була лідером у даній групі країн за більшістю показників, а Словаччина – максимальним аутсайдером. Протягом наступної декади ситуація радикально змінилась, Литва лишилась лідером лише за показником зростання ВВП, решта показників даної країни – досить посередні. У той же час Естонія та Латвія поступово стали аутсайдерами у 2 з 4 основних макроекономічних показників проведеного аналізу.

Ключові слова: Центральна та Східна Європа; розширення Європи; зростання ВВП; інфляція; рівень безробіття.

Табл. 4. Літ. 14.

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РАСШИРЕНИЕ ЕС 2004 ГОДА – 10 ЛЕТ СПУСТЯ

В статье проанализированы ключевые экономические индикаторы ЕС-10 в течение последнего десятилетия, выявлены лидеры и аутсайдеры в данной группе до и после вхождения в ЕС. Анализ и группировка по кластерам основаны на макроэкономических показателях, которые выявили, что до вхождения в ЕС Литва была лидером в данной группе стран по большинству показателей, а Словакия – максимальным аутсайдером. В течение последующей декады ситуация радикально изменилась, Литва осталась лидером только по росту ВВП, остальные показатели данной страны – довольно средние. В то же время Эстония и Латвия постепенно стали аутсайдерами по 2 из 4 основных макроэкономических индикаторов в анализе.

Ключевые слова: Центральная и Восточная Европа; расширение ЕС; рост ВВП; инфляция; уровень безработицы.

Introduction. The year 2004 witnessed the largest enlargement of the European Union (EU). 10 new member countries joined the EU, mainly from the region of Central and Eastern Europe. Table 1 provides the list of all EU-10 MS along with

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their basic macroeconomic indicators 1 year prior to entering the EU and almost 10 years after joining it. The period between 2003 and 2012 is long enough to provide scholars with sufficient macroeconomic indicators to analyze the before and after positions of the EU-10 MS, which is the goal of this article.

Domestic literature on the subject is quite extensive; however, it does not deal with key macroeconomic indicators and identifying leaders and laggards of the EU-10. Therefore, we analyzed the basic macroeconomic indicators in the whole group and identified the leaders of the group in each analyzed period and 10 years after the enlargement. R. Vintrova (2013) analyzed the convergence process of the Central and Eastern EU MS and its changes during the recession. She focused on catching up with the EU average in the last decade and concluded that this process was rather rapid with the exception of the recession period when the process slowed down. Another author dealing with the recession period is M. Labaj (2013); however, he focuses attention only on Slovak economy in the crisis years 2008–2009 concentrating on direct and indirect bonds between individual sectors of the national economy and domestic and foreign demand. F. Furuoka (2014) examines the hysteresis effect on unemployment in the Visegrad countries. His analysis is based on only one macroeconomic indicator and not on the indicators as proposed by N. Kaldor (1971). V. Hedija (2013) studies the EU-10 MS from the point of view of optimal currency area and tries to find the answer, which countries are eligible and suitable for becoming part of the Eurozone. She comes to conclusion that Czech Republic, Estonia, Hungary, and Slovakia are the most suitable countries (of those Estonia and Slovakia together with other EU-10 MS are already the Eurozone members).

In 2014, on 10 years of Slovakia joining the EU, the Faculty of International Relations, University of Economics in Bratislava issued scientific proceedings dedicated to this anniversary. K. Baculakova (2014) studied the prospects of creative industries and the implementation of cultural policy in Slovakia. M. Balejova (2014) focused on the analysis of selected macroeconomic indicators within the V4 region during the 10 years period. L'. Lipkova (2014) studied the selected issues of Slovak membership in the EU. From the political point of view, D. Adaskova (2014) and L. Borosova (2014) focused on security and defense policy and political representation in relation to the EU respectively. Also L'. Lipkova et al. (2011) dealt with various aspects of the EU economic integration, and more specifically, integration through common policies and structural funds.

Table 1 depicts the summary of the EU-10 MS together with their economic performance before and after the enlargement. We used the macroeconomic indicators from Table 1 for our further analysis.

The aim of this paper is to analyze the basic economic indicators of the EU-10 MS during the last 10 years and to identify the leaders in each period and current leaders 10 years after the enlargement. We base our analysis on the macroeconomic performance of the EU-10 MS and put them, based on performance, into different groups with most similar characteristics within the groups and the most dissimilarities – among the groups.

Methodology. The object for the analysis are 10 new member states of the European Union, i.e. those countries that joined the EU in 2004. We used the online database of World Development Indicators by the World Bank (WDI, 2014). We

chose the years 2003, 2007 and 2013 as the base years for our analysis. 2003 as the year before the accession, 2007 as the year before the global financial crisis peaked in 2008, and 2013 as the last year for which we were able to get complete data for the analysis. We were able to obtain all necessary and relevant data for all EU-10 MS. The 2014 data were incomplete, which did not allow for adequate analysis of the state of economies in the analyzed countries.

Table 1. Economic performance of the EU-10 MS, %, authors' and (WDI, 2014)

	2003				2013			
	GDP growth	Inflation	Unemployment	Net exports	GDP growth	Inflation	Unemployment (data for 2012)	Current account balance
Cyprus	1.93	5.09	4.10	-1.24	<i>-5.40</i>	-1.55	<i>11.80</i>	-1.93
Czech Rep.	3.77	0.90	7.80	-1.20	<i>-0.70</i>	<i>1.67</i>	7.00	-1.37
Estonia	7.77	4.04	10.70	-7.49	<i>1.63</i>	<i>4.54</i>	10.10	-1.21
Hungary	3.85	5.40	5.90	-3.84	<i>1.53</i>	2.97	<i>10.90</i>	4.12
Latvia	7.20	3.57	10.60	-12.58	<i>4.11</i>	1.35	<i>14.90</i>	-0.81
Lithuania	10.25	-0.78	12.90	-5.83	<i>3.25</i>	<i>1.73</i>	<i>13.20</i>	1.47
Malta	0.13	3.53	7.50	0.30	2.90	<i>2.09</i>	6.40	0.88
Poland	3.87	0.39	19.60	-2.69	<i>1.67</i>	<i>1.17</i>	10.10	-1.35
Slovak Rep.	4.78	5.31	17.50	-1.91	<i>1.42</i>	0.52	13.90	2.07
Slovenia	2.93	5.53	6.70	-0.23	<i>-1.00</i>	1.40	<i>8.80</i>	6.14

Note: Bold in 2013 columns shows positive development of the indicator for a particular country, while italics shows negative development except for net exports and current account balance.

For the analysis of EU-10 MS economies, we selected the macroeconomic indicators summarized in Table 2. We decided to use the indicators that are part of Kaldor's magic square. For more information on the background and construction of magic square, see N. Kaldor (1971), R.A. Medrano and J.R. Teixeira (2013). Nevertheless, we did not use the magic square proposed by R.A. Medrano and J.R. Teixeira (2013). Instead, we used variables as proposed by J. Lisy (2002: 70).

Table 2. Summary of input variables, authors'

Variable	Unit	Name
GDP growth (annual)	%	GDP
Inflation, GDP deflator (annual)	%	INF
Unemployment (total labor force)	%	UNE
Current account balance (% of GDP) / Net exports (% of GDP)	%	CA / EXP*

* Net exports for 2003.

We measure GDP growth as the aggregate data based on 2005 constant prices, expressed in USD. In case of unemployment, we focused on the overall unemployment rate, measured as a proportion of the total labor force. For inflation, we decided to use the GDP deflator, which reflects price changes better than the consumer price index because of taking into account prices for all goods and services within the economy. In the analysis of external economic relations, we chose the share of cur-

rent account balance to GDP, calculated as the sum of net exports of goods and services and net primary and secondary income expressed in current prices in USD⁴.

In the next part of this paper, we apply cluster analysis for the selected set of variables for individual EU-10 MS. We chose cluster analysis based on its design to group observations or variables into clusters based upon similarities between them. The aim of the decomposition was to create several rather homogenous groups. We concentrated on joining statistical units (countries) in each cluster that were the most similar to each other. Units in different clusters were to be, however, the most dissimilar. As a type of clustering procedure, we used an agglomerative hierarchical procedure with the Ward's clustering method. This type of procedure begins by placing each observation into a separate cluster. Clusters are then joined, two at a time, until the number of clusters is reduced to the desired target. At each stage, the clusters joined are the pair that are closest together. Ward's method defines the distance between two clusters in terms of the increase in the sum of squared deviations around the cluster means that would occur if two clusters were joined. Based on the results, we decided to determine the number of significant clusters as 5. We provide interpretation of clusters in the next part of this paper.

Results. This section analyzes the composition and dissimilarities of clusters of the EU-10 MS based on the variables from Table 2. As the first step of output analysis, we identify and analyze the structure of individual clusters. At the second step of analysis, we identify the main differences between clusters based on input variables. For the identification of dissimilarities among clusters, we used the centroids of the variables for all clusters in selected years. Table 3 (the first step of output analysis) summarizes basic information on individual clusters; Table 4 (the second step of output analysis) provides summaries of characteristics of each cluster based on the analyzed variables.

Based on the results in Table 3, we conclude that number of members in each cluster is rather homogenous with the exception for cluster 2 (4 members). Closer observation of cluster 2 shows that members of this cluster are geographically close to each other: Czech Republic, Hungary, and Poland are neighboring countries in Central Europe forming part of the Visegrad Group. Cluster 3 is similar to cluster 2, comprising two small Baltic states of Estonia and Latvia. Small island states of Cyprus and Malta compose cluster 1. Two smallest clusters by the number of members are clusters 4 and 5 including Lithuania and Slovakia respectively. As seen in Table 3, we base our cluster analysis on GDP p.c. growth for all the observed countries. Centroids are present in the last column, showing that the highest growth of GDP p.c. in 2003 is attributed to cluster 4 – Lithuania. On the opposite side is cluster 1, which recorded decline in the growth of GDP p.c. because of decline in Malta at -0.52%, even though Cyprus in 2003 recorded the growth at 0.18%. The lowest GDP p. c. growth was observed in cluster 2 at 3.53% with Hungary recording the highest value at 4.08% and Slovenia – the lowest, at 2.78%. With the exception of Malta, all other EU-10 MS recorded positive GDP p.c. growth in 2003.

⁴ With the exception of 2003 for which data on current account balance were not available, therefore we used the indicator "net exports as % of GDP". Net exports are calculated as the sum of exports of goods and services minus imports of goods and services.

Table 3. Summary of cluster characteristics, authors' own calculations

Cluster	Number of members	%	Members	Centroids based on GDP p.c. growth (2003)
1	2	20	CYP, MLT	-0.17
2	4	40	CZE, HUN, POL, SVN	3.53
3	2	20	EST, LVA	8.20
4	1	10	LTU	11.15
5	1	10	SVK	5.48
Total:	10	100	-	-

Table 4 provides information needed to identify leaders and laggards for 2003. Following are the years of 2007 and 2013 with same cluster members as for the base year 2003. We identified macroeconomic variables for each cluster, in which member countries performed positively or negatively. Afterwards, we compared centroids for each variable for each observed period to analyze changes between the periods.

For the base year 2003, we identified cluster 4 as the cluster with leading country (Lithuania) in 2 of 4 basic indicators – GDP growth and inflation. However, this cluster performed only averagely in terms of unemployment rate and net exports. Cluster 5 (Slovakia) performed the worst regarding inflation and unemployment rate which were the highest among all the observed countries (with the exception of Poland with its unemployment rate being higher by 2.1% and Slovenia and Hungary with inflation higher by 0.29 and 0.07% respectively). Another cluster with leading indicators in 2003 was cluster 1 with the lowest unemployment rate of 5.8%, even though Malta as one of the members of this cluster recorded higher value than Hungary and Slovenia. In addition, the net export share was almost zero (-0.47) with Malta being the only country of all observed one recording positive value of +0.30. However, this cluster performed worst in terms of GDP growth with centroid value at 1.03 with Malta achieving the lowest GDP growth rate of all the countries at 0.13%. We conclude that, based on the analyzed indicators, we cannot clearly identify leaders and laggards for the base year 2003, which preceded the enlargement of the EU for new MS. However, Lithuania performed best in GDP growth and inflation and Cyprus and Malta in unemployment rate and net exports. On the other hand, cluster 5 may be seen as the main laggard because of the worst performance in inflation and unemployment rate.

The year 2007 brought significant differences and changes in leader and laggard positions of the analyzed clusters. During the first years of the EU membership, Slovakia became the leader in almost all observed indicators, with the exception of unemployment rate, with centroid for cluster 5 being the highest in all three analyzed years (17.5% in 2003, 11% in 2007 and 13.9% in 2013). However, Slovakia (cluster 5) performed best in the rest of the indicators in 2007 with the highest centroid for GDP growth and current account and lowest for inflation. If to take into account individual countries and indicators, we note that no country reached higher GDP growth and lower inflation than Slovakia and only Slovenia, Czech Republic and Malta performed better in terms of current account balance. On the other side, we note that cluster 3 (Estonia and Latvia) performed the worst of all observed clusters, especially as for inflation (15.82%) and current account balance (-19.05%). These two countries

were the only countries to record double-digit inflation in 2007 and performed the worst in terms of current account balance of all the observed countries. We conclude with identification of the leader cluster for 2007, which was cluster 5 – Slovakia. On the other hand, the worst performing cluster was cluster 3 – Estonia and Lithuania.

Table 4. Cluster differences, authors' own calculations

2003				
Cluster	GDP	INF	UNE	EXP
1	1.03	4.31	5.80	-0.47
2	3.45	3.24	10.00	-2.04
3	7.34	3.93	10.65	-10.54
4	10.25	-0.78	12.90	-5.83
5	5.41	5.36	17.50	-1.89
2007				
Cluster	GDP	INF	UNE	CA
1	4.70	3.86	5.20	-6.29
2	5.05	4.24	6.78	-5.44
3	8.94	15.82	5.35	19.05
4	9.84	8.55	4.30	-14.47
5	10.68	1.13	11.00	-4.77
2013				
Cluster	GDP	INF	UNE*	CA
1	-1.25	0.27	9.10	-0.52
2	0.37	1.80	9.20	1.89
3	2.87	2.95	12.50	-1.01
4	3.25	1.73	13.20	1.47
5	1.42	0.52	13.90	2.07

* Unemployment calculated on the data for 2012.

Note: Black cells show the most negative development for a given year and variable, while grey cells show the most positive development for a given year and variable.

Rather equivocal, similar to 2003, was the last observed year – 2013. The average cluster in this period was cluster 2 with centroids for all observed variables between the highest and lowest values in other clusters. Cluster 1 performed the best as for inflation and unemployment (0.27% and 9.1% respectively). However, it recorded the worst value of GDP growth – as the only cluster of all observed clusters; it recorded the decline in GDP growth at -1.25%. Cluster 4 recorded the highest value of GDP growth at 3.25%, which was quite low as compared to 2003 and 2007 (10.25% and 9.84% respectively). Cluster 3 performed the worst in inflation (2.95% with higher value than GDP growth of 2.87%) and current account balance (-1.01%). The results for cluster 5 were also rather ambiguous. Even though cluster 5 performed the best as for account balance (2.07%), it was the cluster with the highest unemployment rate (13.9%). We note that even though the unemployment rate for cluster 5 declined from 17.5% in 2003 to 13.9% in 2013, it still recorded, in all 3 observed periods, the highest unemployment rate of all clusters. From the point of view of individual states, Slovakia (as the only member of cluster 5), had the highest unemployment rate of all EU-10 MS with the exception of Poland and Latvia – Poland having higher unemployment rate in 2003 and Latvia in 2013 (19.6% and 14.9% respectively). Based on the results for 2013 we conclude that there are no clear leaders for this

period, since there are no clusters with solely positive values for each observed indicator. However, on the side of laggards, we conclude that cluster 3 recorded two worst values of the observed indicators; therefore, it performed the worst in this year.

Conclusion. The purpose of this article was to analyze the key economic indicators of EU-10 MS during the last 10 years and to identify the leaders in each period and current leaders 10 years after the enlargement. We built our analysis on the macroeconomic performance of the EU-10 MS and put them, based on the performance, to different groups with the most similar characteristics within the groups and the most dissimilarities among them.

Based on the results of cluster analysis, we identified the leaders of the current EU-10 MS one year prior to the enlargement in 2004. In base year 2003, we identified cluster 4 as the leading one in 2 of 4 basic indicators – GDP growth and inflation. Cluster 5 performed the worst in case of inflation and unemployment rate. On the other hand, even though cluster 1 performed best in unemployment rate and net exports, it was the cluster with the lowest rate of GDP growth. Rather clear situation in 2003 has changed in the course of the following decade. We were not clearly able to identify leaders with the exception of cluster 4 with the highest rate of GDP growth. However, other results for this cluster were rather average. Cluster 1 performed similar to 2003 – the worst record for GDP growth, but the best for inflation and unemployment. Similar goes for cluster 5 – though the best performance in current account balance, the worst performance in unemployment rate. Cluster 3 may be identified as the only laggard since it performed worst in inflation and current account balance.

We come to the conclusion that one year prior to the EU accession, Lithuania performed best of all the EU-10 MS, while Slovakia performed the worst. This situation changed in the following decade with Lithuania performing the best only in GDP growth, but averaging in other indicators, while Estonia and Latvia performed worst in 2 out of 4 observed indicators.

We are aware of the limitations of our research, especially concerning the selection of the macroeconomic indicators. We analyzed only basic macroeconomic indicators with significant impact on national economy as well as on international comparison among economies. Therefore, we suggest introduction of other macroeconomic variables suitable for analysis from both regional and international points of view to identify leading national economies as well as the economies lagging behind at both regional and international levels.

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