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CHANGES IN THE SIMILARITY OF BUSINESS STRUCTURE AND DEMOGRAPHY AFTER EUROPEAN UNION ACCESSION

ZMIANY W UPODABNIANIU SIĘ KRAJÓW POD WZGLĘDEM STRUKTURY I DEMOGRAFII BIZNESU PO AKCESJI DO UNII EUROPEJSKIEJ

Summary: The article is intended to be a 'balance sheet' of integration process in the framework of the European Union as regards the biggest enlargement after 2004. The subject of the studies are the 23 economies of the EU and Norway over the period 2006-2016 in the aspect of whether the new entrants followed more advanced countries. The concept of economic convergence has been assumed as the most crucial theoretical notion explaining the process of assimilation between members of the EU. A cognitive aim is to test whether the integration has induced convergence of the EU countries in terms of 'structure and demography of business'. The hypothesis states that the new entrants to the EU have neared the old members, however they still retain their specificity related to the post-socialistic system. In order to reach the goal and solve tasks, a comparative analysis, a statistical analysis, Euclidean distance and cluster analysis were applied for revealing the dynamics of the process of making economies more similar.

Keywords: integration, the European Union, convergence, business structure and demography.

Streszczenie: Koncepcja konwergencji jest w ekonomii powszechnie używana do wyjaśnia-nia zjawiska asymilacji pomiędzy członkami UE. Badania nad konwergencją najczęściej opierają się na PKB, ale mogą też uwzględniać czynniki stojące za jego kreowaniem, w tym przypadku – przedsiębiorstwa. Celem artykułu było sprawdzenie, czy integracja europejska spowodowała upodobnianie się krajów UE pod względem „struktury i demografii biznesu". Jako hipotezę badawczą przyjęto, że nowe kraje członkowskie zbliżają się do starej UE, ale

wciąż wykazują własną specyfikę. W artykule posłużono się analizą porównawczą, opisem statystycznym struktury branżowej oraz wielkości przedsiębiorstw i ich zdolności przetrwania, a także odległościami euklidesowymi i analizą klastrową w celu zbadania dynamiki upodabniania się gospodarek. Badaniem objęto 23 kraje UE i Norwegię w latach 2006-2016. Zaobserwowano, że kraje zaczynają się upodabniać pod względem struktury biznesowej i demografii, ale wciąż daleko im do bycia jednorodną grupą.

Słowa kluczowe: integracja, Unia Europejska, konwergencja, struktura i demografia biznesu.

1. Introduction

The second decade of the 21st century seems to be a great challenge for a future way of existence and operation for the entire European Community [Giddens 2014]. A list of domestic (a country), internal (the European Union) and external (the world) obstacles might be extended. The more so that all three groups of impedimen The article is intended to be a 'balance sheet' of integration process in the framework of the European Union as regards the biggest enlargement after 2004. The subject of the studies are the 23 economies of the EU and Norway over the period 2006-2016 in the aspect of whether the new entrants followed more advanced countries. The concept of economic convergence has been assumed as the most crucial theoretical notion explaining the process of assimilation between members of the EU. A cognitive aim is to test whether the integration has induced convergence of the EU countries in terms of 'structure and demography of business'. The hypothesis states that the new entrants to the EU have neared the old members, however they still retain their specificity related to the post-socialistic system. In order to reach the goal and solve tasks, a comparative analysis, a statistical analysis, Euclidean distance and cluster analysis were applied for revealing the dynamics of the process of making economies more similar.ts overlap. Dealing with dynamic climate changes as the effect of the mismanagement of the economy, extreme social inequalities (1% of the richest possess 99% of the world's wealth), scale, depth and degree of organization regarding the power captured by the corporate system is an absolute priority of the global economy [Dowbor 2017].

Almost every enlargement since 1973 (Ireland), apart from in1995 (Austria, Finland, Sweden) has meant the accession of less and less developed economies to the European Community. The relatively huge income disparity between old and new members in 2004 induced two opposite directed imbalanced flows: capital streams from Western Europe to Central and East Europe and labour streams *vice versa* [Andor 2019]. Additionally, for Central and East European countries, their economic past without the market as the decisive mechanism of scarce resources' allocation is still a constraint in a total and complex transition. In particular, numerous attempts to establish artificially (politically) giant companies in so called 'strategic industries' are 'entrepreneurship killers'. Firms, being usually state-owned or with the dominance of

state-share, seek a political rent rather than economic goals, so they experience a lack of budget constraints, which enhance mismanagement. Moreover, complications coming from Brexit, populist and even nationalistic movements among the EU members which demand revision of the Treaties might lead to an introduction of a 'double-speed Europe' and the consolidation of divisions into an 'old and new Europe'. Such a phenomenon involves particularism in individual countries and is unfavourable for the entire Community.

The answer to the question of whether the less developed economies, in particular those of Central and Eastern Europe which were incorporated in the EU in 2004, imitated the development path of the most economically advanced countries, considering their planned economy burdens (specificity), is the principal goal of the article. The investigations were carried out on the hypothesis that the 15-year period may be long enough to establish regularities in catching up with the leaders under turbulent global circumstances. Scientific tasks, testing the hypothesis, arise from the assumption that one of the significant descriptors/variables that is helpful in solving them is the 'structure and demography of business'. They are able to reflect simultaneously the probable impact of the integration process that resulted in economic similarity and possible relics of the former system. The target was accomplished with the use of the following methods and tools: a comparative analysis (theoretical background), statistical description, Euclidean distances, cluster analysis (dynamics of similarity of new entrants to old members), and analysis synthesis (findings and conclusion).

2. Theoretical background – is the theory of convergence applicable to explain catching up with the most advanced economies in the EU?

The concept of convergence, sometimes called the catch-up effect, has been studied in economics for at least several decades.[1] It relies on the general hypothesis that less developed economies – measured by GDP *per capita* – grow at higher growth rates than more advanced ones since they are less abundant in resources of capital so their diminishing marginal productivity from capital lowers slower [Solow 1956]. Furthermore, they have opportunities to replicate institutions, modes of behaviour, methods of production, technologies which were experienced effectively. In literature one can find a lot of aspects of catching up to riches as well as examples for both confirming and rebutting of the hypothesis. R. Lucas came to the conclusion that capital does not flow from developed countries to the developing ones despite the lower level per worker (Lucas paradox, [Lucas 1990]). Romer refuted the hypothesis

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[1] The convergent thesis was originally put forward by Jan Tinbergen who claimed that two economic systems inevitably were converging because of being based on the necessity of similar patterns of technological development [*Macmillan Dictionary of Modern Economics*, 1996].

of unconditional/absolute convergence[2] stating that "in contrast to models based on diminishing returns, growth rates can be increasing over time, the effects of small disturbances can be amplified by the actions of private agents, and large countries may always grow faster than small countries" [Romer 1986, p. 1002]. Having introduced the notion of conditional convergence[3] [Mankiw et al. 1992] other studies, on the contrary, prove that unconditional convergence is possible, in particular among large economies [Kortayev et al. 2011]. Polish scholars who also applied the neoclassical model of Solow studied thoroughly the convergence among 27 economies in transition and in sub-groups of countries by use of β and σ coefficients. The results within the entire population did not confirm the hypothesis clearly; for different subgroups and different periods they were relatively optimistic however, and varied significantly (the best values of suitable coefficients were for eight countries that accessed the EU in 2004) [Próchniak, Rapacki 2007].

Many academics while observing the phenomenon tried to specify the determinants essential for the convergence or its failure, in particular the impact of globalization among OECD countries (e.g. [Williamson 1996]), where open economies take advantage due to free trade which creates additional economic forces in order to grow faster [Abel, Bernanke 2005]. The theory of conditional convergence is that foreign aid should also include income transfers which trigger the catching up process.

An overview of economic literature, both world [European Commission 2009] and domestic [Matkowski et al. 2013] pertaining to the impact of economic integration on growth and development, points out the great variety of empirical investigations and findings. The view prevails that the convergence of development paths is not influenced by integration automatically, however one may perceive that the more homogeneous the group of economies, the higher the susceptibility to converge and the shorter the time to obtain the similarity. In the EU, convergence has always been considered as a principal economic mechanism and pre-condition for achieving socio-economic cohesion, although nowadays there arises an anxiety of divergence due to different concepts of integration in the future [Alcidi et al. 2018].

Polish scholars examined the contribution of EU membership to the acceleration of economic growth of the 2004 new entrants. They found that the GDP growth paths of the Central and Eastern Europe countries (CEE-11) converged meaningfully to the EU-15 ones in regard to the acceleration of the catching-up process in income levels. However, the influence of EU membership to the convergence was diversified during the period considered, mostly because of the global financial crisis. Positive results were also confirmed by an econometric analysis of growth determinants

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[2] Absolute convergence means that developing countries always grow at a higher rate than the developed ones.

[3] β coefficient informs about a percentage distance to a steady-state long-term equilibrium a given economy overcomes over one period. Convergence described by σ coefficient occurs when diversification of income levels between economies is diminishing with time. Theoretically, β-convergence is a necessary condition, but insufficient for the occurrence of σ-convergence.

connected with EU membership such as increasing the scope of economic freedom, improving quality of governance, progress of market reforms and institutional market environment, inflow of the EU funds, increase in foreign trade, and foreign direct investments [Rapacki, Próchniak 2014].

The notable enlargement of the EU in 2004 has contributed, undoubtedly, to an improvement of living standards in the CEE economies, and cohesion policies as well as financial institutions provide vital support to the convergence process. They offer assistance to restructure economies and foster, in particular, small and medium-sized enterprises and projects in key sectors such as transport infrastructure and the environment [European Commission 2009].

This may underlie and support the hypothesis that integration within the EU favours convergence between more and less advanced member countries. One should keep in mind that despite the CEE-11 imitating the EU models of institutions, structural reforms, social policies, etc., their specificity resulting from the relics of the planned/socialistic economic system still exists.

Nevertheless from theoretical viewpoint, the concept of the impact of economic integration on the convergence of economies has not yet been resolved unambiguously, especially taking new challenges into account. Therefore it is still worth examining other signs of similarity within integrating economies, taking into consideration new variables which describe a modern economy such as the structure and demography of business.

3. Business structure and demography after EU expansion – empirical findings

Most of the research on convergence is focused on GDP or other monetary measures, and based on the coefficients of variations, but – in connection with the criticism of such measures as too comprehensive to assess the condition of countries – contemporarily also going beyond these categories and looking for other measures is becoming more common [Matkowski et al. 2013; Krakowiak-Bal 2005]. Moreover, the level of GDP depends on many factors, so it is also justified to study the drivers that stand behind building countries' welfare and verify whether countries become more similar in that term, which refers to the assumption that achieving similar outputs requires similar inputs. As the main 'producer' of GDP in the economy are enterprises, this research is dedicated to the structure and demography of enterprises in the EU countries. Under this category, statistical institutions publish data on enterprises' size, branches, type, ability to persist. The aim of the research is to check whether the old and new member states of the EU become (after joining the EU) more similar in terms of the set of characteristics connected with business:
- share of services in total value added,
- share of large enterprises (with employment above 250) in total number of enterprises,
- average size of enterprises (based on employment),

- birth rate of enterprises (the number of enterprise births divided by the number of active enterprises),
- death rate of enterprises (the number of enterprise deaths divided by the number of active enterprises active),
- survival rate for 3-year-old enterprises ("the number of enterprises in the reference period (t) newly born in t-3 having survived to t divided by the number of enterprise births in t-3" [Eurostat], that is how many enterprises founded three years earlier still exist).

The share of services refers to the phenomenon that more developed countries tend to have an increasing trend of this factor [Ghani O'Connell 2014]. The share of large enterprises and average size were chosen due to scientific discussion on the role of small and medium-sized enterprises for economic growth, but also on the 'double face' of large enterprise, which can be perceived as a barrier to smaller ones, but also as a chance to compete with large foreign companies [Buonanno et al. 2005]. The last three factors are demographical and reflect the conditions of creating new enterprises and their capacity to survive.

In the research the following steps were taken:

1. Descriptive analysis (average levels, ranges, standard deviations, coefficients of variation) – to check the dynamics of the characteristics considered as a single variable.

2. Data normalisation (original data has different units and ranges) – to make a multifactorial comparison possible.

3. Calculation of Euclidean distances – to analyse the dynamics of similarity/dissimilarity between the EU countries.

4. Cluster analysis with the use of the Ward method – to highlight the groups of most similar countries.

The data comes from Eurostat, the World Bank, and the OECD. The first year taken into account in the research is 2006[4], because this is the earliest year after the big expansion in 2004, where data are available for most of the EU countries. The next years included in the study are 2011 and 2016 to compare the changes that occurred during the EU integration. The countries analysed are the EU member states with the exclusion of Iceland, Greece, Cyprus, Malta, Bulgaria, and Croatia (due to lack of the data). The study also includes Norway, which is not an EU member, but shows great similarity with other countries of Northern Europe. Marking adopted in the description of the results are: EU for all countries researched, EU-15 for countries that joined the EU before 2004 and Norway, EU-13 for the countries that joined the EU in 2004 or later; these are the most popular, but in fact the EU group contains 24 countries (23 of the EU plus Norway), EU-15 – 14 countries, and EU-13 – 9 countries.

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[4] In some cases data gaps have been filled in based on the nearest years.

Table 1 presents the average level of characteristics, maximum and minimum value (with the information in brackets, which countries reached extreme results), the range (difference between max and min), standard deviation, and coefficient of variation.

On average, the share of services was and still is higher in old member states (the highest is in Luxembourg) than in EU-13, but has an increasing trend in both groups. The coefficient of variation for this characteristic is not high and has a decreasing

Table 1. Business structure and demography characteristics for the EU countries and Norway

Year	EU (23+NO)*						Av – EU-15 (13+NO)*	Av – EU-13 (9)*
	Av	Max	Min	R	SD	V		
Share of services in GDP								
2006	60.1	75.8 (LU)	48.1 (NO)	27.6	6.6	11.1	62.9	55.7
2011	61.7	78.3 (LU)	43.1 (RO)	35.2	7.4	12.0	65.4	56.0
2016	63.2	78.6 (LU)	54.3 (HU)	24.3	6.2	9.8	66.6	57.8
Share of large enterprises								
2006	1.15	3.39 (LU)	0.18 (IT)	3.21	0.70	60.88	1.12	1.20
2011	0.96	3.06 (LU)	0.30 (IT)	2.76	0.62	64.74	1.06	0.81
2016	0.94	3.39 (LU)	0.32 (IT)	3.07	0.70	74.48	1.06	0.75
Average size of enterprises (by number of employees)								
2006	10.8	21.5 (RO)	5.8 (CZ)	15.8	3.7	34.7	10.3	11.4
2011	9.2	15.3 (GB)	5.2 (CZ)	10.1	2.7	29.2	9.3	9.1
2016	8.6	15.0 (DE)	5.0 (CZ)	9.9	2.5	28.8	9.2	7.8
Birth rate of enterprises								
2006	11.2	26.0 (LT)	6.7 (BE)	19.3	4.1	36.3	9.8	13.4
2011	11.2	23.7 (LT)	6.7 (IT)	17.0	3.8	33.7	9.5	13.9
2016	10.4	18.8 (LT)	6.2 (BE)	12.6	3.3	31.6	9.3	12.1
Death rate of enterprises								
2006	8.6	16.6 (LT)	4.3 (LV)	12.3	2.9	33.4	7.9	9.7
2011	9.5	16.4 (PT)	2.9 (BE)	13.5	3.5	37.4	7.9	11.9
2016	7.9	14.8 (PT)	3.3 (BE)	11.5	2.5	32.0	7.6	8.3
Survival rate for 3-old enterprises								
2006	62.2	98.5 (BE)	44.0 (LT)	54.5	11.5	77.5	64.3	59.0
2011	59.2	101.5** (BE)	24.8 (LT)	76.6	14.4	24.4	62.2	54.6
2016	59.0	75.8 (SE)	36.7 (LT)	39.1	8.8	15.0	59.9	57.6

where: Av – arithmetic average, Max – the highest value, Min –the lowest value, R – range (max-min), SD – standard deviation, V – coefficient of variation.

*Numbers in the brackets shows for how many countries' data were available.

** A result above 100% is possible if there are enterprises that were reactivated.

Source: own calculations on the basis of data from: Eurostat, the World Bank, OECD.

tendency, but in 2016 the share of services was still roughly 10 percentage points higher for EU-15. The only country from that group with the share of services under 60% was Norway (58.8%), while among the EU-13 group in 2016 there were only three countries with a share above 60%: Estonia, Latvia, and Lithuania.

The share of large enterprises decreases in both groups of countries, but for EU-13 this decrease is more significant. While in 2006 the average share of large enterprises was higher for EU-13, in 2011 and 2016 it was EU-15 which a had higher result. But variations in the case of this characteristic is very high and has an increasing trend. In fact, both extremes belong to the countries form the EU-15 group (max – Luxembourg, min – Italy). EU-13 group is less diverse (in 2016 the score was from 0.41 in Slovakia to 1.59 in Romania).

Similar trends can be observed for average sized enterprises. At the beginning it was higher for the EU-13 countries, but a more intense decrease in this group resulted in swapping places. In 2006 it was Romania that had the maximum score, later it was the United Kingdom (2011), and Germany (2016). The lowest average size can be observed in the Czech Republic (in all the years surveyed), but in general there is no clear difference between EU-15 and EU-13 for this characteristic – in 2016 the results for EU-15 were from 5.86 (Portugal) to 15 (Germany), and for EU-13 from 5.03 (the Czech Republic) to 12.12 (Romania).

Demographic results are better among the old member states. Although the birth rate is higher for EU-13, the death and survival rates look better for EU-15. What is interesting is that the coefficient of variation in cases of survival rate noted, in comparison to any other characteristic, the most significant decrease (from 77.5% to 15%), and in 2016 average survival differs by only 2.3 percentage points. The range, however, shows that countries are very diverse in terms of demographical characteristics. The most extreme case is Lithuania, which has (in each year) the highest birth rate (18.8%-26%), but also the highest death rate (14.8%-16.6%), and the lowest survival rate (only 24.8%-44% of new enterprises were able to survive for at least three years, while in other countries – like Belgium or Sweden – this result remained at the level of at least 75% throughout the whole period).

Because the countries differ in various intensity and in various directions for their individual characteristics, the question may arise of how much do they differ in general and do they become more or less similar?

To compare the countries in terms of many factors expressed in different units, and from different ranges, it is necessary to normalise the data. Normalisation was conducted with usage of min-max method, on the basis of the following formula:

$$f(x) = \frac{x - \min(x)}{\max(x) - \min(x)} \times (\text{new\_max} - \text{new\_min}) + \text{new\_min},$$

where [min, max] is the range in which the original data is contained, and [new_min, new_max] is the new range. In this case the new range is [0,100], which means the formula can be reduced to:

$$f(x) = \frac{x - \min(x)}{\max(x) - \min(x)} \times 100.$$

Euclidean distance enables measuring the distance between the countries, taking into account many factors at the same time. It was calculated for normalised data using the formula:

$$d(x_i, x_k) = d_{ik} = \sqrt{\sum_{j=1}^{p}(x_{ij} - x_{kj})^2},$$

where j is characteristic for the objects x_i and x_k, and p is the number of characteristics.

Table 2 includes the Euclidean distances calculated for the EU countries and Norway, old member states, and new countries that joined the EU in 2004 or later.

Table 2. Euclidean distances for the EU countries and Norway

Year	Av	Max	Min	R
EU (23 + NO)*				
2006	64.6	144.4 (LT-BE)	17.5 (NL-FR)	126.9
2011	64.4	153.2 (LT-BE)	10.8 (NL-FR)	142.4
2016	54.7	119.5 (PT-LU)	13.7 (ES-IT)	105.8
EU-15 (13 + NO)*				
2006	59.5	114.9 (PT-LU)	17.5 (NL-FR)	97.4
2011	60.6	126.8 (PT-BE)	10.8 (NL-FR)	116.1
2016	58.1	119.5 (PT-LU)	13.7 (ES-IT)	105.8
EU-13 (9)*				
2006	68.8	120.1 (LT-LV)	19.5 (HU-CZ)	100.6
2011	55.4	96.5 (LT-SI)	15.7 (SI-EE)	80.8
2016	38.8	74.4 (LT-RO)	14.6 (PL-HU)	59.8
EU-15 (13+NO) vs EU-13 (9)*				
2006	67.0	144.4 (LT-BE)	18.4 (FI-SI)	126.0
2011	69.7	153.2 (LT-BE)	16.0 (FI-EE)	137.1
2016	56.9	118.0 (LT-LU)	22.0 (FI-EE)	96.0

*Numbers in the brackets show for how many countries data were available.
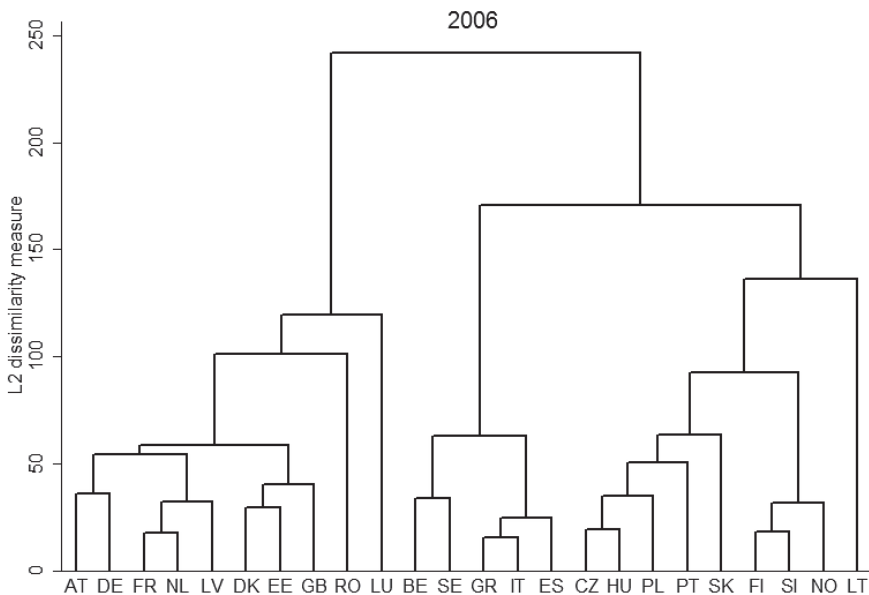
Source: own calculations.

On average the difference in Euclidean distance between the countries was reduced by nearly 10 points. The maximum distance and range were also much lower in 2016 than in 2006 (but in 2011 there was an increase, most probably caused by the financial crisis). The countries from the EU-15 group on average do not become more

similar – the range in 2016 was higher than in 2006, the Euclidean distance was lower, but the difference is slight and without one trend. The largest difference among this group could be observed between Portugal and Belgium (2011) and Portugal and Luxembourg (2006 and 2016). The diversity between EU-13 countries has decreased significantly – from 688 in 2006 to 38.8 in 2016. At the same time the average distance between EU-15 and EU-13 has also dropped by about 10 points (the most notably in Lithuania). A similar trend can be observed regarding the range – it is lower within the EU-13 group as well as between EU-13 and EU-15. It can be summed up that the effect of decreasing distance for the whole EU is a result of the increasing similarity within the EU-13 group and reducing the difference between EU-13 and EU-15.

According to the above results it is interesting whether a clear demarcation can be made for the 'model of business' specific to EU-15 or to EU-13. In order to check this, the cluster analysis was conducted. Grouping of the countries was performed with use of the Ward method, which is a taxonomic, hierarchic way of comparison based on the minimum variance between countries. The results in the form of dendrograms are shown in Figures 1 (2006), 2 (2011), and 3 (2016).

In 2006 there is a visible tendency that most EU-13 countries belong to the cluster on the right, and most EU-15 to the cluster to the left, but there are exceptions: Finland, Norway, and Portugal are in the right-side cluster, Latvia, Estonia and Romania – in the left-side cluster, and at the middle there is another sub-group for the countries from EU-15 that are not that similar to the other EU-15 counties, but also is placed separately from EU-13.
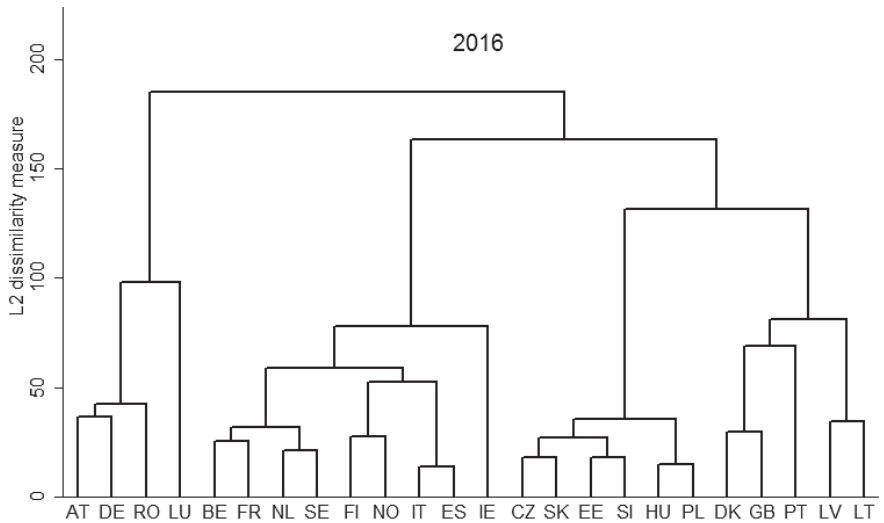

Fig. 1. Dendrogram for the EU countries and Norway (2006)

Source: own calculation.
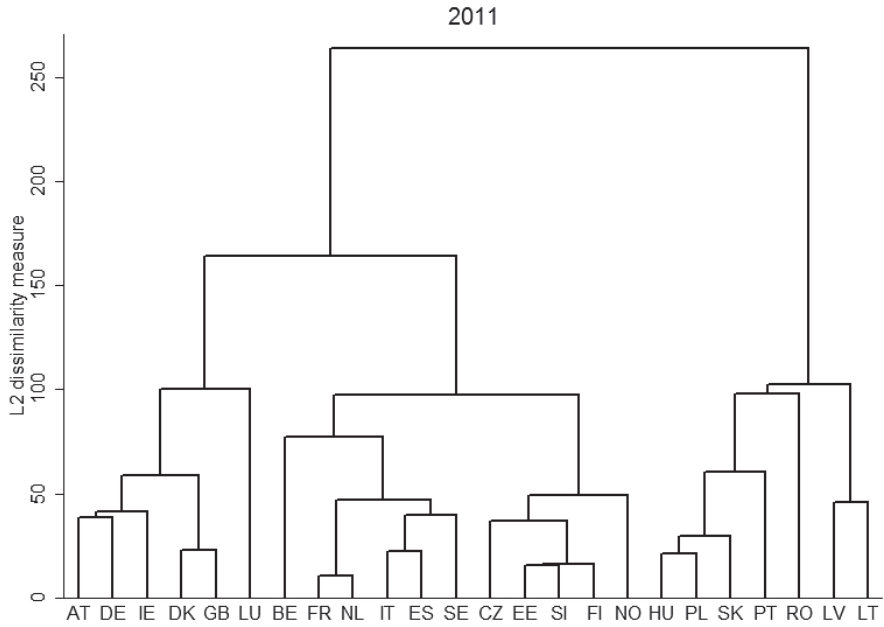
Fig. 2. Dendrogram for the EU countries and Norway (2011)

Source: own calculation.

Fig. 3. Dendrogram for the EU countries and Norway (2016)

Source: own calculation.

The picture in 2011 is different – to the right side there are only some EU-13 countries, and to the left – only EU-15 countries, but the middle cluster is larger and more mixed. What can be seen from the dendrogram for 2016 is, most of all, that the highest linkage lies much lower than on the previous figures (the difference is smaller), but also there are still two clusters that contain only EU-15 countries (the second one) and only EU-13 countries (the third one). Except for these two homogeneous groups there are also two mixed clusters: Romania is together with Austria, Denmark, and Luxembourg, while Latvia and Lithuania are together with Denmark, Great Britain, and Portugal.

As a final conclusion it can be said that countries do converge (in terms of business structure and demography), but they are still far from being a homogeneous group, and a distinction between EU-15 and EU-13 is still present.

4. Conclusion

The considerations in the article lead to the following findings:
- The concept of convergence is an appropriate theoretical notion that is able to clarify the essence of the economic integration process within the European Union, in particular inlight of the cohesion policy.
- Demographic and structural issues connected with enterprises might be considered as an element of the caching-up phenomenon, with a focus on such questions as: are more developed countries similar in terms of characteristics connected with business? Are the new member states of the EU much different from the 'old Union'? What are the dynamics of changes in the European integration in the context of business structure and demography?
- On average, the old and new member states of the EU differ in terms of the share of services (in EU-15 the level is higher, this difference has a decreasing trend, but changes are slow), and the capacity of enterprises to survive (a better capacity can be observed in EU-15 countries – this difference has noted a very significant decrease, but the range is still high). The results connected with the number of large and average-size enterprises do not show that there is one 'model' separate for EU-15 or EU-13 countries, and diversification in this respect increases.
- According to the average distance measured with the Euclidean formula, there can be observed a general decrease of the distance in the EU. This effect is a result of reducing the distances the EU-13 countries and between theEU-13 and EU-15 groups. The cluster analysis confirms the effect of becoming more similar on the most general level, but separate clusters for the countries for EU-15 and EU-13 still exists (and are larger than the mixed ones), which leads to the conclusion that convergence is in progress but EU-13 and EU-15 are still far from being a homogeneous group.

Research can be continued towards checking the significance of characteristics connected with the structure and demography of enterprises for the level of GDP (or

more broadly – for the social welfare) and analyzing the causes of the differences between the countries.

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