ASSESSMENT OF REGIONAL ECONOMIC CONVERGENCE FACTORS INFLUENCE IN EU COUNTRIES

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Abstract. Recently countries set the goal to achieve both rapid economic growth at current period and long-term growth resulting in high national economic level. This goal cannot be achieved if vast economic disparities exist among regions determining unequal conditions to the local population, and if economic development potential of some regions is not applied. A period of economic growth revealed the existing measures as inefficient for reduction of regional economic disparities in the countries due to potentially adverse effect of economic boost on convergence. During economic recession, lacking the financial resources, the objective to reduce regional economic disparities becomes too difficult to implement both in the EU advanced countries and developing ones. The listed reasons determine the relevance of research area and require reassessment of regional economic disparities in the EU countries and underlying causes thereof, considering different national economic level of the EU members and their distinct economic growth, integration to common free market zone as well as different market economy experience. The empirical research allowed identifying the factors, which directly positively (national economic development level, economic integration level) and negatively (economic growth, economic system transformation, rate of economic integration) effect regional convergence.

Key words: economic growth, convergence, economic integration, national economy development level, economic system transformation

JEL code: R11, F15, O11, P20, R13

1. Introduction

Attention to the demand for harmonized economic growth by decreasing regional economic disparities was paid in the sixth decade of the previous century, at the commencement of European economic integration. The above served as a basis for initiation of programmes intended to decrease disparities among regions. While developing such programmes, the assessment of regional economic disparities and identification of causes has become especially relevant, and regional economic convergence – main approach of regional policy with its key goal to promote harmonized and balanced economic growth, its rapid convergence and social cohesion. On the basis of programs under implementation during the last decade over EUR 70 billion were allocated from the EU funds to promote regional economic convergence, thus, the analysis of regional convergence in the EU countries is essential due to both economic and financial reasons. Regional policy can be considered successful if regional disparities decrease; however, any research on convergence/divergence issue does not provide unambiguous conclusions.

The aforementioned circumstances induced the regional economic convergence in the EU countries to turn into the subject of relevant and controversial theoretical discussions as well as empirical analysis, and attracted attention of researchers of various fields. International conferences arranged, respective reports of worldwide organizations show how globally relevant are the regional convergence problems.

At the beginning of transition to market economy in Eastern Europe countries in 1989 – 1991, a rise in production efficiency was expected to be a basis for swift economic growth enabling to catch up with the developed Western Europe countries. However, economic development factors were not territorially homogenous and the market itself was not a warranty for balanced regional development of a country. As countries have got more and more integrated, free competition and unrestricted production factor mobility amplified territorial imbalance of market economy in the EU countries due to intense trade and financial resources reallocation. Such processes are running despite on increased scopes of the EU structural support and regional policy in the countries.

The listed reasons determine the relevance of research area and require reassessment of regional economic disparities in the EU countries and underlying causes thereof, considering different national economic level of the EU members and their distinct economic growth, integration to common free market zone as well as different market economy experience. The aim of the research – on the bases of analysed scientific studies and created model to evaluate regional
economic convergence factors. **Tasks:** identify factors influencing regional economic convergence; develop model to assess regional economic convergence factors; empirically evaluate regional economic convergence factors in the EU countries at NUTS3 level.

2. Theoretical analysis of regional economic convergence factors

Economic theories provide different attitude towards regional convergence stimulating and limiting factors. There is no common consent in the empirical regional convergence researches what factors should be included into the impact assessment model, since this depends on: (1) subjective research purpose; (2) theory concept application in the research and (3) relevant data and data availability.

Upon systematic analysis of theory research it was decided to assess regional convergence in terms of national development level and economic changes. Since the trend of factor impact on regional convergence indicated by separate theories differs, the attitude of neoclassic, cumulative causation, industrial restructuring, new economic geography and Marxist theories was observed when formulating the hypotheses of the research. The relations between theories which directly and indirectly explain regional disparities and their convergence / divergence are displayed in Figure 1.

![Diagram of theoretical analysis]

**Source:** authors’ construction based on theoretical analysis

Theories analysing regional economic convergence in a country have been developing in parallel with the theories of economic growth. Due to this reason, the neoclassic model of economic without significant changes was adapted for the analysis of the differences among regional economies. Regional economic convergence was based on this model, i.e. the differences of economies existing among a country’s regions were considered as a short-term imbalance, which is corrected by free market mechanism through the decreasing efficiency of capital investments, the mobility of resources, and other ways of influence. Despite this, in subsequent models formulated on the basis of neoclassical theory (e.g. Siebert, 1970; Richardson, 1973), the technological level and insufficient dissemination of technologies among the regions creating innovations and following them but not the supply of resources, were identified as the key factors determining the differences of regional economies in a country.

Contrary to the neoclassic theory, regional economies growth differences are explained by the theoretical conceptions of demand approach that were actively developed in the 1980s. The model of economic growth by D.C. North (1955) based on export is the simplest version of this group of theories.
According to this model, the usage of local resources provides the initial impetus to the regional economic growth and later, their export embodied in goods. While export and its diversification as well as the mobility of resources are increasing, regional economic convergence is promoted in a country. By means of this model, it was not explained what creates the demand for production produced in the regions and what conditions determine the specialization. More complex model of this group is the model of cumulative causation developed by N. Kaldor (1970). In this model, the demand remains the primary factor determining the growth of economy, however, another factor – the growth of productivity occurs as well, which is determined by the growth of production volume and which determines this growth by feedback process. This concept is based on the influence of increasing return to scale on regional economic divergence in a country, which was highlighted in former theories of the economic growth. The model of N. Kaldor (1970) can be considered as precursor of the endogenous economic growth model, as it applies the effect of learning by doing, and the factors of economic growth are considered to be export specialization and economy of scales.

The endogenous economic growth theory is based on the idea proposed by P. Romer (1986) that the factors of production are not emphasized in decreasing efficiency. Under a constant or increasing productivity, the capital accumulation will cause the constant or decreasing factors of production are not emphasized in decreasing on the idea proposed by P. Romer (1986) that the convergence is promoted in a country. By means of this model, it was not explained what creates the demand for production produced in the regions and what conditions determine the specialization. More complex model of this group is the model of cumulative causation developed by N. Kaldor (1970). In this model, the demand remains the primary factor determining the growth of economy, however, another factor – the growth of productivity occurs as well, which is determined by the growth of production volume and which determines this growth by feedback process. This concept is based on the influence of increasing return to scale on regional economic divergence in a country, which was highlighted in former theories of the economic growth. The model of N. Kaldor (1970) can be considered as precursor of the endogenous economic growth model, as it applies the effect of learning by doing, and the factors of economic growth are considered to be export specialization and economy of scales.

The theoretical direction of new economic geography developed by P. Krugman (1991), P. Krugman and A. Venables (1995) at the beginning of the 10th decade analysed the factors determining centralization and decentralization of economic activity and gained attention in explaining the convergence of regional economies. In this theory, employing the ideas of agglomeration economies and cumulative causation, it is explained that transportation costs, the advantages presented by agglomeration – the size of local market, under low level of country’s economy integration, determines the concentration of economic activity in some areas as well as regional economic divergence. The decrease of transportation costs and the elimination of trade barriers can promote the decentralization of economic activity and regional economic convergence in a country.

The group of structuralistic theories of economic growth was developed alongside with generalized neoclassic (exogenous and endogenous), new geographic theories. It explains the economic growth not as the movement determined by various factors towards to or backwards from equilibrium but as evolution transferring in various stages. Considering regional economic convergence in a country, it should be noted that structuralistic theories have interrelationships with demand approach economy growth theories, as growth is perceived as the process starting in the region itself, encouraged by the increase of demand. The group of structuralistic theories involves a lot of different approaches, on the basis of which, regional economic convergence in a country can be justified or denied. In the economic development theories (Hoover, Fisher, 1949; Thompson, 1968), it is explained that the assumptions to regional economic convergence in a country are created when the regions transfer from one development stage to another in different time. Product/profit cycle theories (Vernon, 1966; Markusen, 1985) propose that regional economic convergence is expected in the countries that have high level of national economic development, however, the creation and development of the products are more typical to country’s industrialized regions and this means that in a new cycle of economic growth the assumptions for regional economic divergence will occur again. According to the industrial restructuring theory (Massey, Meegan, 1982; Noyelle, Stanback, 1983), it is possible to state that the integration of countries’ economies encouraged by globalization, and, due to this, the increased flows of direct foreign investments destroy the traditional structure of economy, determine the de-investment in majority of industrial branches that were considered to be traditional and encourage regional economic divergence in a country. According to the flexible specialization theory (Piore, Sabel, 1984; Saxenian, 1994), the scenario of regional economic divergence in a country is

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more likely because of different structure of industry from the territorial point of view and the dissemination of technologies which is determined by it as well as the interaction of enterprises. Marxist theory of economic growth (Watkins, Perry, 1977; Castells, 1972; Smith, 1984) analyses the economic changes as a result of historical evolution of domineering society group production form, and the cause of regional economic divergence in a country is considered to be the nature of capitalist system which does not create the theoretically balanced structure of economy growth. It is impossible to achieve the economic growth encouraging the convergence due to unbalanced structure of public relations, and the process of cumulative causation encourages regional economic divergence in a country.

The approach of analysed theories to the assessed influence of the level of national economy development and economy changes on the regional economic convergence in a country are presented in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Theory</th>
<th>Development level of national economy</th>
<th>Economic changes</th>
<th>Economic growth</th>
<th>Economic system transformation</th>
<th>Economic integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoclassic exogenous</td>
<td>+</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cumulative causation/ Growth poles</td>
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<td></td>
<td>−</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Neoclassic endogenous</td>
<td>+/-</td>
<td></td>
<td>+/-</td>
<td></td>
<td>+/-</td>
</tr>
<tr>
<td>New economic geography</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>Economic development/ stage</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product/profit cycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry restructuring</td>
<td></td>
<td></td>
<td>−</td>
<td></td>
<td>−</td>
</tr>
<tr>
<td>Flexible specialization</td>
<td></td>
<td></td>
<td>−</td>
<td></td>
<td>−</td>
</tr>
<tr>
<td>Marxist</td>
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<td>−</td>
<td></td>
<td>−</td>
</tr>
</tbody>
</table>

+ Induce regional economic convergence.
− Reduce regional economic convergence or induce its divergence.
+/− Impact on regional economic convergence depends on other factors.
0 Do not have significant impact on regional economic convergence

Source: authors’ construction based on theoretical analysis

The results obtained in the evaluated empirical research of regional economic convergence in EU countries are different. On the one hand, in the research that are based on neoclassic exogenous economic growth model, the tendencies of regional convergence in the countries dominate (e. g. Barro, Sala-i-Martin, 1991; Sala-i-Martin, 1994, 1996). On the other hand, this tendency of convergence is criticized in the studies based on endogenous economic growth model (e. g. Armstrong, 1995b; Dunford, 1994, Rodríguez-Pose, 1998; Cuadrado-Roura ir kt., 2002; Fingleton, 1999; Magrini, 1999). Furthermore, in other research it is stated that the convergence in the EU countries is taking place only in individual regional groups (clubs) (e. g. Chatterji, 1992; Quah, 1996a,b). Several reasons determine the differences of these results of researches. One of them is the contradictions between theoretical concepts, on the basis of which the models of β convergence are created. The differences of approaches determine different interpretation of the facts as well as the stronger position from the point of view of regional convergence or the divergence in the countries. Other reason – the number of countries and regions covered by the research as well as the period of research. It should be mentioned that the evaluation of the differences of regional economies in the EU countries is related to the problems of data access. This is especially evident when long period is researched and the data are available only from few countries.
It should be noted that the approach of different theoretical directions to the influence of the level of national economy development and the changes of economies on the convergence of regional economies of a country are different. Not only the factors which are considered as determining the convergence are different but the direction of influence is different as well. This ambiguity encourages to empirically proving or disproving the influence of factors generalized in Table 1, and thus, to justify how well the analysed theoretical directions explain the convergence of regional economies determining the factors in the EU countries in 1995 – 2012.

**Evaluation model**

In this part we contain a model, based on theoretical and empirical research, demonstrating the impact of national development level and economic changes: economic growth, economic integration and economic system transformation on regional convergence.

Mean logarithmic deviation (MLD) is selected as key index to measure economic disparities and regional convergence as well as dependent variable of the model. Such selection is justified by the fact that the above index belongs to generalized entropy class meeting strict conditions required for σ convergence analysis.

Taking into account regional convergence factors analysed in the first part of the article and ambiguous assessment of impact of national development level and economic changes on regional convergence, with the intention of quantitative assessment of the impact, the following hypotheses are formed in the empirical research:

H1: The higher is national economic development level the faster is regional convergence.

H2: National economic growth and regional convergence rates are related by inverse relationship.

H3: Economic growth in the countries that had experienced shifting from a command economy to a market economy has more negative impact on regional convergence than in the countries without such shift experience.

H4: Regional convergence runs faster in the countries with more integrated economy.

H5: There is inverse relationship between integration rates and regional convergence rates.

The hypotheses formed in the empirical research are verified by assessment method for impact of national economic development level and economic changes on regional economic convergence (Figure 2).

Empirical research experience suggests segregating the channels through which the regional convergence factors might assert in separate countries. Segregation is based on potential impact duplication (multicollinearity) and relatively small research sample limiting the number of factors subject to analysis.

This model was realized using panel data and fixed effects estimation. The selection was caused by both systemized empirical research and relatively short time series available that conditions panel data usage, involving in the analysis all the countries together and having advantage of higher number of degrees of freedom:

\[
\Delta r_{j,t-s} = \alpha + \delta_1 \cdot T_1 + \ldots + \delta_s \cdot T_s + \beta_1 \cdot \mu y_{j,t-s} + \beta_2 \cdot \Delta y_{j,t-s} + \beta_3 \cdot \Delta \mu y_{j,t-s} + \beta_4 \cdot \mu e_{j,t-s} + \delta_{j,t-s} + \epsilon_{j,t-s}; \quad (1)
\]

Here \( t=1,\ldots,18 \) (research time frame: 1995 – 2012 divided into separate \( t-t+s \) periods considering business cycles in each country examined);

\( \Delta r_{j,t-t+s} \) – measures the changes in regional disparities at NUTS3 level of j-country, i.e. if any convergence or divergence takes place within the period \( t-t+s \) and its intensity thereof;

\( \mu y_{j,t-t+s} \) – measures j-country national development level within the period \( t-t+s \);

\( \Delta y_{j,t-t+s} \) – measures j-country economic growth rate within the period \( t-t+s \);

\( \mu e_{j,t-t+s} \) – measures j-country’s integration to the EU level within the period \( t-t+s \). The bigger trading of j-country with EU states, the higher level of economic integration to the EU of such country is assumed in the research;

\( \delta_{j,t-t+s} \) – measures j-country’s integration to the EU rate within the period \( t-t+s \);

\( k_j \) – indicates if j-country experienced economic system transformation in 1989 – 1991. This categorical variable will be involved into independent variable set using dichotomic dummy variable;

\( a_j \) – unobserved country effect;

\( \delta_1, \ldots, \delta_n \) – intercept for time dummies representing each separate \( t-t+s \) period considering business cycles;

\( \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 \) – regression equation parameters which are of interest in this research:

\( \beta_1 \) – coefficient of national development level impact on regional convergence;
\( \beta_2 \) – coefficient of economic change impact on regional convergence;
\( \beta_3 \) – coefficient of additional economic growth impact on regional divergence in the countries that had experienced economic system transformation;
\( \beta_4 \) – coefficient of economic integration to the EU degree impact on regional convergence;
\( \beta_5 \) – coefficient of economic integration to the EU rate impact on regional convergence;
\( \varepsilon_{jt} \) – idiosyncratic error or time-varying error, with zero serial correlation and constant variance.

Source: authors’ construction

**Fig. 2. Empirical assessment model for impact of national economic development level and economic changes on regional economic convergence**

The time frame (1995 – 2012) of the research is considerably long to reflect short-term cyclic economic fluctuations and long-term tendencies. The research period was selected due to the fact that statistics at NUTS 3 level was started to collect in 1995 and the end of period – the beginning of the economic downturn. Data of 2012 is last the research year due to presented data of the regional GDP in EUROSTAT.

**Main conclusions of empirical research**

All hypotheses were confirmed upon empirical verification of the elaborated assessment method for impact of national economic development level and economic changes on regional economic convergence in the EU:

1) **National economic development level** has a positive impact on regional convergence. Regional convergence in highly developed countries is 7.5% faster, or diverges 7.5% slower than in less advanced countries, after controlling for other factors. The above determines that regional divergences in highly developed countries are lower at the mean.

2) **Economic growth** has a negative impact on regional convergence. Upon economic growth rate increase by one percentage point divergence runs up by 0.526 percentage point, after controlling for other factors.

3) **Economic system** shifting from a command to a market economy in 1989 – 1991 has a negative impact on regional convergence. Intensity of economic growth impact on regional convergence differs in the countries with and without economic system transformation experience. Upon economic growth rate increase by one percentage point, regional divergence runs up by 1.022 percentage point (if compared with 0.526 in the countries without such experience), after controlling for other factors.

4) **Economic integration** level has a positive impact on regional convergence. Higher level of national economic integration to the EU-27 provides...
faster regional convergence or slower divergence. Upon economic integration level increase by one percentage point, regional convergence speeds up or divergence slows down by 0.806 percentage points, after controlling for other factors.

Conclusions

1) Intensity of national economic integration has a negative impact on regional convergence. More intensive national economic integration to the EU-27 provides slower regional convergence or faster divergence. Upon economic integration intensity increase by one percentage point, regional convergence slows down or divergence speeds up by 1.450 percentage points, taking other factors constant.

2) The factors of economic integration level and rate have the same impact on regional convergence rate in both highly developed countries and less developed countries.

3) It may be stated that out of all regional economic convergence factors tested economic system transformation and economic growth has the major impact on regional convergence; however, economic integration level and national development level has the minor impact thereon. The factors of major impact negatively affect regional convergence and the factors of minor impact – positively. Taking into account that intensity of national economic integration also has a negative impact on regional convergence (medium degree of impact), the factors of negative impact counterbalance the factors of positive impact.

Economic system shifting from a command to a market economy in 1989 – 1991 has a residual impact on regional convergence. Comparing the impact degree as of 1995 – 1999, 2000 – 2004 and later, it is determined that the degree diminishes.

National regional convergence is cyclic, i.e. economic growth stimulates regional disparity increase, however the highly developed countries do experience lower regional disparities and the impact of economic growth cycle on regional convergence is lower.

The empirical research allowed identifying the factors, which directly positively (national economic development level, economic integration level) and negatively (economic growth, economic system transformation, rate of economic integration) affect regional convergence.

A possibility of indirect impact of certain factors analysed, differently occurred depending on impact channel, should not be excluded. The empirical research provides that economic growth could be partially deemed the above factor, the negative impact of which on regional convergence shows up at different intensity in the countries with or without experience of transformation from command to market economy as of 1989 – 1991. Economic system transformation in this case could be considered the impact channel causing the different occurrence of economic growth impact.

Bibliography