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## Regional convergence – theoretical approaches

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### Abstract

Within theoretical economic approaches, the *convergence concept* generated a great scientific literature elaborated at international<sup>1</sup>, national<sup>2</sup> and regional level<sup>3</sup>. Also, the numerous studies from another field (economy<sup>4</sup>, geography<sup>5</sup>, history<sup>6</sup>, sociology<sup>7</sup>, and political science<sup>8</sup>) have an important impact of answers regarding the origin, evolution emergence, persistence, deepening, and more noticeable spatial inequalities in the field of incomes and standard living.

The issues regarding convergence and dynamics of spatial distribution have an important role in the present economic literature, even though the approach of these topics remains still insufficiently explored and analysed. The regional convergence (along with nominal and institutional convergence) presents a special interest, considering the important gap between the new and old regions of EU Member-States.

In this paper we limit approaching the field to main theoretical aspects regarding to regional convergence.

**Key-Words: regional convergence, inequalities**

**JEL Classification: R11, R12**

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<sup>1</sup> L. Pritchett, 1997, A. de la Fuente, 1997, D. Quah, S. Durlauf, 1999, B. Fingleton, 2003, S. Magrini, 2004 etc.

<sup>2</sup> R.J. Barro, X Sala-i-Martin, 1992, A. Iancu, 2005, 2008, 2009 etc.

<sup>3</sup> D. Jula, 2007, D.L. Constantin, 2008, 2009, 2010 etc.

<sup>4</sup> P. Krugman, 2008, P. Nijkamp, 2010 etc.

<sup>5</sup> H.W. Armstrong, 1995, I. Ianoş, 2011 etc.

<sup>6</sup> A. O'Connor, 2001 etc.

<sup>7</sup> S. Sassen, 1994, D. Sandu, 2010 etc.

<sup>8</sup> J. Gruber, S. Gaines, 2001 etc.

## **Inequalities and region**

In general, the concept of **inequalities** is used both by analysts, theoreticians, and politicians in order to analysis the differences identified with the help of some adequate mathematical techniques by using specific indicators or indices.

Related to a different context, the concept presents more facets being accompanied also by other elements supporting it: convergence, polarisation, agglomeration, concentration, dispersion, etc. As a rule, the evaluation manner of the level or degree of inequality is determined by:

- the spatial dimension to which the relation is established (regional sub-regional, national, over-national, etc.);
- the time period of the regional analysis.

While the theoretical approaches regarding regional inequalities focused on deeper researches about the nature of difference in level of income within a national territory during a period of time, the literature regarding convergence envisages the catching-up process of the poor countries against the rich ones.

The regional convergence could be a way of testing different theoretical models empirically. As an example neo-classical growth models (e.g. Solow (1956) and Ramsey (1928)) imply conditional convergence, or can be an important factor for policy recommendations.

The role of space (territory) was relatively recent acknowledged in the literature regarding regional convergence, while older approaches about territorial imbalances were characterised by a relative silence about complications that the regional level might have.

The analysis of regional inequalities turned indeed important especially in the last two decades this thing being visible preponderantly in the increased number of empirical studies regarding convergence (S. Rey, M. Janikas, 2005).

The empirical studies about convergence and economic growth can be divided into two large distinct categories:

1. *Studies of substantiating some growth theories*, which lead to building econometric equations estimated based on observing the economy at various levels, including the regional one.
2. *Exploratory studies that apply innovative techniques* with the purpose of generating some hypotheses related to the dynamics of the economic system.

In the following we present synthetically the main theoretic approaches that had as main objective the analysis of the dynamic of regional imbalances and convergence.

### **Theoretic approaches of regional convergence**

In general, the notion of convergence is frequently used within comparative economic analyses regarding economic integration with the purpose of identifying the evolutions of some entities (national, sectoral, regional) against a milestone considered as the most performing one, or at a medium level.

The studies regarding convergence have in view the way in which factors involved in a certain process (integration, globalisation, etc.) act for diminishing disparities between analysed entities. The diminishment of inequalities presupposes bringing closer the values of established performance indicators and ensuring diminishment of gaps within the development level of respective entities.

In specialised literature (A. Iancu, 2008, 2009) there can be identified three types of convergence specific to some fields of application:

1. *Real convergence* that pursues eliminating gaps between countries or regions within the development level given by the income per capita and labour productivity.
2. *Nominal convergence* applied in the field of monetary policy and which refers to obtaining economic stability and switching to the Euro.
3. *Institutional convergence* presupposes rendering compatible the institutions from the viewpoint of structures and functioning.

At the regional level, there is ample empirical evidence of territorial convergence (see Magrini, 2004). Most empirical studies have examined convergence (or divergence) processes utilising econometric or statistical models of linear specification as suggested by the neoclassical theory (Durlauf, 2001).

More recently, the theoretical models allow for multiple regimes and club convergence among countries (Azariadis<sup>9</sup>, 1996, Drazen, 1990). For instance, developed a model where multiple steady states emerge due to the presence of externalities. Such externalities give rise to increasing social returns to scale, once a threshold level of human capital is reached. Similarly, Durlauf (1993), Galor (1996) and Quah (1996) have demonstrated that multiple equilibrium can emerge on account of differences in, among others, human capital, income distribution, capital or market imperfections, local complementarities and externalities.

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<sup>9</sup> Azariadis, C. (1996), The Economics of Poverty Traps Part One: Complete Markets, Journal of Economic Growth, 1: 449-486.

Club convergence implies convergence to a common level only for economies that are both identical in their structural characteristics and similar in their initial conditions (Galor, 1996): there is convergence within each club but there is not convergence across clubs. A few empirical studies have asserted the presence of nonlinearities in the growth process implying multiple steady-states and convergence clubs (Chatterji, 1992; Quah, 1993a; Durlauf and Johnson, 1995; Hansen, 2000). These studies transcend the “all or nothing” logic behind conventional convergence analysis and maintain that convergence may come about for different groups of economies (for a review, see Azariadis, 1996; and Islam, 2003).

The identification of convergence or divergence process is a highly significant issue for the regional and cohesion policy. The experience of the EU regarding to extension is a unique situation, where relatively closed economic systems opened, almost at once, to the world economy and, at the same time, market mechanisms replaced central planning (Petraokos, 2008). The process of economic integration it is perceived to generate higher levels of aggregate efficiency (positive-sum game), can possibly be associated with higher levels of inequality (Nijkamp, Martin, 2005). In regional terms, this process lead to regional imbalances, with less advanced regions possibly experiencing, in the integration process, weaker gains, or, even, net losses, as compared to their more advanced counterparts (Camagni, 1992; Bradley et al, 2005; Kallioras and Petraokos).

For Romania, regional convergence present special interest, taking into account the important gap against other EU regions.

### **The main theories of regional convergence**

Theoretical approaches regarding regional convergence have focused on the catching-up process: less developed regions make considerable efforts to catch up with rich regions.

The main trends of the current convergence process – *agglomeration and dispersion* – are analysed and interpreted within some recent approaches of regional theory:

1. *Theory of endogenous growth* (R. Lucas, P. Romer, P. Nijkamp);
2. *New economic geography* (P. Krugman);
3. *Institutional theory* (W.R. Scott, P. Dimaggio, W. Powell).

1. *The theory of endogenous growth* pays attention to the concentration degree of some economic activities as result of the growth effect of the scale profit from investments realised in human capital and research-development. According to the theory, concentration of the

mentioned factors in central areas and not in the peripheral ones represents the outcome of an economic integration process. The proposed models, including those based on innovation (Schumpeter's growth theory) considered the efficient, adjustment changes and much less adjustment of optimum allocations from certain locations, being focused on integration and trade. Economic growth at regional level takes place based on amplifying the innovation-learning-knowledge-assimilation process corresponding to labour force. This process presents significant spatial implications up to the moment when transaction costs corresponding to transferring knowledge elements remain very high (P. Romer, 1986; R. Lucas, 1988; L. Fontagne, M. Freudenberg, D. Ünal-Kesenci, 1999; G.M. Grossman, E. Helpman, 1991; P. Aghion, P. Howitt, 2005).

2. *The theory of the new economic geography* considers the following hypothesis: regional clusters represent the effect of agglomeration phenomena of some forces on certain fields between which important relations are given. In agreement with this theory, the high transport costs protect companies on small markets. Once transportation costs decrease, an increase of competition between companies takes place and, finally, a decrease in forces dispersion. The theory emphasises in particular market integration, economies of scale, transportation costs, and local markets, promoting the combined effects of economic concentration in the centre of the region with the advantages obtained on labour force market and from advanced technologies localisation (P. Krugman, 1991; M. Fujita, A. Venables, 1999).

3. Within the *institutional theory*, the key-element of one region's development is represented by institutions that establish the technological barriers of economic functions' hierarchies. The reason is given by the fact that these institutions can control the ability of the economy to use and develop own resources in a particular manner. Whenever the institutional capacity is unequally distributed in space, the institutional factor contributes to agglomeration of economic activities strengthening concentration of more advanced activities into most developed areas. An important particularity of these institutions is that they facilitate innovation, research-development, business support, and all these are known as "*innovative systems*" (B. Lundvall, 1992; R. Nelson, 1993).

Within the above-mentioned theoretical approaches, polarisation of economic activities represents a slow, inevitable and convergent process in terms of GDP per capita. At regional

level is acknowledged the importance of the measures and political actions required to ensure balance between agglomeration forces and tendencies (concentration).

G. Myrdal (1957) is the first to propose and promote within the regional theory the concept regarding the circular and cumulative cause of economic processes which explains the increase in international differences for the development level against initial similar conditions. By capital movements, migration and commercial exchanges of goods and services are perpetuated and even increased international and regional inequalities. By trade liberalisation, less developed regions, lacking human capital and innovative technologies are obliged to specialise in goods manufacturing, especially primary goods with inelastic demand (low elasticity) in relation to price and income. Developed regions turn into attraction poles and absorb increasingly larger quantities of capital and labour force from less developed regions.

Neoclassical theories, even if they anticipated the unconditioned convergence process on long-term (convergence club), did not succeed in clarifying the basic conditions that might influence the diminishment of regional disparities (including those from periods of crisis, recession, etc.). Despite all efforts realised in the direction of reforms proposed within the integration process, still a natural, universally valid trend is found of processes' polarisation which leads, finally, to deepening regional divergences.

Already in 1956, J. Williamson considered that in the convergence process inter-regional relations, mobility factors and public policies interact in favour of main agglomerations. Thus, a swifter increase within growth poles (for instance, region-capitals) determines a growth in the level of disparities at regional level. In a more advanced stage of development, regional disparities can be reduced at a higher aggregate level as compared to incomes. The distribution effect consists in the emergence of agglomeration diseconomies (the high cost of labour force or the congestion effect) and may continue with the growth poles. Hence, regions remaining behind in some countries can benefit from technologies diffusion<sup>10</sup>. There are several economists who consider that New Member-States can be framed within the process entitled "catching-up".

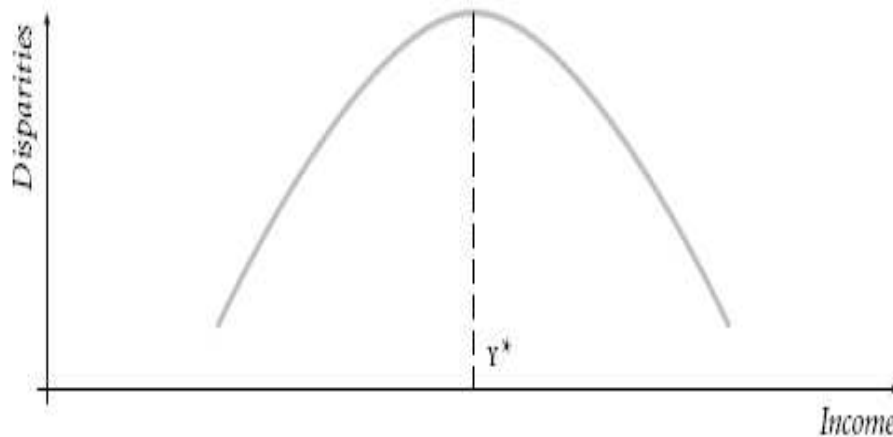
The relationships between growth of national economies and regional imbalances can be graphically represented with the help of a reversed U-shaped curve (Williamson's curve)

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<sup>10</sup> Lackerbauer, J. (2004), *Catching-up, Regional Disparities, and EU Cohesion Policy: The Case of Hungary*, p. 5.

<sup>11</sup>. The New Member-States of the European Union find their place on the ascending side of the curve, while old Member-States are placed on the flattened side<sup>12</sup>. On the curve traced by Williamson, this category of countries register increases of regional disparities, fact that makes them to be represented on the left side of income  $Y$  from figure 1.

**Figure 1: Williamson Curve**



Source: Williamson, J. (1965), „Regional inequality and the process of national development: a description of the patterns”, *Economic Development and Cultural Change*, vol. 13.

In conclusion the new approaches regarding convergence at regional level have as their focus the following aspects:

- *Increasing importance of intangible factors* (including economic policies) in the process of more marked regional disparities; also, the investment process associated with innovation, research, and development of human capital capacities and abilities represent growth sources of disparities between regions.
- The new approaches bring completions and updates to old methods proposed by the neoclassic theory, by *extending the area of the research object, of the used methods and techniques* and, in particular, by modern methods of computing and processing with the assistance of computer science and programming.
- Also, *a more reality-anchored interpretation of regional economies* is noticed; these economies are included into the convergence process (both from the viewpoint of speed, and also from the perspective of growth rates).

Synthesising, it is found tht from the viewpoint of theoretical approaches, regional convergence attracted with it comments and critics alike that contributed to the development

<sup>11</sup> Williamson, J. (1965), “Regional inequality and the process of national development: a description of the patterns”, *Economic Development and Cultural Change*, vol. 13.

<sup>12</sup> Prof. Dipl. Eng. František Turnovec CSc, *Regional Disparities in the EU*, [www.ies.fsv.cuni.cz](http://www.ies.fsv.cuni.cz).



of this field of wide interest. Still, despite contributed developments, it cannot be talked yet about a magic formula to stipulate exactly the solution or solutions, through which convergence of some regional structures is ensured, regions that are characterised by a high diversity both from the viewpoint of differing development conditions (natural, human, infrastructure, innovative structures, etc.), traditions, mentalities, and from the perspective of differing rates of economic growth.

### **Influence factors of regional convergence**

In the last decades, and in particular after the emergence of some large areas of political and economic power, inequalities and regional convergence are two concepts capturing the more and more attention due to the following considerations:

- *From an academic perspective* –the studies regarding regional disparities and, in particular, the ones regarding convergence represent indirect methods of testing the validity of various theories and approaches regarding economic growth and international trade;
- *From the practical viewpoint* –knowledge about regional disparities represents a political priority in the majority of the over-national integration schemes, the more so as their persistence is considered as a negative impact factor on the integration process in itself.

Regional approaches were focused preponderantly on existing disparities at the level of incomes (total GDP and per capita) attempting to provide viable answers related to the process and trends of economic growth at spatial level. From this perspective, very important is the way in which are selected and processed the territorial (series) variables and the spatial level to which reference is done.

The purpose of theoretic approaches is to provide answers and optimum solutions to the identified issues, irrespective of the suggested instrument and the used technique. The interest granted to such researches started to gain visibility after the '80s, their practical importance being correlated with the necessity of ensuring balanced development at territorial level and attaining regional convergence.

The period of time for which the analysis of inequalities is realised is very important as territorial development differs on short-term (during the period of a cycle or as answer to a series of unexpected events) from the one on long-term which is influenced by phenomena that can affect the entire capacity of regional development.

Economic development, in general, is a complex process, with different implications from one sector to another, or from one region to another being influenced by factors of higher or lower impact. With respect to regional development, it can be affected by a series of factors that we shall present synthetically hereunder.

An important factor that can influence the development level of a region is the *regional specialisation degree*. Thus, it was found that by specialisation competitive advantages are obtained which in their turn determine positively the development of certain areas. Still, there are opinions according to which regional specialisation contributes to a lesser extent to the emergence increasingly noticeable economic disparities, in particular of those existing with respect to income per capita, which are triggered by the differences in productivity, and not necessarily in specialisation.

Another influence factor of one region's development is represented by its *production structure* (economic profile). The differences in the output structure lead to differing answers and reactions both from one area to another, and even from one sector to the other. For instance, in the situation when a region has a marked agricultural character, it is very probable that its development shall be affected by unexpected events (in particular natural ones), being less sensitive to cyclical changes of demand. The predominance of one or another sector can be the reason for fluctuations at macroeconomic level or at the level of other regions with dissimilar specialisations. The variations present into the formation of agricultural incomes trigger changes in the demand or consumption of other industrial activities, or in the tertiary sector.

Also, *the nature or type of the analysed region* constitutes a factor that contributes to regional development or to the emergence of some economic disparities. In areas which are predominant consumer industries a decline in the incomes level shall be noticed along with one of employment as effect of the national policy objectives. On the other hand, specialised regions in the production of capital goods are more vulnerable in periods of prolonged recession, which attract the diminishment of expectations and investment intentions.

*The export* is regarded as an important factor contributing to the emergence of regional disparities, irrespective of the market which is considered (external or international). Thus, regions oriented on export (according to tradition, size or organisation form) are more vulnerable to fluctuations of demand on world market, or to international competition as compared with those oriented on the internal market.

A source for the emergence and increasingly marked territorial discrepancies is also the presence of *costs required to obtain regional output, as well as the level of economic*

*efficiency*. In the situation in which demand decreases, the regions in which companies register low efficiency of output are faced with a series of negative phenomena, resulting from the sub-marginal position of the companies. The companies that make intensive use of the labour force tend to adapt much faster their supply depending on market fluctuations. Characterised by higher competitiveness, these companies can maintain or increase their market share for a longer period of time. On the other hand, over-capitalised companies shall increase competitiveness as effect of costs' pressure being less apt to swiftly adjust to fluctuations of the demand on the market.

“*The age*” or oldness of the industrialisation process represents, as well, an important factor leading to certain categories of regional disparities becoming more marked. It is known that economic activities are localised in sectors favourable to entrepreneurial initiatives, in regions that are gradually industrialised or where a diversified structure of industry is given. Such regions are less affected by international factors, in particular due to the lower market share held by the respective industrial sector, but can be influenced by other industrial sectors with problems.

In the last period, a clear factor that is at the basis for the emergence of regional disparities is triggered by the *innovative potential of the respective region*, by its capacity to create value added especially based on activities of research-development-innovation. This fact presupposes the existence of a local tradition linked to the innovative process or the presence of some important financial resources that support the innovative activity.

As conclusion, the following general influence factors of a more marked development can be identified for some regions as compared to others:

- *Physical factors* –into this category are included infrastructure elements that provide for accessibility to the region. A low potential of the physical factors frames the region into the “structurally disadvantaged” group; examples of this kind of regions are: mountains, insular and coastal areas, etc. Transportation networks favour, in their turn, the emergence and development of economic factors. These factors can explain the large differences between the development of Western areas as compared with those from Eastern Europe;
- *Economic factors* –these factors are analysed and evaluated through the prism of the regional GDP indicator or of the regional GDP per capita, the unequal distribution determining the structural earmarks at regional level. The change of the New Member States from planned economies into market economies concomitantly with integration into the EU structures led to the creation of a new spatial model of

economic disparities in these countries. Within the socialist system, rapid industrialisation was associated with urbanisations of less developed regions and with the “dispersion” effect of growth between urban and rural areas. Moreover, the high share of employed labour force in agriculture and industry registered a dramatic decrease, fact that triggered unemployment increase, migration, etc.

- *Social factors* –among these factors we can mention: quantity and quality of labour force, entrepreneurship, RDI activity, the politically unstable environment, skilled labour force migration from less developed regions to the developed ones. The analysis of disparities for this group of factors is realised with a relatively certain difficulty.

Identifying the factors having influence on the regional development and on diminishing economic discrepancies contributes decisively to establishing the optimum measures of regional policy, and finding efficient action levers.

### **Indicators and analysis techniques**

At the basis of the regional inequalities’ analysis are a series of methods and indicators that substantiate in a scientific manner the hypotheses and conclusions presented within spatial research.

The spatial analysis methods are focused on *territorial series that are shaped from the row of values of one characteristic ordered in relation to the administrative-territorial units (ATU) to which they belong*<sup>13</sup>. The territorial series operate with complex units such as localities, towns, municipalities, counties, regions, and countries, etc.

The characteristics of the territorial series are the following:

- *Independence of terms* –the specific levels of the various ATU are not mutually conditioned; this feature allows for separate characterisation of each unit by comparing it with another unit or by including it into the total level of the series;
- *Homogeneity of the series* – all terms must have the same economic and social content, the same statistical definition of the sphere of inclusion;
- *Similitude of the terms* – the existence of an identical moment of observation or of a registration period;

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<sup>13</sup> Novak, A. (2001), *Statistica*, ISBN 973-8258-50-2, Editura Sylvi.

- *Variability of the terms* –the combination of essential factors is determined by the specifics of the entire territorial series, with the multitude of random factors that generate the differentiation from one unit to another;
- *Graphic representation* –this is realised with the help of cartography or of a cartho-diagram on the background of ATU maps. Each unit is represented distinctly, in accordance with the qualitative types.

Currently, the realisation of comparative analyses at territorial level and of some ATU classifications has a particular importance for the national, community and international level from the perspective of measuring development differences between regions and of formulating adequate strategies.

#### *a. Indicators*

The analysis of disparities at regional level by using statistic territorial analysis techniques has at the basis a system of specific indicators<sup>14</sup>, corresponding to the nature of terms and pursued purpose.

Within the European Union of the 27 Member States the aspects regarding convergence have triggered the establishment of a set of common indicators and criteria that can contribute to achieving a unitary vision on evaluating the impact of certain community interventions. The selected indicators for evaluating the cohesion and regional development policy are the following: GDP per capita, unemployment rate, life expectancy at birth and educational level. Their use is affected by the availability of data at sub-national (regional) level in the EU.

With the purpose of obtaining a satisfying image on regional performances, the use of some methods can be realised by combining structural indicators: 1. *Indicators of physical disparities* (climate, distance from centre to periphery, accessibility and population density); 2. *indicators regarding economic disparities* (incomes, industrial activity structure, and economic perspectives, etc.) and 3. *indicators regarding social disparities* (unemployment, labour force structure, active population, qualification and living standard).

The analysis and interpretation of the above-mentioned groups of indicators provides a global image on the existing situation at territorial level and, by comparison, a highlighting of some regional disparities.

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<sup>14</sup> In regional analyses can be encountered the following groups of indicators:

- A. absolute indicators;
- B. indices (ex.: territorial indices, relative gap, territorial concentration coefficient (Gini coefficient, Struck coefficient) and relative structure sizes;
- C. medium indicators: the medium level is represented by the arithmetic or geometric averages, the median, the module.

### ***b. Analysis techniques***

In general, it can be said that regional science “borrowed” from statistics those techniques that can contribute to scientific substantiating of some results. Within regional studies, the dispersion parameters (variance) are the *most used because they can synthesise in a scalable manner the information about inequalities in distribution*. This fact presupposes that each evaluation of aggregated inequalities contains information about distribution, fact leading sometimes to different outcomes (therefore, it is important that for empirical analyses to verify the robustness of conclusions).

With respect to the analysis of regional convergence, there are a series of restrictions regarding the use of statistical techniques which are determined by the use of some non-homogenous series of calculation and which can lead to unrealistic outcomes and affecting the perception about the convergence trend (G. Petrakos, 2005). The alternative is to attach different values to each observation, which would reflect their relative contribution. For instance, in the case where we have as variable the regional income (GDP), the indicator can be weighted with the population number from the respective territory. In some situations, the statistical data and information can be asymmetric, fact leading to difficulties in computing the respective indices.

The trends presented within regional analyses are based on the use of estimation techniques of non-parameters’ averages which allow for presenting some functional particularities. In this instance, there is a series of advantages determined by the generalities or flexibility associated to the approached parameters.

The evaluation of regional imbalances is realised by defining the statistical values corresponding to the computation formulas. From this point of view, taking into account some size differences between the territorial levels can lead to a series of conclusions regarding existing trends.

In conclusion, it can be said that there is permanent concern of economic science for estimating and evaluating the dynamics of territorial entities, considering the existing conditions and the reported periods of time. The regional analysis models pursue in particular to explain the reasons leading to the emergence of economic and social disparities between regions and within the same region, with the purpose of identifying best actions for counteracting the effects of their emergence and prominence.

## Conclusions

Used both by analysts, theoreticians and practitioners, the concept of disparity expresses the differences identified with the help of some adequate mathematical techniques using specific indicators or indices. This concept presents several facets being accompanied by other elements that support it: convergence, polarisation, agglomeration, concentration, dispersion, etc.

In general, the theoretic approaches regarding regional convergence have focused their attention on the *catch-up process: less developed regions make significant efforts to catch-up with rich regions*. The main identified trends within this process – agglomeration and dispersion – are analysed and interpreted within some recent regional approaches: *the theory of endogenous growth, the new economic geography and the institutional theory* (W.R. Scott, P. Dimaggio, W. Powell).

The theories regarding regional disparities and convergence indicate a relative variety of techniques and analyses that can reflect this fact. The integration of economic methods in spatial analyses highlights the effects of spatial dependence and of heterogeneity on convergence. It can be stated that regional science “borrowed” from statistics those techniques that can contribute to scientific substantiation of some outcomes and, in particular, to identifying the trends registered in the convergence process within a community of States.

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