

## The new economic geography and regional policy in Romania

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**Abstract.** *The aim of our paper is to capture, using logical analysis and graphic modelling, the implications of the new economic geography (NEG) in terms of regional policy in Romania, aiming to answer the question whether NEG and agglomeration economies should concern the policy makers in our country. The analysis of the macroeconomic model based on the interdependencies between regional disparities, agglomeration and economic growth shows that in the case of core-periphery dual regional structured economies, the cohesion policy effects can be avoided, in that the central agglomeration will generate a higher growth rate at national level, but with the price of amplifying the existent regional disparities. One way of dampening this negative effect over Romania is to launch an innovation and knowledge-promoting policy, by developing regional innovation systems.*

**Keywords:** new economic geography; regional policy; agglomeration economies; agglomeration externalities; regional innovation system.

**JEL Codes:** R10, R12, R58.

**REL Codes:** 16D, 16H.

## 1. Introduction

Romania's development is characterized by disparities at the level of its eight regions, caused by an unequal distribution of natural resources and human capital, by economic, social, political and demographic inequalities, but also by the manner in which all these interact, against the backdrop of these regions' historical evolution.

Reducing economic disparities is one of the most complex and difficult tasks of regional policy. Allocation of structural funds for development has failed so far to solve this problem. This means that the attraction and use of structural funds is a necessary but not sufficient condition for economic development in peripheral regions. The existence of a core-periphery structure between the regions of some countries may lead to a distortion of the effects of cohesion policy, in that the central agglomeration will generate a higher national growth rate, but with the price of amplifying the existent regional disparities. One way of dampening this negative effect over Romania is to allocate structural funds in an area capable of triggering regional development.

The first chapters are devoted to the concept of the new economic geography (NEG), analysing its evolution from a theoretical point of view, as well as its conceptual and instrumental framework. NEG must give us explanations as to why businesses and individuals choose to locate in one place rather than another. The existence of certain factors, such as a pool of skilled labour, specialised suppliers, knowledge spillovers (Marshall's trinity of agglomeration sources), the opportunities generated by existing economic activities or a wide commercial market, entrepreneurial characteristics or cultural affiliation of individuals, all contribute to the decision of location.

Because geography is a crucial factor in development, it certainly generates strong political repercussions, worthy of consideration, which we try to analyse in the final study. By this we want to answer the purpose of this paper: to render the implications of NEG over Romania's regional policy, using logical analysis and graphical modelling research.

## 2. The evolution of theoretical approaches regarding NEG

A major stream in spatial economic literature was created due to the papers of Paul Krugman, who, since 1990, has turned to the study of economic geography and particularly location issues, his contribution to this field representing the cornerstone of the New Economic Geography (NEG). His theory generated a mainstream in economics of agglomeration, which has developed exponentially in the 1990s, culminating in the work of Fujita,

Krugman and Venables, “The Spatial Economy: Cities, Regions and International Trade”, published in 1999. Subsequently, the literature dedicated to this domain was enriched by the contributions made by Baldwin, Forslid, Martin, Ottaviano and Robert-Nicoud (2003), Fujita and Thisse (2003), but also by other researchers who sought to respond to pragmatic aspects in relation with the contemporary economy, such as globalization, integration, the German reunification, urban agglomeration, trade policy making, etc.

Recent research (Behrens & Robert-Nicoud, 2011) point out that it is unlikely that the progress made within the “straitjacket” of Krugman's original framework will generate new insights in this sector. There are, however, great opportunities to go outside the established framework, to expand NEG approaches in ways that have received little attention so far. Heterogeneity, cities, transportation, public policies are elements that NEG must and can use to make progress.

The future of NEG is foreseeable, as we mentioned in a previous paper (Clipa et al., 2011), by *extending the theoretical framework, developing empirical research and analysing social and political implications*. As a corollary of these three directions, Fujita and Krugman (2004) consider that we need to *develop theoretical quantitative models* that will allow us to perform real simulation exercises. In some economic fields (public finance and international trade) such models play an important role as analytical tools. These models would constitute a major step in considering the theoretical economic geography as a real predictive discipline, capable of evaluating the impact of hypothetical shocks on the spatial structure of economy.

Related to the theoretical developments, if for two decades NEG focused on the macro-heterogeneity of locations, showing how this can be generated endogenously by the decisions taken at micro-economic level by individuals and identical companies, the specialists (Ottaviano, 2011) show that the future research should analyse more deeply the *micro-heterogeneity* of individuals and companies, throwing a light upon how interactions between the two levels of heterogeneity affect the existence and intensity of agglomeration economies.

The transition to the next step – empirical research – can be done successfully only after the inclusion within the NEG models of all *centripetal forces* (linkages, markets, knowledge spillovers) and *centrifugal ones* (immobile factors, land rent/commuting, congestion), as well as after the analysis of how the predictions of these models depend on the relative importance of these forces. Only after doing such an exploration we will be able to interpret the results of empirical research and analyse their implications for social and economic policy. Although it is difficult to move from theoretical, analytical models to empirical ones, destined to assess public policy, the goal should remain the following: developing the normative basis of the new economic geography.

### 3. The conceptual and instrumental framework of NEG

The New Economic Geography is viewed, on one hand, as a synthesis of the polarisation theory, and, on the other hand, as a neoclassical theory of location, adopting theoretical concepts from the first and using a formalised set of instruments from the second. Neoclassical location theory is based on the inherent tendency of the economic market system towards a spatial equilibrium. If the conditions of a reasonable framework are recorded by the economic policy, regions converge. Instead, polarisation theory involves a process of strengthening the concentration and spatial imbalances. While according to the neoclassical theory, any deviation from equilibrium triggers contrary forces that restore the balance of the system, the theory of polarisation is a cumulative circular process based on feedback connections that increasingly alter the system's balance. These latter aspects are plausible within the theory of polarisation, but will suffer from an inadequate formalisation with reference to the neoclassical theory. In the neoclassical theory, self retained and empirically testable models are formalised, while in the polarisation theory there are mostly plausible arguments or vague formulations. This deficiency is removed by the new economic geography.

#### *Key terms*

The major theoretical contributions have enabled NEG researchers, as Fujita and Krugman demonstrate (2004), to operate with several key-terms: the general equilibrium model of a spatial economy, which is different from the approach derived from the traditional theory of location and economic geography; increasing returns or indivisibilities of the individual producer, which prevent the economy to degenerate into a “backyard capitalism” (in which every household produces for personal consumption); imperfect competition, due to increasing returns; transport costs, which make location matter; changing the location of production factors and consumers is a prerequisite for agglomeration.

#### *The causes of agglomeration; two agglomeration forces and a dispersion one*

A major concern of the new economic geography models was and is about achieving the equilibrium in the short and long term. Besides the equilibrium of all markets and of some additional conditions depending on the model [for example, the core-periphery model with vertical linkages (Krugman, Venable, 1995), the number of active companies found in the North and South

is exogenous in the short-term and endogenous in the long-term], we define the equilibrium as a result of two forces of *agglomeration* and a *dispersion* one.

Agglomeration occurs when spatial concentration of one or more economic activities increases the size of the market and thus determines a new spatial concentration of industries, while dispersion favours the dissipation of economic activities within a given economic space. Agglomeration, which means concentration, and dispersion, which means anti-concentration, operate simultaneously, affecting the geographical distribution of economic activities.

Agglomeration size is dictated by market demand, on one hand, which in its turn is determined by market size and purchasing power of consumers, and, on the other hand, by the efficiency of production factors, which is reflected in the total average cost of the product. The level of demand, which is market-size dependent, provides incentives for companies or industries that want to reduce their transaction costs by exploiting their proximity to the market, suppliers and economies of scale generated by market size. Once they enter a large market, these companies will stimulate activity in this area, by supplying themselves from the locals, by hiring the local labour pool, aspects that will further reflect in revenue growth, aggregate demand and hence in the concentration in that location.

Opposite to the concentration one, the dispersion force favours the geographical spread of economic activities, and derives from the intensity of local competition. For example, when a company migrates from South to North, it increases competition and, therefore, requires companies to migrate from North to South. This force is present in all NEG models. Besides this, some models operate with other dispersion factors, such as land prices and commuting.

#### *The core-periphery model*

The core-periphery model introduced by Krugman (1991) provides the framework for the new economic geography, framework that illustrates how the interaction of increasing returns in relation to the company, transport and mobility of factors may cause spatial economic structure and change.

In the model there are two regions (central and peripheral), two production sectors (agricultural and industrial) and two types of work factors (skilled workers, industrial and agricultural workers); some authors called it “model 2 x 2 x 2 core-periphery” (Fujita, Krugman, 2004). Industry produces a variety of horizontally differentiated goods, each variety is produced by an individual company benefiting from economies of scale, using labourers as the only input. Workers enjoy full mobility between regions, whereas farmers are immobile, equally distributed between the two regions. Agricultural goods are

sold free of charge between the two regions, while the interregional exchange of industrial goods implies positive transportation charges, following the “iceberg” type.

The model operates with three fundamental parameters: the costs of industrial goods, the appreciation of diversity in consumption and commercial or transport costs between different regions. Conducting simulations with different commercial costs, important alterations of the model in terms of equilibrium and system stability can be observed.

#### *Circular causality*

In the core-periphery model, farmers' immobility is a *centrifugal force*, in that they consume both types of products. *Centripetal force* is more complex, involving a *circular causality*. Firstly, if a large number of firms locate in a region, a large number of varieties of goods start being produced here. Then, workers, who are consumers in the region as well, gain increased access to a greater number of varieties in comparison to those in the other region. Thus, workers in the first region achieve a higher income, causing other workers to migrate to the site. Secondly, the increase in the number of workers (consumers) creates a bigger market than in the other region. This is explained by the fact that, due to economies of scale, there is a tendency of concentration of each variety in a single region. In addition, it is more profitable to produce goods in the region having greater commercial markets and to ship the products to the other region. This determines the availability of more differentiated goods in the first region. In conclusion, the centripetal force is generated by a circular causality of *forward linkages*, driven by the desire of workers to be in the proximity of consumer goods producers, and of *backward linkages*, explained by the producers' temptation to concentrate in areas where there is a larger market (Fujita, Krugman, 2004).

#### *Symmetrical equilibrium*

If the forward and backward linkages are strong enough to defeat the centrifugal force generated by immobile farmers, the economy will reach a core-periphery structure in which all industrial producers are concentrated in one region. In other words, the low values of free trade indicate a symmetric equilibrium, while a higher level of free trade causes agglomeration to become stronger and, consequently, the model shows a total cluster. Krugman (1991) was able to establish the conditions under which the core-periphery structure becomes unstable locally and defined that level with the term “sustain point”. The point where local stability interrupts symmetry was defined as “breakpoint” and has been studied closely by Puga (1999).

Contrary to the H-O-S model, in which factors have an incentive to migrate to a place that shows a tendency to equalize relative factors, the NEG models are endogenously asymmetric: a continued decrease in trade costs between two initially symmetric regions determines a regional asymmetry. This “bang-bang” characteristic was defined by Ottaviano and Thisse (2004). The fact that multiple stable equilibria exist in a certain framework of parameters determines the model to be dependent. Conversely, a temporary shock that alters the equilibrium model would not require, therefore, a return to the original balance. This property of historical aspects is of great importance in shaping the political implications of NEG. All previous results are still under the assumption that regions are intrinsically symmetric. In fact, regions can rarely be assumed to have exactly the same endowments and trade barriers. This is also underlined by the fact that the study of complex systems focuses nowadays on imbalances, on critical aspects, on potential bifurcations, rather than on equilibria.

#### **4. Agglomeration economies and location**

In the context of economic geography, agglomeration refers to the spatial concentration of entities or to the creation process of an agglomerated structure. There are two main causes of the formation of economic clusters. The first is related to the permanent endowments of each region, such as climate, geographical location, proximity to transportation routes, etc., while the second refers to factors that influence the decision to locate in a particular location. Regarding the latter case, firms and individuals tend to locate where they can find a labour pool, specialised suppliers and knowledge spillovers (Marshall's trinity regarding the sources of agglomerations), as well as opportunities generated by existing economic activities or by a large market, entrepreneurial characteristics or cultural affiliation of individuals specific to a certain location.

Contrary to the neoclassical theory of economic growth, which stipulates that economies characterized by similar structural features tend to experience a convergence of incomes, the new economic geography (Krugman, 1991) provides some justification for the lack of convergence. One of them refers to the neoclassical hypothesis of constant returns of scale, which explains why a region twice as endowed with factors of production will produce twice as much. In fact, producers register fixed costs and increasing returns to scale, which prompts them to locate close to large retail markets, in order to benefit from economies of scale and low transportation costs. Regarding the labour market, workers are attracted to locations with high productivity, where salaries are higher, leading to increasing employment and productivity.

This trend of concentration of economic activities in already crowded locations (*core*), based on centripetal forces (bonds, retail market, diffusion of knowledge), is to be balanced with the contrary tendency, based on centrifugal forces (immobile factors, rents/commuting, congestion), which determine a relocation of economic activities towards *the periphery*. The agglomeration of activities in a region is a prerequisite for economic growth in that area, attracting production factors and further increasing congestion. The explanation stems from the fact that if congestion translates into increased productivity, then it can lead to higher wages, incomes and living standards. The immediate consequence of the individuals' behaviour is their desire to move in order to take advantage of higher living standards in locations with higher productivity. By default, there is an increasing volume of economic activities in areas with high productivity and this, in turn, through economies of agglomeration, leads to a further increase in productivity, causing the population density to increase through migration, as well. Thus, within a country, the regional differences in productivity and economic development continue to deepen, because of people who choose to relocate in high productivity areas. Fortunately, the migration process of work force and economic activities cannot last forever, because factors such as increasing rents or housing prices will reduce congestion.

Additionally, location decisions produce external effects for other categories of individuals, effects which can be negative or positive. For example, when we decide to live and work in locations with high productivity, we contribute to the increase of congestion and emissions (pollution) in that area, an effect negatively perceived by other inhabitants, or we can help existing companies or individuals benefit from our R & D results, without additional charges. These *agglomeration externalities* should be taken into account by political factors when developing a spatial policy.

But for externalities to become a clear justification for direct intervention through a spatial policy, by redistributing activities from the areas with high productivity towards the ones with low productivity, we need to know how these positive and negative externalities balance themselves in practice. Unfortunately, evidence regarding the prevalence of positive or negative externalities are far from conclusive (MIER, p. 31). In addition, the location decisions of individuals and economic activities are based on *net benefits*, obtained by subtracting the compensation costs from the productivity value. This is because high productivity in a particular location tends to be compensated by higher costs of living and production, and the differences in productivity prove to be an insufficient argument for a location change.

## 5. The implications of NEG on Romania's regional policy

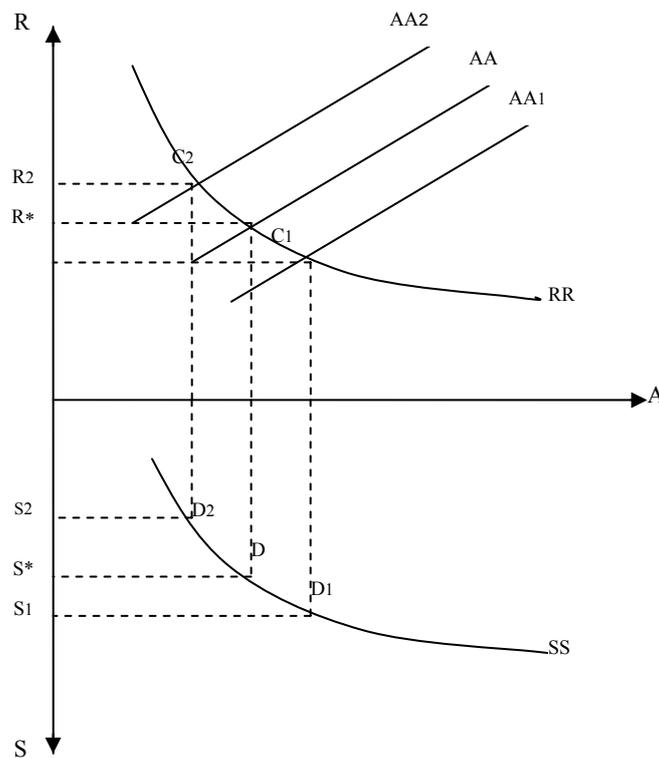
An extremely useful analysis in developing a spatial policy in Romania is the macroeconomic model that takes into account the interdependencies of regional disparities, agglomerations and economic growth (Pelkmans, 2001, Socol, Socol, 2006, p. 65), model based on theories of endogenous growth and economic geography.

The model functions based on the following assumptions: 1. *two regions*, core (C) and periphery (P); 2. *agglomeration index* (A) is an index which measures the concentration of activities, calculated as the ratio between the number of companies in C and the total number of businesses; 3. *inequality index* (R), measured as the ratio between the income per capita from C and the one from P; 4. *geographical effect (centripetal force)* (line AA in Figure 1), the relationship between the degree of agglomeration (A) and the level of regional disparities of income (R) is positive, because the greater regional inequalities are, the higher are companies' interest in locating in C; 5. *growth relationship* (SS curve) expressing the fact that the agglomeration of activities generates technological externalities, which reduce the cost of innovation and lead to a higher national economic growth rate (s); 6. *competition effect (centrifugal force)* (RR curve), the presence of a strong competition leading to reduced profits in C, thus causing a negative relationship between R and A.

Using Figure 1 we are able to analyse the impact of transaction costs on agglomerations. The initial equilibrium is represented by points C and D. If transaction costs between regions are reduced, the agglomeration will increase (line AA shifts in AA1), resulting in a higher growth rate (s1) and lower income inequalities (R1), C1 and D1 becoming the new equilibrium reference points. On the other hand, if transaction costs within the poor region are reduced, then the agglomeration in the core will be reduced as well (line AA shifts in AA2). Companies shifting towards P reduce the innovation rate and increase revenues in C, emphasizing inter-regional inequalities. The equilibrium is restored between reference points C2 and D2. In terms of regional policy measures, the analysis leads us to two conclusions.

Firstly, infrastructure improvement is a policy measure with direct effects on growth and economic and social cohesion. At intra-regional level, public interventions favour regional convergence, resulting in a lower economic growth rate. At inter-regional level, the economic growth rate is higher, due to the conditions generated by the concentration of activities.

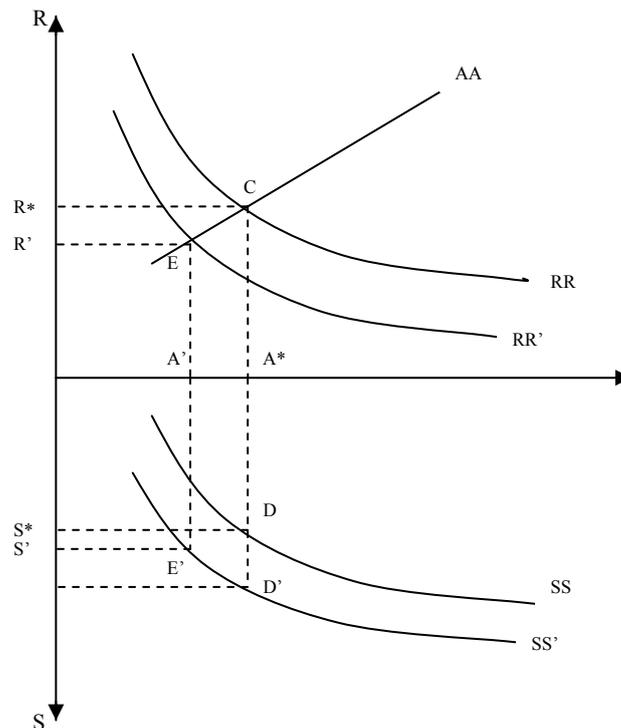
Secondly, regional policy may cover the *granting of funds for industrial conversion in peripheral regions*. This leads to a diminished agglomeration in the more prosperous region (C), due to a lower desire to leave the periphery, but the growth rate will be scaled down, because the agglomeration index is reduced and income inequalities between C and P are increased. However, the relocation of economic activities in peripheral areas rarely leads to economic growth because, on the one hand, the economic activities conducted in the periphery do not involve research and development, but are more attracted by a cheap work force, and, on the other hand, the number of these activities is not sufficient enough to generate an agglomeration capable of triggering economic growth in the periphery.



Source: Socol, Socol, 2006, p. 65.

Figure 1. The impact of transaction costs on agglomerations

Besides these two measures of regional policy, decision makers can intervene *to promote innovation*, by providing incentives for research and development or by investing in educational infrastructure. Looking at Figure 2, we can observe that a reduction in innovation costs, by providing subsidies and public investments in research, development and education, determines a higher growth rate of agglomeration, which translates into a displacement of the growth relationship curve from  $SS$  to  $SS'$ . Increasing innovation leads to a reduction of profits in region C, which, in turn, leads to a reduction of income inequalities between C and P, i.e. the shifting of the  $RR$  curve towards  $RR'$ . Agglomeration will tend to decrease, so the new equilibrium reference points will be E and E'.



Source: Socol, Socol, 2006, p. 65.

Figure 2. The impact of innovation on agglomerations

The importance of innovation, research and knowledge to economic development is undoubtedly recognized. The theories that refer to regions as nodes of knowledge, based on Schumpeter's theory and evolutionary economy, place innovation and the interactive learning process in the centre of economic development. All the factors that encourage innovation in a region, such as partners, competition, human capital, regional knowledge infrastructure, institutions, regulations, legislation, form the regional innovation system. The existence of regional competitive industrial clusters shows that the regional innovation system is viable and gives long-term competitive advantages to the economic actors.

## 6. Conclusions

The analysis of the new economic geography theories led us to conclude that, although it is difficult to move from theoretical, analytical models to empirical ones, destined to assess public policies, the goal should remain the following: developing the normative basis of the new economic geography. We believe that the new economic geography and agglomeration economies should constitute major concerns for policy makers in our country, as it is more efficient to look at these tools as a way of increasing overall productivity, output, income and welfare (efficiency) than as a mechanism designed to cope with economic inequality.

Romania's regional policy should be based on analyses that include all centripetal (bonds, market, diffusion of knowledge) and centrifugal forces (immobile factors, rents/commuting, congestion) of the new economic geography models. The economic activities and individuals' decision to locate depends on the existence of a specialised work-force, suppliers of intermediate goods, the degree of diffusion of knowledge and technology, the opportunities generated by existing economic activities or by retail markets, the entrepreneurial characteristics and cultural affiliation of individuals. In addition to this, agglomeration externalities and net benefits obtained by localisation should be taken into account by policy makers when developing a regional policy.

The analysis of the macroeconomic model based on the interdependencies between regional disparities, agglomeration and economic growth shows that in the case of core-periphery dual regional structured economies, the cohesion policy effects can be avoided, in that the central agglomeration will generate a higher growth rate at national level, but with the price of amplifying the existent regional disparities. One way of dampening this negative effect over Romania is

investing in those areas which could trigger regional development. We are talking about policies designed to promote innovation and knowledge, by providing incentives for research and development or by investing in educational infrastructure. That is why studies identifying areas of interest for the development of regional clusters and measures necessary for their support are and must remain one of the objectives of most regional development strategies.

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