Revista Română de Geografie Politică Year **XIII**, no. **2**, **November 2011**, pp. **171-183**
ISSN **1454-2749**, E-ISSN **2065-1619** Article no. **132105-231**

LOCAL FITTING AND GLOBAL PREDICTION

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Abstract: The presence of the decision-maker at mesoscale has become a key element in the balance of detailed information on local level and general information on regional level. Decision-makers play an important role during recessions because they fit local evolution into regional evolution, a reverse approach to periods of economic boom.

Keywords: decision-maker, local sensitivity, regional prediction, mesoscale, labour market

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INTRODUCTION

This study analyzes the relationships between the components of spatial economic systems from a new perspective providing solutions that avoid the trap of such questions like: How to change a model at component level when transition from local to global occurs? How can we generalize a model without losing touch with reality?

In order to determine differences in the spatial complexity of the local and the regional and how regional complexity is arising from local complexity the issue was reduced to types of relationships between local and global and types of structure (vertical hierarchies or horizontal networks) that integrate the local into the global.

However, there is a mutual impact between economic systems and not merely one system impact on the others. In addition, because each system has several components, any initial impact will have complex effects on the internal relations of another system. Therefore, the system response is unlikely to be simple. This analysis shows the limits of studies based on local territorial levels which are then integrated into higher territorial levels based on the idea of establishing a "balance" between sensitivity (small perturbations can be expanded into large and lasting effects) and metastability (path-dependence and lock-in) in complex systems.

On the other hand, the geographical scale defines the limits and restricts

entities on which control is exercised and disputed. Through crossing scale processes, policies supported and established by the political power at one geographical scale are being extended to the other scales.

The decision maker - economic system relationship is driven by a goal or an important objective that is taken into account by the decision-maker and the model that he/she creates mentally will help to relate adequately to the system. The presence of the decision-maker at the mesoscale become a key-element in the balance of detailed information on local level and general information on regional level. Decision maker links analysis to synthesis, and local level to global level. He builds the global from the local by forecasting and the local from the global by fitting. At mesoscale 'reality' (micro) meets "desire" (macro). "The decision area" is the space of variation of other system components in relation to those chosen by decision maker to be modified into an economic policy. A good choice of components leads to greater efficiency of policy implementation.

The rest of the paper is organized as follows. Section 2 discusses the differences between local and global level. Section 3 presents the interactions between components, while section 4 describes the methodology used to estimate the role of decision-maker as a link between two different territorial levels and, finally, section 5 presents the concludes.

LOCAL-GLOBAL DIFFERENCES AND SPATIAL AGGREGATION

In order to determine differences in the spatial complexity of the local and the regional and how regional complexity is arising from local complexity, the issue was reduced to types of relationships between local and global and types of structure (vertical hierarchies or horizontal networks) that integrate the local into the global.

Overlapping the local level other upper levels, each with its peculiarities, increase difficulties and prevent finding viables and lasting solutions. Therefore analyzing how the "local goes global" and "the global is located" is extremely important in terms of the exponential evolution of the territorial situation. (Ianoş, 2006)

There are many researchers trying to solve the spatial problem of the local-global link starting from structure such as scale (vertical hierarchy) (e.g. Herod and Wright 2002) or from a structure that combines hierarchy and networks, nuancing the notion of scale in different ways: Amin (2002), Brenner (1998), Leitner (2004) and Taylor (2004). The distinction between local and global levels is seen by Marston, Jones, Woodward (2005) as having its roots in the fundamental oppositions that have preoccupied philosophical thinking long ago, listing the micro-macro dualities in social analysis (Layder 1994), atomistic thinking versus holistic thinking. Also, the theoretical boundaries between the abstract/practical and the theoretical/empirical are often associated with the global-local binary (Sayer 1991). And last but not least, we can see the scale categories processed by differences between order and determination, on the one hand, and complexity and randomness, on the other (Jones and Hanh, 1995; Smith, 2001).

DECIPHERING THE INTERACTIONS BETWEEN COMPONENTS

Centrality is an attribute of horizontal networks and defines higher connectivity of a point compared to the others because of its location which is interposed in such a way that can coordinate the underlying territory. Another aspect is that this central position relaties to the scale at which we consider it

and if referred to a broader area there can be other points that may have greater connectivity. Scale does not unbound all relationships established between components.

Marston's conception about complex territorial interlinks is due to the influence of researchers like N. Smith and N. Brenner, the former considered the "father" of "politics of scale" argues that "is geographical scale that defines the boundaries and bounds the identities around which control is exerted and contested" (Smith 1992, also Herod, 1991). The complexity of these forces is unexpected, being revealed by processes of 'scale jumping', whereby 'political claims and power established at one geographical scale are expanded to another' (Smith 2000, see also Staeheli 1994; Miller 2000), or by 'scale bending', in which 'entrenched assumptions about what kinds of social activities fit properly at which scales are being systematically challenged and upset' (Smith, 2004).

Richie Howitt (1993 1998 2003) has a view similar to Brenner's about scales and relations between them, adding them dialectical "multi-directional and simultaneous" operation modality, "between and within" various scales. For Howitt, like Swyngedouw, the local is not so distinct from other scales, it most not be considered separately, but together with other higher territorial levels, the local "containing important elements of other geographic scales', thereby achieving a more 'complex [understanding of the] interpenetration of the global and the local" (1993).

In the direction of a complex approach of scale invites Helga Leitner's work (2004): "transnational networks represent new modes of coordination and governance, a new politics of *horizontal relations* that also has a distinct spatiality. Whereas the spatiality of a politics of scale is associated with *vertical relations* among nested territorially defined political entities, by contrast, networks span space rather than covering it, transgressing the boundaries that separate and define these political entities." Marston, Jones, Woodward (2005) are dissatisfied with attempting to produce "hybrid solution" by joining the conceptualizations of hierarchy with those of network, the deficiencies of scale cannot be filled by adding or integrating the theoretization of network.

Cartwright (1991) finds a "balance" between sensitivity and metastability in complex systems that suggests lower limits (small perturbations can be expanded into large and lasting effects) and higher limits (path dependence and lock-in) to assess the models of complex systems .

Gregory and Urry acknowledges the difficulties posed by the delimitation of economic connections in relation to territorial scales that are bounded by administrative criteria "… the economic relationships in a regional economy are spatially structured, but there is no simple mapping from geographic location to place in the interaction structure. Rather, place is a complex web of social, economic, political and other relations, which are themselves spatially structured and configured over time. These are themes that have become familiar in the human geography literature". (Gregory and Urry 1985).

Nested relationships between components resolved by the graph theory

According Sheppard (1990), space is viewed by economists as endogeneous and uneven. Endogeneity is based on the social nature of distance, the closeness of the two places not being simply based on the Euclidean distance separating them, but on intensity and how easy they interact. It is clear that communication and transportation technologies are endogeneous of spatial

economy and spatial structures are caused by socio-economic processes leading to their unevenness spatial distribution. Furthermore, these spatial structures affect the socio-economic processes that produced them (Soja, 1980, quoted in Sheppard, 2002). Ed Soja coined the term socio-spatial dialectic to refer to such reciprocity, whereby "social and spatial relations are dialectically inter-reactive, interdependent" (Soja, 1980, quoted in Sheppard, 2002). Geographical pre-existing unevenness shape spatial-temporal changes. Despite recent arguments about “death” of distance in the face of globalization, differences in relative location remain critical of the possibilities available to economic actors (Sheppard, 2002).

What interests us in this study is the remote influence of the action of some determinants (economic and financial crisis) underlying exogenous growth theory that can be illustrated by graphs. On the other hand, regional economic indicators do not contain information related to the importance of firms and relations within the region. By the instrumentality of graphs we can illustrate the importance of economic links and nodes in comparison with other links and nodes and regional synergy illustrate by cartograms. This approach stems from the fact that firms are more sensitive to changes in other firms with which they have economic links than to changes in the region as whole. Representation by cartograms tend rather to equalize economic indicators and spread them throughout the region, losing contact between cause and effect. At the same time, adding these relations makes the areas to be converted to points (by concentration) and lines that link the points (crossing only space). So, the geographic concept of space is surpassed making place to the mental concept of space, the space of relations between the components of the economic system and remote action. During the crisis negative effects are spreading through these relations seen as means for transformation.

PLACEMENT BETWEEN THE LOCAL AND THE GLOBAL OF DECISION-MAKERS

Deciphering how the economic system is made and the links between its components is a necessity for the decision-maker’s work.

Nor are the local and the global easily separated from agency and structure, in which subjectively experienced and individually felt thoughts, feelings and actions are held opposed to and to be integrated with objectives, broadly operating social forces, relations and processes (Gregory 1981, Giddens 1984).

Mental models

Complexity theorists like Gell-Mann (1995), Prigogine and Stengers (1984), Rössler (1986) and Casti (1994) believe that the understanding, knowledge, internalization by a mental model of the system depends on each observer, whether he has a privileged relationship with the observed object, the complexity being not an intrinsic property of an independent reality but, at least in part, a property of the knowledge process, a property attributed by the observer.

The observer-observed relationship is driven by a goal or an important objective of the observer and the model that he creates mentally must help him to refer properly to the observed. As suggested by existentialism, there is no sense of the universe itself, but each of us may make it understandable.

Forrester (1969) described mental models as mental image of the world around us. One does not have a city or a country or a government in mind. He has only selected concepts and relationships that use to represent the real system.

The balance between detailed and general information required to be entered into models in order to formalize data of real systems was observed by Kaneko (1984) who relates details with sensitivity to change and universal aspects with robustness.

The two types of data are used according Ramsey (1996), for different purposes: global properties facilitating the prediction, while model fitting to reality is local and therefore sensitive to details.

Incompatibility between models used in local fitting and those used in the forecasts is due to the possibility of exponential growth of small deviations from fitting stage to forecast stage and if a match is made on the region with local instability, "unrepresentative" for the extrapolation studies in a stable global system, fitting has no relevance for foresight (Ramsey, 1996).

Decision-makers options to act

Institutional rational choice share the assumption of interdependence developed by network governance theorists. Governance network theories also have in common with institutional rational choice the concept of polycentricity. As polycentricity theory, the network governance theories recognize the existence of multiplicity of actors in metropolitan governance and unhierarchical relations between them. (Morcol, 2003)

Decisions of agents forming economic systems can be divided in:

- economic decisions having of maximizing profit (looking for abundant labour for economic activity, raw materials, cheaper transport, externalities), influencing agglomeration;
- political decisions that have as purpose regional development and welfare of residents, leading to convergence (see below the influence of policies by type of state);
- people's decisions as employees and consumers

Information about the decisions of each type are the causes of future decisions, inside of an evolving process. The information used in decision-making has different components, different weights of components and different levels of aggregation. Territorial area of competence of economic decision-makers depends on the size of the company that still is reflected in the economic relations with other firms. Economic decisions can target both local, regional and even supranational levels. As employer, the company can recruit labour from neighbouring or a more distant, polarizing area, overcoming geographical restrictions of administrative units. Location decisions are constrained by socio-economic factors. Geographical scale cannot constrain the economic system to operate within its limits in an open economy, which means that it will not include all relations between components these extending outside and being able to turn it into external shocks. The area of jurisdiction of policy-makers is limited to constituency and depends on the degree of decentralization of national policy. When local policy makers do not act, the influence of top-down policies occurs (from national to local level).

Decision makers act on economic systems, as discussed above, based on mental models, anticipating their evolution. Anticipation is the end we have in mind to follow the evolution of the system according to a given "order", it is a law according to which the system evolves and the end will be reached. Anticipation implies the existence of an observer who can act on the system at any time if it changes evolution, following a different trajectory than that anticipated of the observer. The observer takes over the system and leads it to the purpose

pursued. Anticipation and control are two subjective processes that depend on the observer's discernment and "vigilance". In anticipation the path of evolution is not a usual one for the system because the nonlinear behavior of the system is trying to be removed by the anticipator. Rosen (1972 http) said that the difficulty of understanding anticipatory behavior is linked to the principle of causality and time scale, many scientists rejecting that the current state of the system could depend on the future. Referring to anticipation Nadin (Nadin http) goes on sayng that "to see the world once again is not an easy thing".

According to Capra (1996) structures in nature are continuously transformed, by forces and mechanisms into other structures, these structures are, in fact, only manifestations of the underlying processes. Capra avoids the term of component of system not to create the impression of a hierarchical structure within systems, which are only nested. Even so, it presupposes the existence of the structure components. Structure component is a concept which explains the flexibility of structure subjected to influences by reducing or enlarging effects. Thus, the components have a reaction buffer space, in which they move when an external cause "requires" a reaction, an effect. This freedom can be understood rather as quasi-independence.

Quasi-independent evolution does not mean a high degree of isolation of a system from the other systems. The degree of connectivity make the difference between an ordered system (low connectivity) and a chaotic system (maximum connectivity, all subsystems link to all other, influencing each other in the same proportion). Quasi-independence of a subsystem is given by structure, by the number of components, territorial arrangement (location) and their temporal ("evolution level").

The impact of each other's decisions

Social and economic processes emerge from the actions of various agents with bounded rationality that can learn from experience and interactions and those differences contribute to change.

Quasi-independent behaviour of the system's agents is due to certain constraints of the network structure they are part of. At the same time there are constraints imposed on network structure by the discursive construction of the agent's reality (agents can change the structures through constructs and actions) is the conclusion reached by Klinj (2001) following the Giddens structure theory to emphasize the interrelationship between the stability (structure) and dynamism (process) of networks and the role of agents:

"Through their sustained interactions, actors create network structures: rules and resources that (will) have a structuring effect on future interactions in the network... Giddens summarize the distinctive relationship between structure and interaction in his term *duality of structure*s. Structure is a precondition for action, and at the same time, it is affirmed and changed during action" (Morcol, 2003).

Next, we examine how social and economic changes propagate from one region to another (from center to periphery or in outlying regions), both during growth and recession and what factors underlying the spread of these changes and how change occurs (in which areas, intensity, and delays), in two different circumstances: when firms are in complementarity when firms are in competition. As a starting point we have taken two types of models in which policy makers, economic decision makers and individuals have different roles: the center-periphery models and the unemployment models.

In order to provide an empirical analysis of the relationship between regional components we have analyzed employment, migration, education data for two region (NUTS II - IV): Bucharest-Ilfov and South. The data analyzed here are taken from the 2007-2009 Yearbook of the National Institute for Statistics.

The center-periphery models

According to Beck, Gleditsch, and Beardsley, 2006, the goal of comparative research is invariably to test hypotheses about certain relationships between unit attributes and variation in outcomes of interests. Inferences from comparisons across units assuming that observations are independent can yield misleading conclusions if the outcome of interest varies because of diffusion among units rather than functional relationships between the attributes compared (Galton, 1889).

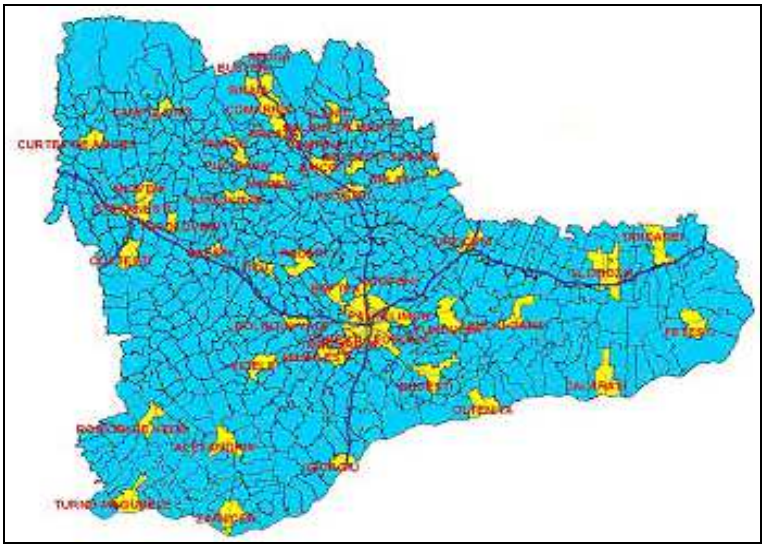

Figure 1. Bucharest-Ilfov and Southern Region (case study regions)

Regional policies, based on traditional theories of regional development (von Tunen's land prices models, Weber and Marshall's industrial location, Loch and Christaller's settlements) recognize that firms may benefit from locating close to one other due to agglomeration economies and tried to create opportunities in order that agglomerations may occur in other locations and obtaining regional economic convergence. In that way, they tried placing the business in underdeveloped and depopulated regions (Massif Central in France, suthern Italy) by incorporating those of developing nearby areas, because according to Christaller (1966), larger settlements are likely to provide a wider range of functions than smaller settlements. More over, agglomeration forces are self-enforcing. This feature is sometimes called "circular causality" to stress the feedback relation between economic activities: upstream expansion can lead to downstream expansion and vice versa. How this is understood by regional policies can or not work in their favour. Policy makers should be aware that once started the process of development is more difficult to revert to the beginning. Indeed, the removal of the initial shock would not lead to a reversal of its effects. This is "hysteresis" or "path-dependency": transitory shocks have permanent

effects. When the magnitude of intervention rises above some threshold level, the economic landscapes starts to change. When this happens, the forces that sustained the *status quo* unwind quite rapidly giving rise to sudden geographical shifts. This threshold property of effective policy intervention casts doubts on regional fine tuning. Marginal policy changes are completely ineffective until the cumulated change remains below a certain threshold. After the threshold is crossed, the impact is catastrophic (Ottaviano, 2003).

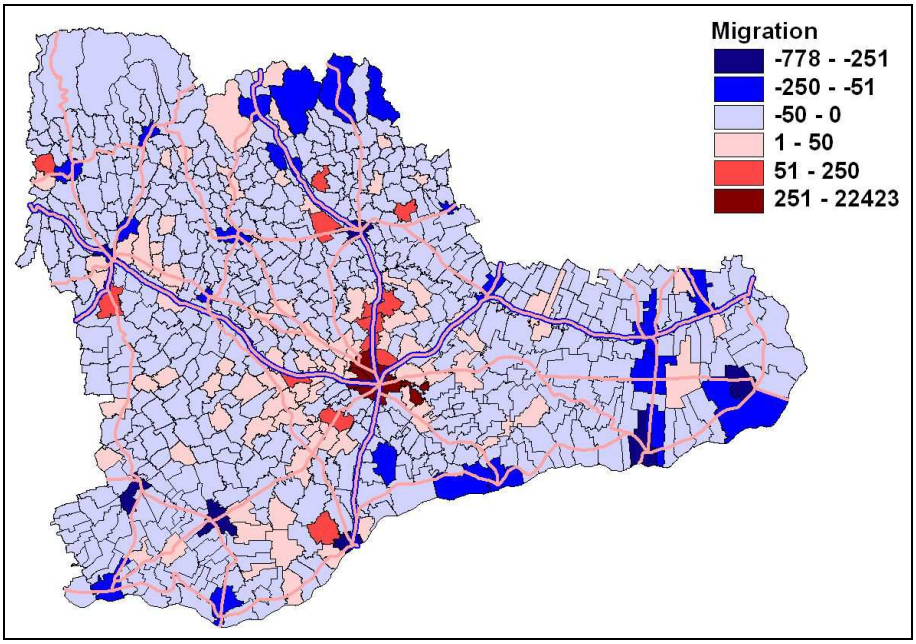

Figure 2. Net migration, 2007

To the extent agglomeration economies do exist in higher-order locations the external benefits associated with spatial industrial clustering will be spread across a diverse range of sectors, whereas in lower-order sectors, the external benefits of clustering will tend to be contained within in a small number of industrial sectors. (Dewhurst, J. and P. McCann, 2003).

Our available data will enable us to check if the center-periphery models work in the same way in the period of economic growth and recession and what decision makers do in order to adapt at the new situation. As we see, nett migration in some rural regions become positive in 2009. Peripheral regions are semi-industrialized regions with small manufacturing industries that use low-level technologies and are sparsely populated, resource-based industries dependent (population migrates to other regions in periods of economic boom) while central region is dominated by services.

One of the most likely sources of regional differences is variation in industry composition. Shocks to aggregate demand have differential effects in terms of each industry. As consumer income falls, the demand for relatively more income-elastic goods should fall relatively further; as further incomes become more uncertain, the demand for durables should decline relatively more than the demand for nondurables. Industries that produce input for more volatile demand industries are themselves more likely to experience severe

demand shocks. As Bernanke (1983) has argued, the banking crises not only reduced money supply but also disrupted the operation of local capital markets (Rosenbloom and Sundstrom, 1999).

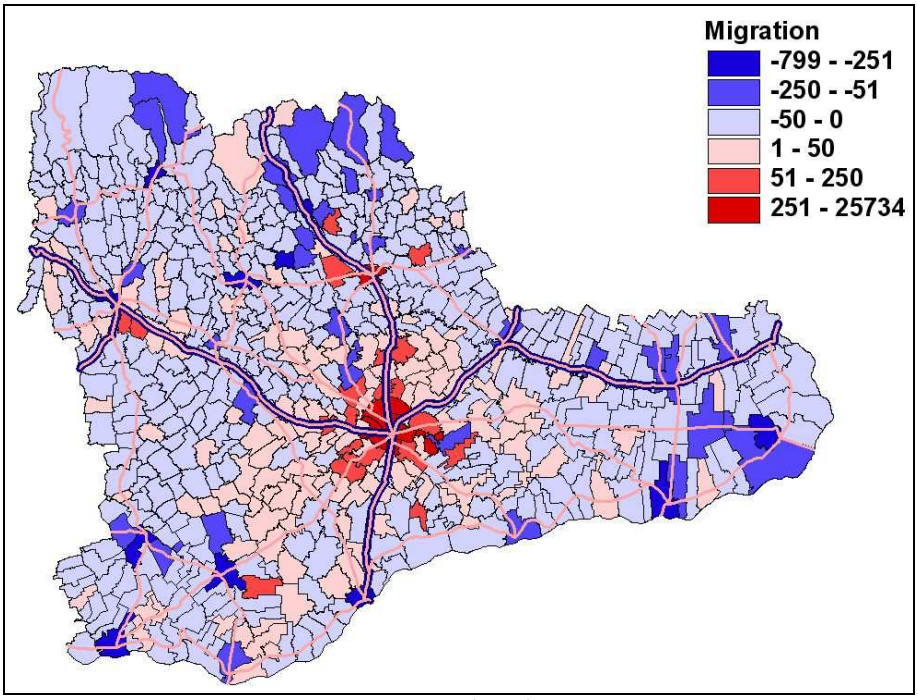

Figure 3. Net migration, 2009

Unemployment models

In Hoover's (1948) classification, higher-order urban areas will generally exhibit greater economies of urbanization, whereas lower-order urban areas will generally exhibit greater economies of localization. From the point of view of local employment patterns, these arguments would also imply that in general, higher-order urban areas will exhibit a relatively diverse range of local employment activities, whereas lower-order areas will tend to exhibit a highly skewed sectoral employment distribution (Dewhurst, J. and P. McCann, 2003).

The larger the pool of workers that a firm can access the more likely it is to find the exact skills that suits its needs (Helsley and Strange, 1990; Amiti and Pissarides, 2005). Another aspect is risk sharing; if firms are subject to idiosyncratic shocks then a larger labour market exposes workers to less risk by increasing the probability of re-employment if they are made redundant (Krugman (1991). Perhaps the most important argument is that a large labour market increases the incentives for workers to undertake training. In a small market, workers who acquire specialist skills may be 'held-up' by monopolistic employers, in which case there is no incentive for them to invest in skills. The presence of a large number of potential employers removes this threat of opportunistic behaviour, and thereby increases the incentives for skill acquisition (Matouschek and Robert-Nicoud 2005). The largest cities tend to be diversified, while smaller cities are more specialized. (Duranton and Puga 2000, 2001). (quoted in Overman, Rice, and Venables (2008)

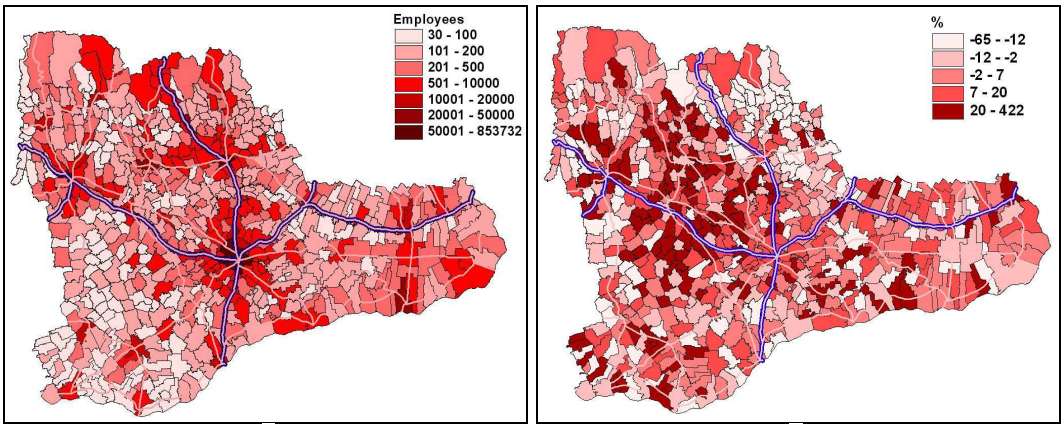

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Figure 4. Employees, 2007 (a) and changes in the number of employees (b), 2008-2007

The mechanisms of the movement of labour and firms have been summarized by Puga, 1998 as follows:

„When workers migrate towards locations with more firms and higher real wages, this intensifies agglomeration. When instead workers do not move across regions, at low trade costs firms become increasingly sensitive to cost differentials, leading industry to spread out again."

There are interdependencies across places so that what happens in one region has implications not only for this location but for other regions as well. The objectives of this paper are to investigate these linkages, identifying the channels through which these effects operate and their net impact. The issue is important because, as we will see, under some circumstances changes that benefit one region also have positive effects on other areas. When this complementary relationship between regions holds, the impact of a shock is in some sense shared between regions. Under other circumstances, however, regions are in a competitive rather than a complementary relationship with one another. A positive shock to one region has a negative impact elsewhere, with the result that the effects on the first region are amplified at the expense of other regions (Overman, Rice, and Venables, 2008).

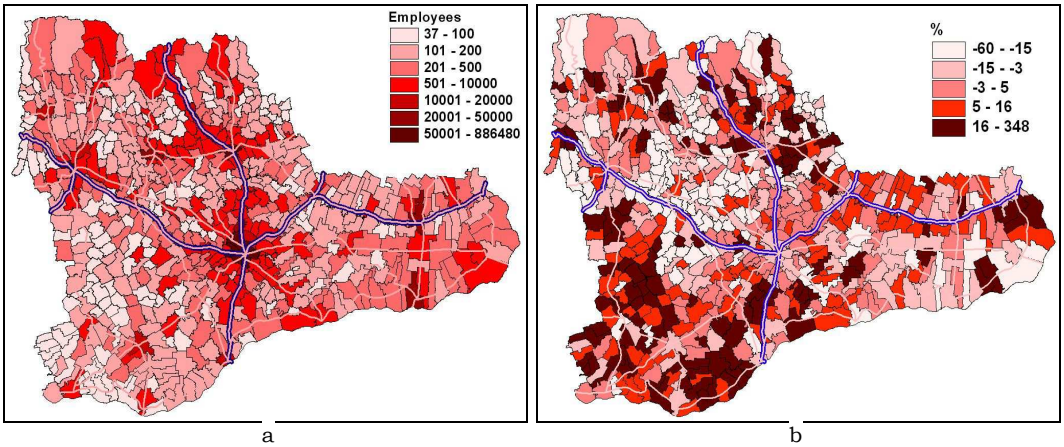

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Figure 5. Employees, 2009 (a) and changes in the number of employees (b), 2009-2008

The long-term unemployed may lose skills or contact with the labour market, generating hysteresis (Blanchard and Summers, 1987), and blocking the possibility of further reductions in the unemployment rate (Abraham and Shimer, 2001).

CONCLUSIONS

Therefore, not all subsystems evolving at the same rate and in the same direction so that the most dynamic and strong mutual ties create a trend that will spill over to other subsystems in the form of external shocks, the latter managed to "rescue" the gaps or differences, generalizing the trend in system evolution. Geographically, we refer to those local economies which, losing the quality of raw material suppliers to some industries, reinvent themselves. Another example is the loss of competitiveness compared with other regions that have the same economic profile and are in relation of competition.

Relations between the components have a bearing on the evolution of the system and the importance of components in the system is given both as absolute and relative or relational value which includes types (positive or negative feedbacks) and intensity (strong or weak) of relations. The importance of a component makes that a change within it to be incorporated into the evolution of the system, and when it comes to reaching a critical threshold in the evolution of a component can destabilize the system. There are critical thresholds at both the local and the global results from interactions at different levels and components of thresholds' overflow across several levels.

A good decision is based on peculiarities of the territorial unit administered. The integration of the evolution of this unit into the territorial system as a whole and the intuition of the way forward of the whole system (forecast achievable) is a good decision because the aggregated data give the trends and particular data support it. Taking a decision involves rethinking the past, the result being that the return to a previous decision means regaining a lost past.

Acknowledgment

Invest in human resources!

This work was supported by project: POSDRU/88/1.5/S/61150 "Doctoral Studies in the field of life and earth sciences", project co-financed through Sectoral Operational Program for the Development of Human Resources 2007-2013 from European Social Fund.

REFERENCES

ABRAHAM, Katharine, G., Shimer, R., (2001), *Changes in Unemployment Duration and Labor-Force Attachment*, in Alan B. Krueger and Robert M. Solow, eds., The roaring nineties: Can full employment be sustained? New York: Russell Sage Founda-tion, pp. 367-420;

AMIN, A., (2002), *Spatialities of globalization Environment and Planning*, A 3, 385–99;

AMITI, M., Pissarides, C., (2005), *Trade and Industrial Location with Heterogeneous Labour*, Journal of International Economics, 67(2), 392-412;

BECK, N., Gleditsch, K.S., Beardsley, K., (2006), *Space is more than geography: Using spatial econometrics in 720 the study of political economy,* International Studies Quarterly 50:27–44;

BLANCHARD, O., Summers. L., (1987), *Hysteresis in Unemployment*" European Economic Review, 31(1–2): 288–295;

BERNANKE, B., (1983), *Nonmonetary effects of the financial crisis in the propagation of the great depression*, American Economic Review, 257-76;

BRENNER, N., (1998), *Between fixity and motion: accumulation, territorial organization and the historical geography of spatial scales Environment and Planning*, D: Society and Space 16 459–81;
CAPRA, F., (1996), *The web of life: A new scientific understanding of living systems*, New York: Anchor Books;
CARTWRIGHT, T.J., (1991), *Planning and chaos theory*, Journal of the American Planning Association, 57, 44–56;
CASTI, J.L., (1994), *Complexification: Explaining a paradoxical world through the science of surprise*, New York: Harper Perennial;
CHRISTALLER, W., (1966), *Central Places in Southern Germany*, (translated by C.W.Baskin), Prentice-Hall, Englewood Cliffs, New Jersey;
DEWHURST, J., McCann, P., (2003), *Specialisation and Regional Size*. Mimeo. University of Dundee;
DURANTON, G. PUGA, D., (2001), *Nursery cities: Urban diversity, process innovation, and the life cycle of products*, American Economic Review 91(5):1454–1477;
DURANTON, G. PUGA, D., (2000), *Diversity and specialisation in cities: Why, where and when does it matter?*, Urban Studies 37(3):533–555;
FORRESTER, J.W., (1969), *Urban Dynamics*, MIT Press, Cambridge, MA;
GALTON, F., (1889), *Comment on EB Tylor 'On a Method of Investigating the Development of Institutions: Applied to Laws of Marriage and Descent*. Journal of the Royal Anthropological Institute 18:268–269;
GELL-MANN, M., (1995). *What is complexity?*, Complexity, 1(1), 16-19;
GIDDENS, A., (1984), *The constitution of society University of California Press*, Berkeley CA;
GREGORY, D., (1981), *Human agency and human geography*, Transactions of the Institute of British Geographers 6 1–18;
GREGORY, D., Urry, J., (eds), (1985), *Social relations and spatial structures*, Macmillan, Basingstoke;
HEROD, A., (1991), *The production of scale in United States labor relations*, Area 23 82–8;
HEROD, A., WRIGHT, M., (2002), *Placing scale: an introduction*, in Herod A and Wright M eds Geographies of power: placing scale Blackwell, Oxford 1–14;
HOOVER, E.M., (1948), *The Location of Economic Activity*, McGraw-Hill, New York;
HELSLEY, R.W., Strange, W.C., (1990), *Matching and agglomeration economies in a system of cities*, Regional Science and Urban Economics 20(2):189–212;
HOWITT, R., (1993), *A world in a grain of sand*: *towards a reconceptualization of geographical scale Australian*, Geographer 24 33–44;
HOWITT, R., (1998), *Scale as relation: musical metaphors of geographical scale*, Area 30 49–58;
HOWITT. R., (2003), *Scale*, in Agnew J, Mitchell K and O'Tuathail G eds A companion to political geography Blackwell, Oxford 138–57;
IANOŞ, I., (2006), *Globalizarea localului şi localizarea globalului*, Geo Valachia, 1, p.120-126;
JONES J.P.III, Hanham, R.Q., (1995), *Contingency, realism and the expansion method*, Geographical Analysis 27 185– 207;
KANEKO, K., TSUDA, I., (1994), *Constructive Complexity and Artificial Reality: An Introduction*;
KLIJN, E.-H. (2001), *Rules as institutional context for decision making in networks: The approach to postwar housing districts in two cities*, Administration & Society, 33(2), 133-164;
KRUGMAN, P., (1991), *Increasing Returns and Economic Geography* in Journal of Political Economy, 99,183-199;
LAYDER, D., (1994), *Understanding social theory*, Sage, London;
LEITNER, H., (2004), *The politics of scale and networks of spatial connectivity: transnational interurban networks and the rescaling of political governance* in Europe in Sheppard E and McMaster R B eds Scale and geographic inquiry Blackwell, Oxford 236–55;
LOSCH, A., (1954), *The Economics of Location*, Yale University Press, New Haven CT;
MARSHALL, A., (1920), *Principles of Economics*, Macmillan, London;
MARSTON, S.A, JONES, J.P.III, Woodward, K., (2005), *Human geography without scale*, Transactions of the Institute of British Geographers, New Series 30 416 ^ 432;
MATOUSCHEK, N., Robert-Nicoud, F., (2005), *The Role of Human Capital Investments in the Location Decision of Firms*, Regional Science and Urban Economics 35(5), pp. 570-83;
MILLER, B., (2000), *Geography and social movements*, University of Minnesota Press, Minneapolis;
SHEPPARD, E., (1990), *Modeling the Capitalist Space Economy: Bringing society and space back*, Economic Geography, 66: 201–228;
MORÇÖL, G., (2003), *Networks and Complexity: Prospects and Challenges For A Theory of Metropolitan Governance*. Penn State – Harrisburg;
O'SULLIVAN, D., (2004), *Complexity science and human geography*, Transactions of Institute of British Geography, NS, 29 pp. 282-295;
OTTAVIANO, G.I., (2003), *Regional policy in the global economy: insights from the New Economic*

Geography, Regional Studies, vol. 37, n. 6-7, pp. 665-674;
OVERMAN, H.G., Rice, P., Venables, A.J., (2008), *Economic linkages across space*, CEPR Discussion Paper, no. 6786, London;
PLUMMER, P., SHEPPARD, E., (2006), *Geography matters: agency, structures and dynamics at the intersection of economics and geography*, Journal of economic geography, 6, pp 619-638;
PRIGOGINE, I., STANGERS, I., (1984), *Order out of chaos; Man's new dialogue with nature*, New York: Bantam Book;
PUGA, D., (1998), *The Rise and Fall of Regional Inequalities*. European Economic Review, forthcoming;
RAMSEY, A., (1996), *If Nonlinear Models Cannot Forecast, What Use Are They?*, Studies in Nonlinear Dynamics and Econometrics;
ROSENBLOOM, J., SUNDSTROM, W., (1999), *The Sources of Regional Variation in the Severity of the Great Depression: Evidence from U.S. Manufacturing, 1919-1937*, Journal of Economic History 59, September 1999, pp. 714-747;
RÖSSLER, O.E., (1986), *How chaotic is the universe?* in A. V. Holden (ed.), Chaos. Princeton, NJ: Princeton University Press;
SAYER, A., (1991), *Behind the locality debate: deconstructing geography's dualisms*, Environment and Planning A 23 283–308;
SHEPPARD, E., (2002), *The spaces and times of globalization: place, scale, networks, and positionality*, Economic Geography, 78: 307–330;
SMITH, M.P., (2001), *Transnational urbanism: locating globalization*, Blackwell, Malden MA;
SMITH, N., (1992), *Contours of a spatialized politics: homeless vehicles and the production of geographical space*, Social Text 33 54–81;
SMITH, N., (2000) *Scale*, in Johnston, R.J., Gregory, D., Pratt, G., Watts, M., (eds) The dictionary of human geography 4th edn Blackwell, Oxford 724–7;
SMITH, N., (2004), *Scale bending and the fate of the national* in Sheppard, E., McMaster, R.B., (eds) Scale and geographic inquiry Blackwell, Malden MA 192–212;
SOJA, E., (1980), *The Socio-spatial Dialectic*. Annals of the Association of American Geographers, 70: 207–225;
STAEHELI, L., (1994), *Empowering political struggle: spaces and scales of resistance*, Political Geography 13 387–91;
TAYLOR, P., (2004), *Is there a Europe of cities? World cities and the limitations of geographical scale analysis* in Sheppard, E., McMaster, R.B., (eds) Scale and geographic inquiry Blackwell, Oxford 213–35;
WEBER, A., (1909), *Theory of the Location of Industries Translated by Friedrich, C.J. 1929*, University of Chicago Press, Chicago;
http://www.anticipotion.info/texte/rosen/anticipatorysystems rosen.pdf.

Submitted:	Revised:	Accepted:	Published online:
July, 19, 2011	July, 22, 2011	September 22, 2011	November 30, 2011