WHAT MEANS "BALANCE" IN THE CENTER-PERIPHERY MODEL

PAUL-RĂZVAN ŞERBAN[*]

The paper considers the issue of balance in models used to determine economic growth (regional growth). Several indicators on labor market and migration were selected and analyzed by the instrumentality of ANOVA and ArcView. How to propagate social and economic changes from one region to another (from center to periphery or in outlying regions), which factors underly the spread of these changes, how change occurs and which are the effects of polarized regional development on peripheral areas were questions that we tried to respond. The case study is about relationships between Bucharest and the rural area and the cities of surrounding regions.

Key words: uneven evolution, complexity theory.

1. Introduction

System's environment or landscape is changing due to modifications emerged in the system, resulting that system's evolution changes the landscape for other systems, transforming their possibilities and potential for development. One consequence of this is that the interaction among systems does not imply a sole direction of causality because of systems' modifications as a result of interaction (Walby, 2003). Complex systems do not respond to change in a smooth manner. Depending on the length of period for observation, a change in a trajectory can be interpreted as a change to a distinct path through a bifurcation point. (Sanders, Wegener, 1983, 1992). The components of systems are connected and causally inter-relates, but this deterministic evolution accumulate differential increases that cannot be indefinitely perpetuated. Those differences in evolution have spatial foundation, sending us to the centrality – favored location in relation to the others.

Complexity theorists see self-organization as a critical balance between order and chaos and, according to Potts (2000), in economics the degree of connection is essential for understanding the nature of this balance. An ordered

[*] University of Bucharest, Faculty of Geography, paulrazvanserban@yahoo.co.uk

system is defined as one with low connectivity. In such a system a change at the level of any component has a limited impact on the rest of the system which, as a whole, remains practically unchanged: low connection implies a high degree of order and a high degree of stability of the system. Complex systems do not evolve randomly but tend to converge towards a particular state, trajectory, shape, etc. One of the hypotheses which explain this reality is the anti-chaos theory formulated by Kauffman.

O'Sullivan provides a definition of complex systems based on their ability to self-organize. Thus, complex systems organize themselves, without direction from higher level, into emergent phenomena that are neither completely ordered nor completely random, but having a non-random structure, combined with sufficient unpredictability for novelty in themselves. The theory of self-organized criticality, formulated by Per Bak, explains the nonlinearity of evolution in time, the critical state of the system being that which amplifies small disturbances, creating avalanches of all sizes.

Bifurcations are mainly the exception in systems' evolution, the frequency of events of a certain magnitude is given by an inverse power law, concludes Per Bak (1996). These points of inflection, that have important consequences on the evolution of the economic system, are quite rare and have a low lasting influence, compared with periods that are included in the main trend. So, disorder and hazard master system only small periods of time and order and determination take long periods of time. Concerning systems' behavior at points of bifurcation there are two main streams: one supported by Allen, Engelen, Sanglier (1986), which give a great importance to random and fortune that are not deviations from the average of predictions, but new states of organization, new directions of evolution and another, oriented by Prigogine and Stengers' insights (1986), which grants a certain degree of probability for one "choice" of evolution's direction and another degree of probability for a different "choice", selection mechanisms not being totally random but asymmetric. Instead of a reality about the evolution of the process, the second direction supports an uncertainty about the further evolution, described by probability distributions. Whilst the initial conditions are known, at the point of bifurcation there are still many opportunities, but some ways are more likely than others. If until the bifurcation point complex systems behave deterministically from that point the evolution is probabilistic.

2. The Model

Using data indicators on labor market and migration we check how center-periphery model works and what the decision makers do in order to adapt to different external changes. Peripheral regions are half industrialized regions with small manufacturing industries that use low-level technologies. They are sparsely populated and resource-based industries dependent (population migrates to other regions in period of economic boom), while central region is dominated by services. The distribution of population, employees and migrants can be seen, statistically, in the following tables including frequencies of data intervals and cumulative weight on 2007-2009:

Table 1

Employees, 2007 and 2009

Bin	Frequency	Cumulative %	Bin	Frequency	Cumulative %
30	1	0.16%	30	1	0.16%
3829.75	578	95.39%	4140.458	579	95.55%
7629.5	13	97.53%	8250.917	13	97.69%
11429.25	4	98.19%	12361.38	3	98.19%
15229	1	98.35%	16471.83	2	98.52%
19028.75	3	98.85%	20582.29	3	99.01%
22828.5	3	99.34%	24692.75	3	99.51%
26628.25	1	99.51%	28803.21	0	99.51%
30428	0	99.51%	32913.67	0	99.51%
34227.75	0	99.51%	37024.13	0	99.51%
38027.5	0	99.51%	41134.58	0	99.51%
41827.25	0	99.51%	45245.04	1	99.67%
45627	0	99.51%	49355.5	0	99.67%
49426.75	1	99.67%	53465.96	0	99.67%
53226.5	0	99.67%	57576.42	0	99.67%
57026.25	0	99.67%	61686.88	0	99.67%
60826	0	99.67%	65797.33	0	99.67%
64625.75	0	99.67%	69907.79	0	99.67%
68425.5	0	99.67%	74018.25	1	99.84%
72225.25	0	99.67%	78128.71	0	99.84%
76025	1	99.84%	82239.17	0	99.84%
79824.75	0	99.84%	86349.63	0	99.84%
83624.5	0	99.84%	90460.08	0	99.84%
87424.25	0	99.84%	94570.54	0	99.84%
More	1	100.00%	More	1	100.00%

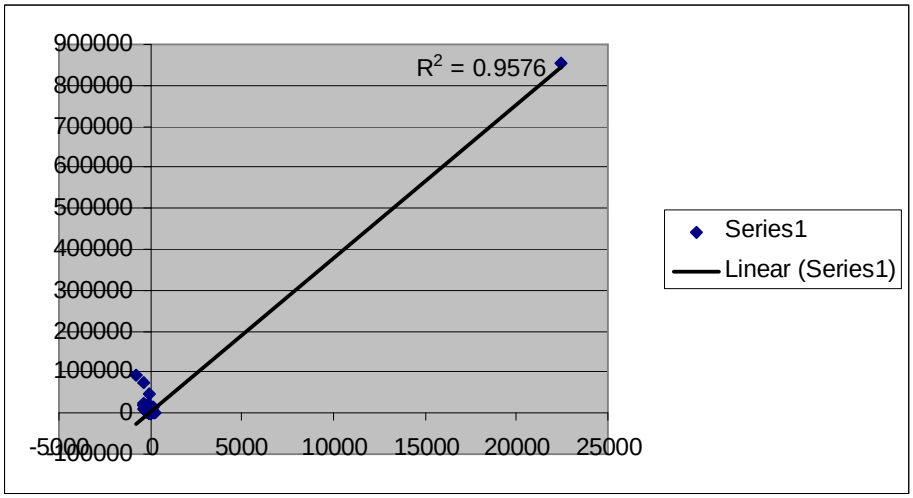
When we talk about complex systems we must consider their existence in time. It is in the intimate nature of complex systems to have some sort of memory of their past. Without memory systems might not be able to learn (the term "learning" having the meaning of process conducted by genetic algorithms – a memory that is activated when there are similar situations with those in the past) or to adapt to environmental changes and bring the complexity level that they have to the present. By incorporating the memory of its past in the future development, a difference between the random and complex system is made, the latter having as temporal reference the bifurcation which alters the trajectory of evolution.

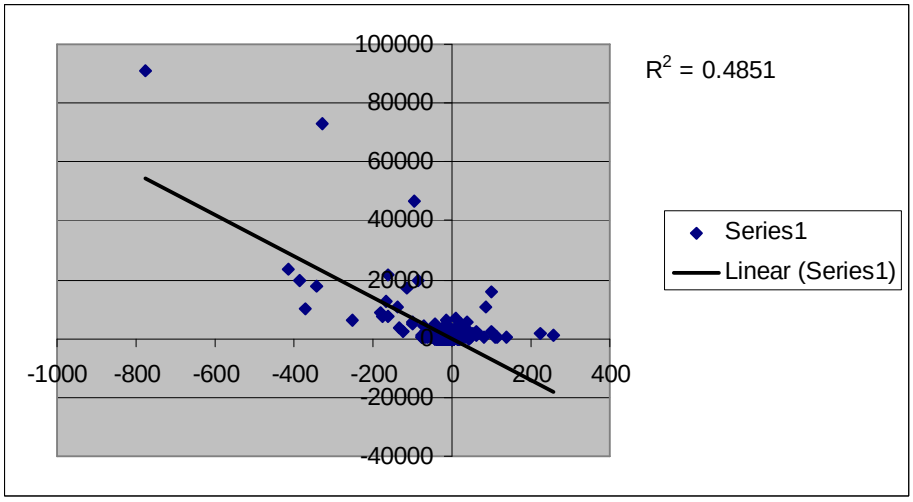
The notion of hysteresis has been raised to describe how external shocks may occur, changing economic structure (Cross, 1993, Katzner, 1993) leading to new insights into path dependency approach, agglomeration forces being self-enforcing. A transient high rate of unemployment, during a recession, can lead to a continuous high rate of unemployment due to loss of skills (or skills obsolescence) of unemployed, along with a deterioration in work attitudes. In other words, cyclical unemployment can lead to structural unemployment. The model of structural hysteresis of labor market differs from the one of prediction of a "natural" rate of unemployment or NAIRU, around which the "cyclical" unemployment is said to move without affecting the rate of "natural" itself.

It is incomprehensible that sudden changes occur in the relations and co-evolution of adaptive systems. Co-evolution, we are tempted to think, implies gradualism because of "history" of relations between systems. An explanation of the fact that small changes may have large effects on the systems is the instability of complex systems. A special type of representation of the evolution of complex systems is the design of several independent paths of development, a critical point in evolution being seen in the point where these paths diverge. (Kaufmann 1993, 1995)

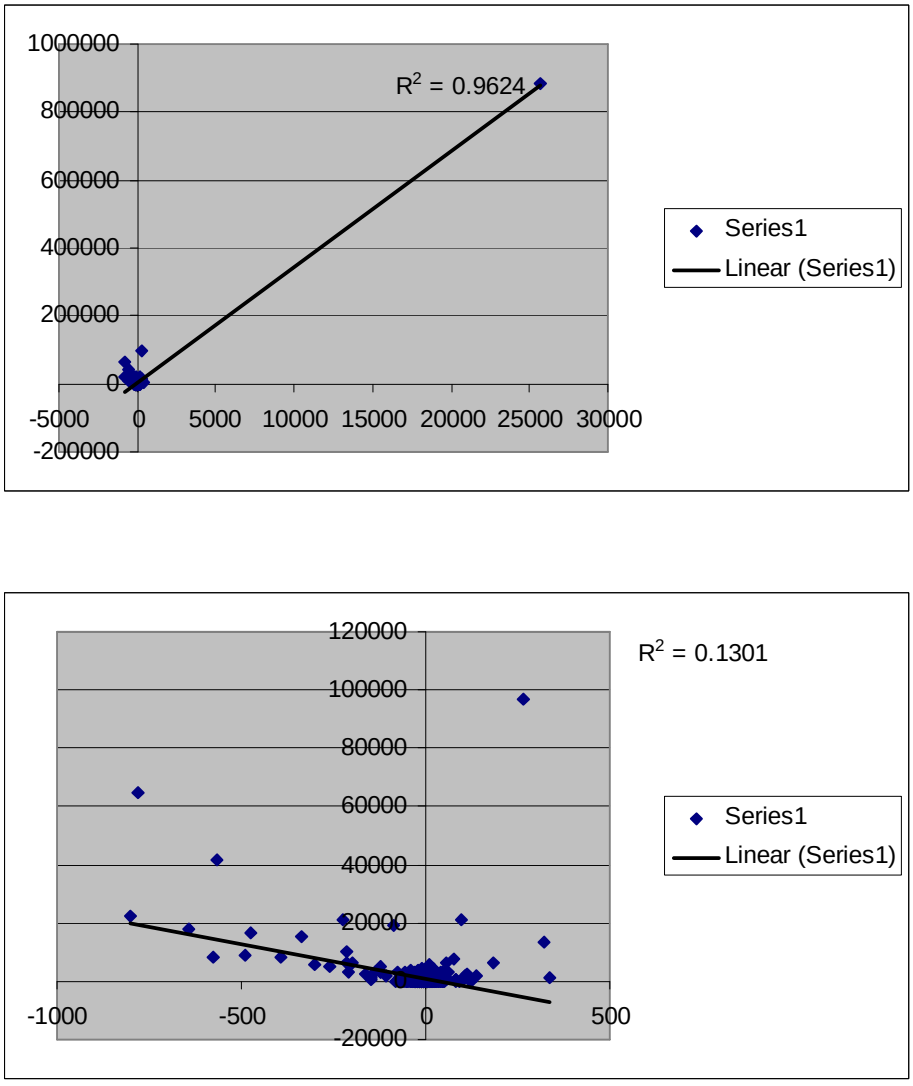
But bifurcations and evolution generally is strongly based on space, as Per Bak (1992) asserted, "in a <subcritical> state as changes in one part of the system have a sufficiently weak effect upon neighboring parts. In addition the state in different regions of the system is correlated only over short distances".

O'Sullivan remarks that geographical space configured and reconfigured systems over time. The space is uneven and there are cities which obviously attract economic flows. The polarizing role of Bucharest in migration of employees is stressed by the following graphs that plot regression lines and R squared in two cases: when data include (first) and when they do not include Bucharest (second).





Graph 1. The influence of migration on total employment (2007)



Graph 2. The influence of migration on total employment (2009)

Neighboring territories are connected with economic activity in the metropolis but, with the distance, influence is reduced. Duit (2008) considers that the bifurcation thresholds have the potential to produce enormous consequences for human welfare if they are flowing along the scale (eg, local-regional-global). Thresholds' probability is related to the degree of coupling between systems. The argument is that loosely coupled systems have more time to recover from failure and are therefore better able to amortize the potential thresholds, while tightly coupled systems do not allow for delay and therefore increase the risk of disturbances to magnify (Perrow, 1984).

The above affirmation translates into the following: depending on economic factors that led to an inflection point in economic development, spatial relationships can change the meaning of polarization in the weakening or disruption of the old and the emergence of others. The relational structure of the new spatial system holds "the traces" of the previous one and for a shorter or longer period of time (depending on the policies adopted and their radicalism) increases entropy.

The manner of acting on systems is based on the understanding of notion of scale in order to anticipate the ways of spreading the recession and the role to be played by decision makers in the self-organizing systems.

One of the meanings that has been acquired by the self-organization is the "systematic distribution by size" (Phillips, 1999) and the most obvious example from the geography of settlements is the distribution by size of cities (see Zipf, 1949), being an organization by mathematical laws, nonimposed by something or someone outside the system (O'Sullivan, 2004).

Complexity theory provides a good framework for Morcol, (2003) in solving a conceptual problem that has important implications for the theoretical division among sociologists and especially among public policy theorists. The question is whether participants in the network are interdependent actors or are constituted by the systems whose components are. This seemingly esoteric question has implications for ongoing paradigmatic debates between supporters and critics of rational choice.

What makes the city to be seen as a system far-from-equilibrium, creative state, is the dissipation resulting of parallel and overlapping plans. Planning parameters of the city emerge from planning activities which engage private and public actors. The plans of each actor, containing different configurations, compete and cooperate in a synergistic process until one wins and "masters" the rest (becomes the order-parameter of the plans). Activities will be mastered by the new order-parameters that will perpetuate. This is, in brief, the model of "parallel-distributed urban planning" achieved by Portugali (2000) from the theory of dissipative structures and stressing the properties of self-organization and emergence of complex systems (Morcol, 2003).

Decision makers resort to multicriteria analysis in order to determine the criticality of the criteria. They change a factor to see the effects. These criteria

are associated with weights of importance. Intuitively, one can think that the greater the weight of a criterion, the most critical the criterion should be. But it is not the case. It is important to distinguish here between the notion of critical and importance. Critical means that a criterion, with small changes in its weight, can produce a significant change in the final solution. There may be criteria with quite small weights of importance (for example, those which are not so important) to be more critical in a given situation than those with higher weights. (Triantaphyllou, E., A. Sanchez, 1997, Triantaphyllou, E., 2000)

Conclusions

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

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Invest in human resources!

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